



Strasbourg, 16.1.2018  
SWD(2018) 21 final

PART 1/2

**COMMISSION STAFF WORKING DOCUMENT**

**IMPACT ASSESSMENT**

*Accompanying the document*

**Proposal for a Directive of the European Parliament and of the Council on port reception facilities for the delivery of waste from ships, repealing Directive 2000/59/EC and amending Directive 2009/16/EC and Directive 2010/65/EU**

{COM(2018) 33 final} - {SWD(2018) 22 final}

## Table of Contents

<b>1. INTRODUCTION</b>	<b>3</b>
<b>1.1. Policy and legal context</b>	<b>3</b>
1.1.1. International context	3
1.1.2. EU Context	5
<b>1.2. Assessment and monitoring</b>	<b>9</b>
<b>2. PROBLEM ANALYSIS</b>	<b>10</b>
<b>2.1. Description of the main problems</b>	<b>10</b>
2.1.1. Main problem 1: Ship generated waste and cargo residues discharged at sea	10
2.1.2. Main problem 2: Administrative burden associated with the implementation of the PRF Directive	16
<b>2.2. The underlying problem drivers</b>	<b>19</b>
2.2.1. Problem driver 1: Inadequate reception and handling of waste by Port Reception Facilities	20
2.2.2. Problem driver 2: Insufficient cost incentives for the delivery of ship generated waste	23
2.2.3. Problem driver 3: Ineffective and insufficient enforcement of the mandatory delivery obligation	26
2.2.4. Problem driver 4: Inconsistent and outdated definitions and forms	28
2.2.5. Problem driver 5: Inconsistent application of exemptions for ships in scheduled traffic	29
<b>2.3. Most affected stakeholders</b>	<b>30</b>
<b>2.4. Evolution of the situation without EU legislative intervention (baseline scenario)</b>	<b>31</b>
2.4.1. Legal/policy developments	31
2.4.2. Economic and technological developments	33
<b>3. WHY SHOULD THE EU ACT?</b>	<b>34</b>
<b>4. OBJECTIVES: WHAT SHOULD BE ACHIEVED?</b>	<b>35</b>
<b>5. POLICY OPTIONS</b>	<b>36</b>
<b>5.1. Description of the retained policy measures</b>	<b>36</b>
<b>5.2. Discarded Policy measures</b>	<b>41</b>
5.2.1. Introduction of an EU discharge prohibition	41
5.2.2. Full alignment with the MARPOL Convention	42
5.2.3. Provide for a delivery exception in case port reception facilities are (temporarily) unavailable	42
5.2.4. Exempt smaller ports and marinas from the obligation to develop a Waste Reception and Handling Plan	43
5.2.5. Require fishing vessels and small recreational craft to submit an advance waste notification	44
<b>5.3. Description of the Policy options</b>	<b>44</b>
5.3.1. Policy option 1: Baseline scenario	45
5.3.2. Policy option 2: Minimum legislative revision of the PRF Directive	45
5.3.3. Policy option 3: MARPOL alignment	46

5.3.4.	Policy option 4: EU PRF Regime beyond MARPOL	47
5.3.5.	Policy option variants 3b and 4b: additional focus on marine litter	48
<b>6.</b>	<b>ANALYSIS OF IMPACTS</b>	<b>52</b>
<b>6.1.</b>	<b>Environmental impacts</b>	<b>52</b>
6.1.1.	Volume of waste discharged at sea and/or delivered in ports	53
6.1.2.	Circular economy	56
<b>6.2.</b>	<b>Economic impacts</b>	<b>57</b>
6.2.1.	Enforcement costs	57
6.2.2.	Compliance costs	58
6.2.3.	Administrative burden and simplification	61
6.2.4.	Business for port reception facility operators	63
6.2.5.	SMEs	64
6.2.6.	Innovation and competitiveness	65
6.2.7.	Third countries, foreign trade and investment	65
<b>6.3.</b>	<b>Social impacts</b>	<b>68</b>
6.3.1.	Employment	68
6.3.2.	Working conditions at sea	68
6.3.3.	Environmental awareness	68
<b>7.</b>	<b>COMPARISON OF THE POLICY OPTIONS</b>	<b>70</b>
<b>7.1.</b>	<b>Effectiveness, efficiency and coherence of the policy options</b>	<b>70</b>
<b>7.2.</b>	<b>Proportionality of the policy options</b>	<b>72</b>
<b>7.3.</b>	<b>Conclusion</b>	<b>74</b>
<b>8.</b>	<b>MONITORING AND EVALUATION</b>	<b>74</b>

## 1. INTRODUCTION

Operational discharges of waste from ships pose a significant threat to the marine environment. The provision of adequate facilities in ports for the reception of waste from ships is an essential precondition for any meaningful control of discharges at sea. Keeping waste on board ships is only feasible and meaningful when there are shore-based facilities to receive this waste.

For these reasons, the European Union introduced Directive 2000/59/EC, which requires the provision of Port Reception Facilities in EU ports, in line with international requirements. More than fifteen years after its entry into force, the Directive is in need of a legislative update and revision to make sure that it can still deliver on its original objectives of reducing waste discharges at sea.

This report builds on the outcome of the REFIT evaluation of this Directive, conducted in 2015, and assesses the options for its revision.

### 1.1. Policy and legal context

#### 1.1.1. *International context*

The MARPOL Convention (hereinafter: “MARPOL”)<sup>1</sup> is the main international convention for protecting the marine environment against vessel-source pollution. It is a combination of two treaties adopted in 1973 and 1978 respectively and updated by amendments through the years<sup>2</sup>. The Convention includes regulations aimed at preventing and minimizing pollution from ships - both accidental pollution and that from routine operations - and currently includes six technical Annexes, providing regulations for the prevention of pollution by **oil** (Annex I), by **noxious liquid substances** in bulk (Annex II), by **packaged harmful substances** (Annex III), by **sewage** from ships (Annex IV), by **garbage** from ships (Annex V) and the prevention of **air pollution** from ships (Annex VI).

The MARPOL Annexes contain general discharge prohibitions for these different waste streams, but also set out the norms and conditions under which certain types of waste can be legally discharged into the marine environment<sup>3</sup>. At the same time, MARPOL requires its contracting parties to provide for facilities in ports and terminals for the reception of the waste and residues from ships. These port reception facilities must be adequate, i.e. capable of receiving the types and quantities of waste from ships normally visiting the port where those facilities are located, without causing undue delay.

MARPOL has also recognised that some areas of the sea, especially enclosed or semi-enclosed seas (due to their oceanographic and ecological conditions and vessel traffic characteristics) are particularly vulnerable to vessel-source pollution and need a higher level of protection. The Convention therefore provides for the establishment of special areas where more stringent discharge standards apply<sup>4</sup>.

<sup>1</sup> International Convention for the Prevention of Pollution from Ships developed by the International Maritime Organisation (IMO); IMO Contracting Parties to the MARPOL Convention: 152 states, representing 99.2% of the world's tonnage. MARPOL has been ratified by all EU Member States.

<sup>2</sup> The amendments to MARPOL Annex IV (Resolution MEPC.200 (62), 2011) and Annex V (Resolution MEPC.201 (62), 2013), are the most relevant in the context of this Impact Assessment, as they introduced more stringent norms for the discharge of sewage and garbage.

<sup>3</sup> See Annex 6 for an overview of discharge norms for Annexes I, II, IV and V

<sup>4</sup> Special areas under MARPOL: Annex I (Mediterranean, Baltic sea, Black sea, Red Sea, Gulfs area, Gulf of Aden, Antarctic, N-W European waters, Oman area, South African waters); Annex II (Antarctic); Annex IV (Baltic sea); Annex V (Mediterranean, Baltic sea, Black sea, Red Sea, Gulfs area, North Sea, Antarctic, Wider Caribbean); Annex VI (Baltic sea, North Sea, North American ECA; US Caribbean sea); see: <http://www.imo.org/en/OurWork/Environment/SpecialAreasUnderMARPOL/Pages/Default.aspx>

To enhance the smooth implementation and uniform application of the discharge prohibitions and related waste delivery process, a standard Advance Notification Form was developed by the International Maritime Organisation ("IMO"), as well as a standard Waste Delivery Notification Form to provide for uniform records throughout the world. However, both forms are not mandatory and contracting parties remain free not to require any reporting or to use a different form. In addition, the IMO has developed the "guide of good practice on port reception facility providers and users", which provides guidance and easy reference to good practices related to the use and provision of port reception facilities as well as a list of applicable regulations and guidelines<sup>5</sup>. In April 2014, the Consolidated guidance for port reception facility providers and users was adopted, which integrates in a single document the Guide to good practice for port reception facility providers and users, as well as four other circulars related to port reception facilities, including the standard reporting forms<sup>6</sup>.

As mentioned above, the Convention has undergone a series of amendments over the years, which have made the framework more comprehensive, in terms of its coverage, as well the discharge norms which have become more stringent. The most relevant amendments in relation to the PRF Directive have been included in the table below, with a more extensive overview included in Annex 6 to this Report of the amendments to the Convention and its Annexes since the year 2000.

**Table 1: Amendments to MARPOL**

	Adopted		Effective	Amendments
2004	Res.MEPC .115(51)	01.Apr. 2004	01.Aug.200 5	Revision of Annex IV: More stringent discharge norms for sewage, and requirements for on board sewage treatment / sewage holding tank.
	Res.MEPC .117(52)	15.Oct. 2004	01.Jan.2007	Revision of Annex I: phasing out single-hull tankers, and tightening the construction, equipment & operational standards
	Res.MEPC .118(52)	15.Oct. 2004	01.Jan.2007	Revision of Annex II: new four-category categorization system for noxious and liquid substances
2006	Res.MEPC .141(54)	24.Mar. .2006	01.Aug.200 7	Revision Annex I: new regulation on oil fuel tank protection and a definition of "heavy grade oil".
2008	Res.MEPC .176(58)	10.Oct. 2008	01.Jul.2010	Revision of Annex VI: more stringent regulations on harmful emissions from ships
2009	Res.MEPC .187(59)	17.Jul. 2009	01.Jan.2011	Revision Annex I: requirements relating to the on board management of oil residue (sludge). New definitions for oil residue, oil residue tanks, oily bilge water and holding tanks.
2011	Res.MEPC .200(62)	15 July 2011	01.Jan.2013	Annex IV: designation of the Baltic Sea as Special Area under Annex IV; special area provisions
	Res.MEPC .201(62)	15.Jul. 2011	01.Jan.2013	Revision Annex V: updating of definitions; inclusion of a new general prohibition on the discharge of garbage.

<sup>5</sup> MEPC.1/Circ.671/Rev.1

<sup>6</sup> Circular [MEPC.1/Circ.834](#), adopted at the 66th meeting of the Marine Environment Protection Committee, April 2014

2016	Res.MEPC .270(69)	22.Apr. 2016	01.Sep.201 7	Revision Annex II: revised GESAMP Hazard Evaluation Procedure. Guidelines for the categorization of noxious liquid substances.
	Res.MEPC .274(69)	22.Apr. 2016	01.Sep.201 7	Revision Annex IV: Baltic Sea Special Area, discharge of sewage and form of ISPP Certificate.
	Res.MEPC .277(70)	28.Oct. 2016	01.Mar.201 8	Revision Annex V: discharge of substances that are harmful to the marine environment (HME substances) and Form of Garbage Record Book.
	Res.MEPC .280(70)	28.Oct. 2016	01.01.2020	Annex VI: Implementation of the fuel oil standard in regulation 14.13 (sulphur content of fuel oil)

### 1.1.2. EU Context

Directive 2000/59/EC on port reception facilities for ship generated waste and cargo residues aims "to reduce the discharges of ship generated waste and cargo residues into the sea, especially illegal discharges from ships using ports in the EU, by improving the availability and use of port reception facilities" (Article 1). The Directive has a transport legal basis (article 100(2) TFEU) and is designed to harmonise conditions and rules in the maritime transport sector. At the same time, the Directive is instrumental in greening maritime traffic, as defined in the Commission Communication on the EU maritime transport policy until 2018<sup>7</sup>, and in reducing marine litter from sea-based sources in line with the commitments made by the EU<sup>8</sup>.

The Directive was adopted to implement and strengthen the implementation of the MARPOL Convention in the following ways:

(i) The Directive is based on the international norms provided by MARPOL and its Annexes. It seeks to implement the MARPOL obligations into EU law. Ship generated waste in the Directive has been defined in relation to waste falling under the scope of Annexes I, IV and V of MARPOL. Cargo residues have been defined as remnants of cargo material remaining after unloading and cleaning operations, which also include tank washings covered by MARPOL Annexes I and II.

(ii) The Directive strengthens the regime established under MARPOL through a **port-based approach**: while MARPOL focuses on operational discharges at sea, the Directive focuses on operations in port. The Directive also has a wider scope than MARPOL, as it applies to all ships, as well as all EU ports visited by these ships, from large commercial ports to small marinas. In this context, it is also worth noting that the provision of waste reception facilities in ports qualifies as a service that a port provides to its users, as defined in the new Ports Regulation<sup>9</sup>, establishing a framework for the provision of port services and common rules on the financial transparency of ports.

The reasons for adopting this port approach in the Directive are pragmatic, policy-based and, importantly, legal. It is generally accepted that the main problems in international regime for operational ship-source pollution are not related to insufficient standards, but rather to the

<sup>7</sup> COM(2009)8 "Strategic goals and recommendations for the EU's maritime transport policy until 2018"

<sup>8</sup> Rio+20 conference and implementation of Sustainable Development Goals

<sup>9</sup> Regulation (EU) 2017/352 of the European Parliament and of the Council of 15 February 2017 establishing a framework for the provision of port services and common rules on the financial transparency of ports (OJ L57, 3.3.2017, p. 1)

inadequacy of their implementation and enforcement. Striving for a harmonised implementation of internationally agreed rules, where necessary complemented by specific EU requirements, is one of the fundamental pillars of EU maritime safety policy. The United Nations Convention for the Law of the Sea ("UNCLOS") provides wide jurisdiction for states to prescribe and enforce rules while ships are voluntarily present in their ports, while there are considerable constraints to do so in the coastal jurisdictional zones. UNCLOS also stipulates the fundamental principle of "avoiding undue delay to ships" which is incorporated both in the MARPOL Convention and the Directive. Hence, the Directive aims at administrative burden reduction to safeguard efficiency of maritime operations in ports. If coastal Member States were only to rely on MARPOL, they would be struggling with the implementation and enforcement of discharge rules for ships in their coastal waters. It would be even more difficult to implement those rules outside the jurisdiction of the Member States, at the high seas.

In order to achieve a proper implementation and enforcement of the general MARPOL provisions, the Directive provides a **number of additional instruments and requirements** for both ports and port users:

- Development of Waste Reception and Handling Plans in ports; these plans should provide a description of the waste reception facilities available in the port, as well as the port's waste management process.
- Advance Waste Notification by ships before their entry into port; ships are required to report on the waste they intend to deliver in the next port of call, the waste delivered in the previous port, as well as the remaining storage capacity until the next port of delivery. The reporting of information on (intended) waste delivery from the ship to the ports is a key element for effective planning of waste management and monitoring mandatory delivery. The notification also lies at the basis of the calculation of on board storage capacity, on the basis of which the ship may be allowed to depart from port without delivering the waste but keeping it on board until the next point of delivery.
- Payment of fees by ships for the reception of their ship-generated waste (based on the "polluter pays principle"); Member States are required to set up cost recovery systems in their ports to ensure that the costs of reception and treatment of ship-generated waste is covered through the collection of a fee from ships, and that part of that fee is charged irrespective of delivery ("indirect fee") so that no incentive is created for the ship to discharge its waste at sea.
- Exemptions for ships engaged in scheduled traffic with frequent and regular port calls; to safeguard the smooth operation of maritime transport and avoid undue burden, ships in scheduled and regular traffic may be exempted in a port from waste notification, delivery of waste, and payment of the fee, provided there is sufficient evidence of an arrangement in place for delivery and payment in a port along the ship's route.
- Inspections to verify that ships comply with the delivery requirements; based on the information reported through the advance waste notification, ships shall be selected for inspection. Irrespective of the inspection framework, a 25% annual inspection target shall be applied.
- Development of the common information and monitoring system in order to improve the identification of ships which have not delivered their waste in accordance with the Directive, and to ascertain whether the goals of the Directive have been met.

These key elements seek to ensure that EU ports provide for adequate port reception facilities, as established by the waste reception and handling plans, and to ensure that all ships deliver



their ship-generated waste and cargo residues to those facilities before departure. In conclusion, the Directive builds on the obligations which Member States have already accepted under MARPOL, but goes further by addressing in detail the legal, financial and practical responsibilities. The following table shows the main parallels between MARPOL and the PRF Directive, clearly indicating which elements are mandatory under both instruments and which are the additional requirements under the Directive, giving effect to the general international norms as well as the voluntary guidance and forms developed under MARPOL.

**Table 2: Comparison MARPOL and the PRF Directive**

	MARPOL <sup>10</sup>	EU legislation (Directive 2000/59/EC)
<b>Scope</b>	<p>Ships entitled to fly the flag of a party to the Convention; the Convention does <u>not</u> apply to any warship, naval auxiliary, or other ship owned or operated by a state and used on a government non-commercial basis.</p> <p>"A ship means a vessel of any type operating in the marine environment..."</p>	<p><b>Article 3:</b> "(a) All ships, including fishing vessels and recreational craft, irrespective of their flag, calling at, or operating within a port of a MS, with the exception of any warship, naval auxiliary or other ship owned or operated by a State, and ..used only on government non-commercial service; (b) All ports of the MS normally visited by ships falling under the scope of (a)."</p> <p><b>Article 2(a):</b> "Ship shall mean a seagoing vessel of any type whatsoever operating in the marine environment...";</p> <p><b>Article 2(c):</b> Ship generated waste shall mean all waste including sewage and residues other than cargo residues which...fall under the scope of Annexes I, IV and V to MARPOL;</p> <p><b>Article 2(d):</b> cargo residues shall mean the remnants of any cargo material on board which remain after unloading and cleaning operations".</p>
<b>Requirements for provision of adequate PRF</b>	<p>Annex I – Reg. 38 (oily waste)</p> <p>Annex II – Reg. 18 (Noxious Liquid Substances)</p> <p>Annex IV – Reg. 12 (sewage)</p> <p>Annex V – Reg. 8 (garbage, including fishing gear)</p> <p>Annex VI – Reg. 17 (waste from exhaust gas cleaning systems/ODS)</p>	<p><b>Article 4:</b> "MS shall ensure the availability of PRF that are adequate to meet the needs of the ships normally using the port without causing undue delay to ships".</p>
	<i>IMO Consolidated Guidance for PRF providers and users: recommendation for the preparation of a Port Waste management Plan</i>	<b>Article 5:</b> Waste Reception and Handling Plans (WRH Plans)
	<i>IMO Consolidated Guidance, Appendix 4, MEPC.1/Circ.834: waste reception facility reporting requirements for flag states</i>	<b>Annex I:</b> requirements for WRH Plans
	<i>MO Consolidated Guidance, Appendix</i>	<b>Article 4(3):</b> Complain procedure on alleged

<sup>10</sup> Parts in italics refer to non-mandatory elements



	<i>1, MEPC.1/Circ.834:Format for reporting alleged inadequacies of PRF</i>	inadequacies, in line with the procedures agreed by IMO.
<b>Discharge prohibitions and norms / delivery obligation</b>	General prohibition, but discharges allowed under certain conditions as specified in the Annexes: Annex I: oily bilge water, oily residues, other Annex II: NLS Annex IV: sewage Annex V: garbage Annex VI: waste from EGCS / ODS	<b>Article 7 (1):</b> "The master of a ship calling at an EU port shall, before leaving the port, deliver all ship generated waste to a port reception facility." <b>Article 7(2):</b> ..a ship may proceed without delivering its waste...if it follows from the information submitted.., that there is sufficient dedicated storage capacity on board.. " <b>Article 10:</b> Cargo residues shall be delivered to PRF in accordance with the provisions of MARPOL.
<b>Reporting of waste information</b>	<i>IMO Consolidated Guidance for PRF providers and users, including IMO Circular 834: standard format for the waste notification and waste receipt</i>	<b>Article 6(1):</b> The master of a ship, other than a fishing vessels or recreational craft authorised to carry no more than 12 passengers, shall complete the form in Annex II and notify the information before calling in a port.
<b>Cost Recovery Systems</b>	<i>IMO Guidelines on adequacy of PRF (Resolution MEPC.83(44): "Fees should not be unreasonably high so as to deter the use of the facilities"</i>	<b>Article 8.1:</b> "MS shall ensure that the costs of PRF shall be covered through the collection of a fee from ships". <b>Article 8.2:</b> "the CRS shall provide no incentive to discharge waste at sea..." (a) all ships (apart from fishing vessels and recreational craft < 12 passengers) shall contribute significantly to the costs of the facilities, irrespective of actual use of the facilities (indirect fee)
<b>Separate collection of waste from ships</b>	<i>On Board: ISO 21070: Management and Handling of Shipboard Garbage 2012 Guidelines for the implementation of MARPOL Annex V, MEPC.219(63) as amended</i>	<i>In EU ports/municipalities: Articles 10 and 11 of the <b>Waste Framework Directive</b> ("...where this is technically, environmentally and economically practicable").</i>
<b>Monitoring and Enforcement</b>	<i>PMOU, Port State Control: control of MARPOL documentation and discharge norms</i>  <i>Port Reception Facilities Database (GISIS)</i>	<b>Article 11(1):</b> MS shall ensure that any ship may be subject to an inspection in order to verify it complies with article 7 and 11 of the Directive; <b>Article 11(2b):</b> Inspections may be undertaken within the framework of the PSC Directive; whatever the framework.., 25% inspection requirement shall apply; <b>Article 11(3):</b> MS shall establish control procedures to the extent required for fishing vessels and recreational craft < 12 passengers.., to ensure compliance with the requirements of the Directive; <b>Article 12(3):</b> establishment of EU information and monitoring system

The Directive also bears strong links to EU environmental legislation, especially in the area of waste management and protection of the marine environment:

- The Directive specifies in article 2 that ship-generated and cargo residues shall be considered to be waste within the meaning of the **Waste Framework Directive** (Directive 2008/98/EC). Furthermore, article 12(g) of the Directive requires MS to ensure that the treatment, recovery or disposal of ship generated waste and cargo residues is carried out in accordance with the relevant waste legislation, in particular the Waste Framework Directive<sup>11</sup>. One of the fundamental elements of this Directive is the introduction of the “**waste hierarchy**” (article 4), which provides the order of preference as regards waste management operations, with waste prevention given the highest priority, followed by preparation for re-use, recycling, other recovery (such as incineration), and disposal at the bottom of the hierarchy. In addition, the Waste Framework Directive imposes a general requirement for providing separate collection in Member States. Another key element is the “**polluter pays principle**”, which has also been incorporated in the PRF Directive’s provision on cost recovery systems for ship generated waste.
- The Directive also links closely to the **Marine Strategy Framework Directive**<sup>12</sup>, which has as its main objective to achieve Good Environmental Status of EU Marine Waters by 2020, in order to protect not only the marine environment, but also related economic and social activities. Under the Marine Strategy Framework Directive monitoring tools have been defined to evaluate progress towards the environmental targets, as well as a set of indicators for monitoring “good environmental status” of the four main European Sea regions<sup>13</sup>, including levels of contaminants, eutrophication and marine litter. In its recently adopted **Circular Economy Strategy**<sup>14</sup>, the Commission has set a target of 30% reduction of marine litter found on beaches and lost fishing gear found at sea by 2020. The marine litter waste categories coincide with the definition of garbage in MARPOL Annex V, and are covered by the definition of ship generated waste in the Port Reception Facilities Directive. The latter can thus make a direct and significant contribution to the reduction of the marine litter generated by ships.

## 1.2. Assessment and monitoring

The Commission has assessed the implementation and effectiveness of the Port Reception Facilities Directive over time. In a first phase, implementation reports were received from all Member States<sup>15</sup>. Subsequently, several workshops and discussions were organised with stakeholders, and the European Maritime Safety Agency (EMSA)<sup>16</sup> prepared a horizontal assessment report following a number of visits to Member States to verify the correct implementation of the Directive<sup>17</sup>.

In 2014, the Commission decided to undertake a REFIT Evaluation of the PRF Directive and to that end launched an evaluation study, which was completed in May 2015<sup>18</sup>. The evaluation

<sup>11</sup> The Waste Framework Directive is currently being revised, with more ambitious recycling targets proposed by the Commission, COM(2015)0595 amending Directive 2008/98/EC on waste, 2.12.2015

<sup>12</sup> Directive 2008/56/EC establishing a framework for community action in the field of marine environmental policy (O.J. L164/19, 25.6.2008)

<sup>13</sup> Baltic, North East Atlantic, Mediterranean and the Black Sea

<sup>14</sup> Commission Communication "Towards a circular economy: a zero waste programme for Europe", COM(2014)398fin

<sup>15</sup> Status reports on the implementation of Directive 2000/59/EC, which were submitted by Member States in 2006

<sup>16</sup> Workshop reports can be found at: <http://www.emsa.europa.eu/implementation-tasks/environment/port-waste-reception-facilities.html>

<sup>17</sup> Horizontal Assessment Report – Port Reception Facilities Directive (Directive 2000/59/EC), EMSA, 2010  
<http://ec.europa.eu/transport/modes/maritime/consultations/doc/prf/emsa-report.pdf>

<sup>18</sup> Ex-post evaluation of Directive 2000/59/EC on port reception facilities for ship-generated waste and cargo residues, final report (Panteia/PwC, May 2015), available at:

addressed questions on the relevance, effectiveness, efficiency, European added value and coherence of the PRF Directive. The main findings from the Evaluation have been described by the Commission in an Evaluation Report<sup>19</sup>, and can be summarised thus:

- The Directive has been **relevant** to achieving the objective of reducing waste discharges at sea, and has had clear **EU added value**, by providing for an EU common approach to the effective implementation and enforcement of the MARPOL requirements.
- The Directive has only been partially **effective and efficient**. Its effectiveness has been evidenced by higher volumes of ship generated waste being delivered to EU ports since the implementation of the Directive (see Annex 5 – waste volumes). This is mainly due to differences in interpretation of its scope and implementation of the main obligations in the Directive, in particular as regards the provision of adequate facilities (including the development of the waste reception and handling plans), the design and operation of the cost recovery systems, the use of the advance waste notification form and enforcement of the mandatory delivery.
- The Directive is only **partially coherent**, as key principles of EU waste legislation have not been properly implemented in ports, and significant changes to the international legal framework in recent years have not been reflected.
- The lack of systematic recording of waste delivered in port and the insufficient exchange of information between Member States have hampered an effective monitoring and enforcement of the Directive, and have resulted in significant data gaps on waste streams in port.

These findings have also provided the basis of the problem definition set out in the current Impact Assessment Report.

## 2. PROBLEM ANALYSIS

### 2.1. Description of the main problems

#### 2.1.1. *Main problem 1: Ship generated waste and cargo residues discharged at sea*

*A significant part of marine litter (garbage) at sea originates from sea-based sources<sup>20</sup>. Other waste streams, such as oily waste and sewage, also continue to be discharged at sea in contravention of existing delivery requirements.*

The **ex-post evaluation** of the Directive established that the delivery of ship-generated waste and cargo residues to port reception facilities has increased since the adoption of the Directive. However, trends are uneven between the different waste categories, and for some of these categories a significant amount of waste continues to be discharged at sea.

Quantification of the waste discharged at sea is difficult in the absence of direct data available. To provide for the best estimate of what is (potentially) discharged at sea, an alternative approach has been developed for this Impact Assessment: a “**waste gap**” has been calculated for all waste types, which is defined as the gap between the waste expected to be

---

<http://ec.europa.eu/transport/modes/maritime/studies/doc/2015-ex-post-evaluation-of-dir-2000-59-ec.pdf>

<sup>19</sup> REFIT Evaluation of Directive 2000/59/EC, COM(2016)168 final (31.03.2016)

<sup>20</sup> Literature generally distinguishes sea-based sources of marine litter from the land-based sources. Besides ships, sea-based sources of marine litter also include off-shore platforms, and marine aquaculture. However, in the context of this Impact Assessment only ships are considered where reference is being made to sea-based sources of marine litter

generated on board of the ship (and the part expected to be delivered in ports), and the waste actually delivered in ports, based on waste delivery data available. This approach has been implemented by using:

- (i) The so-called **MARWAS model**<sup>21</sup>. This model is focused on *merchant and passenger ships*, and has made calculations of the waste gap for **oily waste and sewage**;
- (i) Existing reports and literature<sup>22</sup>, which provide for the calculation of the waste gap for **garbage** from *all types of ships*, including fishing vessels and recreational craft.

A detailed **analysis of waste volumes** is provided in Annex 5.

#### Assessment of the waste gap/potential discharges:

There are no indications that the amount of garbage from ships (marine litter) has decreased in recent years. Time series of marine litter on European shores indicate that the problem has persisted since the implementation of the Directive. Although land-based sources are dominant in generating marine litter, sea-based sources actively contribute to the problem with an estimated EU average of 32% and values up to 50% for some sea basins<sup>23</sup>. Recent studies have also indicated that among the sea-based contributors to the problem of marine litter, the fishing sector features quite dominantly, with the recreational sector also taking a significant share<sup>24</sup>. Although garbage delivered in ports has increased since the introduction of the Directive, a significant delivery gap remains, estimated between 60,000 and 300,000 tonnes, i.e. 7% to 34% of the total to be delivered annually.

The illegal discharge of **oily waste** into the sea has substantially decreased over time, as also evidenced by aerial surveillance data on oil spills detected in surface water<sup>25</sup>. Notwithstanding the apparent progress in delivery, some oily waste that should be delivered in EU ports is not, indicating potential discharges into sea, causing harm to the marine environment. The gap between oily waste generated and treated versus the waste delivered in ports is estimated at 31,000 m<sup>3</sup>, representing 2.5% of the total volumes to be delivered annually.

Regarding the **sewage** that originates from merchant shipping that is to be delivered to port, it is estimated that approximately 10% of the sewage that should be delivered on land is not received by port reception facilities (and thus potentially discharged illegally), corresponding to a possible waste gap for sewage of 136,000 m<sup>3</sup>

Available data on waste deliveries show that after a three-year decrease in volumes delivered, a slight increase has been recorded since 2008 (see graph). However, lack of registration of delivered sewage and insufficient knowledge of on-board treatment and mixing with grey water on board, reduce transparency of the data on sewage deliveries. As regards the recreational and fisheries sectors, while volumes of sewage generated are similar to those for the merchant sector, no data on delivery are presently available to determine whether there is

---

<sup>21</sup> The MARWAS model, which was developed and applied in the context of the IA support study (Ecorys, 2016), has calculated volumes of waste generation on board of vessels, and estimates of expected waste delivery volumes for a list of 29 ports, which together represent 35% of the throughput of all EU merchant ports, and are located across the EU. These volumes were compared to waste delivery data obtained from the same ports included in the list. For an explanation see Annex 4

<sup>22</sup> In particular the European Commission (DG ENV) study “to support the development of measures to combat a range of marine litter resources” (Eunomia, 2016), which has analysed the issue of marine litter from sea-based sources (see p.101 Figure 24. Delivery Gap).

<sup>23</sup> Eunomia (2016), p. 74

<sup>24</sup> <http://www.fishingforlitter.org.uk/assets/file/Report%20FFL%202011%20-%202014.pdf>; Marine Pollution Bulletin 2016 Unger et al. (2016); UNEP OSPAR (2009); Marine Litter Distribution and Density in European Seas (2014); Eunomia (2016), p.95, 30% estimate share for the fishing sector, and 19% for the recreational sector; the balance of sea-based sources is provided by the merchant sector; Arcadis (2012) has estimated a share of 65% share for the fishing sector alone

<sup>25</sup> EMSA (2014) CleanSeaNet; Bonn Agreement (2012)

a similar waste gap. However, based on available sources, estimations point to a possible waste gap for sewage representing 10% of the total volumes to be delivered annually.

Other waste categories are at present not as problematic, but may become an issue in the future. Current volumes of **Annex VI waste**, which includes the sludge from exhaust gas cleaning systems (also referred to as “scrubbers”) as well as the bleed-off water from these systems, are limited, as there are only a small number of ships that have installed scrubbers on board<sup>26</sup>. Future developments, such as special areas being designated under MARPOL<sup>27</sup> and increasing oil prices, may lead to an increased use of these systems on board to meet more stringent sulphur emission norms. A higher uptake of scrubbers will result in more sludge and bleed-off water being generated. As no waste delivery data is currently available, it has not been possible to calculate the waste gap for this type of waste.

Cargo residues are normally a matter for the terminals operating within a port and the shippers to handle, without direct involvement of the port. For that reason data on **cargo residues** is limited and a delivery/waste gap could not be calculated for this type of waste. As cargo residues have an embedded value and delivery implies revenues instead of costs, it is generally considered that this constitutes a sufficient incentive to deliver cargo residues on shore, instead of discharging the residues at sea. Nonetheless, volatile commodity market prices affect their delivery, which is currently the case for oily residues due to the low oil prices. In addition, it may be very expensive to deliver cargo residues containing noxious liquid substances to PRF due to high treatment costs<sup>28</sup>.

Discharges of ship-generated waste and cargo residues negatively affect the marine environment, causing damage to marine ecosystems and resources. In this context, it is worth highlighting the overall costs at EU level associated with ship-source pollution, in particular oil (based on estimates of oil spill clean-up) and garbage (based on available estimates of beach clean-up costs and damage to the fisheries sector):

- Cost of shoreline clean-up of oil spills: between **9,000€ and 49,000€** per tonne of oil spilled<sup>29</sup>
- Beach clean-up costs (marine litter): approximately **297 million euro** annually<sup>30</sup>.
- Damage to fishermen (marine litter): estimates range from 1% of the total revenue generated by the EU fleet in 2010<sup>31</sup> to 5% of revenue<sup>32</sup>, i.e. **between €60 million and €300 million per year**. The damage is caused through fouling of propellers, blocked intake pipes and valves, snagging of nets, silting of cod ends and contamination of catch.

---

<sup>26</sup> The report from the ESSF Scrubber Subgroup on waste from scrubbers (September 2016) refers to a total of 400 scrubbers having been sold to date. Sludge and bleed-off water are mostly generated by scrubbers operating in closed-loop mode

<sup>27</sup> Recent changes to MARPOL Annex VI include a progressive global reduction in emissions of SO<sub>x</sub>, NO<sub>x</sub> and particulate matter and the introduction of emission control areas (ECAs) to reduce emissions of those air pollutants further in designated sea areas. Furthermore, the global sulphur cap will be reduced from current 3.50% to 0.50%, effective from 1 January 2020, subject to a feasibility review to be completed no later than 2018

<sup>28</sup> Concerns over high prices for the delivery of hazardous cargo residues and/or non-availability of PRF adequate to receive these residues have been voiced at several occasions in the context of the ESSF PRF Subgroup

<sup>29</sup> Etkin, D.S. (2001). Methodologies for Estimating Shoreline Clean-up Costs clean-up costs per tonne of oil spilled for the Erika, Prestige and Alfa I incidents, 1999-2012. However, it should be noted that the clean-up costs for operational discharges of oil will not be at the same level as the costs for clean-up operations in response to large accidental oil spills, as assessed in the study

<sup>30</sup> Ex-post evaluation (Panteia, 2015), p.74-75; Although estimated costs for beach clean-up operations also concern marine litter from land-based sources, the average removal cost of a cubic metre of garbage from the beach will not be substantially different for litter from sea-based sources. The removal cost was estimated at 673 euro p/m<sup>3</sup> of garbage

<sup>31</sup> JRC Technical Report: Harm caused by Marine Litter, 2016, p.40

<sup>32</sup> Newman, S. et al(2015), p.373

These figures help provide an order of magnitude of the costs associated to marine pollution. Although it should be acknowledged that there are many different methods in environmental economics on how to monetize these effects, the above mentioned cost figures indicate that the environmental costs are significant, so that even with a minimal reduction of discharges at sea significant benefits can be achieved.



**Table 3: Amount of ship-generated waste generated and delivered annually, and the resulting "waste gap"**

	Annex I - oily waste		Annex IV - sewage		Annex V - garbage		Annex VI -scrubber waste
	Merchant shipping	All, including fishing and recreational craft	Merchant shipping	All, including fishing and recreational craft	Merchant shipping	All, including fishing and recreational craft	All (only applicable for merchant shipping)
Waste to be delivered (after treatment and legal discharge <sup>33</sup> )	1,226,000 m <sup>3</sup>	1,290,000 m <sup>3</sup> Merchant: 1,226,000 m <sup>3</sup> Fishing vessels: 55,000 m <sup>3</sup> Recreational craft: 9,000 m <sup>3</sup>	1,362,000 m <sup>3</sup>	2,312,000 m <sup>3</sup> / 2,562,000 m <sup>3</sup> Merchant: 1,362,000m <sup>3</sup> Fishing vessels: 500,000 / 750,000 m <sup>3</sup> Recreational craft: 450,000 m <sup>3</sup>	434,000 tonnes <sup>34</sup>	881,000 tonnes Merchant: 434,000 tonnes Fishing vessels: 266,000 tonnes Recreational craft: 171,000 tonnes <sup>35</sup>	24,000m <sup>3</sup> sludge 360,000 m <sup>3</sup> bleed-off  (generated by scrubbers operating in closed-loop mode, i.e. 5% of 400)
Actually delivered (4)	1,195,000 m <sup>3</sup>	<i>Unknown, as waste delivery data for fishing ports and marinas are unknown</i>	1,226,000 m <sup>3</sup>	<i>Unknown, as waste delivery data for fishing ports and marinas are unknown</i>	Range from 286,000 to 404,000 tonnes <sup>36</sup>	Range from 580,000 to 820,000 tonnes	<i>Unknown</i>
Delivery gap (3) – (4)	<b>31,000 m<sup>3</sup> (2.5%)</b>	Unknown, but consisting of 31,000 m <sup>3</sup> caused by merchant shipping and a contribution from fishing vessels and recreational craft from 0 to 64,000 m <sup>3</sup>	<b>136,000 m<sup>3</sup> (10%)</b>	<i>Unknown</i>	<b>Between 30,000-148,000 tonnes (7-34%)</b>	<b>Between 60,000-300,000 tonnes (7-34%)</b>	<i>Unknown</i>

Source: MARWAS (Annex I-IV waste); Annex V waste estimates are based on Eunomia (2016)

<sup>33</sup> The models applied have accounted for the waste that is treated on board and/or legally discharged under MARPOL to avoid overestimating the gap between generation and delivery; detailed estimates are provided in Annex 5 (total waste volumes and illegal discharges)

<sup>34</sup> Based on data from Eunomia (2015), including the identified sectors: shipping; cruises; and passenger

<sup>35</sup> The balance of waste generated (10,000 tons) is created by navy

<sup>36</sup> To get insight in the delivery data of the merchant sector, the total delivered waste volumes are applied to the share of waste produced by merchant shipping (thus considering a common garbage delivery pattern per sector)



### *Environmental Vulnerability Assessment:*

In order to gain a deeper understanding of the actual environmental impact of the waste being (potentially) discharged at sea, the impact of waste volumes has to be considered in the context of the **vulnerability of the marine environment** to the different categories of waste, recognising that different waste types have different effects and levels of impact on marine ecosystems. To this end, a vulnerability assessment has been done per sea basin (Mediterranean sea, Black sea, Baltic sea and East Atlantic)<sup>37</sup>, thus providing further insight into the different territorial impacts of this initiative, as also set out in the Territorial Impact Assessment report (see Annex 8 for a summary of the report). Given that the methodology has certain limitations, in as much as it is only based on two specific regional projects and takes a simplified approach compared to what is being developed in the context of the Marine Strategy Framework Directive, this analysis is to be taken as an "add-on" to the above analysis of waste volumes. At the same time, and in the absence of other methodologies currently available, it provides interesting indications of how the different types of waste may impact on marine ecosystems in the sea basins.

The vulnerability of the sea regions has been determined on the basis of a number of features (species, habitats, protected areas and socio-economic effects on human activities) in relation to the different waste types, taking into account: fate of pollutants, impact of pollutants, length of interruption and compensation possibility. The following table summarises the total vulnerability of the sea basins to each waste type.

**Table 4: Summary of environmental vulnerability for ship-generated waste in four regions of European Seas<sup>38</sup>**

Environmental weight <sup>39</sup>	Oily waste	Sewage	Garbage
<b>Baltic Sea</b>	27	22	35
<b>East Atlantic Sea</b>	28	19	35
<b>Mediterranean Sea</b>	24	24	35
<b>Black Sea</b>	28	19	35

From the above table two main conclusions can be drawn:

- Firstly, garbage poses the most significant risk to all sea basins, with no regional differences among them, followed by oily waste and sewage.
- Secondly, it seems that the East Atlantic and Black Sea regions are more sensitive to oily waste than the Mediterranean and the Baltic Sea, whereas the Mediterranean region is the most vulnerable in relation to sewage from ships.

<sup>37</sup> The methodology proposed in the present vulnerability study has similar principles with Marine Strategy Framework Directive, inasmuch as it uses features overlapping with the MSFD descriptors and list of pressures and impacts. However it is not fully in compliance with the methodology/approach currently being developed in the context of the MSFD. In the absence of a reliable and straightforward methodology covering all relevant MSFD descriptors, the proposed methodology, which is based on two projects implemented in the Northeast Atlantic and the Baltic (BRISK and BEAWARE), is used for convenience for the purposes of complementing the analysis of environmental impacts of various policy options amending the PRF Directive. For more explanation on the methodology applied, see Annex 4

<sup>38</sup> The numbers in the table present the sum of the individual vulnerability scores, see annex 4 for an explanation of the methodology

<sup>39</sup> The scoring defines the relative environmental vulnerability towards a unit load (e.g. 1 ton per year) of a specific waste type. E.g.: score value of 1 for feature A and a score value of 2 for feature B means that feature B is twice as vulnerable to the specific waste type as feature A

### **2.1.2. Main problem 2: Administrative burden associated with the implementation of the PRF Directive**

The inefficiency of the EU system on port reception facilities was also among the key findings of the ex-post evaluation<sup>40</sup>, which concluded that: “*Even though the costs associated with the implementation of the Directive are generally outweighed by the (environmental) benefits generated, the costs are not always proportionate to what is being gained from complying with the Directive*”.

The implementation of the Directive creates a substantial administrative burden for ports, port users and relevant competent authorities, part of which can be considered as *disproportionate*, as outlined below<sup>41</sup>.

- **Development, assessment and monitoring of the Waste Reception and Handling Plans;** the Directive requires Member States to evaluate and approve the Waste Reception and Handling Plan, monitor its implementation and ensure re-approval at least every three years and after significant changes in the port. The assessment of the plan will be done against the criteria in Annex I to the Directive, and will normally require a site visit<sup>42</sup>. The process of assessment, approval and monitoring implies effective communication between the Competent Authorities and the ports. For transparency purposes, certain key information from the plans should be made available to all port users, either through publication of (part of) the plan on the website, or through leaflets/brochures<sup>43</sup>. *Smaller ports feel that these procedures create a disproportionate administrative burden. The cost for developing and annually updating a Waste Reception and Handling Plan for a small port has been reported to be as much as 9,000 euro (approximately 5,500 euro for developing the plan and 3,500 euro for updating the plan). However, this cost is defined by the level of detail in the plan, which depends on the port's size, geographical location, and the type of traffic coming into the port, thus providing some leeway to smaller ports in the development of the waste plan (see chapter 5.2, “discarded policy measures”).*
  
- **Exemptions for ships in regular and scheduled traffic**  
If a ship wants to be exempted from the obligation of the advance waste notification, delivery of waste, and the payment of the fee in a specific port (based on the conditions for ships in regular and scheduled traffic), it has to submit an application to the Competent Authorities of the Member State, in which that port is located. The administrative cost for the ship to apply for an exemption is estimated at 2,128 euro. The Competent Authorities will assess the application against the criteria laid down in the Directive (which includes a document check on whether there is an arrangement in place for delivery and payment of the fee in a port along the ship's route). If the result of this assessment is positive, the authorities will grant the exemption clearly stipulating its conditions and monitor the situation. The cost for assessing and granting an exemption is estimated at 5,275 euro. The Member States also have to inform the Commission on a regular basis of the exemptions granted. Since June 2015, this is also possible by reporting the exemptions electronically into SafeSeaNet<sup>44</sup>. *Due to different*

<sup>40</sup> Ex-post evaluation (Panteia, 2015), chapter 9 on Efficiency

<sup>41</sup> For the estimates of the costs provided in this section, see Annex 9 providing detailed calculations of the administrative burden

<sup>42</sup> EMSA Technical Recommendations for the implementation of Directive 2000/59/EC (25/11/2016), Annex II, p.35

<sup>43</sup> As defined in Annex I to the PRF Directive and in the EMSA Technical Recommendations, chapter 3.5.2.3, p.11

<sup>44</sup> The Union Maritime Information and Exchange System (SafeSeaNet), established by Directive 2002/59/EC, is a European Platform for maritime data sharing, hosted and operated by EMSA

*criteria for granting an exemption, application procedures are different for each and every port, and ships spend a lot of time preparing the applications, which could be avoided if the procedures were standardised. Also, due to a lack of exchange of information on exemptions, ports spend extra time checking whether the conditions for granting an exemption have been fulfilled, as well as monitoring exemptions, which could be made easier if the necessary information was made (electronically) available.*

- **Advance Waste Notification**

Before calling in a port, a ship needs to submit an Advance Waste Notification to the Competent Authorities of the Member State where that port is located, specifying the volumes and types of waste it intends to deliver, the storage capacity on board, and the waste that will be retained on board until the next port of delivery<sup>45</sup>. The costs for reporting the Advance Waste Notification are estimated at an average of 40.43 euro per port call representing 89.9 million euro annually. The port, or the appropriate waste management authority in the port, should on receipt of the Advance Waste Notification facilitate the waste delivery process (where appropriate), examine the information notified and report any inconsistencies, including absence of notification or possible non-compliance with the Directive's mandatory delivery requirement to the authority charged with inspections.

*Currently the EU Advance Waste Notification is not aligned with the international form (IMO Circular 834) due to the differences in definitions between the EU Directive and MARPOL. Therefore, ships calling at EU ports need to complete and report a different form than the one applicable internationally (MARPOL). The time for reporting could be shortened significantly if those forms were fully aligned. At the shore side, time and resources are lost due to parallel systems in place for the exchange of information between the authorities and/or the lack of electronic monitoring and reporting. Considering the number of port calls, potential gains in administrative burden reduction are substantial.*

- **Monitoring and exchange of information**

The Directive requires Member States to monitor implementation of the requirements, including the identification of ships, which have not delivered their waste in accordance with the Directive, and exchange information to allow for effective enforcement cooperation. To this end a Common Monitoring and Information System should have been developed. In the absence of a unified system, however, Member States have developed their own reporting and monitoring systems in the course of years.

*Only in recent years has an EU-based electronic system been employed to support monitoring and implementation of the Directive (largely based on SafeSeanet – for reporting and exchange of information - and THETIS EU - for reporting the results of inspections).*

*As a consequence, electronic systems are operating in parallel at EU and national level. The case studies have confirmed these findings and have indicated that data is not systematically exchanged between ports or Member States.*

- **Setting up and operating Cost Recovery Systems**

Member States have to set up a cost recovery system that respects the principles and requirements laid down in the Directive, of which the most important is the obligation

---

<sup>45</sup> Since June 2015 Member States need to provide for electronic reporting of the waste information in accordance with the requirements of Directive 2010/65/EU on reporting formalities for ships arriving in and/or departing from ports of the Member States

of the indirect fee, i.e. the part of the fee that is charged irrespective of delivery of waste by the ship. According to a separate statement from the Commission this part shall represent at least 30% of all of the costs of reception and handling of the waste<sup>46</sup>. Depending on the type of system established, this will imply either close involvement of the port authorities in the waste process and close connections to the PRF operating in the port, or limited involvement, where ships may have to deal directly with the operators with very limited intervention from the port authority. Competent authorities have to ensure that the fees are fair, transparent, non-discriminatory and reflect the costs of the facilities and services. For this, the amount of the fees, and the basis on which they have been calculated, should be made clear for the port users.

*Lack of transparency hampers a ship's waste planning process and may lead to unnecessary delays. Considering that there are over 2.2 million of port calls per year, even minimal delays can represent a significant burden for the sector as a whole. Depending on the CRS in place, ports may also spend excessive time in operating the system, which could be avoided if the calculation of the indirect fee was simplified.*

#### - **Inspections of the mandatory delivery obligation**

Irrespective of the type of inspection framework applied, the Directive requires that a 25% minimum inspection target is applied<sup>47</sup>. In other words, 25% of all individual ships calling annually in the port of a Member State shall be the subject to an inspection in order to verify whether the ship has complied with the delivery requirements of the Directive. This corresponds to 19,550 inspections annually<sup>48</sup>. The port side will not be considered in the context of "administrative burden" (as this falls under the enforcement obligations of the MS), but on the ship's side, the crew on board also has to collaborate in these inspections by answering the questions, showing the required documentation, etc. The inspectors, upon completion of the inspection process, are required to document and report the results. Since 2016, the reporting may be done electronically in THETIS-EU, an inspection database that has been developed by EMSA to facilitate the reporting of PRF inspections, as well as the subsequent exchange of information between the relevant authorities. *Being involved in two parallel inspection regimes, one checking MARPOL compliance (through Port State Control) and one purely checking compliance with the Directive, creates an unnecessary burden on the crew that could be substantially reduced if the inspections were fully integrated.*

Based on an update of the figures from the ex-post evaluation (Panteia, 2015), as well as the inclusion of additional categories of administrative costs, the financial burden for complying with the information obligations in the Directive is estimated at **127 million €**. A detailed breakdown is presented in the Table below<sup>49</sup>, highlighting the contributions from the different obligations in the Directive that have an impact on the administrative burden for both ports, port users, and competent authorities.

---

<sup>46</sup> Article 8 par.2 (a) •Directive 2000/59/EC of the European parliament and of the Council of 27 November 2000 on port reception facilities for ship-generated waste and cargo residues (OJ L332, 28.12.2000, P. 0081 – 0089) and Directive 2000/59/EC of the European Parliament and of the Council of 27 November 2000 on port reception facilities for ship-generated waste and cargo residues - Commission declaration (OJ L 332 , 28.12.2000 P. 0090)

<sup>47</sup> This target is derived from the former Port State Control Directive: Directive 95/21/EC concerning the enforcement, in respect of shipping using Community ports and sailing in the waters under the jurisdiction of the Member States, of international standards for ship safety, pollution prevention and shipboard living and working conditions (port State control)

<sup>48</sup> See Annex 7: EMSA assessment of the enforcement options, annex II provides a breakdown of the number of inspections per Member State

<sup>49</sup> Ex-post Evaluation (Panteia, 2015), p.76 Table 6 Costs and benefits

**Table 5: Annual administrative costs caused by the Directive (million €)<sup>50</sup>**

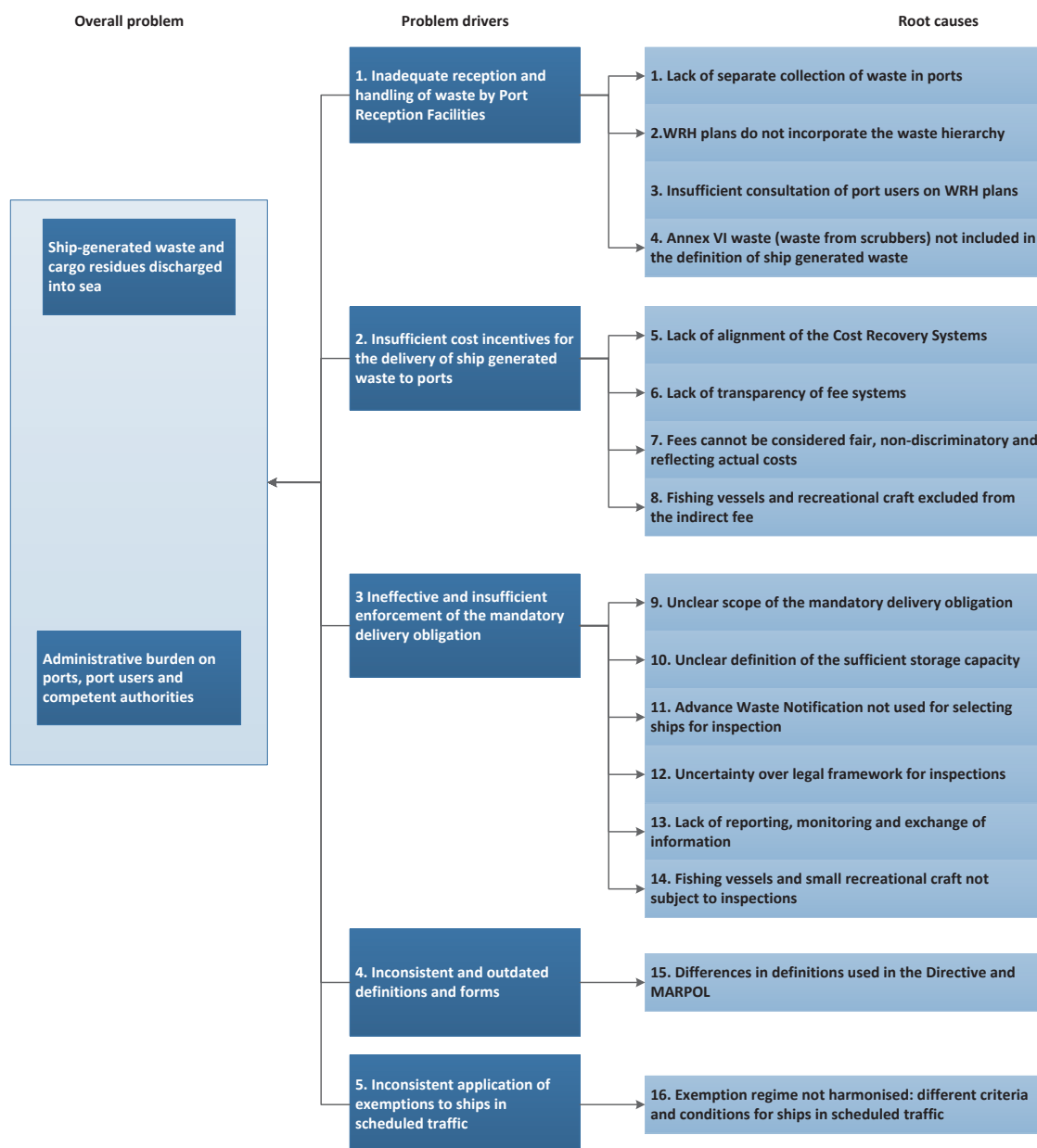
Administrative costs	Stakeholder	Annual costs
Costs for Member States to approve WRH plans	Competent authorities	4.1
Application for an exemption	Port users	5.0
Assessment and granting exemptions	Competent authorities	12.3
Advance waste notification – reporting	Port users	89.9
Advance waste notification – assessment	Ports / competent authorities	7.8
Inspection – providing documentation and collaboration	Port users	0.5
Inspection – reporting results from inspections	Competent Authorities	0.4
<b>Total</b>		<b>127</b>

These costs can be considered a problem, to the extent that they are partly unnecessary and due to inefficiencies in the system. As noted in the ex-post evaluation, a significant part of the administrative burden could be avoided by having a more harmonised and consistent implementation of the Directive and/or by addressing the legal inconsistencies between MARPOL and the Directive. These specific problems will be explained in more detail in the description of the drivers below. Only after the analysis of the problem drivers of the administrative burden has been completed, can an estimate of cost savings be provided.

## 2.2. The underlying problem drivers

The problem drivers and underlying root causes are presented in the graphic below.

<sup>50</sup> See Annex 9 for a detailed quantification of the administrative burden, based on a re-calculation of the figures provided in the ex-post evaluation based on statistical data from Eurostat on average hourly wage cost in the public sector (21.98€) as well as for the maritime sector (26,60€), taking 2015 as a reference year



### 2.2.1. Problem driver 1: Inadequate reception and handling of waste by Port Reception Facilities

Adequate port reception facilities are a precondition for increasing the delivery of waste onshore and reducing discharges at sea. The Directive describes “adequacy” of reception facilities as being “capable of receiving the types and quantities of ship-generated waste and cargo residues from ships normally using a port”. However, questions remain around the exact meaning and interpretation of this concept, as well as problems in terms of the reception and handling of waste. In particular, the following issues pose a challenge to ensuring the adequacy of waste facilities in ports:

- 1. EU Waste Hierarchy not fully implemented in the context of ship-generated waste; no separate collection of ship-generated waste in ports** (root causes 1 and 2)

The majority of the Waste Reception and Handling Plans do not include the basic principles



of the waste hierarchy. This is a missed opportunity as the waste plans, in which both ports and port users are involved, provide a strong base for connecting the waste flows at the ship-port interface. This was also pointed out by a majority of respondents (47<sup>51</sup> out of 79 respondents, i.e. 60%) in the Open Public Consultation. The lack of implementation of the waste hierarchy in the delivery and processing of ship-generated waste on land also discourages port users from applying the principles of environmentally sound management of waste on board of ships. However, it should be noted that more than half of the respondents coming from the port sector (15 out of 26) did not consider the implementation of the waste hierarchy important, while, almost all of the port users that responded to the survey (12 out of 13) and most of the PRF operators (7 out of 10) considered this an important issue.

In the context of the implementation of the waste hierarchy, the problem of a lack of separate collection of waste from ships in ports has come to the foreground. Under the Waste Framework Directive, Member States may still deviate from the general obligation to provide for separate collection at local/municipal level if the segregation is not considered “economically/financially viable”<sup>52</sup>. As a result, many ports do not provide for separate collection in ports, and collect garbage in one container for further disposal. In particular for smaller ports, and thus in remote locations, setting up separate collection systems may pose significant challenges, as also shown in a recent study in relation to the separate collection of solid waste at municipal level<sup>53</sup>. It should be taken into account that the majority of respondents in the targeted survey (22 out of 33 who responded to the question, mainly consisting of port authorities and ship operators) believed that reinforcing the waste hierarchy would result in an increase of the administrative burden, whereas more than half of the respondents (17 out of 30, mostly port authorities and PRF-operators) thought that this would increase their operational costs.

The lack of separation of waste on shore hinders the proper handling of waste on board, including the willingness and motivation of the crew on board<sup>54</sup>. This issue has been mentioned at various occasions by representatives from the shipping sector during stakeholder consultations meetings where the revision of the Directive was discussed<sup>55</sup>. The lack of separate collection also hinders further reuse and recycling of the waste, based on its residual value, as required by the waste legislation, especially the EU Waste Framework Directive. The waste hierarchy, which gives preference to recycling and reuse over incineration and landfill, is often not properly reflected in the waste reception and handling plans of the ports<sup>56</sup>.

An additional problem is posed by the application of the Animal By-Products Regulation (Regulation 1069/2009), which requires catering waste from ships operating internationally, to be incinerated, in particular when this catering waste has been in contact with animal by-products (food waste). This includes plastic bottles and other packaging waste with a high

---

<sup>51</sup> Among which: 11 out of the 26 ports, 12 out of the 13 ports users, 5 out of the 11 Member States authorities, 7 out of the 10 PRF operators/associations, and all 4 NGOs responding to the Open Public Consultation. Of the remaining respondents, 17 were neutral or had no firm opinion about the question (20%) and 17 said that this is not an important issue (20%)

<sup>52</sup> Article 10 par.2 Directive 2008/98/EC states: 'Where necessary to comply with paragraph 1 and to facilitate or improve recovery, waste shall be collected separately if technically, environmentally and economically practicable and shall not be mixed with other waste or other material with different properties.'

<sup>53</sup> Only 19% of generated municipal waste is collected separately in EU-28 capitals: in other words, 80% of the waste still ends up in the residual waste bin (European Commission, DG ENV, (2015), 'Assessment of separate collection schemes in the 28 capitals of the EU', page unnumbered). See also in the same report 'Table: Headline scoreboard including results from 28 EU-Capitals', page 17

<sup>54</sup> As also established by the ex-post Evaluation (Panteia, 2015, p.103)

<sup>55</sup> Meetings of the ESSF PRF Subgroup, as well as more recently the TIA Workshop organised by DG REGIO on 17 March.

<sup>56</sup> This is also a reflection of the overall problem of MS to achieve the general targets for re-use and recycling set in the Waste Framework Directive: Out of 32 European countries, 'the majority... will need to make an extraordinary effort in order to achieve the target of 50% recycling by 2020', as defined under Article 11 Waste Framework Directive 2008/98/EC. (EEA Report no. 2/2013 'Managing municipal solid waste – a review of achievements in 32 European countries', p.6)



potential for recycling, and will especially affect those ports with a high level of international traffic<sup>57</sup>.

## **2. Port users are not properly consulted in the development and re-assessment of the Waste Reception and Handling Plans (root cause 3)**

Although the Directive expressly requires consultation of the relevant parties at the stage of development of a new plan, it is less clear on consultations at the stage of evaluation and re-approval. The lack of consultation contributes to inadequacies in port reception facilities, as it will be more difficult to align the facilities with the needs of the port users, when these needs have not been sufficiently heard and defined during the consultation process. The targeted survey has indicated that port users generally do not feel that they are properly consulted in the development, implementation and revision of the Waste Reception and Handling Plans<sup>58</sup>. Smaller ports in particular claim that they miss the capacity to properly draft plans and include port users in this process.

According to the EMSA horizontal assessment report (2010), especially fishing and recreational ports, often did not have a Waste Reception and Handling Plans in place and if they did then these plans were poorly monitored. The relevant authorities had either failed to require and/or verify that these ports drafted a waste plan, or had exempted smaller recreational ports from this requirement.<sup>59</sup> The ex-post evaluation of the PRF Directive found that among the WRH plans developed by fishing ports, only 48% included an assessment on the need for port reception facilities<sup>60</sup>.

## **3. MARPOL Annex VI waste not included in the scope of the Directive (root cause 4)**

Exhaust gas cleaning systems, also referred to as "scrubbers", are installed on board of ships as a way to meet the new sulphur emission limits to reduce air pollution from ships, as introduced by the latest amendment of Directive 1999/32/EC on the sulphur content of marine fuels<sup>61</sup>. These systems produce waste in the way of sludge and bleed off water, which is not allowed to be discharged under MARPOL and has to be delivered to waste facilities in ports. Given the chemical composition, the waste requires special reception and treatment on shore.

However, since MARPOL Annex VI waste is not included in the scope of the Directive, there is no EU obligation for the provision of facilities adequate for the reception and handling of this type of waste, nor a mandatory delivery requirement. As a consequence, currently few ports in Member States today provide facilities that are capable of handling the waste from scrubbers, whereas in other ports the scrubber sludge is reported and collected as oily waste<sup>62</sup>.

Annex VI waste is particularly relevant for vessels operating exclusively or primarily in (Sulphur) Emission Control Areas, notably the Baltic Sea and the North Sea area<sup>63</sup>, and it may be expected that in the future more sea basins will be designated as special emission zones under MARPOL. By extension, the IMO has recently decided<sup>64</sup> that a global low sulphur cap

<sup>57</sup>This issue was discussed in detail with DG SANCO in the context of the 5<sup>th</sup> meeting of the ESSF PRF Subgroup (25/5/2016); reflected in Points 50-53 of the Minutes of the meeting

<sup>58</sup>49 respondents (i.e. 60%) to the Open Public Consultation were of the opinion that the insufficient consultation of port users is an important or very important factor contributing to the inadequacy of PRF. Among them are 10 ports (out of 26 responding), 12 port users (out of 13), 7 MS authorities (out of 11), 6 PRF operators/associations (out of 10), and all 4 NGOs responding to the Open Public Consultation

<sup>59</sup>EMSA Horizontal Assessment Report – Port Reception Facilities (Directive 2000/59/EC), 2010, p.10

<sup>60</sup>Ex-post evaluation (Panteia, 2015), p.46

<sup>61</sup>Directive 1999/32/EC was amended by Directive 2012/33/EU of the European Parliament and of the Council of 21 November 2012

<sup>62</sup>For estimates on sludge and bleed off generation from scrubbers, please refer to section 2.1.1 and Annex 5

<sup>63</sup>The Baltic Sea and the North Sea were designated as Sulphur Emission Control Areas under MARPOL Annex VI

<sup>64</sup>MEPC 70, October 2016

will be introduced in 2020, resulting in a growing pressure to comply with overall sulphur emission norms through application of scrubber technology on board.

For the Member States bordering Emission Control Areas, scrubber waste only significantly affects some segments of the shipping industry. Most of these segments already have agreements in place with waste operators for delivering their scrubber waste. However, It has been noted in interviews and sector publications<sup>65</sup> that, due to relatively low fuel prices over the past two years, many ship owners have opted for using low sulphur fuel instead of investing in scrubber technology. As a consequence, volumes of scrubber waste have remained low. However, this trend could be reversed by an increase in fuel prices.

In the targeted survey, the majority of the respondents<sup>66</sup> indicated that they expected an increase in the amount of scrubber waste delivered to ports from broadening the scope of the Directive by including MARPOL Annex VI waste. However, the ports that were assessed as part of the case studies undertaken in the context of the Impact Assessment support study concluded that: (i) there is a high degree of uncertainty about the delivery of future scrubber waste volumes; and (ii) required investments and operational costs are strongly dependent on current facilities and systems in place. The interviewees indicated that, so far, they have seen little or no demand for scrubber waste delivery, and stated that it is highly uncertain if this will increase in the near future.

### ***2.2.2. Problem driver 2: Insufficient cost incentives for the delivery of ship generated waste***

The Directive requires that the costs of port reception facilities for ship-generated waste, including the treatment and disposal of the waste, are covered through the collection of a fee from ships. This obligation is based on the "polluter pays principle", in that the costs should be borne by the port users, as opposed to any other stakeholder. In order to ensure that the cost recovery systems provide no incentive for ships to discharge their waste into the sea, the Directive requires that all ships "contribute significantly" to the costs of the facilities, irrespective of their actual use of the facility (the indirect fee component)<sup>67</sup>. At the same time, ports have the possibility to differentiate the fee on basis of the category, type and size of the ship, as well as on the basis of the environmental performance and operation.

#### **1. Lack of harmonisation of cost recovery systems in EU ports (root cause 5)**

The significant contribution has been interpreted widely and has resulted in different models of Cost Recovery Systems being applied in EU ports: some ports apply systems based on a 100 % indirect fee (with variations), whereas others operate systems where the indirect fee is only partially implemented (only covering some of the waste types) or applied through a reimbursement or penalty in case of non-delivery. There are also still a number of ports with 100% direct fee systems in place, where the ship pays on basis of volumes delivered, although these systems do not meet the significant contribution requirement in the Directive<sup>68</sup>. Fees for garbage are typically of an indirect nature, while fees for sewage and oily waste are of a direct nature.

---

<sup>65</sup> See <http://www.platts.com/latest-news/shipping/houston/oil-price-collapse-hits-sales-of-exhaust-gas-2601602>

<sup>66</sup> 30 respondents (73% of the 35 expressing an opinion)

<sup>67</sup> The Commission specified in a separate Declaration annexed to the Directive that the significant contribution should be understood as " a figure of the order of at least 30 % of the costs referred to in article 8(1); O.J. L 332/90, 28.12.2000

<sup>68</sup> A detailed description of cost recovery systems in in Member State ports is provided by an EMSA study from 2005 (Carl Bro, p.9) and updates of this assessment have been reported in the ex post evaluation (Panteia, 2015)

The variations in Cost Recovery Systems can partly be explained by the differences in strategy and administration of ports across the EU, in particular whether the port is publicly owned and operated private or privately owned/operated.

**Table 6: Cost Recovery Systems in EU ports<sup>69</sup>**

- 1. 100% Indirect Fee System:** these charge ships a waste handling fee, irrespective of their use of facilities (this model is also referred to as a "**No Special Fee Systems**");
- 2. Administrative Waste Fee Systems:** these charge ships a fee, which is partly based on the amount of waste, delivered, and an additional fixed fee, which is refundable on delivery of waste;
- 3. 100% Direct Fee Systems:** charge port users based on the volumes of waste discharged, without an additional standard fee.

As a consequence, the level of the incentives to deliver the waste on land is not the same for all EU ports (from 100% incentive to no incentive at all). This has been confirmed by stakeholders in response to the Open Public Consultation: 51<sup>70</sup> out of 79 respondents (63%) indicated that this lack of alignment leads to insufficient incentives for delivery. In addition, the lack of alignment between the Cost Recovery Systems in EU ports creates unnecessary administrative costs particularly for the shipping sector, and does not provide for a level playing field, where all operators can compete under equal conditions.

In the case studies undertaken as part of the Impact Assessment support study, one port highlighted frustrations among stakeholders due to the different practices applied for defining “sufficient storage capacity”, as well as the fact that sometimes the ships have to pay the waste fee, despite of only delivering small volumes of waste (“application of the indirect fee”).

## **2. Lack of transparency as regards the fee structure and the basis for calculation (root causes 6 and 7)**

Irrespective of the type of cost recovery system in place, the Directive requires that the fees, and the basis on which they have been calculated should be made clear to the port users. To this end, the Waste Reception and Handling Plan shall include a description of the charging system, which is listed also among the information to be made available to all port users<sup>71</sup>.

However, ports do not always provide information on their fee system for waste handling, including basic fee levels to the port users, and if they do, the relationship between the fees charged and the costs of the waste handling process is often not clear. This was among the key findings of the EMSA Horizontal Assessment (2010), which reported 14 out of 22 Member States failing to do so<sup>72</sup>. The lack of transparency was also considered a major issue

<sup>69</sup> Following the categorization as stated in EMSA (2010), Horizontal Assessment Report - Port Reception Facilities (Directive 2000/59/EC), page 18-19

<sup>70</sup> Among which: 13 out of the 26 ports, all 13 port users, 6 out of the 11 MS authorities, 8 out of the 10 PRF operators/associations and 2 out of the 4 NGOs responding to the OPC. Of the remaining respondents, 22 were neutral or had no firm opinion about the question (27%) and 8 said that this is not an important issue (10%)

<sup>71</sup> Annex I to Directive 2000/59/EC; this obligation is in line with Article 12 of Regulation (EU) 2017/352 of the European Parliament and of the Council of 15 February 2017, establishing a framework for the provision of port services and common rules on the financial transparency of ports

<sup>72</sup> As also confirmed in the 2015 ex-post evaluation (Panteia, 2015)

by stakeholders in the open public consultation: a majority of respondents (55<sup>73</sup> out of 79, i.e. 69%) acknowledged that the relationship between fees and the actual costs of the reception facilities is unclear. The port users unanimously supported this view, but not all the port respondents agreed to this, with only 65% of ports (15 out of the 26) sharing the same opinion.

One of the reasons for this is that many ports have outsourced the service of providing port reception facilities to external waste operators and therefore do not have the detailed economic overview of the costs associated with the waste handling process. They may only have the negotiated price from the waste operator based on the services provided. However, there are also ports that intervene actively in the process and manage all the payments between the ship and waste operators. The availability of a transparent **overview of the cost/fee structure** thus depends on the design and operation of the port's Cost Recovery System (see problem driver 1), which reflects the diversity of EU ports as regards governance structure and administrative set up. With regard to the **calculation of the waste fee**, some ports charge the costs from the waste operator directly to the ship, while others include different types of cost in the waste fee, such as administrative costs. It is currently left to the individual port to determine the payment flow for waste handling services and the level of the waste fee. As a consequence, there is **no harmonised method for the calculation of the fee** and many different payment and invoicing systems are being implemented.

This is also true when it comes to the application of a reduction in the waste fee to a ship that can demonstrate that it produces reduced quantities of ship-generated waste ("a green ship in the context of article 8(2) of the Directive). The lack of common criteria or minimum requirements for green ships ultimately leads to distortion of competition<sup>74</sup>.

A level playing field is considered of crucial importance for both the shipping sector and port sector. Fair competition requires equal application of regulations across these sectors. In this context, the *ex-post* evaluation concluded that due to the lack of harmonisation, the fees are not always considered "fair, transparent, non-discriminatory and reflecting the costs of the facilities".

### **3. Fishing vessels and small recreational craft not included in the indirect fee (root cause 8)**

Fishing vessels and recreational vessels carrying less than 12 passengers are exempt from the mandatory 'indirect' fee provided for in the Directive. However, the delivery of waste by such vessels is still mandatory, and fishing vessels and small recreational crafts may have to pay (direct) fees based on the volume of waste they deliver. This does not provide a sufficient incentive for these vessels to deliver waste to port reception facilities.

The provision of appropriate reception facilities is a preventative measure that can reduce the likelihood that fishermen discharge their waste at sea, but the accessibility of the reception facilities and the cost of their use discourage delivery by these vessels. The respondents to the targeted survey confirmed that costs are one of the major deterrents to deliver waste: 9 respondents (50%) indicated that costs for waste disposal discourage the delivery of waste, in particular garbage (including household waste).

---

<sup>73</sup> Among which: 15 out of the 26 ports, all 13 port users, 8 out of the 11 MS authorities, 8 out of the 10 PRF operators/associations and 2 out of the 4 NGOs responding to the OPC. Of the remaining respondents, 19 were neutral or had no firm opinion about the question (23%) and 7 said that this is not an important issue (8%)

<sup>74</sup> This was concluded during the second stakeholder conference (January 2016) in the context of the DG MOVE Study on differentiated port infrastructure charges to promote environmentally friendly maritime transport activities and sustainable transportation (Cogea, 2017)

A specific issue in this context is the waste made up of **abandoned, lost or otherwise discarded fishing gear**. Stakeholders from the fishing sector confirmed that it is often difficult or costly to dispose of end-of life-nets in ports (8 out of the 11 respondents who expressed an opinion about this topic in the targeted survey). Furthermore, literature confirms that economic incentives play an important role in addressing the problem. For example, the 2016 GHOST Manual<sup>75</sup> found that economic incentives are potentially important in solving the problem, provided that they are used in the framework of an integrated strategy. The 2009 FAO Study on Abandoned, lost or otherwise discarded fishing gear<sup>76</sup> found that a fee-for-service approach (i.e. direct fees) can be a barrier to the use of port reception facilities since vessel operators may not wish to pay for such fees and, instead, may opt to illegally dispose of their garbage at sea at no immediate direct cost. A general (i.e. indirect) fee, requiring that all vessels using a port pay a standard fee, was believed to be more effective.

In addition, economic incentives to deliver **passively fished waste** are also lacking. Passively fished waste constitutes the waste that is caught in nets during fishing operations, but which does not form part of the operational or household waste of the vessel itself. Half of the respondents to the fisheries survey indicated that costs discourage the delivery of waste collected in nets and garbage (including household garbage) to port reception facilities, while at the same time the majority (14 out of 18, i.e. 78%) were in favour of the introduction of the possibility to deliver waste caught in nets or deliberately retrieved from sea free of charge.

Similarly, although less acute, economic incentives are also lacking for small recreational craft. As explained in chapter 2.2.2 this sector, due to the large number of vessels, is also responsible for a significant share of garbage (19%) found at sea.

### *2.2.3. Problem driver 3: Ineffective and insufficient enforcement of the mandatory delivery obligation*

#### **1. Confusion over the scope of the mandatory delivery requirement for ship generated waste and the application of the exception based on sufficient storage capacity (root causes 9 and 10)**

The relationship between the Directive's mandatory delivery requirement, which applies to "all" ship generated waste, and the MARPOL discharge norms, in particular when the next port of call is a non-EU port, remains unclear. As explained above, MARPOL still allows for operational discharges to be made at sea under strict conditions. Although the Directive is based on the international norms contained in MARPOL, the Directive has a number of provisions that lay down a more ambitious objective, namely to prohibit all discharges at sea by imposing a strict delivery obligation applicable to all waste, except when the ship has sufficient storage capacity on board until the next port of delivery (article 7). As regards cargo residues, the Directive follows a different approach by requiring the delivery to port reception facilities in accordance with provisions of MARPOL.

However, uncertainty remains around the definition of *all* waste, in particular in the light of footnote 1 in Annex II (Waste Notification), which specifically refers for the possibility to legally discharge sewage under MARPOL Annex IV, and specifies that in such a case the

---

<sup>75</sup>GHOST Hands-on Manual to prevent and reduce abandoned fishing gears at sea, 2016; [http://www.ghostgear.org/sites/default/files/attachments/gggi\\_best\\_practice\\_framework\\_part\\_2.pdf](http://www.ghostgear.org/sites/default/files/attachments/gggi_best_practice_framework_part_2.pdf)

<sup>76</sup>Abandoned, lost or otherwise discarded fishing gear, United Nations Environment Programme (UNEP), Food and Agriculture Organization of the United Nations (FAO), 2009, p. 80



waste does not need to be notified before entry into port. This legal ambiguity in the provisions has resulted in confusion among Member States and stakeholders on the scope of the mandatory delivery obligation and the application of the sufficient storage capacity exception. Since there is no clear definition of "sufficient storage capacity" in the Directive, Member States apply different interpretations and thresholds. This lack of harmonisation has created inefficiencies in the waste delivery process, as confirmed by a majority of respondents to the Open Public Consultation<sup>77</sup>.

## **2. Insufficient use of the waste notification forms**

Under the Directive, each ship bound for an EU port - with the exemption of fishing vessels and recreational crafts carrying no more than 12 passengers - has to notify the authority at least 24h prior to its arrival. The master of the ship is required to truly and accurately fill in the form as presented in Annex II of the Directive. This form, and the information contained therein, should provide the basis for the selection of ships for inspection.

However, in the Open Public Consultation, the majority of the respondents (46 out of 74) indicated that the insufficient use and inspection of the waste notification forms lead to insufficient enforcement. The ex-post evaluation of the Port Reception Facilities Directive also concluded that ports and inspection authorities make insufficient use of the forms for the purpose of monitoring and inspection.

Since Member State authorities do not always use the information notified for this purpose, or do not share the information with the enforcement authorities, it becomes difficult to select ships for inspection based on the criteria laid down in the Directive.

## **3. Legal uncertainty over the appropriate framework and basis for inspections (root cause 12)**

Although the Directive provides for the possibility that inspections may be conducted within the framework of the Port State Control Directive<sup>78</sup>, an inspection to verify compliance with the Directive's mandatory delivery requirement for ship generated waste, has a different scope and objective than a Port State Control inspection, which focuses on compliance the international requirements and certificates. This has created legal uncertainties and explains why in reality less inspections are conducted than required by the Directive (25%); most of the inspections conducted in the framework of port state control do not verify compliance with the Directive's requirements, but only check compliance with MARPOL. At the same time, it should be noted that the 25% inspection target stems from the repealed Port State Control Directive. This Directive has been replaced by Directive 2009/16/EU, which has introduced a new approach to inspections based on the effective targeting of vessels in view of their risk profile.

---

<sup>77</sup>More than 60% of the respondents to the OPC noted the following contributing factors to the problem of enforcement: (i) the inconsistency between mandatory discharge requirement (for 'all' ship-generated waste) and the MARPOL discharge norms (52 respondents), (ii) the insufficient use and inspection of waste notification forms by the relevant authorities, and the insufficient reporting on quantities and types of waste delivered to EU ports (46 responses), and (iii) the insufficient exchange of information (49 responses)". 70 % of the respondents (56 stakeholders) considered the unclear definition of sufficient storage capacity to be an important contributor to the problem of insufficient and ineffective enforcement of the mandatory delivery requirement

<sup>78</sup> Directive 2009/16/EC of the European Parliament and of the Council on port State control (OJ L 131, 28.5.2009, p. 57)

#### **4. Insufficient monitoring and exchange of information (root cause 13)**

Not all port authorities keep track of the specific amounts of waste delivered to their port over time, as the electronic means for doing so are generally not in place and there is no legal requirement to have an on-site waste accounting system. Ports that collect this information act on the basis of their own data needs, using their own units of measurement, which complicates the monitoring of compliance and progress within the overall objectives and requirements of the Directive. The lack of data on waste streams, in terms of the amounts and types of waste delivered to port reception facilities, hampers the effective monitoring of the effectiveness of the Directive, in particular its mandatory delivery. In addition, the port case studies have indicated that information on the results of inspections, as well as on the exemptions granted to ships in scheduled traffic, is not systematically reported and exchanged between Member States, so as to allow for cross-border cooperation in enforcement.

#### **5. Fishing vessels and small recreational craft not included in the enforcement framework conditions/criteria (root cause 14)**

The Directive obliges Member States to establish control procedures, *to the extent required*, for fishing vessels and recreational craft below 12 passengers to ensure compliance with the Directive. At the same time, these vessels are exempt from the specific inspection requirements and control procedures laid down in the Directive. This has resulted in a situation in which control procedures for fishing vessels and small recreational craft in general are lacking<sup>79</sup>. In addition, fishing vessels and small recreational craft are not obliged to notify the port of the waste they intend to deliver and the storage capacity on board, as they are also exempted from the advance waste notification. As a consequence, key information on waste disposal from these vessels is missing, which also stands in the way of any meaningful inspection or effective monitoring. In view of the significant contribution of these vessels to the problem of marine litter, the lack of enforcement is problematic and constitutes a significant legal gap in the system<sup>80</sup>.

In the targeted survey for fisheries the majority of the respondents (9 out of 18) considered the introduction of a measure requiring fishing vessels to notify ports in advance of the waste they are bringing ashore as negative. However, as regards the introduction of a measure to include fishing vessels in the specific inspection requirements, the majority (9 out of 18 respondents) believed that this would have a positive impact.

##### ***2.2.4. Problem driver 4: Inconsistent and outdated definitions and forms***

There are important differences between the definitions used in the Directive and those employed in the MARPOL Convention. This is particularly the case for the definition of "ship-generated waste" in the Directive, which only covers certain categories of waste contained in MARPOL (those defined in Annexes I, IV and V), and the definition of "cargo residues" which apart from the MARPOL Annex V cargo residues also covers the remnants of cargo material after cleaning operations, and thus also tank washings falling under MARPOL Annex I and II.

The current misalignment between the Directive and MARPOL creates confusion among the different actors in implementing the Directive, while at the same time complicates compliance with the MARPOL norms and requirements. For example, the differences in definitions hinder full alignment with the IMO circular for the waste notification, as there are significant

<sup>79</sup> EMSA Horizontal Assessment Report (2010) on Directive 2000/59/EC, p.12

<sup>80</sup> As also concluded by Eunomia (2016), p.144



differences in the different categories of waste and cargo residues. This creates an unnecessary administrative burden for port users being confronted with different forms and reporting requirements, depending at which port they call<sup>81</sup>.

In addition, the case studies conducted have indicated that a lack of electronic exchange of information, and/or the existence of parallel systems, results in additional administrative burden, as information exchange is more complicated and not well streamlined. Taking away those barriers would reduce administrative burden for different stakeholder groups, e.g. ship operators, ports and port reception facility operators.

#### **2.2.5. Problem driver 5: Inconsistent application of exemptions for ships in scheduled traffic**

Different procedures and criteria are employed to evaluate exemption requests across the EU, which creates unnecessary administrative burden on port users, while limiting the potential for relevant authorities in different Member States to cooperate in the process.

The parameters for granting exemptions under article 9 of the Directive are not well defined and leave room for different interpretation and application by Member States. As a consequence, different criteria and procedures are employed to evaluate exemption requests in the ports across the EU, which leads to a disproportionate administrative burden on port users, while limiting the potential for relevant competent authorities in different Member States to coordinate the exemptions granted to vessels. Coordination between Member States is necessary for assessing whether the conditions for granting an exemption are fulfilled. Poor coordination is also due to insufficient reporting of exemptions and limited exchange of information between competent authorities in Member States. The inconsistent application and the lack of information exchange result in multiple inefficiencies for ports, port users and competent authorities<sup>82</sup>.

The relationship between the two main problems and the defined problem drivers is summarised in the table below.

**Table 7: Relationship between main problems and problem drivers**

<b>Problem driver</b>	<b>Relation to waste discharges</b>	<b>Relation to administrative burden</b>
Adequacy	Inadequate port reception facilities are a disincentive to deliver waste.	Facilities are not adequate to the needs of port users, which may lead to undue delay in ports and complicated administrative procedures.
Incentives	Proper (cost) incentives promote delivery of waste on shore.	Lack of harmonisation of the fee systems, and lack of transparency cause administrative burden for port users.
Enforcement	Enforcement is needed to prevent /	Unclear rules on enforcement (e.g.

<sup>81</sup> This was confirmed by 57 out of 79 respondents to the to the Open Public Consultation (70%) indicating that differences in definitions constitute an important contributor to the problem of administrative burden, whereas 65% of respondents indicated that reporting forms which are no longer up to date are also an important factor adding to administrative burden

<sup>82</sup> 55 (i.e.68%) of the respondents to the Open Public Consultation were of the opinion that the inconsistent application of exemptions leads to an excessive administrative burden. Among them are 14 ports (out of 26 responding), 11 port users (out of 13), 10 MS authorities (out of 11), 8 PRF operators/associations (out of 10), and 2 out of the 4 NGOs responding. This problem was also noted in the 2011 EMSA report on PRF exemptions, as well as in the ex-post evaluation study (Panteia, 2015), p.68

Problem driver	Relation to waste discharges	Relation to administrative burden
	monitor discharges into sea. In practice, less inspections undertaken than required.	definition of sufficient storage capacity, mandatory delivery requirements and MARPOL discharge norms) lead to administrative burden.
Definitions and forms	Complicated reporting procedures may trigger waste discharges at sea rather than compliance with the Directive.	Inconsistencies between EU Waste Notification and the IMO Circular create administrative burden for ports and port users. In addition, there is a lack of electronic exchange of information and/or parallel systems are in place.
Exemptions	Invalid issuing of exemptions may open the door to illegal discharges into sea	Unclear and inconsistent application of exemption criteria causes administrative burden for port users.

The analysis of the different problem drivers and the underlying root-causes shows that approximately one third of the drivers relates directly to the problem of (unnecessary) administrative burden, whereas approximately two thirds are related to waste being discharged at sea.

### 2.3. Most affected stakeholders

The Directive evenly distributes responsibilities across the different stakeholders involved in the process of waste delivery and management. It should be noted that the Directive has a very wide scope of application: it covers all type of sea-going vessels, from small fishing boats to large container vessels, and all ports receiving sea going vessels, from small marinas to large commercial ports. Hence, the group of affected stakeholders is substantial.

Ports are among the key players, as they have to ensure that adequate facilities are provided to receive the waste from ships. They must also develop Waste Reception and Handling Plans and organise the necessary consultations with the port users to better understand operational needs. Furthermore they have to operate the fee systems to recover the cost from ships and deal with exemption requests. Depending on the administrative set up of the port and its size, tasks may be divided between the harbour master and the port authority. Ports often share the monitoring and enforcement responsibilities with the Member State competent authorities, e.g. in the area of assessing exemption requests, waste notification and inspections. Member State authorities are either vested in the maritime transport departments or the environmental departments at national or regional level.

The other key actors are the actual operators of the port reception facilities, which also include the terminal operators, which normally operate under a concession or licence in the port. They normally relate directly with the ships' agents and the port authorities with regard to the amounts of waste delivered and payment of the fees. They are mostly private companies, of which some can be qualified as small and medium sized enterprises (SMEs).

In parallel, ship owners bear the responsibility for the delivery of their waste to PRF and for compliance with the advance waste notification. As the producers of the waste they have to pay the indirect fee charged for the reception and handing of the waste, under "the polluter pays principle". An important segment of the shipping industry is the cruise sector, which -

given their increasing size and the number of passengers their vessels transport - produce significant amounts of waste to be delivered in accordance with the Directive.

Improvement of the marine environment resulting from a reduction of waste discharges will also benefit EU citizens, in particular those living in coastal regions and near ports. Better waste management makes those areas more attractive for tourism and wider habitation, and has beneficial effects in terms of air and water quality. In addition, protection of the marine ecosystem should also result in an improvement of fish stocks, thus also affecting the fishing and aquaculture industries. These interest groups are often represented by Non-Governmental Organisations and Regional bodies (such as the regional sea conventions and Fishery Advisory Councils).

Most of these stakeholders have been participating in the Port Reception Facilities Subgroup that was established under the European Sustainable Shipping Forum, which has been consulted by the Commission on a regular basis on issues related to the implementation and the planned revision of the Directive.

#### **2.4. Evolution of the situation without EU legislative intervention (baseline scenario)**

The baseline scenario builds on the application of the provisions in the current PRF Directive, complemented by initiatives that have already been adopted and are currently being implemented. It will furthermore be defined by economic and technological developments in the shipping sector, which are defined below.

##### ***2.4.1. Legal/policy developments***

During the last two years, the Commission has been developing different initiatives in order to improve the implementation of the Directive in the short to medium term.

In November 2015, the Commission adopted a Directive for amending Annex II to the PRF Directive<sup>83</sup>. The amendments concerned the incorporation of the new garbage categories in MARPOL (Annex V), as introduced by the IMO in 2013, which should allow for further alignment with the IMO waste notification form. In addition, the Commission introduced a requirement for ships to report on the types and quantities of waste delivered in the previous port of call through the Advance Waste Notification, in order to improve the information reported on waste streams in ports. To reflect these changes in the electronic reporting systems of MS, which should allow for the information to be reported into the National Single Window and further exchanged through SafeSeaNet, the existing waste business rules were amended<sup>84</sup>, which also allowed for the information to be stored at central level, so that the data can be more easily exchanged with other electronic databases (such as THETIS, the inspection database). These measures are fundamental for the further development of the Common Monitoring and Information System set up under article 12(3) of the PRF Directive, and to move towards a system of more targeted inspections (where ships can be selected for inspection on basis of the information reported). To this end, apart from the necessary changes to SafeSeaNet (both at central and MS level), EMSA has set up a specific reporting module for PRF inspections in the THETIS database, referred to as THETIS-EU, which is linked to Safe Sea Net. This module allows for the results from PRF inspections to be

---

<sup>83</sup> Commission Directive 2015/2087/EU adopted on 18 November 2015, O.J. L 302/99, 19.11.2015

<sup>84</sup> The new Waste Business Rules were endorsed by the SSN High Level Steering Group in October 2016

electronically reported and exchanged between MS, thus supporting MS in the inspection tasks.

To support a more harmonised implementation of the main provisions of the Directive, the Commission adopted Interpretative Guidelines in March 2016<sup>85</sup>. In these Guidelines, the Commission presents its interpretation of certain key concepts in the Directive, i.e., the adequacy of Port Reception Facilities, the adoption and consultation of the Waste Reception and Handling Plans, the scope of the mandatory delivery obligation, the advance waste notification, inspections, and the exemption regime for ships in scheduled traffic. Building on the Interpretive Guidelines as well as good practice identified in the Member States, EMSA published a set of Technical Recommendations in November 2016<sup>86</sup>, which provides advice on how best to implement the Directive. In addition, EMSA has developed Guidance for Inspections<sup>87</sup>, aiming to facilitate ship inspections to enforce the mandatory delivery obligation in the Directive.

The impact of these initiatives, in particular the Amendment of Annex II of the Directive (advance waste notification form), the Interpretative Guidelines, the EMSA Technical guidelines, and the Common information and monitoring system, is still premature<sup>88</sup>. While these initiatives are aimed at increasing waste delivery (and as a result lower the waste gap or discharges at sea), quantitative estimates of their impact are not yet available and will need to be assessed going forward.

In the baseline scenario, the current legal inconsistencies between the Directive and MARPOL will continue to exist, or even increase:

1. The scope of the mandatory delivery obligation is implemented by a majority of Member States *in accordance with MARPOL*, i.e. not applied to the delivery of **sewage** in port (which can - to a large extent - be discharged under MARPOL). This is not supported by the legal provisions of the Directive, which clearly state that sewage is included in the definition of Ship Generated Waste in the Directive and also require that all waste be delivered before departure except when the ship has sufficient storage capacity on board<sup>89</sup>. This is also reflected in the application of the Cost Recovery Systems in the Member States, which in most cases do not include sewage in the indirect fee part of the fee system. Implementation of the key concepts in the Directive will continue to vary between the Member States, as guidance on how to interpret and implement the Directive will only be provided through soft law, which is not legally binding on Member States.
2. The Directive will not be considered "up to date" with the international framework, as legal amendments to MARPOL are not incorporated in the European legal framework. This concerns in particular: 1. changes to Annex V (garbage, including a new definition of cargo residues), 2. the introduction of Annex VI, including a new category of waste (waste from exhaust gas cleaning systems and ozone depleting substances), which is not included in the Directive, and 3. changes to Annex IV

<sup>85</sup> Commission Notice 2016/C 115/05 of 31 March 2016, O.J. C 115/5, 1/4/2016

<sup>86</sup> <http://www.emsa.europa.eu/emsa-documents/latest/item/2875-technical-recommendations-on-the-implementation-of-directive-2000-59-ec-on-port-reception-facilities.html>

<sup>87</sup> Published in November 2016

<sup>88</sup> Generally, members of the ESSF PRF sub-group interviewed indicate benefits of these actions, although their magnitude varies between ports, depending on current and past practices (already in line with guidelines or not). Open Public Consultation responses suggest that these initiatives will contribute to an increase of waste delivery by some 5%, thus reducing discharges into sea.

<sup>89</sup> For the Commission's view on the mandatory delivery obligation, see the Interpretive Guidelines provided in Commission Notice 2016/C 115/05, O.J. C 115/5, 31.3.2016

(sewage), including special area provisions. As a consequence of these inconsistencies, parallel legal systems at EU and international level are created, resulting in inefficiencies and hampering effectiveness of the system. Similarly, the problems around enforcement will continue to exist, so long as these issues are not resolved and the relationship to the Port State Control Directive is not settled.

#### 2.4.2. *Economic and technological developments*

How the scenario and problems in relation to waste from ships will develop depends on economic and technological developments in the sector. The following assumptions have been made:

- The **expected growth of shipping**, driven by global economic and trade growth. Growth predictions range from 2.5% to 6% volume growth per year.<sup>90 91</sup> For the cruise sector, a growth of 4.5% per year is considered, based on historic data from CLIA.<sup>92</sup> For the fisheries fleet, a 6% decline per year has been observed over the past year and taken as a proxy for the near future, while for the recreational boating sector, an annual growth of 3% is considered;
- The generation of **sewage and garbage** from ships is expected to increase along with the growth of shipping.
- **Ship size developments**, which will create a cushioning effect on waste generation, as larger ships generate lower amounts relative to their volume of cargo carried. Growth of ship size is most visible in the container segment, with an average ship size increase of about 5%<sup>93 94</sup>, and in the cruise segment, with an annual increase of about 4%.<sup>95 96</sup> For other ship types, sizes are not expected to increase much.
- **Technology developments** vis-à-vis particular specific waste categories, notably:
  - Changes in the fuel mix leading to less oily sludge production. With an increased use of Liquefied Natural Gas and Marine Gas Oil as opposed to Heavy Fuel Oil, and an upcoming global cap on sulphur contents in Heavy Fuel Oil (as of 2020)<sup>97</sup>, a significant reduction of oily sludge may be expected;
  - The uptake of scrubbers, resulting in the generation of scrubber sludge and bleed-off water from these systems. So far, only about 400 scrubbers have been installed<sup>98</sup>, and no distinction between data for closed and open loop scrubbers is available<sup>99</sup>. This number appears relatively small, especially given the recent entry into force of the Sulphur Emission Control Areas in the Baltic and North Sea, and may be explained by low fuel prices, making the alternative of shifting to low sulphur fuels more attractive than investing in after treatment equipment. This may change in the future if fuel prices increase. Moreover, an extension of low sulphur regimes could further increase the uptake of scrubbers. The scenarios are however

<sup>90</sup> Panteia (2015), 'Study on the Analysis and Evolution of International and EU Shipping', p. 59, regarding worldwide GDP growth differs substantially in the lower fragmented scenario

<sup>91</sup> OECD (2011), 'Strategic Transport Infrastructure Needs to 2030', p. 9, regarding maritime container traffic

<sup>92</sup> CLIA (2015), 'Cruise industry outlook 2016'

<sup>93</sup> Based on UNCTAD shipping statistics

<sup>94</sup> <https://www.statista.com>

<sup>95</sup> ISL (2016) 'Shipping statistics and market review 2016, volume 60 - No. 8'

<sup>96</sup> <http://www.cruiseindustrynews.com/cruise-industry-analysis/orderbook-data.html>.

<sup>97</sup> Resolution MEPC 281.(70)

<sup>98</sup> Report from ESSF sub-group on Exhaust Gas Cleaning Systems (2016) (2.1.36 Response by CR OCEAN ENGINEERING)

<sup>99</sup> The distinction between open loop and closed loop systems is important, as the former generate wash waters that can be discharged at sea in accordance with pre-defined conditions defined in the corresponding IMO Guidelines, while the latter produce scrubber sludge and bleed-off water that is not allowed to be discharged under MARPOL and need to be delivered to port reception facilities. See Annex 6 (MARPOL discharge norms)



uncertain, ranging from 25% uptake by the shipping sector by 2020<sup>100</sup> to 60% by 2025,<sup>101</sup> without a clear scope of the relevant market;<sup>102</sup>

- In addition, ongoing technological advancements may contribute to lower amounts of ship-generated waste per unit of shipping. In this respect, new legislation promotes technical advancement in the sector more strongly than efficiency considerations<sup>103</sup>.
- To summarise, it is expected that waste generation will increase for almost all waste categories, while delivery is also expected to improve due to recent initiatives. Which of these two forces will be overriding is uncertain, but it seems likely that the autonomous growth of the shipping industry and waste generation will be in orders of magnitude above and beyond 5%. This would call for a need for further EU intervention to promote good waste management practices on board.

With no EU intervention, it may be expected that the problems that exist under the current regime will persist and may increase in the future due to potential developments in the sector outlined above: 1. more waste will be discharged at sea, and 2. the administrative burden is expected to increase.

### 3. WHY SHOULD THE EU ACT?

Shipping is an international sector, operating in different EU and international waters, being serviced by ports around the globe. Therefore, it has by nature a strong cross border dimension. In order to avoid a litany of different port policies, and to ensure a level playing field for both ports and port users, harmonisation at EU level will be necessary. A more harmonised implementation of the different provisions in the Directive will improve the competitiveness and economic efficiency of the shipping sector, while ensuring basic conditions in ports to avoid adverse effects such as “PRF shopping”, where ships keep their waste on board until delivery in the port where this is economically most advantageous. Another example of inefficient functioning of the market is provided by the exemption regime, whereby the conditions for granting an exemption to a ship in scheduled and regular traffic are different in each and every port along the ship’s route, causing inefficiencies for the ship and at the port side.

This is also reflected in the Directive’s legal basis, provided in Article 100(2) TFEU, which includes the adoption of common rules for international (sea) transport to or from the territory of a Member State as a fundamental part of the EU transport market. Although the Directive has a transport legal basis, it should be noted that its main objective is the protection of the marine environment, which has been a guiding principle in this Impact Assessment. Likewise, the Directive also incorporates some of the fundamental principles of EU environmental law, such as the “polluter pays” principle. This dual approach is also fully reflected in the overall objectives of the revision. With the revision of the Directive the Commission seeks to reconcile the interests and principles of both EU transport and environmental policy.

---

<sup>100</sup> DNV-GL (2013), ‘An outlook for the maritime industry towards 2020 – future development in maritime shipping’

<sup>101</sup> Ensys Energy & Navigistics consulting (2016), ‘Marine Fuels Outlook Under MARPOL ANNEX VI’

<sup>102</sup> The Report from the ESSF sub-group on Exhaust Gas Cleaning Systems (2016) also mentions that the introduction of the global sulphur cap of 0.5% may provide a stronger case for installation of EGCS, but that some EGCS may be marketed as being 0.5% equivalent instead of 0.1%, and in doing so greatly reduce size, cost and wash water requirements. The IMO has also provided scenarios for the uptake of scrubbers in its official fuel availability assessment (MEPC 70/INF.6)

<sup>103</sup> EMSA study on waste generated on board, CE Delft 2016

At the same time, subsidiarity should apply at the level of implementation of common rules and principles. Member State authorities are best placed to define the level of the fees to be charged for the reception and handling of ship generated waste, as well as to determine the level of detail and regional coverage of the Waste Reception and Handling Plans.

The revision should also facilitate the enforcement of the mandatory delivery obligation in a more harmonised way. As was shown in the problem definition, the multiplicity of enforcement practices in EU ports has made the regime generally ineffective and has undermined its deterrent effect. The public consultation revealed that most stakeholders (including ports, port users, operators and NGOs) in general support action at EU level<sup>104</sup>. By extension, the Territorial Impact Assessment indicated that generally stakeholders prioritised further harmonisation at EU level over regional differentiation.

For these reasons, it is concluded that only EU wide norms will provide a consistent regulatory framework that provides the necessary safeguards against the problems identified in this report.

#### 4. OBJECTIVES: WHAT SHOULD BE ACHIEVED?

The proposed revision of the PRF Directive aims to resolve two main problems:

1. Ship-generated waste and cargo residues discharged at sea

*Significant parts of marine litter originate from sea-based sources, which continue to discharge their waste at sea in contravention with existing discharge norms/prohibitions and the EU delivery obligation. This is also the case for other waste streams, such as oily waste and sewage.*

2. Administrative burden/costs caused by the implementation of the PRF Directive

*The PRF Directive causes substantial administrative cost, notably related to advance notification, the development of Waste Reception and Handling Plans and Inspections; a significant part of this cost is unnecessary and due to inefficiencies in the system.*

Therefore, the objectives of the proposed revision have been defined as follows:

- Protection of the marine environment through a reduction of discharges of ship-generated waste at sea;
- Facilitation of maritime operations through a reduction of the administrative burden on ports, port users and competent authorities.

Given that the first objective also aligns with the main aim of the Directive ("to reduce discharges of waste at sea") and the associated costs from discharges of waste at sea outweigh the costs associated with the administrative burden, as was shown in chapter two, the first objective of the **reduction of waste discharges**, should be considered the primary objective of the revision of the Directive, and the **reduction of the administrative burden** as a secondary objective.

In addition, the revision seeks to contribute to the wider objectives of the circular economy by contributing to an improvement of the waste handling process, as well as reduction of marine litter from sea-based sources.

---

<sup>104</sup> The majority of the respondents to the Open Public Consultation (77 out of 81) considered that the issues addressed by the PRF Directive continue to require some form of action at EU level



To achieve these general objectives, five specific objectives have been defined:

- SO-1: To ensure the availability of adequate facilities;
- SO-2: To provide effective (cost) incentives to deliver waste to port reception facilities;
- SO-3: To remove barriers to enforcement;
- SO-4: To harmonise and update definitions and forms;
- SO-5: To harmonise the rules for exemptions.

## 5. POLICY OPTIONS

### 5.1. Description of the retained policy measures

A set of measures has been defined and grouped according to the above-mentioned specific objectives. The policy measures are also linked to underlying root causes, as illustrated in the Table below.

**Table 8:**

Objective	Policy measure	Description	Soft law option <sup>105</sup>	Related root cause no. <sup>106</sup>
SO-1 Adequacy	PM-1A	<b>Broaden the scope of the PRF Directive to include MARPOL Annex VI waste</b> (residues/sludge and bleed-off water from exhaust gas cleaning systems). Ports will be obliged to provide for port reception facilities capable of receiving this type of waste and include the relevant references in the WRH Plan. Ships will have to include this waste in their advance waste notification to ports, and will be obliged to pay a fee for the delivery. PRF inspections will also need to check that the Annex VI waste has been delivered on shore and not retained on board if storage capacity is insufficient. It should be noted that, although Annex VI also covers ozone depleting substances, these will not be included, as these are as normally handled by the repair yards. Wash waters from scrubbers will also not be included as these can be discharged in accordance with the relevant MARPOL Guidelines and should not be considered as waste in the sense of the Directive <sup>107</sup> .	SL (waste business rules)	<b>4</b> (scrubber waste not included in definition of SGW) <b>15</b> (differences in definitions)
	PM-1B	<b>Reinforce the waste hierarchy as laid down in the Waste Framework Directive.</b> This should be done by incorporating the principles of the waste hierarchy in the process of waste processing in ports (description in the Waste Reception and Handling Plan), and more specifically by setting up systems of separate	SL	<b>1</b> (lack of separate collection) <b>2</b> (waste plans not reflecting the Waste

<sup>105</sup>This column refers to the possibility of development of (additional) soft law guidance/recommendations; it does not refer to soft law already existing (Interpretive Guidelines, EMSA Technical Recommendations and Inspection Guidance; see baseline scenario)

<sup>106</sup> This column refers to the numbering used in the graph on page 16

<sup>107</sup> EMSA technical assessment for the IA (January, 2017, p. 17) and Report from the ESSF Scrubber Subgroup, September 2016

Objective	Policy measure	Description	Soft law option <sup>105</sup>	Related root cause no. <sup>106</sup>
		collection to facilitate subsequent re-use and recycling of waste collected in ports.		Hierarchy)
	PM-1C	<b>Strengthen the requirements for consultation of port users</b> , by clarifying in the Directive that consultation should take place in the development, as well as the monitoring and re-assessment, of the Waste Reception and Handling Plans.		3 (insufficient consultation of port users)
	PM-1D	<b>Clarify the definition of 'adequacy' of PRF</b> , by defining the main elements of this concept in the Directive in line with international and EU Guidelines and practice.		1, 2, 3, 4
SO-2 Incentives	PM-2A	<b>Introduce the use of a shared methodology to establish the indirect fee part of the Cost Recovery System in ports.</b> This measure aims to streamline the underlying principles of the indirect fee, including the relationship between fees and costs, and the “right to deliver”, without prescribing one specific system for all ports, as this would not take account of the differences in geographic location, size and administrative set up of ports in the EU. This should also increase the transparency of the CRS, in particular as regards the basis for the calculation of the fees, which should also be included in the information of the WRH Plans to be communicated to port users.	SL	5 (lack of alignment CRS), 6 (lack of transparency), 7 (fees not considered fair, non-discriminatory and reflecting costs), 8 (fishing vessels and recreational craft excluded from indirect fee)
	PM-2B	<b>Introduce a 100% indirect fee for garbage (MARPOL Annex V).</b> This measure builds on PM 2A, but will specify that for garbage the indirect part shall be 100%, so that it should be possible that this waste can be delivered without any additional direct charges, so that a maximum incentive is provided for delivering this waste to PRF instead of discharging at sea.		5 (lack of alignment CRS)
	PM-2C	<b>Provide for a list of conditions that can be used to certify a ship as “green” in the context of the Directive (article 8(2c)),</b> i.e. a ship whose design, equipment and operation are such that it produces reduced quantities of ship generated waste. This should facilitate the operation of certification schemes in ports to give reductions in the waste fee for such ships (already provided for in the Directive) and should promote the uptake of new technologies on board of ships to generate less waste.	SL	5, 6, 7, 8
	PM-2D	<b>Include fishing vessels and small recreational craft in the indirect fee regime.</b> This measure builds on PM 2A and will require these vessels to pay a fee irrespective of delivery, so as to provide an incentive for delivery similar to the incentive given to other vessels.		8(fishing vessels and recreational craft excluded from indirect fee)

Objective	Policy measure	Description	Soft law option <sup>105</sup>	Related root cause no. <sup>106</sup>
	PM-2E	<b>Include “passively fished waste”</b> in the scope of the Directive and include this waste stream in the 100% indirect fee for garbage. This measure addresses the waste that fishermen catch in their nets during normal fishing operations, and which doesn’t form part of the operational waste of the vessel itself. Given the current scope of the Directive, which is limited to ship generated waste as defined in the MARPOL annexes (which do not cover passively fished waste), the inclusion of this waste in the Directive will thus require extending its scope beyond MARPOL. By applying this measure in combination with PM 2B and 2D, the passively fished waste should be included in the indirect fee so that it can be delivered to port without having to pay additional direct charges. This measure would also facilitate the operation of existing “fishing for litter” schemes in the EU	SL	8
SO-3 Enforcement	PM-3A	<b>Clarify the scope of the mandatory waste delivery obligation in article 7</b> , two variants:		
	PM-3A.1	Align the delivery obligation with the MARPOL discharge norms; under this variant the mandatory delivery requirement would apply to the waste that cannot be discharged under MARPOL. The delivery obligation would thus reflect the discharge norms and provide for full complementarity.		9 (unclear scope of the mandatory delivery obligation)
	PM-3A.2	Strengthen the current mandatory delivery obligation for all ship-generated waste, beyond the MARPOL discharge norms. The delivery of all waste will be strengthened by making clear in the legal text that this also includes the waste that can in principle be discharged under MARPOL. It should be noted, however, that a delivery obligation does not equal a discharge ban and that a strict delivery obligation does not regulate operations at sea (which will continue to be governed by MARPOL) but rather focuses on what happens in port.		9 (unclear scope of the mandatory delivery obligation)
	PM-3B	<b>Introduce a requirement for a waste receipt.</b> The PRF operator will be required to issue a waste receipt to a ship upon delivery, stating the amounts and types of waste delivered. This receipt shall be communicated to the port authority which will be reporting its information electronically into the Common Monitoring and Information System (SafeSeaNet) for further exchange with Member States, as well as for statistical purposes to ensure better insights on waste streams in port. Small unmanned facilities shall be exempted from the requirement of issuing a	SL	13 (insufficient reporting, monitoring and exchange of information)

Objective	Policy measure	Description	Soft law option <sup>105</sup>	Related root cause no. <sup>106</sup>
		waste receipt. Two variants:		
	PM-3B.1	<b>Waste Receipt in line with IMO Circular 834</b> (based on the same definitions and categories of ship generated waste and cargo residues as used in MARPOL)		<b>13</b>
	PM-3B.2	<b>EU Waste receipt</b> (based on different definitions and categories of ship generated waste and cargo residues than those used in MARPOL)		<b>13</b>
	PM-3C	<b>Clarify the definition of 'Sufficient Storage Capacity'</b> (the main exception to the mandatory delivery obligation, "SSC"); two variants:		<b>10</b> (unclear definition of sufficient storage capacity)
	PM-3C.1	<b>Flexible variant:</b> calculation of SSC on board taking into account discharges that can be made in accordance with MARPOL after the ship has left the port.	SL	<b>10</b>
	PM-3C.2	<b>Strict variant:</b> calculations shall be made of the SSC until the next port of call/delivery and the exception shall not be allowed in situations in which the next port of call is located outside the EU or unknown (outside the port to port reporting and monitoring system and no certainty that adequate PRF will be available in the next port).	SL	<b>10</b>
	PM-3D	<b>Strengthen the inspection regime, by replacing the 25% minimum inspection requirement with a risk-based approach.</b> Two variants:		<b>11</b> (AWN not used for selecting ships for inspection) <b>12</b> (uncertainty over legal framework for inspections)
	PM-3D.1	<b>Incorporate the PRF inspections into the PSC Regime.</b> To achieve this variant, the Port State Control Directive (Directive 2009/16/EC) will have to be amended to allow for PRF inspections to be combined with PSC inspections and to use the same risk-based selection system of ships for inspection. Results of the inspections will be reported in the PSC database (THETIS). This approach will allow for the enforcement of the PRF Directive in parallel to MARPOL enforcement. However, in addition to the PSC regime, a separate obligation will have to be provided in the Directive for inspection of <b>domestic vessels</b> (10% annual inspection target), as these do not fall under PSC, but should not be left out of the		<b>11, 12</b>

Objective	Policy measure	Description	Soft law option <sup>105</sup>	Related root cause no. <sup>106</sup>
		scope of PRF enforcement.		
	PM-3D.2	<b>Provide for a dedicated PRF inspection regime.</b> Under this variant, a specific PRF targeting mechanism will be provided, as well as a system to calculate the annual PRF inspection commitment per MS. The results of inspections shall be recorded in a separate EU module of the PSC database (THETIS-EU), which will also support the targeting mechanism and calculation of the commitment.		<b>11, 12</b>
	PM-3E	<b>Strengthening the enforcement regime for fishing vessels and small recreational craft,</b> by introducing a 10% annual inspection target for these vessels. Only the larger vessels will be included, i.e. those over 100 GT, as this is the MARPOL threshold for carrying a garbage management plan on board, which will be the key data source for checking whether waste delivery obligations have been met.		<b>14</b> (fishing vessels and small recreational craft not subject to inspections)
	PM-3F	<b>Extend/adapt the electronic Monitoring and Information System,</b> based on THETIS-EU and SSN, to ensure better electronic reporting and exchange of information. Under both inspection variants above, adaptations will be necessary to THETIS/ THETIS EU, as well as adaptations of SSN (at central and MS level).	SL	<b>13</b> (insufficient reporting, monitoring and exchange of information)
SO-4 Definitions	PM-4A	<b>Align the definition of ship generated waste with the Annexes of MARPOL,</b> by including MARPOL Annex VI (see also measure 1A), as well as incorporating the definition of cargo residues within the overall scope of ship-generated waste, in order to fully align with the definitions used in the MARPOL Annexes. This will also bring Annexes I and II wash waters, which under the current Directive are considered as “cargo residues”, into the scope of SGW, and the definition of cargo residues will be limited to MARPOL Annex V cargo residues. This measure builds on PM 3A (variant 1); the rationale for a deviant definition of cargo residues in the Directive has been to exclude it from the current strict delivery obligation for all waste and instead have it covered by the more flexible delivery obligation in article 10 (delivery in accordance with MARPOL). With PM 3A (1) there will be no further need for this distinction, thus opening the door for alignment of the definitions.		<b>15</b> (differences in definitions)
	PM-4B	<b>Update the waste notification form(s) to fully reflect the IMO standard</b> (IMO MEPC.1/Circ.834), including its definitions and waste categorisation. This policy measure builds on PM 4A above.		<b>15</b>
SO-5	PM-5A	<b>Include common criteria for the granting of</b>		<b>16</b> (exemption)

Objective	Policy measure	Description	Soft law option <sup>105</sup>	Related root cause no. <sup>106</sup>
Exemptions		<b>exemptions to ships in scheduled traffic.</b> This will involve the clarification of the terms already provided in article 9 in line with the Commission’s Interpretive Guidelines, so that a truly common exemption regime is provided. A standardised exemption certificate will be included in an additional annex to the Directive, which should also be reported into the Common Monitoring and Information System (SSN) for subsequent exchange between MS.		regime not harmonised) <b>13</b> (insufficient reporting, monitoring and exchange of information)
	PM-5B	Clarify in the Directive that <b>vessels operating exclusively within one port</b> (tug vessels, pilot vessels, etc.) can also be exempted under the same conditions, in line with the Commission’s Interpretive Guidelines.		<b>16</b>

Some of the measures proposed as part of the revision of the PRF Directive can also be implemented through soft law. In general, however, this tends to result in a reduced overall impact, while potentially lowering costs. The soft law approach has been assessed for the relevant measures.

## 5.2. Discarded Policy measures

### 5.2.1. Introduction of an EU discharge prohibition

As explained above (chapter 1.1, EU legal context), the PRF Directive focuses on delivery in port, compared to MARPOL which regulates discharges at sea. Although the delivery obligation bears a strong connection to discharge operations at sea, it is certainly not equivalent to a discharge prohibition. To effectively address the discharges of waste in European waters, it has therefore been considered to introduce a discharge prohibition in the Directive. This would effectively assign “special area status” to EU waters for all categories of waste and cargo residues, especially having an effect on sewage discharges from passenger ships, not least because MARPOL still leaves considerable scope for sewage discharges, especially beyond the 12 nm zone (see MARPOL discharge norms, Annex 6). However, for the following reasons such a measure is not considered feasible and should be discarded:

The MARPOL regulatory regime has evolved over time to formulate an adequate and functional framework for international shipping. This has also been acknowledged by the EU with the adoption of Directive [2005/35/EU](#) (as amended) on ship source pollution, which incorporates the MARPOL international standards for ship source pollution into EU law. The international standards included are the discharge norms contained in MARPOL Annexes I and II. The Directive requires that the illegal discharge of polluting substances (as defined in MARPOL Annexes I and II) be considered a criminal offence (under the conditions laid down in Directive 2009/123) and that criminal penalties be imposed on the polluter. Although this Directive does not cover all of the Annexes of MARPOL, introducing a discharge ban for all EU waters would deviate from the approach taken by this Directive to incorporate the MARPOL norms, and would introduce further inconsistencies between the EU and the international legal framework. Given that shipping is an international sector, operating both in European and international waters, deviations between discharge standards should be avoided. In addition, a discharge ban in EU waters would be very difficult to enforce and control, as it will be difficult to prove illegal discharges, due to a lack of evidence in open seas, and the fact



that the document proof (certificates and documents held on board) is completed in accordance with the MARPOL requirements, and would not correspond to the EU needs and requirements. Taking into account the specific situation of sewage discharges, it should also be noted that a general discharge prohibition would have an impact on the operational pattern of ships as additional sewage treatment plants and storage capacity would need to be installed on board of ships, affecting their design, construction and equipment, making it difficult to have a flag-neutral implementation in EU waters.

### **5.2.2. Full alignment with the MARPOL Convention**

Full compliance with MARPOL would mean repealing those specific measures which have made the MARPOL regime more effective through the application of EU law.

MARPOL only provides for a general obligation to provide adequate PRF in the relevant annexes. However, while the Directive builds on this general obligation, it goes further by addressing in detail the legal, financial and practical responsibilities. In particular, the Directive has provided for:

1. Adoption of the waste reception and handling plans, which is a fundamental instrument to ensure adequacy of PRF;
2. Requiring mandatory delivery of all waste before departure, in order to ensure that ships actually use the facilities set up in the ports;
3. Requiring the establishment of Cost Recovery Systems to ensure that the costs of port reception facilities are covered through a fee from ships;
4. Requiring ships to report the advance waste notification;
5. A system of compliance control (monitoring and enforcement).

The REFIT Evaluation has also shown that overall the Directive has been relevant, effective and efficient, although the regime can be further improved. Repealing the specific obligations imposed by the Directive has never been advocated by any of the stakeholders. Full alignment and abandoning the EU's port approach and obligations would have a serious negative impact on the delivery of waste to port and lead to more waste being discharged at sea.

### **5.2.3. Provide for a delivery exception in case port reception facilities are (temporarily) unavailable**

The current Directive does not provide for situations where port reception facilities are (temporarily) unavailable, which may result in a ship leaving the port without having delivered in accordance with the Directive. This has been raised in particular in the context of passenger ships with significant volumes of sewage on board calling at ports where adequate facilities for dealing with the quantity or quality of the waste are not available, or in cases where due to natural disasters or serious problems with the infrastructure ships are not in a position to deliver their waste. Having to wait in the port until the situation has been resolved may generate long delays resulting in high costs for the ship, and may be difficult due to itinerary planning. For these reasons, it has been considered to introduce a provision that addresses these situations and would allow the ship to depart with waste still on board for delivery in the nearest port on its route for immediate delivery. This would further build on the regional approach already embedded in article 5 of the Directive, which allows Member States to develop the waste reception and handling plans in a regional context, with the

appropriate involvement of each port, specifying the availability of waste facilities on a regional basis.

This policy measure has been discarded in the Impact Assessment, as it risks introducing a loophole to the main obligations (provision of adequate port reception facilities and mandatory delivery), which would undermine the overall objective of the Directive. Even with a more detailed description of what should be considered adequate in terms of the facilities in line with international and EU Guidance (see policy measure 1D), some degree of uncertainty will remain on when this exception could be invoked, as this concept is strongly dependent on local conditions and the type of traffic to the port. This argument has also been discussed in the IMO's Marine Environment Protection Committee, in the context of a request for an amendment of MARPOL<sup>108</sup>. The fact that the issue is still being discussed at the international level provides an important reason for not considering such a measure in the context of the revision of the PRF Directive.

Finally, it should be mentioned that practical measures to address the issue are already available under the current Directive: the advance waste notification allows for timely arrangements to be made in case adequate facilities may not be available for the waste reported to be delivered. In addition, the waste reception and handling plan provides a key instrument in planning the waste delivery process, as it provides the basic information to the port users, including information on the reception facilities available in the port, and can include contingency planning and arrangements covering situations of force majeure.

#### ***5.2.4. Exempt smaller ports and marinas from the obligation to develop a Waste Reception and Handling Plan***

The Waste Reception and Handling Plans are fundamental for ensuring that adequate port reception facilities are provided. For this reason, the Directive requires that such an appropriate plan is developed for each port, including small fishing ports and marinas. It has been argued by stakeholders that the requirement for developing a WRH Plan places an unreasonable burden on smaller ports, only servicing a limited number of ships.

However, this policy measure has been discarded, as the current provisions in the Directive leave a sufficient degree of flexibility for Member State authorities as regards the development and monitoring of the WRH Plans, with due consideration being given to the type of port as well as its size and location.

This has been confirmed in the Commission's Guidelines for the interpretation of the Directive<sup>109</sup>, which explain that the plans may vary significantly in detail and coverage and some of the items in Annex I to the Directive (setting out the requirements for the Waste Reception and Handling Plans) may be only partially applicable to smaller ports. The Guidelines note that what is considered to be an "appropriate" plan depends on the size, geographic location and type of port, which would also determine the level of detail required. Furthermore, the Guidelines also point to the possibility provided in article 5(2) of the Directive of adopting a regional Waste Reception and Handling Plan, which combines the essential elements into one plan covering several ports in the same region, in order to facilitate port waste management planning.

---

<sup>108</sup> Submission from CLIA to MEPC 70, October 2016

<sup>109</sup> Commission Notice 2016/C 115/05, adopted on 31.03.2016

The EMSA Technical Recommendations have also reflected this flexibility in the development of the plans, by presenting an overview of the different types and formats that can be developed, showing large variety in coverage and detail depending on the size and geographic location of the port(s), as well as the waste streams normally delivered.

Another reason for not considering an exemption for “smaller” ports from having to develop a Waste Plan, is that part of the focus of the revision is on the reduction of marine litter, including the litter generated by fishing vessels and recreational craft, which are the vessels most likely to be calling at smaller harbours and marinas. Having a basic waste management plan in place for the smaller ports, and also communicating information about available waste facilities to port users, will increase the likelihood of these vessels delivering their waste on shore.

#### ***5.2.5. Require fishing vessels and small recreational craft to submit an advance waste notification***

The Directive exempts fishing vessels as well as small recreational craft (carrying less than 12 passengers on board) from the obligation to notify the port of entry of the information contained in Annex II (advance waste notification). In order to collect the relevant data from the amounts of waste carried on board by these vessels, their storage capacity, and whether or not they have delivered in the previous port, it has been considered to include these vessels in the scope of the advance waste notification requirement. This should also support the enforcement of the mandatory delivery requirement, as well as facilitate the waste management process.

However, it should be noted that most of these vessels operate from and to the same port. Furthermore, the majority will not be equipped to electronically notify the required information. Requiring fishing vessels and small recreational craft to report waste information would thus induce considerable administrative cost to the operators of such vessels, as well as to national authorities for having to process the information. Even if a threshold is applied (only ships over 100 GT or 45 mtr in length overall<sup>110</sup>) it would still imply a considerable burden on the vessels concerned, given that they would be required to submit the advance waste notification every time they call in port. In addition, the measure would require both Member States and EMSA to upgrade their electronic reporting systems (SafeSeaNet and the National Single Window) to cater for the additional notifications.

### **5.3. Description of the Policy options**

The policy options have been constructed in such a way as to provide clearly identifiable packages of policy measures focusing on the objectives outlined above.

In the development of these policy options, three main guiding principles have been considered, as presented below:

- **The scope of the revision.** Policy option 2 concentrates on a minimum legislative revision, focusing mainly on adequacy and incentives measures to be included in the revised Directive (while other areas are to be covered through parallel soft law measures). The other policy options focus on a more extensive legislative revision of the Directive, addressing the different operational objectives;

---

<sup>110</sup> In line with the thresholds applicable under Directive 2002/59/EC of the European Parliament and of the Council of 27 June 2002 establishing a Community vessel traffic monitoring and information system and repealing Council Directive 93/75/EEC

- **The scope of the mandatory delivery of waste** in ports (article 7). The interpretation and enforcement of the delivery requirement define the main differences between Policy options 3 and 4. Policy option 3 seeks to align the delivery requirement with the discharge norms laid down in MARPOL, i.e. explicitly requiring that the waste which cannot be discharged under MARPOL has to be delivered to a facility on land. This will also reflect on other aspects, as elaborated below. Policy option 4 aims to have all waste delivered at ports, including the waste that can be legally discharged at sea in accordance with MARPOL. This position will also reflect on other aspects, such as the application of the Cost Recovery Systems, and the type of inspection regime in place;
- The potential for addressing the specific problem of **marine litter (garbage)** from ships. Policy options 3 and 4 both have two variant options; one with and one without focus on marine litter, as described below.
- The potential for reducing **administrative burden and simplification** of the regime has been considered for all the options presented.

### 5.3.1. *Policy option 1: Baseline scenario*

Policy option 1 provides the baseline scenario as described in section 2.4 above. Ambiguities in the application of the Directive would continue to exist, as no legal clarity would be provided on the relationship between the delivery obligation in the Directive and the discharge norms under MARPOL, as well as the concept of adequacy of port reception facilities. Soft Law measures that have been developed by the Commission and EMSA in the past can help provide further guidance on the main concepts of the Directive, but Member States will not be legally required to apply the recommendations. Through effective reporting and exchange of information of waste information through the Common Monitoring and Information System, enforcement of the mandatory delivery requirement can be supported, provided that the National Single Window is properly set up and implemented in all EU Member States. EMSA Guidance on enforcement will also help inspection authorities to conduct proper inspections under the Directive.

### 5.3.2. *Policy option 2: Minimum legislative revision of the PRF Directive*

Policy option 2 builds on the baseline scenario, including targeted initiatives that have already been prepared and planned (as described in section 2.4 above), complemented by concise legal adjustments to the Directive, as well as development of soft law measures on certain aspects that need further clarification. As such policy option 2 would contain all the measures which would be necessary *as a minimum* to ensure effective continuation of the regime.

More specifically, the minimum legislative changes to be made include basic alignment with recent changes in MARPOL, such as the inclusion of MARPOL Annex VI waste (scrubber waste) into the scope of the Directive, as well as updating legal references in the PRF Directive which are no longer valid. The Directive contains old references to EU legislation which has meanwhile been amended, such as the Waste Framework Directive and the Port State Control Directive. Furthermore, the "adequacy" concept could be further clarified in the text of the Directive in line with the interpretation provided in the Commission Guidelines<sup>111</sup>.

In addition, Policy option 2 would also envisage a number of the proposed policy measures to be developed through soft law, providing further guidance on their implementation. The

---

<sup>111</sup> Commission Notice 2016/C 115/05, Guidelines for the interpretation of Directive 2000/59/EC

following policy measures (“PM”), which seek to provide for better incentives for the delivery of waste, would qualify for further development through soft law:

- PM-2A: Introduce a shared methodology to calculate the indirect fee and the ‘right to deliver’;
- PM-2C: Incentivise measures that reduce the amount of waste produced on-board. For this the current provisions for green ships should be further improved;
- PM-2E: Development of "fishing for litter" schemes to effectively deal with passively fished waste from fishing vessels.

### **5.3.3. Policy option 3: MARPOL alignment**

Policy option 3 is referred to as "MARPOL alignment" as it seeks **further approximation** to the MARPOL Convention, in particular the MARPOL Annexes. At the same time, **it does not mean a full alignment with MARPOL** either, as this would require abandoning existing requirements in the Directive, such as the development of Waste Reception and Handling Plans and the development of cost recovery systems, which are important features of the PRF regime that should remain and even be further strengthened in order to fully respond to the concerns identified in the ex-post evaluation.

In the first place, the MARPOL alignment option defines the **scope of the mandatory delivery** requirement in article 7 in relation to MARPOL: the delivery obligation will reflect the MARPOL discharge prohibition, i.e.: what cannot be discharged under MARPOL shall be delivered to PRF by ships calling in EU ports. This should also be reflected in the interpretation of the sufficient storage capacity exception in article 7.2, which in turn should be more flexible and take account of MARPOL legal discharges until the next port of delivery.

In addition, Policy option 3 aims to **fully align the definition of ship-generated waste (article 2 of the Directive) with the Annexes of MARPOL**. This would involve including a reference to MARPOL Annex VI, as well as the cargo residues which are currently defined as a separate category of waste under the Directive (including MARPOL Annexes I and II wash waters, as well as MARPOL Annex V cargo residues).

By extension, this would allow for the **waste notification form to be aligned with the IMO Circular MEPC.1/Circ. 834**, notably for the same categories of waste to be reflected. The same would be the case for the waste receipt to be introduced under this option, which would also fully reflect the waste receipt included in IMO Circular 834.

Policy option 3 will also bring the Directive’s **inspections fully under the Port State Control Regime**, which provides for a risk-based selection system of ships for inspection. This would imply that every initial Port State Control inspection also checks compliance with the Directive, in particular the mandatory delivery of ship-generated waste. This will require the Port State Control Directive to be amended to incorporate these inspections, as well as new priority criteria<sup>112</sup> to be incorporated in Annex I to the Port State Control Directive. Combining PRF inspections with Port State Control inspections **would allow for checking MARPOL and compliance with the Directive simultaneously**.

As mentioned before, Policy option 3 also includes measures for improving the adequacy of port reception facilities (defined in accordance with IMO Guidelines), which address both the

---

<sup>112</sup> Additional overriding factors and/or unexpected factors; EMSA assessment of the enforcement options for the revision (see Annex 7)



operational conditions of the facilities through a more refined definition of "adequacy", as well as the environmental operation of the facilities in accordance with EU waste legislation. In addition, it contains measures for improving the incentives for delivery, such as further streamlining the underlying principles of the Cost Recovery Systems, in particular with regard to the requirement for an indirect fee, and providing rebates for ships that reduce waste generation on board ("green ships").

#### **5.3.4. Policy option 4: EU PRF Regime beyond MARPOL**

This option seeks to further strengthen the EU regime for the delivery of all ship-generated waste to port: the mandatory delivery applies to all waste from ships, and this will include an express reference to the waste that can be legally discharged under MARPOL. As demonstrated by the overview of the MARPOL discharge norms, this would mostly have an effect on the delivery of small quantities of oily waste and sewage, which under strict operational conditions can be discharged at sea.

As it was not deemed appropriate to include a discharge prohibition in the Directive (see chapter 5.2 above), the effectiveness of this option depends on a strict enforcement of the mandatory delivery requirement in each EU port. It also depends on a restrictive interpretation of the exception of sufficient storage capacity, backed up by an electronic monitoring and information system<sup>113</sup>, where the information from the advance waste notification as well as the waste receipt will be reported and exchanged between Member States. Policy option 4 would thus require the introduction of a dedicated targeting mechanism, defining the priorities for inspection (to be determined by alerts created on basis of the information notified/reported), as well as an inspection commitment for Member States to check compliance.

Policy option 4 implies keeping the distinction between ship-generated waste and cargo residues<sup>114</sup>, as there are no valid reasons for subjecting the latter to the stricter EU regime, given their specific nature and the fact that they are mostly handled by the terminals, which is different from the ship-generated waste. The cargo residues would thus continue to be delivered in accordance with MARPOL, as is the case under the current Directive.

As a consequence, the forms to be used (waste notification and waste receipt) cannot be fully aligned with IMO Circular 834 either, as MARPOL applies different definitions for cargo residues as reflected in the Circular. Option 4 would only allow for the forms to be aligned with the Circular *to the extent possible*, which has already been the approach adopted so far by the waste expert group for implementing Annex II to the Directive<sup>115</sup>.

This option includes the adequacy measures which build on the definition of adequacy in the IMO Guidelines and the principles of EU waste law. It also includes the measures for improving the incentives for delivery, including the introduction of harmonised criteria for considering a ship to be a "green ship" in the context of the Directive, i.e. that it reduces its waste generation on board, and may thus qualify for a reduction in the waste fees charged by the port<sup>116</sup>.

---

<sup>113</sup> Building on the new version of SafeSeaNet, taking account of the latest changes to Annex II PRF Directive, as well as the dedicated module in THETIS-EU (available since April 2016)

<sup>114</sup> The definition of cargo residues in the Directive includes wash waters, as well as solid/liquid cargo residues, which is different from MARPOL, which only refers to cargo residues in the context of MARPOL Annex V

<sup>115</sup> To implement the changes to Annex II (waste notification) for the electronic reporting of the waste information in the National Single Window, new waste business rules were developed by a group of experts set up under the High Level Steering Group, which were adopted in July 2016 and endorsed by the HLSG in October 2016

<sup>116</sup> Article 8(2)c of the Port Reception Facilities Directive, also referred to as the "Green Ship concept"



### 5.3.5. Policy option variants 3b and 4b: additional focus on marine litter

An option variant has been defined to specifically address the issue of marine litter from ships (mostly covered by MARPOL Annex V waste). This option variant will group all the measures that can effectively make a contribution to reaching the overall reduction target set in the circular economy. The following two approaches are proposed:

- 1. Approach based on incentives:** to provide for a maximum incentive not to discharge at sea but instead deliver the waste to a facility on land, the indirect part of the fee is set at 100%. Furthermore, as has been shown in the analysis, fishing vessels and small recreational craft can be held accountable for a significant part of the marine litter from sea-based sources. Therefore, in this approach fishing vessels and small recreational craft have been included in the indirect fee regime of the Directive. In addition, passively fished waste would also be brought under the scope of the Directive, and arrangements put in place so that this type of waste can be delivered on shore without fishing vessels having to pay additional charges.
- 2. Approach based on enforcement and incentives** (more stringent variant): this approach includes the incentive part mentioned above, but also addresses the enforcement of the waste delivery obligation for fishing vessels and recreational craft. The current regime can be strengthened by including specific targets for these vessels in the Directive, including reporting on the results from inspections in the monitoring and information system (THETIS-EU module). For the enforcement part, a differentiated approach is adopted for fishing vessels and recreational craft, based on GT: Fishing vessels and recreational craft over 100 GT will be targeted, as these vessels according to MARPOL need to carry a garbage management plan on board<sup>117</sup>, which constitutes a crucial document to be checked in the inspection.

This option variant (3b and 4b) will include the adequacy measures, as well as the measures for improving the incentives for delivery, including the Green Ship concept.

The Table below presents an overview of the policy measures per policy option. Please note that all options are scored against the baseline scenario (Policy option 1), which has scores of “0”, and also refers to the relevant Guidance already available (Interpretive Guidelines-IG, Technical Recommendations-TR, and/or Inspection Guidance-IG<sup>118</sup>).

---

<sup>117</sup> MARPOL Annex V, Regulation 10 reads: "the garbage management plan shall provide written procedures for minimizing, collecting, storing, processing and disposing of garbage, including the use of the equipment on board. It shall also designate the person or persons in charge of carrying out the plan. Such a plan shall be based on the guidelines developed by the Organization and written in the working language of the crew"

<sup>118</sup> "IG" refers to Interpretive Guidelines (Commission Notice 2016/C 115/05 providing Guidelines for the Interpretation of Directive 2000/59/EC), TR refers to the Technical Recommendations developed by EMSA (Technical Recommendations for the implementation of the PRF Directive, 2016) and "GI" to Guidance for Inspections (EMSA, 2016)

**Table 9: Policy measures and policy options**

	PO-1: Baseline scenario	PO-2: Minimum Revision	PO-3A: MARPOL alignment	PO-3B: MARPOL alignment - - special focus on marine	PO-4A Stringent PRF regime - - no special focus on marine	PO-4B: Stringent PRF regime - - special focus on
<b>PM-1A:</b> Broaden the scope of the PRF Directive to include MARPOL Annex VI waste (residues from exhaust gas cleaning systems).	0	✓	✓	✓	✓	✓
<b>PM-1B:</b> Reinforce the waste hierarchy as laid down in the Waste Framework Directive, promoting separate collection in view of reuse and recycling of ship-generated waste.	IG		✓	✓	✓	✓
<b>PM-1C:</b> Strengthen the requirements for systematic consultation of stakeholders in the development and updating of waste reception and handling (WRH) plans.	IG	✓	✓	✓	✓	✓
<b>PM-1D:</b> Provide a better definition of 'adequacy' in line with international guidance.	IG	✓	✓	✓	✓	✓
<b>PM-2A:</b> Introduce a shared methodology to calculate the indirect fee, including higher levels of transparency on the various elements of costs charged to port users for the use of PRFs, and introduce the "right to deliver".	0	SL	✓	✓	✓	✓
<b>PM-2B:</b> Introduce a 100% indirect fee for garbage.	0			✓		✓
<b>PM-2C:</b> Incentivise measures that reduce the amount of waste produced on-board. For this, the current provisions for green ships should be further improved.	0	SL	✓	✓	✓	✓
<b>PM-2D:</b> Incentivise the delivery of all waste from fishing vessels and small recreational craft to port reception facilities by including them in the indirect fee regime.	0			✓		✓
<b>PM-2E:</b> Fishing for litter: include passively fished waste into the scope of the Directive and in the indirect fee						
<b>PM-3A.1:</b> Clarify the position of the PRF Directive related to delivery of ship-generated waste. <i>Variant 1:</i> Align the scope of mandatory delivery with the MARPOL discharge norms	0		✓	✓		
<b>PM-3A.2:</b> Clarify the position of the PRF Directive related to delivery of ship-generated waste. <i>Variant 2:</i> Strengthen / emphasize the current Article 7 provision on delivery of all ship-generated waste, beyond the MARPOL discharge norms.	0				✓	✓
<b>PM-3B:</b> Introduce requirement for a waste receipt	0		✓	✓	✓	✓

	PO-1: Baseline scenario	PO-2: Minimum Revision	PO-3A: MARPOL alignment	PO-3B: MARPOL alignment - special focus on marine	PO-4A Stringent PRF regime - no special focus on marine	PO-4B: Stringent PRF regime - special focus on
to be issued upon delivery ( <i>Variant 1</i> : fully aligned with IMO Circular 834, <i>Variant 2</i> : EU waste receipt based on IMO Circular).						
<b>PM-3C.1</b> : Clarify the definition of 'sufficient storage capacity' <i>Variant 1</i> : Sufficient Storage Capacity exception takes account of MARPOL legal discharges	0		✓	✓		
<b>PM-3C.2</b> : Clarify the definition of 'sufficient storage capacity' <i>Variant 2</i> : Sufficient Storage Capacity exception does not take account of MARPOL legal discharges, and is not allowed when the next port of call is located outside the EU.	TR				✓	✓
<b>PM-3D.1</b> : Replace the 25% minimum inspection requirement with a risk-based approach. <i>Variant 1</i> : Incorporate the inspections into the Port State Control Regime (amending Directive 2009/16/EC)	0		✓	✓		
<b>PM-3D.2</b> : Replace the 25% minimum inspection requirement with a risk based approach. <i>Variant 2</i> Dedicated targeting mechanism.	IG, GI				✓	✓
<b>PM-3E</b> : Provide an annual inspection target for fishing vessels and small recreational craft	0			✓		✓
<b>PM-3F</b> : Extend the electronic Monitoring and Information System, based on THETIS (EU) and SSN, to ensure better reporting and exchange of information, including the essential information from the Waste Reception and Handling Plans.	0		✓	✓	✓	✓
<b>PM-4A</b> : Align the definitions of "cargo residues" and "ship-generated waste" with the definitions used in MARPOL	0		✓	✓		
<b>PM-4B</b> : Align and update the forms to reflect the IMO standard (IMO MEPC.1/Circ.834)	0		✓	✓		
<b>PM-5A</b> : Develop common criteria to be applied for the application and approval of exemptions, including the introduction of a standardised exemption certificate, while also setting minimal requirements on information exchange between relevant authorities.	IG, TR		✓	✓	✓	✓
<b>PM-5B</b> : Clarify in the legal text of the Directive that vessels which are operating exclusively within one	IG		✓	✓	✓	✓

	PO-1: Baseline scenario	PO-2: Minimum Revision	PO-3A: MARPOL alignment	PO-3B: MARPOL alignment - special focus on marine	PO-4A Stringent PRF regime - no special focus on marine	PO-4B: Stringent PRF regime - special focus on
port can also be exempted, provided they comply with the relevant conditions.						

As was explained at the beginning of this section, the approximation with the MARPOL convention has been a determining factor in designing the policy options. The degree of alignment with MARPOL differs between the options and is depicted in the Table below.

**Table 10: policy options- degree of alignment with MARPOL**

<i>Policy options</i>	<b>Scope (Ship Generated Waste – MARPOL Annexes)</b>	<b>Definitions (Ship Generated Waste , Cargo Residues)</b>	<b>Delivery obligation vs MARPOL discharge norms</b>	<b>Inspections (PRF vs PSC)</b>
PO-2	+ inclusion Annex VI waste	- distinction between SGW and CR maintained	- delivery beyond MARPOL discharge norms	- PRF inspection regime
PO-3	++ inclusion Annex VI waste, and delete distinction SGW and CR)	++ alignment definitions and forms	+ delivery in accordance with MARPOL discharge norms	+ PSC inspections (of the PRF delivery obligation)
PO-3b (ML variant)	+ inclusion Annex VI waste; - inclusion passively fished waste, and small fishing vessels and recreational craft in CRS	++ alignment definitions and forms	+ delivery in accordance with MARPOL discharge norms	+ PSC inspections (of the PRF delivery obligation, including for fishing vessels and recreational craft > 100GT)
PO-4	+ inclusion Annex VI waste	- distinction between SGW and CR maintained	- delivery beyond MARPOL discharge norms	- PRF inspection regime
PO-4b (ML variant)	+ inclusion Annex VI waste; - inclusion passively fished waste, and small fishing vessels and recreational craft in CRS	- distinction between SGW and CR maintained	- delivery beyond MARPOL discharge norms	- PRF inspection regime

It should also be noted that the measures addressing the **fishing vessels and small recreational** craft in option variants 3b and 4b as outlined above, constitute an add-on to the current regime, which already covers these vessels, but excludes them from the indirect fee, waste notification and the application of enforcement conditions and criteria. The following table provides an overview of the changes envisaged for these vessels under variant options 3b and 4b compared to their current position under the Directive.

**Table 11: position of fishing vessels and recreational craft**

Scope/obligation	Current regime	Option variants 3b and 4b
Overall scope	<b>All ships, including fishing vessels and recreational craft</b> , irrespective of their flag, calling at a port of a Member State	<b>All ships, including fishing vessels and recreational craft</b> , irrespective of their flag, calling at a port of a MS
Payment of the indirect fee	Principles of the indirect fee to apply to ships <i>other than fishing vessels and recreational craft</i> <b>authorised to carry no more than 12 passengers.</b>	Principles of the indirect fee (including 100% indirect fee for garbage) to apply to <b>all ships, including fishing vessels and recreational craft.</b>
Inspections	Any ship may be subject to an inspection.  The criteria and procedures for selecting ships for inspection do not apply to <b>fishing vessels and recreational craft authorised to carry no more than 12 passengers.</b>  Control procedures to be developed for inspections, <i>to the extent required</i> , for <b>fishing vessels and for recreational craft authorised to carry no more than 12 passengers</b>	Any ship may be subject to an inspection.  <b>20%</b> of the total of number of <b>fishing vessels of 100 GT and above</b> calling in the MS annually; <b>20%</b> of the total of number of <b>recreational craft of 100 GT and above</b> calling in the MS annually  Procedures for inspections to be established for fishing vessels and recreational craft <b>below 100 GT</b>

## 6. ANALYSIS OF IMPACTS

### 6.1. Environmental impacts

Environmental impacts, in particular those defined as an increase in waste delivery to port reception facilities and a decrease in waste discharged at sea, are described below per policy option. The impact on the circular economy, which was introduced as an additional objective, has also been included in the assessment of expected environmental impacts of the different policy options.

### 6.1.1. Volume of waste discharged at sea and/or delivered in ports

Policy Options 2, 3, 4 and variants 3b and 4b all envisage the inclusion of MARPOL Annex VI waste in the scope of the Directive (PM-1A), which will require the provision of additional capacity in ports for the reception of this type of waste. Although MARPOL does not allow this waste to be discharged at sea, and requires reception facilities to be provided in ports, the current Directive does not include the corresponding provisions for this type of waste. It can be expected that inclusion of this waste in the Directive will improve enforcement of the MARPOL discharge prohibition and result in more deliveries of Annex VI waste in port<sup>119</sup>. However, this increase in delivery will highly depend on the uptake of Exhaust Gas Cleaning Systems (scrubbers) by the shipping market, which has been estimated at approximately 24,000m<sup>3</sup> of sludge, and 360,000m<sup>3</sup> bleed-off annually<sup>120</sup>.

Also included in all policy options is the strengthened requirement for consultation (PM 1-C), which should improve the adequacy of PRFs as better tailored to the needs of port users. Improved consultation is expected to result in jointly agreed procedures and principles, as recorded in the Waste Reception and Handling Plans, as well as more commitment from port users to the proper management of their waste, including delivery, and more clarity on the operational aspects of the waste delivery and handling process. This should result in more waste being delivered in port.

Besides these, the relatively small number of policy measures in **Policy Option 2** (minimum revision) has a limited combined impact on waste delivery. Through soft law measures, additional waste impact can be generated if Member States wish to adhere to the policy lines recommended.

**Policy Options 3 and 4** both contain additional measures which improve the adequacy of port reception facilities, incentives for delivery of the waste to those facilities, and the exemption regime for ships in scheduled and regular traffic. The measures with the greatest potential for generating increased waste delivery are described below.

As confirmed by the results of the Open Public Consultation<sup>121</sup>, inefficient cost incentives are an important reason for the illegal discharge of waste at sea. By streamlining the indirect fee, and making the link between fees and costs more transparent – while clarifying that the payment of the fee also provides a right to deliver the waste – the incentive regime will be more harmonised, in particular as regards *the level* of the financial incentive provided. A stronger incentive through harmonisation of the indirect fee is expected to lead to more deliveries of the different waste types in specific ports, which before introduction of the measure applied a lower indirect fee. However, it has been questioned whether this will result in an overall increase of volumes of waste delivered at the EU aggregate level<sup>122</sup>.

---

<sup>119</sup>As also confirmed by stakeholders to the targeted surveys: 30 respondents (i.e.73% of the 41 who replied to this specific question) in the targeted survey indicated an expected increase in the amount of scrubber waste delivered to ports from the introduction of this measure, accompanied by a decrease of discharges of this waste at sea, as expected by 15 out of 27 respondents (i.e. 56%).

<sup>120</sup>See Annex 5, waste analysis

<sup>121</sup>59 of the 79 (75%) respondents to the Open Public Consultation considered that inefficient incentives are an important or very important contributing factor to the (illegal) discharge of ship-generated waste and cargo residues at sea. This makes it the first contributing factor according to the responses to the OPC. Respondents were mostly composed of port authorities and their associations, port users, PRF operators and their associations, and Member States authorities

<sup>122</sup>There was general agreement among respondents to the targeted survey that the introduction of a shared methodology to calculate the indirect fees would lead to a higher level of incentive for delivery in port. However, 13 out of 20 respondents on this question (65%) did not expect a significant increase in volumes of waste to be delivered at the aggregated EU level. This was also confirmed by the ESSF PRF Subgroup, which assessed the impacts of the recommendations for streamlining the cost recovery systems as developed by the Correspondence Group



The main differences between Options 3 and 4 in terms of waste delivery will come from the proposed enforcement measures, which are different for the two Policy Options. Generally it can be expected that improved inspections will result in more waste being delivered.

**Policy Option 3** (MARPOL alignment) relies on the inclusion of the inspections in the Port State Control regime. Compared to the baseline scenario, where 25% of all individual ships calling annually need to be inspected, the incorporation of inspections into the Port State Control regime, and the subsequent scope for applying a risk-based approach, will result in a considerable decrease of inspections to be undertaken. At the same time, the system will be more effective than the current regime, as it also allows for checking compliance with the Directive's delivery obligation and the MARPOL requirements through the same procedures, which overall is expected to result in better compliance and implementation than is currently the case<sup>123</sup>. A more effective inspection regime will also have a deterrent effect on ships visiting EU ports, and it is to be expected to result in more waste being delivered, as was also confirmed by 42 % of the respondents to the targeted survey (mainly PRF operators and port authorities).

**Policy Option variant 3b** (MARPOL alignment, with special focus on marine litter) would lead to even more waste to be delivered to port, in particular from the fishing sector. This would result mainly from the following additional measures: PM-2B (100% indirect fee for garbage) is expected to contribute to the delivery of garbage waste, as it should allow the ship, after having paid the indirect fee, to deliver all its garbage to the port without having to pay any additional direct charges<sup>124</sup>. The inclusion of fishing vessels and small recreational craft in the indirect fee obligation would also provide a better incentive for these vessels to deliver their waste to port instead of discharging at sea<sup>125</sup>. This can be further strengthened by more effective enforcement of larger fishing vessels and pleasure craft (over 100GT), which according to MARPOL rules are obliged to carry a garbage management book on board. An additional increase in waste delivered in ports is to be expected from PM-2E (incentivising the delivery of passively fished waste by fishing vessels to port reception facilities through the fishing for litter programmes). This would bring passively fished waste into the scope of the Directive, as well as the indirect fee, allowing fishing vessels to deliver this waste to port without having to pay additional direct charges. A majority of respondents to the targeted survey for the fishing sector (14 out of the 18 who expressed an opinion, i.e. 78%) were in favour of the introduction of the possibility to deliver the waste caught in nets or deliberately retrieved from sea under the indirect fee.

**Policy Option 4** (EU PRF regime, without additional focus on marine litter) is expected to result in more waste being delivered to port reception facilities than policy option 3 (MARPOL alignment), as this policy option would also target the waste that could otherwise be kept on board for subsequent discharge under the MARPOL norms. This would be particularly relevant for sewage, in particular the sewage that has been generated in the port, as well as small quantities of oily waste. As a result, the discharge of these categories of waste at sea is expected to be reduced. However, it should be noted that having a strict delivery obligation in place is not the same as a discharge prohibition (which has been discarded as a policy measure; see chapter 5.2). A delivery obligation will not directly regulate the ship's

---

<sup>123</sup>As explained in the baseline scenario and problem definition, MS currently do not meet the 25% inspection requirement set out in the Directive and insufficient PRF inspections are undertaken

<sup>124</sup>47% of the respondents to the targeted survey confirmed that the application of the 100% indirect fee system for garbage will have a positive impact on waste delivery in ports

<sup>125</sup>However, it should be acknowledged that currently in most fee systems in EU ports, fishing vessels already pay a monthly or yearly fee (as part of the port dues), which should cover their household and operational waste, as reported at the 6<sup>th</sup> meeting of the PRF Subgroup under the ESSF, panel discussion on waste from the fishing sector (4 October, 2016)

operations at sea, but may at most reduce *the need* for the ship to discharge, in particular through a strict application of the exception of sufficient storage capacity on board until the next port of call. If the application of this exception does not take into account potential legal (MARPOL) discharges at sea but requires the storage capacity to be sufficient until the next port, then the ships will have less operational needs to discharge *en route*. Therefore, limited additional waste deliveries may be expected, but will be difficult to estimate due to the fact that this depends on the ship's operations at sea.

In **Policy Option 4b** (EU PRF regime, with special focus on marine litter), additional delivery of garbage waste can be expected, in line with the description of the impacts for Policy option 3b, as explained above.

In **Policy Options 3 and 4** (both variants), a significant contribution to all illegal waste discharges could be provided. While it is not possible to provide an exact quantification of the expected increase in waste deliveries, it is important to note the substantial marginal effects of every 1%-increase in terms of reduction of the waste gap. Taking into account the estimates of the waste gap provided in chapter 2, every 1%-increase in deliveries in all waste categories would result in: 11,900 m<sup>3</sup> of additional oily waste delivered (waste gap reduced by 40%), 12,300 m<sup>3</sup> of additional sewage delivered (waste gap reduced by 9%) and 5,800-8,200 tonnes of additional garbage delivered (waste gap reduced by 2-14%).

This indicates that even slight changes in delivery would have substantial environmental impacts. As regards Policy options 3b and 4b, additional delivery of garbage may be expected in comparison to options 3a and 4a.

The significance of the potential environmental benefits can be illustrated by looking at the example of **garbage** discharges and their potential environmental costs. Every **1% increase** of discharges of garbage at sea, corresponding to between 5,800 to 8,200 tonnes of garbage delivered on-shore, may result in:

- 1.6 to 2.3 M€ beach clean-up costs;
- 1.2 to 1.6 M€ damage for the fishing sector (based on studies mentioned in section 2.1);
- Costs to the marine ecosystems which cannot be monetized, but have been described by marine biologists, as also shown in the environmental vulnerability analysis (annex 8).

These figures also include the garbage waste from fishing vessels and recreational craft, which - considering the share of these vessels in the total annual on-board generation of garbage (30% and 19% respectively, corresponding to 437,000 tonnes of garbage) - contribute significantly to the problem of marine litter and the associated costs. This justifies including specific measures for these vessels in Options 3b and 4b in order to maximise the potential for garbage delivery on shore.

Therefore, even focusing on garbage alone and on those impacts which can be monetised, a 1% increase in delivery of waste to port reception facilities will generate environmental impacts high enough to outweigh the regulatory costs. Indeed, for all the options considered, the order of magnitude of costs does not exceed hundreds of thousands of euros, as opposed to millions of euros as regards the expected environmental benefits.

**Table 12: Waste potentially discharged at sea in the baseline scenario (as absolute value and as percentage of total waste to be delivered)**

Oily waste	Sewage	Garbage (*including fishing vessels and small recreational craft)	Annex VI waste
31,000 m <sup>3</sup> (2.5%)	136,000 m <sup>3</sup> (10%)	60,000-300,000 tonnes (7-34%)	Unknown

The results of the environmental vulnerability analysis indicate that, for a given volume of waste delivered to port reception facilities, avoidable negative environmental impacts are not equal for all types of waste. It appears, for example, that negative effects are higher for garbage in all sea basins. Therefore the potential for additional garbage to be delivered should be assigned a higher weighting factor when considering the actual environmental impacts. Furthermore, for oily waste and sewage, the environmental impacts are different per sea basin. Taking into account the outcomes from the vulnerability analysis, it may be concluded that Policy Options 3b and 4b will generate the highest environmental benefits, as these are the options that are the most effective in reducing garbage.

### 6.1.2. Circular economy

In addition to increasing waste delivery in ports, the options have the potential to contribute to the circular economy, in particular by improving waste management practices in ports as well as on board vessels. This is mostly the case through PM 1B and 1D, which seek to reinforce the waste hierarchy in EU law, in particular through separate collection of waste<sup>126</sup>, and a better definition of adequacy, which should also cover the environmental operation of port reception facilities. In addition, PM 1C seeks to improve consultation of stakeholders in the process, which also allows for the principles of the circular economy to be better implemented<sup>127</sup>. Providing for harmonised criteria for green ships will promote the uptake of sustainable waste practices on board, including segregation and waste minimisation, thus also contributing to the circular economy.

**Policy Option 2** (minimum revision), which includes measures 1C (consultation with port users) and 1D (adequacy definition) as part of a minimum legislative revision, is thus expected to generate a positive impact on the circular economy. However, the important measure of separate collection is not included, limiting this potential contribution. Encouraging incentive schemes to promote better waste practices on board (“green ship award schemes”) can be fostered and aligned through soft law guidance.

Both **Policy Option 3** (MARPOL alignment) and **Policy Option 4** (EU PRF regime) provide for measures 1B (waste hierarchy), 1C (consultation with port users), as well as 1D (adequacy definition), thus including the main elements that will generate positive effects for the circular economy. In addition, both policy options include PM–3B (waste receipt), which may produce additional benefits from increased monitoring of waste streams delivered in ports.

<sup>126</sup> A recent study conducted for DG ENV on separate collection concluded that 'Separate collection of waste fractions leads to higher recycling levels, as the fractions collected separately are usually sent to recovery operations, in particular to recycling' (p.18), [http://ec.europa.eu/environment/waste/studies/pdf/Separate%20collection\\_Final%20Report.pdf](http://ec.europa.eu/environment/waste/studies/pdf/Separate%20collection_Final%20Report.pdf)

<sup>127</sup> Stakeholder involvement may lead to better recycling results as was shown in a recent study carried out by La Sapienza University on door-to-door collection schemes in three communities in Italy; [https://www.uclgcisdip.org/sites/default/files/Capannori\\_2010\\_en\\_FINAL.pdf](https://www.uclgcisdip.org/sites/default/files/Capannori_2010_en_FINAL.pdf).

The policy measures dedicated to marine litter contained in **Policy Options 3b and 4b** are all expected to result in additional deliveries of garbage waste to port reception facilities. This waste, which would also include passively fished waste (i.e. the waste caught in nets during fishing operations) through the application of the fishing for litter schemes, has the potential to be further re-used or recycled. This in turn will generate further revenues for waste operators. These options thus score even higher in terms of their contribution to the circular economy.

**Table 13: Synthesis of environmental impacts**

	Waste delivered	Circular economy
	<i>Potential:</i>	
<b>Option 2</b>	+ for oily waste + for sewage + for garbage	+
<b>Option 3a</b>	++ for oily waste ++ for sewage ++ for garbage	++
<b>Option 3b</b>	++ for oily waste ++ for sewage +++ for garbage	+++
<b>Option 4a</b>	++ for oily waste +++ for sewage ++ for garbage Additional potential for waste treated/legally discharged	+++
<b>Option 4b</b>	++ for oily waste +++ for sewage +++ for garbage (additional potential for treated / legally discharged waste)	++++

## 6.2. Economic impacts

### 6.2.1. Enforcement costs

The enforcement costs comprise all costs borne by the authorities to enforce legislation. These costs are expected mainly as a consequence of the inspection requirements to be included in the revised Directive<sup>128</sup>.

In **Policy Option 2**, no new enforcement requirements are introduced in the revision of the Directive, so there are no additional enforcement costs to be borne.

In **Policy Options 3 (both variants)**, the inspections are incorporated in the PSC Regime (by amending Directive 2009/16/EC). The main benefit from this approach in comparison with the baseline is that through the Port State Control regime the selection of ships will be made

<sup>128</sup> The estimates of inspection costs in this section are based on the EMSA assessment of the enforcement option in **Annex 7**. The calculations depart from the premise that under the PSC regime 15186 inspections are conducted, against 17222 inspections under the current Directive based on the 25% inspection target. Inspection costs under option 3 are based on 15min additional time, whereas under option 4 a 2hr inspection time for a dedicated PRF inspection is assumed, at 21,95 € average wage cost p/hr. For detailed calculations see **Annex 9**

on a risk basis, focused on those ships posing the highest risk. Furthermore, this approach entails clear follow-up procedures in the context of the Port State Control Directive, as well as recording of all inspections in a database (THETIS).

Annually, 15,186 inspections are conducted in EU Member States under the Port State Control Regime. Using the opportunity of these inspections to also check whether the ship has delivered its waste in accordance with the Directive, or whether it has sufficient capacity on board for delivery in the next port, is estimated to cost 85,500€ per year. In order to retain domestic vessels in the scope of the inspections, a separate regime will have to complement the inspections under Port State Control. Checking 20% of all domestic vessels each year (ca. 600 inspections) would cost around 26,000€ on a yearly basis.

In **Policy Option 3b**, in addition to the costs incurred under option 3A, fishing vessels and small recreational craft would also be brought into the scope of the inspection regime. If the target is set at the inspection of 20% of fishing vessels over 100GT and 20% of small recreational vessels over 100GT, the *additional* costs of inspections under these variant options have been estimated at 34,000€ per year (for around 770 vessels).

The total **inspection costs** for **Policy Option 3a** are therefore estimated at 110,000€ per year (for approximately 16,000 inspections) and the total inspection costs for **Option 3b** are estimated at 144,000€ per year (for approximately 17,000 inspections).

In **Policy Option 4 (both variants)**, a dedicated EU PRF regime would need to be developed, with a PRF targeting mechanism allowing for ships to be selected for inspection. The implementation of this dedicated regime would result in a total of 17,000 inspections per year, for which the costs have been estimated to be around 757,000€.

In **Policy Option 4b**, the same additional costs as in **Policy Option 3b** are incurred from bringing fishing vessels and small recreational crafts into the scope of PRF inspections (PM-3E), i.e. with the same inspection target of 20%, resulting in an *additional* cost for inspection of 34,000€ per year (covering 800 vessels).

Thus, the total inspection costs for **Policy Option 4a** are estimated at 757,000€ per year (for 17,000 inspections) and the total estimated costs for **Policy Option 4b** at 791,000€ per year (for approximately 18,000 inspections).

These costs have been compared with the inspection costs from full compliance with the requirements in the current Directive, imposing a 25% minimum yearly inspection target. Based on available data on the number of vessels, this target would translate into 19,500 inspections per year in EU Member States. As the Directive stipulates, it is possible for Member States to conduct the PRF inspections within the framework of Port State Control. The associated inspection costs are estimated to be around 429,000€ per year.

### 6.2.2. Compliance costs

Compliance costs, including the investment and operational costs incurred from complying with the proposed measures, will mostly fall on ports and Member State competent authorities, in particular:

- Ports may have to invest in new facilities or upgrade existing facilities as a result of bringing MARPOL Annex VI waste into the scope of the Directive (PM 1A). The measure is expected to give rise to additional costs for providing adequate storage,



reception and treatment for this type of waste. However, Member States – as contracting parties to IMO – already need to comply with the requirements under MARPOL to provide for adequate port reception facilities, and to deliver this waste on land, as discharge at sea is prohibited under Annex VI. Therefore, it is assumed that basic infrastructure for receiving this waste is already in place in those ports that are regularly visited by ships with scrubbers on board, and compliance costs will therefore be limited<sup>129</sup>.

- In addition, a number of other policy measures (incentive measures PM 2B and PM 2D, enforcement measures PM 3A and PM 3D) are expected to result in more waste, in particular garbage, being delivered to ports as a consequence of better incentives and enforcement. This will require the development of additional capacity for the reception and treatment of the extra waste delivered. On the other side, the incentive measures, in particular measure 2C ("harmonisation of the green ship concept") should facilitate compliance of the shipping sector and reduce the costs associated with waste delivery.
- Ports and municipal authorities will have to provide for **separate collection of waste** from ships<sup>130</sup> (PM 1B), to adjust their **cost recovery system** to provide for 100% indirect fee for garbage (PM 2B), and to rearrange their inspection regimes (3D.1 and 3D.2). At the same time, separate collection is expected to generate new revenues for the ports that can compensate for the new investments in waste collection<sup>131</sup>.

Generally it has been difficult to acquire data from ports as regards the compliance costs (including investment costs) to be expected from the proposed policy measures, as it concerns commercially sensitive data. Although a qualitative description has been provided by stakeholders (see Annex 2 – results from the stakeholder consultation)<sup>132</sup>, no exact figures have been provided, except in the case of the costs incurred with the application of the No Special Fee System in ports, as referred to below.

As regards the **separate collection of waste**, initial costs for the establishment of these systems should be distinguished from annual running costs. Although some data on costs for separate collection systems in EU municipalities is available<sup>133</sup>, these are not directly applicable to ports, as the data apply to households and are quoted per capita. Some parallels may be drawn to the door to door collection system, where in some ports collection takes place through the employment of barges, whereas in other ports a system of bring points or civic amenity sites is in place. However, given that waste generation and treatment on board differs widely from that by households, a direct comparison between persons per household and passengers on board cannot be drawn. Moreover, ports differ widely, in terms of size, type of traffic and administrative organisation, and infrastructure on waste collection and management in many cases also depend on the municipal set up already in place (as required under EU waste legislation<sup>134</sup>). For these reasons, the available data cannot be applied in the context of waste collection in port.

<sup>129</sup> This has been confirmed in the 5 case studies conducted for the Impact Assessment support study (Ecorys, 2017), which indicate that only limited technical adjustments to existing facilities would be required at low investment costs

<sup>130</sup> 24 respondents (68%) to the targeted survey expect an increase in investment costs

<sup>131</sup> As concluded in the Impact Assessment for the revision of the Waste Framework Directive, SWD (2014)207final; part 2/6, and the Eunomia study in support of the waste targets review. This was confirmed by 60% of respondents to the targeted survey who expect separate collection to generate new business for PRF operators

<sup>132</sup> A description of expected impacts from streamlining the principles of the Cost Recovery Systems in article 8 of the Directive was provided by the Correspondence Group set up under the ESSF PRF Subgroup; interim report October 2016

<sup>133</sup> DG ENV study on " **Assessment of separate collection schemes in the 28 capitals in the EU**"; [http://ec.europa.eu/environment/waste/studies/pdf/Separate%20collection\\_Final%20Report.pdf](http://ec.europa.eu/environment/waste/studies/pdf/Separate%20collection_Final%20Report.pdf)); the average costs for the door-to door separate collection system as well as the bring points have been considered in this study. The establishment costs for door-to-door collection systems have been estimated at 3 euro/cap, whereas annual running costs have been estimated at 11 euro/cap. For the bring points, costs are estimated at 5 euro/cap for setting up this system, and 5 euro/cap for running the system

<sup>134</sup> According to article 10 and 11 of the Waste Framework Directive Member States are required to set up separate collection of waste to promote recovery and recycling, where this is technically, environmentally and economically practicable



Concerning the transition to the **No Special Fee System** in ports for the reception and handling of **garbage**, limited data is available. However, the Correspondence Group under the ESSF has reported that the operation of this system in one of the larger ports in the Mediterranean has resulted in a 700,000 euro deficit in 2016, while some of the large ports claimed that the introduction of such a fee system could result in a doubling of the waste fee to cover all the costs related to collection and handling of garbage from ships, including the hazardous waste, which can be very expensive to manage. Acknowledging that this cost is highly dependent on other factors, such as the port's administrative set up, type and number of ships calling and type of waste being delivered, it can serve as an illustration of costs that could be incurred from setting in place and operating the No Special Fee System in a port. At the same time it should be noted that the transition cost for the EU as a whole will be limited, as the majority of ports already has some form of No Special Fee system in place with respect to garbage from ships<sup>135</sup>, and because funds should be available from EU producer responsibility systems for certain waste streams as required under EU waste legislation<sup>136</sup>.

**Policy Option 2** (minimum revision) will not require significant additional investments to what is already undertaken in the baseline scenario. However, the inclusion of MARPOL Annex VI waste in the scope of the Directive may require additional investments in waste reception facilities in ports to handle this specific type of waste, with more impacts to be expected for ports bordering the special Emission Control Areas, i.e. the North Sea and the Baltic, where standards for Nitrogen Oxide (Nox) and Sulphur Oxide (Sox) emissions are more stringent. Otherwise, as option 2 mainly consists of concise legal adjustments to the PRF Directive and soft law measures, limited impact is expected in terms of compliance costs.

Under **Policy Options 3 and 4**, in addition to investing in additional capacity of PRF to receive MARPOL Annex VI waste (as described above), additional compliance costs may be expected for ports in relation to setting up separate collection schemes to receive the waste that has already been segregated on board<sup>137</sup>. Although Member States should already have this system and the related infrastructure in place as required under the Waste Framework Directive, a number of Member States do not provide for separate collection at municipal/port level<sup>138</sup>. As such, implementing this requirement for separate collection of waste in ports, should also help improve Member States' compliance with obligations under EU waste legislation, which should be considered positively in the overall assessment of the compliance costs of these options. Operational costs may also be incurred through the creation and implementation of incentive schemes based on harmonised criteria for recognising green ships, which reduce the amount of waste produced on board (PM 2C).

Furthermore, additional compliance costs may be expected for Member State authorities under **Policy Options 3b and 4b** from the transition to the 100% indirect fee system for garbage (PM-2B). This applies in particular to the initial phase when the existing Cost Recovery Systems will have to be re-designed to meet the criteria of the 100% indirect fee

---

<sup>135</sup> According to an assessment done by EMSA, only 4 out of the 23 Member States with ports, currently do not operate a 100% indirect fee (or No Special Fee) system for garbage, i.e. the Netherlands, Belgium, Greece and Malta

<sup>136</sup> In particular as required by Directive 2008/98/EC (Waste Framework Directive), Directive 2012/19/EU (Waste Electrical and Electronic Equipment) and Directive 2006/66/EC (Batteries)

<sup>137</sup> Under the proposed revision of the Waste Framework Directive 2008/98/EC (chosen scenario 17), recycling collection costs per se denote a cost to society. However, the savings from residual waste collection and treatment outweigh the costs of recycling collection and add up for EU28, over the period 2015-2035, to a financial benefit of €4.93 Billion in 2015 real term prices. The net social costs for EU28 amount to €24.50 Billion over the same period. (see Eunomia, (2015), Support to the Waste Targets Review, Analysis of new Policy options, pages 66, Figure 4-22, and 68. Table 4-10)

<sup>138</sup> Where this is not deemed "technically, environmentally and economically viable" as specified in article 10 and 11 of Directive 2008/98/EC on waste

system. This system requires the indirect fee, which is to be paid irrespective of delivery, to cover all of the costs from the reception and handling of the garbage delivered. As such, payment of the fee should allow the ship to deliver all its garbage without having to pay any additional fees. It should be noted that the majority of MS already have this system in place for receiving garbage from ships<sup>139</sup>. If fishing vessels and small recreational craft are also included in the 100% indirect fee systems (PM-2D), including the waste collected under the "fishing for litter schemes" (PM-2E), compliance costs for ports may increase<sup>140</sup> because of the additional waste being delivered. However, these may be offset by a decrease in waste accounting costs, as passively collected waste will no longer have to be distinguished from the waste generated by the vessel itself<sup>141</sup>. At the ship side, operational costs are expected to increase as a result of additional handling and storage of waste, including passively fished waste, although this cost increase will in principle be limited given the non-mandatory nature of the fishing for litter schemes.

The operational costs for **Policy Option 4** (EU PRF regime) are higher than in Policy Option 3 and are mostly related to the enforcement measures, such as the provision of specific training for inspectors to be able to implement the new/dedicated inspection regime (PM 3.D2), as well as the extension of the electronic monitoring and information system to provide for operational alerts (PM-3F)<sup>142</sup>.

### 6.2.3. *Administrative burden and simplification*

Administrative burden comprises all costs borne by businesses, citizens or organisations as a result of administrative activities performed to comply with information obligations contained in the legislation. In the context of the Directive, information obligations are primarily borne by ship owners through having to submit the Advance Waste Notifications, and through the provision of information and documents during inspections. Furthermore, ports/competent authorities are facing administrative burden from assessing the Advance Waste Notification, assessing and granting exemptions and reporting/documenting the results from inspections (see chapter 2.2.2). Therefore, the administrative burden is most likely to be affected by the policy measures improving the consistency in **definitions/forms**, as well as the **enforcement and exemption regimes**.

Time spent by port users during inspections to demonstrate compliance is also considered as administrative burden from the port user's perspective. Applying the standard cost model, the total time spent in inspections determines the amount of administrative burden borne by the port users. As developed in previous sections, different options provide for different enforcement regimes.

The Territorial Impact Assessment has shown that positive impacts in terms of governance effectiveness may be expected in certain regions in the EU. In particular, the coastal areas in the Eastern part of the Baltic Sea, as well as EU coastal regions bordering the Black Sea, may benefit from the revision of the Directive, especially the measures aimed at simplifying and

<sup>139</sup> From the 23 port states in the EU, 19 MS apply the 100% NSF system for garbage (source: EMSA assessment, January 2017).

<sup>140</sup> 8 out of 19 respondents (43 %) to the fisheries survey expect that this will lead to an increase in investment costs. At the same time, the same percentage of respondents believed that this measure will lead to additional business for PRF operators

<sup>141</sup> The total cost of waste disposal is estimated at €2,750,000 (annual cost per vessel: 172 EUR); this figure is based on the large scale fishing fleet of 16,000 vessels. The total cost of additional waste disposal from incorporating the fishing for litter schemes should be offset against the cost that marine litter to the fishing industry, which is estimated at 300 mio EUR annually (loss of revenue) (source: DG MARE)

<sup>142</sup> These costs are estimated at approximately 70,000 Euro for two training sessions per year, and a sum of 30-50,000 Euro for making the necessary changes to the Port State Control Database (EU module for PRF inspections)

improving transparency (PM-2A), which are closely linked to the reduction of administrative burden.

**Policy Option 2** (minimum revision) has some potential for reducing the administration burden by providing a clearer definition of adequacy, as well as (partially) aligning the scope of the Directive with MARPOL by including Annex VI waste, which will also be reflected in the reporting forms used.

Both **Policy Options 3 and 4** are expected to result in administrative burden reduction through the introduction of a shared methodology to calculate the indirect fee, as well as through greater transparency in the relation between fees and costs (PM 2-A). A majority of ports and port users welcome a standard calculation method and clarification of the costs included<sup>143</sup>.

**Policy Option 3** (MARPOL alignment) has the greatest potential for reducing the administrative burden, as this option groups several measures, which all seek to align the PRF system with MARPOL. This alignment also provides significant potential for simplification of the PRF regime, in particular by:

- Aligning the scope of the mandatory delivery obligation with the MARPOL discharge norms (PM 3-A.1), which also allows for mirroring the MARPOL definitions of Ship Generated Waste and Cargo Residues (PM-4A). This in turn will allow for the forms, notably the **advance waste notification**, to be fully aligned with the IMO form (IMO Circular 834) as described in PM4B. Cost savings from this alignment of the waste notification with the IMO Circular are estimated at 2,888,000€<sup>144</sup>. There may be some additional administrative cost from issuing and reporting the waste receipt (PM-3B). However, this is expected to be limited given that in most cases such a receipt is already issued upon delivery<sup>145</sup>, and by extension, information on actual delivery in the *previous* port should normally have been reported through the advance waste notification;
- Incorporating **inspections** within the **Port State Control regime** (PM 3D.1). Expected cost savings from this measure for the crew involved in the inspection on board are estimated at: 386,000€<sup>146</sup>. In addition, clarification of the Sufficient Storage Capacity thresholds in accordance with the MARPOL discharge norms should alleviate the administrative burden for ship operators<sup>147</sup>. Improved reporting and exchange of information (PM 3F) are also expected to reduce the administrative burden on competent authorities and inspectorate bodies in charge of monitoring and enforcement.

Both **Policy Options 3 and 4** include the policy measure on harmonising the **exemption procedures** for ships in scheduled and regular traffic (PM 5-A), which will include the

<sup>143</sup> A Correspondence Group was set up by the ESSF PRF Subgroup in October 2015 to assess the scope of further streamlining the fee systems in EU ports, and issued a list of 9 recommendations to the Commission in June 2016, including a method for calculating the “significant contribution” (which defines the indirect fee). The Correspondence Group included ports, port users and MS competent authorities

<sup>144</sup> This estimate of cost savings for port users is based on an assumed 5% time saving for freighters, with 1hr average time for completing the advance waste notification and 1% for passenger ships, with 4hr average time for the waste notification per port call; for cruise vessels the assumed time saving is also 1%, but with an average 8hrs for completing the advance waste notification; see annex 9 for detailed cost calculations

<sup>145</sup> The case studies conducted in the context of the IA support study (Ecorys, 2017) confirmed that it is already common practice to issue a waste receipt to the ship upon delivery of the waste

<sup>146</sup> Based on a yearly number of 15186 vessels being inspected under PSC yearly, with 15 minutes additional time for the PRF inspection, at 26.60 euro p/hr average wage cost in the maritime sector (Eurostat 2016); see Annex 9 for detailed calculations

<sup>147</sup> The application of different thresholds for determining the sufficient storage capacity in the EU ports, was considered one of the main reasons for unnecessary administrative burden by a majority of stakeholders in the public consultation

introduction of a standard exemption certificate and electronic exchange of information of the exemptions through SafeSeaNet. This approach should make it easier for competent authorities to assess exemption requests, and monitor the exempted ships. Potential gains in time and cost are estimated at approximately 4,100,000€<sup>148</sup>. Also on the ship's side, this should lead to more clarity on eligibility and documentation to be provided, plus reduced time for obtaining an exemption if all conditions have been complied with.

For **Policy Option 3b** (MARPOL – special focus on marine litter) the policy measures to reduce marine litter may create additional administrative burden for smaller vessels and ports, in particular the proposed inspection regime for fishing vessels and recreational craft > 100GT, which will require additional efforts at the inspection as well as the ship's side. At the operational side of the ship, a limited increase of administrative burden on the ship's crew involved in the inspection may be expected, which is estimated at 41 000€ annually<sup>149</sup>. Consequently, policy option 3b is likely to increase the administrative burden to some extent compared to policy option 3A. On the other hand, it is expected that the 100% indirect fee system for garbage will be easier to operate than other systems currently in place, and would result in a reduction of the administrative burden for ports and port users.

For **Policy Option 4** the administrative burden overall has a different outlook. Although administrative costs will be reduced from introducing a more harmonised exemption regime (PM 5-A), the potential for administrative burden reduction of this policy option is limited, as definitions are not aligned with those used in MARPOL, and therefore the reporting forms cannot be standardised with the IMO Circular. The main difference compared to policy option 3 is related to the impact from the enforcement variants under this option: PM-3A.2 (strict mandatory delivery obligation for all waste) may generate an increase in administrative burden, mainly as a result of having a dual system in place with a strong need for inspections. The increase in administrative burden for the crew on board involved in the inspection has been estimated at approximately 400,000 € annually<sup>150</sup>. The introduction of a EU waste receipt (PM-3B.2) that is not fully aligned to the IMO waste receipt is also expected to generate additional administrative burden on port authorities.

The specific policy measures that focus on marine litter included in **Policy Option 4b** may increase the administrative burden even further, to the extent described for option 3b above.

#### **6.2.4. Business for port reception facility operators**

An increase in waste delivery will create new business and revenues for port reception facility operators. Consequently, this impact follows the pattern of volumes of waste delivered in ports, as described under the environmental impacts above.

**Policy Option 2** will only result in a limited increase of waste delivered, and will thus not generate significant additional business for port reception facility operators.

---

<sup>148</sup> This estimate is based on the assumption that around 2500 exemptions are granted annually, with an average of 30 days for assessing and granting the exemption, and an average of 10 days' time reduction expected from the proposed measures; see Annex 9 for detailed calculations. The estimated time gain from having a more harmonised exemption regime was confirmed by the Correspondence Group on Exemptions (set up by at the last meeting of ESSF PRF Subgroup in February 2017, to assess the issue of exemptions and advise the Commission how best to address this in the revision)

<sup>149</sup> Based on an additional 770 inspections, 2hr inspection time and an average hourly wage of 26.60€ (Eurostat, average wage for the maritime sector in 2016); see Annex 9

<sup>150</sup> This estimate is based on the total number 17220 inspections per year under the dedicated PRF inspection regime, with 2hr average time spent by a crew member at 26.60 euro p/hr (average wage cost in the maritime sector in 2016, Eurostat); see Annex 9



**Policy Option 3** is expected to result in increased waste deliveries following the incentive measures (PM 2A, 2B) and the measures improving the enforcement regime (PM 3D.1). This impact will be even higher for **policy option 3b** (MARPOL alignment with special focus on marine litter), as the measures focused on marine litter should result in more waste deliveries from the fishing and recreational sector, with a residual value for subsequent recycling/reuse if handled properly.

**Policy Option 4 (EU PRF regime)** could have an even more substantial impact on business for port reception facility operators, as this policy option strengthens the strict delivery obligation in ports (PM 3A.2) supported by a dedicated monitoring and inspection regime (PM 3D.2 and PM 3F), which is expected to result in more waste being delivered to port reception facilities, in particular sewage. Similar to Option 3b, **Policy Option 4b** (EU PRF regime with special focus on marine litter) is expected to provide an additional increase in business for port reception facility operators, mostly from the waste being delivered by the fishing and recreational sectors.

#### 6.2.5. SMEs

The impact on SMEs is mainly linked to three factors: (i) the impact on waste delivered at ports, creating additional business for port reception facilities, (ii) the position of the fishing sector, affected through a number of policy measures that are specifically targeting this sector, and (iii) the benefits for the recreational sector, in particular local tourism, private marinas, and pleasure craft operators. The port reception facility operators hold a relatively small share of SMEs<sup>151</sup>. The fishing industry on the other side contains a relatively high number of SMEs, with an average share of 54%<sup>152</sup>, whereas the recreational sector also includes a significant number of SME's. Therefore the measures addressing these shipping segments (notably: PM 2D, 2E and PM 3E) are expected to have a significant impact on SMEs.

**Policy Option 2** (minimum revision) will only have a limited impact on SMEs, as it will not include the measures specifically addressing the fishing and recreational sectors. **Policy Option 3** (MARPOL alignment) may have a positive impact on SMEs from the additional business to be expected for port reception facility operators, as described above. This impact is somewhat higher for **Policy Option 4** (EU PRF regime) given the potential for additional waste to be delivered at ports. The most notable impact on SMEs is expected from **Policy Option 3b** and **Policy Option 4b**, given the focus of these variant options on the fishing and recreational sectors by including them in the payment of the indirect fee and the Directive's inspection regime. SMEs are expected to benefit from the proposed incentive measures: encouraging fishing vessels and recreational craft to deliver their waste on land instead of discharging at sea will create more business for the waste operators. Furthermore, the measures are expected to result in a cleaner marine environment, as well as cleaner beaches, which should have a positive effect on the tourism sector in coastal regions (and islands), boosting the local economy. This has also been acknowledged in the Territorial Impact Assessment, which expects the greatest impacts on tourism development in the areas around the Southern Mediterranean and Black Sea.

---

<sup>151</sup> Euroshore, the International trade association of port reception facility providers in Europe, has indicated that only few of its members can be considered as SME's, and the majority belongs to multinational companies or large national companies. Euroshore includes almost 100% of all PRF operators in Belgium, the Netherlands, Spain, Greece Portugal and Bulgaria

<sup>152</sup> During the period 2008-2014; Eurostat labour force survey of fishermen, 2008-2014

### 6.2.6. *Innovation and competitiveness*

Innovation and competitiveness would potentially be fostered by policy measures 1B (reinforcing the waste hierarchy in WRH Plans) and 2C (harmonisation of “Green Ship” criteria for ships that reduce their waste production on board). Implementation of the EU Waste hierarchy in the context of waste management in ports would require establishment of systems for the separate collection of waste from ships, to enable the waste to be further re-used or recycled. Innovative and effective collection systems may have to be developed to ensure high capture rates and revenues, while increasing the revenue from further treatment<sup>153</sup>. Similarly, applying sound environmental practices on board in order to ensure reduced waste production will also require ships to be equipped with innovative systems<sup>154</sup>. In turn, a ship’s environmental performance, certified in accordance with “green ship” criteria, may improve a ship’s competitive position compared to other ship operators in the market.

Conversely, competition between ports may be impacted by PM 2A (shared methodology for calculation of the indirect fee and more transparency between fees and costs), as well as PM 2B (100% indirect fee for garbage) and PM 3A.2 (strict EU mandatory delivery obligation). PM2A envisages more streamlining of the underlying principles of the indirect fee, which should be inherent in every port’s Cost Recovery System. In particular, this should provide more transparency as regards the fee charged and the type of costs covered by these fees, so that port users understand what they are paying for as well as the basic cost calculation. This is expected to provide for a better level playing field for both ports and port users, where these actors compete on basis of equal and fair conditions. PM 3A, which requires delivery of waste beyond the MARPOL discharge norms, may impact the competitive position of the EU port sector, although this effect may be limited as ships will be calling at EU ports for a range of considerations other than the port’s waste policy and fees<sup>155</sup>.

As PM-2C (green ship concept) is included in both **Policy Options 3 and 4**, these options are expected to generate a positive impact on competitiveness and innovation. In addition, both policy options include the PM 2A and 2B, which – as explained above – are expected to create an enhanced level playing field for ports and port users. On the other side, **Policy Option 4** includes PM-3A.2, which may have a negative impact on the EU port sector, making this option less attractive than Policy Option 3 in terms of competitiveness, as reflected in a lower score for option 4.

### 6.2.7. *Third countries, foreign trade and investment*

Limited impact is expected from the various policy options as regards third countries, foreign trade and investment. The impact is particularly linked to PM-3A.2, which proposes a strict delivery requirement for all ship generated waste, including for the waste that can be discharged under MARPOL. As a result, the rules applied in EU ports will be stricter than elsewhere in the world. This may have a negative impact on ship movements to EU ports, and discourage investments in ports that are in direct competition with non-EU ports (e.g. in the Southern Mediterranean). Generally, it may be expected that the stricter the requirements are in comparison with the applicable international obligations under MARPOL, the bigger the

---

<sup>153</sup> A recent study conducted by DG ENV on separate collection schemes in the 28 capitals of the EU has assessed the different collection systems, showing the door-to-door collection system and the pay as you throw system to be the most effective. In addition, the Impact Assessment for revision of the Waste Framework Directive has shown that setting up separate collection systems would positively impact competitiveness and innovation of the manufacturing and waste management sector (page 9) [http://ec.europa.eu/environment/waste/studies/pdf/Separate%20collection\\_Final%20Report.pdf](http://ec.europa.eu/environment/waste/studies/pdf/Separate%20collection_Final%20Report.pdf)

<sup>154</sup> 5 out of the 9 respondents who expressed an opinion in the targeted survey think that harmonisation of the green ship concept would lead to increased competitiveness and innovation, in particular in the European manufacturing industry

<sup>155</sup> The waste fees only constitute a small fraction of the overall port dues to be paid



competitive disadvantages will be that EU ports are facing in view of neighbouring non-EU ports with which they are in direct competition.

On the other side it should be acknowledged that regulatory convergence between EU and neighbouring states, as well as higher global standards, may be fostered through regional agreements, such as for example the cooperation among states surrounding the Mediterranean Sea in the context of the Barcelona Convention<sup>156</sup>.

As this Policy measure is included in **Policy Options 4a and 4b**, these options are expected to have a negative impact on trade and investment, contrary to **Policy Options 3a and 3b**, which may positively influence trade and investments, through seeking closer alignment with the international rules on shipping.

---

<sup>156</sup>The Barcelona Convention for the Protection of the Marine Environment and the Coastal Region of the Mediterranean, adopted in 1995; contracting parties include both EU Member States, as well as non EU MS: Albania, Algeria, Bosnia and Herzegovina, Croatia, Cyprus, Egypt, the European Community, France, Greece, Israel, Italy, Lebanon, Libya, Malta, Monaco, Montenegro, Morocco, Slovenia, Spain, Syria, Tunisia, Turkey

<b>Table 14: Synthesis Econ. Impacts</b>	<b>Enforcement costs</b>	<b>Compliance costs</b>	<b>Administrative burden and simplification</b>	<b>PRF operators 157</b>	<b>SMEs</b>	<b>Innovation and competitiveness</b>	<b>Third countries, Foreign trade and investment</b>
<b>Option 1 Baseline</b>	19,500 inspections 429,000€ per year <sup>158</sup>						
<b>Option 2</b>	<b>0</b> 19,500 inspections 429,000€ per year	<b>0/+</b> (Additional PRF capacity to receive Annex VI waste)	<b>0/+</b> Improved clarity and coherence	+	+	<b>0</b>	<b>0</b>
<b>Option 3a</b>	<b>+</b> 16,000 inspections 110 000€ per year  <i>319,000€ decrease</i>	<b>-</b> (Additional PRF capacity to receive Annex VI waste Separate collection schemes to be set up)	<b>+++</b> Improved clarity and coherence - Waste notification: 2,888,000€ decrease - Exemptions: 4,100,000 € decrease - Inspections (crew's involvement): 386,000€ decrease	++	++	+	+
<b>Option 3b</b>	<b>+</b> 17,000 inspections 144,000€ per year  <i>285,000€ decrease</i>	<b>- -</b> (Additional PRF capacity to receive Annex VI waste Separate collection schemes to be set up CRS: 4 MS to shift to NSF for garbage)	<b>++</b> Improved clarity and coherence - Waste notification: 2,880,000€ decrease - Exemptions: 4,100,000€ decrease - Inspections (crew's involvement): 386,000€ decrease (freight and passenger ships) 41,000€ increase (fishing and recreational craft)	+++	+++	+	+
<b>Option 4a</b>	<b>-</b> 17,000 inspections 757,000€ per year  <i>328,000€ increase</i>	<b>- -</b> (Additional PRF capacity to receive Annex VI waste Separate collection schemes to be set up)	<b>+</b> Improved clarity and coherence: - Exemptions: 4,100,000€ decrease - Inspections (crew's involvement): 397,000€ increase - Waste receipt: not fully aligned to IMO form	+++	+++	-	- (trade and investment)
<b>Option 4b</b>	<b>-</b> 18,000 inspections 791,000€ per year  <i>362,000€ increase</i>	<b>- -</b> (Additional PRF capacity to receive Annex VI waste Separate collection schemes to be set up 4 MS shift to NSF garbage)	<b>+</b> Improved clarity and coherence: - Exemptions: 4,100,000€ decrease - Inspections: 397,000€ increase (freight and passenger ships) and 41,000€ increase (fishing and recreational craft), - Waste receipt: not fully aligned to IMO form	++++	++++	-	- (trade and investment)

<sup>157</sup> Impacts on PRF operators are assumed to be proportional to waste delivery

<sup>158</sup> Actual situation: low number of inspections and costs (1166 inspections have been recorded in THETIS-EU since it has become operational, corresponding to a total annual inspection cost of 25,629€)

### **6.3. Social impacts**

Few social impacts have been identified from the proposed policy options for the revision of the Directive. The possible impacts considered are described below, in particular: employment in the maritime sector and in coastal tourism; working conditions at sea; and environmental awareness.

#### **6.3.1. Employment**

Employment impacts are limited to a number of policy measures, notably those that result in additional volumes of waste to be delivered on land, generating additional business for PRF operators, and those that stimulate the tourism sector through the improvement of the coastal environment. As was shown above, this potential is greatest for **Policy Options 3b and 4b** (with special focus on marine litter), which are expected to generate additional jobs in the area of waste management and nautical tourism. However, for the fishing sector this will depend on the uptake of the fishing for litter schemes in the MS, as participation in those schemes will remain voluntary.

The Territorial Impact Assessment (Annex 8) concluded that in terms of effects on tourism and employment, regional differences are to be expected from the proposed revision: the Black Sea region (Romania and Bulgaria) would benefit the most from the expected growth in tourism, resulting in additional employment in this sector. It was also recognised that the increased quality of the environment could induce a more positive impact on tourism in the Southern Mediterranean coastal regions (Italy and Greece), and reduce out-migration, especially from the islands in this region.

#### **6.3.2. Working conditions at sea**

Some of the policy measures will affect the activities that are carried out on board the ship, such as PM-2C (green ship, including segregation of waste on board the ship) or PM-2E (fishing for litter programmes, which require additional storage and handling of passively fished waste on board). This was also acknowledged by stakeholders in the Territorial Impact Assessment, where the involvement of crew in proper waste handling on board was deemed crucial for ensuring waste reduction and delivery of waste to ports. Similar conclusions were reached in the context of stakeholder dialogue around the issue of waste management practices in the fishing sector<sup>159</sup>.

At the same time, no significant impacts are expected in terms of working conditions at sea or in ports for the different policy options.

#### **6.3.3. Environmental awareness**

The Territorial Impact Assessment concluded that the options for the revision will contribute to more environmental awareness, especially in ports and coastal communities but also among the crew on board ships. This has also been

---

<sup>159</sup> Workshop on best practices in waste collection and handling in Dutch fishing ports, Urk, the Netherlands. 7 March 2017, which advocated an awareness raising campaign aimed at the crew of fishing vessels to keep all waste on board

acknowledged in a recent report on Marine Litter Management Practices for the Fishing industry<sup>160</sup>, which concluded that improved management of waste from fishing vessels raises the awareness around this type of waste as a source of marine litter and also increases the knowledge of sources and pathways of marine litter. Given the special focus of Policy options 3b and 4b on marine litter, these options have the highest potential of raising environmental awareness.

**Table 15: Synthesis of social impacts**

	Employment	Working conditions at sea	Environmental awareness
<b>Option 2</b>	+	0	++
<b>Option 3a</b>	++	0	++
<b>Option 3b</b>	+++	0	+++
<b>Option 4a</b>	+++	0	++
<b>Option 4b</b>	++++	0	+++

The following table synthesizes the assessment of the policy options in terms of environmental, economic and social impacts.

**Table 16: Synthesis of the assessment of the policy options**

	PO-1: Baseline scenario	PO-2: Minimum Revision	PO-3A: MARPOL alignment	PO-3B: MARPOL alignment - special focus on marine litter	PO-4A EU PRF regime	PO-4B: EU PRF regime - special focus on marine litter
<i>Environmental impacts</i>						
Waste discharged at sea	0	+	++	+++	+++	++++
Circular economy	0	+	++	+++	+++	++++
<i>Economic impacts</i>						
Enforcement costs	0	0	+	+	-	-
Compliance costs	0	-	-	--	--	--
Administrative burden	0	+	+++	++	+	+
Business for	0	+	++	+++	++++	++++

<sup>160</sup> Review of Marine Litter Management Practices for the Fishing Industry in the N-East Atlantic Area, Cefas (2017), p. 14-15

<b>PRF operators</b>						
<b>SMEs</b>	0	+	++	+++	++	+++
<b>Innovation and competitiveness</b>	0	0	+	+	-	-
<i>Social impacts</i>						
<b>Employment</b> (Waste management, Fisheries, Tourism)	0	+	++	+++	+++	++++
<b>Environmental awareness</b>	0	0	++	+++	++	+++

## 7. COMPARISON OF THE POLICY OPTIONS

### 7.1. Effectiveness, efficiency and coherence of the policy options

#### PO-2: Minimum revision

The policy option scores relatively low on effectiveness, with only a limited contribution to volumes of waste delivered, reducing the administrative burden and contributing to the circular economy. At the same time, it should be acknowledged that the operational and investment costs of this option are relatively low. The balance between these relatively limited benefits and the minimal operational and investment costs is net positive, making it a policy option that is preferable to the baseline scenario. This policy option is also expected to have a positive effect on coherence: internal coherence will be fostered through clarification of existing rules (mostly in the adequacy cluster) in line with international and EU Guidance, whereas external coherence will benefit from an update of legal references, such as the current PSC Directive and EU waste legislation, as well as the inclusion of MARPOL Annex VI into the scope of the Directive. However, as only few issues can be addressed through a minimum revision of the PRF Directive, this option strongly relies on the development and application of soft law to address the majority of the problems (guidance on adequacy, incentives and enforcement).

#### PO-3a: MARPOL alignment – without special focus on marine litter

This policy option scores well on **effectiveness**, with positive contributions to waste delivery, administrative burden reduction/simplification and contribution to the circular economy. However, as regards the delivery of garbage waste, the effectiveness is limited, mainly because fishing vessels and recreational craft will not be specifically addressed in the proposed measures. On the other side, the policy option significantly decreases the unnecessary administrative burden, which will be less the case for variant options with special focus on marine litter. Policy option 3A also benefits from **synergetic effects** between defined policy measures. Policy measure 3A.1, i.e. MARPOL alignment, adds to the effectiveness of other measures, such as bringing PRF inspections within the scope of the Port State Control regime (through the amendment of Directive [2009/16/EC](#)) and the improvement of

definitions and forms. The main focus on MARPOL alignment also implies that this policy option scores well on coherence, in particular its external coherence to international regulations, whereas inclusion of the PRF inspections in the PSC framework adds to coherence with related EU policy measures.

Although this option will result in additional operational and investment costs, these should be limited because of the basic administrative framework and operational infrastructure already in place, and should be accompanied by substantial benefits. Therefore, this policy option scores positively on efficiency. Other impacts are expected to be limited and for that reason this option scores lower than its variant option focusing on marine litter.

#### **PO-3b: MARPOL alignment – with special focus on marine litter**

MARPOL alignment with a special focus on marine litter scores very well on **effectiveness**. Performance on waste delivery and circular economy is better than in policy option 3A. This policy option also benefits from **synergetic effects** between defined policy measures. Policy measure 3A.1, i.e. MARPOL alignment, adds to the effectiveness of other measures, such as bringing PRF inspections within the scope of the Port State Control regime (though an amendment of Directive 2009/16/EC) and the improvement of definitions and forms. This policy option produces similar benefits for coherence as described for option 3 above, but with even greater potential: through the special focus on the reduction of garbage discharges it directly supports related EU and international initiatives in reducing marine litter, as well as the environmental objectives of the Marine Strategy Framework Directive.

Although investment costs may be higher than for policy option 3a, the increased contribution to the objectives results in a positive score on efficiency. Other impacts outscore the performance of policy option 3a. All in all, this policy option provides a better overall package, based on impacts and costs, as well as synergetic effects between policy measures included in this policy option.

#### **PO-4a: EU regime beyond MARPOL - without special focus on marine litter**

Strict operation of the EU regime, based on a strict mandatory delivery obligation (beyond the MARPOL discharge norms) without a specific focus on marine litter, scores better on the waste delivery objective than policy option 3, but since a strict delivery obligation is not the same as a discharge prohibition, potential gains (in terms of waste deliveries) may still be limited. It also scores relatively well in terms of contributing to the circular economy and also has an overall net result in terms of decreasing the administrative burden mostly from the uniform rules on exemptions. However, gains in administrative burden reduction are certainly not as high as under Policy option 3. The (potential) gains in additional waste delivered are offset by the additional enforcement costs created. With aggregated operational and investment costs similar to policy option 3, this policy option scores lower on efficiency. As regards coherence, the option increases the Directive's internal coherence with EU environmental policy, but at the same time reduces its external coherence with the international regulations (MARPOL). Therefore its net effect on coherence will also be lower than under policy option 3.

Overall, this policy option is considered feasible. Although some additional waste may be collected in ports, the efforts in enforcement required in this policy option



outweigh the environmental gains, and result in this policy option being scored lower than policy option 3a.

#### **PO-4b: EU regime beyond MARPOL– with special focus on marine litter**

Strict interpretation of the PRF Directive, with special focus on marine litter, scores well on the objectives of increasing waste delivery, as well contributing to the circular economy. However, the increase in administrative burden is even more substantial, again negatively impacting overall effectiveness of this policy option. By extension, the additional waste delivered is offset by the overall additional administrative burden. Aggregated operational and investment costs are higher than Policy Option 3 (both variants), resulting in a lower efficiency score. The additional focus on marine litter will have positive effects on coherence with EU and international initiatives on marine litter, in addition to the environmental benefits already attributed to Policy Option 4a. However, similar to Option 4a the positive effects will be off-set by a decrease in coherence with international regulations (MARPOL). Although this Policy Option is considered feasible, the overall balance is lower than policy measure 3b.

The analysis of the options and the comparison is largely in line with the outcome of the stakeholder consultations (as summarised in Annex 2 – synopsis report).

Stakeholders have generally expressed preference for further alignment with MARPOL as the more efficient option, rather than strengthening the EU regime, which would require significant additional enforcement efforts to be made and result in additional administrative burden. For these reasons, the MARPOL alignment option and its marine litter variant were also considered more proportionate than option 4. This also applies to option 3b, where the measures specifically addressing the problem of marine litter were considered justified, given the particularly harmful effects of garbage on the marine environment. Stakeholders acknowledged the potential of the revision for addressing the sea-based sources of marine litter at various occasions<sup>161</sup>, and the need for redefining the position of fishing vessels and recreational craft, given the important contribution of sea-based sources to the problem of marine litter. The issue of Incentives, which is addressed in options 3 and 4, was among the main concerns expressed by stakeholders. Both options envisage the streamlining of the underlying principles of the indirect fee, which is based on a list of recommendations drawn up by the main stakeholders. A number of stakeholders, in particular the ports, have nevertheless expressed concerns over the efficiency of the 100% indirect fee for garbage, as included in option variants 3b and 4b.

## **7.2. Proportionality of the policy options**

The proposed policy options do not go beyond what is needed to achieve the policy objectives. They effectively (to various degrees) reduce discharges of waste at sea and lift unnecessary administrative burden on all stakeholders, as explained below.

---

<sup>161</sup> In particular in the context of the meetings of the ESSF PRF Subgroup, where the issue of marine litter was a recurrent point on the agenda, with the organisation of a panel discussion with the ports, fishing organisations, operators and regional sea conventions held in October 2016; see Annex 2 - synopsis report of stakeholder consultation

**PO-2: minimum revision**

As Policy option 2 only envisages the introduction of minimum legislative updates, reflecting changes in EU legislation, as well as in the international legal framework, the impacts of the revision are limited. As regard the other issues to be tackled, the option relies mostly on soft law guidance.

**PO-3a: MARPOL alignment – without special focus on marine litter**

Policy Option 3 seeks to achieve the objectives mainly by aligning with the international approach (MARPOL), as well as integrating inspections into the Port State Control framework. Further approximation to the international framework generates important efficiency gains, in particular from aligning definitions, forms, and inspection procedures.

**PO-3b: MARPOL alignment – with special focus on marine litter**

The specific problem of marine litter warrants some additional measures, specifically designed to achieve intended discharge reduction at sea through a combination of both incentive and enforcement measures. As enforcement might be disproportionate as regards the smaller vessels, it has been proposed in Policy Options 3b and 4b to take a differentiated approach and apply these measures only to vessels over 100GT.

**PO-4a: EU regime beyond MARPOL - without special focus on marine litter**

Policy option 4 provides stricter requirements, but still limits the additional burden compared to the current obligations, and also provides a risk-based approach for enforcement. While going beyond MARPOL discharge norms, in terms of the scope of the delivery obligation, the idea of an EU discharge prohibition has been discarded, as this would go beyond the objectives of the revision (see section 5.2.1).

**PO-4b: EU regime beyond MARPOL– with special focus on marine litter**

The specific problem of marine litter warrants some additional measures, specifically designed to achieve intended discharge reduction at sea through a combination of both incentive and enforcement measures. As enforcement might be disproportionate as regards the smaller vessels, it has been proposed in Policy Options 3b and 4b to take a differentiated approach and apply these measures only to vessels over 100GT.

As regards the position of **fishing vessels and small recreational craft**, it should be noted that these vessels are already included in the scope of the current Directive, and are only exempted from certain obligations, in particular the advance waste notification, payment of the indirect fee, and inspection criteria and procedures, although the Directive requires Member States to establish control procedures for fishing vessels and small recreational craft, to the extent required. Stakeholders view the inclusion of fishing vessels in the indirect fee favourably, as they have to pay anyhow for the waste they deliver, and payment of an indirect fee should give the right to these vessels to deliver all of their waste (including passively fished waste) without having to pay additional direct charges. The advance reporting by these vessels has been discarded as this would be a disproportionate measure, and for the inspection part a threshold has been applied (100GT and above), so that only the larger vessels will be targeted in terms of inspections. To address marine litter effectively, it is important to include the fishing vessels and recreational craft more comprehensively in the scope of the Directive, given their relatively high share in the contribution to the marine litter problem at sea. As has been shown in section 2.1.1,

i.e. approximately 30% and 19% respectively of all marine litter from ships (the remainder being attributed to merchant shipping).

**Table 17: Comparison of the policy options**

	PO-1	PO-2	PO-3a: MARPOL alignment	PO-3b: marine litter variant	PO-4a: EU PRF regime	PO-4b: marine litter variant
<i>Effectiveness</i>	0	+	+++	++++	+++	+++
<i>Efficiency</i>	0	+	++	++	+	+
<i>Coherence</i>	0	+	+++	++++	++	++
<i>Proportionality</i>	0	+	++	++	+	+

### 7.3. Conclusion

Based on the analysis above, **Policy Option 3b (MARPOL alignment, with special focus on marine litter)**, scores best on effectiveness, efficiency, coherence and proportionality, as also shown in the Table above. This policy option contributes positively to volumes of waste delivered, thereby reducing discharges of waste at sea. It also contributes to the reduction of the (unnecessary) administrative burden associated with the implementation of the Directive, and will positively support the operation of a circular economy. These positive effects will be realised at relatively limited operational and investment cost. Furthermore, this policy option includes a number of policy measures, in particular those in relation to alignment with the MARPOL Annexes, which have synergetic effects. The policy option, and the measures it entails, can be considered proportionate in relation to the problems addressed.

The preferred option also fully delivers on the REFIT objectives of the revision, in particular simplification of the regulatory framework and administrative burden reduction. By seeking further alignment with MARPOL, inconsistencies between the EU framework and the international regime are removed and parallel reporting can be avoided. Through increased electronic reporting and exchange of information and by integrating the inspections within the Port State Control framework, following a risk-based approach, the burden on ports, port users and authorities in the Member States will be significantly reduced.

## 8. MONITORING AND EVALUATION

The Commission services will monitor the implementation and effectiveness of this initiative through a set of core indicators listed in the table below that will measure the progress towards achieving the operational objectives. Some of the indicators are of qualitative nature and show if the desired deliverables are being achieved and

implemented, while others are based on data to be collected that will need to be analysed further.

It is foreseen that five years after the end of the implementation date of the proposed legislation, the Commission services will carry out an evaluation to verify whether the objectives of the initiative have been reached. This is intended to determine whether the new measures in place have resulted in an improvement of the situation, both in terms of increased waste deliveries in port, as well as simplification and reduction of the administrative burden. This evaluation shall be carried out based on the below mentioned core progress indicators in line with Commission requirements on evaluation.

The existing data limitations around volumes of waste being delivered to port, exemptions granted, as well as results from the inspections undertaken, should be addressed through the mix of policy measures included in option 3B: these include the introduction of a **waste receipt**, to be reported into SafeSeaNet, which is expected to generate information on types and quantities of waste actually delivered in ports and facilitate monitoring of the mandatory delivery obligation. In addition, the **exemptions** will also be electronically reported and exchanged through SafeSeaNet, based on harmonised criteria and a standard format, which should provide more information on vessels that have been exempted from the main obligations in the Directive. Finally, the results of inspections will have to be reported into Port State Control database (THETIS), which should allow for operational alerts to be developed for monitoring and enforcement purposes.

**Table 18: Core progress indicators for monitoring purposes**

Operational objectives	Core progress indicators	Source of data
<b>Availability of adequate facilities</b>	Comprehensive WRH Plans;  Basic information on Port Reception Facilities publicly available  Increase in separate collection systems in port	Website of the ports    DG ENV (results from monitoring the new Waste Framework Directive)
<b>Effective (cost) incentives to deliver waste at port reception facilities</b>	Increase in waste deliveries in port	EMSA: SafeSeaNet (waste receipt/Advance Waste Notification)  MS reports
<b>Effective and efficient enforcement</b>	Increase in the number of PRF inspections undertaken  Information on waste deliveries electronically reported	EMSA: THETIS (EU)  EMSA: SafeSeaNet

<b>Harmonised and updated definitions and forms</b>	Level of alignment with MARPOL forms	Member State Competent Authorities  EMSA: SafeSeaNet (waste business rules)
<b>Common rules for exemptions</b>	Electronic reporting and exchange of exemptions	EMSA: SafeSeaNet
<b>Reduction of marine litter from sea-based sources</b>	Fishing gear lost at sea; marine litter found at beaches	Surveys from the Regional Seas Conventions
<b>Reduction of the administrative burden</b>	Amount of time spent in terms of reporting, monitoring and inspections  Monetised equivalent of the time spent based on hourly wage costs in the maritime and public administration sector <sup>162</sup>	Surveys from the Competent Authorities and Ship Operators  Eurostat data for public administrations Eurostat data for the maritime transport sector

<sup>162</sup> Standard cost model should be applied, ref. tool # 53 (cost model for estimating administrative costs) of the Better Regulation Toolbox (2015); see also Annex 9 to this report (calculation of administrative burden and enforcement costs).



Strasbourg, 16.1.2018  
SWD(2018) 21 final

PART 2/2

**COMMISSION STAFF WORKING DOCUMENT**

**IMPACT ASSESSMENT**

*Accompanying the document*

**Proposal for a Directive of the European Parliament and of the Council on port reception facilities for the delivery of waste from ships, repealing Directive 2000/59/EC and amending Directive 2009/16/EC**

{COM(2018) 33 final} - {SWD(2018) 22 final}



## Table of contents

Annex 1 – Procedural information concerning the process to prepare the impact assessment report and the related initiative.....	2
Annex 2 – Synopsis report of stakeholder consultation .....	10
Annex 3 – Affected stakeholders .....	24
Annex 4 – Analytical models used in preparing the impact assessment.....	26
Annex 5 – Total waste volumes and illegal discharges .....	332
Annex 6 – MARPOL discharge norms and relevant amendments .....	47
Annex 7 – EMSA Assessment of the enforcement options.....	52
Annex 8 – Regional differences.....	79
Annex 9 – Calculation of administrative burden and enforcement costs .....	104
Annex 10 – Glossary of terms .....	114

**Annex 1 – Procedural information concerning the process to prepare the impact assessment report and the related initiative**

**Lead DG: Directorate General Mobility and Transport**

Agenda Planning Reference AP N°	Short title	Foreseen adoption
2017/MOVE/1	Revision of Directive on port reception facilities for ship-generated waste and cargo residues	Autumn 2017 (Commission proposal)

**Organisation and timing**

The Inter Service Steering Group (ISSG) for the Impact Assessment was set up in October 2015 and includes the following DGs and Services: SG, SJ, GROW, ENV, MARE, as well as EMSA (European Maritime Safety Agency).

Five meetings were organised between October 2015 and May 2017. Further consultations with the ISSG were carried out by e-mail.

The ISSG approved the Inception Impact Assessment which was published in December 2015. The ISSG also discussed the main milestones in the process, in particular the consultation strategy and main stakeholder consultation activities, the task specifications to launch the contract for the external IA support study, key deliverables from the support study, and the draft impact assessment report before the submission to the Regulatory Scrutiny Board.

**Consultation of the Regulatory Scrutiny Board**

The Regulatory Scrutiny Board ("RSB") received the draft version of the present Impact Assessment report on 24 May 2017. Further to the meeting with the RSB on 21 June 2017, the RSB gave a positive opinion with reservations on 23 June 2017. The opinion included recommendations, which have been addressed in the revised IA report as explained in the table below.

Comments from the Regulatory Scrutiny Board		
<i>Main considerations</i>	<i>Further considerations</i>	<i>How these issues have been addressed in the IA Report</i>
<b>1. The report does not sufficiently explain the added value of the Directive compared to the MARPOL Convention.</b>	The report should further explain the <b>context of the Directive and its added value to MARPOL</b> . It should specifically clarify the legal objectives and enforcement regimes of the Directive compared to MARPOL.	Further explanation on the relationship with MARPOL and EU added value of the Directive has been inserted in <b>section 1.1.2</b> (EU context), together with a table providing for a comparison between the two instruments.
	To understand the problem definition, the report should clarify the <b>EU value added for the last 15 years</b> and the <b>development of the MARPOL Convention and IMO</b> in the period where no amendments	<b>Section 1.1.1</b> (International context) includes an overview of the relevant amendments to MARPOL in the past 15 years; references to these amendments have also been included in footnote 2.

	<p>have been made to the Directive. It should explain issues relating to <b>enforcement</b> and assess them in more detail. The presentation of the <b>baseline</b> in section 2.4 should use this analysis. The services could consider giving a counter-factual assessment like the cost of non-Europe (a no policy option): this could reinforce the justification for the Directive overall and for future amendments in line with MARPOL and IMO amendments.</p>	<p>The EU added value is not only in enforcement, but also in <b>implementation</b> of the main (MARPOL) obligations. Both issues have been explained in more detail in <b>section 1.1.2 and section 2.4</b>.</p> <p>A counter-factual assessment does not seem necessary nor appropriate at this point in time, given that the <b>REFIT Evaluation</b> made a detailed assessment of the Directive, and concluded that the Directive has been relevant, effective and efficient (be it partly) and has had clear EU added value. This is explained in section 1.2, and further references to the outcome of the REFIT Evaluation have been included.</p>
	<p>The problem description should clarify the respective <b>magnitude and order of importance</b> of the <b>two problems</b> (ship-generated waste and administrative burden). The report should reflect this in the hierarchy of <b>objectives</b>.</p>	<p>The respective magnitude and order of importance of 1/ waste being discharged at sea and 2/ administrative burden have been made more explicit in the introduction of <b>section 2.1</b>.</p> <p>Furthermore, in <b>Chapter 4</b> (objectives), it has been explained why objective 1 ("reduction of discharges of waste at sea") ranks as the primary objective and the reduction of administrative burden as the secondary objective.</p>
	<p>It should also better explain the importance of further reducing waste disposal at sea, given the already good performance on the collection of oily waste and sewage.</p>	<p><b>Section 2.1.1</b> (waste discharged at sea) explains why every tonne of waste discharged by ships should be avoided, taking into account adverse effects on the marine environment, with reference to significant costs in relation to beach clean-up, oil recovery operations and damage to the fishing sector. Given the environmental vulnerability of all sea regions to garbage, this is most apparent for garbage, but also applies to the other waste categories.</p>
<p><b>2. The report lacks a clear description of how far the policy options are in line with, or go beyond, the MARPOL Convention in terms of scope and content.</b></p>	<p>The report needs to further develop and explain the <b>content of the policy options</b>. It should specify <b>in how far the policy options are in line with the MARPOL Convention</b> or deviate from it, i.e. go beyond in scope and content, in particular regarding enforcement. For <b>option 3</b>, the report should explain whether the revision of the Directive would be a <b>mere alignment with the convention</b>, or would add <b>additional aspects</b> not covered by MARPOL.</p>	<p>The report includes additional explanations in section 5.3., with an additional table comparing the different policy options to MARPOL. As explained in <b>section 5.3.3</b>, the MARPOL alignment option <b>does not equal full alignment</b> with the Convention, as this would mean retracting fundamental obligations, such as the WRH Plans, exemption regime and the fee systems, which have proven to be effective and useful (REFIT Evaluation and previous assessments).</p> <p>A discarded policy option has been included in a <b>new section 5.2.2</b> in the report which is "full alignment with MARPOL", providing the reasons/explanation why this is not considered a viable option.</p>

	<p>Furthermore, the report should explain how, under the various policy options, the Directive will meet its objectives in <b>maritime areas bordered by non-EU countries and how the Directive will interact with MARPOL and with regional agreements.</b></p>	<p>The Report explains for the different options in <b>section 6.2.7</b> (third countries) – where relevant – how these may influence the relation with bordering non-EU countries (this is particularly relevant for application of the mandatory delivery obligation, which may play out differently for the options 3 and 4).</p>
<p><b>3. The impact analysis does not demonstrate the proportionality of the policy options, in particular the extension of fees to fishing and recreational vessels.</b> Moreover, the assessment focuses exclusively on administrative costs, ignoring compliance costs and investment costs.</p>	<p>The impact analysis should clarify the <b>scale of the environmental benefits</b>: this would allow their comparison to the costs of the policy options. [...] In particular, the analysis should show the relation between the costs of the <b>extension of the scope of the Directive to fishing &amp; recreational vessels</b> (option 3b) and the expected environmental benefit of further reducing marine litter.</p> <p>The report should present <b>orders of magnitude of compliance and investment costs</b>: this would clarify their importance relative to administrative costs. It would also allow a more meaningful comparison with the benefits of the policy options.</p>	<p>It has been explained in <b>section 7.1</b> for each one of the options that they are proportionate in relation to intended objectives.</p> <p>More elements of a cost-benefit have been introduced in section 6.1 (environmental impacts), showing the order of magnitude of expected benefits from a 1% increase of garbage deliveries to port.</p> <p>Compliance costs, including investment costs/impacts, are described in qualitative terms in the report (<b>section 6.2.2</b>). The same section also explains why these costs are not expected to be significant and how in some cases will even be reduced by the proposed measures. The comparison in <b>table 10 (p. 58)</b> also shows that the enforcement and administrative costs are expected to be the more important than the compliance costs.</p> <p>Additional efforts have been made to gather the relevant quantitative data from the ports on <b>setting up separate collection systems and establishing NSF for garbage</b>. However, limited feedback was received, as it concerns commercially sensitive data. Data from DG ENV study on separate waste collection in EU MS has been quoted in <b>section 6.2.2</b>, and it has been explained why these figures cannot be applied (directly) in the context of waste management in ports and for calculating compliance costs from setting up separate collection of waste from ships.</p> <p>At the same time it has been noted that the obligation to provide for separate collection already stems from the Waste Framework Directive (where "technically, environmentally and economically practicable") and compliance costs cannot be (fully) attributed to the proposed revision of the PRF Directive.</p>

<b>4. Other issues</b>	The report should <b>systematically explain stakeholders' views</b> throughout the main text, including crews and port staff, in particular regarding the value-added of the Directive and their views on the policy options.	More references to the stakeholder views have been introduced in the different parts of the report. In relation to working conditions on board (considered in <b>section 6.3.2</b> – social impacts, working conditions on sea), reference has been made to discussions in the TIA workshop and best practice examples from a recent Workshop on waste in Dutch fishing ports (March 2017) to illustrate how the proposed measures may impact working conditions on board/involvement of crew on board fishing vessels.
	The report should address the <b>data limitations</b> encountered in the evaluation and the impact assessment. It should assess whether the initiative should include <b>additional measures to ensure the adequate data availability</b> for the monitoring and evaluation.	Data limitations have been more clearly explained in <b>section 8</b> of the report, as well as the way in which these are addressed through option 3b (waste notification, waste receipt, reporting into SSN and reporting of inspection results in THETIS).

### Evidence used in the impact assessment

The IA report and the options considered in the IA report were developed based on the following documents and evidence:

#### Commission documents

- Commission Notice 2016/C 115/05 providing Guidelines for the interpretation of Directive 2000/59/EC on port reception facilities for ship generated waste and cargo residues (31/3/2016);
- Report from the Commission to the European Parliament and the Council: REFIT Evaluation of Directive 2000/59/EC (31/3/2016), COM(2016)168final;
- Commission Communication COM(2009)8 "Strategic goals and recommendations for the EU's maritime transport policy until 2018";
- Commission Communication "Towards a circular economy: a zero waste programme for Europe", COM(2014)398fin
- European Sustainable Shipping Forum, 5th Meeting of the Sub-group on Port Reception Facilities (25/05/2016), meeting minutes.
- ESSF sub-group on Exhaust Gas Cleaning Systems (2016), report.

#### Documents from EMSA

- EMSA technical assessment on the list of open issues in the context of the IA for the revision of the PRF Directive (January 2017); supplement on enforcement (March 2017), available upon request;
- EMSA Technical Recommendations for the implementation of Directive 2000/59/EC (25/11/2016), available on <http://www.emsa.europa.eu/news-a-press-centre/external->

[news/item/2875-technical-recommendations-on-the-implementation-of-directive-2000-59-ec-on-port-reception-facilities.html](http://www.emsa.europa.eu/news/item/2875-technical-recommendations-on-the-implementation-of-directive-2000-59-ec-on-port-reception-facilities.html) ;

- EMSA Guidance for Ship Inspections under the Port Reception Facilities Directive (25/11/2016), available on <http://www.emsa.europa.eu/news-a-press-centre/external-news/item/2876-guidance-for-ship-inspections-under-the-port-reception-facilities-directive-directive-2000-59-ec.html> ;
- EMSA study on the delivery of ship generated waste and cargo residues to port reception facilities in EU ports (Ramboll, August, 2012), available on <http://www.emsa.europa.eu/publications/technical-reports-studies-and-plans/item/1607-study-on-the-delivery-of-ship-generated-waste-and-cargo-residues-to-port-reception-facilities-in-eu-ports.html> ;
- EMSA Note on the inclusion of MARPOL Annex VI in the scope of Directive 2000/59/EC (June 2012), available upon request;
- EMSA note on the revision of MARPOL Annex V and related Guidelines (January 2012), available upon request;
- EMSA working document (2<sup>nd</sup> draft) on the obligation or granted exception for a ship to deliver its waste (article 7, Directive 2000/59/EC) (October 2011), available upon request;
- EMSA Workshop report on Port Reception Facilities for ship-generated waste and cargo residues (April 2011), available upon request;
- EMSA report of an informal meeting with industry on cargo residues (March 2011), available upon request;
- EMSA horizontal assessment report – Port Reception Facilities (December 2010), <http://ec.europa.eu/transport/modes/maritime/consultations/doc/prf/emsa-report.pdf> ;
- EMSA paper on the identification of ships producing reduced quantities of ship-generated waste (September 2008), <http://www.emsa.europa.eu/implementation-tasks/environment/port-waste-reception-facilities/items.html?cid=147&id=714> ;
- EMSA assessment of international instruments covering cargo residues (June 2008), available upon request;
- EMSA Note on Article 9 on exemptions under Directive 2000/59/EC (January 2008), available upon request;
- EMSA Workshop report on the handling of cargo residues (December 2007), available upon request;
- EMSA Workshop report on the Implementation of Directive 2000/59/EC on Port Reception Facilities for Ship-generated Waste and Cargo Residues (September 2007), available upon request;
- EMSA study on ships producing reduced quantities of ship-generated waste – present situation and future opportunities to encourage the development of cleaner ships (HPTI, ISSUS, October 2007) <http://www.emsa.europa.eu/implementation-tasks/environment/147-port-reception-facilities/714-study-on-the-certification-of-ship-recycling-facilities81.html> ;
- EMSA technical report assessing Waste Reception and Handling Plans adopted in accordance with article 5 of Directive 2000/59/EC (2007), available upon request;
- EMSA Workshop report on the cost recovery systems of Directive 2000/59/EC (March 2006) <http://www.emsa.europa.eu/workshops-a-events/188-workshops/564-the-cost-recovery-systems-of-the-directive-20059ec-on-port-reception-facilities-for-ship-generated-waste.html> ;
- EMSA technical report evaluating the variety of cost recovery systems adopted in accordance with article 8 of Directive 2000/59/EC (2006), available on



<http://www.emsa.europa.eu/workshops-a-events/188-workshops/564-the-cost-recovery-systems-of-the-directive-20059ec-on-port-reception-facilities-for-ship-generated-waste.html> ;

- EMSA study on the availability and use of port reception facilities for ship-generated waste (Carlbro, December 2005), <http://www.emsa.europa.eu/publications/technical-reports-studies-and-plans/item/235-a-study-on-the-availability-and-use-of-port-reception-facilities-for-ship-generated-waste-summary.html>

#### IMO Documents

- International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 relating thereto (Marpol 73/78);
- MEPC.1/Circ.671, adopted on 20 July 2009 (Ref. T5/1.01), Guide to good practice for port reception facilities providers and users;
- Circular MEPC.1/circ.834, adopted at the 66th meeting of the Marine Environment Protection Committee, April 2014;
- IMO, 2012, Guidelines for the Implementation of MARPOL Annex V (resolution MEPC.219(63));
- Resolution MEPC.200(62), adopted on 15 July 2011, Amendments to the Annex of the Protocol of 1978 relating to the International Convention for the Prevention of Pollution from Ships, 1973 (Special Area Provisions and the Designation of the Baltic Sea as a Special Area under MARPOL Annex IV);
- Resolution MEPC.201(62), adopted on 15 July 2011, Amendments to the Annex of the Protocol of 1978 relating to the International Convention for the Prevention of Pollution from Ships, 1973 (Revised MARPOL Annex V);
- Resolution MEPC.281(70) (Adopted on 28 October 2016) Amendments to the 2014 Guidelines on the method of calculation of the attained energy efficiency design index (EEDI) for new ships (Resolution MEPC.245(66), as amended by Resolution MEPC.263 (68))

#### External studies and literature

- Panteia, PwC, 2015, Ex-post Evaluation of Directive 2000/59/EC on port reception facilities for ship-generated waste and cargo residues;
- Eunomia, (2016), report for DG ENV, Study to support the development of measures to combat a range of marine litter sources for DG ENV;
- GHOST, (2016), Hands-on Manual to prevent and reduce abandoned fishing gears at sea, ;
- Abandoned, lost or otherwise discarded fishing gear, (2009) United Nations Environment Programme (UNEP), Food and Agriculture Organization of the United Nations (FAO);
- Panteia (2015), Study on the Analysis and Evolution of International and EU Shipping;
- OECD (2011), Strategic Transport Infrastructure Needs to 2030;
- CLIA (2015), Cruise industry outlook 2016;
- UNCTAD shipping statistics;
- <https://www.statista.com> ;
- Shipping statistics and market review 2016, volume 60 - No. 8, (2016), ISL;

- <http://www.cruiseindustrynews.com/cruise-industry-analysis/orderbook-data.html>;
- Report from ESSF sub-group on Exhaust Gas Cleaning Systems (2016);
- DNV-GL (2013), An outlook for the maritime industry towards 2020 – future development in maritime shipping;
- Ensys Energy & Navigistics consulting (2016), Marine Fuels Outlook Under MARPOL ANNEX VI;
- Eunomia, (2015), Support to the Waste Targets Review, Analysis of new Policy options
- Werner, S., Budziak, A., van Franeker, J., Galgani, F., Hanke, G., Maes, T., Matiddi, M., Nilsson, P., Oosterbaan, L., Priestland, E., Thompson, R., Veiga, J. and Vlachogianni, T.; 2016; Harm caused by Marine Litter. MSFD GES TG Marine Litter - Thematic Report; JRC Technical report; EUR 28317 EN; doi:10.2788/690366;
- Newman, S., Watkins, E., Farmer, A., ten Brinck, P., Schweitzer, J-P., The Economics of Marine Litter, Chapter 14 in (eds.) Bergmann, M., Gutow, L., Klages, M., *Marine Anthropogenic Litter*, (2015), Alfred-Wegener-Institut Helmholtz-Zentrum für Polar- und Meeresforschung, Eprint ID 37207, ISBN 978-3-319-16510-3 (eBook), p. 373, referring to Mouat, J., Lozano, R.L. & Bateson, H. (2010), Economic Impacts of marine litter, KIMO International, pp.105.
- UNEP OSPAR (2009). Marine litter in the North-East Atlantic Region: Assessment and priorities for response. London, United Kingdom;
- Unger, A., Harrison, N., Fisheries as a source of marine debris on beaches in the United Kingdom, (2016), Marine Pollution Bulletin, 107, pp.52-58;
- EEA, Report no. 2/2013 'Managing municipal solid waste – a review of achievements in 32 European countries';
- CE Delft (for EMSA), (2016), The Management of Ship-Generated Waste On-board Ships, EMSA/OP/02/2016, Delft, CE Delft, January 2017;
- <http://www.zerowasteurope.eu/downloads/case-study-1-the-story-of-capannori/>
- Cefas, (2017), Review of Marine Litter Management Practices for the Fishing Industry in the N-East Atlantic Area, Cefas

### EU Legislation

- Directive 2000/59/EC of the European parliament and of the Council of 27 November 2000 on port reception facilities for ship-generated waste and cargo residues (OJ L332, 28.12.2000, P. 0081 – 0089);
- Directive 2000/59/EC of the European Parliament and of the Council of 27 November 2000 on port reception facilities for ship-generated waste and cargo residues - Commission declaration (OJ L 332 , 28.12.2000 P. 0090)
- Commission Directive (EU) 2015/2087 amending Annex II to Directive 2000/59/EC (OJ L 302, 19.11.2015, p.99);
- Directive 2002/59/EC of the European Parliament and of the Council of 27 June 2002 establishing a Community vessel traffic monitoring and information system and repealing Council Directive 93/75/EEC (OJ L 208, 5.8.2002, p.10)
- Directive 2009/16/EC of the European Parliament and of the Council on port State control (OJ L 131, 28.5.2009, p. 57);
- Regulation (EU) 2017/352 of the European Parliament and of the Council of 15 February 2017 establishing a framework for the provision of port services and common rules on the financial transparency of ports (OJ L57, 3.3.2017, p. 1);

- Directive 2008/98/EC of the European Parliament and of the Council of 19 November 2008 on waste and repealing certain Directives (OJ L 312, 22.11.2008, p. 3);
- Directive 2005/35/EC of the European Parliament and of the Council of 7 September 2005 on ship-source pollution and on the introduction of penalties for infringements (OJ L255, 30.9.2005, p. 11);
- Directive 2009/123/EC of the European Parliament and of the Council 21 October 2009 amending Directive 2005/35/EC on ship-source pollution and on the introduction of penalties for infringements (OJ L 280, 27.10.2009, p. 52);
- Directive 2008/56/EC of the European Parliament and of the Council of 17 June 2008 establishing a framework for community action in the field of marine environmental policy (Marine Strategy Framework Directive) (OJ L 164, 25.6.2008, p. 19);
- Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy (OJ L 327, 22.12.2000, p. 1) (Water Framework Directive);
- Directive 2010/65/EU of the European Parliament and of the Council of 20 October 2010 on reporting formalities for ships arriving in and/or departing from ports of the Member States and repealing Directive 2002/6/EC (OJ L 283, 29.10.2010, p.1);
- Council Directive 1999/32/EC of 26 April 1999 relating to a reduction in the sulphur content of certain liquid fuels and amending Directive 93/12/EEC (OJ L 121, 11. 5. 1999, p. 13);
- Directive 2012/33/EU of the European parliament and of the Council of 21 November 2012 amending Council Directive 1999/32/EC as regards the sulphur content of marine fuels (OJ L 327, 27.11.2012, p.1); Directive 2008/98/EC of the European Parliament and of the Council of 19 November 2008 on waste and repealing certain Directives (OJ L 312, 22.11.2008, p.3) (Waste Framework Directive)

### **External expertise**

The Commission sought external expertise through a contract for a support study with Ecorys. From the deliverables of this contract, the IA report used in particular the information provided in the case studies and targeted stakeholder consultation, the calculation of the "waste gap" for the baseline, the environmental vulnerability assessment, as well as the qualitative assessment of impacts. As a complement to this work, DG MOVE carried out further quantification of the potential impacts, with the technical assistance of EMSA and based on the data provided by DG MARE and DG ENV.

### 1. Introduction

In the context of the Impact Assessment for the revision of Directive 2000/59/EC on port reception facilities for ship generated waste and cargo residues ("the PRF Directive"), the European Commission (DG MOVE) has undertaken a number of stakeholder consultation activities. Part of these activities were conducted in the context of the Impact Assessment support study (by Ecorys), which was launched in May 2016 to assist the Commission in the Impact Assessment of the options for the revision of the PRF Directive. This report provides an overview of the different stakeholder groups that were engaged in consultation activities, as well as a summary and analysis of the responses received. All aspects of the Impact Assessment were included in the consultation of stakeholders (problem definition, EU dimension, options/measures and potential impacts). In particular, the consultation activities were instrumental in getting a better view of the extent to which the problem drivers identified in the ex-post evaluation of the PRF Directive (Panteia, 2015) contribute to the main problems, and the extent to which the proposed policy measures are adequate to address these problem drivers.

The following consultation activities have been conducted:

- a) Meetings of the “PRF subgroup”, which was established under the European Sustainable Shipping Forum to assist the Commission with the implementation of the Directive as well as the future revision, bringing together the main stakeholders (ports, port users, PRF operators, MS authorities, NGOs, etc.). The Group has had 7 meetings between February 2015 and February 2017, the last three of which focused primarily on the Impact Assessment.
- b) An Open Public Consultation (OPC), conducted from July to October 2016;
- c) Targeted (impact) surveys addressed to the ports and port users, conducted in the Autumn of 2016;
- d) Interviews with key stakeholders;
- e) Case studies conducted in 5 ports in different EU regions;
- f) An Expert Workshop organised with DG REGIO in March 2017 in the context of a Territorial Impact Assessment.

The outcome of these consultation activities has provided valuable feedback for the Commission’s Impact Assessment report.

### 2. Consultation methods

#### *2.1. Work of the “PRF subgroup” within the context of ESSF*

The PRF subgroup was established in December 2014 to advise the European Commission on issues related to the implementation and operation of Directive 2000/59/EC, as well as on the need and scope of a possible revision of the Directive. The Subgroup has provided a wide stakeholder platform for sharing best practices and experience with the implementation and enforcement of the PRF Directive. In addition, the PRF Sub-group has provided direct input and expertise to the impact assessment process for the options of the planned revision.

### ESSF PRF Subgroup

PRF Sub-Group set up under the European Sustainable Shipping Forum brings together the main stakeholders, i.e. representatives from shipping companies, ports, port reception facility operators, terminal operators, Member State competent authorities, NGOs. The following organisations are members of the Subgroup:

Maritime and Coastguard Agency (UK), Department of Transport (UK), Public Waste Agency of Flanders, Transport Safety Agency(FI), Ministry of Shipping, Maritime Affairs & the Aegean of the Hellenic Republic (EL), Ministry of Maritime Affairs, Transport and Infrastructure (HR), Dutch Ministry of Infrastructure and the Environment (NL), Miljøministeriet (DK), Swedish Transport Agency (SE), Ports of Stockholm (SE), Executive Agency "Maritime Administration" (BG), Port services and Ecology Directorate, Bulgarian Ports Infrastructure Company (BG), SHIP-SERVICE SA, Environmental Protection Department (PL), Ministry of Economic Affairs and Communications (EE), Ministry of Transport, Communications and Works(CY), Maritime Ports and Inland Waterway Transport Sub-Directorate, Ministry of Ecology, Sustainable Development and Energy (FR), ESPO Ports of Stockholm, ESPO Port of Amsterdam, ESPO Port of Barcelona, ESPO Port of London Authority, ESPO, Finnish Port Association, Irish Ports Association, Danish Ports Association, Baltic Ports Organization, FEPOR, PORT Deltalings, FEPOR Voltri Terminal Europa SpA (Genoa), FEPOR Port of Kiel, ECSA German Shipowners' Association (VDR), ECSA Environmental affairs, Koninklijke Vereniging van Nederlandse Reders (KVNR), ECSA Union of Greek Shipowners (UGS), ECSA Costa Crociere, ECSA, ECSA DFDS A/S, CLIA Europe, CLIA Europe, CIN SNAM SpA, MAERSK, INTERTANKO, Euroshore International, SEAS AT RISK, WASTE FREE OCEANS, EGCSA ,EGCSA the Nord Group, Behörde für Stadtentwicklung und Umwelt Hamburg (BSU), C/O HANSESTADT BREMISCHES HAFENAMT, FEPOR, ECOIMSA-TRADEBE , Veolia Southampton, MAC, Euroshore International, Hellenic Environmental Center, Antipollution S.A.

Seven meetings of the Group were conducted between February 2015 and February 2017; whereas, the first meetings were more focused on the implementation of the Directive and the REFIT Evaluation, the last three meetings focused more on the Impact Assessment for the revision of the Directive. Issues that were discussed in the various meetings of the Group included the following: defining the adequacy of PRF, harmonization of fee systems, the use of existing standards and forms, exemptions for ships in regular and scheduled traffic, the delivery of waste from fishing vessels and the link with marine litter, the enforcement of the mandatory delivery obligation, and the application of the waste hierarchy in the context of ship-generated waste.

The subgroup has also established links to other Subgroups within the ESSF, in particular the Scrubber Subgroup, which produced a report on the issue of waste from exhaust gas cleaning systems to support the Impact Assessment for the PRF revision.

Furthermore, three Correspondence Groups were set up to further develop certain key issues:

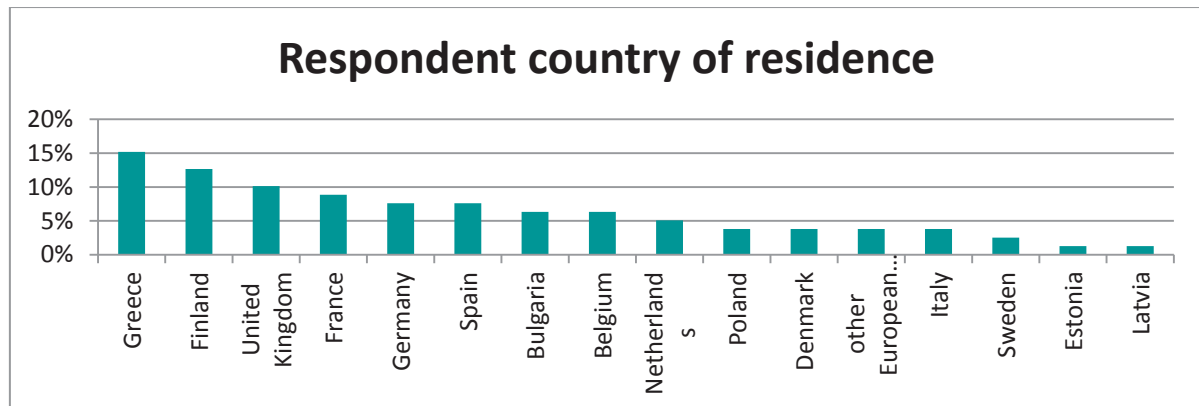
1. A Correspondence Group on the Cost Recovery Systems, which produced a list of recommendations to the Commission with an assessment of the expected impacts from the recommended measures;
2. A Correspondence Group on exemptions, which has provided important input to the impact assessment on how to improve the current exemption regime;
3. A Correspondence Group on the issue of Ozone Depleting Substances.



## 2.2. Open Public Consultation

The Open Public Consultation (OPC) on the Impact Assessment for the revision of the PRF Directive was launched by the European Commission on 13 July 2016 and remained open until 16 October 2016. The main objective of the OPC was to get a better view of the extent to which the identified problem drivers contribute to the illegal discharge of waste at sea and of whether the proposed policy measures are appropriate to address these problems drivers.

The Commission received 79 responses<sup>1</sup>. The respondents came from fifteen different Member States as well as from two non-EU countries:



The results of the OPC reflect the views from the stakeholders that are most likely to be affected by a revision of the Directive. The respondents were almost exclusively interested parties with a high level of expertise. Indeed, out of 81 respondents, only 5 filled in the survey under their personal capacity and only 5 of the respondents did not belong to one of the identified key stakeholder groups. In addition, all but 3 of the respondents indicated that they had a good knowledge of the topic of PRF and the issues at stake. However, as with all such open surveys, the results cannot be considered as representative of the opinions all EU stakeholders. One third of the responses were provided by ports (i.e. Port Authorities and Port Associations – 26 respondents), which appear to be the group most interested in the revision of the PRF Directive. The port users also participated in the consultation (i.e. Shipowners and their Associations – 13 respondents), as well as the port reception facilities operators and their associations (10 respondents), Member States authorities (11 respondents) and a number of Non-Governmental Organisations (4 respondents).

Moreover, as part of the public consultation, seven position papers were received from a variety of stakeholders including industry associations and private companies.

**Table 1: Classification of stakeholders responding to the public consultation**

Stakeholder category	Number of responses	% of responses
European & National shipping Associations	4	5%
Ship-owners/operators	9	11%

<sup>1</sup> Two additional responses were sent in after the submission deadline, and were taken also into account separately, bringing the total number of respondents to 81.



Stakeholder category	Number of responses	% of responses
Port associations	3	5%
Port authorities	23	28%
PRF operators associations	2	2%
PRF/ waste operators	8	10%
Member State (all relevant agencies, including ministries and inspectorates)	11	14%
National government from non-EU Member State (including acceding and candidate countries)	2	2%
Environmental and all other NGOs	4	5%
Other (private sector & industry associations)	10	12%
Personal Capacity	5	6%
<b>Total</b>	<b>81</b>	<b>100%</b>

### **2.3. Targeted surveys**

#### *i. Port Stakeholders*

The targeted survey for port stakeholders was launched on 07 October 2016 and remained open until 26 November 2016. There were 78 respondents to the surveys; however, 59% of the questions were only partially completed. Representatives of the port sector made up the biggest group of respondents (34 respondents i.e. 43%); 15 were port-users (19%); 10 respondents represented the PRF operators (13%) and 14 respondents were competent authorities (18%). Stakeholders were asked to assess the expected impacts of each policy measure.

#### *ii. Fisheries*

The targeted survey for fisheries was launched on 7 October 2016 and remained open until 09 November 2016. There were 48 respondents to this survey, of which half replied on an individual basis and half on behalf of an organisation. 65% of the questions in the survey were only partially completed.

### **2.4. Interviews with key stakeholders**

5 exploratory interviews were conducted at the beginning of the Impact Assessment Support Study. Subsequently 45 interviews (around half of them in the context of a case study, see next point) have been conducted with stakeholders representing the various sectors affected. The main objective was to obtain their views on the possible measures and their expected impacts. The interviews have provided in depth information and filled data or knowledge gaps left by the surveys.

### **Stakeholders targeted through surveys and interviews**

The targeted surveys and the interviews conducted by the contractors in charge of the Impact Assessment support study aimed at a wide coverage of stakeholder types. The following stakeholders were among the ones contacted:

- Port associations: ESPO, Baltic Ports Organisation, ABP, NAPA
- Individual port authorities, including members of the above associations, covering different segments, locations and size categories
- European associations of port users: ECSA, CLIA, Interferry, Intertanko, Intercargo, EBA, Fonasba
- National associations of port users: EU ship owner associations and selected third countries (flag states)
- Individual ship owners / operators
- Associations of PRF operators: Euroshore (port waste reception operators), Feport (terminal operators), SIGTTO, port specific associations (e.g. Deltalinqs)
- Individual PRF operators: waste reception operators members of Euroshore
- Member States: all MS's relevant agencies (ministries or inspectorates)
- Other organisations: IMO, EMSA, sea basins organisations (HELCOM, OSPAR, Barcelona & Bucharest Conventions), REMPEC (assisting Mediterranean countries implementing MARPOL), UNEP (implementing Barcelona Convention), environmental and other NGOs
- Fisheries sector: Europeche, KIMO
- Marinas and nautical sector: EBA

### ***2.5. Case studies conducted in 5 ports in different EU regions***

The following five ports were selected for the case studies to represent ports in the different European Sea Basins:

- Copenhagen (Baltic Sea)
- Antwerp (North Sea)
- Constanta (Black Sea)
- Genoa (Mediterranean)
- Le Havre (Atlantic).

The five selected ports cover both smaller ports (Genoa, Constanta) as well as larger ports (Antwerp, le Havre), as well as different port types ranging from mostly passenger ports (Copenhagen) to ports with a specific focus on cargo (Antwerp). These ports were also selected based on differences in:

- Waste type and volume actually collected;
- Applied waste notification system;
- Applied cost recovery system;
- Role and responsibilities regarding waste handling in the port;
- Ownership and operation;
- Contractual framework;
- Impact of the PRF Directive.

The case studies consisted in a combination of desk research, surveys (with close-ended questions about the current situation and open-ended questions about potential impacts of measures) and interviews with a balanced range of stakeholders.

### ***2.6. Territorial Impact Assessment through an expert Workshop (DG REGIO)***

An expert workshop was organised by Directorate General of Regional and Urban Policy (DG REGIO) in collaboration with Directorate General for Mobility and Transport (DG MOVE) on 17 March 2017. This workshop applied the TIA tool of the ESPON 2020 Cooperation Programme and was attended by 17 participants including experts from different regions in the EU. The results of the territorial impact assessment expert workshop on revision of the PRF Directive are summarised in annex 8 of this IA.

#### **Territorial Impact Assessment workshop**

Representatives of the following organisations took part in the workshop for the purpose of the Territorial Impact Assessment:

Conference of Peripheral and Maritime Regions of Europe, Neptune Lines Shipping and Managing Enterprises S.A., Union of Greek Ship-owners (EL), Carnival Cruise, Autorità di Sistema Portuale del Mare Tirreno Centro Settentrionale, (IT) ECASBA: Federation of National Associations of Ship Brokers and Agents, Port of Rotterdam Authority (NL), Regional Government of Madeira, Madeira Ports Administration Board (PT), Environmental Investigation Agency (EIA) representing Seas at Risk, Grand Port Maritime du Havre (FR), Port of Harlingen (NL), Commission on the Protection of the Black Sea Against Pollution (Bucharest Convention), KIMO the Netherlands and Belgium, part of the international KIMO network, Department of the Environment – University of the Aegean University (EL), Baltic Ports.

## **3. Results of consultation activities**

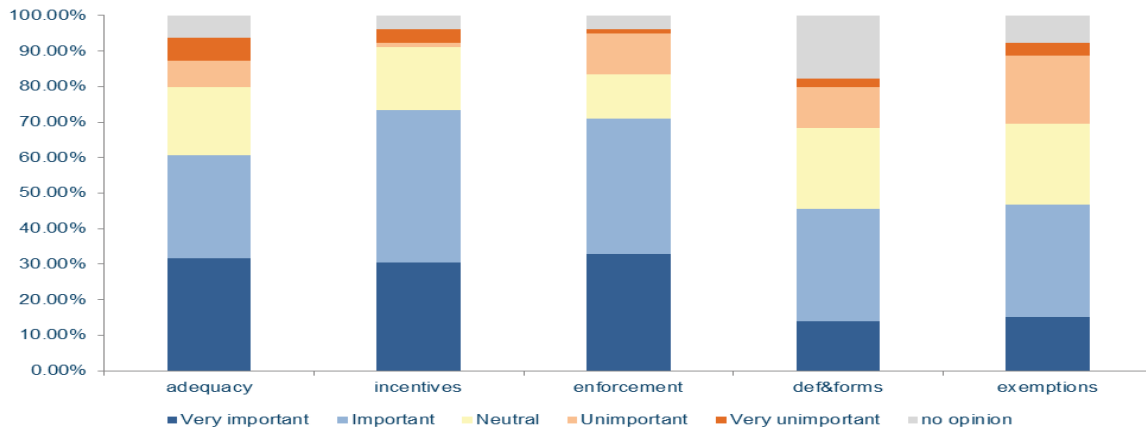
### **3.1. Stakeholder concerns over the current PRF Regime**

The following concerns were raised by stakeholders in all different consultation activities, but predominantly by participants in the ESSF PRF Subgroup:

- Data limitations as regards waste deliveries, waste discharges, adequacy of facilities, and number of inspections undertaken;
- The lack of incentives for ships that minimise their waste on board;
- The waste hierarchy of reduction, reuse, recycling, recovery and disposal not being fully implemented in the ports; lack of separate collection of waste from ships;
- Problems with reporting cargo residues prior to the cargo being landed;
- Competition between ports on waste fees and waste handling processes;
- The lack of transparency in ports, especially on the fee structure and the link between fees and costs;
- The need and feasibility of issuing a waste receipt to ships;
- Difficulties in harmonising the fees structure at EU level;
- Problems in electronic reporting;
- The definition of short sea shipping (SSS) and the administrative burden for ships engaged in SSS from having to comply with the Directive;

- Problems in calculating the Sufficient Storage Capacity on board of a vessel and uncertainty over whether the next port of call has adequate PRF in place.

Both the open public consultation and the targeted consultation confirmed five main problem drivers i.e. **adequacy**, **incentives**, **enforcement**, **definitions** and **exemptions**. The lack of incentives and insufficient enforcement of the mandatory delivery were considered the most important problem drivers, followed by the lack of adequate port reception facilities, and the lack of harmonised exemption criteria. Inconsistent and outdated definitions in the Directive were considered less problematic.



As regards the various policy measures for a possible revision of the PRF Directive, the respondents evaluated five packages of various policy measures (twenty eight in total). The majority of the stakeholders evaluated the policy measures as effective or very effective<sup>2</sup>.

### 3.2. Summary of the input – basic conclusions as regards the identified problem drivers and expected impacts of the proposed policy measures

In general, the consultation revealed that stakeholders across the board, including ports users, operators and NGOs, widely support action at EU level. However, the views of the respondents vary as regards the preferred action to address the main problems, i.e. waste discharged at sea and the unnecessary administrative burden associated with the implementation of the PRF Directive. With regard to the five main problem drivers the following conclusions have been drawn:

#### 3.2.1 Incentives

The most important driver is the issue of incentives. In this regard, the majority of the stakeholders (55 out of 81, i.e. 69%) acknowledged that the **relationship between fees charged to ships and the actual costs** of port reception facilities is unclear or not sufficiently transparent. In the OPC, the port users unanimously supported this view, as well as the vast majority of the Member States and PRF operators. Furthermore, 65% of the port stakeholders supported this view in the OPC (17 out of 26 Port Authorities and Port Associations).

In addition, 51 respondents to the OPC (63% of the total) indicated that a **lack of alignment in the implementation of cost recovery systems** is an ‘important’ or ‘very important’

<sup>2</sup> Please refer to the published “Summary of the Open Public consultation” for an analysis of the responses for each policy measure.

contributing factor to the problem of (cost) incentives not being sufficient for users to deliver waste and cargo residues to port reception facilities.

There was also general agreement that the introduction of a **shared methodology to calculate the indirect fees** may lead to fewer variations between ports in terms of the level of incentives provided, as ports would be incentivising delivery of waste in a similar way. A more harmonised application of the indirect fee is also expected to result in a higher level of incentives for delivery in individual ports. However, at an aggregated EU level, no significant changes in volumes of waste discharged at sea were expected. This is confirmed by respondents in the targeted survey: 13 respondents out of the 20 (i.e. 65%) respondents replying to the question expected no impact from this measure. Providing a methodology and guidelines to the ports for calculation of costs related to ship waste management was welcomed by most ports and port users. Respondents to the targeted survey expected this policy measure to be neutral for investment (50%, i.e. 10 out of 20 respondents to the question), operational costs (38%, i.e. 10 out of 26 respondents) and administrative costs (33%, i.e. 9 out of 27 respondents).

Applying a **100% indirect fee system for garbage** is expected to provide positive impact on waste delivered in ports: 14 out of the 23 respondents who expressed an opinion in the targeted survey (i.e. 61%) confirmed that this policy measure may result in increase of deliveries, whereas only 3 of them indicated that it would lead to a decrease of the quantities of garbage delivered in ports. Moreover, providing incentives for reducing the amount of waste produced on board (**green ship concept**) was expected to have a positive impact on the European manufacturing industry. In this regard, 5 out of 9 of the respondents who expressed an opinion in the targeted survey expect an increase of competitiveness and innovation while expecting a neutral impact (10 out of 25, i.e. 40%) or a slight increase (9 out of 25, i.e. 36%) in the administrative burden.

With regard to the calculation of the waste fee, some ports list the cost breakdown provided by the waste operator directly in the WRH plans, while others try to include other types of cost into the fee, e.g. administrative costs. As indicated by the **case studies**, it is up to each port to decide on the payment flow for waste handling services and to calculate the height of the waste fee. Consequently, the picture is unclear due to the many payment and invoicing systems implemented. In this regard, as confirmed by the ports in the case studies, '**PRF shopping**' occurs frequently. It is considered a good idea to provide a methodology and guidelines to the ports for calculation of costs related to ship waste management. It can be very difficult to calculate the costs when external waste operators are involved in some of the waste operations, and the port itself in others, as it has been confirmed by one of the case study ports.

Further to the above, the ESSF/PRF-SG/Correspondence Group (CG) on **Cost Recovery Systems (CRS)** provided eight final recommendations to the Commission for streamlining the underlying principles of the CRS, including: (1) defining the cost elements of PRF; (2) defining the significant contribution referred to in article 8 of the Directive; (3) providing a method to calculate the 30% significant contribution; (4) including the "right to deliver"; (5) improving transparency; (6) harmonising criteria for "green ships"; (7) adding the type of trade as a new differentiation criterion for the application of fees and (8) introducing auditable PRF service levels. Generally, it was stressed that there should not be an aim for full harmonization, i.e. prescribing one particular cost recovery system for all EU ports, as it is necessary to respect regional differences between ports. Nevertheless, it was acknowledged

that there is a need for more alignment on how the different principles of article 8 should be interpreted and applied.

### **3.2.2 Enforcement**

The issue of the enforcement not being effective was considered as the second most important driver. In this regard, the majority of the respondents in the OPC (56 out of the 81 respondents, i.e. 70%) indicated that the unclear definition of ‘**sufficient storage capacity**’ is an important or very important contributor to the problem of ineffective enforcement. More than 60% of the respondents also indicated a number of additional contributing factors, such as the inconsistency between mandatory discharge requirement (for ‘all’ ship-generated waste) and the MARPOL discharge norms, in particular when the next port of call is a non-EU port, as well as the insufficient use of the waste notification forms by the relevant authorities, which causes that this data is not used for selecting ships for inspection. In addition, the insufficient reporting and exchange of information were mentioned.

As regards the requirement for a **waste receipt**, 6 out of the 16 respondents who expressed an opinion in the targeted survey indicated that this would decrease discharges of waste at sea, while the majority expected a moderate increase of waste delivered to port reception facilities. In addition, 11 out of 23 respondents expressing an opinion expected an increase in administrative burden from this measure, while the same number (i.e. 11) expected the measure to have no impact at all. Likewise, most respondents (13 out of 23) expect a neutral effect for operational costs. The case studies confirmed that, most (larger) ports already have implemented this measure, as it is recommended under MARPOL.

As regards **clarifying the definition of 'sufficient storage capacity'** (as the basis of providing an exception to the delivery obligation), 6 out of 18 (i.e. 33%) of the respondents to the targeted survey expected that this would result in a decrease of the volume of waste discharged at sea or not to have any effect at all (8 respondents i.e. 44%). Some of the respondents (6 out of 24, i.e. 24%) expected an increase of administrative burden, while others (3 out of 24, i.e. 12%) expected this to result in a decrease in administrative burden. It is also noted that 5 out of a total of 23, i.e. 22% of respondents thought that this would result in an increase of operational costs. From the case studies it is noted that port authorities monitoring waste notifications do not encounter many cases of storage capacity limits reached. However, as indicated by the ports participating in the case studies, fixed definitions and/or detailed guidelines on how to respond to ships not delivering waste would be welcomed. One port highlighted frustrations among stakeholders because of the different practices applied for defining “sufficient storage capacity”, and because of the fact that sometimes the ship has to pay despite only delivering small volumes of waste ("application of the indirect fee").

As regards the **replacement of the 25% minimum inspection requirement with a risk-based approach**, in total, 8 of the 14 respondents who expressed an opinion in the targeted survey (mainly PRF operators and port authorities) think that this measure would result in less waste discharged at sea. Most of the respondents expect a moderate increase in the delivery of waste to port reception facilities. Although 6 of the respondents indicated that they expect an increase of the administrative burden from this measure, 11 believed that this was not the case. Only 2 of them expect an actual decrease in administrative burden from this approach.



The case studies have indicated that **data is not systematically exchanged between ports or Member States**. In addition, it was mentioned that unnecessary administrative burden is caused by inconsistent or insufficient implementation of the PRF Directive.

### 3.2.3 Adequacy

The third most important driver is the issue of adequacy of PRF. In this regard, the respondents in the OPC identified a number of contributing factors, in particular: the increased use of exhaust gas cleaning systems, which requires adequate reception of the sludge generated by these systems; the fact that the Waste Reception and Handling (WRH) plans do not properly reflect the waste hierarchy, and the lack of consultation of all port users in the development and implementation of WRH plans.

In the targeted survey, 30 respondents (73% of the 35 expressing an opinion) indicated an expected increase in the amount of scrubber waste delivered to ports from **broadening the scope of the Directive to include MARPOL Annex VI waste**. Similarly, the majority (16 out of the 24 expressing an opinion, i.e. 63%) expected a decrease of discharges of scrubber waste at sea. At the same time, the majority of the respondents also believe that this measure will lead to an increase of the administrative burden<sup>3</sup>, as well as the operational costs<sup>4</sup>. The vast majority of the respondents expressing an opinion (15 out of 17 respondents, i.e. 88%) expect an increase of business for PRF operators as a result of this policy measure, which would also require the PRF operators to invest in additional reception capacity. However, from the case studies it appears that in the five ports reviewed, it would only require simple adjustments, at low investment costs. The five case studies have underlined two key aspects: (i) uncertainty about the delivery of future scrubber waste volumes; and (ii) required investments and operational costs to be strongly dependent on current facilities and systems in place. The interviewees indicated that, so far, they have seen little or no demand for scrubber waste delivery, and stated that it is highly uncertain if this will increase in the near future.

In case of **reinforcing the waste hierarchy** as laid down in the Waste Framework Directive, it should be noted that the majority of respondents (22, i.e. 66% of the 33 who responded to the question, mainly port authorities and ship operators) in the targeted survey believed that this would result in an increase of the administrative burden, while only 3 expect a decrease. Moreover, about half of the respondents expressing an opinion in the targeted survey (17 out of 30, mainly port authorities and PRF-operators) thought this would increase their operational costs, while 7 (23%) expected a decrease. The same trend is confirmed as regards the investment costs expected from this measure. More than two thirds of the respondents (17 of the 23 who expressed an opinion)<sup>5</sup> expect an increase of their investment costs, while 6 (26%) expect no change in costs. A positive effect of this measure in terms of an increase of business for the PRF operators is also expected by two thirds of the respondents (12 out of 18). The five case studies underlined the potential of reinforcing the waste hierarchy, although not much impact on waste delivery is expected.

As regards a possible **strengthening of the requirements for systematic consultation of stakeholders in the development and updating of WRH plans**, the potential of resulting in a decrease of waste discharges was questioned by most stakeholders (only 9 out of 22 respondents expressing an opinion, i.e. 41% expect a decrease in waste discharges against 13

---

<sup>3</sup> 23 out of 35 respondents, i.e. 53%, expect an increase in their administrative burden while 31% believe that they will have a neutral effect.

<sup>4</sup> The respondents (75%) expect an increase in their operational costs as a result of this measure.

<sup>5</sup> Most respondents to this question are either port authorities or PRF-operators.

i.e. 59% who expect no significant result at all or even an increase). On the other side, it was acknowledged that PRF are considered to be more adequate to meet the needs of the ships visiting the ports, if the port users are actively involved in the process of developing and evaluating the WRH plans. However, the operational costs are expected to be low for most stakeholder groups involved, which is also confirmed by the respondents to the targeted survey (32 in total), of which 15 (i.e. 47%) expect no impact, and 4 (i.e. 13%) mentioned a decrease. Around 9 out of 32 (i.e. 28%) of the respondents still expect an increase in costs from this measure. As regards the impact on administrative burden the respondents, almost half expect an increase of administrative burden (15 out of 32, i.e. 47%). In all five ports of the case studies some form of stakeholder engagement in updating the WRH plans is already applied. Therefore, strengthening the requirements for systematic consultation of stakeholders in the development and updating of WRH plans is not expected to cause significant administrative burden.

In terms of **improving the definition of 'adequacy'** in line with international guidance, the stakeholders evaluated the hypothesis that if port reception facilities become more adequate, especially if they are able to cater for all types of waste, it would become easier for ship operators to deliver their waste to a facility. Almost 35% of the respondents (8 out of a total of 23) to the targeted survey are of the opinion that the volumes discharged at sea will decrease. This view is mainly held by the PRF operators. Another 52% of the respondents, (12 out of a total of 23) mainly consisting of port authorities, as well as ship operators/agents, indicated that volumes discharged at sea will *not* be influenced by this measure. Overall, the majority of the stakeholders indicated that the volumes delivered to PRF (for all waste categories) will neither increase nor decrease from having more adequate facilities in place. On administrative burden, opinions varied, but 45% (14 out of a total of 31) of the respondents did not expect any effect from this measure.

The stakeholders identified the issues of definitions and exemptions as less important drivers resulting in waste being discharged at sea. On the other side, many stakeholders<sup>6</sup> indicated that these drivers are important contributors to the problem of administrative burden.

### **3.2.4 Definitions**

In total, 57 out of 81 (i.e. 70%) of all respondents in the OPC indicated that differences in definitions are an 'important' or 'very important' contributor to the problem of administrative burden and 53 (i.e. 65%) of the respondents indicated that reporting forms which are no longer up to date also constitute an 'important' or 'very important' factor adding to the administrative burden. However, the targeted survey has not confirmed these results as, according to the majority of the respondents, aligning the definitions with MARPOL will not influence the administrative burden, as the majority of the respondents (12 out of 25, i.e. 48%) do not expect this to have any effect.

As regards a possible **alignment and updating of the waste notification and waste receipt forms**, more than 50% of the respondents in the targeted survey indicated that they do not expect any impact from this measure on volumes delivered to port reception facilities. At the same time, 11 out of 24, (i.e. 46%) of the respondents also do not expect any impact of this measure on administrative burden, against 5 (i.e. 21%) (predominantly port authorities) who expect an increase in the administrative burden and 7 (i.e. 29%) (predominantly ship-owners

---

<sup>6</sup> see OPC results.

and operators) a decrease. However, the case studies have indicated a potential reduction of administrative burden due to this measure.

As regards **aligning the definitions for cargo residues and ship-generated waste** used in MARPOL, the case studies also confirmed a potential reduction of administrative burden due to this measure. Four out of the five ports indicated that any alignment between EU legislation and MARPOL is welcomed, as it will result in a reduction of the administrative burden in general and for ships coming from outside the EU in particular.

### *3.2.5 Exemptions*

Inconsistent application of exemptions is considered to have a high impact on administrative burden as indicated by 55 out of 81 (i.e. 68%) of the respondents in the OPC. For the possible development of **common criteria for exemptions** most respondents in the targeted survey (10 out of 18, i.e. 56%) expect a neutral effect on waste discharges, as well as on waste deliveries to port (53%-60% of responses, depending on waste category). With regard to the administrative burden, responses in the targeted survey<sup>7</sup> were not conclusive; 7 (i.e. 28%) of the respondents expect no impact on administrative burden, whereas 9 (i.e. 36%) expect an increase, and 5 (i.e. 20%) expect a decrease in administrative burden. However, within the same context, the case studies indicated that several ports provide large numbers of exemptions and that exemption criteria are applied differently between ports. It appears that the number of exemptions given can be significant, not only because of the high numbers of scheduled traffic calls (e.g. ferries), but also because of the current (lenient) interpretation of the criteria and conditions provided in the Directive. Furthermore, as regards the possibility of granting exemptions to vessels which are operating exclusively within one port, the five case studies indicated that these vessels are mostly already exempted under the regime of article 9 of the Directive.

### **3.3. Summary of input for fisheries and recreational crafts**

With regard to the issue of waste from fishing vessels and its relevance in the wider context of marine litter, within the context of the ESSF/PRF subgroup an expert panel<sup>8</sup> discussed the matter, and also commented on the proposed policy measures for improving the delivery of waste from fishing vessels to PRF. Although, generally, there was limited support for bringing fishing vessels into the scope of the notification requirement as well as the PRF inspection regime, there was general agreement on the proposal to apply the **No Special Fee (100% indirect fee) to fishing vessels**, i.e. delivery of all their waste to PRF without having to pay any additional (direct) charges. The port stakeholders responding to the general targeted survey expected an increase of the volume of waste delivered in ports because of the **incentive measures proposed for fishing vessels and small recreational craft**. Many respondents (13 out of 19 expressing an opinion, i.e. 68%) point to an increase of the volume of garbage delivered to port reception facilities. 11 out of 23 (i.e. 48%) of the respondents expressing an opinion to the targeted survey expect the measure to result in an increase of the administrative burden, whereas 7 out of 10 expressing an opinion (i.e. 70%) expect an increase in the investment costs. On the other side, 6 out of 14 (i.e. 43%) of the respondents expressing an opinion expect the measure to lead to additional business for PRF operators.

As regards **bringing fishing vessels and small recreational craft into the PRF inspection regime**, the ports interviewed expressed their doubts about the feasibility of this measure,

---

<sup>7</sup> In total, 25 respondents answered this question.

<sup>8</sup> Including representatives from the port and fishing sector, as well as from a regional sea organisation.

especially concerning the reporting requirement for these vessels. However, it should be noted that the ports interviewed are not fishing ports.

The stakeholders responding to the **targeted survey for fisheries** have highlighted the following:

92% of the respondents<sup>9</sup> indicated that they regularly deliver waste generated on board and 67% indicated<sup>10</sup> that they regularly deliver waste collected in nets ("passively fished waste"). At the same time, the majority of the respondents noted that all the ports where they are calling regularly, accept their waste but 8 out of 12 respondents (i.e. 67%) of them also indicated that it is sometimes difficult or costly to dispose of end-of-life nets. With regard to the question whether waste fees depend to some extent on the actual volumes delivered the replies were, in general, divided (yes/no), with an equivalent rate of those not being able to reply to this question. Some factors discouraging the delivery of fishing gear from the vessel or the delivery of waste collected in nets (including abandoned or lost fishing gear) were highlighted i.e. the costs, inconvenience, bureaucracy and lack of enforcement. The same factors were highlighted as discouraging the delivery of ship generated waste. However, the responses to the targeted survey are not conclusive as there are equivalent rates of opposite views.

Although there are opposite views on the proposed measures for the fishing sector, the majority of the respondents (14 out of 18, i.e. 78%) were in favour of the introduction of the possibility to **deliver waste caught in nets or deliberately retrieved from sea free of charge**. The majority of the respondents (9 out of 18, i.e. 50%) consider the introduction of a measure requiring fishing vessels to notify ports in advance of the waste they are bringing ashore as negative while some (5, i.e. 28%) believe that there will be a neutral effect and only a few respondents (3, i.e. 17%) expect a positive effect from the advance waste reporting. However, as regards the introduction of a measure to include fishing vessels in the specific inspection requirements and control procedures to verify the compliance with the delivery obligation, the majority (9 out of 18, i.e. 50%) believe that this will have a positive impact, with 6 (i.e. 33%) of the respondents viewing this negatively.

### **3.4. Summary of input from the Territorial Impact Assessment**

The main conclusions from the Expert Workshop, and the application of the **TIA Quick check**, can be summarised as follows (see also Annex 8):

The experts generally expect positive effects from a revision of the Directive on Port Reception Facilities for Ship Generated Waste and Cargo Residues on territorial development. However, especially in the field of governance, a minority of experts is sceptical about its effective implementation and are afraid of additional administrative burden challenging fisheries, the harbour economy and the ship transport sector.

The positive effects are quite equally distributed to all coastal regions. However, especially some of the Eastern and Southern European coastal regions could benefit more than others from the revision of the Directive:

- The EU regions neighbouring the Black Sea in Romania and Bulgaria are expected to experience a more significant positive impact on economic growth, especially in the tourism sector, as a catching up effect. An efficient implementation of the Directive

---

<sup>9</sup> 11 out of a total of 12 respondents to this question.

<sup>10</sup> 8 out of a total of 12 respondents to this question.

could also increase their governance effectiveness due to learning effects also for other fields.

- The increased quality of the environment could especially induce a more positive impact on tourism in Greek and Southern Italian regions in the Mediterranean Sea, also resulting in a higher positive impact on economic growth in Greek coastal regions.
- An effective implementation of the revised PRF Directive could have a positive impact on the governance effectiveness in the Eastern European coastal regions bordering the Baltic Sea. In addition, a higher positive impact on economic growth can be expected.
- The outermost regions could benefit especially in economic terms from the revised Directive: economic growth is expected, in particular from an increase in tourism. These effects could contribute to reduce "out-migration" and "brain-drain".

#### **4. Use of consultation results**

The findings from the consultation activities have been used to analyse the problems, define the right policy measures and/or fine-tune the proposed measures, and assess the impacts of these measures.

Input from the stakeholders has facilitated the verification of the information from existing reports, studies and assessments, as well as of the data collected (waste delivery data, data on waste generated on board, data on illegal discharges at sea). The responses have provided DG MOVE with a better view of the extent to which the identified problem drivers contribute to the illegal discharge of waste at sea and allowed for a more detailed assessment of impacts of the policy measures.

In conclusion, the different consultations have provided a useful insights in the functioning of the PRF regime, its main problems and how best to address these through the revision, from those stakeholders with a high level of expertise and knowledge.

Where relevant, references have been made in the Impact Assessment Report to the outcome of the stakeholder consultations.

### Annex 3 – Affected stakeholders

Stakeholder	Description	Key interests
<b>Ports</b>	<p>'...a place or a geographical area made up of such improvement works and equipment as to permit, principally, the reception of ships, including fishing vessels and recreational craft.'</p> <p>(Directive 2000/59/EC, art. 2)</p> <p>Port authorities Harbour Masters Port associations</p>	<ul style="list-style-type: none"> <li>• Ensure that reception facilities are provided that are adequate to receive the waste from ships</li> <li>• Develop Waste Reception and Handling Plans</li> <li>• Organise the necessary consultations with the port users to better understand operational needs</li> <li>• Operate the fee systems to recover the cost from ships and deal with exemption requests. Tasks may be divided between the harbour master and the port authority.</li> <li>• Share the monitoring and enforcement responsibilities with the Member State competent authorities, e.g. in the area of assessing exemption requests, waste notification and inspections.</li> </ul>
<b>Member State competent authorities</b>	<p>Maritime Transport/Environment departments at national or regional level, national Inspection bodies</p>	<p>Implementation and enforcement of the requirements under the Directive 2000/59/EC.</p> <ul style="list-style-type: none"> <li>• Assessment and approval of exemption requests</li> <li>• Assessment and approval of the WRH Plans</li> <li>• Assessment of waste notifications</li> <li>• Conducting inspections</li> </ul>
<b>Operators of the port reception facilities, including terminal operators</b>	<p>Companies operating under a concession or licence in the port</p>	<p>Implementation of the waste reception and handling plans (Article 5 Directive 2000/59/EC.)</p>



<b>Ship owners</b>	Shipping companies and their Agents Ship operators (including fishing vessels and pleasure craft)	<ul style="list-style-type: none"> <li>• Harmonisation of PRF Directive definitions and exemptions</li> <li>• Cost-efficient port operations</li> </ul> (vis-à-vis time spent at port and financially)
<b>Fishing industry</b>	Fishing companies drawing on EU-water fishing stocks, and their Regional bodies (Advisory Councils)	<ul style="list-style-type: none"> <li>• Improvement of fishing stocks in terms of quality and quantity</li> <li>• Sustainability of the fishing sector resulting from healthy marine ecosystems</li> </ul>
<b>EU citizens</b>	EU citizens in coastal regions and islands, often represented by NGOs	<ul style="list-style-type: none"> <li>• Healthy living environments</li> <li>• Marine ecosystem services</li> <li>• Tourism</li> </ul>

## Annex 4 – Analytical models used in preparing the impact assessment

The Impact Assessment relies on analytical tools for the calculation of its baseline and of the potential impacts of its options. In this annex, these analytical tools are presented, including a description of what they consist in, how they have been developed, and what their strengths and limitations are.

### 1. MARWAS model

#### 1.1 Purpose

The contractor in charge of the IA support study, Ecorys, has requested the Danish consultancy company Port Environment to run a series of data analyses on ship generated waste, using the dedicated computer program MARWAS.

The main purpose of the MARWAS analyses is to have an indication of the waste (types and volume) which is expected to be delivered to a port and compare it to the actual waste delivery figures obtained directly from the 29 ports that provided such data. The difference between the figures obtained from the MARWAS analysis and by the ports form the waste gap. The waste gap indicates the waste volumes per waste type which might be illegally discharged at sea. MARWAS estimates the waste types and volume generated based on all the voyages to a given port from a previous port of call.

#### 1.2. Principles

The MARWAS model is built on a data base manager, which processes data from the Lloyds Maritime Intelligence Services (LMIS). Using comprehensive data on the parameters influencing waste generation and the number of voyages and ships in a given period, MARWAS predicts the types and calculates the amounts of waste generated on board the ship during the voyage from the last port of call.

The MARWAS model was originally developed to process data obtained from the LMIS. For this study, however, on behalf of the European Commission, ECORYS has requested that data obtained from SafeSeaNet (SSN) and MARINFO be used instead. The SSN & MARINFO data are not directly compatible with MARWAS and some manual adjustments had to be made.

The MARWAS model was subsequently run for the 29 ports<sup>11</sup> for which port delivery data was also obtained, so as to allow for an equal comparison between the MARWAS estimates and the waste delivery data from ports regarding ship-generated waste. In order to increase the reliability of the outcomes and to correct for variations over the years, data was aggregated over a 5-year period (2011-2015).

#### 1.3. Assumptions

---

<sup>11</sup> Antwerp, Gent, Zeebrugge, Vama, Burgas, Dubrovnik, Split, Copenhagen, Helsinki, Rauma, Turku, Le Havre, Marseille, Hamburg, Kiel, Cork, Genoa, Ravenna, Ventspils, Riga, Amsterdam, Groningen/Delfzijl, Rotterdam, Szczecin, Swinoujscie, Constantza, Galati, Koper, Algeciras

Before running a MARWAS analysis, a number of assumptions (waste generation factors) have to be entered into the software. These assumptions influence the estimates. As mentioned in the CE Delft study (2016), waste generation factors can vary for different kinds of waste generation and up to several hundred percent depending on a number of issues e.g. maintenance level and ship category. In the MARWAS analysis made by the contractor, different assumptions have been used for 16 ship categories and up to five sizes<sup>12</sup>. The MARWAS calculations cover three waste categories (Annex I oily waste, Annex IV sewage and Annex V household garbage).

Formulas and statistics are based on IMO recommendations, literature and consultations with ship masters, engineers, port operators, ship owners etc. However, as the waste generation and the way it is treated on board is a function of human behaviour, there is no precise and fixed relation to calculate them.

#### **1.4. Limitations**

**Data:** Data on ship movements have been provided by EMSA for most EU ports. However, due to differences in the data format between the data provided by EMSA and the data which is normally used in MARWAS (LMIS data), significant data adjustments had to be made, i.e. the consultants determined manually port positions and port ID numbers. Furthermore, there were some data missing from major ports (Bremerhaven, Venice, Tallinn) and a range of inconsistencies in the data provided e.g. missing data on the previous port of call. This information is vital in order to calculate the length of voyage and waste generated. To overcome the missing data and data inconsistencies, comprehensive MARWAS software adjustments were carried out<sup>13</sup>.

**MARWAS:** MARWAS is designed to process data provided by Lloyds (LMIS) and estimates the waste generation from the previous port of call to the port in question. This means that MARWAS does not take into account the situations where the calling ship accumulates waste on board or keeps the waste on board for delivery in the next port. However, as data is taken into account over 5 years, these differences are anticipated to level out.

For **garbage**, MARWAS estimates only household waste. Other types of waste categorised as garbage are not estimated and included in the MARWAS figures e.g. various types of wood and packaging material, as this type of garbage is very individual from ship to ship. The amount of waste delivered at the port reception facilities is more than twice as large as the amount of household waste generated on board as modelled by MARWAS. Therefore the MARWAS model was insufficient on its own and had to be complemented by other sources in order to properly estimate the waste gap for garbage.

## **2. Environmental vulnerability analysis**

### **2.1. Purpose**

A report, "Environmental vulnerability analysis of ship generated waste in European waters" (2017), was prepared by the contractor Ecorys as a part of the Impact Assessment support

---

<sup>12</sup> The list of values used in function of the various ship characteristics are detailed in the annex 3 "Method for calculation of waste generation" of the IA support study.

<sup>13</sup> See Annex 3 of the IA support study for details of the data processing steps.

study. The report develops environmental indices for each waste type and each sea area in order to rank the severity of the environmental impact of a unit (e.g. 1 tonne) of each waste type on each sea area. It represents an environmental weighting of a tonne of waste. A tonne of garbage (including plastics) will cause a different environmental damage than a tonne of sewage, for example.

This analysis is used in combination with the assessment of the volumes of waste potentially discharged at sea ("waste gap"), both in the description of the baseline and in the assessment of environmental impacts. The calculations of the scores per sea basins are detailed in annex 8.

## 2.2. Principles

The environmental damage of the discharge of a particular waste type from ships is a combination of the amount of waste discharged and the vulnerability of the marine environment to this particular type of waste. The environmental damage can be determined using the following formula: Environmental Damage = Mass flow of waste type x Vulnerability

European Seas are regulated at EU level through the Water Framework Directive (WFD)<sup>14</sup> and the Marine Strategy Framework Directive (MSFD)<sup>15</sup>. They constitute the legal framework to protect and restore clean water across Europe and ensure its long-term, sustainable use. Status and goals are defined through assessments and monitoring of a series of quality elements. They describe biological, hydro-morphological, physical and chemical elements and indicators. The fundamental concept of environmental assessment is rooted in the MSFD and WFD as well as in other basic EU and international documents<sup>16</sup>.

The same concept is applied in the vulnerability study. The approach of the environmental vulnerability assessment is compatible with EU-wide methodologies for the assessment of the quality of the marine environment. It follows the same concept of selecting a relevant feature (corresponding to receptors in the MSFD) to assess the impact that waste discharge has on the feature and then accumulating the impacts on all features into an overall impact assessment. It applies methods and results that have been developed and agreed upon among several Member States' authorities in earlier EU-funded projects of regional scale (Be AWARE 2015<sup>17</sup>, BRISK 2012<sup>18</sup>).

---

<sup>14</sup> Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy

<sup>15</sup> Directive 2008/56/EC of the European Parliament and of the Council of 17 June 2008 establishing a framework for community action in the field of marine environmental policy (Marine Strategy Framework Directive)

<sup>16</sup> USEPA, 2017: US Environmental Protection Agency – *Risk Assessment* website:

<https://www.epa.gov/risk>

EU, 2007: European Commission. Interpretation manual of European Union habitats, EUR July 2007. DG environment. Nature and biodiversity, 2007

<sup>17</sup> The BE-AWARE project was a two year initiative (2012-2014), co-financed by the European Union, which aimed to quantitatively identify the risk and magnitude of mineral oils spills, in the Bonn Agreement area and undertake a qualitative risk assessment for hazardous and noxious substances.

<https://www.bonnagreement.org/be-aware>

<sup>18</sup> The overall aim of the BRISK project (2009-2012) is to increase the preparedness of all Baltic Sea countries to respond to major spills of oil and hazardous substances from shipping. <http://www.brisk.helcom.fi/>

In line with the WFD and the MSFD, the environmental vulnerability study is based on the scientific relation between selected environmental features (descriptors) which represent the marine environment, such as species, habitats and human activities, on the one side, and the impact by the different waste types. The next step in this concept is to describe the way in which the features are affected by the impact of concern – here it is the impact of waste. A scientific and systematic relation between impact and receptors is often not easy to determine and therefore often based on assessments that to a certain degree always include some subjectivity.

The following approach to determine environmental vulnerability is applied:

- Step 1: Identification of vulnerability features.
- Step 2: Scoring of each of the identified sensitive features from low, medium, high to very high vulnerability based on fixed and agreed criteria, see below. The following vulnerability scores were used: Score 4 (= very high), Score 3 (=high), Score 2 (=moderate/medium), Score 1 (= low).
- Step 3: Assessment of total environmental vulnerability of an area by adding all individual scores of the features.

*Table 1: Illustration of the steps of the environmental vulnerability analysis*

<b>Step 1: Features</b>	<b>Step 2: Environmental scores</b>			<b>Step 3: Total environmental score</b>
	<b>Criterion 1</b>	<b>Criterion 2</b>	<b>Criterion m</b>	
<b>Feature 1</b>	Score (1-4)	Score (1-4)	Score (1-4)	Sum of scores
<b>Feature 2</b>	Score (1-4)	Score (1-4)	Score (1-4)	Sum of scores
<b>Feature n</b>	Score (1-4)	Score (1-4)	Score (1-4)	Sum of scores
<b>Total environmental vulnerability</b>				<b>Grand total</b>

#### *Step 1:*

In the former regional projects (Be AWARE 2015 , BRISK 2012), features ('descriptors') comprised biological species, types of protected areas, human activities and different habitat types, in total between 8 and 49 features. They were aggregated into four groups:

- Species (Sensitive populations, life-cycle and life stage aspects)
- Habitats (Shoreline and coastal habitats and open sea habitats)
- Protected areas (Coastal and marine protected areas under, inter alia, the EC Habitats and Birds Directive, RAMSAR Convention and OSPAR Convention)
- Socio-economic effects on human activities (Fisheries, aquaculture, tourism and recreation, coastal communities and heritage site, coastal facilities with water intakes, ports, mineral extraction zones and renewable energy)

In the analysis made for the purpose of this Impact Assessment, the four categories above are identified as environmental features. Sensitivity is determined by taking a wide range of parameters into account. The analysis builds upon the overall results of earlier detailed studies, where available, e.g. for the Baltic Sea and the North Sea Also for the Mediterranean

Sea, maps of environmental sensitive areas are available. For the remaining sea areas, the general findings on correlation between environmental sensitive areas and certain geographical feature (archipelagos, shallow areas, coastal areas) are applied. In order to properly assess sensitivity of a given sea area, it is necessarily to include knowledge on spatial and temporal distribution of sensitive species or habitats. General distribution patterns collected in previous projects are used.

**Step 2:**

Ecological vulnerability to oil spill and pollutants in general is determined on a scale from 1 to 4: Score 4 (= very high), Score 3 (=high), Score 2 (=moderate/medium), Score 1 (= low). The scoring describes how vulnerable a specific feature identified above is regarding the different waste types. In broad terms, the scoring defines the relative environmental vulnerability towards a unit load (e.g. 1 ton per year) of a specific waste type.

The determination of the environmental score is based on the following criteria:

- ‘Fate of pollutants’: In terms of natural degradation and removal, onshore as well as in open water.
- ‘Impact of pollutants’: In terms of physical and toxic effects, tainting, and population and lifecycle considerations.
- ‘Length of interruption’: Describing socio-economic impact in terms of the length of interruption of a human activity or service.
- ‘Compensation possibility’: Whether or not economic compensation can be sought for a damaged feature.

**Step 3:**

For each combination of features (e.g. Species) and criteria (e.g. Fate) a score between 1 and 4 is determined. The sum of all scores gives the total environmental score for each sea area (found in the right lower cell in a matrix for all waste types).

Based on an environmental description of the four European sea areas and on a description of how the three waste types affect the environment, the aggregated environmental vulnerability for ship generated waste in four European sea areas are given.

*Table 2: Matrix used for the determination of environmental vulnerability towards each specific waste type*

	<b>Fate</b>	<b>Impact</b>	<b>Length of interruption</b>	<b>Possible compensation</b>	<b>Sum</b>
<b>Species</b>					
<b>Habitat</b>					
<b>Protected area</b>					
<b>Socio-ec.</b>					
<b>Total environmental vulnerability</b>					<b>Total score</b>

**2.3. Assumptions**



In short, assumptions are made on:

- The vulnerability of sea areas (based on species and habitats present and their resilience).
- The impact of different types of pollution on these.

The scoring has been made by an expert in marine biology<sup>19</sup>. It has been tested and peer-reviewed: a second alternative and independent scoring has been carried out by another marine biologist, who took part in the development of the BRISK and BE AWARE projects but who was not directly involved in the present project.

It resulted that the differences between the assessments carried out by the two experts are minor and have a maximum deviation of 3 points out of 20-30, corresponding to maximum 10-13%. In 50% of the indices, the two experts gave identical values. This indicates that the assessment method is stable enough for the present purpose.

## **2.4. Limitations**

Different views and arguments may exist on the method and scoring used. Some uncertainty concerning score values may arise from this. In order to assess and limit this subjectivity, an alternative and independent set of scores have been elaborated to compare the resulting environmental weight, as explained above.

The method used for the purpose of this vulnerability assessment intends to provide indications in the context of the impact assessment. However it is not in line with the methodologies which are currently being developed in DG ENV in the context of the Marine Strategy Framework Directive.

---

<sup>19</sup> Full results and details of the 3 steps are available in annex 8.

### 1. Oily waste (MARPOL Annex I)

#### Definition

MARPOL Annex I waste covers oily ship generated waste, which includes oily bilge water, oily residues (sludge) and dirty ballast water and oily cargo residues; mostly being tank washings. This type of waste is mostly generated by merchant shipping, as a result of the consumption of heavy fuel oil. Ship engines running on marine diesel or LNG hardly generate any oily waste. Therefore, the fisheries and recreational sector do not contribute much to the generation of this waste category. In addition, oily cargo residues and tank washings are also included under MARPOL Annex I.

#### MARPOL discharge regime

Under Annex I, the discharge of oily waste is only allowed under very strict conditions (see Table 1 in Annex), for example the oil has to be treated before discharging by filtering equipment which is in line with the requirements laid down in Annex I. Essentially, discharging of oily waste into sea is only allowed when the oily waste is filtered and significantly diluted, so that it cannot cause harm to the marine environment.

#### Primary waste generation

MARWAS has calculated the amount of primary waste generated would be in the order of 700,000 m<sup>3</sup> per year for the 29 ports analysed. When aggregating this to the total EU merchant shipping, at most about 2 mln m<sup>3</sup> of primary oily waste is generated.

The generation of oily waste from fisheries vessels and recreational craft is limited as in those segments, diesel is the dominant fuel instead of HFO. Estimates for oily waste generation indicate less than **600 kg** of oil per annum per medium size fishing vessel<sup>20</sup> and about **5 kg** oil per average recreational craft *per annum*<sup>21</sup>.

Typically larger sized ships, with higher primary waste generation, have on-board treatment facilities, but there is a limit to the waste reduction potential through treatment of around 30% (for engine sludge) to 40% (for engine bilge). Typically smaller sized ships have no or lower treatment potential. The MARWAS model has applied assumptions for this for 16 vessel types and 5 size classes. For fisheries and recreational boating, as vessels are typically small and volumes of oily waste generated per vessels are very low, in line with MARWAS it is assumed that no on-board treatment is taking place.

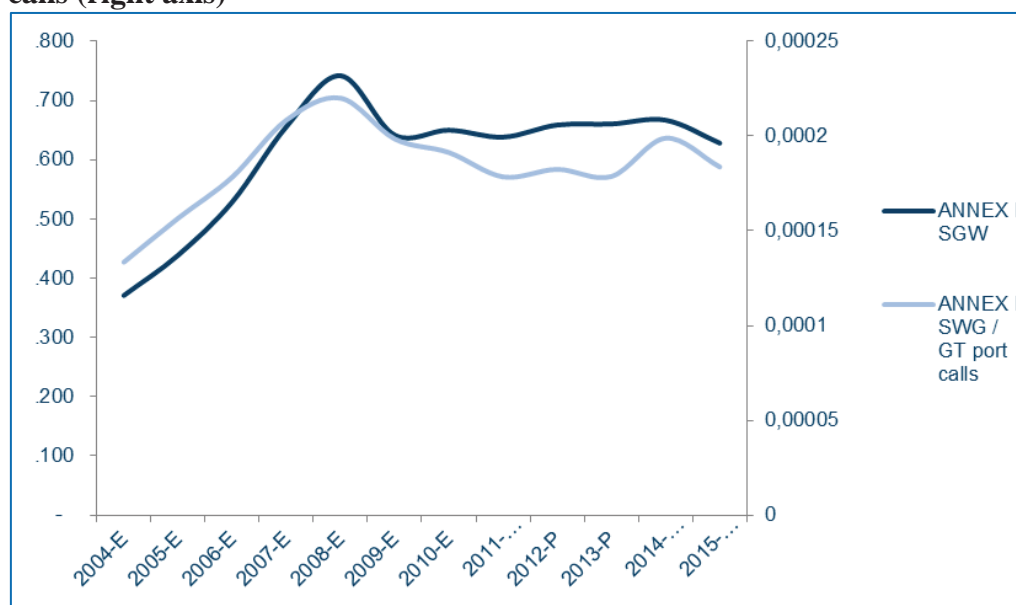
#### Delivery volumes and waste gap

Regarding the *delivery of oily waste* at PRFs, waste delivery data collected for 29 larger EU ports indicate that volumes of oily waste delivered to port reception facilities have doubled between 2004 and 2008, and have remained stable since, as shown in **Figure 1**.

20 <http://www.engines.man.eu/global/en/marine/engines-for-commercial-shipping/overview/Overview.html> and [http://www.mtu-online.com/fileadmin/fm-dam/mtu-usa/mtuinorthamerica/white-papers/WhitePaper\\_PrevMaintenance\\_Marine.pdf](http://www.mtu-online.com/fileadmin/fm-dam/mtu-usa/mtuinorthamerica/white-papers/WhitePaper_PrevMaintenance_Marine.pdf)

21 [http://www.yanmarmarine.com/theme/yanmarportal/UploadedFiles/Marine/productDownloads/Pleasure-operation-manual/JH5/JH5\\_EN\\_operation-manual.pdf](http://www.yanmarmarine.com/theme/yanmarportal/UploadedFiles/Marine/productDownloads/Pleasure-operation-manual/JH5/JH5_EN_operation-manual.pdf)

**Figure 1 ANNEX I oily waste SGW delivered in 1000 ton (left axis) and per unit of GT calls (right axis)**



Source: delivery data collected by Ecorys from 29 merchant shipping ports

Waste delivery data correlated for the amount and size of ships calling at the ports (measured by Gross Tonnage (GT) of all ships called) shows a similar pattern.

A comparison of net oily waste generated (taking account of treatment and legal discharges) estimates made for merchant shipping using MARWAS with delivery data from ports indicates that the *gap between net waste generated and waste delivered* at a port reception facilities is about 2.5%, as illustrated in Table 1. This finding is confirmed by interviews with representatives from ports and PRF operators.

**Table 1 Volumes of net oily waste generated and delivered in 29 EU ports, in 1,000 m<sup>3</sup> (average annual volumes 2011-2015)**

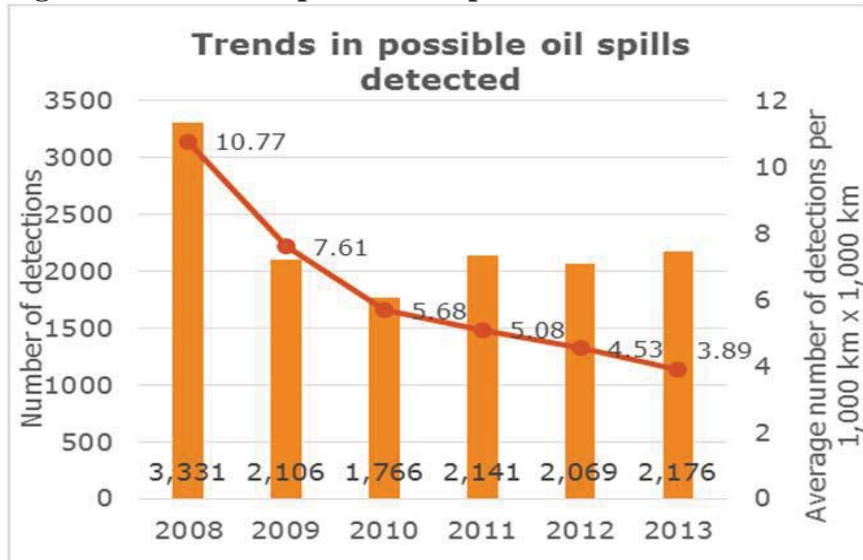
Volume generated	Volume delivered	Delivery gap
1,226	1,195	2.5%

Source: MARWAS calculations (generation), and port delivery data (collected by Ecorys)

For the fisheries and recreational sector, no data on oily waste delivery is available. Therefore, taking into account these sectors, the delivery gap is potentially higher.

Aerial surveillance data on oil spills detected in surface water indicate that the amount of oily waste discharged into sea has significantly decreased since the introduction of the PRF Directive (EMSA (2014), Bonn Agreement (2012)), as illustrated below.

**Figure 2 Trends in possible oil spills detected**



Source: EMSA (2014), *Pollution Preparedness and Response Activities*.

Note that these concern “possible” oil spills, as not all dark areas on images collected are necessarily oil

Information from PRF operators (Deloitte, 2016) indicates that oily waste, having a commercial value, is typically kept on board to be delivered in a port where market conditions are most favourable (relating to oil prices, demand for oily waste). Such conditions may be found within but possibly also outside the EU.

### Conclusion on Annex I waste

Based on a number of sources, it can be concluded that the illegal discharge of oily waste into the sea has substantially decreased over time. Sources include the MARWAS analysis, the CE Delft study on ship-generated waste (2016), a review of delivery data of 29 larger ports, the ex-post evaluation (Panteia, 2015) and validation through case studies and interviews. Notwithstanding the apparent progress in delivery, some oily waste that should be delivered in EU ports is not, indicating potential discharges into sea, causing harm to the marine environment. The gap between oily waste generated and treated versus the waste delivered in ports is estimated at **2.5%**.

## 2. Sewage (MARPOL Annex IV)

### Definition

Under MARPOL, sewage is defined as drainage and other wastes from any form of toilets and urinals, medical premises, spaces containing living animals, or other waste waters mixed with the above.

### Discharge regime

MARPOL Annex IV regulates the discharge of sewage. The regulations in Annex IV prohibit the discharge of sewage into the sea, except when the ship has in operation an approved sewage treatment plant or when the ship is discharging comminuted and disinfected sewage using an approved system, at a distance of more than three nautical miles from the nearest land. Sewage, which is not comminuted or disinfected, can be discharged at a distance of

more than 12 nautical miles from the nearest land. Specific discharge prohibitions apply to special areas (see Table 2, in attachment).

MARPOL allows for discharging when the ship operates 12 nautical miles away from shore, provided the sewage is treated or comminuted and disinfected, so that the harm to the marine environment is minimised. As the discharges should take place under certain minimum sailing speeds and maximum discharge rates, the sewage will be diluted, further reducing its potential environmental impact.

It is observed that the on-board treatment of sewage is significant and can be up to 100% for the larger sized modern cruise ships (those that generate the largest amount of primary sewage). A calculation using the MARWAS model shows that of all primary sewage generated by merchant ships, typically 80-100% is treated on board and/or legally discharged. As per MARPOL annex IV, these should be approved sewage treatment plants (MEPC(227)64). Besides minimal treatment, more advanced physical, chemical and biological treatment systems are gradually gaining importance.

### **Sewage generation on board and MARWAS estimates**

MARWAS assumes a sewage generation of 80 litres/person/day. CE Delft (2016) estimates a waste production of 10-60 litres /person/day of sewage, based on interviews and a survey on a handful of selected ships. An older source indicates 38 litres/person/day (Lester & Weeden,2004). Eunomia (2016) refers to estimates by Butt (2007) of 20-40 litres/person/day. An analysis by Helcom (2014) for cruise ships in the Baltic Sea arrives at an estimated 170 litre/person/day (possibly this includes 'grey water' i.e. from showers, galley etc. but the report does not specify this). The support study has estimated total primary (non-treated) sewage generated by EU merchant shipping to be up to approximately 29 mln m<sup>3</sup> per year.

Calculations of MARWAS for 29 larger ports provide a volume of sewage to be delivered, **after treatment and legal discharge**, of about **500,000 m<sup>3</sup> per year**. Aggregating this to all EU merchant ports would give a volume of approximately **1.5 mio m<sup>3</sup>**.

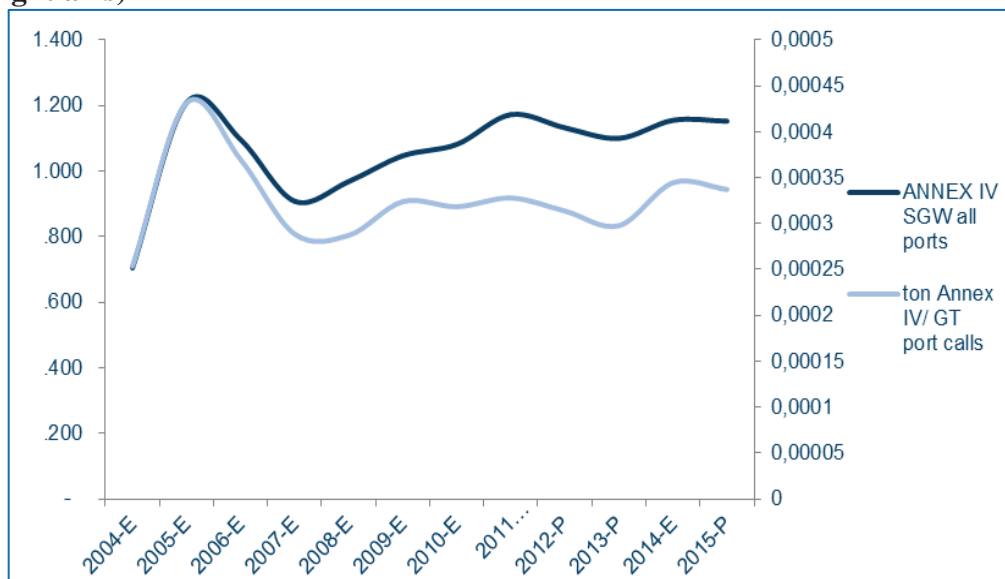
The fisheries and recreational sector also generates sewage, and typically those ships do not have on-board treatment facilities. Recreational vessels also typically operate within 12 nautical miles from shore. Furthermore, these segments are operating in port significant proportions of time (about 50% for fisheries vessels, and about 55% for recreational vessels), where they cannot discharge and therefore are normally delivered to PRF (or even not generated on board as recreational boaters will use shore toilet facilities). Estimates on the basis of the European recreational and fisheries fleet indicate a sewage generation of 1-1.5 mln m<sup>3</sup> from the recreational boating sector, and about 1 mln m<sup>3</sup> from the fisheries sector, both thus of similar order of magnitude as the merchant shipping sector. See annex X for assumptions underlying these figures.

### **Delivery and gap**

The *port delivery data for sewage* in **Figure** shows a strong increase (75%) in sewage delivered from 2004 to 2005. which coincides with the revision and entry into force of MARPOL Annex IV (revision date: April 1, 2004 and entered into force on 1 August 2005). Since then, a decrease of between 2005 to 2008 was observed, with one possible explanation being that existing ships were required to comply with the provisions of the revised Annex IV five years after the date of entry into force of Annex IV, namely since 27 September 2008. Since 2008, a slight increase is observed. Note that the increasing cruise liner traffic to MS ports does not seem to influence this pattern significantly, which might be explained by the

improvements of sewage treatment technologies on board. It should be noted however, that it is not certain that all ports have registered their cruise liner sewage delivery as part of their data, as some ports have special arrangements with cruise liners. Waste delivery data correlated for the GT calling the ports show a similar pattern.

**Figure 3. ANNEX IV SGW sewage delivered – in 1000 ton (left axis) and per unit of GT calls (right axis)**



Source: delivery data collected by Ecorys from 29 merchant shipping ports

Lack of registration of delivered sewage e.g. from cruise liners (individual arrangements), insufficient knowledge on “treatment on board” facilities and other legal discharges do however reduce the transparency regarding where and how much sewage is delivered to ports although some areas begin to map the sewage delivery more systematically, e.g. in the Baltic Sea<sup>22</sup>.

When comparing the remaining volumes with volumes delivered to 29 ports, a *sewage delivery gap* of 7-17% is observed, indicating that this part of sewage is not delivered, so potentially discharged illegally. The uncertainty relates to varying estimates of sewage generation on-board ships. Table presents the estimated figures for a high and low scenario.

**Table 3 Volumes of sewage generated and delivered, in 1000 m3 (average annual volumes 2011-2015), EU merchant ports**

Scenario	Generated waste	Delivered waste	Waste gap
High	1,471	1,226	17%
Low	1,471	1,362	7%

Source: MARWAS calculations (generation), and port delivery data (collected by Ecorys for 29 ports and aggregated to EU level)

The limited delivery observed is confirmed in a study by HELCOM (2014) for the Baltic Sea, which reveals that **only 30% of cruise ship calls involve sewage delivery**. Reasons provided for this include statements on unreasonably high costs as, well as low capacity for waste delivery in some ports.

<sup>22</sup> <http://www.helcom.fi/action-areas/shipping/sewage-from-ships/overview-report/>.



As delivery by the fisheries and recreational boating sector is currently not being reported, data on volumes delivered by these categories of vessels is not available.

### **Conclusion on Annex IV waste**

Based on ship-generated waste estimates from CE Delft (2016), MARWAS calculations, delivery data from 29 ports, Helcom (2014), case studies and interviews, it is concluded that, for merchant shipping, of the sewage that is to be delivered to port, approximately 7-17% is not received by port reception facilities and potentially discharged illegally, affecting the marine environment. For the recreational and fisheries sector, while volumes of sewage generated are similar to those of the merchant sector, no data on delivery are available to assess whether the gap for these sectors is similar or, possibly, higher.

## **3. Garbage (MARPOL Annex V)**

### **Definition**

Annex V covers garbage, including domestic waste, plastics, food waste, cooking oil, animal carcasses, fishing gear, operational waste and incinerator ashes. In addition Annex V waste also includes cargo residues; mostly tank washings from dry bulk.

### **MARPOL Discharge regime**

Under MARPOL, it is allowed for Annex V to legally discharge of specific types of garbage. For example food waste, animal carcasses and cleaning agents can still be legally discharged at sea (mostly when the ship is beyond 12 nautical miles from the nearest coast). All other garbage, including plastics, domestic wastes, cooking oil, incinerator ashes, operational wastes, and fishing gear cannot be legally discharged under MARPOL (see Table 3 in the Annex).

### **Primary waste generation**

For household waste, MARWAS assumes a generation of 3 kg/person/day. For other garbage categories, however, the model does not provide estimates. The EUNOMIA study (2016) provides the most extensive estimates of waste generation for all Annex V waste types on an aggregate level and per waste category (see below).

**Table 4. Annex V on-board waste generation estimates for 2013 (tons) by sub-category and ship segment**

Sector / waste stream	Shipping	Fishing	Cruises	Passenger	Recreational	Nav y	Total	%
Annex V – domestic type waste	74,443	43,531	86,717	123,016	170,928	8,769	507,406	58%
Annex V – solid CR	122,521	/	/	/	/	/	122,521	14%
Annex V – fishing gear	/	218,467	/	/	/	/	218,467	25%
Annex V – Other operational type waste	27,074	4,305	/	360	/	867	32,606	4%
Total	224,038	266,303	86,717	123,376	170,928	9,636	881,000	
%	25%	30%	10%	14%	19%	1%		

Source: EUNOMIA, 2016.

The data show that the contribution of the various shipping segments differs between waste categories, where typically passenger ships (cruise, ferries, recreational boating) cover the majority of domestic waste (garbage), while cargo ships are the main responsible for MARPOL Annex V cargo residues and other operational waste. It should be noted that the figures presented only cover cargo residues from dry bulk. In calculating the figures, Eunomia already corrected for legal discharges of food waste. If an average treatment of 25% is assumed (see below), the gross waste generation would be an approximate 1.2 mln tons for all shipping sectors, and about 0.3 mln for merchant shipping alone. Fishing and recreational vessels together account for about half of the total annex V waste generation.

### Treatment and legal discharge

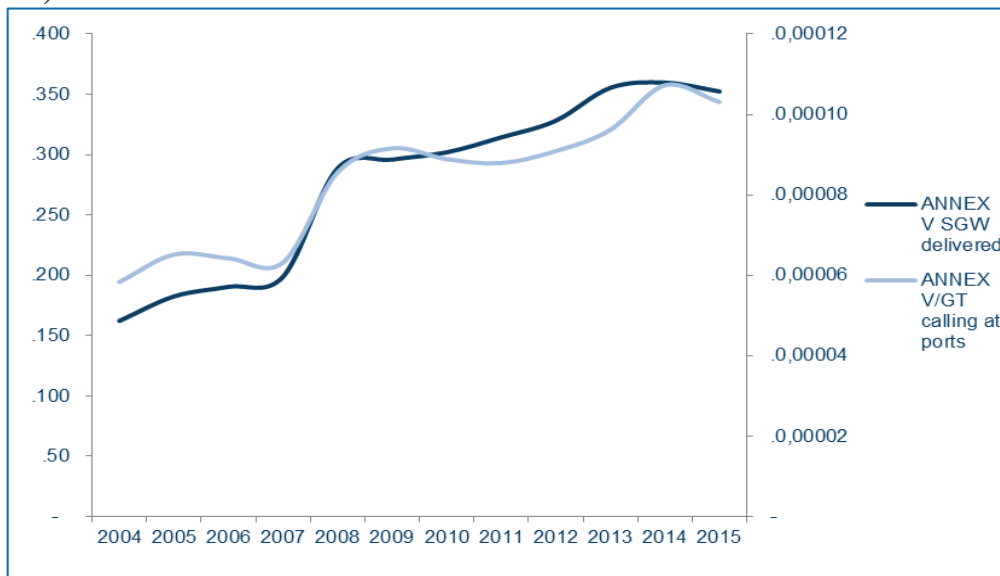
Food waste accounts for approximately 17% of total annex V domestic waste (Eunomia). Furthermore, fishing vessels, passenger ferries and recreational vessels are unlikely to have incinerators on board, but about a quarter of the shipping sector, in particular cruise vessels, do. This is in line with the MARWAS model, which assumes no treatment for small specialised vessels, and 20-30% on-board treatment of garbage for larger sized ships. For cruise ships, treatment (usually incineration) is assumed to be up to 80%, an estimate confirmed by Butt (2007) who indicates that on cruise ships, 75%-85% of residual waste is incinerated.

### Delivery and gap

Data on Annex V waste delivery to 29 ports show an increase in waste delivery by merchant ships since the implementation of the PRF Directive, as reflected in Figure , showing volumes higher than the amounts of waste generated as estimated by Eunomia (see

Table above).

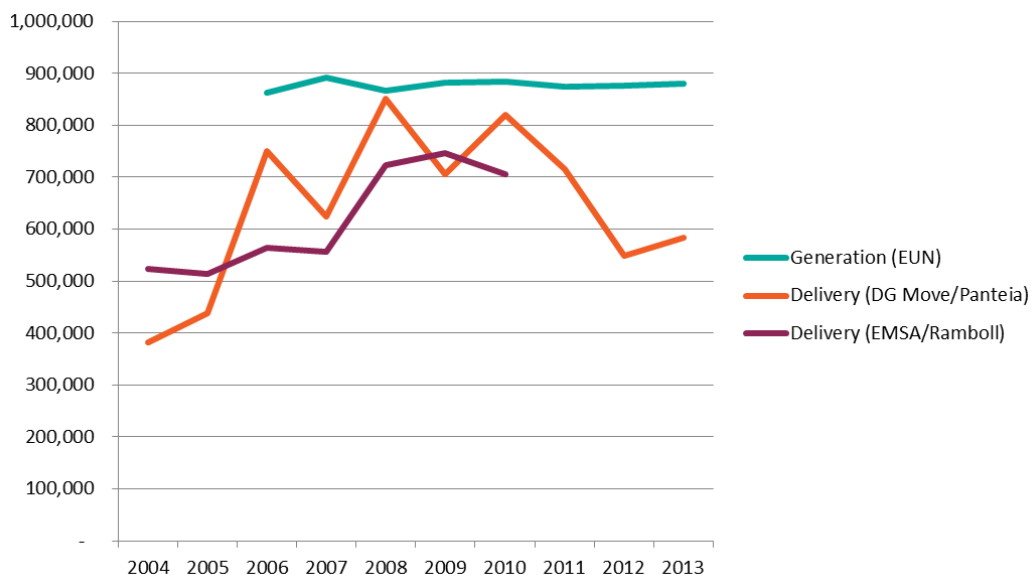
**Figure 4. ANNEX V garbage delivered – in 1000 ton (left axis) and per unit of GT calls (right axis)**



Source: Data from waste deliveries from 29 EU ports

In order to estimate the *delivery gap for garbage*, a comparison was made between total waste generated with waste delivered, using their delivery estimates from studies done by Panteia (2015, REFIT Evaluation) and Ramboll (2012), indicating a **significant gap between generation and delivery of about 33%** (order of 900,000 tons generated vs 600,000 tons delivered), as shown in Figure 5 below.

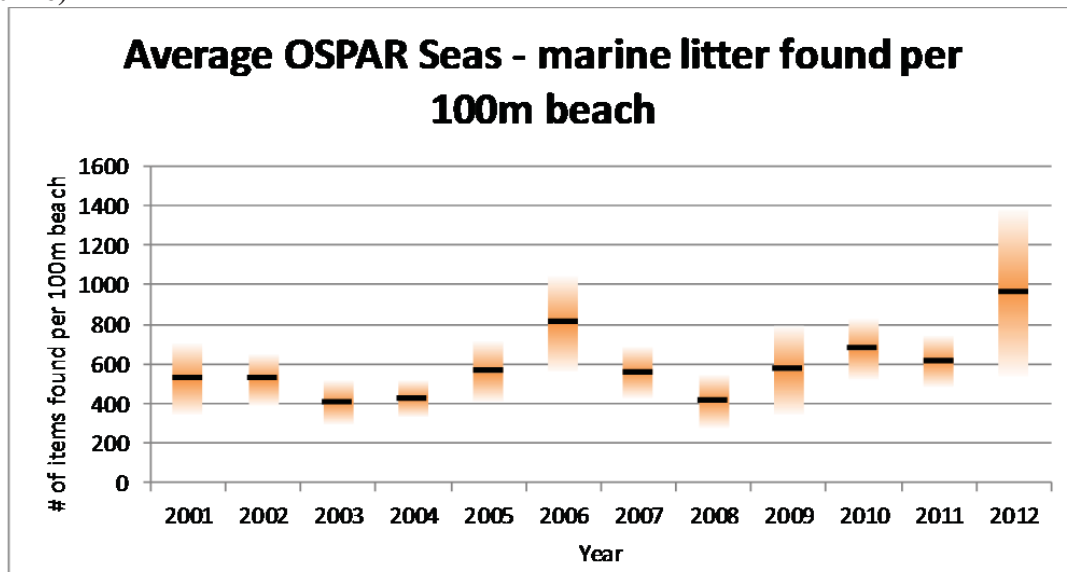
**Figure 5 Delivery estimates based on EMSA/Ramboll (2012) and DG Move/Panteia (2015); Generation estimate (Eunomia) - tonnes**



Source: Eunomia (2016)

At the same time, time series data from marine litter monitoring programmes (OSPAR, 2012) do not indicate a reduction of the amount of marine litter in European seas.

Figure 6. Marine litter found on European shores (number of items per 100m of coastline)



Source: OSPAR (in Panteia, 2015)

It should be noted that given the high share of marine litter from land-based sources, the above developments cannot be directly linked. However, a study by Sá et al (2015) **finds evidence that significant higher concentrations of Annex V waste float near dense shipping routes** (operational waste and packaging material), compared to the areas with little shipping traffic, indicate a significant contribution of the (merchant) shipping sector to waste at sea.

For the fisheries sector, more specific estimates exist in relation to fisheries equipment, including so-called abandoned, lost or otherwise discarded fishing gear (ALDFG), ranging up to 220,000 tons per year for the EU as a whole (calculations based on Eunomia, 2016). Data from fishing for litter programmes initiated over the past decade suggest that the amount of ALDFG is gradually decreasing, but still a lot of 'old' ALDFG is in Europe's seas. ALDFG is to be passively fished and delivered to port, which is supported by fishing for litter programmes or independently.

Plastics are the most abundant debris found in the marine environment and comprise more than half of marine litter in European Regional Seas. Figures estimated point at 54,000 to 145,000 tonnes of plastic per year entering the marine environment from land-based sources (Eunomia, 2016). Visual surveys and surface trawls indicate a stock of plastics floating near the surface to be in the order of 268,000 tons, to which European seas are accounting at least 30% (Five Gyres Institute, 2014 as reported in Eunomia, 2016). These figures do not take into account plastics that sink or to micro-plastics that cannot be visually observed, indicating that the overall stock of plastics in the marine environment is significantly larger.

Analyses of the *origins of marine litter* found in European seas and on shore indicate that a substantial part originates from ships, but various sources use different estimates, caused by different measurement methods.

**Table 5 Share of marine litter from sea based sources**

Source	Baltic Sea	North Atlantic	Mediterranean Sea	Black Sea	EU average
Ocean Conservancy (2012) – waste count		20%			12%
Idem, weight corrected (Eunomia, 2016)					32%
Arcadis (2012)	18%	48%	16%	50%	34%
- Of which fishing sector	51%	88%	58%	48%	65%
- Of which other shipping	49%	12%	42%	52%	35%

Eunomia (2016) discusses the limitations of data and methods applied by Ocean Conservancy and Arcadis, and, also referring to other sources (Van Franeker et al., 2010 and Ioakeimidis et al., 2014), **assumes a general split of 20-40% of marine litter being derived from sea-based sources.**

#### **Conclusion on Annex V waste**

The amount of marine litter found in European seas remains at a rather constant level and time series of marine litter on European shores indicate that the problem has persisted since the implementation of the PRF Directive. Although land-based sources are dominant in generating marine litter, sea-based sources actively contribute to the problem with an estimated EU average 32% and values up to 50% for some sea basins. It is estimated that the fishing and recreational sectors are relatively large sea-based sources contributors, with shares of 30% and 19% respectively according to Eunomia (2016) (the balance provided by merchant shipping), and 65% for fisheries alone according to Arcadis (2012). Although garbage delivered in ports has increased since the introduction of the PRF Directive, a significant delivery gap thus remains.

#### **4. Waste from exhaust gas cleaning systems and ozone depleting substances (MARPOL Annex VI)**

##### **Definition**

Under MARPOL Annex VI strict requirements regarding emission levels are adopted. A range of waste types are included in Annex VI, such as waste from exhaust gas cleaning systems (scrubbers) and ozone depleting substances (ODS). The analysis concentrates on waste from scrubbers, as ODS is mainly handled through repair yards, which fall outside the scope of the Directive.

##### **MARPOL discharge regime**

Under MARPOL Annex VI strict requirements regarding emission levels are adopted (see Table 6). Scrubbers are one of several possibilities to comply with low emission standards

required in Sulphur Emission Control Areas (SECAs). Currently, Annex VI waste is not regulated by the PRF Directive.

### **Primary waste generation**

Scrubbers are one of several possibilities to comply with low emission standards, but their use comes with the generation of so-called scrubber sludge; categorised under MARPOL Annex VI. Currently, Annex VI waste is not regulated by the PRF Directive.

This type of waste is mainly generated by merchant shipping, as their ship engines run on heavy fuel oil for which abatement measures are required, at least in Sulphur Emission Control Areas (SECA). Fisheries and recreational boating hardly contribute to the generation of Annex VI waste.

This waste category is currently generated in limited volumes only, due to the fact that the number of ships with on-board scrubbers is still relatively small. Volumes of waste generated have not been studied widely, but from a recent survey completed by an expert group on exhaust gas cleaning Systems (EGCS Subgroup under the European Sustainable Shipping Forum), some indications can be derived. According to the data presented, approximately 400 scrubbers have been installed on board of vessels. It is indicated that these concern both open loop and closed loop scrubbers. Open loop scrubbers take in sea water, use it for scrubbing, then treat it and discharge it back into sea, whereas closed loop scrubbers use fresh water from a holding tank that, after use and treatment, is used again, while the treatment gives wash water bleed-off and sludge.

The same survey provides indications that closed loop scrubbers would generate 1kg of dry matter per MWh, or 20 kg/MWh sludge in total (assuming 5% dry matter content). For an average ship with

A 15MW engine, operating 4,000 hours per year, this would imply 60 tons of dry matter or 1.2 mln tons of sludge (appr. 1,200 m<sup>3</sup>). Open loop scrubbers are reported not to generate any sludge.

The expert group has also reported that closed loop scrubbers bleed-off about 0.3 m<sup>3</sup>/MWh. If we assume an average RoRo ship to have installed power of 15 MW, this gives 4.5m<sup>3</sup> of waste per hour. Assuming an average engine running time of 4,000 hours per year, one ship would thus generate 18.000 m<sup>3</sup>/year. The total volume of scrubber waste generated for all ships then depends on the share of systems that are operating in closed loop.<sup>23</sup> If 5% of the current 400 scrubbers would operate in closed loop mode, the total volume of waste generated amounts to 24,000 m<sup>3</sup> sludge (1,200 m<sup>3</sup> dry matter), with 360,000 m<sup>3</sup> of bleed-off being generated.

The expected growth of this type of waste in the future with a growing uptake potential of scrubbers, driven by regulatory measures including SECA zones in Europe, and announced global sulphur content limits. Any estimate on volume is, however, premature, as it is uncertain how the shipping sector will respond to upcoming legislation (i.e. investing in exhaust gas cleaning systems – EGCS and choosing between open-loop or closed-loop systems, or switching to cleaner but more expensive fuels). The recent CE Delft study (2016) also concluded that it has proven difficult to provide estimates of volumes generated on-board ships for this type of waste.

---

<sup>23</sup> A verification of these figures and assumptions has been asked from EGCSA, but has not been received.



### **Treatment and legal discharges**

The EGCS survey indicates that currently the majority of scrubbers sold are systems operating in open loop, which discharge wash waters and do not generate sludge. However, specific figures on the share of open loop scrubbers and the time they are operated in open loop mode have not been provided. The survey also indicates that closed loop systems still have some discharge (0.1-0.3 m<sup>3</sup>/MWh, although they are also stated to be able to operate with zero discharge for limited periods, depending on storage of bleed off water).

### **Delivery and gap**

Data on delivery of Annex VI waste is not available, as this category is currently not separately included in the PRF Directive. Therefore no gap can be calculated. In absolute terms, the amount of potential waste to be delivered would currently be small as the number of scrubbers currently in use is very low, and a large share of these are open-loop scrubbers legally discharging into sea.

### **Conclusion on Annex VI waste**

While the current volumes of Annex VI waste generation are limited, environmental legislation will drive the demand for increased use of exhaust gas treatment systems, causing a growing volume of Annex VI waste generation. An important factor is the ratio of closed vs open loop scrubbers.

## **5. Cargo residues**

Cargo residues have been defined under the Directive as "remnants of any cargo material on board in cargo holds or tanks which remain after unloading procedures and cleaning operations are completed and shall include loading/unloading excesses and spillage. As such they include both cargo residues as defined in MARPOL Annex V, as well as tank washings falling under MARPOL Annexes I (oily tank washings) and II (tank washings containing noxious liquid substances).

The issue of cargo residues is very different from ship-generated waste and more complex. Cargo residues fall outside the scope of both Article 7 (delivery obligation) and Article 8 (fees) of the Directive, and are regulated under Article 10 (referring to MARPOL) instead. In contrast to ship-generated waste, cargo residues can vary widely. They may also still have a commercial value and therefore usually remain the property of the cargo owner. At the same time, depending on the type of residue, they may require special handling, equipment or treatment. As a result, cargo residues are normally a matter for the terminal operators and shippers to handle, rather than being under the direct competence of the port authorities. The costs are normally covered by the cargo owners (although the ship and/or its agent may also be involved). PRF providers are also used, in case the cargo owners are not interested and/or the terminals cannot take the residues.

The PRF Directive provides in Article 10 that cargo residues are to be delivered to a port reception facility in accordance with the provisions of MARPOL. MARPOL allows for discharges of Annex I and II tank-washings under strict conditions (ref. XX), and a general prohibition of CR discharges of cargo residues under Annex V, with the exception of non-harmful categories of residues and under predefined conditions.

Regarding oily tank washings under Annex I CE Delft (2016) concludes that these are only generated on oil tankers, whereas cargo residues are mostly generated by cargo ships (mainly dry bulk carriers). The amount generated depends on several factors such as the type of cargo, the handling equipment and the efficiency of the stevedores. Results from interviews concluded that the amounts generated per washing, per cargo tank, ranged from 1 to 2 m<sup>3</sup> (CE Delft, 2016).

The inventory of waste delivery to ports has found that data on cargo residues is lacking in many ports, which is attributed to the fact that cargo residues are often delivered to terminal operators rather than PRF operators. As a result, data provided regarding the delivery of cargo residues is quite limited and shows strong fluctuations between years, for both types (oily and solid residues in tank washings). Conclusions on any delivery gap cannot be given as a result of above-mentioned limitations. However, as cargo residues have a residual value and thus delivery implies revenues instead of costs, it is generally regarded that this is a sufficient incentive to deliver cargo residues and not discharge them into the sea. Nonetheless, volatile commodity market prices affect the attractiveness of delivering cargo residues; if the market price is low, there is less of an incentive to deliver cargo residues. This is currently the case for oily residues due to the low oil prices.

Summarising the data on each waste category, the following table has been composed (see next page).

**Table 1: Amount of ship generated waste generated and delivered annually, and the resulting "waste gap"**

	Annex I - oily waste		Annex IV - sewage		Annex V - garbage		Annex VI -scrubber waste
	Merchant shipping	All, including fishing and recreational craft	Merchant shipping	All, including fishing and recreational craft	Merchant shipping	All, including fishing and recreational craft	All (only applicable for merchant shipping)
Primary waste generation (1)	1,977,000 m <sup>3</sup>	2,061,000 m <sup>3</sup> Merchant: 1,997,000 m <sup>3</sup> Fishing vessels: 55,000 m <sup>3</sup> Recreational craft: 9,000 m <sup>3</sup>	27,240,000 m <sup>3</sup>	29,240,000 m <sup>3</sup> Merchant: 27,240,000 m <sup>3</sup> Fishing vessels: 1,000,000 / 1,500,000 m <sup>3</sup> Recreational craft: 1,000,000 m <sup>3</sup>	Not provided	Not provided	400 vessels with scrubbers on board, generating wash waters, sludge and bleed-off
Treatment/legal discharge (2)	38% <sup>24</sup> of (1) = 751,000 m <sup>3</sup>	Close to zero from fishing and recreational craft, thus limited to merchant shipping, i.e. 759,000 m <sup>3</sup>	80-100% of (1) – assuming average 95% = 25,878,000 m <sup>3</sup>	Merchant shipping: average 95% = 25,878,000 m <sup>3</sup> Fishing vessels: 50% = 500,000 / 750,000 m <sup>3</sup> <sup>25</sup> ; Recreational craft: 55% = 550,000 m <sup>3</sup>	Not provided	Not provided <sup>26</sup>	Legal discharge from scrubbers operating in open-loop mode: 95% of 400 vessels (380)
Remaining to be delivered (3) = (1) – (2)	1,226,000 m <sup>3</sup>	1,290,000 m <sup>3</sup> Merchant: 1,226,000 m <sup>3</sup> Fishing vessels: 55,000 m <sup>3</sup> Recreational craft: 9,000 m <sup>3</sup>	1,362,000 m <sup>3</sup>	2,312,000 m <sup>3</sup> / 2,562,000 m <sup>3</sup> Merchant: 1,362,000 m <sup>3</sup> Fishing vessels: 500,000 / 750,000 m <sup>3</sup> Recreational craft: 450,000 m <sup>3</sup>	434,000 tonnes <sup>27</sup>	881,000 tonnes Merchant: 434,000 tonnes Fishing vessels: 266,000 tonnes Recreational craft: 171,000 tonnes <sup>28</sup>	24,000m <sup>3</sup> sludge 360,000 m <sup>3</sup> bleed-off (generated by scrubbers operating in closed-loop mode, i.e. 5% of 400)
Actually delivered (4)	1,195,000 m <sup>3</sup>	Unknown, as waste delivery data for fishing ports and marinas are unknown	1,226,000 m <sup>3</sup>	Unknown, as waste delivery data for fishing ports and marinas are unknown	Range from 286,000 to 404,000 tonnes <sup>29</sup>	Range from 580,000 to 820,000 tonnes	Unknown

<sup>24</sup> 38% estimate is based on the most relevant ship categories used in MARWAS.

<sup>25</sup> The waste deducted from waste produced for fishing and recreational craft is based on time of fishing vessels and recreational craft in ports.

<sup>26</sup> Details of the calculations can be found in the Eunomia study, section 2.6.5.2, which has estimated that approximately 20% of Annex V waste is incinerated on-board; this is confirmed by MARWAS which assumes 20-30% on-board treatment of garbage for large ships, and no treatment on board of small specialised vessels.

<sup>27</sup> Based on data from Eunomia (2015), including the identified sectors: shipping; cruises; and passenger.

<sup>28</sup> The balance of waste generated (10,000 tonnes) is created by navy.

<sup>29</sup> To get insight in the delivery data of the merchant sector, the total delivered waste volumes are applied to the share of waste produced by merchant shipping (thus considering a common garbage delivery pattern per sector).

Delivery gap (3) – (4)	<b>31,000 m<sup>3</sup> (2.5%)</b>	Unknown, but consisting of 31,000 m <sup>3</sup> caused by merchant shipping and a contribution from fishing vessels and recreational craft between 0 and 64,000 m <sup>3</sup>	<b>136,000 m<sup>3</sup> (10%)</b>	<i>Unknown</i>	<b>Between 30,000-148,000 tonnes (7-34%)</b>	<b>Between 60,000-300,000 tonnes (7-34%)</b>	<i>Unknown</i>
---------------------------	------------------------------------	---	------------------------------------	----------------	--	--	----------------

Source: MARWAS (Annex I-IV waste); Annex V waste estimates are based on Eunomia (2016)

## Annex 6 – MARPOL discharge norms and relevant amendments

MARPOL Annex I <sup>30</sup>			
Waste category	Ships outside special areas	Ships within special areas <sup>31</sup>	Offshore platforms and all ships within 500 m of such platforms
Oily bilge water	Applicable to ships > 400 GT Discharge only permitted when: * the ship is proceeding en route;	Applicable to ships > 400 GT Discharge only permitted when: * the ship is proceeding en route	Discharge prohibited
Oily residues (sludge)	* the oily mixture is processed through an oil filtering equipment meeting the requirements of regulation 14 of this Annex;	* the oily mixture is processed through an oil filtering equipment meeting the requirements of regulation 14.7 of this Annex	
Other	* the oil content of the effluent without dilution does not exceed 15 parts per million; * the oily mixture does not originate from cargo pump-room bilges on oil tankers * the oily mixture, in case of oil tankers, is not mixed with oil cargo residues	* the oil content of the effluent without dilution does not exceed 15 parts per million * the oily mixture does not originate from cargo pump-room bilges on oil tankers * the oily mixture, in case of oil tankers, is not mixed with oil cargo residues	

<sup>30</sup> [http://www.marpoltraining.com/MMSKOREAN/MARPOL/Annex\\_I/r15.htm](http://www.marpoltraining.com/MMSKOREAN/MARPOL/Annex_I/r15.htm) and [http://www.bsh.de/en/Marine\\_data/Environmental\\_protection/MARPOL\\_Convention/Discharge\\_regulations\\_in\\_Annex\\_I.pdf](http://www.bsh.de/en/Marine_data/Environmental_protection/MARPOL_Convention/Discharge_regulations_in_Annex_I.pdf)

<sup>31</sup> The following European waters are special zones: Mediterranean Sea, Baltic Sea, Black Sea and North Western European Waters (Annex I).

<b>MARPOL Annex IV<sup>32</sup></b>			
<b>Waste category</b>	<b>Ships outside special areas</b>	<b>Ships within special areas<sup>33</sup></b>	<b>Offshore platforms and all ships within 500 m of such platforms</b>
Sewage	Discharge in principle prohibited unless ship has in operation an approved sewage treatment plant or when the ship is discharging comminuted and disinfected sewage using an approved system at a distance of more than three nautical miles from the nearest land. Sewage which is not comminuted or disinfected may be discharged at a distance of more than 12 nautical miles from the nearest land	Of the EU waters, only Baltic Sea is appointed as special area. Currently regulation is not yet in force.  If in force only applicable to passenger ships. The following applies: discharge of sewage from passenger ships within the special area will generally be prohibited under the new regulations, except when the ship has in operation an approved sewage treatment plant which has been certified by the Administration	See rules 'ships outside special areas'

<b>MARPOL Annex V<sup>34</sup></b>			
<b>Waste category</b>	<b>Ships outside special areas</b>	<b>Ships within special areas<sup>35</sup></b>	<b>Offshore platforms and all ships within 500 m of such platforms</b>
Food waste comminuted or ground	Discharge permitted $\geq 3$ nm from the nearest land and en route	Discharge permitted $\geq 12$ nm from the nearest land and en route	Discharge permitted $\geq 12$ nm from the nearest land
Food waste not comminuted or ground	Discharge permitted $\geq 12$ nm from the nearest land and en	Discharge prohibited	Discharge prohibited

<sup>32</sup> <http://www.imo.org/en/OurWork/Environment/PollutionPrevention/Sewage/Pages/Default.aspx>, especially MEPC.157(55) and MEPC.227(64)

<sup>33</sup> The following European waters are special zones: the Baltic Sea (Annex IV)

<sup>34</sup> <http://www.imo.org/en/OurWork/Environment/PollutionPrevention/Garbage/Documents/2014%20revision/Annex%20V%20discharge%20requirements%202007-2013.pdf>

<sup>35</sup> The following European waters are special zones: Mediterranean Sea, Baltic Sea, Black sea and North Sea (Annex V)



<b>MARPOL Annex V<sup>34</sup></b>			
<b>Waste category</b>	<b>Ships outside special areas</b>	<b>Ships within special areas<sup>35</sup></b>	<b>Offshore platforms and all ships within 500 m of such platforms</b>
	route		
Cargo residues <sup>361</sup> not contained in wash water	Discharge permitted $\geq 12$ nm from the nearest land and en route	Discharge prohibited	Discharge prohibited
Cargo residues <sup>1</sup> contained in wash water	route	Discharge only permitted in specific circumstances <sup>37</sup> and $\geq 12$ nm from the nearest land and en route	Discharge prohibited
Cleaning agents and additives <sup>1</sup> contained in cargo hold wash water	Discharge permitted	Discharge only permitted in specific circumstances <sup>2</sup> and $\geq 12$ nm from the nearest land and en route	Discharge prohibited
Cleaning agents and additives <sup>1</sup> contained in deck and external surfaces wash water		Discharge permitted	Discharge prohibited
Carcasses of animals carried on board as cargo and which died during the voyage	Discharge permitted as far from the nearest land as possible and en route	Discharge prohibited	Discharge prohibited
All other garbage including plastics, domestic wastes, cooking oil, incinerator ashes, operational wastes and fishing gear	Discharge prohibited	Discharge prohibited	Discharge prohibited
Mixed garbage	When garbage is mixed with or contaminated by other substances prohibited from discharge or having different discharge requirements, the more stringent requirements shall apply		

<sup>36</sup> These substances must not be harmful to the marine environment.

<sup>37</sup> 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 area 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).

MARPOL Annex VI		
Waste category	Ships outside special areas	Ships within special areas
Ozone Depleting Substances	Prohibited	
Nitrogen Oxides (NOx)	<p>n = engine's rated speed (RPM)</p> <p>Tier I – Construction on or after 1 January 2000  n &lt; 130 → emission limit 17.0  n = 130 – 1999 → emission limit 45.n-0.2 (e.g. 720rpm – 12.1)  n &gt; 1999 → emission limit 9.8</p> <p>Tier II – Construction on or after 1 January 2011  n &lt; 130 → emission limit 14.4  n = 130 – 1999 → emission limit 44.n-0.23 (e.g. 720rpm – 9.7)  n &gt; 1999 → emission limit 7.7</p> <p>Tier III – Construction on or after 2016  n &lt; 130 → emission limit 3.4  n = 130 – 1999 → emission limit 9.n-0.2 (e.g. 720rpm – 2.4)  n &gt; 1999 → emission limit 2.0</p> <p>The same Tier I limits will apply to those existing marine diesel engine with a power output of more than 5,000 kW and a per-cylinder displacement at or above 90 litres installed on a ship constructed between 1st January 1990 and 1st January 2000. A certified approved method must be provided following the requirements set in the NOx Technical Code.</p>	<p>The IMO Marine Environment Protection Committee at its 66th session agreed to set the Tier III requirements to be applied to the marine diesel engines installed on:</p> <p>* ships constructed on or after 1st January 2016 and which operate in the North American ECA or the United States Caribbean Sea ECA, both designated for the control of NOx emissions.</p> <p>* ships constructed on or after the date of adoption by the committee of a new ECA, or a later date as may be specified in the amendment designating the new NOx Tier III ECA.</p>
Sulphur oxides and Particulate Matter (SOx)	<p>Outside an ECA established to limit SOx and PM emissions:</p> <ul style="list-style-type: none"> <li>- 3.50% m/m on and after 1 January 2012</li> <li>- 0.50% m/m on and after 1 January 2020</li> </ul>	<p>Inside an ECA established to limit SOx and PM emissions:</p> <ul style="list-style-type: none"> <li>- 1.00% m/m on and after 1 July 2010</li> <li>- 0,10% m/m on and after 1 January 2015</li> </ul>
Volatile	This regulation only applies to tankers and VOC from tankers are regulated in	

<b>MARPOL Annex VI</b>		
<b>Waste category</b>	<b>Ships outside special areas</b>	<b>Ships within special areas</b>
organic compounds (VOC)	ports or terminals. The relevant Government designates which ports and terminals at which VOC emissions from tankers are to be regulated.	
Ship board Incinerators	<p>Shipboard incineration of the following substances shall be prohibited:</p> <ul style="list-style-type: none"> <li>- Annex I, II and III cargo residues of the present convention and related contaminated packing materials;</li> <li>- Polychlorinated biphenyls (PCBs);</li> <li>- Garbage, as defined in Annex V of the present Convention, containing more than traces of heavy metals;</li> <li>- Refined petroleum products containing halogen compounds;</li> <li>- Sewage and sludge oil not generated on board;</li> <li>- Exhaust gas cleaning system residues.</li> </ul> <p>Regulation 16 permits incineration of:</p> <ul style="list-style-type: none"> <li>- PVC - plastics (where type approved to do so) (Reg.16.3)</li> <li>- Sewage sludge and sludge oil permitted in boilers but not when in ports, harbours and estuaries (Reg.16.)</li> <li>- Incinerators installed before 24 May 2005 on domestic shipping can be excluded by the Administration (Reg. 16.6.2)</li> <li>- Operating manual, training, and temperature control (Reg. 16.7 - 16.9)</li> </ul> <p>Shipboard Incinerators installed after 1 January 2000 must be type approved and certified to meet prescribed emission standards.</p> <p>Shipboard incineration must only take place in a shipboard incinerator except for incineration of sewage sludge and sludge oil generated during normal operation of a ship, which may also take place in the main or auxiliary power plant or boilers, but in those cases, must not take place inside ports, harbours and estuaries.</p>	

## **Annex 7 – EMSA Assessment of the enforcement options**

Paper by EMSA starting on the next page.

# **EMSA's assistance with Directive 2000/59/EC on Port Reception Facilities (PRF)**

## **Technical assessment on the list of open questions (Supplement on enforcement)**

Date: 12/05/2017 (version 5)



# 1. Introduction

This is a complementary analysis to EMSA's technical assessment on a given list of open questions addressed in view of the forthcoming impact assessment for the revision of the PRF Directive.

The analysis focusses on a new risk based approach for PRF inspections in the context of the revision of the PRF Directive and it provides two alternative enforcement scenarios each tailor made to address the enforcement part of policy options number 3 and number 4 of the IA Support Study.

## 2. Risk based approach for PRF inspections

### 2.1 Introduction to the Issue

In relation to enforcement, the following should be taken into account:

- References to the PSC regime are outdated and should be amended. In particular, the mechanism to calculate annual inspection commitment for PRF inspections is outdated and should be revised;
- THETIS EU, which is available since April 2016 and serves as a platform to record and exchange information on the results of individual compliance verifications under Directive 2000/59/EC, may also be used to facilitate enforcement of the PRF Directive;
- There are no specific and accurate data on the number of actual PRF inspections conducted by the Member States annually. It may be assumed that a certain part of the total number of the PSC inspections may have also covered PRF requirements. However, so far, previous findings<sup>38</sup> and the limited use of the dedicated THETIS-EU - PRF module<sup>39</sup> indicate that, enforcement efforts by the Member States may well remain a problematic area for implementation of the PRF Directive.

In view of the revision of the PRF Directive, the enforcement part (i.e. the so-called "PRF inspection") may be streamlined and evolved on a risk-based approach aiming at more effective inspections and more efficient use of resources. In this regard, the hereunder analysis provides two alternative proposals each tailor made to address the different respective needs of each of the alternative policy options (PO/3 or PO/4)<sup>40</sup> described in the IASS.

### 2.2 Options for the enforcement provisions under the revised Directive

#### 2.2.1 General

The current PRF Directive regulates a number of requirements to ensure the accomplishment of the purpose of the Directive<sup>41</sup>. In the enforcement part (Article 11), it requires from MS to ensure that:

- A)** A sufficient number of PRF inspections is carried out and
- B)** During a PRF inspection compliance with the "delivery obligation" under Articles 7 and 10 is verified.

In this regard:

**A)** The sufficient number of inspections (inspection commitment) is defined in Article 11.1(b) of the PRF Directive, setting up the minimum number of inspections equal to 25% inspection requirement set out in Directive 95/21/EC. For the year 2016, this provision would mean that a total number of **19453 "PRF inspections"** would need to be conducted by the Member States<sup>42</sup>.

<sup>38</sup> Refer to the Enforcement part (Theme III) of EMSA's Horizontal Analysis of Port Reception Facilities (Directive 2000/59/EC), December 2010.

<sup>39</sup> In 2016 only **1166 "PRF inspections"** were recorded in THETIS-EU.

<sup>40</sup> I.e. PO3: "MARPOL alignment and better enforcement" or PO4: "EU PRF Regime beyond MARPOL".

<sup>41</sup> I.e. to reduce the discharges of SGW and CR into the sea, especially illegal discharges, from ships using ports in the EU, by improving the availability and use of PRFs for SGW and CR.

<sup>42</sup> See Annex I to this report.



However, after the recast of the Directive 95/21/EC the above calculation has been abolished and the new PSC Directive<sup>43</sup> has established a “risk-based inspection regime”. In comparison to the old (95/21) regime the number of the PSC inspections has fallen from 23679 in 2010 (last year of old regime) to around 17800 in 2016<sup>44</sup>.

In conclusion, the current PSC regime demands less number of inspections than the current PRF enforcement regime but the PSC inspections are conducted on a risk-basis, they follow detail procedures and they are all reported in THETIS. Although the PRF inspections in most Member States are conducted within the framework of the PSC inspections this is not the case for all Member States, their actual annual number is not clear and, in any case, their results are not reported in THETIS or in THETIS-EU<sup>45</sup>.

**B)** A PRF inspection must verify that the ship complies with specific PRF requirements stemming from the PRF Directive. It may be part of another inspection (e.g. part of a PSC or a FS inspection) or it may be conducted solely as an inspection for checking compliance with the PRF Directive. Of course, the more demanding and complicating the requirements of the PRF inspection are, the more difficult is to be part of another enforcement regime because of the additional burden on the inspector and potential difficulties to match the respective requirements and procedures.

One must take into account that, different policy options i.e. **PO3** providing for an alignment with MARPOL or **PO4** providing for an EU PRF regime beyond MARPOL call for different enforcement regimes accordingly.

## 2.2.2 Policy Option 3 (“MARPOL alignment and better enforcement”) – Port State Control inspections according to the PSC Directive plus Flag State inspections

### 2.2.2.1 The PSC enforcement regime may also cover the PRF regime

The PRF inspection has a wider scope of application than a PSC inspection but, at the same time, it has a limited number of items to be checked during the inspection, while the PSC inspection is a random inspection that may cover (or not) a very broad number of items and not necessarily the MARPOL requirements. In addition, the PSC Directive does not cover the specific provisions of the PRF Directive with regard to the “delivery obligation”, exceptions etc, therefore, a PSC inspection cannot be considered per se as a PRF inspection unless the PSCO combines the PSC inspection with the additional control of the specific requirements of the PRF Directive.

As already mentioned, a PRF inspection may be part of another enforcement regime. In this context, it is evident that **the PSC enforcement regime** may substantially<sup>46</sup> cover the PRF enforcement requirements if the PSC Directive is amended to incorporate these requirements ensuring that a PSC inspection will also include the specific “PRF inspection”. Annex II provides a detailed comparison between the two regimes (PRF vs PSC) in order to have a better understanding of the adjustments that may be necessary for combining PSC and PRF inspections.

Provided that the PSC Directive is amended accordingly, the PSC regime may enforce effectively the PO3 principal to align the scope of the EU mandatory delivery requirement with MARPOL<sup>47</sup>. Under PO3, the “EU delivery obligation” addresses what cannot be discharged legally according to MARPOL<sup>48</sup>. In this regard, the PSC regime will cater for the proper enforcement of the EU PRF regime i.e. advanced waste notification (**AWN**), **risk-based selection of ships** for inspection and **compliance with the obligation to deliver** to ensure compliance with MARPOL requirements.

<sup>43</sup> Directive 2009/16/EC.

<sup>44</sup> However, the number of individual ships inspected has risen from 14577 to 14757. This indicates that more ships are inspected, but the frequency of inspections per ship has reduced. Numbers refer to the whole Paris MOU region. Total EU inspections are **15186**.

<sup>45</sup> Not mandatory reporting to THETIS-EU and a very small number has been reported up to now.

<sup>46</sup> But not fully, as its scope does not include Flag State inspections or inspections on domestic vessels, fishing vessels and recreational crafts.

<sup>47</sup> The delivery obligation will reflect the MARPOL discharge prohibition, i.e.: what cannot be discharged under MARPOL shall be delivered to PRF by ships calling in EU ports

<sup>48</sup> On the contrary, under PO4 the “EU delivery obligation” addresses all the SGW/CR produced on board a ship regardless whether they can be legally discharged under MARPOL. See below section 2.2.3.

## **Amendment of the PSC Directive**

### **1) Advanced Waste Notification**

It should be noted that the PSC Directive already covers the **AWN**, turning a ship to priority II and making it eligible for a PSC inspection in case of failure to comply with AWN requirements. In addition to this, a competent authority may impose a penalty in accordance with the provisions of the PRF Directive. Therefore, no additional regulation for AWN is necessary.

### **2) Risk-based selection system of ships for inspection**

The PSC Directive already has a **risk-based approach for selection of ships** and this will cater also for the purposes of the PRF Directive in the sense that a Member State may report a ship as potentially harming the marine environment (e.g. in case of no delivery of SGW/[CR]) and then turn it into **priority I for selection for a mandatory additional PSC inspection**.

The selection system could be further streamlined if a specific “**unexpected factor**” is added in Annex I of the PSC Directive: “- Ships which have not complied with the obligation to deliver their SGW [or CR] in accordance with the PRF Directive”. This would turn the ship automatically to Priority II and eligible for a PSC additional inspection.

It should be noted that the addition of a new unexpected factor would not pose any inconsistencies to the PSC – Paris MOU system because, within the framework of the PO3, non delivery of non-dischargeable SGW/[CR] (when an exception cannot be granted) implies a potential breach of MARPOL and, consequently, the ship may be considered to pose a threat of harm to the marine environment. Therefore, an additional more detailed inspection (or expanded inspection depending on ship’s type and inspector’s professional judgement) is appropriate to focus on compliance with MARPOL and the EU PRF requirements<sup>49</sup>.

If the ship has failed to comply with the notification requirements/AWN, as already mentioned in paragraph (1) above, it may be selected for an additional more detailed (or expanded inspection depending on ship’s type and inspector’s professional judgement<sup>50</sup>) to verify compliance with the EU PRF requirements (and MARPOL).

### **3) Combining PSC with PRF inspection**

The main adjustment that needs to be made is to ensure the control of the “obligation to deliver” according to Article 7 or Article 10 of the current PRF Directive<sup>51</sup>, within the context of a PSC inspection.

For this purpose, it would be appropriate to **expand the scope of the “initial PSC inspection”** to cater also for a verification of the delivery of SGW/[CR] according to the PRF Directive, mainly by checking the certificates and documents of the ship (e.g. Oil Record Book, Garbage Record Book, Ship’s logs e.t.c.), checking the submitted Advanced Waste Notification Form<sup>52</sup> and checking, if available, previous waste delivery receipts.

There are two consecutive steps to follow:

- **First** the PSCO shall assess the ship’s operation in relation to Article 7 and Article 10 of the PRF Directive. If compliance with the PRF Directive requirements of Article 7 or 10 is not confirmed<sup>53</sup> this shall constitute a clear ground for a more detailed inspection to verify compliance with the EU PRF requirements (i.e. Article 7 or 8 of the PRF Directive). In the context of this inspection, if non-compliance with the EU Directive can

<sup>49</sup> See below paragraph (3).

<sup>50</sup> See Annex I, part II.3B(c) of the PSC Directive.

<sup>51</sup> The references to current Articles will be adjusted to the revised Directive.

<sup>52</sup> In accordance with Article 6 of the PRF Directive.

<sup>53</sup> I.e. delivery has not occurred in previous port of call (and no exception can be confirmed) or the ship has declared no waste to be delivered ashore while the PSCO finds that there is no sufficient dedicated storage capacity on board for the coming voyage.

be substantiated<sup>54</sup>, then the PSCO will follow the standard PSC procedures (recording of deficiency, possible detention<sup>55</sup>, e.t.c.).

- **Second** the PSCO, in accordance with Article 7 of the PRF Directive will decide for the delivery of SGW at the port of inspection or (if sufficient dedicated storage capacity exists<sup>56</sup>) will grant an exception. If the decision of the PSCO is for the ship to deliver SGW in the port's PRF then a ship related message should be recorded in THETIS indicating that the ship has to deliver its SGW in a PRF. This will be useful for the next PSC inspection where verification can be made.

Failure to deliver the SGW/[CR] will constitute a deficiency and the ship may also be detained until it delivers all SGW/[CR]. It may also lead to a penalty for the breach of the respective requirements of the PRF Directive. The penalty could be imposed irrespective of whether the non-delivery has occurred in a port of the Member State or in a port of another Member State<sup>57</sup>.

In summary<sup>58</sup>, **the PSC Directive will be amended to:**

1. **add a specific "unexpected" factor" in Annex I ("Ships which have been reported not complying with the obligation to deliver their SGW [and/or CR] in accordance with Articles X and X of the Directive 20XX/XX/EU") (Currently Articles 7 and 10 of the Directive 2000/59/EC");**
2. the definition of the "initial PSC inspection" in Article 2.11 refers to "*the checks required by Article 13.1*". Therefore, **Article 13.1 will be amended** by adding an additional bullet-point as "**(d) verifies that the ship is in compliance with Articles X and X of the Directive 20XX/XX/EU**" (Currently Articles 7 and 10 of the Directive 2000/59/EC);
3. **Amend Article 13 paragraph (3)** as follows: "A more detailed inspection shall be carried out, including further checking of compliance with on-board operational requirements, whenever there are clear grounds for believing, after the inspection referred to in point 1, that the condition of a ship or of its equipment or crew does not substantially meet the relevant requirements of a Convention **or of the relevant EU maritime legislation**";
4. **Amend paragraph (1) of Article 19** as follows: "1. The competent authority shall be satisfied that any deficiencies confirmed or revealed by the inspection are, or will be, rectified in accordance with the Conventions **and the relevant EU maritime legislation**".
5. **Amend Annex V** to include in section (A) two new clear grounds i.e. "**20. Evidence from the check of ship's certificates and documents and/or the submitted Advanced Waste Notification that the ship has not complied with Articles X and X of the Directive 20XX/XX/EU**" (Currently Articles 7 and 10 of Directive 2000/59/EC) and "**21. ships with overriding or unexpected factors as listed in Annex I**";
6. **Amend Annex X** to add a new subparagraph: "**3.12. Areas under Directive 20XX/XX/EU**" (Currently Directive 2000/59/EC). **Failure to comply with Article X of the Directive 20XX/XX/EU**" (Currently Article 7 of Directive 2000/59/EC)"
7. **THETIS** needs to be adapted to cater for the PRF requirements.

(All references to figures should be adapted to the revised PRF Directive).

These amendments would ensure that all PSC inspections would also look on the PRF enforcement (i.e. for 2016, a number of 15186 PRF inspections would have been conducted). The PRF Directive (especially Article 7 and

<sup>54</sup> **For example: a)** such a case would be if there is a ship related message from previous inspection that the ship had to deliver all SGW/[CR] before departure and the ship has not complied with this **or b)** if there is an alert from another Member State that the ship did not deliver SGW in accordance with Article 7 of the PRF Directive and, after checking ship's documents, the PSCO confirms that indeed the ship did not deliver its waste.

<sup>55</sup> There might be a need for specific guidance on recording deficiencies or detaining a ship on the basis of an EU legal requirement.

<sup>56</sup> The concept of "sufficient storage capacity" will need to be defined in relation to MARPOL i.e. to include also the possibility for legal discharges under MARPOL for the coming voyage. Moreover, Member States will need to define the competent authorities and procedures for granting an exception (because not all the ships calling at a port of a Member State will be inspected by the PSC authorities). Otherwise, the decision to deliver or not SGW/CR will be left to the Master of the ship.

<sup>57</sup> This implies that the revised PRF Directive should have a specific provision **allowing for the Member State of the next port of call to impose a penalty if a delivery in the previous port of call has not occurred (and there was no exception granted).**

<sup>58</sup> See also Annex III for a schematic description of the PSC-PRF inspections.

Article 10) would need to be revised in line with the above analysis to guide the PSCOs during the PSC-PRF inspection.

### **2.2.2.2 Additional Enforcement Regime**

As already explained, the PSC regime may substantially cover the PRF enforcement requirements but its scope cannot coincide with the current scope of the PRF Directive. There are two options: **first** to rely solely in the PSC Directive or **second** to provide for an additional enforcement regime to cover potential Flag State inspections and domestic vessels equivalent to the current PRF regime. The additional regime may also cover the cases where a MS conducts PRF inspections on board foreign flagged vessels not within the context of the PSC Directive (i.e. the PRF inspector is not a PSCO<sup>59</sup>).

(N.B.: The fishing vessels and recreational crafts will be considered separately as “Policy option variants: with or without additional focus on marine litter” and they may be added either to PO3 or PO4 or not added at all<sup>60</sup>).

#### **2.2.2.2.(1) Flag State inspections**

The PSC enforcement regime will ensure that a large number of PRF inspections will be conducted and recorded in THETIS. However, inspections by the Flag State shall remain a possibility as it is the prerogative of a Flag State to inspect any ship in its Register at any time.

Therefore, it is sensible (but not necessary) to provide also for a possibility to perform “PRF Flag State Inspections”. Although the FS inspections of ships on international voyages will cover the same ships covered by PSC inspections, the Member States may use the possibility to conduct also a PRF inspection during a normal FS inspection and to record the results in THETIS-EU.

The number of the “FS-PRF inspections” will be added to the number of the PSC-PRF inspections<sup>61</sup> thus improving enforcement of the PRF provisions. Reporting in THETIS-EU will increase awareness regarding the compliance with the PRF Directive requirements.

It should be noted that the FS inspections may be undertaken within or out of the EU. However, FS-PRF inspections may only be conducted when a ship is in a port of a Member State preferably<sup>62</sup> to a port of the Member State whose flag is flying to avoid potential conflicting decisions on the obligation to deliver between PSC and FS inspections.

It is not possible to estimate the total number of inspections to be conducted under the Flag State regime as the FS-PRF inspection would be in the discretion of the Member States. Nevertheless, it may be regulated that if a Member State performs a FS-PRF inspection it shall record the inspection to THETIS-EU (mandatory reporting of the FS-PRF inspections).

Notwithstanding the FS-PRF inspections of ships on international voyages the Member States should also enforce the PRF provisions on board domestic vessels.

#### **2.2.2.2.(2) Inspections on domestic vessels**

For the Domestic vessels a separate PRF enforcement regime is necessary as these vessels cannot be covered by the PSC regime. EMSA does not have a clear picture of the total number of the domestic vessels in the Member States. The MARINFO data base provides some indicative figures but it should be noted that only ships above

---

<sup>59</sup> This would create additional burden to ships given that the PSC Directive regime will already cover foreign flagged ships. It may however, be a way out if Member States require this possibility.

<sup>60</sup> See below chapter 3.

<sup>61</sup> N.B.: every PSC inspection will be also a PRF inspection.

<sup>62</sup> But not necessarily as in this case the Port State will have the decisive role.

100GT are recorded and the actual number of all the domestic vessels (irrespective of size), might be significantly larger.

In the MARINFO data base there are **2959** potentially “domestic” vessels in the EU<sup>63</sup>.

**THETIS-EU could be used either on voluntary or on mandatory basis to report PRF inspections on board domestic vessels** (in case of mandatory reporting a threshold of e.g. 100GT would seem necessary for a realistic reporting of the PRF inspection and for avoiding excessive administrative burden).

Furthermore, a minimum inspection obligation of **at least 20%** of all domestic vessels above 100GT may also be introduced. This percentage is equal to the one already used in similar legislation (i.e. the Sulphur Directive) and safeguards that there will be also for domestic vessels a minimum number of inspections conducted per annum. In this case, Member States would need to provide a list of all the active<sup>64</sup> seagoing domestic vessels above 100GT. In this regard, a mandatory system of inspections for domestic vessels would comprise **around 600 PRF inspections** annually reported in THETIS-EU.

Probably the optimum solution would be to require from Member States to establish control procedures, to the extent required, for domestic vessels to ensure compliance with the applicable requirements of this Directive and to report inspections in THETIS-EU (no mandatory minimum threshold for inspections).

### **2.2.2.3 Pros and Cons**

The option “Port State Control inspections according to the PSC Directive plus Flag State inspections” aims at the application of the MARPOL convention through the provisions of the EU legislation<sup>65</sup>.

In this regard, amending the PSC Directive in a way that a PRF inspection becomes part of every PSC inspection may facilitate the enforcement of the PRF Directive and, ultimately, the enforcement of MARPOL provisions against illegal discharges.

In the context of this proposal, all initial PSC inspections will be also covering the requirements of the PRF Directive. In addition, if relevant clear grounds (or relevant unexpected/overriding factors) exist, the PSCOs will ensure a more detailed verification of PRF compliance and respective actions will be undertaken in accordance with the provisions of the PSC Directive. In other words, the PRF Directive is to become like a “relevant instrument” of the PSC Directive and will be applied through PSC inspections.

Therefore, an immediate benefit of this proposal will be that through the PSC inspections the selection of ships will be made on a risk basis, a significant number of inspections will be conducted annually (16000+), detailed follow-up procedures will be in place and all the inspections and results will be recorded in a database.

In comparison to the current legislative requirements the option entails fewer inspections (i.e. around 16000 per annum instead of around 19500 and, therefore, less administrative burden<sup>66</sup>. It will also cover more effectively the domestic vessels than the current PRF Directive and will ensure a more effective and efficient enforcement regime because of the risk based approach and the use of existing resources (PSCOs) which are already familiar with MARPOL implementation.

Notwithstanding the existing PRF legislation, the actual implementation of the provisions for the enforcement of the PRF Directive may well be below the minimum requirements. As regards inspections, in most of the Member States they were carried out within the Port State Control framework, but the check-lists used by the PSC inspectors normally did not contain any elements specific to the PRF Directive<sup>67</sup>. In addition, although THETIS-EU is available

<sup>63</sup> All above 100GT. No fishing vessels included. Data for 2015.

<sup>64</sup> I.e. authorised/certified to conduct sea voyages.

<sup>65</sup> PRF and PSC Directives.

<sup>66</sup> Full incorporation of the PRF inspection in the PSC inspection will also entail time savings in comparison to today's regime.

<sup>67</sup> Refer to the Enforcement part (Theme III) of EMSA's Horizontal Analysis of Port Reception Facilities (Directive 2000/59/EC), December 2010.



since April 2016 only **1166** “PRF inspections” were recorded in THETIS-EU within 2016. Therefore, in comparison to the current actual situation<sup>68</sup>, the proposed new PSC-PRF regime might entail additional administrative burden to the Member States in the sense that actual enforcement of the legislative requirements will become more effective. However, any new regime which secures better enforcement would entail additional administrative burden compared to what is (not) happening today.

**There is a possibility for some assumptions in order to calculate the additional administrative burden:**

It should be taken into account that in the context of the PSC inspection the PSCOs already control the relevant MARPOL requirements as appropriate. Because of the proposal, there may be a slight increase of the burden of each PSC inspection related mostly to the initial control of the data in AWN and in THETIS for verifying compliance with Article 7 of the PRF Directive and to possible follow-up actions if deficiencies revealed.

In this regard, we may assume that, under normal conditions (i.e. the ship requests to deliver its waste) around 5 minutes would be the additional time for a PSCO to control the specific PRF requirements. If the ship does not deliver all the waste ashore then the PSCO will need to evaluate if there is sufficient dedicated storage capacity for the coming voyage. This could take up to 15 minutes for performing the necessary calculations. As an average, we may assume that on each initial PSC inspection an addition of 10 minutes may be needed because of the PRF requirements.

Of course, it is not possible to estimate the time for a more detailed inspection if clear grounds are revealed as this would depend on the merits of each case. In any case, this is already the current situation in the PSC inspection regime.

However, the proposed amendment of the PSC Directive does not cover the current obligation of the Member States according to the PRF Directive<sup>69</sup> to “ensure that the information notified by masters in accordance with Article 6 be appropriately examined”. In other words, the Member States would still need to establish a mechanism to ensure the examination of all AWN submitted. This is not part of the inspection process but it is an important task ensuring the maximum benefit from the AWN and may reveal clear grounds for a PSC inspection. If this is done by the PSC authorities or another authority it should be left to the discretion of the Member States.

There may be a negative approach from those Member States that are currently using a separate enforcement regime to implement the PRF Directive in the sense that this regime will not be needed anymore. According to the latest EMSA’s visits to Member States<sup>70</sup> seven (07) Member States are using a separate PRF regime. However, four (04) of them also use the PSC regime<sup>71</sup>. A possible solution would be to use these resources for conducting Flag State inspections particularly on domestic vessels, fishing vessels and recreational crafts but maybe also for examining all the AWN submitted and informing the PSC authorities in case clear grounds revealed.

In summary, the option of amending the PSC Directive ensures a risk-based selection system, reliable reporting and harmonised application of the relevant procedures. In addition, it generates less administrative burden to the Member States and to ships as there is no increase in the total number of inspections conducted on board ships but only a slight burden to the current PSC inspection. As long as the procedures for the “PRF inspection within the PSC inspection” will be kept as simple as possible and close to the current PSC procedures, then the burden to each PSC inspection will be minimum related mostly to the initial control of the data in AWN and in THETIS for verifying compliance with Article 7 of the PRF Directive<sup>72</sup> calculating if sufficient dedicated storage capacity exists on board.

<sup>68</sup> I.e. limited enforcement efforts by the Member States.

<sup>69</sup> Article 12(1d).

<sup>70</sup> I.e. second cycle of visits (2012-2016), for the monitoring of the implementation of the PSC Directive.

<sup>71</sup> I.e. only 3 MS exclusively use other authorities than the PSC authorities to implement the PRF Directive. See **Annex VII** of this report.

<sup>72</sup> Figure to be adjusted to the revised Directive.



## 2.2.3 Policy Option 4 (“EU PRF Regime beyond MARPOL”) – Dedicated PRF inspection regime

### 2.2.3.1 The need for a dedicated “PRF enforcement regime”

As described in the Executive Summary of the draft IASS the Policy Option 4 (PO4) seeks to strengthen the mandatory delivery of all waste under the PRF Directive, thereby going beyond the scope of MARPOL, and also aiming to address (at least part of) the "legal discharges" (mainly sewage and small quantities of oily waste).

The enforcement of the aforementioned policy option would require a dedicated EU enforcement regime to control delivery of all SGW/CR regardless of the MARPOL discharge provisions. It is uncertain how effective an EU enforcement regime beyond MARPOL would be but it would be necessary to secure stricter control of all SGW/[CR], better information sharing among the Member States, a dedicated PRF targeting mechanism for selection of ships for inspection and a tailor made PRF inspection procedure to secure the delivery of all SGW/[CR] beyond the requirements of MARPOL.

### 2.2.3.2 “PRF targeting mechanism”

Selection of ships for inspection to verify compliance with the provisions of Directive 2000/59/EC for ships other than fishing vessels and recreational craft authorized to carry no more than 12 passengers would be conducted both for ships flying the flag of the Member State and ships flying the flag of another State (FS and PS inspections). The whole regime may be organised under the same principles of the enforcement regime of the Sulphur Directive.

Introduction of a dedicated PRF targeting system would be necessary:

#### **Article X - Union risk based targeting mechanism<sup>73</sup>**

1. **Based on the results of inspections foreseen by paragraph 1 of Article Y, associated findings, waste alerts and pre arrival notification conveyed from the SSN Network, ships other than fishing vessels and recreational craft authorized to carry no more than 12 passengers calling in EU Member States shall, in the inspection database, be attributed to a priority for inspection.**
2. **The relevant priority shall be determined by alerts created by the Member States and by a combination of the following generic and historical parameters:**
  - a. **ships which have not complied with the notification requirements in Article C (Currently Article 6);**
  - b. **ships for which the examination of the information provided by the master in accordance with Article C (Currently Article 6), has revealed other grounds to believe that the ship does not comply with this Directive;**
  - c. **Ships which have never been inspected before, within the context of this Directive;**
  - d. **Ships which have been reported by port authorities or other competent bodies that they have not complied with Articles A (Currently Article 7) and B (Currently Article 10);**
  - e. **Ships which have been the subject of a report, by the master or a crew member, for not complying with Articles A (Currently Article 7) and B (Currently Article 10) unless the Member State concerned deems the report to be manifestly unfounded.**
3. **Taking into account the above parameters and to facilitate the selection process in case of multiple ships in port, the following four priorities for inspection are proposed:**
  - a. **A Ship is considered as PRF Priority 1 (PRF1) and shall be inspected if it has an alert created by the last port of call when there is clear evidence that the ship has proceeded to sea without having complied with Articles A (Currently Article 7) and B (Currently Article 10);**
  - b. **A ship is considered as PRF Priority 2 (PRF2) and may be inspected if three or more of the criteria noted in paragraph 2 are met.**

<sup>73</sup> The targeting mechanism may well be included in an Annex to the Directive or it may be adopted by an IA or DA and may be elaborated further.

- c. **A ship is considered as PRF Priority 3 (PRF3) and may be inspected if one or two of the criteria noted in paragraph 2 are met.**
- d. **A ship is considered as normal priority and may be inspected if none of the criteria noted in paragraph 2 are met.**

### **2.2.3.3 “PRF inspections”**

A PRF inspection should be an in-depth investigation for ensuring that the ship was in compliance with the EU requirements for delivery of all SGW/CR and that, within EU waters, has not made any discharges (whether allowed or not by MARPOL). For this reason, a dedicated PRF inspection procedure should be established and formalised on the basis of today’s EMSA’s guidance for ship inspections under the PRF Directive.

An additional element to enhance effectiveness of the dedicated “EU PRF enforcement regime” would be to introduce a mandatory requirement for all EU PRFs to issue a “**waste delivery receipt**”<sup>74</sup> and for all ships using EU PRFs to keep on-board these receipts for at least two years.

Furthermore, it is proposed to introduce a system to calculate the **annual PRF inspection commitment per Member State** adhering the same principles implemented for the enforcement of the Sulphur Directive through the Commission Implementing Decision (EU) 2015/253 and in particular Article 3. This rule will offer certainty to Member States on how many PRF inspections should perform and on the same time will allow for better monitoring of the Member States’ enforcement efforts. However, for the PRF inspections a 20% inspection rate should be proposed to be closer, as far as possible, to the current (legal) level of inspections of the PRF Directive<sup>75</sup>.

#### ***Article Y - Inspection commitment to verify compliance with the provisions of Directive [20XX/XX/EC] on Port Reception Facilities***

1. **Member States shall carry out inspections to verify compliance with Articles A (Currently Article 7) and B (Currently Article 10) of at least 20 % of the total number of individual ships calling in the relevant Member State per year. The total number of individual ships calling in a Member State shall correspond to the average number of ships of the three preceding years as reported through SafeSeaNet.**
2. **Inspections performed on ships registered in the Member State will be taken into account equally if the result is recorded in THETIS EU**
3. **Member States shall comply with the frequencies specified in paragraphs 1 and 2 by selecting ships on the basis of a Union risk-based targeting mechanism in THETIS EU and of specific alerts on individual ships reported in THETIS EU.**
4. **Member States shall ensure that the information related to inspections performed in accordance with paragraphs 1 and 2 are transferred to the inspection database as soon as the inspection report is completed or the detailed assessment of factors relating to the ship's compliance with this Directive, such as the accuracy of any information provided in accordance with Article C (Currently Article 6), has taken place.**

The inspection commitment per Member State if the proposed Article was to be implemented in 2017 can be found in Annex IV of the present assessment. It should be noted however that these figures are generated from the current SSN data and may not cover all smaller ships (below 300GT) or domestic vessels. For these ships the Member States should establish control procedures to ensure compliance with the applicable requirements of the PRF Directive.

### **2.2.3.5 “Inspection Data Base”**

<sup>74</sup> See Annex V for an analysis of the application of this requirement particularly in relation to unmanned PRFs. To note however, that regulating for unmanned PRFs would increase further the complexity of the whole inspection system.

<sup>75</sup> I.e. 25% of individual ships and around 19500 inspections.

A dedicated module in THETIS EU would be necessary to serve as a platform to record and exchange information on the results of individual compliance verifications under the PRF Directive as well as to convey relevant information (waste notification) from SafeSeaNet.

#### **Article Z – Inspection Data Base**

- 1. EMSA shall develop, host and maintain an inspection database (THETIS EU) set up in accordance with this Directive**
- 2. THETIS EU shall:**
  - a. serve as a platform to record and exchange information on the results of inspections under Directive 20XX/XX/EC;**
  - b. provide data for the Union risk based targeting mechanism;**
  - c. set up the priorities for inspections in accordance with the generic and historical parameters of Article Y;**
  - d. calculate the inspection commitments for each Member State in accordance with the provisions of Article X;**
- 3. Member States shall take the appropriate measures to ensure that the provisions of paragraph 3 of Annex III of Commission Directive 2014/100/EU in relation to pre arrival waste notification are met.**

#### **2.2.3.5 Pros and Cons**

The option of a “dedicated “PRF enforcement regime” will require additional inspection efforts and, therefore, additional resources, for all the Member States, even for those that already have a separate “PRF inspection regime” because it will formalise the selection system and will provide minimum targets.

The tailor made selection system, waste alerts and the detailed reporting in THETIS-EU would facilitate EU requirements going beyond MARPOL.

In addition, it would serve better the current obligation of the Member States according to the PRF Directive to “ensure that the information notified by masters in accordance with Article 6 be appropriately examined”. A dedicated PRF regime would safeguard the examination of all AWN submitted.

If a dedicated PRF inspection is to be conducted then significant time would be needed for the inspector to control the relevant ship’s documents (e.g. certificates, ORB, GRB, ship’s logs, plans, tables e.t.c.) and to have a look around to get acquainted with the overall condition of the ship particularly in the engine room, cargo holds, ballast, bunker, waste bins e.t.c. We may assume that at least one (01) hour would be needed for the inspector to get acquainted with the ship and to check ship’s documents on top of the 10 minutes for controlling only the specific PRF requirements<sup>76</sup>.

Of course, it is not possible to estimate the time for a detailed inspection if non-compliances are revealed as this would depend on the merits of each case. However, it may be assumed that, as an average, at least 2 hours may be needed for the whole PRF inspection.

In addition to the above, a separate PRF inspection would be added to the current number of the PSC inspections and would entail additional logistics (transportation costs for the inspectors, different time windows engaging more of the ship’s crew time e.t.c). In theory, the PSC regime might still be used to conduct the PRF inspections (as an extension to the PSC inspection). However, in practice, it would be extremely difficult to combine the different selection procedures and targeting as well as the different inspection procedures and the separate reporting in THETIS-EU.

---

<sup>76</sup> We assume 10 minutes on the basis of the analysis already conducted under section 2.2.2.3 above.

For this reason, although the total number of the PRF dedicated inspections (estimated<sup>77</sup> to **17220**) would not be significantly higher compared to the total number of the combined PSC-PRF inspections of PO3 (estimated<sup>78</sup> to **15186**) however, this would entail significantly higher administrative burden for the Member States and for the industry as this number would be added to the number of the current PSC inspections.

### 3. Fishing vessels and recreational crafts (Policy option variants: With or without additional focus on marine litter)

#### 3.1 General

In the draft IASS a variant option is defined to specifically address the issue of marine litter (MARPOL Annex V waste) from ships and will group all the measures that can effectively make a contribution to reaching the overall reduction target set in the circular economy. Two variants will be distinguished:

1. Approach based on incentives: as fishing vessels and small recreational craft can be held accountable for a significant part of the marine litter from sea-based sources, these vessels should be included in the indirect fee regime of the Directive. In addition, the passively fished waste could be brought under the scope of the Directive, and arrangements put in place that this type of waste can be delivered on shore free of charge.
2. Approach based on enforcement and incentives (more stringent variant): this variant will include the incentive part mentioned above, but **will also address the enforcement of the waste delivery obligation for fishing vessels and recreational craft**. The current regime can be strengthened by including specific targets for these vessels in the Directive, including the vessels in the THETIS-EU module for reporting the inspections. This variant also includes the reporting of fishing vessels, and should consider the differentiation based on GT or length.

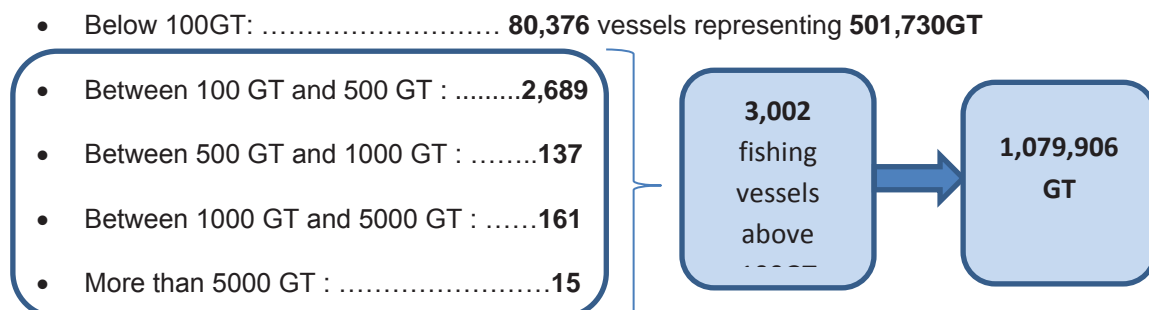
Hereunder an analysis of the fishing fleet and the recreational crafts in the EU is provided with some alternative proposals for selecting the optimum one for becoming the enforcement part of the policy option variant “with additional focus on marine litter”.

#### 3.2 Fishing Vessels

##### 3.2.1 The fishing fleet in the EU

In accordance with the data in the EU fishing fleet registry<sup>79</sup> the composition of the EU fishing fleet is as follows:

The total number of EU fishing vessels<sup>80</sup> is **83,378** with a total **1,581,636GT**. There are:



<sup>77</sup> Calculation for year 2017. See Annex IV.

<sup>78</sup> Actual number of PSC inspections in 2016.

<sup>79</sup> <http://ec.europa.eu/fisheries/fleet/index.cfm?method=Search.SearchAdvanced&country>

<sup>80</sup> On 22 March 2017. Norway – Iceland are exempted.

In the MARINFO database<sup>81</sup> the total number of EU fishing vessels<sup>82</sup> above 100GT is **2990**. Therefore, it may be assumed that the data for fishing vessels above 100GT are relatively accurate<sup>83</sup>.

From all the EU fleet there are **7918** fishing vessels with more than 15 meters LOA<sup>84</sup>. They represent 1,330,440GT.

There are 9213 fishing vessels equipped with VMS<sup>85</sup> representing 1,299,249GT.

These data clearly show that less than 3.6% of all the EU fishing vessels are above 100GT. Furthermore, 9.5% of all the EU fishing vessels are above 15 meters LOA and around 11% are equipped with VMS.

However, in terms of Gross Tonnage the whole EU fishing fleet counts for 1,581,636GT. The vessels above 100GT represent more than **68%** of the total EU fishing fleet tonnage. The vessels above 15 meters LOA represent almost **84%** of the total EU fishing fleet tonnage. The vessels equipped with VMS represent more than **82%** of the total EU fishing fleet tonnage<sup>86</sup>.

### 3.2.2 Alternative proposals for strengthening the enforcement on fishing vessels

In accordance with the PRF Directive, Member States shall establish control procedures, to the extent required, for fishing vessels (and recreational craft authorised to carry no more than 12 passengers) to ensure compliance with the applicable requirements of the PRF Directive.

**On top of this requirement** and taking into account the above figures, we may use one of the aforementioned thresholds for a mandatory inspection regime for fishing vessels. The threshold, the frequency of the inspections and the percentage of the vessels to be inspected in relation to each Member State's fleet, will define the total number of mandatory inspections.

In this regard, the following alternative options may be proposed<sup>87</sup>:

**A) All fishing vessels above 100GT flying the flag of a Member State shall be inspected at least once per year by this Member State or by a Port Member State** (eligible 3.6% of all EU fishing vessels/68% of the total EU fishing fleet tonnage).

This option entails around **3000 inspections per year** (see Annex VI for an analysis of the inspection burden per Member State). Fishing vessels above 100GT must have a MARPOL Annex V garbage management plan and may have an IMO number.

The inspections could be recorded in THETIS-EU (on a mandatory or voluntary basis). Advanced Waste Notification would also be possible but it may entail a significant administrative burden to smaller vessels which normally conduct short voyages. The obligation to inspect all fishing vessels above 100GT annually may also entail significant administrative burden for the Member States particularly in case of vessels operating in remote areas, small ports or islands.

**B) Member States shall inspect annually at least 20% of all fishing vessels above 100GT flying their flag** (eligible 3.6% of all EU fishing vessels/68% of all fishing fleet tonnage, same target group as above option).

The percentage is equal to the one already used in similar legislation (i.e. the Sulphur Directive). This option entails around **600 inspections per year** (see Annex VI for an analysis of the inspection burden per Member State).

A more stringent option would be for the Member States to inspect annually at least 30% of all fishing vessels above 100GT flying their flag. It would entail 900 inspections per year.

---

<sup>81</sup> See Annex VI for an analysis of the number of fishing vessels per Member State.

<sup>82</sup> Norway – Iceland are exempted.

<sup>83</sup> However, these figures do not include fishing vessels flying a flag of a third country (non-EU) that may be based in EU Member States.

<sup>84</sup> Length Overall.

<sup>85</sup> Vessel Monitoring System.

<sup>86</sup> N.B. 260 fishing vessels above 15 meters LOA (56,137GT) found in the database not equipped with VMS (22 March 2017).

<sup>87</sup> N.B.: The legal wording of the proposals should be looked at with DG MARE.



The inspections could be recorded in THETIS-EU (on a mandatory or voluntary basis). Advanced Waste Notification would also be possible but it may entail a significant administrative burden to smaller vessels which normally conduct short voyages.

The option gives more flexibility to the Member States to select the vessels for inspection in a more convenient way (e.g. in bigger ports not on remote areas) while at the same time imposes less administrative burden to both the administrations and the industry.

**C) Member States shall inspect at least 20% of all fishing vessels above 15 meters LOA flying their flag** (eligible 9.5% of all EU fishing vessels/82% of the total EU fishing fleet tonnage).

This option entails around **1,600 inspections per year**. Inspections could be recorded in THETIS-EU (on a mandatory or voluntary basis). Advanced Waste Notification might also be possible but it would entail a significant administrative burden to the whole enforcement system (SSN – PRF Inspectors for evaluating the AWN) because of the significant increase of the total number of vessels reporting on a daily basis, without providing significant benefits. Fishing vessels above 15 meters LOA must have a VMS on board and they need to report regularly their catch. In this regard, it might be possible to amend the respective EU legislation<sup>88</sup> to cater also for a waste report which could be used by the relevant authorities<sup>89</sup>.

A more stringent option would be for the Member States to inspect annually at least 30% of all fishing vessels above 15 meters LOA flying their flag. It would entail 2400 inspections per year.

In both cases, selection of vessels for inspection could be made on the basis of a targeting mechanism to be developed.

In the light of the above, the most realistic scenario seems to be **option (B)**. This option, covers an important part of the fishing fleet (68% of the total tonnage), focussing on vessels posing the biggest threat. In addition, it comprises only 'Flag State inspections' and gives the flexibility to the Member States to select the most convenient/efficient inspections for complying with the 10% obligation. Although it generates a relatively small annual number of inspections the target group is around 3000 vessels (the biggest ones) and thus it may have an important effect in better enforcement. This option is also the most realistic one if AWN is considered necessary for fishing vessels as it covers a relatively small number of vessels in comparison to option C. However, also in this case, it would worth exploring the possibility to provide waste notification through the established electronic reporting of the fishing vessels (VMS) in order to avoid, if possible, an additional layer of reporting and the respective administrative burden.

### 3.3 Recreational Crafts

In the MARINFO database the total number of active recreational crafts is **3668**. However, not all of them are connected to the EU (only 850 have registered a port call in Europe, in one year time - 2015<sup>90</sup>).

All of the **850 ships called in the EU** were above 100GT and had an IMO number.

In accordance with the PRF Directive, Member States shall establish control procedures, to the extent required, for (fishing vessels) and recreational craft authorised to carry no more than 12 passengers to ensure compliance with the applicable requirements of the PRF Directive.

**On top of this requirement** and taking into account the above figures we may use 100GT as a threshold for a mandatory inspection regime for recreational crafts.

In this regard, the following proposal could be made:

---

<sup>88</sup> I.e. Council Regulation (EC) No 1224/2009 and Commission Implementing Regulation (EU) No. 404/2011 laying down detailed rules for the implementation of Council Regulation (EC) No. 1224/2009 establishing a Community control system, for ensuring compliance with the rules of the Common Fisheries Policy of 20 November 2009

<sup>89</sup> DG MARE would need to be consulted.

<sup>90</sup> EMSA does not have data for years after 2015.



**Member States shall inspect at least 20% of the total number of individual crafts calling in the relevant Member State per year. The total number of individual ships calling in a Member State shall correspond to the average number of ships of the three preceding years** (eligible 850 vessels but no accurate/detailed data available).

This proposal entails around **170 inspections per year** and the inspections may be recorded in THETIS-EU (on a mandatory or voluntary basis). Advanced Waste Notification would also be possible but it may entail a significant administrative burden if vessels conduct short voyages. Selection of vessels for inspection may be done on the basis of a targeting mechanism to be developed.

However, and taking into account, the lack of credible data, the relatively small number of annual inspections and the small targeted group, the proposal to include a mandatory inspection regime for recreational crafts cannot be supported adequately.

## Annex I Calls, ships and 25% rule per Member State as if Directive 95/21 was still in force<sup>91</sup>;

Country Description	ATA	Port Call ID (Count Distinct)	IMO Number (Count Distinct)		25% rule
Belgium	2016	24449	5470		1368
Bulgaria	2016	3085	1357		339
Croatia	2016	4870	978		245
Cyprus	2016	2416	821		205
Denmark	2016	17355	2485		621
Estonia	2016	5944	1336		334
Finland	2016	20846	1404		351
France	2016	42707	5733		1433
Germany	2016	41949	5150		1288
Greece	2016	32608	4446		1112
Iceland	2016	2625	356		89
Ireland	2016	12444	1460		365
Italy	2016	38077	5730		1433
Latvia	2016	6490	1978		495
Lithuania	2016	3383	1581		395

<sup>91</sup> No calls by ships flying national flag, no Fishing vessels.

Malta	2016	3331	945		236
Netherlands	2016	36771	7013		1753
Norway	2016	43610	2848		712
Poland	2016	13430	2444		611
Portugal	2016	8607	2466		617
Romania	2016	5452	1992		498
Slovenia	2016	2134	737		184
Spain	2016	80901	10029		2507
Sweden	2016	32052	2694		674
United Kingdom	2016	88368	9564		2391
<b>Totals</b>	<b>Totals</b>	<b>573904</b>	<b>81017</b>		<b>20254</b>

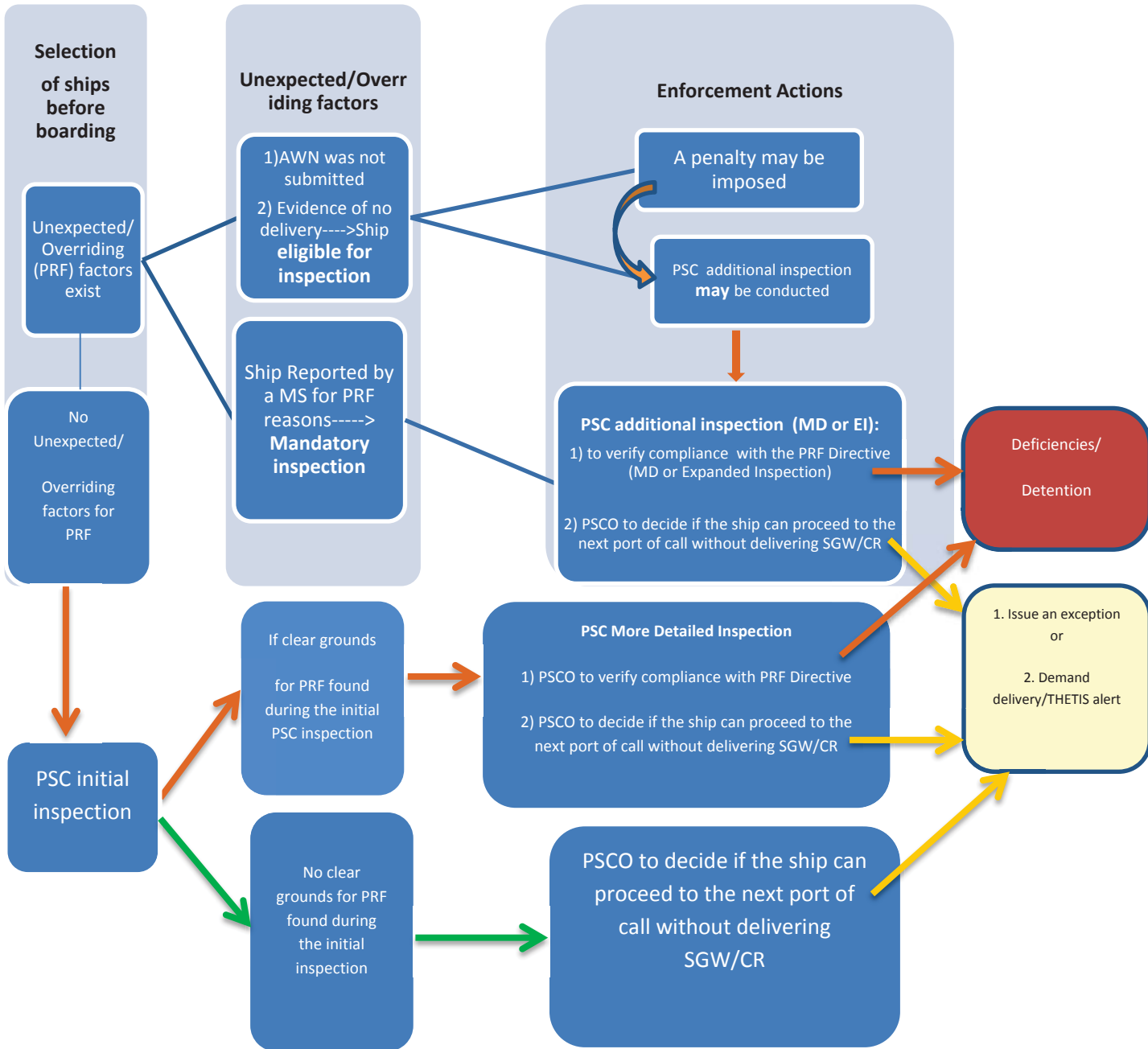
Total without Norway and Iceland = **19453**

## Annex II Comparison between a “PRF Inspection” and a “PSC inspection”:

	PRF Inspection (Dir 2000/59)	PSC Inspection (Dir 2009/16)	Comments
<b>Objective</b>	To enforce compliance with the PRF waste and Cargo Residue landing requirements of the PRF Directive.	To enforce compliance with International Conventions (e.g. MARPOL) and regulations.  (Art.1: “...compliance with international and relevant Community legislation...”).	<u>PSC inspection</u> is broader than <u>the PRF inspection</u> and may cover (or not) the MARPOL discharge requirements if clear grounds revealed or in case of overriding - unexpected factors.
<b>Scope</b>	To all ships, (including fishing vessels and recreational crafts), irrespective of their flag, calling at, or operating within, a port of a Member State (very few exceptions basically warships).	To any ship of a foreign flag and its crew calling at a port or anchorage of a Member State to engage in a ship/port interface (fishing vessels, pleasure yachts not engaged in trade and warships excluded).	<u>PRF inspection</u> may be conducted on board almost all ships (including domestic vessels, fishing vessels & recreational crafts) either flying the flag of the MS or a foreign flag. <u>PSC inspection</u> may only be conducted on board ships flying a foreign flag (fishing vessels/yachts excluded).
<b>Notification Requirements</b>	Pre-arrival submission of AWN. Failure to submit may lead to enforcement actions (mandatory delivery, penalty etc).	Failure to submit AWN is an unexpected factor i.e. the ship becomes eligible for a PSC inspection (Priority II).	A PSC additional inspection may be triggered by a failure to submit an AWN according to the PRF Directive.
<b>Inspection Commitment</b>	Obsolete and confusing targets for the number of inspections.	Fair share of the inspections between the MS and number of inspections based on a risk approach.	<u>PRF old 25% rule (2016): 19453</u> inspections (fishing vessels & recreational crafts excluded from this number as there are no quantified inspection commitments for these vessels). <u>PSC nbr of inspections (2016): 15186</u> inspections.
<b>Inspectors</b>	No qualifications for PRF inspectors.	PSCOs must have documented training and experience.	A PSCO may be a PRF inspector without any additional qualifications. A PRF inspector cannot be a PSCO (unless properly trained and authorised)
<b>Inspection items</b>	<b>1.</b> Generic selection scheme for ships for inspection (fishing vessels & recreational crafts excluded): — ships which have not complied with the notification requirements; — ships for which the examination of the information provided by the master in accordance with Article 6 of the PRF Directive has revealed	<b>1.</b> Highly sophisticated and risk based selection scheme. <b>2.</b> Enforcement/control of ship’s log books and of the Certificates & Documents according to MARPOL (Initial inspection). <b>3.</b> Enforcement of the MARPOL requirements for discharge of SGW/CR (in case of MD or Expanded inspection).	The PSC <u>selection of ships for inspection</u> already covers the AWN requirement of the PRF Directive while it may also cover the rest of the PRF Directive’s requirements if MS report or accuse a ship as potentially harming the marine environment.  The <u>PRF inspection</u> always focuses on the “delivery obligation” of SGW and CR. The <u>PSC inspection</u> may never come to control the MARPOL

	<p>other grounds to believe that the ship does not comply with the PRF Directive.</p> <p><b>2.</b> Control of ship's log books and of the Certificates &amp; Documents according to MARPOL (e.g. IOPPC, ORB, GRB etc).</p> <p><b>3.</b> Enforcement of Articles 7 &amp; 10 of the PRF Directive ("delivery obligation" and possible exceptions on the basis of the concept of "existing sufficient dedicated storage capacity").</p> <p><b>4.</b> Exemptions (from the obligation to deliver) in accordance with Article 9.</p> <p><b>5.</b> Establish an appropriate information and monitoring system to improve the identification of ships which have not delivered their SGW/CR (THETIS-EU has been developed since April 2016 on a voluntary basis).</p>	<p>N.B.: a More Detailed inspection is to be conducted whenever there are clear grounds for believing that the ship does not meet the requirements of a Convention (i.e. MARPOL) or in case of overriding - unexpected factors (in this case either a MD or an Expanded inspection).</p> <p><b>4.</b> Mandatory Inspection database (THETIS) and a detailed system for reporting inspections and follow-up measures.</p>	<p>requirements for discharge of SGW/CR and will never control the "discharge obligation" according to the PRF Directive.</p>
<p><b>Follow-up measures</b></p>	<p><b>1.</b> Warning or simple request to comply with any non-conformity, such as re-notification.</p> <p><b>2.</b> Formal request to deliver SGW before the vessel leaves, for example, when there is insufficient storage capacity for the ships SGW for the next journey.</p> <p><b>3.</b> Hold the ship to ensure notification and delivery of all or part of the SGW.</p> <p><b>4.</b> Inform the next port of call for a more detailed assessment.</p> <p><b>5.</b> Penalties for the breach of the provisions of the Directive</p>	<p><b>1.</b> Recording of deficiencies against MARPOL</p> <p><b>2.</b> Detention</p> <p><b>3.</b> Penalties for the breach of the provisions of the Directive</p>	<p>Holding a ship or recording a non-compliance according to the PRF Directive has not the same consequences as a detention or a deficiency according to the PSC Directive (affecting SRP, Flag &amp; ROs and Banning).</p>

## Annex III: Diagram of combined PSC-PRF inspections.





## Annex IV: Annual PRF inspection commitment for sea going ships per Member State if the provisions of the new proposal (EU dedicated PRF enforcement regime) were to be implemented in 2017

Member State	2014 Total Individual Ships	2015 Total Individual Ships	2016 Total Individual Ships	Average Total Individual Ships	2017 PRF Inspection Obligation
Belgium	5242	5265	5538	5348	<b>1068</b>
Bulgaria	1465	1370	1388	1407	<b>280</b>
Croatia	634	1005	1024	887	<b>176</b>
Cyprus	801	847	849	832	<b>166</b>
Denmark	2770	2825	2873	2822	<b>564</b>
Estonia	1422	1333	1361	1372	<b>274</b>
Finland	1503	1486	1539	1509	<b>300</b>
France	6028	6014	5930	5990	<b>1198</b>
Germany	5340	5127	5360	5275	<b>1054</b>
Greece	4615	4899	4848	4787	<b>956</b>
Iceland	332	353	359	348	<b>68</b>
Ireland	1473	1460	1513	1482	<b>296</b>

<b>Italy</b>	6174	6374	6353	6300	<b>1260</b>
<b>Latvia</b>	2070	1985	2005	2020	<b>404</b>
<b>Lithuania</b>	1565	1649	1606	1606	<b>320</b>
<b>Malta</b>	1078	1129	1145	1117	<b>222</b>
<b>Netherlands</b>	8033	7967	8031	8010	<b>1602</b>
<b>Norway</b>	3207	3316	3727	3416	<b>682</b>
<b>Poland</b>	2531	2616	2531	2559	<b>510</b>
<b>Portugal</b>	2805	2933	2560	2766	<b>552</b>
<b>Romania</b>	2025	2044	2024	2031	<b>406</b>
<b>Slovenia</b>	646	752	739	712	<b>142</b>
<b>Spain</b>	10467	10693	10710	10623	<b>2124</b>
<b>Sweden</b>	2743	2714	2703	2720	<b>544</b>
<b>United Kingdom</b>	10180	10225	10385	10263	<b>2052</b>
<b>Total</b>				86202	<b>17220</b>

## Annex V: Mandatory Waste receipt: how to address the problems in smaller/unmanned ports?

On the case of the unmanned PRFs, EMSA has acknowledged that “without adding considerable costs to unmanned facilities the provision of a receipt cannot be made mandatory”. Therefore, either the new PRF Directive will require a - costly - mandatory waste delivery receipt for all cases or will **exempt** the unmanned PRFs from issuing receipts (N.B.: in this case there may be a need to define what an unmanned facility is).

Should the 2<sup>nd</sup> option is decided, then in the case of unmanned PRFs, the Inspectors in the next port of call may have to rely solely on the information entered into the Record Books on-board the ship and the information provided by the ship on the advanced waste notification form. However, in practice, there is no credible way to verify only through an ex post-delivery inspection if the delivery has actually taken place and the entries in the Record Books and the Waste Notification Form are true.

A practical approach to have some level of control and enforcement would be:

1. To regulate an obligation for ships to **report waste delivered information** (by the ship representative electronically in the NSW).

**and**

2. a) To regulate in the new Directive an obligation for all the Member States which allow the use of unmanned facilities, to conduct a defined number of **unexpected inspections** when a ship calls to a port/berth with unmanned PRFs for verifying in advance of the delivery, that the WNF is true. This would be part of the MS's annual inspection obligation commitment and would constitute a specific percentage (e.g. **20% of the total annual number of individual ships calling in the MS' unmanned PRFs per year**). The total number of individual ships calling in a MS's unmanned PRFs shall correspond to the average number of ships of the three preceding years as reported through SafeSeaNet/THETIS-EU.

Unexpected Inspections could be combined with:

- b) an obligation for the operator of the unmanned PRF to conduct a minimum number of **verifications** to verify that the reported delivery of SGW by the ship has actually taken place. (In practice, this means that a ship would need to be targeted, according to its pre-notification report and then the quantities actually delivered to be recorded by the operator of the unmanned PRF either with presence or not of a ship representative. The verifications could be done in person or by using e.g. electronic measurements or photos activated by a photocell e.t.c., for minimising administrative burden); (a minimum percentage e.g. 20% of the total number of the deliveries of SGW in each unmanned facility may be proposed based on the average number of deliveries from ships during the three preceding years as reported through SafeSeaNet/THETIS-EU.

The **targeting mechanism** could be enhanced with a 'ship related message' indicating that a ship is bound for a port with unmanned PRF or that the last port of call was a port with unmanned PRF, for selecting ships either for unexpected inspections or verifications.

**Annex VI: Annual PRF inspection commitment for fishing vessels above 100GT per Member State if all vessels should be inspected once a year or if a 20% inspection commitment per annum is introduced.**

<b>FLAG_NAME</b>	<b>Number of fishing vessels (all vessels to be inspected annually)</b>	<b>ANNUAL INSPECTION (10% Rule)</b>
Ireland	181	36
Poland	45	10
Croatia	84	16
Denmark	168	34
United Kingdom	360	72
Estonia	35	8
Germany	83	16
Finland	31	6
Spain	680	136
France	423	84
Greece	44	8
Latvia	62	12
Malta	14	2

Romania	3	0
Belgium	49	10
Cyprus	5	2
Sweden	68	14
Bulgaria	9	2
Portugal	225	46
Italy	189	38
Netherlands	195	40
Lithuania	37	8
<b>TOTAL</b>	<b>2990</b>	<b>600</b>

## Annex VII: PRF Directive - Inspection Authorities in Member States

PRF Directive - Inspection Authorities in Member States		
MS	PSC Responsible?	If NO who is responsible?
Belgium	NO	FPS Mobility and Transport - Environmental control
Bulgaria	YES	
Croatia	YES	
Cyprus	YES	In cooperation with Cyprus Port Authority. Port fees include the collection of waste
Denmark	YES	Separate report produced in each inspection
Estonia	YES	Port Supervision Department - Environmental inspectorate
Finland	YES	
France	YES	
Germany	Partly	Federal States - Harbour Police and Administration
Greece	YES	PSCOs during PSC inspections - In addition local HCG authorities
Iceland	YES	On behalf of the Environmental Agency
Ireland	YES	
Italy	NO	Ministry of Environment through ICG personnel
Latvia	NO (see comment)	Responsibility lies with the Ministry of Environmental Protection. Para 33 of Cabinet Regulation No 455 provides that "compliance of Regulation may be controlled by PSC"
Lithuania	YES	Klaipeda State Seaport Authority - Environment Protection Department of Klaipeda Region
Malta	NO	Ports and Yachting Directorate, TM
Netherlands	YES	
Norway	YES	Partly the Norwegian Coastal Administration
Poland	NO	Environmental Protection Inspectorate in Maritime Office
Portugal	NO	Port Authority (PSC acts under MARPOL)
Romania	YES	RNA- APMC
Slovenia	YES	
Spain	YES	(In respect of Articles 6, 7 and 11)
Sweden	YES	
United Kingdom	YES	



## Annex 8 – Regional differences

In this Impact Assessment, the territorial dimension of the problem and the differentiated territorial impacts of the options considered have been taken into account. This has been done in several ways: by conducting a Territorial Impact Assessment in cooperation with DG REGIO, and by analysing the environmental vulnerability different sea basins to different types of waste discharged at sea. The results of these two exercises are summarised in this annex.

### Part I: Territorial Impact Assessment for the Revision of Directive 2000/59/EC on Port Reception Facilities for ship-generated waste and cargo residues

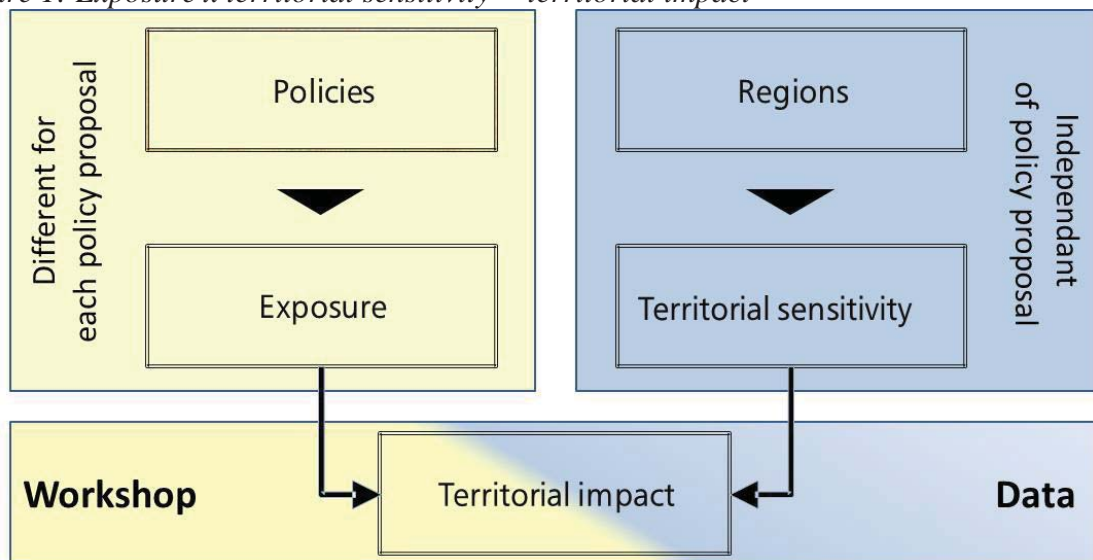
#### 1. Principle

A Territorial Impact Assessment (TIA) was carried out following the "ESPON TIA quick check" method<sup>92</sup>. A TIA aims at showing the regional differentiation of the impact of EU policies. The "ESPON TIA quick check" approach combines:

- 1) expert judgement on the potential effect of the amended PRF Directive (exposure)
- 2) a set of indicators describing the characteristics of European regions (territorial sensitivity).

This combination of exposure and territorial sensitivity results in potential territorial impacts (cf. following figure). This approach is based on the vulnerability concept developed by the Intergovernmental Panel on Climate Change (IPCC).

Figure 1:  $Exposure \times territorial\ sensitivity = territorial\ impact$



Source: ÖIR, 2015.

“Territorial sensitivity” describes the baseline situation of the region according to its ability to cope with external effects. It is a characteristic of a region that can be described by different indicators independently of the directive analysed. “Exposure” describes the intensity of the

<sup>92</sup> The ESPON TIA tool is available at: <http://tiatool.espon.eu/tia/>; (username: Guest and password: ToR-guest).

potential effect caused by the amended legislation on a specific indicator. Exposure illustrates the experts' judgement, i.e. the main findings of the expert discussion at the TIA workshop. The results of the guided expert discussion are judgments about the potential impact of an EU policy in different thematic fields (economy, society, environment, governance) for a range of relevant indicators. These results are fed into the ESPON TIA Quick Check web tool. The web tool translates the combination of the expert judgments on exposure with the different sensitivity of regions into maps showing the territorial impact of EU policy on NUTS3 level. These maps serve as a starting point for the further discussion on the different impacts of a concrete EU policy on different regions. Consequently, the experts participating in the workshop provide the main input for this quick check on territorial effects of an EU policy proposal.

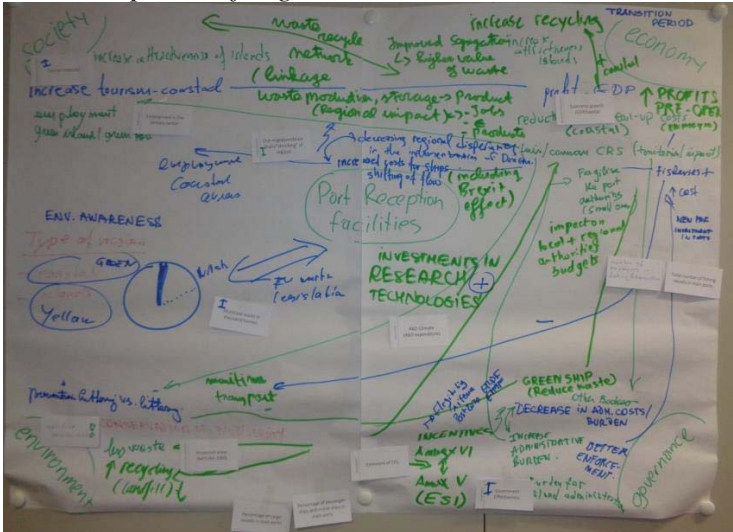
The workshop on the revision of the Directive 2000/59/EC on Port Reception Facilities for Ship Generated Waste and Cargo Residues (PRF Directive) was held on 17<sup>th</sup> of March 2017 in Brussels and brought together 17 experts representing different stakeholders, as e.g. port administrations, ship owners, NGOs and environmental institutions, regional authorities and European institutions such as DG REGIO, DG MOVE, the CoR and ESPON EGTC. Two moderators from the ÖIR, provided by ESPON, prepared and guided the workshop and handled the ESPON TIA tool.

**2. Process**

**2.1. Identifying the potential territorial effects considering economy-, society-, environment- and governance-related indicators – drafting a conceptual model**

In the first step of the TIA workshop, the participants discussed about the potential effects of the revision of the PRF Directive on the development of regions, in the fields of economy, society, environment and governance. The participants identified potential linkages between the revision of Directive and the effects on territories including interdependencies and feed-back-loops between different effects (see figure below).

Figure 2: Workshop findings: Conceptual model of the potential territorial effects from a revision of Directive 2000/59/EC on port reception facilities for ship generated waste and cargo residues on the development of regions



Source: Territorial impact assessment expert workshop, Brussels 17<sup>th</sup> March 2017

During the workshop session the following issues were discussed:

### **Environment**

- The planned revision of the Directive will reduce littering at sea. Consequently, it will generate strong positive effects on the maritime environment and decrease the pollution of the sea. These potential positive effects were analysed in the study on the environmental vulnerability analysis of ship-generated waste (COWI, Ecorys 2016). (The ESPON TIA quick check approach does not allow picturing effects other than those on territorial units.)
- Less waste discharged at sea will also reduce the waste being washed up on the coastlines and littering of the beaches. This would reduce the disturbance of ecosystems and protected areas along the coasts of mainland and islands.
- More collected and correctly treated ship-generated waste could increase the recycling rates and reduce the ecological footprint. Consequently, it will reduce the need for new resources in terms of metabolism.
- However, when the collected waste is not treated correctly, it could be brought to landfills in the coastal regions and islands causing the respective negative effects on the environment.
- The “green ship concept” would foster resource cycles on ships which could help to reduce the ship-generated waste and accordingly reduce the waste that needs to be delivered to harbours and be prepared for re-use, recycling and other recovery.
- Positive effects on air quality are expected.
- The amendment of the Directive (resulting in more effective implementation and enforcement) will contribute to increase the environmental awareness especially in ports and on ships.

### **Economy**

- A more effective collection of ship-generated waste and the reduction of sea littering can increase the attractiveness of islands and coastal regions. This could have a positive effect on tourism and consequently on the economic development of these regions.
- More collected ship-generated waste in the ports could lead to more activities related to waste treatment and recycling which could increase the GDP in the green technologies sector.
- Increased recycling rates will lead to a higher value of the collected waste, which could affect the value chains positively in line with the circular economy concept. For instance the collected plastic bottles could be recycled in the textile production or similar products.
- The increased amounts of ship-generated waste in the port regions could stimulate the need for new recycling solutions. This could result in an increasing investment in research in the fields of recycling and green technologies.
- Often public authorities and especially municipalities collect “stranded waste” from the beaches. Due to the reduction of the amount of “stranded waste” the need for its collection by public authorities will be reduced and consequently public budgets will be relieved.

### **Society**

- The improved environmental situation in the sea and along the coastline could potentially create new job opportunities in tourism and consequently could reduce out-migration, especially from islands.

- Due to the positive economic effects, employment in the service sector and in fishery and agriculture could increase.

### **Governance**

- When the implementation of the amended Directive is done in an efficient way, the administrative costs of government could decrease. However, if new administrative burden is created, administrative costs will increase.

## **2.2 Identifying the types of regions affected**

The experts agreed that in general all coastal regions would be affected by the modification of the Directive, as the Directive covers all ports. Additionally, it was agreed that islands would be especially affected in some aspects.

## **2.3. Picturing the potential territorial effects through relevant indicators**

In order to assess the potential effects pictured in the conceptual model, suitable indicators need to be selected related to the economy, environment, society and governance parameters that the experts discussed. The experts chose indicators that are relevant for coastal regions. For some indicators the experts suggested to assess the effects on islands separately. The availability of data for all NUTS 3 regions is posing certain limitations to indicators that can be used. Experts therefore chose in some cases indicators that, despite being relevant to the revision of the Directive, were not their first choice.

## **2.4. Judging the intensity of the potential effects**

The participants of the workshop were asked to estimate the potential effects deriving from the modification of the PRF Directive. They judged the potential effect on the territorial welfare along the following scores: strong advantageous effect / weak advantageous effect / neutral or unknown effect / weak disadvantageous effect / strong disadvantageous effect on territorial welfare.

## **2.5. Calculating and mapping the potential “regional impact” – Combining the expert judgement with the regional sensitivity**

The principle described above is applied: the effects deriving from a particular policy measure (exposure) are combined with the characteristics of a region (territorial sensitivity) to produce potential territorial impacts.

The result of the territorial impact assessment is presented in maps, showing potential territorial impacts based on the combination of the expert judgement of the exposure with the territorial sensitivity of a region, described by an indicator at NUTS3 level. For some indicators that are available at NUTS2 a regional breakdown to NUTS3 was conducted by using proxy indicators. Whereas expert judgement is a qualitative judgement (i.e. strong advantageous effect on territorial welfare/weak advantageous effect/no effect/weak disadvantageous effect/strong disadvantageous effect), the sensitivity is a quantitative indicator.

## **3/ Potential regional impacts identified**

### **3.1. Impacts on environment-related indicators**

The experts in the workshop selected 2 indicators as being relevant to capture the environmental effects of the revision of the PRF Directive:

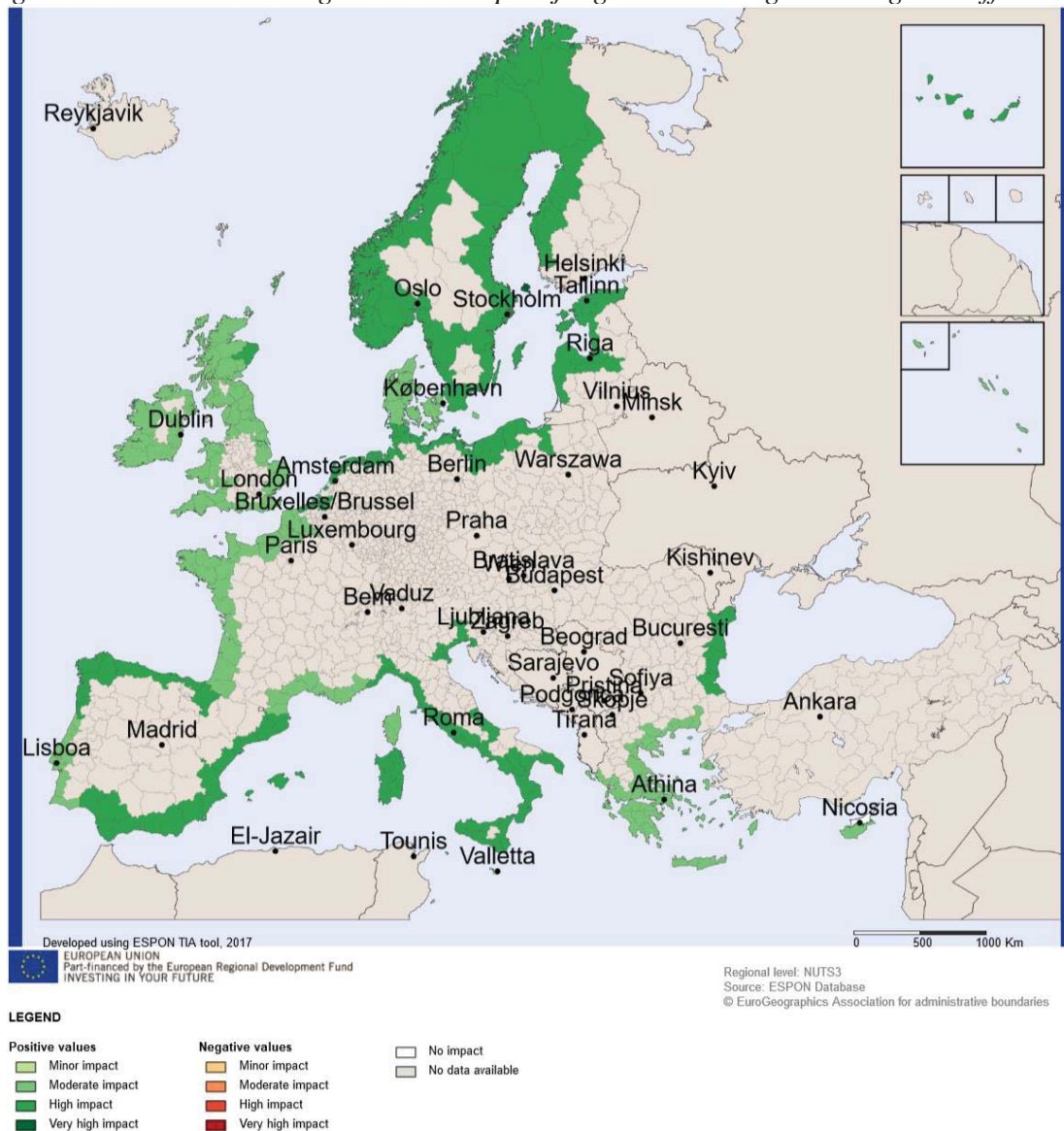
- Protected areas (NATURA 2000)
- Pollutants in air (PM10)

The effect of the revised PRF Directive on both of these environmental indicators is expected to be advantageous. All experts expect positive environmental impacts to stem from the revised Directive. These positive impacts are assumed to affect more strongly EU regions with a large share of protected areas under the Natura 2000 programme. These regions are mainly situated along the Bulgarian and Romanian coast of the Black Sea, on the Italian and Spanish coast of the Mediterranean Sea, the Spanish regions on the Atlantic coast, the Norwegian regions, the German coastal regions and almost all coastal regions of the Baltic Sea. Other coastal regions would face a moderate positive impact.

The majority of the participants of the workshop also judged that a weak advantageous effect could be expected of the modification of the PRF Directive on the air quality. Linked with the current sensitivity of the coastal regions (measured in PM10 pollutants in the air), this weak advantageous effect could result in a minor positive impact in almost all coastal regions.



Map 1: Result of the expert judgement: Protected areas (NATURA 2000) in coastal regions potentially affected by the revision of Directive 2000/59/EC on port reception facilities for ship generated waste and cargo residues expert judgement: strong advantageous effect



Source: Territorial impact assessment expert workshop, Brussels 17<sup>th</sup> March 2017

### 3.2. Impacts on economy-related indicators

The experts in the workshop selected 6 indicators as being relevant to capture the economic effects of the revision of the PRF Directive:

- Passenger ship transport economy: Percentage of passenger ships and cruise ships in main ports
- Cargo ship transport economy: Percentage of cargo vessels in main ports
- Port economy: Total number of vessels (all types) in main ports
- Tourism: Tourist Intensity
- Economic growth (GDP/capita)
- R&D Climate (R&D expenditure)

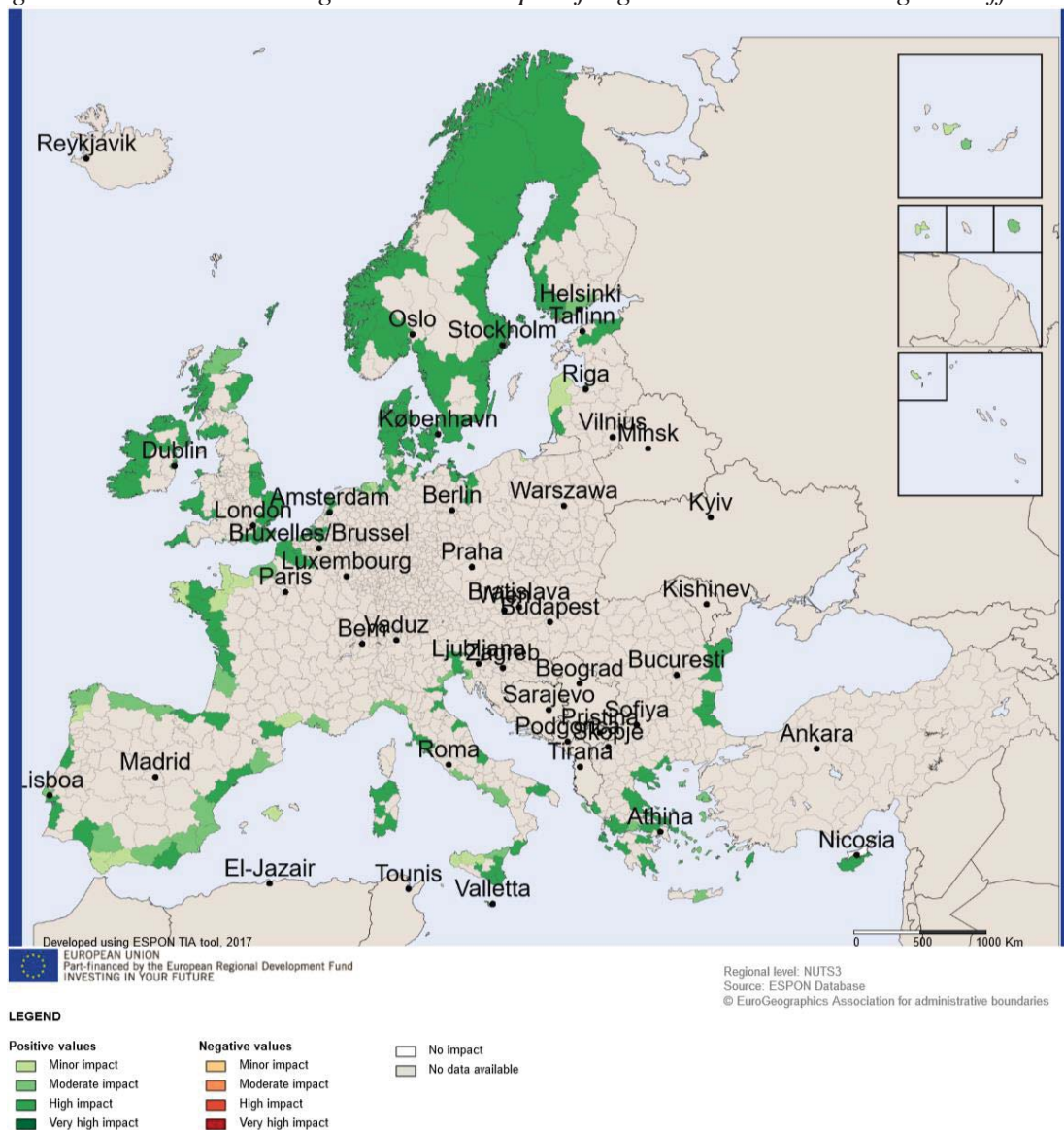
Most workshop participants expected a strongly advantageous effect on the transport economy for passenger ships and cruise ships. Regions where the transport by passenger ships



is highly important would be more affected by regulations changing the preconditions for the passenger-ship transport economy than regions, where the passenger-ship transport economy has less relevance. Combining this sensitivity with this strongly advantageous effect expected by the experts would result in a moderate to high impact in port regions.

The majority of the experts participating in the TIA workshop expected an advantageous effect on the cargo ship transport economy. Regions where the transport with cargo vessels is highly important would be more affected by legislation changing the preconditions for operating cargo vessels than regions, where the cargo-ship transport economy has less relevance. A highly positive impact could be expected in the coastal regions of countries in the North and North-West of Europe, as especially in Sweden, Norway, Denmark, the UK and Ireland. Also the coastal regions of Romania and Bulgaria in the Black Sea could benefit from a highly positive impact. The impact on regions of the Atlantic coast of France and Spain, as well on the European Mediterranean coast, differs from region to region.

*Map 2: Result of the expert judgement: Cargo ship transport economy in coastal regions potentially affected by the revision of Directive 2000/59/EC on port reception facilities for ship generated waste and cargo residues – expert judgement: weak advantageous effect*

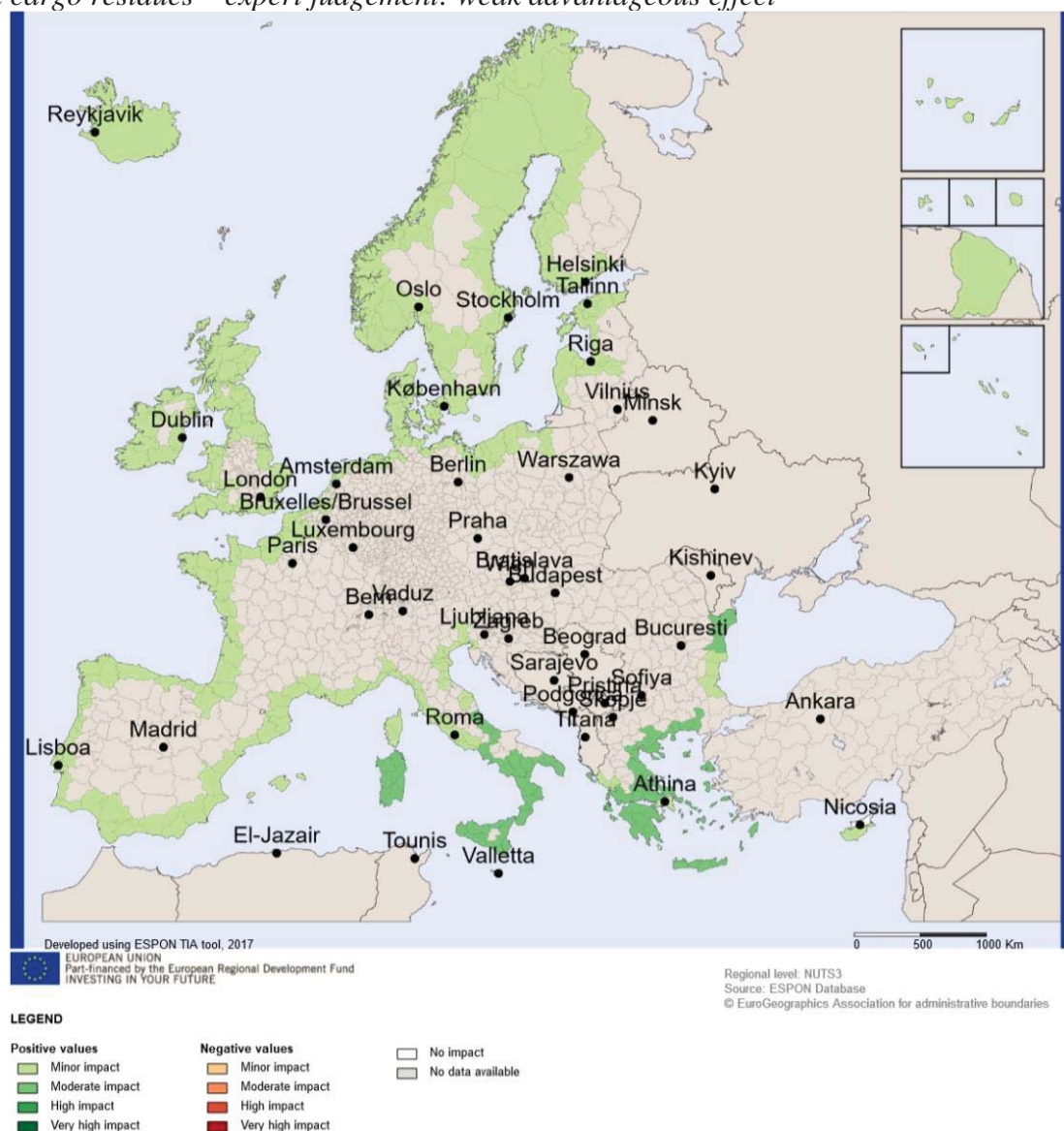


Source: Territorial impact assessment expert workshop, Brussels 17<sup>th</sup> March 2017

The majority of the workshop participants expected an advantageous effect on the economy of ports. A hypothesis is made that the bigger the harbour and the more vessels are in-coming, the higher the sensitivity of the port economy is towards changes in the regulations. Almost all coastal regions would face a minor positive impact.

The experts agreed that a better environmental quality, especially less littering on the sea near the coast and on the beach will have definitely positive effects on tourism. The positive effect on islands was seen as even more advantageous. It would mainly benefit the coastal regions in the South East of Europe (Greece, South Italy, Romania), with a moderate positive impact. All other coastal regions would face a minor positive impact. If the effect on islands was strongly advantageous, the potential territorial impact would be even stronger, ranging between high and very high (Italian and Greek islands in the Mediterranean Sea).

*Map 3: Result of the expert judgement: Tourist intensity in coastal regions potentially affected by the revision of Directive 2000/59/EC on port reception facilities for ship generated waste and cargo residues – expert judgement: weak advantageous effect*



Source: Territorial impact assessment expert workshop, Brussels 17<sup>th</sup> March 2017

The participants definitely saw a potential positive effect from the modifications of the PRF Directive and its improved implementation on the economic growth of coastal regions. Regions with lower GDP per capita are expected to benefit more from directives such as the PRF aiming at GDP growth increase. Especially the Eastern European coastal regions in the Baltic Sea and the Black Sea and some regions in Greece could potentially benefit with a high positive impact, whereas most other regions would have a moderate impact.

The experts discussed that a higher volume of delivered waste by ships could call for new and more innovative ways to handle the ship-generated waste. This could stimulate additional investments in research in the fields of waste recovery and recycling. Consequently, the participants saw a potentially advantageous effect of the modification of the PRF Directive on the R&D climate. Regions with an already highly innovative climate and with a greater share of enterprises engaged in product and/or process innovation activities are considered to be more sensitive to legislation influencing innovation than others. As the centres of innovation are mainly not located in coastal regions, almost all coastal regions would face just a minor impact on the R&D climate caused by the need of new technologies in the recovery, re-use and recycling of ship-generated waste.

### **3.3. Impacts on social-related indicators**

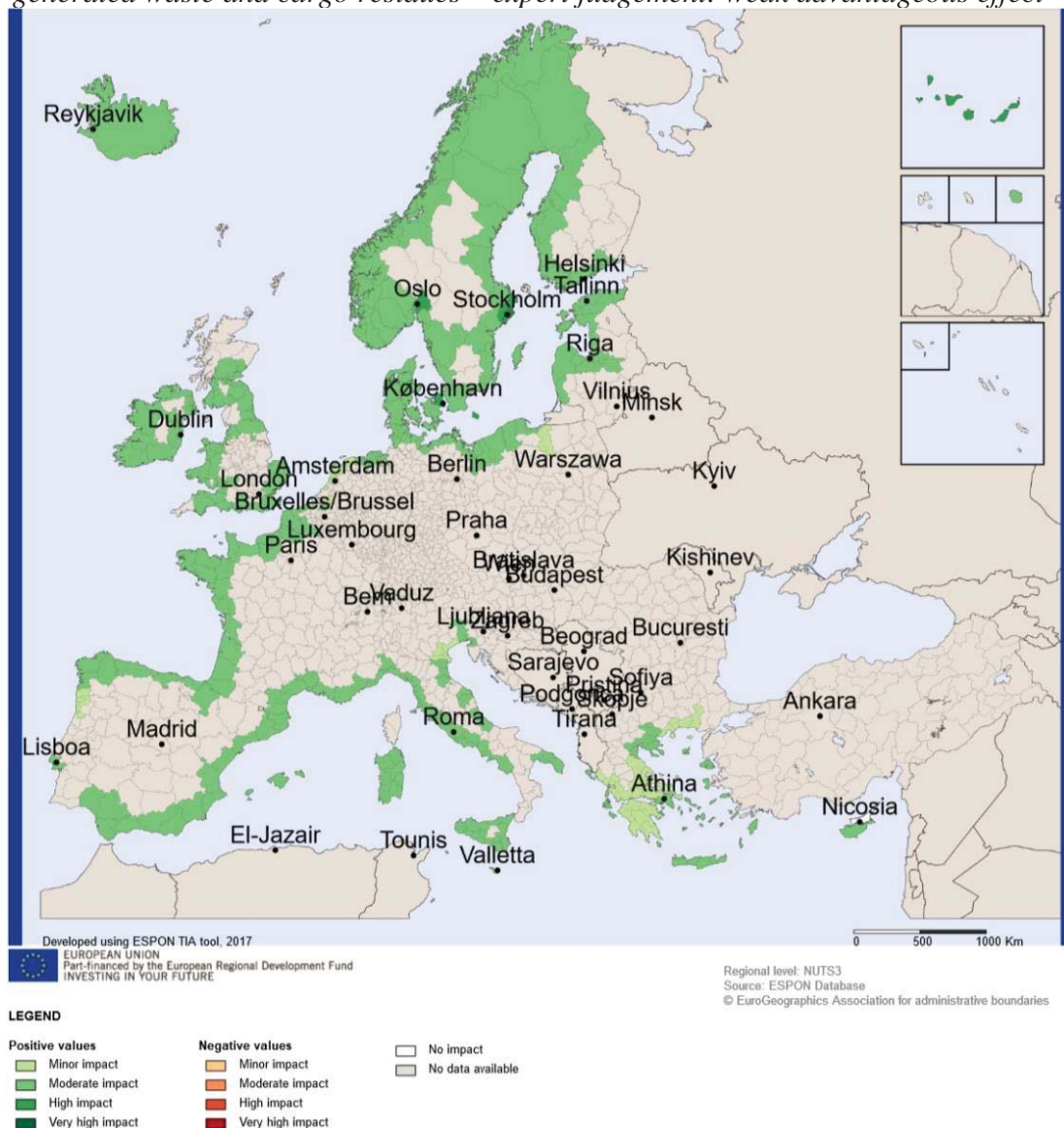
The experts in the workshop selected 3 indicators as being relevant to capture the social effects of the revision of the PRF Directive:

- Employment in the tertiary sector
- Employment in Fishery and Aquaculture
- Out-migration/brain drain/“shrinking” of regions

The experts agreed that the modifications of the PRF Directive would cause positive effects on the employment in the tertiary sector. It is assumed that regions with a greater share of employment in the tertiary sector are likely to be more affected by the resulting changes in the level of employment than regions with a lower share. The following map shows the potential territorial impact from the revision of the PRF Directive based on the employment in the tertiary sector in coastal regions, combining the expert judgement with the territorial sensitivity. Most coastal regions would gain a moderate positive effect. In the coastal regions of Greece, only a minor positive impact is expected, because in these regions the service sector is less developed.



Map 4: Result of the expert judgement: Employment in the tertiary sector in coastal regions potentially affected by the revision of Directive 2000/59/EC on port reception facilities for ship generated waste and cargo residues – expert judgement: weak advantageous effect



Source: Territorial impact assessment expert workshop, Brussels 17<sup>th</sup> March 2017

Whereas the majority of the voting participants (10 out of 13) saw a potential advantageous effect of the modification of the PRF Directive and its improved implementation on the employment in fishery and aquaculture, a minority of three experts judged the effects on fishery and aquaculture as weakly disadvantageous. It is assumed that regions with a higher share of employment in fishery and aquaculture are more sensitive to legislation aiming at changing the conditions in these sectors than others. About 90 % of the regions with a relevant share of the employment in fishery and aquaculture would face a minor positive impact, whereas the remaining 10 % would face a moderate positive impact.

According to the experts' opinion, the improved environmental situation in the sea and along the coastline as well as potential new job opportunities in tourism could theoretically reduce the out-migration from coastal regions and especially from islands. However, only a few experts considered that the revision of PRF Directive could have a concrete effect on migration patterns. 8 out of 17 experts expressed an opinion about the impact of the Directive

on this indicator. The effect is expected to be positive for coastal regions, and even more so for islands. It is assumed that regions experiencing out-migration and brain drain will benefit more from actions aimed at their reduction. A weak advantageous effect on out-migration and brain drain would lead to a moderate positive impact in most coastal regions. Some coastal regions on Norway, in Romania and in the West of Greece could gain even a high positive impact. Most islands would gain a very high positive impact.

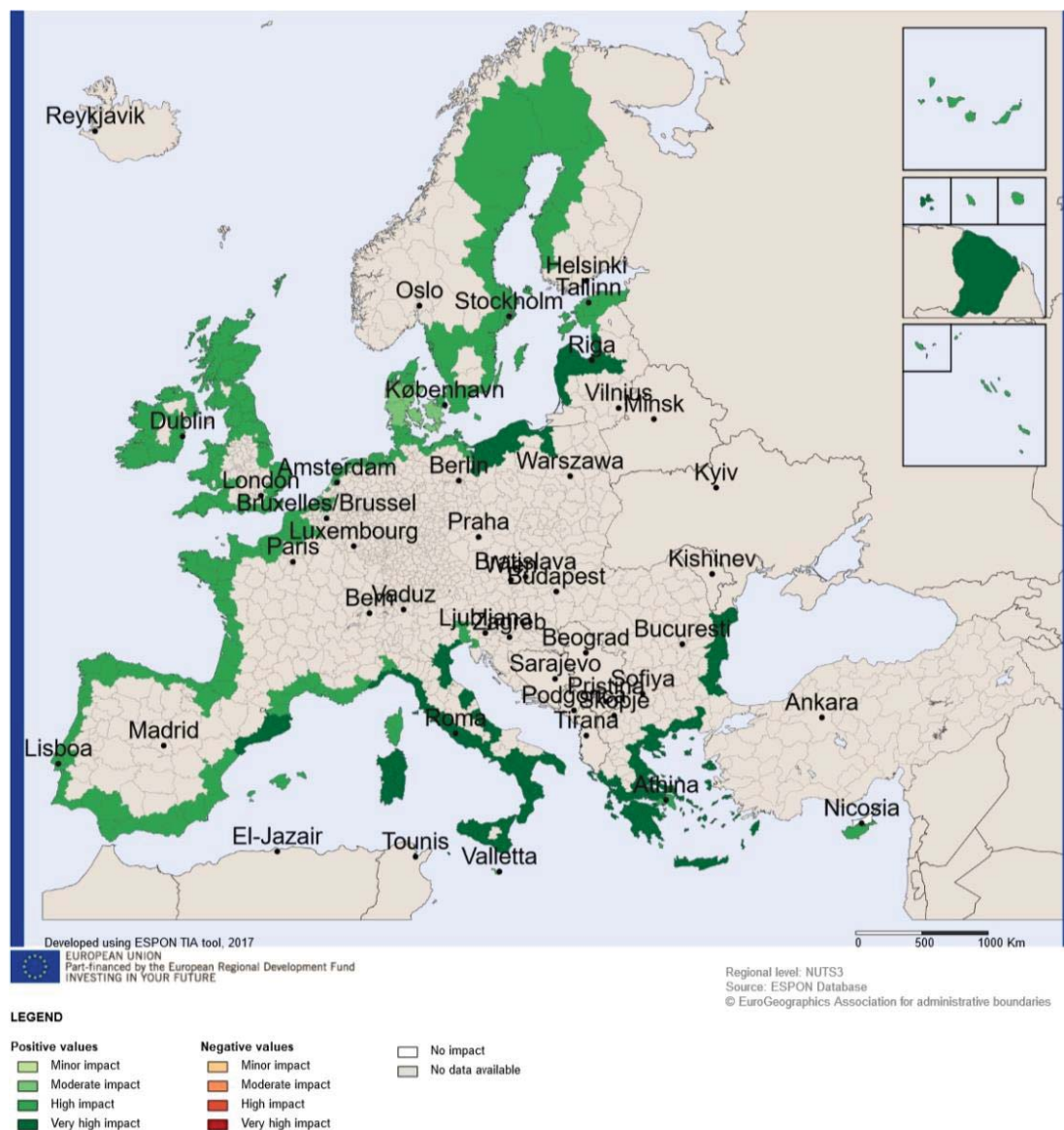
### **3.4. Impacts on governance-related indicators**

The experts in the workshop selected 2 indicators as being relevant to capture the governance effects of the revision of the PRF Directive:

- Government effectiveness
- Ability to deal with additional waste

The experts discussed that an efficient and correct implementation of the modified PRF Directive could reduce administrative burdens and decrease administrative costs. However, an insufficient implementation would bring about new administrative burdens and would increase administrative costs as well. 14 experts judged the expected effects on government effectiveness as advantageous and 2 as weakly disadvantageous in coastal regions (respectively 10 and 2 in islands). The sensitivity of the government effectiveness is measured by the Regional Competitiveness Index. Regions with a low Regional Competitiveness Index will benefit more from an improvement of government effectiveness by implementing new standards of administration than regions that already have high standards of their administration. If the above mentioned Directive is implemented efficiently, the Eastern European regions of the Baltic Sea in Latvia, Lithuania, and Poland; the Black Sea regions in Romania and Bulgaria; and the Italian and Greek regions in the Mediterranean Sea could gain the highest positive impact on government effectiveness. Most of the other regions would also gain a high positive impact.

*Map 5: Result of the expert judgement: Government effectiveness in coastal regions potentially affected by the revision of Directive 2000/59/EC on port reception facilities for ship generated waste and cargo residues – expert judgement: strong advantageous effect*



Source: Territorial impact assessment expert workshop, Brussels 17<sup>th</sup> March 2017

The participants judged the modifications of the PRF Directive and its improved implementation on the ability to deal with additional waste differently for coastal regions and for islands. For coastal regions the effects were judged as positive overall. For islands the judgement was more diverse: 9 experts judged the potential effects of the revised PRF Directive advantageous whereas 3 judged them as weakly disadvantageous. The ability to deal with additional waste delivered by ships due to a more effective implementation of the Directive could be linked to the existing experience in treating generated waste. The more experience in waste disposal a region already has, the higher its ability to handle additional waste correctly. As no data exist at regional level on the experience in treating ship-generated waste, the amount of municipal waste generated in thousand tonnes within one region was established as a proxy indicator. For the coastal regions the majority of the experts expect a weakly advantageous effect. This would lead to minor positive impacts on most coastal regions. Some coastal regions in the South and East of Spain could gain a moderate positive impact. Most islands would gain a moderate or high positive impact.

#### 4. Conclusions and policy implications



#### 4.1. Findings based on the results of the TIA Quick check

The experts expect predominantly positive effects on territorial development from a revision of the Directive on Port Reception Facilities for Ship Generated Waste and Cargo Residues. Many positive effects are quite equally distributed to all coastal regions. However, especially some of the Eastern and Southern European coastal regions could more than others benefit from a more effective Directive regulating ship-generated waste:

- The EU regions neighbouring the **Black Sea in Romania and Bulgaria** could experience a relatively higher positive impact on economic growth and especially on tourism as a catching-up effect. An efficient implementation of the Directive could also increase their governance effectiveness due to learning effects also for other fields.
- The increased environmental quality could especially induce a more positive impact on tourism in **Greek and Southern Italian regions in the Mediterranean Sea** enabling also a higher positive impact on economic growth in Greek coastal regions.
- An effective implementation of the revised PRF Directive could bring a more positive impact on the governance effectiveness to the **Eastern European coastal regions in the Baltic Sea**.
- Additionally, a higher positive impact on economic growth can be expected.
- As far as data are available, the TIA shows that the outermost regions could benefit especially in **economic aspects** from the revised Directive. Due to a catching-up effect they could get a relatively higher positive impact on economic growth and especially on **tourism intensity**. These effects could contribute to reduce "out-migration" and "brain-drain".

#### 4.2. Findings and recommendations from the expert discussion

After linking the results of the expert judgements on the effects with the sensitivity of the regions towards these effects, the experts discussed on conclusions and policy implications.

- **Additional focus on a differentiation between the sea basins**

The experts are familiar with the existing regional differences in the implementation of the current Directive with respect to the different European sea regions. In particular, the intensive exchange and collaboration in certain sea regions, e.g. in the Baltic Sea or the Mediterranean Sea, is noteworthy. The TIA reflects this situation only partly. For future investigation, more focus should be given to these differences by sea basin.

- **A differentiated approach for the ports of small islands and small coastal ports**

Experts discussed the idea of a differentiated approach with regard to the infrastructure that would be needed for ports of small islands and small coastal ports to receive and treat waste from cruise ships and fishing boats that would bring disproportionate burden for investment in waste reception infrastructures. According to the Commission, the current Directive leaves sufficient flexibility to adopt a differentiated approach to address these challenges. In addition, the possibility of making these investments eligible for the Cohesion Fund was suggested as an option.

- **The effects of the indirect fee and the wish for more transparency and harmonisation**

The principle of an indirect fee is that the fees for the delivery of generated waste have to be paid to the harbour authority, independently of whether waste is delivered to the harbour or

not. This should encourage ships to deliver their waste. However, the indirect fee is calculated differently for each harbour. This situation causes several problems:

- Some ships opt for an avoidance strategy and deliver their garbage to non-EU countries where fees are lower, or those ports where no indirect fee is charged. Negative effects on the environment are likely to arise, as in the Non-EU countries some ports do not provide facilities to treat the garbage correctly.
- Cargo ships calling to several ports within a short time period without producing a huge amount of waste are forced to pay the fee, even if no relevant waste is produced. This increases the costs for this type of shipping.
- There are possibilities to define exemptions from the indirect fee for ships in regular and scheduled traffic, but these definitions differ among the Member States. This results in a distortion of competition between Member States and types of ships.
- Due to the different implementation of the Directive, the calculation of the indirect fee differs among Member States. This results in different prices for the same amount of waste in different ports. Consequently, ships are encouraged to go to ports with lower fees ("PRF shopping").

Due to these "imbalances" most of the experts called for **more transparency** of the calculation of the indirect fee and for a **better harmonisation** of the implementation of the Directive.

- **The need to strengthen the value chain after the delivery of the ship-generated waste**

In some ports there is no separate collection and treatment of the waste that has been previously segregated on board the ship; instead, the waste is discarded together in one waste bin and probably not recycled but brought to landfills, causing negative effects on the environment. This discourages the ship crew who has treated the waste correctly in line with the demands of international standards and the EU waste legislation.

The experts representing ship owners and shipping companies emphasise the need to put concrete attention on the link between waste leaving the vessel and its treatment on land.

- **Public money for collecting litter**

At the moment, fishing vessels do not fall under the indirect fee obligation of the Directive. The waste that is passively fished at sea (such as the abandoned, lost and otherwise discarded fishing gear - ALDFG, plastic bottles, etc.) is not included in the scope of the PRF Directive. As a result, the fishing vessels have to pay separately for any such waste they want to deliver on shore. This provides a disincentive for collecting marine litter at sea and delivering this waste to PRF. The modification of the PRF Directive could foresee that in the future the indirect fees should include fishing vessels, so that they can deliver all their garbage without having to pay any additional direct charges, and that this fee shall also include the passively-fished waste. This should reduce this type of waste being dumped at sea. Additionally, it was discussed whether other sources of finance, as e.g. money from the EU fisheries fund, could be used for offering the right economic incentive to fishermen for collecting the waste from the sea and delivering this waste to PRF.

### 1. Principle

The environmental vulnerability analysis is used as an input for the analysis of the problem and of the potential impacts of options in the Impact Assessment. The environmental damage of the discharge of a particular waste type from ships is a combination of the amount of waste discharged and the vulnerability of the marine environment to this particular type of waste. The environmental vulnerability analysis used for this Impact Assessment takes into account regional difference as assessments are made separately for four European water basins according to their specific features and vulnerability.

In line with the WFD and the MSFD, the environmental vulnerability study is based on the scientific relation between selected environmental features (descriptors) that represent the marine environment, such as species, habitats and human activities on the one side and the impact by the different waste types. The next step in this concept is to describe the way in which the features are affected by the impact of waste.

An environmental damage analysis has been carried out for three types of ship-generated waste, namely:

- Oily waste (liquids, solid waste, containers etc. with oil residue)
- Sewage (waste water from sanitation, kitchen and laundry facilities)
- Garbage (solid waste)

The environmental impact of ship-generated waste is assessed for the following European Waters:

- Baltic Sea
- Eastern Atlantic Ocean
- Mediterranean Sea
- Black Sea

The vulnerability analysis applies methods and results that have been developed and agreed upon among several Member States authorities in earlier EU-funded projects of regional scale<sup>93</sup>. The approach is compatible with EU-wide methodologies for the assessment of the quality of the marine environment, as developed under the Marine Strategy Framework Directive (MSFD).

The different waste types will have different environmental impacts, which can be weighted accordingly. That will aid to focus on waste types of particular interest and concern.

In the BRISK and BEAWARE projects, the following approach to determine environmental vulnerability was developed and agreed upon:

- **Step 1:** Identification of vulnerability features (descriptors) to be mapped.
- **Step 2:** Scoring of each of the identified sensitive features from low, medium, high to very high vulnerability based on fixed and agreed criteria, see below. The following

---

<sup>93</sup> BE AWARE, 2015. Environmental and socio-economic vulnerability.

[http://www.bonagreement.org/site/assets/files/17082/technical\\_sub\\_report\\_2\\_vulnerability\\_analysis-1.pdf](http://www.bonagreement.org/site/assets/files/17082/technical_sub_report_2_vulnerability_analysis-1.pdf)

BRISK, 2012. [http://www.brisk.helcom.fi/publications/en\\_GB/publications/](http://www.brisk.helcom.fi/publications/en_GB/publications/)

vulnerability scores were used: Score 4 (= very high), Score 3 (=high), Score 2 (=moderate/medium), Score 1 (=low).

- **Step 3:** Assessment of total environmental vulnerability of an area by adding all individual scores of the features.

For more information on the different steps and the method used, please refer to annex 4.

## 2. Vulnerability characteristics of the waters

Below is a summary of the characteristics of the regions as basis for determining the vulnerabilities towards each waste type (to the extent possible) and hence the overall vulnerability.

### 2.1. Baltic Sea

The Baltic Sea is a large brackish sea. It receives fresh water from many large and small rivers, while salt water only can enter from the North Sea along the bottom of the narrow Danish straits (Little Belt, Great Belt and the Sound between Denmark and Sweden). These conditions create a pronounced salinity gradient from southwest to northeast, where salinities can range from 20 PSU in the southern Kattegat to < 1 PSU in the innermost parts of the Bothnian Bay and the Gulf of Finland<sup>94</sup>.

The pronounced salinity gradient is the most important factor for the Baltic Sea ecosystems. Relatively few organisms are adapted to the stressful brackish conditions and the biodiversity of brackish ecosystems are therefore low compared to open oceans. The number of benthic fauna species is about 2,000 at the saline Danish west coast, approximately 800 species are found in the Sound and less than 100 in the brackish waters of the northern Baltic proper, while fewer than 20 inhabit the seabed of the Bothnian Sea. In the BRISK project<sup>95</sup>, vulnerability mapping related to oil spills from marine traffic, generally showed a relatively low vulnerability in open waters compared to relatively high vulnerability in shallow and coastal waters, and an increase in vulnerability towards the coastlines with a few hotspots, where sensitive areas were located with high vulnerability. There was little variation between seasons.

### 2.2 East Atlantic Ocean

The East Atlantic Ocean in this context comprises the Greater North Sea, the English Channel and the Bay of Biscay and Iberian Coast region. The area is one of the busiest maritime areas. Offshore activities, related to the exploitation of oil and gas reserves, and maritime traffic are very important. The northern part is relatively shallow with sediments mainly composed of mud, sandy mud, sand and gravel. The southern part of the region includes the continental shelf and slope, and parts of the abyssal plain with features such as seamounts, banks and submarine canyons. The region is situated in temperate latitudes with a climate strongly

---

<sup>94</sup> HELCOM (2009). Biodiversity in the Baltic Sea-An integrated thematic assessment on biodiversity and nature conservation in the Baltic Sea. Balt. Sea Environ. Proc. No 116 B.

<http://www.helcom.fi/Lists/Publications/BSEP116B.pdf> IPIECA, 1994: Vulnerability mapping for oil spill response. IMO/IPIECA Report. Series Volume 1.

<sup>95</sup> BRISK, 2012. [http://www.brisk.helcom.fi/publications/en\\_GB/publications/](http://www.brisk.helcom.fi/publications/en_GB/publications/) EU, 1998: European Environment Agency: *Environmental Risk Assessment – Approaches, Experiences, and Information Sources. 1998*

influenced by the inflow of oceanic water from the Atlantic Ocean. Hundreds of fish species are known to inhabit the area, many with high economic value for fisheries. Some 10 million seabirds are present during most of the year.

Species of cetaceans and seals occur regularly over large parts of the area. The coastline is highly varied with fjords, estuaries, sandbanks, bays, or intertidal mudflats. In the southern part, rocky cliffs, shingles and rocky shores are found as well as sandy and muddy beaches and coastal lagoons. Major activities in the region include fishing, the extraction of sand and gravel, and offshore activities related to the exploitation of oil and gas reserves.

### **1.3. Mediterranean Sea**

The Mediterranean Sea is a series of deep basins connected to each other. It has a mean depth of 1500 m and is only connected to the Atlantic Ocean through the Gibraltar Strait, which is 22 km wide and has a depth of 320m<sup>96</sup>. The strait significantly restricts water exchange. The limited water exchange, combined with high temperatures, results in large evaporation and, because the loss of water from evaporation exceeds input of water from rainfall and rivers, the salinity of the Mediterranean is relatively high.

The biological productivity in the region is generally low. However, the biological diversity is high with many endemic species<sup>97</sup>. The continental shelf is generally very narrow, but the coastal marine area from the shore to the outer extent of the continental shelf, contains rich ecosystems and the few areas of high productivity in the region. The reasons for the high habitat diversity are the steep depth gradient in the basin and the latitudinal range causing climatic conditions to range from sub-tropical to temperate. Marine ecosystems in the Mediterranean are important for fisheries and tourism.

Coastal and marine ecosystems of the Mediterranean include rocky shores, brackish water lagoons, estuaries, wetlands, sea grass meadows and deep water benthic systems including seamounts and cold-water coral reefs and pelagic systems<sup>98</sup>.

### **1.4. Black Sea**

The Black Sea is the world's largest inland water basin, which is only connected to the Mediterranean Sea through the shallow Bosphorus Strait. The average depth of the Black Sea exceeds 2000 m except in the North-Eastern Sea of Azov. The Black Sea receives freshwater from five large rivers and very small amounts of salt water enter the Black Sea from the Mediterranean Sea. These conditions result in a constant stratification of water masses and an extremely slow water renewal. Hypoxic conditions and high concentrations of hydrogen sulphide exist below 200m depth.

The biodiversity of the Black Sea is low, both because of natural conditions due to little exchange with other sea areas and due to pressure from several issues including eutrophication/nutrient enrichment, changes in marine living resources and chemical pollution (including oil). There have been extensive fisheries in the Black Sea, which has declined in later years.

---

<sup>96</sup> Tomczak M., Godfrey JS. 1994. Regional Oceanography: An introduction. Pergamon Press

<sup>97</sup> UNEP/MAP, 2012. State of the Mediterranean Marine and Coastal Environment, UNEP/MAP – Barcelona Convention, Athens, 2012.

<sup>98</sup> *Ibid.*

Pollution, loss of biodiversity and coastal degradation have been identified as the major issues affecting the environmental state of the Black Sea. Eutrophication has changed the structure of the Black Sea ecosystem. Oil pollution threatens the Black Sea coastal ecosystems and the levels of pollution are unacceptable in many coastal areas and river mouths.

### **3. Characteristics of waste types**

In order to allocate vulnerability scores to each type of ship-generated waste, each type of waste was characterised in terms of chemical characteristics and potential type of impact on the marine environment. This is outlined below.

#### **3.1. Oily waste**

This chapter is on oil waste and does not include larger accidental oil spills. Oily waste may contain various kinds of hydrocarbons, but volatile compounds will evaporate before the waste enters the marine environment and persistent long-chained oil residue will therefore not be present. On that basis, it is valid to assess fate and impact of oily waste based on the most common oil compounds, which could be total hydrocarbon (THC), or polyaromatic hydrocarbons (PAH).

#### **3.2. Sewage**

Sewage is interpreted as treated or untreated wastewater discharged from ships. The impact of sewage will be determined as an increase of nutrient concentration in water bodies likely to be affected in a relevant period after release (1 day- week). IMO and the Baltic countries have agreed that from 2021 sewage in the Baltic Sea from passenger ships (>12 passengers) are only allowed to be discharged after treatment.

#### **3.3. Garbage**

Garbage is defined as any persistent material discarded into the sea. Plastic is estimated to account for 50-80 % of waste stranded on beaches, floating on the ocean surface and on the seabed<sup>99</sup>. According to MARPOL Annex V definition, garbage is defined to include:

- Food waste
- Cargo residues contained or not contained in wash water
- Cleaning agents and additives contained or not contained in wash water
- Animal carcasses
- All other waste including plastics, synthetic ropes, fishing gear, waste bags, incinerator ashes, clinkers, cooking oil, floating dunnage, lining and packing materials, paper, rags, glass, metal, bottles, crockery and similar refuse.

The impact of garbage on the marine environment in this report is focused on the impact from plastic, including digestion or entanglement of litter by animals and aesthetic impacts (e.g. plastic on shore).

### **4. Vulnerability analysis**

---

<sup>99</sup> Barnes, D, Galgani, F, Thompson, RC and Barlaz, M (2009). Accumulation and fragmentation of plastic debris in global environments. *Phil.Trans R Soc.B* , 364, pp.1985-1998.



In the following, environmental scores of the four selected feature groups are presented for each waste type and sea region.

#### 4.1. Oily waste

The impact of oily wastes does not include effects such as oiled birds etc., since it can be assumed that the oily waste (not spills) is not in free phase (as slicks) but soaked up in textiles etc. in relatively small amounts.

Table 1.1 lists the vulnerability scores of oily waste for the Baltic Sea. The rationale behind scoring of the Baltic Sea and the North Sea are almost identical under the assumption that the two regions are similar in response. Based on available literature<sup>100</sup> it can be assumed that oil components in oily waste discharged to the marine environment hence disappear quickly (within days). Only limited amounts of PAHs will enter the water, where they are likely to be degraded naturally through physical, chemical and potentially biological processes. It is assumed that impacts will be limited to the water column, primarily on plankton or other small pelagic organisms. Only small amounts of oil compounds from oily waste will reach the sea floor or the coast. The impact scores on habitats and protected areas in the Baltic Sea are estimated a little lower than those on species, as most habitats and protected areas are coastal and oily waste is less likely to reach the coast since larger ships sail in a distance from it and oily waste will weather and fate on its drift ashore. That is not the case for the North East Atlantic, where protected areas are found in the central North Sea, and that is reflected in the score values for impacts on protected areas (Table 1.2).

A main argument for the relatively high impact score is the potential effects that PAH may have on marine life. Many PAHs are known to be potentially lethal to organisms or lead to long-term chronic effects on the population level<sup>101</sup>.

Length of interruption of socio-economic activities or services are most likely short, as the discharges of oily waste are presumed to be low amounts in short pulses mainly in open sea. In combination with low probabilities of placing a responsibility to potential pollution from oily waste, compensation possibilities are most likely very limited.

*Table 1.1. Vulnerability scores and resulting environmental vulnerability of oily waste in the Baltic Sea*

Oily waste	Fate	Impact	Length of interruption	Possible compensation	Sum
Species	2	4	1	1	8
Habitat	2	3	1	1	7
Protected area	2	3	1	1	7
Socio-economic	2	1	1	1	5
<b>Sum</b>					<b>27</b>

<sup>100</sup> ITOF, 2017: <http://www.itopf.com/knowledge-resources/documents-guides/document/tip-2-fate-ofmarine-oil-spills/>

<sup>101</sup> OSPAR, 2009. Assessment of impacts of offshore oil and gas activities in the North-East Atlantic. OSPAR commission, Offshore industry series.

Table 1.2. Vulnerability scores and resulting environmental vulnerability of oily waste in the North East Atlantic Ocean

Oily waste	Fate	Impact	Length of interruption	Possible compensation	Sum
Species	2	4	1	1	8
Habitat	2	3	1	1	7
Protected area	2	4	1	1	8
Socio-economic	2	1	1	1	5
<b>Sum</b>					<b>28</b>

The rationale behind the vulnerability score of the Mediterranean Sea and the Black Sea (Table 1.3 and Table 1.4) are to a large degree similar to the Baltic and Eastern Atlantic. The assumption that impacts are mainly occurring in the water column, lower the impact score value for the Mediterranean Sea because of its oligotrophic nature. This implies that the encounter rate between oily wastes and organisms in general is lower in the Mediterranean Sea than in the other sea regions and therefore less organisms will potentially be affected. This is done by lowering the impact score with one unit in each feature.

Table 1.3. Vulnerability scores and resulting environmental vulnerability of oily waste in the Mediterranean Sea

Oily waste	Fate	Impact	Length of interruption	Possible compensation	Sum
Species	2	3	1	1	7
Habitat	2	2	1	1	6
Protected area	2	2	1	1	6
Socio-economic	2	1	1	1	5
<b>Sum</b>					<b>24</b>

Table 1.4. Vulnerability scores and resulting environmental vulnerability of oily waste in the Black Sea

Oily waste	Fate	Impact	Length of interruption	Possible compensation	Sum
Species	2	4	1	1	8
Habitat	2	3	1	1	7
Protected area	2	4	1	1	8
Socio-economic	2	1	1	1	5
<b>Sum</b>					<b>28</b>

## 4.2. Sewage

The impact of sewage has been determined as an increase of nutrient concentration in water bodies likely to be affected in a relevant period after release (1 day- week).

Table 2.1 lists vulnerability scores and the resulting environmental weight of sewage in the Baltic Sea.

*Table 2.1. Vulnerability scores and resulting environmental vulnerability of sewage in the Baltic Sea*

Sewage	Fate	Impact	Length of interruption	Possible compensation	Sum
Species	2	2	1	1	6
Habitat	1	2	1	1	5
Protected area	2	1	1	1	5
Socio-economic	1	2	2	1	6
<b>Sum</b>					<b>22</b>

The 'fate of sewage discharged in the Baltic Sea' is scored as 2 for species and protected areas. It is assumed that sewage will quickly be diluted in the water column and nutrients from the sewage will be taken up by phytoplankton within days. Species in open water may therefore be exposed to local elevated nutrient concentrations for short periods. This applies also for protected areas near potential discharges, as they are vulnerable to added nutrients. Habitats are mostly coastal and they are assigned a low score value of 1, since nutrients from sewage most likely have been diluted or taken up before they can affect the areas.

'Impacts of discharged sewage in the Baltic Sea' are assigned a score value of 2 for species, habitats and socio-economic features. The Baltic Sea is already under pressure from eutrophication and is sensitive to additional nutrients. Protected areas are scored with a value of 1, corresponding to their expected long distance from sewage discharges.

'Length of interruption' are assigned a score value of 1, except for socio-economic features, on the grounds they are potentially more vulnerable to sewage discharge, e.g. near beaches or other places of high tourism value, which can be closed for health reasons. Possible compensation is assigned a score value of 1 for all features, because of an expected temporary impact with low probability of assigning blame.

*Table 2.2. Vulnerability scores and resulting environmental vulnerability of sewage in the East Atlantic Sea*

Sewage	Fate	Impact	Length of interruption	Possible compensation	Sum
Species	2	1	1	1	5
Habitat	1	1	1	1	4
Protected area	2	2	1	1	6
Socio-economic	1	1	1	1	4
<b>Sum</b>					<b>19</b>

Table 2.2 shows vulnerability score values and environmental weight of sewage waste in the North East Atlantic Sea. Fate of sewage is assumed the same as described for the Baltic Sea following the same argumentation and it receives the same score values.

Impact is set to have a score value of 1, except for protected areas since the North East Atlantic is not as eutrophicated as the Baltic Sea and any sewage discharge is assumed to quickly be diluted and taken up by plankton organisms. Protected areas are given a score value of 2, because they are found in central parts of the region and are potentially more impacted by nutrients from sewage.

Length of interruption are assigned a score value of 1, because of the quick fate of sewage and relatively low impact. 'Possible compensation' is assigned a score value of 1 for all features, because of an expected temporary impact with low probability of assigning blame.

*Table 2.3. Vulnerability scores and resulting environmental vulnerability of sewage in the Mediterranean Sea*

Sewage	Fate	Impact	Length of interruption	Possible compensation	Sum
<b>Species</b>	2	2	1	1	6
<b>Habitat</b>	2	2	1	1	6
<b>Protected area</b>	2	2	1	1	6
<b>Socio-economic</b>	2	2	1	1	6
<b>Sum</b>					<b>24</b>

In Table 2.3 is the vulnerability scores and environmental weight of sewage in the Mediterranean Sea. Fate and impact of sewage is scored a value of 2. That is a reflection of the general oligotrophic conditions in the Mediterranean Sea as opposed as the more eutrophicated Baltic Sea and East Atlantic Sea. Biological productivity in an oligotrophic sea area is more nutrient-limited than in a eutrophic sea area and pulses of nutrient releases from a sewage discharge may have a longer fate and stronger impact.

Score values of length of interruption and possible compensation are set to 1, based on the identical arguments for sewage discharge in the North East Atlantic Sea.

*Table 2.4. Vulnerability scores and resulting environmental vulnerability of sewage in the Black Sea*

Sewage	Fate	Impact	Length of interruption	Possible compensation	Sum
<b>Species</b>	2	1	1	1	5
<b>Habitat</b>	1	1	1	1	4
<b>Protected area</b>	2	2	1	1	6
<b>Socio-economic</b>	1	1	1	1	4
<b>Sum</b>					<b>19</b>

Table 2.4 lists the vulnerability score values for sewage waste discharge in the Black Sea. In general, the rationale for the scoring follows that of the scoring of the Baltic Sea. Except for length of interruption, where it is assumed lower in the Black Sea area, compared to the Baltic Sea.

The above scores for sewage are based on the assumption of equal persistence in the marine environment compared with the other investigated waste types (oily wastes and garbage). This assumption is necessary in order to carry out a general investigation as the present. The persistence of sewage, however, is remarkably shorter (hours) compared to the persistence of oil wastes (weeks/months) and the persistence of garbage (hours-decades). This implies that sewage discharged far away from vulnerable areas (shore, shallows, archipelagos) will be diluted and/or transformed by biological processes. The total discharge of sewage hence is to be corrected in order to obtain the discharge that potentially can affect environmental vulnerable areas. Recent scientific work<sup>102</sup> indicates that nutrient discharge in the open areas of the North Sea has limited effect on the eutrophication. The effective discharge is expected to be of the same order of magnitude as the illegal discharge assessed by MARWAS.

### 4.3 Garbage

The impact of garbage is focused on digestion or entanglement of litter by animals and aesthetic impacts (e.g. plastic on shore).

Table 3.1 lists vulnerability scores and the resulting environmental weight of garbage in the Baltic Sea, East Atlantic Sea, Mediterranean Sea and the Black Sea.

*Table 3.1. Vulnerability scores and resulting environmental vulnerability of garbage in the Baltic Sea, East Atlantic Sea, Mediterranean Sea and the Black Sea*

<b>Garbage</b>	<b>Fate</b>	<b>Impact</b>	<b>Length of interruption</b>	<b>Possible compensation</b>	<b>Sum</b>
<b>Species</b>	4	2	1	1	8
<b>Habitat</b>	4	2	1	1	8
<b>Protected area</b>	4	2	2	1	9
<b>Socio-economic</b>	4	3	2	1	10
<b>Sum</b>					<b>35</b>

The scoring is done under the assumption that the vast majority of garbage is plastic. The fate of plastic is a slow degradation, where macro plastic is degraded to micro plastic and eventually total degraded on a time scale of centuries<sup>103</sup>. It is globally distributed, although plastic seems to accumulate in enclosed seas, such as the Mediterranean Sea and the Black

<sup>102</sup> OSPAR, 2017:

[http://qsr2010.ospar.org/media/assessments/p00440\\_supplements/p00440\\_suppl\\_4\\_disc\\_harges\\_of\\_wastes.pdf](http://qsr2010.ospar.org/media/assessments/p00440_supplements/p00440_suppl_4_disc_harges_of_wastes.pdf)

<sup>103</sup> Li WC, Tse HF, Fok L. 2016. Plastic waste in the marine environment: A review of sources, occurrence and effects. *Science of the Total Environment*, 566–567, 333–349.

Sea<sup>104</sup>. It is also assumed that length of interruption and possible compensation are similar in the investigated sea regions. On that basis, the four sea regions receive the same vulnerability score and environmental weight in relation to garbage. The rationale behind is presented in the following.

Macro plastic is generally defined as having a size >25 mm and organisms can be entangled in it or ingest particles. Micro plastic is assessed to be even more harmful as they can accumulate in food webs and potentially act as carrying vectors of hydrophobic contaminants<sup>105</sup>. For these reasons, fate score values are set to 4.

Impact from garbage in the Baltic Sea is scored based on possible impacts from entanglement and/or ingestion by marine species, in particular marine mammals, sea birds and fish. Both entanglement and ingestion are commonly found, although entanglement is more frequently observed than ingestion<sup>106</sup>. Effects of entanglement on populations are rarely possible to assess, but some reports show significant long-term effects<sup>107</sup>. Effects on the marine environment from ingestion and related exposure to contaminants carried by plastic are unclear, although the ubiquitous and increasing presence of plastic raises concerns<sup>108</sup>. On this basis, impact scores are set to a value of 2 for species, habitats and protected areas. For socio-economy, the value is set to 3, due to potential aesthetic effects from garbage on beaches, nature reserves etc.

Length of interruption is assigned a score value of 1 for species and habitats, due to relatively low impact from garbage. The score value for habitats and socio-economy are set to 2, due to potential aesthetic effects from garbage on beaches, nature reserves etc.

Possible compensation is assigned a score value of 1 for all features, because of an expected low impact with low probability of assigning blame.

## 5. Summary and sensitivity analysis

In the table below are summarized the environmental weights for each ship-generated waste type per sea region.

*Table 5.1. Summary of environmental vulnerability for ship-generated waste in four regions of European Seas*

<b>Environmental weight</b>	<b>Oily waste</b>	<b>Sewage</b>	<b>Garbage</b>
<b>Baltic Sea</b>	27	22	35
<b>East Atlantic Sea</b>	28	19	35
<b>Mediterranean Sea</b>	24	24	35
<b>Black Sea</b>	28	19	35

<sup>104</sup> Galgani F, Hanke G, Maes T. 2015. Global Distribution, Composition and Abundance of Marine Litter. In: Marine Anthropogenic Litter, (Eds. M. Bergmann, L. Gutow, M. Klages). Springer Open Access.

<sup>105</sup> Li WC, Tse HF, Fok L. 2016. Plastic waste in the marine environment: A review of sources, occurrence and effects. Science of the Total Environment, 566–567, 333–349.

<sup>106</sup> *ibid.*

<sup>107</sup> Kühn S, Rebolledo ELB, Franeker JA van. 2015. Deleterious Effects of Litter on Marine Life. In: Marine Anthropogenic Litter, (Eds. M. Bergmann, L. Gutow, M. Klages). Springer Open Access.

<sup>108</sup> *ibid.*



Different views and arguments may exist on the methodology and scoring used in this report. Some uncertainty concerning score values may arise from this. In order to use these uncertainties constructively in the project, an alternative and independent set of scores have been elaborated to compare the resulting environmental weight in order to assess the uncertainties of the subjective aspect of the scoring method.

A different marine biologist who was not a part of the present project conducted the alternative scoring. He is experienced in this kind of environmental scoring procedure through in participation in the similar earlier projects (BRISK and BE AWARE projects).

*Table 5.1. Comparison between environmental vulnerability of the project and an alternative scoring*

Environmental weight	Oily waste		Sewage		Garbage	
	Project score	Alternative score	Project score	Alternative score	Project score	Alternative score
<b>Baltic Sea</b>	27	27	22	18	35	38
<b>East Atlantic Sea</b>	28	28	19	19	35	38
<b>Mediterranean Sea</b>	24	27	24	24	35	38
<b>Black Sea</b>	28	28	19	19	35	38

The above table indicates that the differences in the assessments carried out by different experts are minor and have a max deviation of 3 points out of 20-30, corresponding to maximum 10-13%. In 50% of the indices, the two experts gave the identical values. This indicates that the assessment method is stable enough for the present purpose.

## Annex 9 – Calculation of administrative burden and enforcement costs

### I. Calculation of administrative costs from complying with the current Directive (Baseline)

#### A. Administrative burden:

The following calculations provide an update of the administrative burden caused by the PRF Directive as this had been estimated by the “Ex-Post evaluation of Directive 2000/59/EC on port reception facilities for ship-generated waste and cargo residues (Panteia)”.

#### **1. Estimation of cost of developing WRH plans (table 1)**

Hourly wage costs (Eurostat data for Public administrations/2015)	Daily wage costs, derived from Eurostat (based on 8 hours)	Number of days required for developing <sup>109</sup>	Costs for developing WRH Plan
21.98	175.84	30 (min)	<b>5275</b>
21.98	175.84	220 (max)	<b>38685</b>

#### **2. Estimation of annual cost of updating WRH plans (table 2)**

Hourly wage costs (Eurostat data for Public administrations/2015)	Daily wage costs, derived from Eurostat (based on 8 hours)	Number of days required for updating <sup>110</sup>	Costs for updating WRH Plan
21.98	175.84	16 (min)	<b>3865</b>
21.98	175.84	40 (max)	<b>7034</b>

**In order to arrive at annual costs of developing and updating WRH plans, the following assumptions have been made (according to Panteia methodology):**

- On average **10,000 EURO is spent on developing WRH plans**. We have taken a value below the average of the values listed in Table 1, as we think there may be a bias towards the values being based on somewhat larger ports (as inputs were taken from Panteia survey, which has few responses from small ports).
- On average **4,000 EURO is spent annually on updating WRH plans**, again using a value below the average, following the same reasoning as above.
- We assume that a new WRH plan has a useful life time of 15 years, after which the WRH plan will be newly developed.
- We assume there are 1,500 ports in the EU<sup>111</sup>.

<sup>109</sup> Ex-post evaluation (Panteia, 2015): “In the consultation, port authorities were asked to indicate how much time they spent to develop WRH plans. Those that answered to this question in the stakeholder consultation indicated that they spent **between 30 and 220 days on developing the WRH plan** and **between 16 and 40 days per year to update the WRH plan**. Time spent on the WRH plans largely depends on the size of the port”.

<sup>110</sup> See footnote 1.

On the basis of the above-mentioned assumptions, the total annual costs for WRH plans for port users are:

### 3. Total annual costs for WRH plans for ports (table 3)

Activity of WRH plan	Number of ports	Average <u>annual</u> costs (EURO)	Total annual costs (EURO)
Development	1500	667 <sup>112</sup>	1,000,000
Update	1500	4000	6,000,000
<b>Total</b>			<b>7,000,000</b>

### 4. Estimates of costs for Member States to approve WRH plans (table 4)

Hourly wage costs (Eurostat data for public administrations/2015)	Annual hours (OECD EU Average annual hours actually worked for 2015)	Calculated average annual wage cost EU for public administration
21.98	1696	37278
2015 number of port calls (Eurostat)	Number of staff needed <sup>113</sup>	Estimated costs
2,224,608	111.23	<b>4,146,432</b>

### 5. Application for an Exemption (port users) (table 5)

Hourly wage costs (Eurostat)	Daily wage costs <sup>114</sup> , derived from Eurostat (based on 8 hours)	Number of days required for applying <sup>115</sup>	Costs for Applying for an exemption
26.6	212.8	10	2,128 euro

Average number of exemptions granted per year:

Today, there are reports from only 7 Member States (2 of them have also reported in SSN). Some of the data is fragmented, possibly obsolete and difficult to extract the final number of exemptions. However, we may assume that 710 exemptions from 7 MS may correspond to **2,333 exemptions** from all 23 maritime EU MS<sup>116</sup>. Therefore:

2,333 exemptions x 2,128 euros = **4,964,624 euro** annual costs for port users.

### 6. Assessment and granting exemptions (competent authorities) (table 6)

<sup>111</sup> According to Panteia.

<sup>112</sup> 10000 euros/15 years = 667 euros.

<sup>113</sup> In the Panteia study it was found that one desk officer, on average, handled the administrative costs that follow from roughly 20,000 port calls i.e. 1 officer per 20,000 port calls.

<sup>114</sup> Assuming that one officer will be responsible for compiling the application file.

<sup>115</sup> The assumption takes into account the preparation of the application file, communication between ship and shipping company, communication with Port Authorities/PRF operators/administrations, collection of necessary information from all relevant stakeholders e.t.c. Participants in the Correspondence Group on Exemptions established under the ESSF/PRF SG have offered information on the average time which ranges from 15 minutes (but not including time spent from ship Agents) to 1 month. The **10 days assumption** is a conservative average within these limits.

<sup>116</sup>  $Y = 23 \times 710/7 = 2333$ .

The same assumptions may be used for calculating the cost incurred by the Competent Authorities for assessing and granting exemptions:

Hourly wage costs (Eurostat data for public administrations/2015)	Daily wage costs <sup>117</sup> , derived from Eurostat (based on 8 hours)	Number of days required for assessment <sup>118</sup>	Costs for Assessing and granting an exemption
21.98	175.84	30	5,275 euro

2,333 exemptions x 5.275 euros = **12,306,575 euro** annual costs for Competent Authorities.

## 7. Advance waste notification

### 7.1 Port users

Regarding the information obligations of the PRF Directive, stakeholders indicated<sup>119</sup> that it generally takes between 30-60 minutes to complete and submit the advance waste notification, but an average sized cruise ship spends roughly 8 man-hours to retrieve and/or estimate the necessary information on the amounts of waste to discharge. Passenger vessels that are not cruise ships face similar difficulties as cruise ships, though not as substantially; therefore an assumption of 4 hours has been made for this category.

**85% of port calls were freight vessels, with an estimated average time of 1 hour work. Passenger vessels (14%) around 4 hours, and cruise ships (1%) around 8 hours.** The division as noted above was applied to the 2015 Eurostat statistics of port calls in the EU, against an average wage cost in the Maritime transport sector of €26,6 (also by Eurostat).

The large share of freight transport in the number of annual port calls (85% in 2013) and the relatively small share of cruise ships (1%) and other passenger transport (14%) have been weighed in our calculation, resulting in **total annual costs of 89.9 million EURO**:

#### Estimated administrative burden on port users (reporting) (table 7A)

Number of hours required for notification	Sector – share in overall port calls EU	Number of port calls/2015 (Eurostat)	Hourly wage costs/2016 (Eurostat)	Estimated total costs
1	Freight – 84%	1,868,671	26.6	49,706,649 <sup>120</sup>
4	Passengers – 15%	333,691	26.6	35,504,722 <sup>121</sup>
8	Cruise ships – 1%	22,246	26.6	4,733,949 <sup>122</sup>

<sup>117</sup> Assuming that one officer will be responsible for checking the application file.

<sup>118</sup> The assumption takes into account the initial examination of the application file, communication with the applicants (ship and shipping company), communication with Port Authorities/PRF operators/administrations, collection of necessary information from all relevant stakeholders etc. It is also based on the outcome of the CG for exemptions established under the ESSF/PRF SG. The participants indicated a range of time spent from one week to 45 days or several weeks. 30 days seems to be a sensible average in this regard.

<sup>119</sup> Panteia study.

<sup>120</sup>  $Y = 1 \times 26.6 \times 1,868,671 = 49,706,649$ .

<sup>121</sup>  $Y = 4 \times 26.6 \times 333,691 = 35,504,722$ .

<sup>122</sup>  $Y = 8 \times 26.6 \times 22,246 = 4,733,949$ .

Total	100%	2,224,608		<b>89,945,320</b>
-------	------	-----------	--	-------------------

## 7.2 Port/competent authorities

Once transmitted to the port authority, the advance notification form needs to be processed, creating an administrative burden on the side of the port/competent authority. The port of Piraeus indicated<sup>123</sup> that they have one person who is working full time on the management/assessment of the advance notification forms, which comes down to roughly 10 minutes per port call<sup>124</sup>. Calculations are presented in Table 7B:

### Estimated administrative burden on authorities (assessment) (table 7B)

Number of hours required for process	Number of port calls/2015 (Eurostat)	Hourly wage costs (Eurostat data for public administrations/2015)	Estimated total Costs ( $Y = 2224608 \times 0.16 \times 21.98 = 7,823,501$ )
0.16	2,224,608	21.98	<b>7,823,501</b>

## 8. Inspection – providing documentation and collaboration (port users)

The Panteia study had assumed<sup>125</sup> that “on average, 2.27% of all port calls are subject to inspection” This assumption gave a number of 51,961 inspections annually. However, this figure is far higher than the actual figure of Port State Control inspections (the number of the all EU PSC inspections under the regime of the repealed PSC Directive was around 20,000 inspections annually - for 2016 the figure would have been **19,453**)<sup>126</sup>.

Therefore, calculations have been based on approximately **19,500** inspections, and one 1 hour work for the crew member to accompany the inspector (according to Panteia<sup>127</sup>):  
 $19,500 \text{ hours} \times 26.6 \text{ euro}^{128} = \mathbf{518,700 \text{ euro}}$  (based on the 25% yearly inspection target).

Alternatively, we have 1166 inspections recorded in THETIS-EU for 2016 so:  
 $1166 \times 1 \text{ hour} = 1166 \text{ hours} \times 26.6 \text{ euro} = \mathbf{31,016 \text{ euro}}$  (actual cost).

### Inspection – reporting results from inspections (Competent Authorities)

The enforcement costs for the competent authority were based on the same calculation, but the EU average hourly wage costs for public administration were used.

Therefore, we calculate  $19,500 \text{ inspections} \times 1 \text{ hour}$  (according to Panteia) =  $19,500 \text{ hours} \times 21.98 \text{ euro}^{129} = \mathbf{428,610 \text{ euro}}$  (based on the 25% inspection target)

Alternatively, we have 1166 inspections recorded in THETIS-EU for 2016 so:  
 $1166 \times 1 \text{ hour} = 1166 \text{ hours} \times 21.98 \text{ euro} = \mathbf{25,629 \text{ euro}}$  (actual cost)

<sup>123</sup> Panteia study.

<sup>124</sup> Panteia study

<sup>125</sup> Based on data collected in the stakeholder consultation.

<sup>126</sup> See EMSA’s Technical assessment on the list of open questions (Supplement on enforcement)/Annex I.

<sup>127</sup> Based on the information collected in additional interviews and the stakeholder consultation, an inspection lasts generally no more than one hour, and **requires a crew member to accompany the inspectors.**

<sup>128</sup> Hourly wage cost in the Maritime transport sector for 2016.

<sup>129</sup> Eurostat for year 2015.

The following table summarises the results (in million euro):

<b>Administrative costs</b>	<b>Stakeholder</b>	<b>Annual costs</b>
Total annual costs for WRH plans	Ports	7.0
Costs for Member States to approve WRH plans	Competent authorities	4.1
Application for an Exemption	Port users	5.0
Assessment and granting exemptions	Competent authorities	12.3
Advance waste notification – reporting	Port users	89.9
Advance waste notification – assessment	Ports / competent authorities	7.8
Inspection – providing documentation and collaboration	Port users	0.5
Inspection – reporting results from inspections	Competent Authorities	0.4
<b>Total</b>		<b>127</b>

#### **B. Enforcement costs (Inspections undertaken – cost of the Inspectors):**

Two approaches can be applied for calculating these costs:

I. based on the **25% target** in the Directive:

19,500 inspections<sup>130</sup> x 1 hour<sup>131</sup> = 19,500 hours x 21.98 euro<sup>132</sup> = **428,610 euro.**

II. based on the number of **inspections actually reported** (in THETIS-EU):

1,166 inspections x 1 hour (according to Panteia) = 1,166 hours x 21.98 euro = **25,629 euro.**

<sup>130</sup> See EMSA's Technical assessment on the list of open questions (Supplement on enforcement)/Annex I.

<sup>131</sup> The 1hr estimated time for an inspection has been derived from the Panteia ex-post evaluation.

<sup>132</sup> Hourly wage costs (Eurostat data for public administrations/2015).



## **II. Quantification of the impacts of the Policy Measures**

### **(Impact on administrative burden and enforcement)**

The following calculations provide an estimate of the impact of various proposed policy measures/options for the revision of the PRF Directive.

#### **1. Policy measures on Inspections (PM-3D.1, 3D.2, 3E)**

##### **A. Enforcement costs**

##### **PM-3D.1 Incorporate the PRF inspections in the PSC Regime (amending Directive 2009/16/EC)**

###### **a) PSC regime:**

In the year 2016, 15,186 inspections were conducted in the EU Member States under the PSC Regime. It is assumed that under normal conditions (i.e. the ship requests to deliver its waste), it would take a Port State Control Officer (PSCO) approximately **5 minutes additional** time to control the specific PRF requirements. If the ship does not deliver all the waste ashore then the PSCO will need to evaluate if there is sufficient dedicated storage capacity for the coming voyage. This could take up to **15 minutes** for performing the necessary calculations. If we take a conservative approach (based on the maximum time assumption), 15 minutes would have to be added to each initial PSC inspection for checking compliance with the PRF requirements<sup>133</sup>.

Additional cost of 15 minutes per PSC inspection = 21.98 euros<sup>134</sup> x 15 min./60 min. = 5.5 euros; **Total annual cost:** 15,186 inspections x 5.5 euros = **83,523 euro**

b) **A separate regime for domestic vessels** would be complementing the PSC regime (checking 20% of all individual domestic vessels each year i.e. 600 inspections<sup>135</sup>).

**Total (PRF) annual cost of domestic inspections:** 600 inspections x 2 hours (average time for a fully dedicated PRF inspection) x 21.98 euros = **26,376 euro**

<b>Total annual inspection cost for PM-3D.1: 83,523 euros + 26,376 euros = 109,899 euro</b>
---

- **Estimated cost savings** in comparison to 25% target in the Directive: 428,610 euro - 109,899 euro = **318,711 euro**.
- **Estimated cost increase** in comparison to the cost of inspections actually reported (in THETIS-EU): 109,899 euro - 25,629 euro = **84,270 euro**.

##### **PM-3D.2 Develop a dedicated EU PRF targeting mechanism:**

The annual number of the PRF dedicated inspections is estimated at **17,220**<sup>136</sup>.

<sup>133</sup> It should be noted that all the other 'PRF related' actions (e.g. checking ship's documents, checking the tanks and garbage tins etc) will be part of the PSC inspection so no additional time has been calculated).

<sup>134</sup> Hourly wage costs (Eurostat data for public administrations/2015).

<sup>135</sup> See EMSA's Technical assessment on the list of open questions.

<sup>136</sup> See EMSA's Technical assessment on the list of open questions.

If a dedicated PRF inspection is to be conducted, then significant time would be needed for the inspector to control the relevant ship's documents (e.g. certificates, ORB, GRB, ship's logs, plans, tables etc.), as well as to get acquainted with the overall condition of the ship particularly in the engine room, cargo holds, ballast, bunker, waste bins etc. It is assumed that at least one (1) hour would be needed for the inspector to assess the overall condition of the ship and to check the ship's documents in addition to the 10 minutes for controlling specific PRF requirements. It is not possible to estimate the time for a detailed inspection if non-compliances are revealed as this would depend on the merits of each case. Therefore, we may assume an average of **2 hours** for each PRF inspection to be conducted.

**Total annual inspection cost for PM-3D.2: 17,220 x 2 hours x 21.98 euros = 756,991 euro**

- **Estimated cost increase** in comparison to 25% target in the Directive: 756,991 euro - 428,610 euro = **328,381 euro.**
- **Estimated cost increase** in comparison to the cost of inspections actually reported (in THETIS-EU): 756,991 - 25,629 euro = **731,362 euro.**

**PM-3E Bring fishing vessels and small recreational craft into the PRF inspection regime:**

Member States will be required to inspect annually at least 20% of all **fishing vessels above 100GT** flying their flag, i.e. around 600 inspections per year<sup>137</sup>.

Cost of inspections: 600 inspections x 2 hours x 21.98 euros = **26,376 euro**

Member States will be required to inspect annually at least **20% of all individual recreational crafts above 100GT** calling in their ports i.e. around **170 inspections** per year<sup>138</sup>.

Cost of inspections: 170 inspections x 2 hours x 21.98 euros = **7,473 euro**

**Total annual inspection cost of PM-3E (vessels >100GT): 26,376 euros + 7,473 euros = 33,849 euro**

An alternative approach for targeting recreational craft has also been developed, which is based on the vessel's length overall, i.e. a threshold of 24meters LOA<sup>139</sup>. There are currently around 3,000 recreational crafts above 24meters LOA in the EU (source: DG MARE). Requiring Member States to inspect annually at least 20% of all individual recreational crafts above 24meters LOA calling in their ports will mean around 600 inspections per year. Therefore in this case:

Total number of inspections of fishing vessels and small recreational crafts: 600 inspections + 600 inspections = 1,200 inspections.

<sup>137</sup> See EMSA's Technical assessment on the list of open questions.

<sup>138</sup> However, this figure may be underestimating the actual number of recreational crafts calling in the EU. See EMSA's Technical assessment on the list of open questions.

<sup>139</sup> Length Overall

**Total annual inspection cost of PM-3E: 1,200 inspections x 2 hours x 21.98 euro = 52,752 euro (based on 24 LOA threshold for recreational craft)**

**B. Administrative costs of inspections (costs for crew involved, administrative burden):**

It is assumed that each inspection requires a crew member to accompany the inspectors.

**PM-3D.1 (incorporate PRF Inspections in PSC regime):**

- a) **PSC:** Users (ship's crew) additional time is estimated to 15 minutes (0.25 hours) per PSC inspection. Cost/PSC = 15,186 inspections x 0.25 hours x 26.6 euro<sup>140</sup> = **100,987 euro**
- b) **Domestic vessels:** 600 inspections x 2 hours (average time for a fully dedicated PRF inspection) x 26.6 euro = **31,920 euro**

**Total administrative cost for port users (ships) of PM-3D.1: 100,987euros + 31,920 euros = 132,907 euro**

- **Estimated cost savings** in comparison to 25% target in the Directive: 518,700 euro – 132,907 euro = **385,793 euro**.
- **Estimated cost increase** in comparison to the cost of inspections actually reported (in THETIS-EU): 132,907 euro - 25,629 euro = **107,278 euro**.

**PM-3D.2 (dedicated PRF Inspection regime):**

**Dedicated PRF:** Users (ship's crew) additional time is estimated to 2 hours per PRF inspection. Therefore:

**Total administrative costs PM-3D.2: 17,220 inspections x 2 hours x 26.6 euro<sup>141</sup> = 916,104 euro**

- **Estimated cost increase** in comparison to 25% target in the Directive: 916,104 euro - 518,700 euro = **397,404 euro**.
- **Estimated cost increase** in comparison to the cost of inspections actually reported (in THETIS-EU): 916,104 euro - 25,629 euro = **890,475 euro**.

**PM-3E (inspection regime for fishing vessels and recreational craft):**

**fishing vessels & recreational crafts (above 100GT):** additional time for port-users (ship's crew) is estimated at 2 hours per PRF inspection.

**Total administrative costs PM-3E= 770 inspections x 2 hours x 26.6 euro<sup>142</sup> = 40,964 euro.**

<sup>140</sup> I.e. hourly wage cost in the Maritime transport sector of €26,6 (Eurostat).

<sup>141</sup> I.e. hourly wage cost in the Maritime transport sector of €26,6 (Eurostat).

<sup>142</sup> I.e. hourly wage cost in the Maritime transport sector of €26,6 (Eurostat).

(If the 24 meters LOA threshold is applied for recreational crafts this will result in 600 inspections per year on these crafts. This means 1200 inspections x 2 hours x 26.6 euro = 63,840 euro).

## 2. Policy measures on Exemptions (PM-5A)

### PM-5A Harmonising exemption procedures for ships in scheduled and regular traffic:

Harmonising exemption procedures for ships in scheduled and regular traffic includes the introduction of a standard exemption certificate and electronic exchange of information of the exemptions through SafeSeaNet.

a) The ESSF/PRF-SG/“Correspondence Group on exemptions”, has shared experiences and input on expected time and cost savings, including the recent introduction of an online application tool in one of the EU MS for the evaluation and granting of exemptions in all their seaports. The new system in place has resulted in a reduction from (up to) 45 days needed for the exemption process to 20 days, which corresponds to 25 days of time saving, or a 56% reduction of the time needed for assessing and granting an exemption. Therefore, taking a conservative approach<sup>143</sup> and based on an average time of 30 days for assessing and granting an exemption, the proposed measures may reduce the time for competent authorities to complete the process with **10 days**. This corresponds to a reduced cost for assessing and granting an exemption i.e. **3,517 euro**.

Hourly wage costs (Eurostat data for public administrations/2015)	Daily wage costs <sup>144</sup> , derived from Eurostat (based on 8 hours)	Number of days required for assessment <sup>145</sup>		Costs for Assessing and granting an exemption	
		Current average time	Reduced time	Current situation	Review (PM-5A)
21.98	175.84	30	(30 – 10) = <b>20</b>	5,275 euro	3,517 euro

The updated annual costs for competent authorities with PM 5A is calculated as follows:  
2,333 exemptions<sup>146</sup> x 3,517 euro = **8,205,161 euro**

Potential cost savings annually: **12.3 million euro<sup>147</sup> - 8.2 million euro = 4.1 million euro**

b) Also on the ship's side, this measure should lead to more clarity on eligibility, documentation to be provided and **reduced time for obtaining an exemption**. The cost associated with the application for an exemption was estimated to be **2128 euro** (see table on the quantification of the administrative burden). However, given limited data available, it is

<sup>143</sup> As some competent authorities already have IT applications in place, a more conservative approach in terms of time savings is warranted.

<sup>144</sup> Assuming that one officer will be responsible for checking the application file.

<sup>145</sup> See the Calculation of administrative burden caused by the PRF Directive – table 6.

<sup>146</sup> Based on the number of exemptions reported through SSN and to the Commission in 2015.

<sup>147</sup> See the Calculation of administrative burden caused by the PRF Directive – chapter 6.

difficult to indicate expected time and cost savings for the crew member involved in the process.

### **3. Policy measures on aligning the Advance Waste Notification (PM-4B)**

In table 7A (see above) the current administrative burden on port users because of the advance waste notification has been calculated:

Estimated current administrative burden on port users (reporting) = 89,945,320 euro

A possible alignment and updating of the PRF Directive's waste notification form, with MARPOL (IMO Circular 834) as foreseen in PM-4B will provide some benefits mostly with regard to cargo residues, Annex II and Annex VI waste which are currently different or not included in the 'EU' form.

It may be assumed that for freighters around **5% time savings** will occur (mostly because of the alignment on cargo residues). For cruise and passenger vessels we may assume only **1% savings** because cargo residues are not applicable. Based on these assumptions, the following calculation is made of the time saved from the alignment of the advance waste notification:

Freighters: 1 hour x 5% = 0.05 hours savings;  
 Passenger ships: 4 hours x 1% = 0.04 hours savings;  
 Cruise ships: 8 hours x 1% = 0.08 hours savings.

#### **Estimated administrative burden on port users (reporting) / updated after alignment with MARPOL**

Number of hours required for notification	Sector – share in overall port calls EU	Number of port calls/2015 (Eurostat)	Hourly wage costs/2016 (Eurostat)	Estimated total costs
1-0.05 = <b>0.95</b>	Freight – 84%	1,868,671	26.6	47,221,316 <sup>148</sup>
4-0.04 = <b>3.96</b>	Passengers – 15%	333,691	26.6	35,149,675 <sup>149</sup>
8-0.08 = <b>7.92</b>	Cruise ships – 1%	22,246	26.6	4,686,609 <sup>150</sup>
<b>Total</b>	<b>100%</b>	<b>2,224,608</b>		<b>87,057,600</b>

**Estimated cost savings** from aligning the PRF Directive with MARPOL definitions of Ship Generated Waste and Cargo Residues = 89,945,320 - 87,057,600 = **2,887,720 euro**

<sup>148</sup>  $Y = 0.95 \times 26.6 \times 1,868,671 = 47,221,316.$

<sup>149</sup>  $Y = 3.96 \times 26.6 \times 333,691 = 35,149,675.$

<sup>150</sup>  $Y = 7.92 \times 26.6 \times 22,246 = 4,686,609.$

## Annex 10 – Glossary of terms

Term	Definition	Source
<b>Black water</b>	'Water polluted with food, animal, or human waste.'	<a href="http://www.businessdictionary.com/definition/black-water.html">http://www.businessdictionary.com/definition/black-water.html</a>
<b>Bleed-off water</b>	<p>'A small amount of scrubbing water extracted to bleed-off unit to remove contaminants.'</p> <p>'...small amount of aqueous solution removed from the cleaning medium of an EGCS[Exhaust Gas Cleaning Systems]/EGR to keep its required operating properties and efficiency...'</p> <p>'...condensate from cooling of exhaust gas in an EGR [Exhaust Gas Recirculation] process...'</p>	<p><a href="https://ec.europa.eu/transport/sites/tranport/files/modes/maritime/events/doc/2011_06_01_stakeholder-event/item9.pdf">https://ec.europa.eu/transport/sites/tranport/files/modes/maritime/events/doc/2011_06_01_stakeholder-event/item9.pdf</a></p> <p>EMSA's assistance with Directive 2000/59/EC on Port Reception Facilities (PRF), Technical assessment on the list of open questions, Ref. EMSA.2017.036676, p.16</p> <p>IMO, PPR 4/11- Guidelines for the discharge of exhaust gas recirculation bleed-off water- Report CG, p.5</p>
<b>Cargo residues</b>	<p>'...the remnants of any cargo material on board in cargo holds or tanks which remain after unloading procedures and cleaning operations are completed and shall include loading/unloading excesses and spillage.'</p> <p>'...the remnants of any cargo which are not covered by other Annexes to the present Convention and which remain on the deck or in holds following loading or unloading, including loading and unloading excess or spillage, whether in wet or dry condition or entrained in wash water but does not include cargo dust remaining on the deck after sweeping or dust on the external surfaces of the ship.'</p>	<p>Directive 2000/59/EC on port reception facilities for ship-generated waste and cargo residues, Article 2(d).</p> <p>1978 Annex V OF THE 1978 Protocol relating to the 1973 International Convention for the Prevention of Pollution from ships: Regulations for the prevention of pollution by garbage from ships (Revised version as of 2011), Regulation 1 Definitions (2)</p>
<b>Exhaust Gas</b>	'Exhaust Gas Cleaning Systems	EMSA's assistance with Directive



<b>Cleaning Systems (EGCS)</b>	(EGCS) are systems designed to reduce the sulphur oxide emissions by ships using otherwise non-compliant fuels. These systems [are] more commonly known by “scrubbers”...'	2000/59/EC on Port Reception Facilities (PRF), Technical assessment on the list of open questions, Ref. EMSA.2017.036676, p.5
<b>Fishing gear</b>	'...any physical device or part thereof or combination of items that may be placed on or in the water or on the sea-bed with the intended purpose of capturing, or controlling for subsequent capture or harvesting, marine or fresh water organisms.'	1978 Annex V OF THE 1978 Protocol relating to the 1973 International Convention for the Prevention of Pollution from ships: Regulations for the prevention of pollution by garbage from ships (Revised version as of 2011), Regulation 1 Definitions (6)
<b>Food wastes</b>	'...any spoiled or unspoiled food substances and includes fruits, vegetables, dairy products, poultry, meat products and food scraps generated aboard ship.'	1978 Annex V OF THE 1978 Protocol relating to the 1973 International Convention for the Prevention of Pollution from ships: Regulations for the prevention of pollution by garbage from ships (Revised version as of 2011), Regulation 1 Definitions (8)
<b>Garbage</b>	'...all kinds of food wastes, domestic wastes and operational wastes, all plastics, cargo residues, incinerator ashes, cooking oil, fishing gear, and animal carcasses generated during the normal operation of the ship and liable to be disposed of continuously or periodically except those substances which are defined or listed in other Annexes to the present Convention. Garbage does not include fresh fish and parts thereof generated as a result of fishing activities undertaken during the voyage, or as a result of aquaculture activities which involve the transport of fish including shellfish for placement in the aquaculture facility and the transport of harvested fish including shellfish from such facilities to shore for processing.'	1978 Annex V of the 1978 Protocol relating to the 1973 International Convention for the Prevention of Pollution from ships: Regulations for the prevention of pollution by garbage from ships (Revised version as of 2011), Regulation 1 Definitions (9)
<b>Good environmental</b>	'...the environmental status of marine waters where these	Directive 2008/56/EC of the European Parliament and of the

<b>status</b>	provide ecologically diverse and dynamic oceans and seas which are clean, healthy and productive...'	Council of 17 June 2008 establishing a framework for community action in the field of marine environmental policy (Marine Strategy Framework Directive), Article 3, par.5.
<b>Gray water</b>	'Relatively clean waste water, such as from kitchen, bathroom (not the toilet), and laundry cycles. This water can be reused or recycled with little or no treatment for landscape irrigation and other non-potable uses. Also called sanitary water.'	<a href="http://www.businessdictionary.com/definition/gray-water.html">http://www.businessdictionary.com/definition/gray-water.html</a>
<b>Marine litter</b>	'Marine litter consists of items that have been deliberately discarded, unintentionally lost, or transported by winds and rivers, into the sea and on beaches. It mainly consists of plastics, wood, metals, glass, rubber, clothing and paper. Land-based sources include tourism, sewage and illegal or poorly managed landfills. The main sea-based sources are shipping and fishing.'	<a href="http://ec.europa.eu/environment/marine/pdf/flyer_marine_litter.pdf">http://ec.europa.eu/environment/marine/pdf/flyer_marine_litter.pdf</a>
<b>Oil</b>	'...petroleum in any form including crude oil, fuel oil, sludge, oil refuse and refined products (other than petrochemicals which are subject to the provisions of Annex II of the present Convention)...'	1978 Annex I of the 1978 Protocol relating to the 1973 International Convention for the Prevention of Pollution from ships: Regulations for the prevention of pollution by oil (Revised version as of 2010), Regulation 1 Definitions (1)
<b>Operational wastes</b>	'all solid wastes (including slurries) not covered by other Annexes that are collected on board during normal maintenance or operations of a ship, or used for cargo stowage and handling. Operational wastes also includes cleaning agents and additives contained in cargo hold and external wash water. Operational wastes does not include grey water, bilge water, or other similar discharges essential to the operation of a ship, taking into	1978 Annex V OF THE 1978 Protocol relating to the 1973 International Convention for the Prevention of Pollution from ships: Regulations for the prevention of pollution by garbage from ships (Revised version as of 2011), Regulation 1 Definitions (12)

	account the guidelines developed by the Organization [IMO].'	
<b>Plastic</b>	'...a solid material which contains as an essential ingredient one or more high molecular mass polymers and which is formed (shaped) during either manufacture of the polymer or the fabrication into a finished product by heat and/or pressure. Plastics have material properties ranging from hard and brittle to soft and elastic. For the purposes of this annex, "all plastics" means all garbage that consists of or includes plastic in any form, including synthetic ropes, synthetic fishing nets, plastic garbage bags and incinerator ashes from plastic products.'	1978 Annex V OF THE 1978 Protocol relating to the 1973 International Convention for the Prevention of Pollution from ships: Regulations for the prevention of pollution by garbage from ships (Revised version as of 2011), Regulation 1 Definitions (13)
<b>Scrubber</b>	See 'Exhaust Gas Cleaning Systems'	
<b>Sewage</b>	'...1. drainage and other wastes from any form of toilets and urinals; .2 drainage from medical premises (dispensary, sick bay, etc.) via wash basins, wash tubs and scuppers located in such premises; .3 drainage from spaces containing living animals; or .4 other waste waters when mixed with the drainages defined above.'	1978 Annex IV of the 1978 Protocol relating to the 1973 International Convention for the Prevention of Pollution from ships: Regulations for the Prevention of pollution by sewage from ships (revised version as of 2011), Regulation 1 Definitions (3)
<b>Sludge</b>	'...dirty and heavily dense waste that results from "washwater" discharge filtration and conditioning equipment and retained on-board.'	EMSA's assistance with Directive 2000/59/EC on Port Reception Facilities (PRF), Technical assessment on the list of open questions, Ref. EMSA.2017.036676, p. 16
<b>Special area</b>	'...a sea area where for recognized 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	1978 Annex V OF THE 1978 Protocol relating to the 1973 International Convention for the Prevention of Pollution from ships: Regulations for the prevention of pollution by garbage from ships (Revised version as of 2011),

	garbage is required.'	Regulation 1 Definitions (14)
<b>Wash water</b>	'The water used for washing down the pollutant exhaust stream...'	EMSA's assistance with Directive 2000/59/EC on Port Reception Facilities (PRF), Technical assessment on the list of open questions, Ref. EMSA.2017.036676, p. 6
<b>Waste hierarchy</b>	<p>'Preamble ... (31) The waste hierarchy generally lays down a priority order of what constitutes the best overall environmental option in waste legislation and policy, while departing from such hierarchy may be necessary for specific waste streams when justified for reasons of, inter alia, technical feasibility, economic viability and environmental protection.'</p> <p>'1. The following waste hierarchy shall apply as a priority order in waste prevention and management legislation and policy:</p> <ul style="list-style-type: none"> <li>(a) prevention;</li> <li>(b) preparing for re-use;</li> <li>(c) recycling;</li> <li>(d) other recovery, e.g. energy recovery; and</li> <li>(e) disposal.' </li></ul>	Directive 2008/98/EC of the European Parliament and of the Council of 19 November 2008 on waste and repealing certain Directives, Article 4.