

# From Ship to Shore:

Port Reception Facilities and the Regulatory Framework for Controlling  
Marine Plastic Pollution in the Arctic

Candidate number: 508

Submission deadline: 01 December 2021

Number of words: 17 941



**TABLE OF CONTENTS**

- 1. INTRODUCTION ..... 3**
- 1.1 Scope of the Problem: Our Plastic Seas ..... 3
- 1.2 The Role of Shipping and Marine Plastic Pollution in the Arctic ..... 5
- 1.3 The Role of Port Reception Facilities in Tackling the Marine Plastic Problem ..... 6
- 1.4 Research Question ..... 7
- 1.5 Methodology and Structure ..... 8
- 2. THE EXISTING INTERNATIONAL LEGAL LANDSCAPE RELEVANT TO CONTROLLING PLASTICS IN THE ARCTIC MARINE ENVIRONMENT... 10**
- 2.1 UNCLOS ..... 10
- 2.2 Main Conventions Directly Applicable to Shipping and Plastic Waste ..... 12
  - 2.2.1 London Convention and Protocol ..... 12
  - 2.2.2 MARPOL ..... 14
- 2.3 Other Conventions Indirectly Applicable to Shipping and Plastic Pollution ..... 17
  - 2.3.1 Basel Convention ..... 17
  - 2.3.2 Convention for Biological Diversity ..... 17
- 2.4 Non-Binding International Legal Instruments ..... 18
- 2.5 Conclusions ..... 20
- 3. REGIONAL LAW APPLICABLE TO MARINE PLASTIC POLLUTION IN THE ARCTIC ..... 22**
- 3.1 Regional Action Plan on Marine Litter in the Arctic ..... 22
  - 3.1.1 Shipping-Related Measures of the Arctic RAP-ML ..... 23
  - 3.1.2 Bringing Attention to PRFs ..... 24
- 3.2 Other Regional Regimes with Some Overlap in the Arctic ..... 25
  - 3.2.1 EU Directives ..... 25
    - 3.2.1.1 The PRF Directive ..... 26
    - 3.2.1.2 The SUP Directive ..... 31
  - 3.2.2 OSPAR Convention ..... 32
- 3.3 Conclusions ..... 35
- 4. ASSESSMENT OF TWO NATIONAL LAW APPROACHES ..... 36**
- 4.1 United States ..... 36
  - 4.1.1 The U.S. and Arctic Shipping ..... 36

4.1.2	Applicable Legislation .....	37
4.1.3	Shortcomings of the PRF Legislation as to the Arctic and Plastics .....	38
4.1.4	Incorporating a Circular Economy for Marine Plastics? .....	39
4.2	Norway .....	40
4.2.1	Applicable Legislation .....	41
4.2.2	Sufficiency of Norwegian PRFs .....	43
4.2.3	Toward a Circular Economy Mode for Norwegian PRFs? .....	44
4.3	Conclusions .....	45
<b>5.</b>	<b>CONCLUSIONS AND RECOMMENDATIONS .....</b>	<b>46</b>
5.1	The Need for Better Definition of "Adequate" with respect to PRFs .....	46
5.2	The Dearth of PRFs for Handling Plastic Waste in the Arctic Must Be Addressed .....	48
5.3	PRF Fee Structures Should be Harmonized and Better Communicated .....	49
5.4	Arctic PRFs as Circular Economy Hubs for Ships and Plastic Waste .....	50
	<b>TABLE OF REFERENCE .....</b>	<b>54</b>

# 1. INTRODUCTION

## 1.1 Scope of the Problem: Our Plastic Seas

That marine plastic debris has become a pervasive problem spanning the planet is well documented.<sup>1</sup> Since plastic is persistent, lightweight, and susceptible to fragmentation through ultraviolet radiation and wave action, it can be transported everywhere by ocean currents, sea ice, wind, vessels, and even marine animals and plankton. It is estimated that between 150 million to 400 million tons of plastic have accumulated in the world's oceans since the 1950s.<sup>2</sup> And the problem is worsening: scientists estimate that over 8 million metric tons of additional plastic waste enter the world's seas every year, and if current plastic production and disposal rates continue unchecked the cumulative mass of plastic in the ocean will likely increase by an order of magnitude from 2010 levels by 2025.<sup>3</sup>

At the outset a definitional clarification should be made regarding "marine litter," as much of the literature regarding marine plastic waste in the Arctic and elsewhere uses this term somewhat interchangeably. "Marine litter" has been defined as "any persistent, manufactured or processed solid material discarded, disposed of or abandoned in the marine and coastal environment."<sup>4</sup> Marine litter includes machined wood, synthetic fiber, textiles, metal, glass, ceramics, rubber, and other artificial materials, but by far the predominant component of marine litter by volume and geographic distribution is plastic.<sup>5</sup>

Marine plastic waste is generally divided into macroplastics and microplastics. Macroplastics are plastic items that are greater than 5 mm in diameter, while microplastics are plastic particles or fragments less than 5 mm in diameter.<sup>6</sup> Microplastics include plastic pellets, which are granules or spherules between 1 - 5 mm in size that are produced as feedstock for production of larger plastic items.<sup>7</sup>

---

<sup>1</sup> Almroth and Eggert, "Marine Plastic Pollution: Sources," 317; UNEP 2016, *Marine plastic debris - Global lessons*, 2; UNGA 2012, Resolution A/RES/RES/66/288, para. 163.

<sup>2</sup> Toyoshima, "Marine Plastic Pollution in the Arctic," 1.

<sup>3</sup> Jambeck, et al. "Plastic waste inputs from land into the ocean," 770; Boucher and Friot, "Primary Microplastics in the Oceans," 8.

<sup>4</sup> UNEP 2009, *Marine Litter: A Global Challenge*, 13.

<sup>5</sup> PAME, *Regional Action Plan on Marine Litter in the Arctic*, 6.

<sup>6</sup> PAME, *Desktop Study on Marine Litter*, 2.

<sup>7</sup> *ibid.*

The Arctic<sup>8</sup> has become an emerging hot spot of the global marine plastic problem. Recent studies have confirmed the presence of marine plastic litter in significant quantities in all sectors of the Arctic marine environment, including shorelines, sea ice, the water column, the deep sea floor, and marine sediments.<sup>9</sup> Surveys of Alaskan beaches recorded up to 4,518 kilograms of plastic per kilometer, and Svalbard beach surveys have logged substantial plastic litter likely sourced from ships including packaging, beverage bottles, spoons, toothbrushes, and cigarette butts.<sup>10</sup> Shallow water sediments of the Barents Sea at Graspett contained 3,900 microplastic pieces per kilogram.<sup>11</sup> Coastal seafloor in the Norwegian Sea contained 2709 macroplastic pieces per square kilometer.<sup>12</sup> Sea subsurface samples in the Arctic Polar Mixed Layer averaged 20 microplastic pieces per cubic meter, with microplastic debris found in more than 90% of samples collected from the sea surface down to a depth of 6 m below surface.<sup>13</sup> Sea ice in the Fram Strait yielded an astonishing 12,000 microplastic pieces per square meter.<sup>14</sup>

Arctic Ocean surface waters are now considered to hold the most plastics of any ocean basin, and the beginnings of another oceanic garbage patch are appearing in the Barents Sea above Norway and Russia.<sup>15</sup> Considerable amounts of plastic are migrating all the way to the deeper Arctic sea floor as well; a multi-year study monitoring plastic waste on the seabed at a depth of 2,500 m, east of the Fram Strait reported that the volume of plastic has been increasing every year since 2011.<sup>16</sup> High levels of microplastics have been documented in the digestive

---

<sup>8</sup> Different formulations exist as to what the "Arctic" marine area encompasses. The Geographical Arctic, for example, is generally considered to include the area within the Arctic Circle, at approximately 66.33 to 66.50 degrees north latitude. See <https://www.nationalgeographic.org/encyclopedia/arctic/>; <https://www.arcticportal.org>. For the purposes of this thesis, and to encompass the major Arctic shipping routes as well as the Central Arctic Ocean and adjacent marginal seas, the IMO Polar Code definition of "Arctic" waters is adopted. See Resolution MEPC 265(68), Annex, Chapter 11 Regulation 46(2).

<sup>9</sup> Katz, "Why Does the Arctic Have More Plastic," 1.

<sup>10</sup> PAME, *Desktop Study*, 34; Bergmann et al., "Citizen scientists," 536-537.

<sup>11</sup> *ibid.*

<sup>12</sup> *ibid.*

<sup>13</sup> Lusher, et al., "Microplastics in Arctic polar waters," 2.

<sup>14</sup> PAME, *Desktop Study*, 34.

<sup>15</sup> Katz, *supra* n. 9.

<sup>16</sup> Tekman, et al., "Marine litter on deep Arctic seafloor," 94.

tracts of Arctic birds, fish and shellfish.<sup>17</sup> Accordingly, the Arctic Council has noted concern over the increasing accumulation of marine plastic debris in the Arctic, its effects on the environment, and its impacts on Arctic communities.<sup>18</sup>

## **1.2 The Role of Shipping and Marine Plastic Pollution in the Arctic**

Generally, plastic waste present in the Arctic marine environment has two possible pathways: from land-based and sea-based sources. The focus of this thesis concerns sea-based sources, and in particular plastic waste from commercial shipping activities. Types of ship-based plastic wastes are varied, including cargo materials such as straps, packaging, sheeting, and crates as well as plastic cargo itself (industrial pellets or nurdles; consumer goods). Accidental discharge can occur through emergencies, collisions, grounding or extreme weather conditions, but avoidable ship-generated plastic waste enters the sea via improper handling, inadequate procedures and storage facilities on board, and lack of reception facilities in ports. Microplastics from routine cleaning or painting of ship hulls, grey water discharge, and ballasting is also of significant concern.<sup>19</sup>

A recent report by the Joint Group of Experts on Scientific Aspects of Marine Environmental Protection (GESAMP) highlighted that stranding of plastic items, including lost container contents, from merchant shipping is increasing, and remote areas near shipping lanes are in particular more likely to be affected by debris from shipping than from land activity.<sup>20</sup> Ship traffic in the Arctic increased 25% between 2013 and 2019, and the distance sailed by bulk carriers increased 160% in the same period.<sup>21</sup> A continued upward trajectory in vessel traffic looms, in large part owing to climate change effects allowing for expansion of shipping routes and periods of navigability. Other sectors of maritime activity in the Arctic region that generate plastic waste - fisheries, aquaculture, cruise tourism and offshore resource development - are also likely to expand.

While the presence of plastics in the Arctic marine environment is influenced by oceanic currents and circulation into and within the region, studies have shown a correlation between

---

<sup>17</sup> PAME, *Desktop Study*, 6; Bergmann, 538-539.

<sup>18</sup> Arctic Council, Fairbanks Declaration (2017), 6.

<sup>19</sup> PAME, *Desktop Study*, 25.

<sup>20</sup> GESAMP, *Sea-based sources of marine litter*, 33.

<sup>21</sup> PAME, "The Increase in Arctic Shipping," 31.

increasing shipping activity and increasing densities of macroplastics and microplastics found in Arctic waters and coastal areas that are remote from any sizeable populations centers.<sup>22</sup> Maritime operations including commercial shipping and fishing are considered to be main contributors to the volumes of plastic waste collected along the shores of Svalbard in recent years.<sup>23</sup> Going forward, it benefits the shipping industry, Arctic communities, Arctic ecosystems and society in general to ensure that increased shipping activity in the Arctic is not accompanied by ever-increasing levels of plastic debris in the marine environment.

### **1.3 The Role of Port Reception Facilities in Tackling the Marine Plastics Problem**

In order for plastics from shipping and other maritime activities to be kept out of the ocean, the starting point is effective waste management practices onboard. Equally important are environmentally proper and effective methods for receiving plastic waste from vessels at ports. The two are interlinked. A facilitative pathway is provided by port reception facilities (PRFs), which are prescribed by international, regional and national laws. PRFs are generally defined as any fixed, floating or mobile facility capable of and fit for the purpose of receiving wastes and residues from ships.<sup>24</sup> In light of the significant opportunity that PRFs may provide for not only reducing or avoiding altogether plastic pollution from ships but also enhancing recovery of existing plastic litter, there is a need to critically analyze whether current regulations governing and related to PRFs are effective in realizing that potential.

Parties to the International Convention for the Prevention of Pollution from Ships (MARPOL), for example, are obligated as port states to ensure that "adequate" PRFs are provided at their ports and terminals.<sup>25</sup> MARPOL, however, does not regulate the management of ships' plastic waste at ports and terminals beyond the reception facility requirement. Other regional and national legislation regarding PRFs and applicable to the Arctic has been developed. Nonetheless, indications are that a substantial delivery gap exists in estimates of plastic waste volumes carried by ships and recorded amounts actually offloaded at European port and terminal PRFs.<sup>26</sup> It therefore bears considering whether there

---

<sup>22</sup> Nashoug, "Sources of Marine Litter," 6, 11; Martinez, et al., "Temporal Trends in Marine Litter... Arctic Deep Sea," 11; Peeken, et al., "Arctic Sea Ice an important temporal sink," 8.

<sup>23</sup> Nashoug, 12.

<sup>24</sup> MEPC.1/Circ.834/Rev.1 Annex, 4.

<sup>25</sup> see discussion in Chapter 2, *infra*.

<sup>26</sup> GESAMP, 39.

are legal barriers to, or tools for, maximizing the usefulness of PRFs in reducing marine plastic litter in the Arctic.

#### **1.4 Research Question**

This thesis asks whether the existing regulatory regime applicable to the Arctic for controlling marine plastic pollution from shipping is fit for purpose, with specific focus on ship-to-shore management of plastic waste utilizing PRFs. In answering this question, the thesis will critically assess the content and possible shortcomings of applicable international and regional law primarily, and select national law secondarily. Non-binding instruments such as the Arctic Council's May 2021 Regional Action Plan on Marine Litter are discussed as parallel and potentially important regulatory support.

Throughout, the thesis considers to what degree the emerging circular economy paradigm may be integrated with the regulatory regime to prevent flows of plastics to the Arctic marine environment from shipping. "Circular economy" as a concept borrows from a number of systems-based ideas derived from economics, ecology and business. One succinct definition posits circular economy as "a sustainable business model that aims to eliminate waste in industrial systems through recycling, reuse, and recovery."<sup>27</sup> Under the "industrial ecology" school of thought, circular economy consists of looping energy and material flows so that wastes are inputs to production processes, and ensuring that ecological constraints guide design and execution of the processes.<sup>28</sup>

Exploration of all nuances of circular economy thinking and practice is beyond the intent, scope and space limitations of this thesis. In the context of the research question posed, this thesis adopts the trans-disciplinary perspective of Sauvé in describing circular economy as a system that takes into account environmental impacts of resource consumption and pollution in creating closed loops that minimize extraction of raw virgin resources and optimize recovery, reuse and recycling of waste products and materials.<sup>29</sup> Crucial to closing the loops is that "the circular economy must provide the economic incentives to ensure that post-consumption products are reintegrated upstream into the manufacturing process."<sup>30</sup> This

---

<sup>27</sup> Mah, "Future-Proofing Capitalism,"121.

<sup>28</sup> Ellen MacArthur Foundation, "Towards the Circular Economy," 27.

<sup>29</sup> Sauve et al., "Environmental sciences...and circular economy," 52-53.

<sup>30</sup> *ibid.*, 54.



model focuses on connections between operators within industrial ecosystems, and thus seems adaptable to shipping and plastic waste management. Application of this perspective to land-based waste has garnered increasing attention, but its connection to sea-based plastic pollution appears to be a largely unexplored topic.

## **1.5 Methodology and Structure**

In addressing the research question this thesis will primarily employ a doctrinal legal research methodology. The purpose of this approach is to analyze the existing legal framework relevant to Arctic marine plastic pollution with the aim of identifying gaps, ambiguities, and potential weaknesses concerning the legal rules applicable to shipping-related plastic waste and PRFs. The principal focus will be primary sources of international and regional regulation, and to the extent applicable, certain non-binding instruments. Because the legal framework depends heavily on implementation through national laws, the thesis includes a brief comparative assessment of the PRF legislation of two Arctic nations, Norway and the United States. The aim is to discern any commonality or divergences in legal approaches that may impact effectiveness of the international regulatory regime applicable in the Arctic. Throughout and particularly in the concluding section, the thesis also adopts a normative approach in developing proposals to improve the regulatory regime and possible means to achieve them.

The thesis research originally intended to include stakeholder interviews to gain empirical data as a supplement to the doctrinal research approach, however this was not possible due to lack of responses and time constraints. A further delimitation of the thesis is that it was not possible to address marine plastic pollution from fishing activities, and in particular lost or discarded fishing gear, as that is a lengthy topic in its own right and the subject of considerable treatment in policy and legal literature. Therefore it is mentioned only to the extent of its overlap with PRFs and rules applicable to all vessels regarding marine plastic waste control. The research topic of this thesis, concentrating on Arctic shipping and PRFs, is not one that has received much attention yet in academic literature, as key legislation and policy initiatives are mostly recent and data collection on PRFs has been fairly minimal to date.

The structure of the thesis consists of four parts corresponding to Chapters 2 through 5. Chapter 2 examines current international law relevant to controlling marine plastic litter in the Arctic, and particularly the legal underpinnings of ship-based plastic waste management and

PRFs. This will provide the overall backdrop for discussions in the following chapters. In Chapter 3, regional law and initiatives pertinent to Arctic marine plastic control are assessed, including European Union (EU) Directives and regional action plans. Chapter 4 considers the contributions and limitations of relevant national laws of Norway and the United States regarding Arctic PRF implementation at the port state level. Finally, Chapter 5 discusses recommendations stemming from the overall conclusion that current regulatory frameworks concerning control of marine plastic waste from shipping need strengthening. In formulating practical considerations for improvement, the thesis offers thoughts on the potential for making the regulatory system more effective through incorporating a circular economy model that might foster better use of PRFs as cost-effective, environmentally-sound channels for reducing marine plastic pollution in the Arctic.

## **2. The Existing International Legal Landscape Relevant to Controlling Plastics in the Arctic Marine Environment**

At the global level no single international agreement regulates exclusively or comprehensively the introduction of plastic litter into the world's oceans, or the removal of existing plastic wastes. There is no equivalent counterpart to the Antarctic Treaty for the Arctic region. In terms of international law, control of marine plastic pollution in the Arctic derives from pieces of various agreements supporting the notion that there should be no plastic inputs into the world's seas, including Arctic waters. Some international conventions reference plastics in the context of marine pollution in general, and some may be said to indirectly include control of plastic wastes in the marine environment within their ambit.

This chapter will examine the principal international legal instruments that play a part in regulating marine plastic pollution in the Arctic in order to determine the scope of existing coverage. In particular, rules pertaining to shipping and PRFs will be critically assessed. In addition, the impact of recent international "soft law" initiatives will be considered in terms of possible enhancement or further development of existing rules.

### **2.1 UNCLOS**

The launch point with respect to oceanic governance and marine environmental protection generally, including the Arctic region, is the United Nations Convention on the Law of the Sea (UNCLOS). While the treaty does not specifically reference plastic, it defines marine pollution broadly as the introduction by humans of substances into the marine environment that pose or are likely to pose hazards to human health, marine life, marine activities, and quality of sea water.<sup>31</sup> This definition arguably encompasses plastic wastes in light of their ubiquitous presence and known negative impacts on global seas,<sup>32</sup> and pursuant to general principles of good faith interpretation of treaties based on ordinary meaning of terms in light of treaty objectives.<sup>33</sup>

UNCLOS imposes on states a general obligation to protect the marine environment, and to fulfill this obligation states are directed to take all measures necessary "to prevent, reduce and

---

<sup>31</sup> UNCLOS, Article 1(1)(4).

<sup>32</sup> Goncalves and Faure, "International Law Instruments to Address the Plastic Soup," 894.

<sup>33</sup> Vienna Convention on the Law of Treaties, Article 31(1).

control" pollution from any source.<sup>34</sup> Most relevant to shipping and plastic litter, member states are obligated to institute measures designed to minimize to the fullest extent possible pollution from vessels, and prevention of intentional as well as accidental discharges.<sup>35</sup> In addition, states are directed to act through competent international organizations or diplomatic conferences in establishing international rules to prevent and abate pollution from vessels.<sup>36</sup>

The UNCLOS legal regime confers varying levels of jurisdictional control with respect to marine vessel pollution depending on marine zone and state relationship. Flag states are tasked with regulating pollution from ships flying their flag of registry wherever such vessels sail, and flag state vessel regulations are to have at minimum the same effect as generally accepted international rules and standards (GAIRS).<sup>37</sup> Flag states are also the primary enforcers of vessel pollution violations wherever they occur, without prejudice to any co-existent enforcement authority conferred on coastal and port states under UNCLOS.<sup>38</sup>

Coastal states may adopt marine pollution control laws within their territorial sea that are more stringent than GAIRS, and in their EEZ that conform to but do not exceed GAIRS.<sup>39</sup> A narrow exception exists whereby coastal states can implement stricter pollution control measures if existing international rules are deemed, based on scientific and technical evidence, to be inadequate to meet "special circumstances" for particular EEZ areas.<sup>40</sup> Any laws so adopted may relate to discharges from or navigational practices of ships. This provision conceivably provides Arctic states that are party to UNCLOS with leeway to impose more rigorous requirements regarding ships' plastic waste handling within their EEZs, if the requisite showing of necessity is made.

Port states are considered synonymous with coastal states for most purposes under UNCLOS, but have one specified enforcement capability beyond coastal states' authority to take action with respect to territorial seas or EEZ waters. A state can investigate any foreign vessel voluntarily present at its port or offshore terminal, and institute proceedings when supported

---

<sup>34</sup> UNCLOS, Articles 192, 194.

<sup>35</sup> *ibid.*, Article 194(3).

<sup>36</sup> *ibid.*, Article 211.

<sup>37</sup> *ibid.*, Article 211(2).

<sup>38</sup> *ibid.*, Article 217.

<sup>39</sup> *ibid.*, Articles 211(4), 211(5).

<sup>40</sup> *ibid.*, Article 211(6).

by clear evidence, with respect to any pollutant discharge from that vessel occurring beyond its EEZ that violates applicable international rules and standards.<sup>41</sup> This could potentially provide a basis for Arctic port states to take action against illegal dumping of plastic in areas of the Central Arctic Ocean.

Because it is a framework convention, UNCLOS speaks in terms of developing additional global, regional and state rules controlling marine environmental pollution, and harmonizing national and regional policies. A prime example with respect to the Arctic is Article 234, which affords coastal states the right to adopt and enforce regulations for the prevention, reduction and control of marine pollution from ships in ice-covered areas within the limits of their EEZ. The only limitation is that such laws must have due regard to navigation, and be based on best available scientific evidence. UNCLOS thus lays a path for establishing other laws and standards more specifically attuned to plastic pollution from shipping in the Arctic. As the foundation for solving maritime sovereignty issues, UNCLOS may also be an important influence on furthering legal rules and responsibilities for recovering existing plastic pollution from Arctic waters. However, UNCLOS does not regulate what ships do with their plastic waste or PRFs, thus leaving a regulatory opening for other treaties and laws to fill.

## **2.2 Main Conventions Directly Applicable to Shipping and Plastic Waste**

### **2.2.1 London Convention and Protocol**

The earliest treaty specifically addressing plastics, ships and the marine environment is the London Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter (LDC). Based on the "no-harm" rule of international law, *i.e.* states have a duty to ensure activities within their jurisdiction or control do not cause damage to the environment of other states or areas beyond the limits of any national jurisdiction, the LDC requires parties to "individually and collectively promote effective control of all sources of pollution of the marine environment."<sup>42</sup> The specific target of the convention is dumping at sea of wastes, very broadly defined as "material and substance of any kind, form or description."<sup>43</sup> "Dumping" is defined as "any deliberate disposal at sea" of wastes from ships, offshore

---

<sup>41</sup> *ibid.*, Article 218(1).

<sup>42</sup> LDC, Article 1.

<sup>43</sup> *ibid.*, Article 3(4).

platforms, or aircraft.<sup>44</sup>

The LDC completely prohibits dumping of any wastes listed in Annex I, and Annex I includes "persistent plastics and other persistent synthetic materials, for example netting and ropes, which may float or may remain in suspension in the sea in such a manner as to interfere materially with fishing, navigation or other legitimate uses of the sea."<sup>45</sup> Like UNCLOS, primary responsibility for measures implementing the LDC falls to flag states with respect to its vessels, but all parties are authorized to take appropriate measures to prevent and punish conduct within their territory contravening the LDC's provisions. Parties with common interests to protect the marine environment in a given geographical area are urged to enter into regional agreements for the prevention of marine pollution generally and by dumping specifically,<sup>46</sup> which could provide legal impetus, for example, for an Arctic regional agreement targeting plastic wastes.

The 1996 London Protocol (LP)<sup>47</sup> was intended to modernize and eventually replace the LDC, and it ratchets up the original requirements. The LP flips the script from the original LDC by adopting a "reverse list" approach that prohibits all dumping at sea except for permitted exceptions under LP's Annex 1. Since Annex 1 does not include plastics, it follows that no plastic waste may be dumped from ships. Implementation and enforcement under the LP is similar to the LDC; primary responsibility is vested in flag states with respect to vessels registered under its flag. Parties must adopt appropriate measures in accordance with international law to prevent and if necessary punish acts contrary to the LP's provisions. As for applying the LP in areas beyond the jurisdiction of any state, and developing liability rules and procedures for dumping or incineration at sea in contravention of the LP, a considerably weaker obligation of party cooperation applies.<sup>48</sup>

While important as a clear and binding ban on deliberate discharge of plastic from ships to the sea, the LDC/LP has limitations. It does not govern disposal of plastic wastes incidental to or derived from normal operations of vessels, or placement of material for a purpose other than disposal. The LDC/LP provides mechanisms through which suspected illegal dumping of

---

<sup>44</sup> *ibid.*, Article 3(1)(a).

<sup>45</sup> *ibid.*, Article 4(a) and Annex I.

<sup>46</sup> *ibid.*, Article 8.

<sup>47</sup> 1673 UNTS 57, as amended and entered into force in 2006.

<sup>48</sup> LP, Articles 10(3) and 15.

wastes can be reported and investigated, but these mechanisms appear to be vastly under-used. Very little information is publicly available relating to dumping reports or follow-up measures, or even how many illegal dumping incidents involving plastics may have occurred.<sup>49</sup> Currently 87 countries are party to LDC and 53 are party to LP,<sup>50</sup> which means more than half of the world's nations are not party to either agreement. Non-parties' shipping activities regarding plastic waste dumping are thus not captured within the LDC/LP's available reporting and compliance scheme. Also, like UNCLOS, the LDC/LP is silent as to what ships are to do instead of dumping plastic, and leaves the important issue of waste delivery to PRFs to other legal instruments.

### 2.2.2 MARPOL

The most directly relevant global agreement concerning control of plastics and Arctic shipping is the International Convention for the Prevention of Pollution from Ships (1973), as modified by the 1978 Protocol relating thereto (MARPOL). Parties have a general obligation to "prevent the pollution of the marine environment by discharge of harmful substances or effluents containing such substances."<sup>51</sup> "Harmful substance" includes "any substance liable to create hazards to human health, marine life."<sup>52</sup> "Discharge" means any release of harmful substances from a ship, other than dumping within the meaning of the LDC.<sup>53</sup>

MARPOL leaves enforcement and sanctioning of violations largely up to the administering authority with respect to vessels concerned, and state parties with jurisdiction of areas where violations occur. As under the LDC, a ship that is in any port or offshore terminal may be subject to inspection for purposes of verifying whether the ship has discharged any harmful substances infringing MARPOL regulations as set out in the Annexes.<sup>54</sup>

MARPOL requires parties to communicate to the IMO, which serves as secretariat for the convention, the text of laws and regulations promulgated on matters within the scope of MARPOL, reports of penalties imposed, and a list of reception facilities for handling ship

---

<sup>49</sup> GESAMP, *supra* n. 20, 47.

<sup>50</sup> IMO, "London Convention Protocol."

<sup>51</sup> MARPOL, Article 1.

<sup>52</sup> *ibid.*, Article 2(2).

<sup>53</sup> *ibid.*, Article 2(3).

<sup>54</sup> *ibid.*, Article 6.

wastes.<sup>55</sup> Ship masters have a duty to report particulars of any pollution incident fully and without delay. Article II(1)(a) makes clear this duty to report applies to any "discharge above the permitted level," which for plastics is zero. However, as with the LDC/LP, in practice the various reporting obligations have not been widely enforced.

Annex V is MARPOL's core regulatory piece pertaining to plastic waste. The IMO has called plastic the greatest danger to marine life, acknowledging that despite current legal rules in some areas a substantial portion of plastic litter "comes from passing ships which find it convenient to throw rubbish overboard rather than dispose of it in ports."<sup>56</sup>

Annex V applies to all ships unless expressly provided otherwise. Regulation 1 of the Annex defines "garbage" as including "all plastics...generated during the normal operation of the ship and liable to be disposed of continuously or periodically." "Plastic" is further defined as "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."<sup>57</sup>

Under Regulation 3.2, "discharge into the sea of all plastics, including but not limited to synthetic ropes, synthetic fishing nets, plastic garbage bags and incinerator ashes from plastic products is prohibited," except for certain exceptions under Regulation 7. The exceptions are narrow, and pertain to situations where discharge may be necessary for securing the safety of a ship and those on board, for saving life at sea, or instances of accidental loss provided all reasonable preventative precautions were taken. There are no exceptions for *de minimus* discharges, and thus on its face Annex V prohibits the discard of any amount of plastic in the sea.

In terms of ship-board practices pertaining to plastic wastes, Annex V regulations mandate a Garbage Management Plan based on IMO guidelines for all ships over 100 GT, and a Garbage Record Book with details of all disposal and incineration operations for all ships over 400 GT.<sup>58</sup> Through the most recent Annex V amendments effective as of March 2018, Garbage Record Book entries are now required for each vessel discharge of waste to a PRF or another

---

<sup>55</sup> *ibid.*, Article 11.

<sup>56</sup> IMO, "Prevention of Pollution by Garbage from Ships."

<sup>57</sup> MARPOL Annex V, Regulation 1.13.

<sup>58</sup> *ibid.*, Regulation 10.2, 10.3.



ship, as well as accidental or other discharges covered by Regulation 7 exceptions.<sup>59</sup>

Newly added Chapter 3 of Annex V makes the environment-related provisions of the Polar Code<sup>60</sup> mandatory, and requires all ships to comply with environmental provisions specific to the conditions of Arctic waters.<sup>61</sup> The Polar Code was developed to supplement MARPOL by encouraging stronger efforts to mitigate adverse impacts unique to the environment and people in remote and vulnerable polar areas. While a worthy aim, at present the Polar Code does not add anything substantive to already-existing MARPOL obligations with respect to plastic waste, and contains no specific references to plastics.

Crucial to ensuring that plastic waste from ships does not end up in the sea is providing places for the waste to go. Regulation 8 of Annex V represents the first internationally binding requirement for PRFs, and obliges governments to ensure provision of "adequate" reception facilities at ports and terminals for receiving garbage, without causing undue delay to ships. Parties are to notify the IMO of cases where PRFs are inadequate. In practice, however, Regulation 8 has not been fully or effectively implemented in the Arctic, and continues to represent an unmet need.

Parties whose coastline borders a "special area" must also "ensure that as soon as possible, in all ports and terminals within the special area, adequate reception facilities are provided, taking into account the needs of ships operating in these areas."<sup>62</sup> "Special area" is defined in Regulation 1.14 as a sea zone where technical, oceanographic, ecological, and vessel traffic conditions warrant adoption of enhanced mandatory methods for preventing marine pollution by garbage. Eight such special areas are designated, including the North Sea below 62°N and the Antarctic. The Arctic is not included, but arguably should be. As the effectiveness of ships' compliance with the garbage requirements of MARPOL is largely dependent on availability of adequate PRFs, the omission of the Arctic as a designated special area under Annex V is not conducive to enhancing plastic waste management. This critical regulatory gap will be discussed further in Chapter 3 in the context of the Arctic Council's recent Regional Action Plan for Marine Litter.

---

<sup>59</sup> MEPC.277(70).

<sup>60</sup> MEPC.264(68), Annex.

<sup>61</sup> MEPC.265(68).

<sup>62</sup> MARPOL Annex V, Regulation 8.2.

## 2.3 Other Conventions Indirectly Applicable to Shipping and Plastic Pollution

### 2.3.1 Basel Convention

The Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal (BC) seeks to regulate the trade of waste from one state to another, and through non-national areas when at least two contracting states are involved in the shipment. "Wastes" are defined as including substances or objects which are to be disposed of pursuant to provisions of national law, however wastes derived from normal ship operations are excluded as being covered separately by MARPOL.<sup>63</sup> This presents the possibility for some overlap, however, if for example ship-generated plastic waste becomes a marketable and tradable commodity under circular economy systems. One aspect of the BC system is that waste export can occur, following notice and consent procedures, if wastes are required as raw material for recycling or recovery industries in the importing country.<sup>64</sup>

The original BC did not specifically identify plastic as included in its transboundary waste regulatory scheme. In May 2019, parties to the BC passed an amendment to restrict international trade in plastic scrap 'recyclables' and other plastic wastes to address their improper disposal and reduce leakage into the environment. As a result, transboundary shipments of most plastic scrap/wastes are regulated under the BC effective 1 January 2021. One complication is that not all types of plastics are covered by the amendments' complex designations and definitions. It is also unclear to what extent and how the BC system as amended might intersect with MARPOL and other instruments applicable to shipping, and the BC regrettably offers no guidance on how its regulation of plastic waste ties in with PRFs.

### 2.3.2 Convention for Biological Diversity

The Convention for Biological Diversity (CBD) has nearly universal state inclusion, and is considered the key global framework agreement for protecting species, habitats and ecological processes.<sup>65</sup> Like UNCLOS, the CBD does not mention plastic. It is nonetheless relevant by virtue of the logical connection between its core objective - regulating activities

---

<sup>63</sup> Basel Convention, Articles 1, 2.1.

<sup>64</sup> *ibid.*, Article 4.9.

<sup>65</sup> 1760 UNTS 79. Only four nations - Andorra, Iraq, Somalia, and the United States - are non-parties. The U.S. signed the CBD but has not ratified it.

affecting biodiversity - and threats posed by marine plastic pollution.

Perhaps indicative of its wide participation, the CBD lacks detailed, specific state requirements. In 2010 the CBD parties adopted the Aichi Biodiversity Targets, which included the unachieved aim of reducing pollution from all sources to levels not detrimental to ecosystem functioning and biodiversity preservation by 2020. Currently, a Post-2020 Global Biodiversity Framework under CBD is being drafted which intends to revisit the pollution targets and specifically call for eliminating the discharge of plastic waste by 2030.<sup>66</sup> While non-binding, this target could benefit from close coordination with laws regulating shipping, plastic waste handling and PRFs in the Arctic as well as other sensitive environments.

## **2.4 Non-Binding International Legal Instruments**

In recognition that "despite the existing regulatory framework to prevent marine plastic litter from ships, discharges into the sea continue to occur," the IMO's Marine Environment Protection Committee (MEPC) in October 2018 adopted the IMO Action Plan to Address Marine Plastic Litter from Ships.<sup>67</sup> The Action Plan aims to build on existing regulatory frameworks and promote new supporting measures to reduce marine plastic litter from the maritime sector. Two important observations highlighted in the Action Plan are that plastic waste material has the potential to be brought back into the economy by means of reuse or recycling, and MARPOL obliges governments to ensure adequate PRFs to receive ships' plastic waste. The Plan does not specifically connect the dots on these points, but it moves in that direction.

For example, the Action Plan calls for taking a closer look at the availability and adequacy of PRFs. It suggests consideration of certain measures for improving PRF effectiveness with regard to marine plastics, such as: requiring PRFs to provide for separate garbage collection for plastic wastes to facilitate reuse or recycling; enhancing enforcement of MARPOL Annex V requirements for delivery of plastic wastes to PRFs; developing economic incentive tools to support PRF cost frameworks, including low user fees disassociated from waste delivery; encouraging states to expand implementation of their duty under Annex V Regulation 8 to provide adequate PRFs; and improving sustainable port-side plastic waste processing,

---

<sup>66</sup> CBD/WG2020/3/3, 5 July 2021.

<sup>67</sup> MEPC.310(73).

especially with respect to remote and polar regions.<sup>68</sup> Because the Action Plan is non-binding, adoption of these measures by states is voluntary.

The IMO Action Plan was preceded and informed by a PRF guidance circular released by MEPC in March 2018.<sup>69</sup> The circular is intended as a practical guide for ships and PRF providers in establishing best practices, "with an eye towards improving the integration of PRFs into a more comprehensive waste management scheme in which final disposal of MARPOL wastes/residues occurs in a manner that protects the environment."<sup>70</sup> Only very general recommendations are offered as to best practices, such as incorporating good waste management strategies into voyage planning, and communicating essential information from a port's waste management plan to ship operators. And despite acknowledging "the need to tackle the long-standing problem of the inadequacy of port reception facilities,"<sup>71</sup> the guidance merely repeats the standard and unhelpful definition of "adequacy" as meeting the needs of ships using ports without causing undue delay. Somewhat more illuminating is a proposed form in the guidance's Annex for reporting "Inadequacy of Facilities," which under a column labeled "Problems encountered" cites six negative factors from a ship operator's perspective: no facility available, undue delay, technical difficulty, inconvenient location, delay/cost from having to shift berth, and unreasonable charges.<sup>72</sup>

A potentially helpful inclusion from a circular economy perspective is the guidance circular's advice to PRF operators and port authorities that they should seek to work with relevant national and regional authorities, as well as private industry partners, to develop shore-side waste management strategies "that encourage reduction, reuse and recycling of ship-generated wastes/residues landed ashore at PRFs."<sup>73</sup> In this way regulatory frameworks could assist, and be assisted by, PRF efforts to employ resale and recycling options for reusable/recyclable plastics.

Following shortly after the IMO's PRF guidance and Action Plan, the United Nations Environment Assembly (UNEA) at its 4th Session in 2019 adopted a resolution promising to

---

<sup>68</sup> *ibid.*, Actions 14-18.

<sup>69</sup> MEPC.1/Circ.834/Rev.1.

<sup>70</sup> *ibid.*, Annex, 2.

<sup>71</sup> *ibid.*, 1.

<sup>72</sup> *ibid.*, Annex, 13.

<sup>73</sup> *ibid.*, Annex, 10.

step up efforts to tackle marine plastic pollution.<sup>74</sup> Central to these efforts, in the UNEA's view, is "the importance of more sustainable management of plastics throughout their life cycle in order to increase sustainable consumption and production patterns, including but not limited to the circular economy and other sustainable economic models."<sup>75</sup> While not specifically addressing shipping and PRFs, the resolution encourages further action within regional seas conventions and programs as well as through international organizations to develop more widespread, environmentally sound plastic waste management and options for marine plastic litter recovery. At present there is no regional seas convention focused solely on the Arctic. Other applicable regional instruments and initiatives that may assist in furthering the UNEA resolution objectives are assessed in Chapter 3. Although UNEA resolutions are non-binding, they can nonetheless be considered as having an important catalytic function influencing development of international environmental rules and principles, as well as fostering voluntary action and cooperation.<sup>76</sup>

## **2.5 Conclusions**

This chapter has examined how international law bearing on control of plastic pollution from shipping in the Arctic exists in fragments across various binding and non-binding instruments. Despite clear and seemingly enforceable bans on discharging any plastics into any seas, implementation of relevant international regulations has not kept up with the problem of increasing marine plastic pollution. Incomplete reporting and compliance under all conventions is partly to blame. Another contributing factor is inadequate reach of existing regulations. For example, garbage management plans and record books requirements under MARPOL Annex V should be extended to all vessels, not just those over 100 and 400 GT. The Arctic should be designated an Annex V "special area," as discussed further in the next chapter.

Progress in implementation of existing (and future) rules may be aided by greater focus on incentivizing plastic waste collection and delivery by ships. The IMO Action Plan and Consolidated PRF Guidance together shine a spotlight on the emerging realization that PRFs are central to solving the marine plastic pollution problem, although better integration into the regulatory framework needs to be achieved. Recent proposals for dealing with marine plastics through a circular economy lens, at least in non-binding international instruments,

---

<sup>74</sup> UNEP/EA.4/Res.6, 15 March 2019.

<sup>75</sup> *ibid.*

<sup>76</sup> Perrez, "The Role of the United Nations Environment Assembly," 4, 13.

could also prove useful in the context of enhancing PRFs as solution mechanisms.

### **3. REGIONAL LAW APPLICABLE TO MARINE PLASTIC POLLUTION IN THE ARCTIC**

Besides the lack of any international convention specifically focused on plastic pollution of the marine environment, there is also no legally binding regional or bilateral agreement squarely addressing marine plastic pollution in the Arctic. There are, however, regional "soft" and "hard" law instruments with some degree of impact on the problem. The principal measures include a recent regional plan established by the Arctic Council, two EU directives from 2019, and a neighboring regional seas convention concerning the North Atlantic (the OSPAR Convention).

#### **3.1 Regional Action Plan on Marine Litter in the Arctic**

The Arctic Council has been active in many aspects of marine environmental protection, and on 20 May 2021 it released a Regional Action Plan on Marine Litter in the Arctic (hereafter 'Arctic RAP-ML') at its 12th Ministerial Meeting in Reykjavik.<sup>77</sup> Preparation of the plan was conducted chiefly by the Arctic Council's Working Group on the Protection of the Arctic Marine Environment (PAME).

Some preliminary details regarding the Arctic Council bear noting. Established in 1996 by the Ottawa Declaration, the Arctic Council is an intergovernmental forum comprised of eight member states with coastline or territory in the Arctic region (Canada, the Russian Federation, Norway, Iceland, the United States, the Kingdom of Denmark including Greenland and the Faroe Islands, Finland, and Sweden).<sup>78</sup> The Council also includes six organizations representing Arctic indigenous groups designated as "Permanent Participants," who have consultative but not voting rights. Decisions are made by the eight member states on a consensus basis.<sup>79</sup> Since the Council is not a legislative body it cannot adopt, implement and enforce regulations. It has functioned more as a high-level deliberative body regarding common policy objectives of the Arctic states, including measures addressing regional environmental and shipping concerns.

---

<sup>77</sup> PAME, "Regional Action Plan on Marine Litter in the Arctic" (May 2021).

<sup>78</sup> Loukacheva, "The Arctic Council and 'Law-Making'," 110.

<sup>79</sup> *ibid.*

### 3.1.1 Shipping-Related Measures of the Arctic RAP-ML

The Arctic RAP-ML is the only pan-Arctic framework expressly addressing marine plastic pollution in the region. The Plan defines its geographic scope as including all Arctic marine areas identified by its member states, including coastal zones and river basins connected to the oceanic environment.<sup>80</sup> It presents its focus as "actions to be taken in the Arctic, by Arctic States collectively and independently...designed to be complementary to, and cooperative with, efforts underway in other international and regional organizations and conventions, as well as their activities and programs."<sup>81</sup>

Several of the Plan's Strategic Actions target reducing plastic inputs to the marine environment from all maritime sectors. Emphasis is placed on improving waste management practices of fishing vessels, ships, offshore structures, aquaculture sites and PRFs by measures such as better assessment of plastic wastes generated; identifying gaps regarding collection, sorting, disposal, and recycling at ports; identifying and promoting best practices, guidelines, and ISO standards for waste handling; and promoting separate collection of plastic wastes to enhance recovery, reuse or recycling.<sup>82</sup> The Plan does not, however, specify any implementation details, benchmarks or completion dates regarding these actions.

Similarly, the Arctic RAP-ML encourages Arctic states to improve compliance with MARPOL Annex V requirements through vessel inspections and enforcement measures, although without discussing how that might be achieved. As has been observed in other shipping zones, ensuring that plastic waste is not dumped overboard (or discovering if it has been) is extremely challenging given the inherent difficulties of tracing plastic pollution.<sup>83</sup> A potentially more productive measure suggested by the Plan is increasing vessel owners' recognition of financial benefits that may be achieved by better plastic waste management, along with developing and disseminating guidance on practices to prevent plastic waste from ending up in the ocean.<sup>84</sup>

Overall, the implementation section of the Arctic RAP-ML is brief and general - likely

---

<sup>80</sup> Arctic RAP-ML, 9.

<sup>81</sup> *ibid.*, 3.

<sup>82</sup> *ibid.*, 13-15.

<sup>83</sup> OSPAR Commission, "Sanctions, penalties and fines...waste disposal offences at sea," 10.

<sup>84</sup> Arctic RAP-ML, 19.



because a separate Implementation Plan for 2021-2023 is currently being prepared by PAME.<sup>85</sup> Going forward, the review process includes status reports every two years to Senior Arctic Officials and state ministers, and biennial Working Group plans for specific project activities.<sup>86</sup>

### 3.1.2 Bringing Attention to PRFs

The Arctic RAP-ML rightly notes that "[s]hips and offshore structures are sources of marine litter if they do not have the infrastructure and processes onboard or onshore to effectively manage and dispose of their waste."<sup>87</sup> Here the Plan draws heavily on the IMO and MARPOL for direction. Measures to be undertaken include reviewing IMO annual reports on alleged inadequate PRFs and recommending solutions; supporting Arctic states in developing amendments to MARPOL to allow for regional arrangements for PRFs and, if successful, creating a Regional Reception Facilities Plan; and supporting implementation of IMO's own Action Plan addressing plastic litter from ships.<sup>88</sup>

The Plan acknowledges that MARPOL and the Polar Code prohibit discharge of plastic waste from ships and offshore structures into Arctic waters and instead require disposal at PRFs. Accordingly, Action Item 20 advocates a focus "on the effectiveness of port reception facilities, including waste collection and recycling, and on prevention of cargo loss."<sup>89</sup> While this reflects and reconfirms a recurrent ambition of regional and international instruments governing marine pollution, it lacks specificity.

Few ports and terminals in the Arctic region have plastic waste management infrastructure.<sup>90</sup> Data from the IMO's Global Integrated Shipping Information System (GISIS), the World Port Source, and the U.S. Coast Guard Maritime Information Exchange cited in a 2012 PAME report identified only 24 out of 163 Arctic ports as having PRFs available, all of unspecified

---

<sup>85</sup> As of the time of writing, initial elements of the Implementation Plan expected to be developed at PAME's second working group meeting in October 2021 have not been published yet.

<sup>86</sup> Arctic RAP-ML, 20.

<sup>87</sup> *ibid.*, 14.

<sup>88</sup> *ibid.*, 15-16.

<sup>89</sup> *ibid.*, 15.

<sup>90</sup> PAME I-2012, "Specially Designated Arctic Marine Areas and Port Waste Reception Facilities," 3.

capacity, with respect to Annex V waste including plastics.<sup>91</sup> The goal of increasing the number and capacities of Arctic PRFs, which could significantly aid abatement of marine plastic pollution in the Arctic, has been on the table for nearly twenty years.<sup>92</sup> At present it is unclear how much progress has been made since appears a long-discussed update survey of Arctic PRFs has yet to be completed region-wide.<sup>93</sup>

The adequacy of PRFs is a prerequisite for the Arctic to acquire "Special Area" designation under MARPOL, thereby triggering a higher level of protection with stricter waste requirements. A companion action is underway by PAME to address the PRF infrastructure deficit. At its group meeting in February 2021, PAME urged the Arctic States "to continue to work collectively and within their national IMO delegations by correspondence to finalize draft MARPOL amendment text that would implement a Regional Port Waste Reception Facilities regime in the Arctic region."<sup>94</sup> Such text is anticipated to be taken up at the IMO's 9th meeting of the Subcommittee on Pollution Prevention and Response in 2022.<sup>95</sup> In view of the slow pace of expansion of PRFs equipped for plastic waste handling across all Arctic states, a regional regime may prove the best way forward.

## **3.2 Other Regional Regimes with Some Overlap in the Arctic**

In the absence of an Arctic-oriented binding legal instrument addressing control of marine plastic pollution with regard to shipping, it makes sense to ask whether other regional legal measures may apply. Two candidates with some degree of overlap are EU regulatory measures and the Convention for the Protection of the Marine Environment of the North-East Atlantic (OSPAR Convention).

### **3.2.1 EU Directives**

Two 2019 EU legislative instruments directly relate to marine plastics, in line with the European Strategy for Plastics in a Circular Economy. EU Directive 2019/883 on Port

---

<sup>91</sup> *ibid.*, 3-8.

<sup>92</sup> *ibid.*, 1, noting that PAME began a PRF assessment project in 2004.

<sup>93</sup> PAME, "Shipping - Current Projects 2021-2023."

<sup>94</sup> PAME 1-2021, Working Group Summary Meeting Report, 4.

<sup>95</sup> *ibid.* Agenda item no. 13 for the April 2022 PPR meeting includes development of necessary amendments to MARPOL Annex V to allow states with Arctic ports to enter into regional arrangements for PRFs. IMO PPR 9/1 Provisional Agenda (2 Sept. 2021).

Reception Facilities (hereafter the 'PRF Directive') amends EU Directive 2010/65 and repeals Directive 2000/59/EC.<sup>96</sup> EU Directive 2019/904 concerns reduction of impacts of certain single-use plastic products on the environment (hereafter the 'SUP Directive').<sup>97</sup> Both Directives were slated to be implemented by EU Member States and made part of their internal laws by July 2021.

Arctic Council states that are also EU Member States are Sweden, Finland and Denmark. Norway and Iceland as European Economic Area (EEA) members may be bound to implement EU directives if they have been formally incorporated into the EEA Agreement.<sup>98</sup> The SUP Directive has been incorporated into the EEA Agreement as of 24 September 2021 and is therefore in force with respect to Norway and Iceland.<sup>99</sup> As of the time of writing, the PRF Directive is still "under scrutiny" by the EEA European Free Trade Association (EFTA), meaning that the Directive has been marked as 'EEA relevant' by the EU but has not yet been approved for EEA Agreement incorporation.<sup>100</sup> Non-EU/EEA states are of course not bound to implement either Directive.

### *3.2.1.1 The PRF Directive*

The PRF Directive could serve as an important catalyst for reducing marine plastic pollution from shipping in the Arctic. For over twenty years the EU has pursued implementation of MARPOL in large part through a port-based approach, previously manifested in its first PRF legislation, Directive 2000/59/EC. In its updated form, the PRF Directive invokes the prevention and polluter pays principles as the basis for EU maritime policy. It also adds the concept of extended or enhanced producer responsibility (EPR) as a cornerstone of EU waste management and regulation, including wastes from ships and offshore installations.<sup>101</sup>

The objective of the Directive is "to protect the marine environment against the negative effects from discharge of waste from ships using ports located in the Union, while ensuring the smooth operation of maritime traffic, by improving the availability and use of adequate

---

<sup>96</sup> OJ L 151/116, 7.6.2019.

<sup>97</sup> OJ L 155/1, 12.6.2019.

<sup>98</sup> Agreement on the European Economic Area, OJ No. L1/3, 3.1.1994.

<sup>99</sup> EFTA, EEA-Lex Doc. 32019L0904.

<sup>100</sup> EFTA, EEA-Lex, Doc. 32019L0883.

<sup>101</sup> OJ L 151/117.

port reception facilities and the delivery of waste to those facilities."<sup>102</sup> Of significance as to scope, the Directive applies to all ships, irrespective of flag, calling at or operating within any port of a Member State (but excluding ships engaged in port services, and military vessels or other non-commercial state-owned vessels).<sup>103</sup>

"Waste from ship" means all waste generated during service of a ship or during loading/unloading/cleaning operations, and which falls under MARPOL Annexes I, II, IV, V and VI, as well as passively fished waste collected in nets during fishing.<sup>104</sup> "Port reception facility" means any facility which is fixed, floating or mobile and capable of providing the service of receiving waste from ships.<sup>105</sup> "Sufficient storage capacity" denotes enough capacity to store waste on board the ship from the moment of departure until the next port of call, including waste likely to be generated during the voyage.<sup>106</sup>

As the Directive recognizes, appropriate incentives for delivery of plastic waste by ships to PRFs must exist in order to effectively control marine plastic litter. A principal means of providing correct incentives is through cost recovery systems which apply an 'indirect fee' on all ships calling at ports, regardless of delivery of waste. Since there are no additional direct charges for the actual delivery of wastes, ships will not incur extra fees for carrying and depositing plastic waste at ports. Article 8 of the Directive thus requires Member States to ensure that the costs of operating PRFs are covered through collection of indirect fees that provide no incentives for ships to discharge waste at sea.<sup>107</sup> Cost recovery systems are to cover administrative costs plus a significant portion of direct operational costs of waste handling at PRFs, and supplemented where necessary by alternative financing schemes.<sup>108</sup>

Since there are allowances for imposing extra direct fees on very large deliveries of MARPOL Annex V waste exceeding normal capacity loads of the PRF, care must be taken so as not to promote back-door dumping of the excess plastic waste, or undercut incentives for vessels to collect and deliver passively collected plastic such as through Fishing-For-Litter schemes.

---

<sup>102</sup> *ibid.*, L151/123.

<sup>103</sup> *ibid.*, L151/123-124.

<sup>104</sup> *ibid.*, L151/123.

<sup>105</sup> *ibid.*

<sup>106</sup> *ibid.*

<sup>107</sup> *ibid.*, L 151/128.

<sup>108</sup> *ibid.*

The Directive does not indicate how this will be accomplished. Similar caution and further guidance is warranted regarding other financial incentives promoted in the Directive, such as allowing discounts on indirect fees for vessels that are designed or equipped to minimize waste per certified standards, and for vessels involved primarily in short sea shipping, which entail more frequent port calls. The latter discount, while appropriate from the perspective of encouraging development of short sea shipping and reducing prohibitive costs of operation, must be structured so as not to bypass proper delivery and handling of plastic waste from this transport sector.

The Directive allows for some differentiation of indirect fees by category and size of ship, or by the hazardous nature of waste delivered, although there are no further parameters outlined.<sup>109</sup> Acts defining such fee differentiation criteria were to have been adopted by the European Commission by July 2021, but as of the time of writing this appears to have been deferred.

In terms of administrative mechanics of waste delivery from ships to PRFs, vessels bound for EU ports must complete an advance waste notification reporting all information required under Annex 2 to the state-designated authority. The advance waste notification must be transmitted at least 24 hours before arrival if the port of call is known, or as soon as the port is known if less than 24 hours. The ship's master shall deliver all of the waste carried on board to a PRF when calling at an EU port before leaving that port, "in accordance with the relevant discharge norms laid down in the MARPOL Convention."<sup>110</sup> The PRF completes a waste delivery receipt in a form as outlined in Annex 3, and delivers it to the ship master, who must maintain it onboard for inspection and reporting purposes.

A caveat is that these requirements do not apply in small ports with unmanned facilities, or that are remotely located, which may commonly be the case in the Arctic. Also, a ship can proceed to its next port of call without delivering on-board waste if the reportable information under Annex 2 indicates that there is "sufficient dedicated storage capacity" for all waste accumulated during the intended voyage, or the ship only calls at anchorage for under 24 hours, or under adverse weather conditions.<sup>111</sup> The European Commission plans to adopt

---

<sup>109</sup> L 151/129.

<sup>110</sup> L 151/127.

<sup>111</sup> *ibid.*

implementing acts defining methods for calculating "sufficient dedicated storage capacity,"<sup>112</sup> but until then this remains a somewhat open-ended avoidance mechanism for actual delivery and handling of plastic waste which could be particularly detrimental in the Arctic in view of substantial distances typically involved between ports with PRFs.

The Directive requires Member States to promulgate rules on penalties for infringements of national provisions adopted pursuant to the Directive, and take all measures necessary to ensure that they are implemented. Penalties must be proportionate but dissuasive of violating conduct.<sup>113</sup> In a sense the threat of imposition of penalties could complement the indirect fee system with regard to waste delivery at port, so long as the threat is actual through viable enforcement procedures rather than illusory.

While the Directive has just come into force, its key contribution could be in furthering development and availability of facilities capable of handling plastics that vessels offload. It is telling that the Directive admits its predecessor regulation, Dir. 2000/59/EC, was not effective in this regard, and attributes that failure partly to differing interpretations by Member States of key concepts such as "adequate" PRFs.<sup>114</sup> Article 4 of the new Directive mandates that Member States ensure the availability of PRFs "adequate to meet the need of the ships normally using the port without causing undue delay to ships."<sup>115</sup> In terms of solving the vagueness problem with the term "adequate" in relation to PRFs, this clearly does not add any substantive content or meaning. Cross-reference is made to the IMO guidelines on adequacy of PRFs, which are equally opaque.<sup>116</sup>

By way of attempting to add some specification, the Directive instructs that PRFs are to have the capacity to receive the types and quantities of waste from ships normally using the port, while considering the operational needs of port users, the size and geographic location of the port, the type of ships calling there, and any exemptions available. PRFs are to conduct waste management in an environmentally fit manner pursuant to relevant EU and national waste legislation. Member States are to ensure separate collection of plastic wastes from ships to

---

<sup>112</sup> L 151/128.

<sup>113</sup> L 151/132.

<sup>114</sup> L 151/117.

<sup>115</sup> L 151/125.

<sup>116</sup> see discussion *supra* at 19.

assist in reuse and recycling schemes.<sup>117</sup>

Certain reporting requirements also come into play under the Directive with the goal of exposing and correcting flaws in PRF functionality. A Member State in its capacity as a flag state is to notify IMO and authorities of the port state of alleged inadequacies of port state PRFs. Member States as port states shall investigate all reported cases of alleged inadequacies, and use IMO forms and procedures to notify IMO and the reporting flag state of the outcome.<sup>118</sup>

Perhaps the most useful part of the regulation in terms of providing relevant guidance to ports and port users on improving PRFs are the instructions under Article 5 for waste reception and handling plans for each port.<sup>119</sup> Detailed requirements for these plans are set out in Annex 1. The plan and structure of costs must be conveyed to ship operators and also made publicly available. Information must include the location and capacity of the PRFs, hours of operation, list of wastes from ships normally managed by the PRF, descriptions of procedures for delivery of wastes, cost recovery systems, and procedures for reporting alleged inadequacies.<sup>120</sup>

Annex 4, Categories of Costs and Net Revenues Related to the Operation and Administration of PRFs, provides a roadmap of all cost factors to consider in making PRFs functionally effective. Direct costs include infrastructure, site and equipment leasing, waste collection and transport, maintenance, labor costs, electricity, and insurance. Indirect costs are the administrative expenses for managing the port system, including development of plans, audits, management of cost recovery, EPR and recycling systems, reporting and communications. Net revenues include proceeds from waste management schemes such as recycling, available funding from governments, agencies and special maritime or fisheries funds, and net financial benefits from EPR schemes.<sup>121</sup> These can be effective planning tools from a circular economy perspective for making PRFs financially as well as environmentally

---

<sup>117</sup> L 151/125.

<sup>118</sup> *ibid.* It bears noting that MARPOL already requires parties to maintain updated information on their PRFs and communicate this information to the IMO. The IMO established a PRF database within its Global Integrated Shipping Information System (GISIS) for this purpose. However, enforcement of this reporting requirement is not robust or consistent.

<sup>119</sup> L 151/126.

<sup>120</sup> *ibid.*

<sup>121</sup> L 151/141.

sustainable.

While its impact on reducing marine plastic pollution remains to be assessed, the Directive is thus far the most thorough template of requirements for plastic waste management and PRF upgrading affecting at least parts of the Arctic region. A drawback, of course, is that the Directive does not directly apply as yet to Norway and Iceland. Also, Arctic states Canada, the Russian Federation and the United States are not bound by it.

### 3.2.1.2 *The SUP Directive*

The SUP Directive impacts control of marine plastic waste from sea-based sources in the Arctic indirectly. It was enacted as a component of the European Strategy for Plastics, which the Directive describes as "a step towards establishing a circular economy in which the design and production of plastics and plastic products fully respect re-use, repair and recycling needs and in which more sustainable materials are developed and promoted."<sup>122</sup> The Directive refers to UNCLOS, the LDC/LP, MARPOL Annex V, the BC, and prior EU waste legislation as requiring EU Member States to maintain environmentally sound waste management as a principal means of preventing and reducing marine plastic litter. However, as the Directive notes, the presence of all of these laws on the books has had little impact on actually reducing levels of plastic waste in the marine environment.<sup>123</sup>

The Directive aims to reduce and prevent impacts of SUP and fishing gear containing plastic on the aquatic environment. SUP items include discarded cigarettes, as tobacco product filters contain plastic and constitute one of the most commonly found plastic litter types found on European beaches.<sup>124</sup>

The Directive regulates various SUP products in different ways. For items listed in Part A of the Annex, Member States are required to take necessary measures to achieve "measurable quantitative reduction" in consumption of these items by 2026, as compared to 2022, and report on the measures adopted.<sup>125</sup> Notably, however, the Directive does not set any specific reduction targets. For products listed in Part B of the Annex, Member States are to prohibit

---

<sup>122</sup> OJ L 155/1 (12.6.2019).

<sup>123</sup> L 155/2.

<sup>124</sup> L 155/5.

<sup>125</sup> L 155/8, 9. Part A products include beverage cups, lids, food containers, and plastic fishing gear.



placing them on the market effective in 2021.<sup>126</sup> Other regulations in the Directive specify recycled content percentage requirements for beverage containers, as phased in by 2025 and 2030, and require member states to ensure that extended producer responsibility (EPR) schemes are established for all SUP products listed in Part E of the Annex as well as fishing gear.<sup>127</sup> Regrettably, despite its high percentage presence in marine plastic litter found on beaches and tossed overboard from vessels, tobacco products are only regulated to the extent of imposing certain consumer labelling requirements, and instituting some EPR measures by the end of 2024 requiring producers to cover costs of cleaning up litter resulting from such products.<sup>128</sup>

The restrictions on SUPs established in this Directive certainly translate at some level to reducing potential plastic waste streams to the Arctic marine environment. At minimum, over time it can be expected to reduce the amount of SUP items carried on board ships. And one cross-correlation with the PRF Directive is contained in Article 8, subsection 9, whereby Member States are to ensure that fishing gear producers "cover the costs of the separate collection of waste fishing gear containing plastic that has been delivered to adequate port reception facilities in accordance with Directive (EU) 2019/883 or to other equivalent collection systems that fall outside the scope of that Directive and the costs of its subsequent transport and treatment."<sup>129</sup>

### 3.2.2 OSPAR Convention

The OSPAR Convention has been hailed as one of the more successful and comprehensive regional seas regimes with respect to tackling marine plastic pollution.<sup>130</sup> The Preamble of the Convention highlights the need for "concerted action at national, regional and global levels...to prevent and eliminate marine pollution and to achieve sustainable management of the maritime area," and references customary international law as reflected in UNCLOS Part XII as well as pollution control provisions of the LDC/LP. At the same time, the Convention is built on the premise that more effective measures are needed to control marine pollution

---

<sup>126</sup> L 155/10. Part B products include cotton bud sticks, cutlery, plates, straws, beverage stirrers, balloon sticks, and expanded polystyrene food containers.

<sup>127</sup> L 155/10, 12.

<sup>128</sup> L 155/11, 12, 18.

<sup>129</sup> L 155/12.

<sup>130</sup> UNEP/AHEG/2018/1/INF/3 (May 2018), 50-51.

than are present in other international instruments.<sup>131</sup>

OSPAR's definition of its geographical scope opens up for significant overlap with the Arctic RAP-ML. OSPAR's "maritime area" includes internal waters and territorial seas of the Convention's contracting parties, the sea beyond and adjacent to the territorial sea of coastal state members, as well as significant high seas areas within the limits of the northern Atlantic and Arctic Oceans. Arctic Council member states that are also parties to OSPAR are Norway, Finland, Sweden and Iceland.<sup>132</sup>

The Convention adopts similar broad definitions of "pollution" and "dumping" as found in UNCLOS, MARPOL, and LDC/LP.<sup>133</sup> Core obligations of the parties include taking all possible steps to eliminate pollution by dumping or incineration at sea by ships and from offshore structures.<sup>134</sup>

OSPAR's Annexes mirror the pollution and waste categories in MARPOL's Annexes, and essentially prohibit dumping of all wastes or other matter from vessels and offshore structures with certain narrow exceptions, such as dredged material and CO<sub>2</sub> streams from carbon capture and storage projects under regulatory guidelines.<sup>135</sup> Compliance with Annexes is vested in the parties with respect to all vessels registered in their respective territories, vessels loading in a member state's territory, and any vessels believed to be engaged in dumping or incineration within a member state's internal waters, territorial sea, or EEZ (other than military or other state-operated vessels).

OSPAR itself makes no explicit mention of plastic, but OSPAR's own Regional Action Plan on Marine Litter (hereafter 'OSPAR RAP-ML') adopted in 2014 by the OSPAR parties as an "OSPAR Other Agreement," does call out plastic pollution as a prime focus.<sup>136</sup> The OSPAR RAP-ML targets marine plastics from sea-based and land-based sources, as well as litter already present in the marine environment. It applies to the entire OSPAR maritime area,

---

<sup>131</sup> OSPAR Convention, 32 ILM 1068.

<sup>132</sup> OSPAR Commission, "OSPAR Convention."

<sup>133</sup> OSPAR Convention, Articles 1(d), 1(f).

<sup>134</sup> *ibid.*, Articles 2, 4 and 5.

<sup>135</sup> *ibid.*, Annex II and III.

<sup>136</sup> OSPAR Commission, "Documents-Action Plan for Marine Litter." The Plan encompasses all types of marine litter, but notes that approximately 90% of all marine litter is plastic. OSPAR RAP-ML, 3.

divided into several regions. Region I, sub-labeled "Arctic," covers a substantial portion of Arctic waters including the Norwegian Sea from approximately 55°N latitude, North Atlantic waters surrounding Iceland and the eastern half of Greenland, and a wedge of the Central Arctic Area including the North Pole.<sup>137</sup>

The OSPAR RAP-ML contains several action items referencing ship-generated waste and PRFs. Parties are encouraged to develop best practices for vessel waste management, reporting and inspections, and institute effective penalties for waste disposal offences.<sup>138</sup> With specific regard to PRFs, the plan supports development of standards and instructs parties to engage in regional coordination on implementing EU Directive 2000/59/EC in relation to MARPOL Annex V. That Directive has now been repealed and replaced by the current PRF Directive, as discussed in the preceding section. Such coordination is desirable given the geographic and regulatory overlap, and in theory should deliver better cost recovery systems ensuring that the maximum amount of ship-generated plastic waste gets delivered to PRFs. The OSPAR RAP-ML also includes analyzing whether discharge of waste should be made compulsory in each port for all ships leaving the OSPAR maritime area for non-EU ports.<sup>139</sup> That requirement is not part of the PRF Directive, however, and therefore harmonization with the regulations will likely be necessary.

Like the Arctic RAP-ML, the OSPAR RAP-ML is designed as a "flexible tool" setting out certain actions, some of which require collective activity within a framework under the OSPAR Commission, and some that the parties are encouraged to consider in their national programs and laws. The OSPAR RAP-ML also defers quite heavily to the competence of other international bodies and authorities. It is more explicit, however, than the Arctic RAP-ML in terms of invoking the polluter pays principle, inherent in the notion of EPR, as underpinning all actions. In circular economy terms, each party is directed to investigate markets for plastic waste from fishing and shipping industries.<sup>140</sup> The OSPAR RAP highlights the need for cross-sectoral and cross-organizational cooperation to combat marine plastic waste, and specifically references in this regard UNEP, the Regional Seas Programs, IMO, the EU, CBD, and Fisheries Councils and Commissions - but no mention is made of the Arctic Council or its working groups. The OSPAR Commission has, however, had observer

---

<sup>137</sup> OSPAR Commission, "OSPAR Convention/North-East Atlantic." OSPAR RAP-ML, 6.

<sup>138</sup> OSPAR RAP-ML, 10.

<sup>139</sup> *ibid.*, 9.

<sup>140</sup> *ibid.*, 14.

status at the Arctic Council since 2017.<sup>141</sup>

The initial OSPAR RAP covered the period from 2014 to 2021, and a second RAP for the period 2021-2030 is currently being developed. OSPAR itself notes that although progress was made in implementing actions under the first RAP, "[n]evertheless, levels of marine litter remain a problem and OSPAR's objective for marine litter has not yet been met."<sup>142</sup>

### **3.3 Conclusions**

The regional instruments examined in this chapter can be said to partially fill in some of the regulatory holes left open by international instruments concerning control of Arctic marine plastic pollution generally, and PRFs in particular. They also hint at prospects for integrating regulatory control of maritime plastic waste and PRFs in circular economy models of waste management.

The challenge, however, will be reconciling the variety of governance regimes and regulatory approaches in a coordinated and consistent manner across Arctic (and non-Arctic) states. The Arctic RAP-ML is Arctic-specific, but non-binding. The EU Directives and OSPAR Convention are binding, but not on all Arctic states. Overlap exists between the Directives, OSPAR and the Arctic RAP-ML as to geographic scope, and to some extent party participation. Still, as the only Arctic-focused instrument engaging participation of all Arctic states, as well as non-state stakeholders, the Arctic RAP-ML could provide a bridge to better implementation of applicable laws governing marine plastic pollution from shipping and effective PRFs. Whether this happens may depend on whether critical data and legal gaps concerning ship plastic waste management practices and PRF adequacy can be filled on a collaborative and timely basis across the region.

---

<sup>141</sup> Arctic Council, "Observers."

<sup>142</sup> OSPAR Commission, "Development of New Marine Litter Regional Action Plan."

## 4. Assessment of Two National Law Approaches

The introduction to the Arctic RAP-ML declares that "the Arctic States have a robust suite of legislation, programs, and monitoring initiatives that form the framework within which this [plan] will be applied and will serve to help implement the strategic actions that follow."<sup>143</sup> Since Member States are the drivers of implementation, it bears considering whether existing national laws facilitate enhancement of PRFs and possible integration of a circular economy path for marine plastic waste in the Arctic.

A complete comparative analysis of relevant laws of all Arctic States is beyond the scope of this thesis. Instead, this chapter will briefly study the current PRF legislation of two Arctic states, the United States and Norway, and certain limited publicly available information concerning the status of PRFs in both countries that may serve the shipping sector in the Arctic. This chapter also seeks to answer the question whether these Arctic states are adopting circular economic thinking and incentives for tackling marine plastic pollution with regard to their laws regarding plastic waste from shipping and PRFs.

### 4.1 United States

#### 4.1.1 The U.S. and Arctic Shipping

The United States is an Arctic nation by virtue of the state of Alaska. Generally speaking, Alaskan waters are bounded by the Beaufort Sea and Arctic Ocean to the north, the Gulf of Alaska and Pacific Ocean to the south, and the Bering Strait, Bering Sea and Chukchi Sea to the west.<sup>144</sup> Shipping activities in Arctic Alaska, including areas in the Bering Strait, Beaufort Sea, Prudhoe Bay and Alaskan North Slope coastal zone, consist primarily of commercial tug and barge services transporting goods for indigenous populations living in remote communities, and fuel industry transport and support.<sup>145</sup>

According to CGMIX, the U.S. Coast Guard's public website, there are 123 PRFs in Alaska which are approved for MARPOL V purposes.<sup>146</sup> These PRFs are spread out among

---

<sup>143</sup> *supra* fn 77, 11.

<sup>144</sup> NOAA, "Arctic Zone."

<sup>145</sup> Metcalf, "Preparing for Maritime Transportation in a Changing Arctic," Senate Testimony.

<sup>146</sup> CGMIX, "MARPOL Search."

approximately 43 different port and terminal locations, all located below the Arctic Circle. The three Alaskan ports located north of the Arctic Circle, Prudhoe Bay, Kivilina and Utqiagvik, are not deepwater ports and do not have certified PRFs as they are not required to under current regulations. The Chamber of Shipping of America noted in 2018 that projections of diminishing sea ice in the Arctic and longer ice-free periods will likely lead to increased international shipping activity in the entire Alaskan Arctic sector.<sup>147</sup>

#### 4.1.2 Applicable Legislation

With regard to marine plastic pollution, U.S. federal legislation has existed since 1987 in the form of the Marine Plastic Pollution Research and Control Act (MPPRCA).<sup>148</sup> This Act provided marine litter-oriented amendments to the statute representing the United States' domestic implementation of MARPOL, the Act to Prevent Pollution from Ships (Ship Pollution Act).<sup>149</sup> The MPPRCA thus incorporates MARPOL Annex V provisions making it illegal for ships to discharge any plastics wherever located. The Act also authorized the Environmental Protection Agency to study and report on improving methods and markets for recycling discarded plastics, and develop recommendations for new legislation to prohibit, regulate or tax sources of plastic materials that enter the marine environment.<sup>150</sup> This measure in essence marked an early foray into developing the EPR concept, but which to date has not progressed very far in terms of new U.S. federal law.

In terms of ship-based measures on plastic waste, U.S. federal law requires the Secretary of the department overseeing the Coast Guard to establish regulations which require U.S. ships to maintain garbage record books and ship waste management plans, and to display placards notifying crew and passengers of the requirements of MARPOL Annex V.<sup>151</sup> The Secretary is also required to cooperate with other MARPOL parties in detection of violations and enforcement of MARPOL, including conducting inspections, investigations, and legal actions for imposition of fines or penalties.<sup>152</sup>

---

<sup>147</sup> *ibid.*

<sup>148</sup> Pub. L. 100-220.

<sup>149</sup> 33 USC 1901.

<sup>150</sup> Pub. L. 100-220, § 2202, 2203.

<sup>151</sup> 33 USC 1903. The Coast Guard currently operates within the U.S. Department of Homeland Security.

<sup>152</sup> 33 USC 1907.

The portion of the Ship Pollution Act and MPPRCA focused on PRFs authorizes the Coast Guard to promulgate regulations for setting criteria regarding the adequacy of U.S. PRFs. If a PRF meets the requirements of MARPOL Annex V and the regulations, the Coast Guard may, after inspection of the facility, issue a certificate of adequacy (COA).<sup>153</sup> COAs are valid for 5 years unless suspended or revoked, and may be renewed. The Coast Guard is required to maintain a list of PRFs with respect to which a COA is in effect, or has been revoked or suspended. The Coast Guard may deny entry of a ship to a port or terminal relating to adequate PRFs for garbage, if the port or terminal is not in compliance with the regulations prescribed.<sup>154</sup>

#### 4.1.3 Shortcomings of the PRF Legislation as to the Arctic and Plastics

In its present form, the Coast Guard regulations implementing MARPOL PRF requirements are fairly short. The purpose of the regulations, "establishing criteria for the adequacy of reception facilities, and procedures for certifying that facilities are adequate for receiving garbage from ships,"<sup>155</sup> is interpreted quite generally. "Reception facility," for example, is defined as anything capable of receiving garbage.<sup>156</sup>

On its face, the regulations require that all ports and terminals under the jurisdiction of the United States, including commercial fishing facilities, mineral and oil shore bases, and recreational boating facilities, must have a reception facility which meets the criteria for adequacy of PRFs with regard to garbage as set out in subpart D of the regulation.<sup>157</sup> However, ports and terminals are only required to obtain a formal COA, and be subject to ongoing compliance inspection, if they receive tankers or any other oceangoing ship of 400 gross tons or more, or fishing vessels which offload more than 500,000 pounds of commercial fishery products during a calendar year.<sup>158</sup> This potentially leaves many PRFs that could service Arctic shipping out of the formal COA loop.

---

<sup>153</sup> 33 USC 1905.

<sup>154</sup> *ibid.*

<sup>155</sup> 33 CFR 158 et seq., Reception Facilities for Oil, Noxious Liquid Substances, and Garbage.

<sup>156</sup> 33 CFR 158.120.

<sup>157</sup> 33 CFR 158.133(c).

<sup>158</sup> 33 CFR 158.135(c).

Subpart D of the regulations, titled "Criteria for Adequacy of Reception Facilities: Garbage," in actuality does not list much by way of detailed specifications. Basically, a PRF must function so that it does not interfere with other port operations, must be conveniently located, and must be situated so that garbage from ships cannot escape into the water. All PRFs must in addition hold federal, state and local permits or licenses as may be required by environmental and public health authorities concerning garbage handling.<sup>159</sup> Ports must ensure the availability of a PRF capable of receiving all garbage that the master of a ship desires to discharge - except garbage from ships not having commercial transactions with that port.<sup>160</sup> The exception perhaps makes sense from the perspective of having no basis to collect an indirect fee for port usage that would ostensibly cover waste handling costs, but may leave out a number of vessels that should be off-loading plastic waste to proper facilities whenever and wherever possible.

Overall the Coast Guard PRF regulations add little to the question of what "adequate" means in regard to PRFs and processing plastic wastes from ships. The "criteria" listed are quite general, leaving considerable room for broad interpretation. Also, due to the large number of U.S. ports and terminals to which MARPOL Annex V applies and corresponding administrative burdens, Congress permitted the Coast Guard in drafting the regulations to limit the number of ports and terminals required to obtain a formal COA.<sup>161</sup> Regardless, even if a port is not required to obtain a formal COA, the Coast Guard has the authority to ensure all ports comply with the regulations (such as they are) and MARPOL relating to PRFs for plastic waste.

#### 4.1.4 Incorporating a Circular Economy for Marine Plastics?

The PRF regulations have not been updated to any significant degree in recent years. Might other related legislation may provide stimulus for revisions in line with a more circular economy-oriented approach?

One possibility is the Marine Debris Act, first enacted by Congress in 2006 and subsequently amended in 2018 and 2020. The Act authorized the Coast Guard to take special actions for better implementation of MARPOL Annex V and the corresponding U.S. Ship Pollution Act,

---

<sup>159</sup> 33 CFR 158.410(a)

<sup>160</sup> 33 CFR 158.420

<sup>161</sup> Safety4Sea, "USCG: Waste Reception Facilities on fishing ports."



"improving compliance with requirements that all U.S. ports and terminals maintain adequate receptacles for disposal of plastics, including through voluntary government-industry partnerships, and developing plans to improve ship-board waste management, including record-keeping and access to waste reception facilities."<sup>162</sup>

The most recent amendment, the Save Our Seas 2.0 Act of 2020 (SOS 2.0)<sup>163</sup> expands objectives and measures to combat marine plastic pollution. These include pilot programs providing financial incentives for plastic litter prevention and retrieval, such as grants to fishermen who incidentally capture plastic at sea, store it onboard, and transport it to PRFs. A further tie-in with PRFs could occur through designated investment under SOS 2.0 of up to \$55 million in funding each year through 2025 for improving "local post-consumer materials management," including municipal recycling programs. Funding would also be available for local waste management authorities, and in theory this could encompass PRFs.<sup>164</sup>

A hallmark feature of SOS 2.0 is its emphasis throughout on promoting a circular economy as a means of breaking the linear chain by which plastic waste streams end up as marine debris. This goal extends to making sustainable plastic waste management services available where access to such has been lacking, and eliminating leakages of plastic waste into the marine environment through development of markets for recycled, reusable and repurposed plastic materials in a closed loop manner.

SOS 2.0 has been criticized for not advancing specific EPR schemes, or instituting significant restrictions on virgin plastic production from fossil fuels.<sup>165</sup> It could have connected the dots more directly between innovations in waste management and PRFs to foster a zero plastic waste shipping industry and address removal of existing marine plastic pollution. Still, it presents new ways to address long-standing inadequacies with plastic recycling systems and to incentivize keeping plastics out of the ocean.

---

<sup>162</sup> Pub. L. 109-449 (codified at 33 USC 1951 et seq.), 120 Stat. 3336, sec. 4.

<sup>163</sup> Pub. L. 116-224, 134 Stat. 1072.

<sup>164</sup> *ibid.*, 134 Stat. 1092-1093.

<sup>165</sup> Stern, et al., "Bipartisan Save Our Seas 2.0 Act," 1.

## 4.2 Norway

### 4.2.1 Applicable Legislation

Norwegian PRF law, like the U.S. legislation, stems from MARPOL obligations. Regulations implementing MARPOL were established by the Norwegian Maritime Directorate on 16 June 1983 pursuant to the Act of 9 June 1903 No. 7 relating to Public Control of the Seaworthiness of Ships (Ship Safety Act, amended 2007). These Regulations apply to all Norwegian ships, and to foreign ships in Norwegian territorial waters and in the Norwegian exclusive economic zone. However, with respect to Annex V specifically, the original legislation was not focused at all on plastic wastes and did not incorporate any PRF provisions.

Subsequently, ship-board and port-based plastic waste management and mitigation measures were incorporated in section 12 of the Norwegian Regulations on environmental safety for ships and mobile offshore units in 2013.<sup>166</sup> These revised regulations did not substantively supplement maritime plastic waste control beyond modification of the requirement for carrying onboard garbage management plans from ships with at least 400 GT to ships with at least 100 GT, in keeping with IMO revisions to MARPOL Annex V.

Current Norwegian PRF regulations, found at Chapter 20 of the Pollution Control Regulations,<sup>167</sup> are oriented to protect the environment by ensuring the establishment and operation of adequate reception facilities for ship-generated waste, and ensuring delivery of ship-generated waste to PRFs.<sup>168</sup> The PRF regulations apply to all ships, Norwegian and foreign, calling at a Norwegian port, and all Norwegian ports normally visited by such ships.<sup>169</sup>

The main activities regulated fall under three categories: what ships must do with respect to delivering plastic waste to PRFs; what fees can be charged to ships by PRFs; and what requirements apply to PRFs. In the first category, ships must provide advance notification and deliver their waste to PRFs. The form and content of notification is described in Annex II

---

<sup>166</sup> Norwegian Maritime Authority Circular No. RSR 22-2012.

<sup>167</sup> With specific regard to revisions of Chapter 20 reflecting incorporation of EU Directive 2000/59/EC on PRFs, see: Regulation No 1243 of 12 Oct. 2003, repealed and replaced by Regulation No 931 of 1 June 2004, and further amended by Regulation No 1210 of 3 Oct. 2013.

<sup>168</sup> Pollution Control Regulations, §20-1.

<sup>169</sup> *ibid.*, §20-2.

to the regulations, and must normally be given at least 24 hours prior to arrival if the port of call is known.<sup>170</sup>

The master of a ship must deliver ship-generated plastic waste to a PRF prior to departure, unless there is sufficient onboard dedicated storage capacity for all ship-generated waste.

The Norwegian Maritime Directorate is responsible for supervising ships' compliance with the regulations, and may issue orders to the ship master regarding waste delivery. Reliance, however, seems to be placed on vessel self-reporting of onboard storage capacity.

Costs associated with reception of ship-generated waste are to be covered through the collection of a fee from ships calling at the port. This fee is collected irrespective of whether ship-generated waste is delivered to a PRF. The fee structure is somewhat complicated by calculation allowances for parameters such as the number of persons which the ship is authorized to carry, or the number of crew members, and the number of days having elapsed since the previous port of delivery. A surcharge may be imposed on ships which fail to comply with the compulsory notification of waste delivery, or if a ship delivers exceptionally large quantities of waste, in relation to the ship's size, type and sailing time.<sup>171</sup> Fee reductions may apply if the ship's environmental design, equipment or operation substantially contributes to reducing the quantity of waste delivered by the ship to the PRF, or the costs of treating or disposing of the ship's waste ashore (e.g. through sorting of various types of plastics).<sup>172</sup>

In most respects the Norwegian regulations resemble the U.S. PRF regulations. And, as with current international and regional instruments establishing PRF rules, the Norwegian PRF regulations require port operators to ensure the availability and operation of PRFs that are "adequate" to meet the needs for delivery of ship-generated plastic waste in the port, without causing undue delay to shipping schedules.

An area where the Norwegian regulations appear to be more extensive than corresponding U.S. legislation concerns PRF waste reception and handling plans. Essential plan elements include a description of the type and capacity of the PRF, the procedures for receiving ship-generated waste, explanation of the fee system, and procedures for reporting alleged inadequacies of the PRF. In addition, the plans should include a description of how ship-

---

<sup>170</sup> *ibid.*, §20-7.

<sup>171</sup> *ibid.*, § 20-10.

<sup>172</sup> *ibid.*, § 20-11.

generated waste is disposed of. The added detail of the Norwegian regulations in this regard is likely a reflection of the prior EU Directive on PRFs, Directive 2000/59/EC, which had been incorporated in the EEA Agreement and thus applied to Norway.

#### 4.2.2 Sufficiency of Norwegian PRFs

Although the Norwegian PRF regulations include a number of procedural elements reflecting not only MARPOL Annex V requirements but also the previous EU PRF Directive, Norway was investigated and found lacking with respect to implementation of its PRF obligations.<sup>173</sup> In 2010 the European Maritime Safety Agency ("EMSA") conducted an investigation and produced a report analyzing the overall quality of the PRF system in Norway and the extent of compliance with the original EU PRF Directive, which formed the basis of an EFTA Surveillance Authority Opinion and ultimately a judgment by the EFTA Court in 2016.<sup>174</sup>

The case before the EFTA Court focused on three principal compliance failures: the general lack of adequate PRFs at all Norwegian ports, the absence of waste reception and handling plans for all ports, and the failure to monitor and approve such plans for all ports. The Court concluded that Norway had not at the time of ruling corrected these compliance failures as identified by EMSA.<sup>175</sup>

The Court's judgment included noteworthy findings regarding the state of PRF implementation in Norway. As of the time of the proceedings Norway had no mechanism to determine whether relevant ports had an adequate PRF. Indeed, Norwegian authorities acknowledged that a substantial number of ports did not have verifiable adequate PRFs in place. The Court observed that the EU Directive imposed on EEA States an obligation to achieve results, including appropriate waste reception and handling plans for each port, and the result "cannot be satisfied merely by the creation of an appropriate regulatory framework."<sup>176</sup> Norwegian authorities had acknowledged that as of October 2015, a waste reception and handling plan had been approved for only 969 of 4443 ports identified.<sup>177</sup>

---

<sup>173</sup> Opinion, EFTA Surveillance Authority, Case No: 71727.

<sup>174</sup> *ibid.*

<sup>175</sup> Judgment of the EFTA Court, 2 August 2016, Case E-25/15.

<sup>176</sup> *ibid.*, 9.

<sup>177</sup> *ibid.*

The EFTA case highlights the often encountered difficulty of achieving regulatory implementation. On paper, Norway's PRF regulations are more detailed than the U.S. Coast Guard's analogous set of PRF regulations, especially with regard to PRF waste reception and handling plans. Yet Norway struggled to fully implement its regulations. It is not clear whether this was the result of insufficient resources, or lack of prioritization, or some other cause. It bears noting that the EFTA Court judgment concerned Norway's lack of compliance with the prior version of the EU PRF Directive, which has now been repealed and replaced. The new EU PRF Directive is currently pending review under the EEA Agreement. If it becomes applicable to the EEA States, Norway will likely need to update its national PRF regulations accordingly. That could provide an opportunity for incorporating circular economy thinking into PRF development, which would also correlate with strategic actions and objectives of the Arctic RAP-ML to reduce marine plastic pollution.

#### 4.2.3 Towards a Circular Economy Mode for Norwegian PRFs?

An advisory report to the Norwegian Parliament from the Ministry of Climate and Environment in June 2017 recommended that Norway undertake new efforts to tackle the local and global problem of marine plastic pollution.<sup>178</sup> Such efforts should adopt a circular economy focus, whereby secondary post-consumption plastic materials are substituted for primary raw materials. By implementing principles and technology of a circular economy, the report argues, Norway can derive more efficient use of resources, cost-savings, new sources of revenue and market opportunities, and enhanced global reputation.<sup>179</sup>

Increased and improved plastic recycling can contribute to plastic waste obtaining greater economic value, which in turn can lead to incentives for clean-up and less plastic waste ending up in the sea.<sup>180</sup> The connection with discharges of plastic waste from ships comes through regulations pursuant to the Ship Safety Act, and pollution control laws such as the PRF regulations.<sup>181</sup> Unfortunately the report did not elaborate on this connection in substantial detail, but did highlight some important regulatory and policy measures such as indirect PRF fees, projects to incentivize delivery of passively collected as well as stored

---

<sup>178</sup> Meld. St. 45 (2016-2017), *Avfall som ressurs - avfallspolitikk og sirkulær økonomi*.

<sup>179</sup> *ibid.*, 7-9.

<sup>180</sup> *ibid.*, 14, 42-43.

<sup>181</sup> *ibid.*, 44.

plastic waste to PRFs, and EPR schemes.<sup>182</sup> At present these enhancements of PRFs appear to be a slow work in progress in Norway, but poised to incorporate more circular economy-oriented measures.

### **4.3 Conclusions**

The two Arctic nations considered in this section, the United States and Norway, have national acts and regulations seeking to control marine plastic pollution, and to implement international law requirements regarding PRFs. The U.S. approach can be characterized as having a general framework of PRF regulations in place with little specificity, but wide implementation and administrative oversight. The Norwegian approach appears to be something of the inverse: more specific regulations, but less extensive implementation. Both approaches, unfortunately, leave the Arctic area in their respective jurisdictions sparsely covered to date as far as PRFs up to the task of appropriately handling plastic waste from Arctic shipping.

Unlike the U.S., Norway has the added regulatory layer of the EU PRF Directive to follow, although at present this is in limbo since the new operative PRF Directive is not yet part of the EEA Agreement. The new PRF Directive can be regarded as a positive regulatory development and influence, but it remains to be seen how quickly and effectively it can be rolled out.

Both countries are involved, collaboratively but not compulsorily, in carrying out the Arctic RAP-ML, which could help establish PRF best practices attuned to the Arctic.

More recent policy statements in both countries, and in the case of the United States new federal legislation, portend greater interest in applying a circular economy approach to the problem of marine plastic pollution. In both countries, national regulations concerning PRFs will need to be revised and upgraded. As with all Arctic States, national requirements should be clear, transparent and accessible to the shipping industry to ensure successful compliance and better marine plastic waste control in the Arctic region.

---

<sup>182</sup> *ibid.*, 55-56.

## 5. Conclusions and Recommendations

While all plastic originates from land-based production processes, in its post-consumer phase much of it continues to end up in the world's seas. The Arctic marine environment is no exception, despite the region's low human population density. The reasons for this are not well understood yet, but evidence suggests shipping and fishing activities in the Arctic and near-Arctic have played a significant role in contributing to the presence of plastic pollution, whether from illegal or accidental disposal at sea, improper waste handling at ports, or unfiltered wastewater discharge.

This thesis inquires whether the regulatory regime applicable to shipping-generated plastic waste and PRFs meets the objective of controlling marine plastic pollution in the Arctic. Arctic shipping, while steadily rising with each year of diminishing ice cover, should be a sector whose contribution to marine plastic pollution can be vastly minimized. The international legal building blocks for doing so have long been set through UNCLOS, the LDC/LP, the BC, and MARPOL, but for the most part have not translated to specific-enough regulatory solutions to close loopholes.

Existing laws require ships to bring plastic waste to shore for handling, and require ports to ensure availability of adequate PRFs. While this provides a useful baseline for achieving zero plastic waste from shipping in the Arctic, this thesis concludes that additional regulatory attention and coordination is needed. Some proposals for achieving that are discussed below. The thesis also suggests in the final section that circular economy methods could enhance realization of regulatory goals.

### 5.1 The Need for Better Definition of "Adequate" with respect to PRFs

"Keeping the seas and oceans clean should be seen as the overriding obligation for the use and provision of PRFs," according to the IMO.<sup>183</sup> MARPOL established PRFs as the primary interface between ships and land in proper disposal of ship-generated waste, including plastics. In doing so it applied "adequacy" as a benchmark. But what does "adequate" mean in terms of PRFs and the handling of plastic waste from vessels? The standard form of reference has thus far been that States are "to ensure provision of adequate facilities at ports and terminals for the reception of garbage without causing undue delay to ships, and

---

<sup>183</sup> MEPC.1/Circ.834/Rev.1, Annex, 4.

according to the needs of the ships using them."<sup>184</sup> This basic formulation has been repeated almost *verbatim* in other international, regional and national laws and action plans, *e.g.* the IMO Action Plan to Address Marine Plastic Litter from Ships, the OSPAR RAP, the Arctic RAP-ML, the EU PRF Directives in 2000 and 2019, the U.S. Coast Guard regulations under the Ship Pollution Act, and the Norwegian regulations under the Pollution Control Act.

The IMO recognized that despite decades of PRFs being legally required, results have been inconsistent and insufficient.<sup>185</sup> Broad and varying interpretations by States, and even among different ports within States, of what constitutes "adequate" suggest a need for clearer standards. Yet the IMO's 2018 Consolidated Guidance for PRFs simply repeated the same definition: "*adequacy* as used in the MARPOL Annexes means that PRFs meet the needs of ships using the ports without causing undue delay."<sup>186</sup> Similarly, the EU's 2019 PRF Directive acknowledged that the predecessor 2000 PRF Directive had failed largely because of the lack of clarity on what an "adequate" PRF is, but posited no significant definitional refinement.<sup>187</sup> The term remains vague and unhelpful.

One might wonder why such an important qualifying term is left so poorly defined. A possible explanation may lie in an intention to allow each State maximum discretion in how it implements the international and regional rules. But shipping is a global industry and marine plastic pollution is a global problem, so some universality in definitions and standards is not only desirable but necessary. To advance effectiveness of PRFs for plastic waste from shipping the term "adequate" could be defined in terms of best practices.<sup>188</sup> These could include providing separate collection receptacles for plastic waste from ships, arranging for sorting of plastics by type, size, or other criteria to aid in recycling, and measures to enforce actual delivery of plastic wastes to PRFs by making garbage record-keeping and plastic waste management plans compulsory for all vessels, and subject to inspection at ports and PRFs. Clarifying the definition of "adequate" with specific actions would assist in holding MARPOL member states accountable for effective implementation of their obligation to provide PRFs

---

<sup>184</sup> MARPOL Annex V, Regulation 8.

<sup>185</sup> MEPC.1/Cir.834/Rev.1, 1.

<sup>186</sup> MEPC.1/Circ.834/Rev.1, Annex, 2.

<sup>187</sup> PRF Directive, at L 151/117.

<sup>188</sup> The IMO Consolidated Guidance seems to suggest as much: "Although legal requirements for PRFs will vary depending on the port state's implementing legislation, good practices for PRFs should include procedures that facilitate better integration with shipboard and land-side wastes/residues management practices." MEPC.1/Circ.834/Rev.1, Annex, 10.



that can handle plastic wastes in a responsible, environmentally sound manner.

Specifically with respect to the Arctic, national and regional bodies should use data to determine what the current and projected plastic waste handling needs of various types of vessels traversing the Arctic are, and use that information in crafting a definition of "adequate" Arctic and near-Arctic PRFs that is more fit for purpose. At present a new ISO standard specifically focused on Arctic PRFs is under development, although there is no publicly announced timeframe for its completion.<sup>189</sup> This and other related ISO standards, such as ISO 21070:2011 regarding handling of ship-generated garbage and ISO 16304:2018 regarding design and operation of PRFs generally, could also possibly assist in harmonizing the definition of "adequate" PRFs, if made more widely available.

Any clarification of "adequate" PRFs for in the Arctic could come from a top-down international law approach, such as MARPOL Annex V or Polar Code amendments. This would have the advantage of being automatically binding on MARPOL member states, but would likely take years to achieve. A regional approach such as further refinement of EU Directives and/or marine litter action plans (OSPAR, Arctic RAP-ML) is another route. The latter are non-binding, but may provide a more timely and easier path to reaching consensus.

## **5.2 The Dearth of PRFs for Handling Plastic Waste in the Arctic Must be Addressed**

At present insufficient infrastructure exists within or near the Arctic region to service ship-generated or vessel-collected plastic waste. Regarding the two Arctic nations discussed in this thesis, there are no listed PRFs in Svalbard or Jan Mayen, or in Alaska north of the Arctic Circle. The overall lack of PRF coverage means that vessels operating in or traveling through Arctic waters must for the most part store the waste onboard - if capacity exists. The potential for discharge at sea, although illegal under international and national law, cannot be discounted.

The Arctic RAP-ML calls attention to this paucity of facilities and the need for expansion, primarily through pursuing regional arrangements for pooling resources to meet logistical and cost challenges in providing PRFs able to manage plastics and other ship-generated wastes in an environmentally sound manner. To move this effort forward, the IMO could act expeditiously on the Arctic Council States' request for designation of the Arctic as a Special

---

<sup>189</sup> ISO/AWI 24247, "Arrangement and Management of Port Reception Facilities in the Arctic."

Area under MARPOL Annex V, and approve an Arctic Regional Facility Plan as contemplated by amendments to Regulation 8 of MARPOL Annex V.<sup>190</sup> The Arctic Council has been calling for better data collection on Arctic ports and PRFs since 2004, and an update of its brief 2012 survey report remains uncompleted.<sup>191</sup> A formal submission to the IMO from the Arctic Council States for long-range Arctic regional PRF planning has been in development since 2017.<sup>192</sup> There are some signs that this initiative may be moving forward in 2022 at the 9th meeting of IMO's Sub-Committee on Pollution Prevention and Response.<sup>193</sup>

The progress of a regional PRF regime in the Arctic is important from a regulatory standpoint, since improvements in national implementing regulations for handling plastic waste from ships may follow in its wake. Establishing a regional PRF framework can also enhance adoption of circular economy measures designed to address marine plastic pollution, as discussed in section 5.4.

### **5.3 PRF Fee Structures Should be Harmonized and Better Communicated**

One of the most important factors in maximizing delivery of plastic waste to ports is the waste fee system. High fees for waste collection serve as a disincentive to ships to discharge their waste at port. Accordingly, more recent PRF regulations and directives mandate assessment of indirect fees, uncoupled from whether or how much waste is delivered by a vessel. While a step in the right direction, implementation of indirect fee structures remains uneven. Fees imposed vary widely and may be prohibitive for many vessels, thus serving as a disincentive for proper plastic waste handling. PRF complaints lodged on IMO's PRF database module under GISIS demonstrate confusion and dissatisfaction among vessel owners and operators as to what fees can be expected and how they are derived.<sup>194</sup> In many cases, such as in the United States, plastic waste PRF services may be provided by third party private entities with little oversight. The Coast Guard has responded to fee complaints via GISIS that it has no authority to set PRF fees covering waste collection.<sup>195</sup>

---

<sup>190</sup> see MARPOL Annex V, Regulations 1(14) and 8(2); MEPC.216(63).

<sup>191</sup> see fn 93 *supra*.

<sup>192</sup> PAME, *Regional Reception Facilities Plan (RRFP) and Proposal for IMO Consideration* (May 2017).

<sup>193</sup> see fn 95 *supra*.

<sup>194</sup> One of the most frequent complaints of the roughly 1000 inadequacies listed since July 2006 is unreasonable charges for use of garbage PRFs. GISIS/PRF, "Alleged inadequacy."

<sup>195</sup> *ibid*.

Ideally, for the indirect fee system to function as intended there should be a single rate assessed on all ships of certain classes or sizes visiting ports. This also lowers the administrative burden on port operators. Regulatory loopholes that allow ships to retain plastic waste onboard by stating they have sufficient storage capacity, making ultimate disposition of the plastic uncertain, should be closed. But this of necessity requires that vessels can land the plastic they have onboard, without undue inconvenience and cost -- a particular challenge in the Arctic given the deficient number and capacities of PRFs currently. Delivery of plastic waste should be a net benefit for ships, which in turn will increase level of compliance. In this regard, merging regulation with circular economy measures could ultimately decrease and regularize plastic waste handling costs that factor into general indirect PRF fees charged to vessels.

#### **5.4 Arctic PRFs as Circular Economy Hubs for Ships and Plastic Waste**

A GESAMP report issued 22 November 2021 concluded that "[i]mproving PRFs for waste from ships, including its onshore downstream management, is the single most effective solution to preventing discarding of waste at sea."<sup>196</sup> Circular economy systems provide an alternative to traditional linear "take-make-use-discard" material and energy flows, which are now widely recognized as being unsustainable. Can a circular economy approach aid in mitigating marine plastic pollution in the Arctic? The research of this thesis suggests that it might, and an overlooked but crucial linchpin is PRFs. Integrating PRF regulations and operations with circular economy measures is a potentially game-changing - and so far, missed - opportunity.

Cost-effective and sustainable management of marine plastic litter in the Arctic depends upon a stronger, more integrated, and better implemented regulatory framework than presently exists. PRFs are a nexus point, since they are already required under international, regional and national laws applicable in the Arctic and serve as the transition node between marine plastic waste on ships (or taken out of the ocean) and a recyclable resource. PRFs thus have the ability to function as a circular economy corridor, taking in plastic waste material from the shipping industry and marine environment, and conveying it on a path to non-waste value components. This contributes both toward preventing new marine plastic pollution through waste diversion, and remedying at least in part existing marine plastic pollution.

---

<sup>196</sup> GESAMP, fn 20 *supra*, 69.

It is not possible to close all loops and achieve 100% circularity for plastics, given the physical constraints of the 2nd law of thermodynamics: recycling itself requires energy, consumes resources, and produces emissions.<sup>197</sup> An adverse example would be combusting plastic waste or its recovered raw material components to produce energy, but also emitting in the process greenhouse gases or other undesirable by-products. This means that regulations - and PRF operations - must ensure that circular economy measures make a net positive contribution to environmental sustainability.

Regulatory measures must also correct the inherent market failure of marine plastic pollution: the marginal price of disposable, cheap plastic does not reflect the full marginal cost to society of producing it or dealing with it post-consumption. Examples of market-based mechanisms to change behavior, re-direct economic incentives and internalize social costs include EPR, which also encompasses the polluter-pays principle, and high landfill taxes to encourage diversion of plastic waste to closed-loop recycling, recovery and reuse.<sup>198</sup> Most countries in Europe have implemented such measures to varying degrees. These should, however, be explicitly linked to PRFs by operation of law.

Capturing plastic waste from ships in closed-loop collection and recycling systems at PRFs reduces the risk of those plastics reaching the sea and becoming marine litter. Regulations supporting this endeavor could include deposit refund programs, direct investment in infrastructure such as state-of-the-art plastic sorting equipment, extending EPR schemes to PRFs directly to boost recycling rates and financing, cost-effective sorting and cleaning methods for plastic waste *in situ*, and extending Fishing for Litter initiatives to non-fishing vessels, such as cruise ships. Incentivizing better and more efficient collection of plastic waste on ships and in the ocean for transfer to PRFs is an essential part of achieving circularity.<sup>199</sup> Every piece of plastic diverted from or removed from the sea creates value.

Environmental laws and regulations, and even "soft law" action plans pursuant to conventions like OSPAR or regional bodies like the Arctic Council, can help foster cross-chain and cross-stakeholder collaboration supporting a circular economy for plastics by establishing standards and guidelines, and enabling a level playing field in access to markets, corporate responsibility, certification, access to information, investment, and certification. All of these

---

<sup>197</sup> Korhonen, "Circular Economy...Limitations," 42.

<sup>198</sup> Newman, et al., "The Economics of Marine Litter," 384.

<sup>199</sup> *ibid.*, 386.

are elements ripe for strengthening with respect to PRFs, whether regional or domestic, serving Arctic shipping.

Plastic pollution does not respect borders. Its ubiquitous presence in the Arctic marine environment can be mitigated by applying a circular economy zero waste model that upscales reduction, reuse, recycling at the PRF interface with shipping and fishing activities in the Arctic. To increase the uptake, quality and economics of plastic recycling, regulatory tools are needed to make recyclates cheaper and more favored than primary feedstocks for plastic production. Microplastics especially are virtually unregulated, and for the shipping sector must encompass grey water treatment and discharge.

One multi-disciplinary study concluded that the most influential legislation for management of marine plastic pollution has been top-down EU policies which are used to form the basis of regional and national plans, and cited as prime examples the 2019 EU SUP Directive and PRF Directive.<sup>200</sup> These legislative instruments have informed, *inter alia*, the OSPAR RAP and the Arctic RAP-ML. However, the success of legislation and action plans depends on awareness, implementation and enforcement. The best bet for an effective Arctic marine plastic regulatory regime may be what one research team recently described as multilevel environmental governance (MEG), combining top-down and bottom-up measures to reduce plastic pollution.<sup>201</sup> Circular economy principles and tools are incorporated as a driver for cutting through the fragmentation, lack of coordination, and weak enforcement of existing plastics regulation. For PRFs this translates to defining and establishing circular waste management practices whose objective is to make environmental plastic waste a reusable resource.

A recent research paper makes the point that the current low price of oil combined with the Covid-19 pandemic has put something of a damper on circular economy/plastics recycling initiatives, and at present petrochemical-based virgin materials are still cheaper and easier to use than recycled plastics or plastic-like alternatives.<sup>202</sup> Laws and regulations informed by science, technological innovation, and public awareness will be necessary to flip that narrative. The shipping industry is one player among many industry sectors with a connection to the marine plastics problem, and the Arctic is one relatively discrete area among

---

<sup>200</sup> Frantzi et al., "Adoption and diffusion of marine litter clean-up technologies," ??.

<sup>201</sup> see Poto, et al., "Suggestions for a Systematic Regulatory Approach to Ocean Plastics," 5.

<sup>202</sup> Mah, fn 27 *supra*, 136.

many maritime regions, but realizing the full circular economy potential of PRFs in the Arctic could set a useful example for turning the corner on marine plastic pollution globally.

## **Table of reference**

### **Treaties**

Vienna Convention on the Law of Treaties (adopted on 23 May 1969, entered into force 27 January 1980) 1155 UNTS 331.

London Convention on Prevention of Marine Pollution by Dumping of Wastes and Other Matter (adopted in 29 December 1972, entered into force 30 August 1975) 1046 UNTS 120, amended by London Protocol to the Convention on Prevention of Marine Pollution by Dumping of Wastes and Other Matter (adopted 17 November 1996, entered into force 24 March 2006) 36 ILM 1 (1997).

International Convention for the Prevention of Pollution from Ships 1973 (adopted 2 November 1973, entered into force 20 October 1983) 1340 UNTS 184, amended by Protocol of 1978 Relating to the International Convention for the Prevention of Pollution from Ships (adopted 17 February 1978, entered into force 2 October 1983) (MARPOL 73/78) 1340 UNTS 61.

United Nations Convention on the Law of the Sea (adopted 10 December 1982, entered into force 16 November 1994) 1833 UNTS 397.

Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal (adopted 22 March 1989, entered into force 5 May 1992) 1673 UNTS 57.

Convention on Biological Diversity (adopted 5 June 1992, entered into force 29 December 1993) 1760 UNTS 79.

Convention for the Protection of the Marine Environment of the North-East Atlantic (adopted 2 September 1992, entered into force 25 March 1998) 2354 UNTS 42279.

### **IMO Resolutions and Other Guidance**

IMO Action Plan to Address Marine Plastic Litter from Ships, Resolution MEPC.310(73) (adopted 26 October 2018)

International Code For Ships Operating In Polar Waters (Polar Code) 2017, Resolution MSC.385(94) (adopted on 21 November 2014); Resolutions MEPC.264(68) and MEPC.265(68), MEPC 68/21/Add.1, entered into force 1 January 2017.

MEPC.1/Circ.834/Rev.1, *Consolidated guidance for port reception facility providers and users*. (1 March 2018).

Resolution MEPC.277(70), Amendments to MARPOL Annex V, entered into force 1 March 2018.

MEPC.1/Circ.893 (9 July 2021), Provision of Adequate Facilities at Ports and Terminals for the Reception of Plastic Waste from Ships.

## **UN Resolutions**

United Nations General Assembly, Resolution A/RES/RES/66/288 (2012).

United Nations Environment Assembly, UNEP/EA.4/Res. 6 (2019).

## **EU Legislation**

Agreement on the European Economic Area. Official Journal of the European Union No. L1, 3.1.1994, (as updated 1.8.2016).

Directive (EU) 2019/883 on Port Reception Facilities for the Delivery of Wastes from Ships (amending Directive 2010/65/EU and repealing Directive 2000/59/EC). Official Journal of the European Union L 151/116 (7.6.2019).

Directive (EU) 2019/904 on Reduction of the Impact of Certain Plastic Products on the Environment. Official Journal of the European Union L 155/ 1 (12.6.2019).

## **Domestic Legislation**

### **United States**

Act to Prevent Pollution from Ships, 33 U.S.C. 1901 et seq., 94 Stat. 2297.

Marine Plastic Pollution Research and Control Act. Pub. L. 100-220, title II (29 December 1987). 101 Stat. 1460.

Marine Debris Act, 33 USC 1951 et seq., Pub. L. 109-449, 120 Stat. 3333.

Save Our Seas 2.0 Act of 2020, Pub. L. 116-224, 134 Stat. 1072 (codifying amendments to 33 USC secs. 1951, 1958, 1959, 4201, 4211-4219, 4231-4237, 4261-4265, 4281-4282).

Regulations regarding Reception Facilities for Oil, Noxious Liquid Substances, and Garbage 33 CFR 158 et seq. (1 July 2020 edition).

### **Norway**

Pollution Control Act of 13 March 1981, No. 6 Concerning Protection Against Pollution and Concerning Waste (<http://www.regjeringen.no/en/dep/kld/id668/>) (last amended 01.06.2021)



Regulations relating to Pollution Control / Forskrift om begrensning av forurensning (forurensningsforskriften), Del 6. Forurensning til vassdrag og det marine miljø fra skipsfartog andre aktiviteter, Kapittel 20. Levering og mottak av avfall og lasterester fra skip. <https://nettarkiv.miljodirektoratet.no/> (last accessed 11.11.2021)

## Arctic Council Instruments

Fairbanks Declaration 2017, Declaration of the Foreign Ministers of the Arctic States at the 10th Ministerial meeting of the Arctic Council, held in Fairbanks, Alaska, 10-11 May, 2017.

PAME, Regional Action Plan on Marine Litter in the Arctic (May 2021).

## Articles

Almroth, Bethanie and Eggert, Haakon. "Marine Plastic Pollution: Sources, Impacts, and Policy Issues," *Review of Environmental Economics and Policy* 13, 2 (2019): 317-326. doi: 10.1093/reep/rez012.

Arguello, Gabriela. "Environmentally sound management of ship wastes: challenges and opportunities for European ports," *Journal of Shipping and Trade* 5, 12 (2020): 1-21 doi: 10.1186/s41072-020.00068-w.

Bergmann, Melanie et al., "Citizen scientists reveal: marine litter pollutes Arctic beaches and affects wild life," *Marine Pollution Bulletin* 125, 537 (2017): 535-540. doi: 10.1016/j.marpolbul.2017.09.055.

Dauvergne, Peter. "Why is the global governance of plastic failing the oceans?" *Global Environmental Change* 51 (2018): 22–31. doi: 10.1016/j.gloenvcha.2018.05.002.

Frantzi, Sofia et al., "Adoption and diffusion of marine litter clean-up technologies across European seas: Legal, institutional and financial drivers and barriers," *Marine Pollution Bulletin* 170, 112611 (2021): 1-9. doi: /10.1016/j.marpolbul.2021.112611.

Goncalves, Luisa and Faure, Michael. "International Law Instruments to Address the Plastic Soup," *Wm. & Mary Env'tl. L. & Pol'y Rev.* 43 (2019): 871- 948.

Jambeck, Jenna, et al. "Plastic waste inputs from land into the ocean." *Science* 347, 62223. (2015): 768–771. doi: 10.1126/science.1260352.

Korhonen, Jouni et al. "Circular Economy: The Concept and its Limitations," *Ecological Economics* 143 (2018): 37-46.

Loukacheva, Natalia, "The Arctic Council and 'Law-Making'," *The Northern Review* 50 (2020): 109-135. doi: 10.22584/nr50.2020.005.

- Lusher, Amy et al. "Microplastics in Arctic polar waters," *Sci. Rep.* 5, 14947 (2015): 1-9.  
doi: 10.1038/srep14947.
- Mah, Alice. "Future-Proofing Capitalism: The Paradox of the Circular Economy for Plastics," *Global Environmental Politics*, 21, 2 (2021): 121-142. doi: 10.1162/glep\_a\_00594.
- Martinez, Karla. et al. "Temporal Trends in Marine Litter at Three Stations of the Hausgarten Observatory in the Arctic Deep Sea," *Frontiers in Marine Science*, 7, 321 (2020): 1-16.  
doi: 10.3389/fmars.2020.00321.
- Peeken, Ilka et al. "Arctic Sea Ice is an important temporal sink and means of transport for microplastic," *Nature Communications*, 9, 1505 (2018): 1-12.  
doi: 10.1038/s41467-018-03825-5.
- Perrez, Franz. "The Role of the United Nations Environment Assembly in Emerging Issues of International Environmental Law," *Sustainability*, 12, 5680 (2020): 1-13.  
doi: 10.3390/su12145680.
- Poto, Margherita et al., "Suggestions for a Systematic Regulatory Approach to Ocean Plastics," *Foods*, 2021,10. 2197 (2021): 1-12. doi: 10.3390/foods10092197.
- Sauvé, Sebastian et al. "Environmental sciences, sustainable development and circular economy: Alternative concepts for trans-disciplinary research," *Environmental Development*, 17, (2016): 48-56. doi: 10.1016/j.envdev.2015.09.002.
- Tekman, Mine et al. "Marine litter on deep Arctic seafloor continues to increase and spreads to the north at the Hausgarten observatory." *Deep Sea Res I* 120 (2017): 88-99.  
doi: 10.1016/j.dsr.2016.12.011.
- Toyoshima, Junko. "Marine Plastic Pollution in the Arctic," *OPRI Perspectives* 10, 1 (2020): 1-7. <https://www.spf.org/opri-intl/global-data/report/perspectives/2021010763638974>.

## **Books**

- Ghosh, Sadhan K. *Circular Economy: Global Perspective*. Singapore: Springer, 2019.
- Newman, Stephanie et al. "The Economics of Marine Litter." In *Marine Anthropogenic Litter*, edited by Melanie Bergmann et al. 367-394. Springer Nature, 2015.

## **Reports**

- Boucher, Julien and Friot, Damien. *Primary Microplastics in the Oceans: A Global Evaluation of Sources*. (2017) Gland, Switzerland: IUCN (2017) 43 pp.  
doi: dx.doi.org/10.2305/IUCN.CH.2017.01.en
- Ellen MacArthur Foundation, "Towards the Circular Economy." Vol. 1 (2013).

<https://www.ellenmacarthurfoundation.org/assets/downloads/publications/Ellen-MacArthur-Foundation-Towards-the-Circular-Economy-vol.1.pdf>.

GESAMP, *Sea-Based Sources of Marine Litter*, Report No. 108 of the Joint Group of Experts on the Scientific Aspects of Marine Environmental Protection, Working Group 43 (22 November 2021).

Nashoug, Benedikte. "Sources of Marine Litter," SALT Workshop, Svalbard 4-6 September 2016, SALT report no. 1017 (16 March 2017). 18 pp.

PAME, Regional Waste Management Strategies for Arctic Shipping / Regional Reception Facilities Plan (RRFP) and Proposal for IMO Consideration (May 2017).

PAME, Arctic Shipping Status Report #1, "The Increase in Arctic Shipping 2016-2019." (31 March 2020). <https://pame.is/projects/arctic-marine-shipping/arctic-shipping-statusreports/723-arctic-shipping-report-1-the-increase-in-arctic-shipping-2013-2019-pdf-version/file>

PAME, *Desktop Study on Marine Litter including Microplastics in the Arctic* (May 2019).

PAME I-2021 Working Group Summary Meeting Report, 5 February 2021.

PAME Work Plan 2021-2023, <https://pame.is/pame-work-plan>

UNEP (2009), *Marine Litter: A Global Challenge*. United Nations Environment Program, Nairobi.

UNEP (2016), *Marine Plastic Debris and Microplastics - Global Lessons and Research to Inspire Action and Guide Policy Change*. United Nations Environment Program, Nairobi.

UNEP (2018), *Combating marine plastic litter and microplastics: an assessment of the effectiveness of relevant international, regional and subregional governance strategies and approaches*. (Nairobi) UNEP/AHEG/2018/1/INF/3 May 2018.

White Paper 45 to the Norwegian Parliament (2017), Meld. St. 45 (2016-2017), *Avfall som ressurs - avfallspolitikk og sirkulær økonomi*

## Online Resources

Arctic Council, <https://www.arctic-council.org> (last accessed 25.11.2021)

Arctic Portal, <https://www.arcticportal.org> (last accessed 2.9.2021)

European Free Trade Association, "EEA Agreement." <https://www.efta.int/eea-lex/32019L0904>; <https://www.efta.int/eea-lex/32019L0883> (last accessed 30.10.2021)

Katz, Cheryl. "Why Does the Arctic Have More Plastic Than Most Places on Earth?" *National Geographic*, 30 October 2019. <https://www.nationalgeographic.com/science/article/remote-arctic-contains-more-plastic-than-most-places-on-earth> (last accessed 2.9.2021)

IMO, "London Convention Protocol." <https://www.imo.org/en/KnowledgeCentre/ConferencesMeetings/Pages/London-Convention-Protocol.aspx> (last accessed 14.10.2021)

IMO, "Prevention of Pollution by Garbage from Ships." <https://www.imo.org/en/OurWork/Environment/Pages/Garbage-Default.aspx> (last accessed 02.11.2021)

IMO, "GISIS/Port Reception Facility Database." <https://gisis.imo.org/Public/PRF/AllegedInadequacy.aspx> (last accessed 6.11.2021)

International Standards Organization, ISO/AWI 24247, Ships and Marine Technology - Marine Environment Protection - Arrangement and Management of Port Reception Facilities in the Arctic. <https://www.iso.org/standard/78183.html> (last accessed 6.11.2021)

National Geographic Society, "Arctic." <https://www.nationalgeographic.org/encyclopedia/arctic/> (last accessed 2.9.2021)

National Oceanic and Atmospheric Administration, <https://www.pmel.noaa.gov/arctic-zone/faq.html> (last accessed 10.11.2021)

Norwegian Maritime Authority Circular No. RSR 22-2012, 18 Dec. 2012. <https://www.sdir.no/en/shipping/legislation/directives/amendments-to/> (last accessed 29.10.2021)

OSPAR Commission, "Marine Litter Regional Action Plan." <https://www.ospar.org/documents?v=34422> (last accessed 17.11.2021); <https://www.ospar.org/work-areas/eiha/marine-litter/regional-action-plan/development-of-the-new-marine-litter-regional-action-plan> (last accessed 23.11.2021)

OSPAR Commission, "Convention." <https://www.ospar.org/convention>; <https://www.ospar.org/convention/the-north-east-atlantic/i> (last accessed 12.11.2021)

PAME, "Current Marine Litter Projects." <https://www.pame.is/projects-new/arctic-marine-pollution/current-marine-litter-projects/424-arctic-coastal-cleanup> (last accessed 31.8.2021)

PAME, "Regional Action Plan on Marine Litter." <https://pame.is/projects-new/arctic-marine-pollution/marine-litter-highlights/428-regional-action-plan-on-marine-litter>. (last accessed 25.11.2021)

PAME I-2012 Agenda Item 4.6, AMSA Recommendation II(D), "Specially Designated Arctic Marine Areas and Port Waste Reception Facilities." [https://www.pame.is/images/05\\_Protectec\\_Area/2012/PAME\\_I\\_2012/04\\_Agenda/](https://www.pame.is/images/05_Protectec_Area/2012/PAME_I_2012/04_Agenda/) (last accessed 31.10.2021)

PAME, "Shipping current projects 2021-2023. <https://www.pame.is/projects-new/arctic-shipping/shipping-current-projects-2021-2023/422-arctic-port-reception-facilities-inventory> (last accessed 22.11.2021)

Safety4Sea, "USCG: Waste Reception Facilities on fishing ports," 17 Jan. 2020. <https://safety4sea.com/uscg-waste-reception-facilities-on-fishing-ports/> (last accessed 2.11.2021)

Stern, A. et al., "Bipartisan Save Our Seas 2.0 Act Signed into Law," 23 Dec. 2020. <https://www.natlawreview.com/article/bipartisan-save-our-seas-20-act-signed-law> (last accessed 28 10.2021)

U.S. Coast Guard, CGMIX. <https://cgmix.uscg.mil/MARPOL/MARPOLSearch.aspx> (last accessed 15.11.2021)

## **Miscellaneous**

Ad Hoc Working Group, Convention for Biological Diversity, "First Draft of the Post-2020 Global Biodiversity Framework," CBD/WG2020/3/3 (5 July 2021).

EFTA Court, Judgment of 2 August 2016, Case E-25/15, *EFTA Surveillance Authority v. The Kingdom of Norway*, <https://eftacourt.int/download/35-15-judgment/?wpdmdl=1559>.

EFTA Surveillance Authority, Opinion concerning the incorrect implementation by Norway of Directive 2000/59/EC on port reception facilities, Case No: 71727, 10 July 2013. <https://www.eftasurv.int/cms/sites/default/files/documents/gopro/2920-674349.pdf>

OSPAR Commission/HELCOM, "Sanctions, penalties and fines issued by OSPAR and HELCOM Contracting Parties for waste disposal offences at sea," ICG-M-(1) 16/6/2: 1-49.

Metcalf, Kathy. "Preparing for Maritime Transportation in a Changing Arctic," Testimony of Kathy Metcalf at hearing before U.S. Senate Subcommittee on Oceans, Atmosphere, Fisheries, and Coast Guard, 6 December 2018. <https://www.commerce.senate.gov/2018/12/subcommittee-announces-hearing-to-examine-arctic-transportation-issues>