

Marine Plastics: Fragmentation, Effectiveness and Legitimacy in International Lawmaking

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Abstract

It hardly needs stating that much of the plastic rubbish that is now found in our oceans comes from land-based sources. From plastic bags, to toothbrushes and plastic nurdles plastic enters the oceans through, for example, discharges or dumping in rivers, from waste dumped on land blowing into watercourses, and from land-fill sites which have been built too close to the coastline and are damaged by storms. This paper explains the weaknesses in the current law on marine pollution from land based sources and activities that paves the way for such widespread pollution of our oceans before examining possible legal solutions to this problem. Potential solutions to this problem are assessed using insights from literature on fragmentation and on effectiveness and legitimacy of regimes. In constructing this analysis the paper thus develops understandings of when and why the adoption of treaties may be both appropriate and effective.

Key Words: Plastics, Marine Pollution from Land-based Activities, Regime Building, Protection of the Marine Environment, Law of the Sea, Marine Environmental Law

1. Introduction

It hardly needs stating that most of the plastic that is now found in our oceans comes from land-based sources.¹ From plastic bags, to toothbrushes and plastic nurdles, plastic enters the oceans through, for example, discharges or dumping in rivers,² from waste dumped on land blowing into watercourses, and from land-fill sites which have been built too close to the

¹ See M Eriksen, LCM Lebreton, HS Carson, M Thiel, CJ Moore, et al 'Plastic Pollution in the World's Oceans: More than 5 Trillion Plastic Pieces Weighing over 250,000 Tons Afloat at Sea' (2014) PLoS ONE 9(12): e111913. doi:10.1371/journal.pone.0111913; see also, M Bergmann, MB Tekman & L Gutow 'Marine Litter; Sea change for plastic pollution' (2017) 544 Nature 297; UNEP 'Marine Plastic Debris and Microplastics: Global Lessons and Research to Inspire Action and Guide Policy Change' (UNEP, 2016); Ocean Conservancy and McKinsey Centre for Business and Environment "Stemming the Tide: Land-based strategies for a plastic free ocean" (2017) <<https://oceanconservancy.org/wp-content/uploads/2017/04/full-report-stemming-the.pdf>>; Haward, M 'Plastic pollution of the world's seas and oceans as a contemporary challenge in ocean governance' (2018) 9 *Nature Communications*, Article number: 667.

² D Morritt, PV Stefanoudis, D Pearce, OA Crimmen & PF Clark 'Plastics in the Thames: A river runs through it' (2014) 78 *Marine Pollution*, 196 – 200; JR Jambeck, R Geyer, C Wilcox, TR Siegler, M Perryman, A Andrady, R Narayan & KL Law 'Plastic waste inputs from land into the ocean' (2015) 347 (6223) *Science* 768 – 771; AA Horton, C Syendsen, RJ Williams, DJ Spurgeon & E Lahive 'Large microplastic particles in sediments of tributaries of the River Thames, UK – Abundance, sources and methods for effective quantification' (2017) 114 (1) *Marine Pollution Bulletin*, 218 – 226.

coastline³ and damaged by storms. That this is happening may seem odd given that Article 207 of the UN Convention on the Law of the Sea⁴ requires States to adopt laws and procedures to manage marine pollution from land-based activities. One would anticipate that States would have adopted national legislation to tackle this problem and indeed, some States have. Kenya, for example, has banned the production, import, export and use of single use plastic bags.⁵ Other countries have adopted less stringent measures. The UK, for example, has imposed a levy on the use of single use plastic bags.⁶ These national measures raise the question of why more is not being done at the State level and what exactly international law requires of States in relation to marine plastics pollution from land-based pollution. They also raise the questions of what further measures could be adopted and where the best location of new measures lies in what is (as we demonstrate) a fragmented “regime” on plastics – questions which are germane to any area of international law making. Should they be adopted under an existing treaty, or treaties or through a new treaty, mirroring, for example the POPs⁷ or Mercury⁸ Conventions? Which approach would be more effective or have more legitimacy? The scale of the problem of plastics pollution also leads us to ask if it, like other problems of the Anthropocene, dictates the adoption of a precautionary approach to international law making. We begin with a review of the current law, before moving on to tackle the questions set out here.

2. The Current Law

2.1 Normatively Weak and Imprecise

Article 207 of the United Nations Convention on the Law of the Sea (LOSC) is designed as a framework provision. It sets out the basic obligation to ‘adopt laws and regulations to prevent, reduce, and control pollution from land-based sources’, but it does not provide detail on what those laws are to be.⁹ That detail is to come from ‘internationally agreed rules,

³ JH Tibbetts ‘Managing Marine Plastic Pollution: Policy Initiatives to Address Wayward Waste’ (2015) 123 (4) *Environmental Health Perspectives*, A90 – A93; VG Carman, N Machain & C Campagna ‘Legal and institutional tools to mitigate plastic pollution affecting marine species: Argentina as a case study’ (2015) 92 *Marine Pollution Bulletin*, 125 – 133.

⁴ United Nations Convention on the Law of the Sea (adopted 10 December 1982; entered into force 16 November 1994) 1833 UNTS 3.

⁵ Environmental Management and Co-ordination Act, The Kenya Gazette Vol.CXIX-No.31 Page. 1077 (14 March 2017), Sections 3 and 86.

⁶ See for example the Single Use Carrier Bags Charges (England) Order 2015.

⁷ Stockholm Convention on Persistent Organic Pollutants (adopted 22 May 2001; entered into force 17 May 2004) 2256 UNTS 119.

⁸ Minamata Convention on Mercury (adopted 10 October 2013; entered into force 16 August 2017) <https://treaties.un.org/Pages/ViewDetails.aspx?src=IND&mtdsg_no=XXVII-17&chapter=27&clang=en>.

⁹ A Proelss, *United Nations Convention on the Law of the Sea: A Commentary*, 1383 – 1390; D VanderZwaag and A Powers, ‘The Protection of the Marine Environment from Land-based Pollution and Activities: Gauging the Tides of Global and Regional Governance’ (2008) 23 *International Journal of Marine and Coastal Law* 423, 425 – 426; Y Tanaka, ‘Regulation of Land-Based Marine Pollution in International Law: A Comparative Analysis Between Global and Regional Legal Frameworks’ (2006) 66 *Heidelberg Journal of International Law* 535; T Mensah, ‘The International Legal Regime for the Protection and Preservation of the Marine Environment from Land-based Sources of Pollution’ in A E Boyle and D Freestone (eds), *International Law and Sustainable Development* (International Law and Sustainable Development, Oxford University Press 1999), 297 – 324; A E Boyle, ‘Land-

standards, and recommended practices and procedures'.¹⁰ There is some debate as to what this obligation entails. While some authors indicate that it means that all States, whether party or not to the treaties referred to in Article 207, must take them into account,¹¹ as the provision reflects an intention to harmonise international, regional and national actions tackling land-based pollution including plastic,¹² others suggest that may not be the case.¹³ In any event, the provision is normatively weak as there is no timeline by which States must adopt measures, nor is there an actual obligation to give effect to the agreed rules, standards, and recommended practices and procedures in national legislation, nor is there any clarity as to which agreements, rules etc are caught by the phrase 'internationally agreed rules, standards, and recommended practices and procedures' or which international organisations are deemed competent to adopt such rules, standards etc. This is in contrast to, for example the provisions on dumping under which State actions must be 'no less effective than' the relevant global rules and standards¹⁴ and to the provisions on vessel source pollution¹⁵ where the International Maritime Organization was acknowledged as the 'competent international organisation'. In the case of marine pollution from land-based activities, however, the term 'international organisations' was intentionally used as, marine pollution from land-based activities involves multiple actors and institutions.¹⁶ The problem this presents is, however, that there is a danger of both fragmentation¹⁷ of legal standards and of forum (or rather standard) shopping¹⁸ with States choosing which subsequent agreements or institutions they choose to join or to focus on in practice.

In addition, there may be problems holding States to account. Although a State that fails to demonstrate the consideration of 'internationally agreed rules, standards and recommended practices and procedures' runs the risk of being in breach of the due diligence obligation under international law,¹⁹ the likelihood of States being held to account for such a breach are

based Sources of Marine Pollution' (1992) 16 *Marine Policy* 20; A E Boyle, 'Marine Pollution under the Law of the Sea Convention' (1985) 79 *American Journal of International Law* 347.

¹⁰ The LOSC, Article 207 (4). See generally R R Churchill, 'The LOSC Regime for Protection of the Marine Environment – Fit for the Twenty-first Century?' in R Rayfuse (ed), *Research Handbook of International Marine Environmental Law* (Research Handbook of International Marine Environmental Law Edward Elgar 2015) 24 – 25.

¹¹ Ibid.

¹² Proelss *ibid*, 1384.

¹³ Popattanachai *ibid*, 162 – 163.

¹⁴ Proelss *supra* n 9, the LOSC, Article 210 (6); M Nordquist, S Rosenne and A Yankov, *United Nations Convention on the Law of the Sea 1982 A Commentary*, vol IV (Martinus Nijhoff Publishers 1991) 132; For more discussion on Article 207 of the LOSC, see. N Popattanachai, 'Regional Cooperation Addressing Pollution from Land-based Activities: An Interpretation of Article 207 of the Law of the Sea Convention Focusing on Monitoring, Assessment, and Surveillance of the Pollution', (Nottingham Trent University 2018), 133 – 183.

¹⁵ Nordquist et al *supra* n 14 201 – 202.

¹⁶ Ibid 133. See also, Proelss *supra* n 9 1387 – 1388.

¹⁷ Margaret Young "Regime Interaction in Creating, Implementing and Enforcing International Law" in Margaret Young ed. *Regime Interaction in International Law: Facing Fragmentation* (Cambridge University Press, 2012 p.85

¹⁸ Daniel W. Drezner "The Power and Peril of International Regime Complexity" (2009) 7 *Perspectives on Politics* 65

¹⁹ Ibid. For due diligence, see P Birnie, A E Boyle and C Redgwell, *International Law and the Environment* (3rd edn, Oxford University Press 2009), 147; International Law Commission, 'Draft Articles on Prevention of Transboundary Harm from Hazardous Activities' (Draft Articles on Prevention of Transboundary Harm),

slim. First there is the question of what counts as an appropriate response to this obligation. Even if that question could be clearly answered, if a State can show that they have adopted the necessary measures to control pollution, evidenced a certain level of vigilance and taken enforcement action against those contributing to plastics pollution they have a clear defence.²⁰ In addition, until relatively recently, plastic was hailed as a wonder material and not thought of as a pollutant. Perhaps as a result of this (and as discussed below) there is relatively little international regulation directed at the control of plastics pollution. Second, while studies have shown that most of the plastic in the ocean comes from a small number of countries²¹ all States cause plastics pollution and it will be extremely difficult to show a chain of causation from a specific harm back to plastics pollution from a single State. Thus making it very hard to hold any State to account through the laws of State responsibility.

To some extent these weaknesses in Article 207 are being addressed through subsequent agreements and practice, but as we show in the next section, these efforts also contain some weaknesses with respect to plastics. One of the most significant flaws is that the instruments addressing marine plastics pollution address more forms of pollution than plastics.

2.2 It's not just plastic

The question of which institutions and rules or standards are relevant has been answered in part through the establishment of the Global Programme of Action for the Protection of the Marine Environment from Land-based Activities (GPA).²² Its effect is, however, somewhat limited by its non-legally binding nature²³ and it is not the only instrument in town - rules and standards are being adopted under other treaties such as the Basel Convention²⁴ and the Convention on Biological Diversity.²⁵ Nevertheless, the GPA provides the main focus for discussion of rules and standards relevant to Article 207. It also provides a mechanism through which States can agree source categories of pollution and prioritise sources to

Yearbook of the International Law Commission, 2001, Vol. II, Part Two; International Law Association, First Report of the ILA Study Group on Due Diligence in International Law, 2014). For cases relating to the due diligence obligation, see. *Certain Activities Carried Out by Nicaragua in the Border Area (Costa Rica v. Nicaragua)* and *Construction of a Road in Costa Rica along the San Juan River (Nicaragua v. Costa Rica)*, (Judgment) [2015] ICJ Rep 665; Advisory Opinion on Responsibilities and obligations of States with respect to activities in the Area, 1 February 2011, ITLOS Reports 2011, 10; *Pulp Mills on the River Uruguay case (Argentina v. Uruguay)* (Judgment), [2004] ICJ Rep 2010 14

²⁰ Request for Advisory Opinion submitted by the Sub-Regional Fisheries Commission, Advisory Opinion, 2 April 2015, ITLOS Reports 2015

²¹ Ocean Conservancy (*supra* n 1).

²² UNEP 'Global Programme of Action for the Protection of the Marine Environment from Land-based Activities' UNEP(OCA)/LBA/IG.27 (5 December 1995).

²³ D VanderZwaag and A Powers *supra* n 9 437 – 438.

²⁴ 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.

²⁵ Convention on Biological Diversity (adopted 5 June 1992; entered into force 29 December 1993) 1760 UNTS 79.

address.²⁶ Marine plastic is captured under the broader category of ‘litter’ and was not initially a priority action though action to tackle it was encouraged.²⁷

The types of action encouraged included, at the national level, the employment of appropriate regulatory measures including ‘economic instruments and voluntary measures to encourage reduction of the generation of solid wastes’ and the use of other non-regulatory measures such as an increase of rubbish containers in public areas; establishing and ensuring the suitable operation of solid-waste management facilities; raising public awareness and educational campaigns on marine litter; and ‘improved management programmes in the rural areas in order to avoid litter escape into river, marine, and coastal environment’.²⁸ At the regional level, an exchange of information on ‘practices and experience regarding waste management, recycling, and reuse and cleaner production as well as regional arrangements for solid-waste management’ are required. In addition, a clearing-house mechanism on waste management and other cooperation and assistance – financially and technologically – are recommended at the international level.²⁹

Despite the GPA’s soft law status, it has attracted considerable State interaction and is supported by regular Inter-Governmental Reviews (IGRs). These have led across time to more and more attention being paid to plastics pollution. At first, however, plastics pollution continued to be treated as one of many forms of marine litter and it is only more recently that it has been treated as a form of pollution in its own right. Even then the focus of attention was, until 2017 on monitoring and developing understanding and not on the adoption of regulations. It was not until the second and third IGRs that we saw marine litter (and plastics) being highlighted as an emerging issue.³⁰ These led to the establishment of various measures such as the Global Initiative on Marine Litter³¹ and the Manila Declaration.³² The basic thrust of the measures adopted was to focus on developing understanding and on developing guidelines for monitoring. The results include the UNEP/IOC Guidelines on Survey and Monitoring of Marine Litter,³³ the Honolulu Strategy: A Global Framework for Prevention and Management of Marine Debris (Honolulu Strategy)³⁴ (acknowledged in the third IGR as

²⁶ The GPA (*supra* n 22) para 142.

²⁷ *Ibid*, under the GPA, Land-based pollution and activities are categorised into nine source-categories. They are (i) sewage, (ii) Persistent Organic Pollutants (POPs); (iii) radioactive substances; (iv) heavy metal; (v) oils (hydrocarbons); (vi) nutrients; (vii) sediment mobilisation; (viii) litter; and (ix) physical alteration and destruction of habitats. Of these nine source-categories, sewages, and POPs are prioritised source-categories requiring urgent actions.

²⁸ *Ibid*, paras 146, (a) – (g).

²⁹ *Ibid*, paras 147 – 148.

³⁰ UNEP ‘Progress in implementing the Global Programme of Action for the Protection of the Marine Environment from Land-based Activities at the national, regional and international levels over the period 2007–2011’ UNEP/GPA/IGR.3/2 (9 November 2011), para 39 – 41.

³¹ UNEP ‘Report of the second intergovernmental review meeting on the implementation of the global programme of action for the protection of the marine environment from land-based activities’, UNEP/GPA/IGR.2/7 (26 January 2012), Annex.

³² *Ibid*, Annex ‘Manila Declaration on Furthering the Implementation of the Global Programme of Action for the Protection of the Marine Environment from Land-based Activities’.

³³ UNEP ‘UNEP/IOC Guidelines on Survey and Monitoring of Marine Litter’ UNEP Regional Seas Reports and Studies, No. 186; IOC Technical Series No. 83, <<http://wedocs.unep.org/bitstream/handle/20.500.11822/13604/rsrs186.pdf?sequence=1>>.

³⁴ UNEP/NOAA, ‘The Honolulu Strategy; A Global Framework for Prevention and Management of Marine Debris’ (2012) <https://marinedebris.noaa.gov/sites/default/files/publications-files/Honolulu_Strategy.pdf> 11 – 12;

relevant to the implementation of the GPA in respect of marine litter)³⁵ the adoption of the Global Partnership on Marine Litter (GPML) in 2012³⁶ and publication of 'Marine Plastic Debris and Microplastics: Global Lessons and Research to Inspire Action and Guide Policy Change' which sets out policy recommendations including that States invite a range of international regimes from the World Trade Organisation to the Basel Convention to take account of the report in their work and that the precautionary approach be applied.³⁷

The focus was turned more clearly on plastics at the fourth IGR meeting with States committing to accelerate actions to reducing marine pollution caused by plastics and microplastics.³⁸ It was only then in 2017 that States moved from focussing on monitoring and the development of understanding to agreeing measures States should take to tackle the plastics problem. States agreed to 'implement long-term and robust strategies to reduce the use of plastics and microplastics, particularly plastic bags and single use plastics, including by partnering with stakeholders at relevant levels to address their production, marketing and use'³⁹ and established a sub-programme on marine litter as part of the 2018-2022 programme of work. This sub-programme aims to 'assist countries in strengthening evidence-based policymaking, raising awareness and building national capacity by providing advisory services through integrated, full lifecycle, ecosystem-based management and resource efficiency objectives and policies. This also includes approaches such as the '6Rs' (remove, reduce, reuse, recycle, re-design, recover) that recognize waste as a resource and highlight the strong linkage between ecosystem services and human well-being'.⁴⁰

This global process has gone a long way towards developing standards for the control and prevention of plastics pollution. It has not, however, occurred in isolation. At the same time as measures have been adopted through the IGR process, there have been some significant (though geographically limited) developments relating to the control of plastics at the regional level. These have once again, tended to come under the broader heading marine litter.⁴¹ As we demonstrate below while there may be evidence of emerging practice around a norm of reduction of plastics pollution, only a few Regional Seas programmes have actually

The Strategy was acknowledged in the third IGR as relevant to the implementation of the GPA in the case of marine litter.

³⁵ UNEP, 'Report of the third intergovernmental review meeting on the implementation of the global programme of action for the protection of the marine environment from land-based activities', UNEP/GPA/IGR.3/6 (26 January 2012), Annex. One recital of the Manila Declaration reads '...Recognizing that litter does not belong to the sea and therefore emphasizing the relevance of the Honolulu Commitment endorsed at the 5th International Marine Debris Conference, and the Honolulu Strategy, ...'

³⁶ For more information of the GPML, see. <<https://www.unenvironment.org/explore-topics/oceans-seas/what-we-do/addressing-land-based-pollution/global-partnership-marine>>.

³⁷ UNEP 'Marine plastic debris and microplastics – Global lessons and research to inspire action and guide policy change' (*supra* n. 1) (UNEP, 2016).

³⁸ UNEP, 'Draft programme of work of the Global Programme of Action Coordination Office for the period 2018–2022' (Advance Copy) UNEP/GPA/IGR.4/4 (7 September 2017), para. 8 (g).

³⁹ *Ibid*, para. 8 (i)

⁴⁰ UNEP, 'Draft programme of work' (*supra* n 38) paras. 32 – 33.

⁴¹ UNGA, 'Report of the Secretary-General on Oceans and the Law of the Sea' UN Doc A/70/74/Add.1 (2016), para 99.

demonstrated such practice, having adopted Action plans to combat the problem. Thus the majority of regional seas have yet to address this problem.

Of those regional seas that do address marine litter, a small number provide significant targets and measures and adopt a precautionary approach. For example, the OSPAR Regional Action Plan for Prevention and Management of Marine Litter in the North-East Atlantic,⁴² aims “to substantially reduce marine litter in the OSPAR maritime area to levels where properties and quantities do not cause harm to the marine environment” by 2020. While this standard opens the question of what quantities and properties would not cause harm, in light of the growing evidence of the problems caused by marine litter, and plastics in particular, it will be a challenging target to meet. To meet it OSPAR has a number of regional initiatives which include working with industry to develop best environmental practice, sharing best waste management practices within the region, and ensuring that plastics pellets are effectively managed during all stages of the production process. Many of the initiatives focus on working with other agencies and actors. For example, OSPAR has committed to exploring voluntary agreements to stop use of micro plastics and where that is not possible to work with the EU to ensure appropriate legislation is adopted. The Mediterranean first started tackling the problem of marine litter more than 30 years ago and adopted measures to tackle persistent synthetics as long ago as 1991.⁴³ It is perhaps not surprising then that its provisions appear to be the furthest advanced with more emphasis placed on national action and clear deadlines set for the adoption of measures such as exploring extended producer liability. Some other regional seas have adopted similar provisions. For example, the Baltic,⁴⁴ has adopted a series of regional actions including sharing best practice and improving storm water management to reduce litter reaching the seas through this form of run off and reviewing the necessity for legislation to address micro-plastics.

What is notable about the measures adopted at regional level is that they distinguish between particular types or uses of plastics. Micro-plastics are identified as a priority problem as are single use plastics such as plastic bags and bottles. The Baltic has also adopted a suite of voluntary national actions from which member States can choose those most appropriate to their circumstances.⁴⁵ These range from establishing more ashtrays in public places to address cigarette butts, to promoting extended producer responsibilities. Other regions such as PERSGA focus on public education and clean up,⁴⁶ or on establishing the extent of the challenge posed by plastics.⁴⁷

⁴² Regional Action Plan (RAP) for Marine Litter (OSPAR Marine Litter RPA), available at: <<https://www.ospar.org/work-areas/eiha/marine-litter/regional-action-plan>>.

⁴³ Measures on Control of pollution by persistent synthetic materials in the Mediterranean Sea adopted by the 7th Meeting of the Contracting Parties (Cairo, October 1991) see UNEP, ‘Regional Plan for the Marine Litter Management in the Mediterranean’ (Mediterranean Marine Litter RAP) UNEP(DEPI)/MED WG. 379/5 (2013) at 1.

⁴⁴ Regional Action Plan for Marine Litter in the Baltic Sea (Baltic Marine Litter RAP) (2015), <<http://www.helcom.fi/Lists/Publications/Regional%20Action%20Plan%20for%20Marine%20Litter.pdf>>.

⁴⁵ Ibid.

⁴⁶ The Regional Organization for the Conservation of the Environment of the Red Sea and Gulf of Aden (PERSGA) ‘*Marine Litter In The PERSGA Region*’ (PERSGA 2008).

⁴⁷ UNEP, ‘Regional Action Plan On Marine Litter Management (RAPMaLi) For The Wider Caribbean Region 2014’, CEP Technical Report 72 (UNEP 2014)

In recognition of the importance of regional programmes. UN Environment is providing assistance to South-East Asia, South Asia, the South Pacific and North-East Pacific regions in establishing marine litter action plans and supporting the implementation of the existing action plans in “the greater Caribbean, Mediterranean and the North-West Pacific regions, where regional nodes of the Global Partnership on Marine Litter have been established.”⁴⁸

A similar type of approach is taken by the Basel Convention which addresses plastics through its provisions on hazardous and other wastes. ‘Hazardous wastes’ are identified either by characteristics specified in Annexes I and III or by listing in Annexes VIII and IX and must be controlled. ‘Other wastes’ are listed in Annex II and require ‘special consideration’. Both types of wastes are to be disposed of in an environmentally sound way, and their transboundary movement must be controlled.⁴⁹ Several developments have been made to address plastics under the Basel Convention, including the adoption of the Technical Guidelines for the Identification and Environmentally Sound Management of Plastic Wastes and for their Disposal.⁵⁰ The guidelines give ‘general guidance on the identification, environmentally sound management and disposal’ of plastic waste.⁵¹ Notably, the technical guidelines on plastic wastes ‘include all polymer and plastic types, not just those having an Annex I constituent’.⁵² In addition, marine plastic has become the subject of the 2018 – 2019 work programme of the Basel Convention’s Open-ended Working Group to consider options and ‘develop a proposal for possible further actions’.⁵³

A different set of actions have been taken in other fora. Several calls have been made at the international level for action on developing understanding which appear to be being heeded. For example, in 2005 the UN General Assembly noted the lack of ‘information and data on marine debris’ (including plastic).⁵⁴ States were urged to support and conduct more research on ‘the extent and nature of the problem’.⁵⁵ In addition, States are encouraged to provide ‘greater assistance’ on waste management and their monitoring regimes.⁵⁶ These calls led to several studies under a variety of processes and bodies, including Socioeconomic

⁴⁸ UNEP, ‘Progress in the Implementation of Resolution 2/11 on Marine Plastic Litter and Microplastics Report of the Executive Director’ UNEP/EA.3/13 (21 September 2017).

⁴⁹ Basel Convention (*supra* n 24) Article 4. For plastic listed under the Basel Convention, see, <<http://www.basel.int/Implementation/MarinePlasticLitterandMicroplastics/Overview/tabid/6068/Default.aspx>>.

⁵⁰ UNEP, ‘Report of the Conference of the Parties to the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal on the work of its sixth meeting’, Decision BC-VI/21 ‘Technical Guidelines for the Identification and Environmentally Sound Management of Plastic Wastes and for their Disposal’ UNEP/CHW.6/40 (2003) Annex at 136; The guidelines are found at Conference of the Parties to the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal, ‘Technical Guidelines for the Identification and Environmentally Sound Management of Plastic Wastes and for Their Disposal’ UNEP/CHW.6/21 (2002), <<http://www.basel.int/Portals/4/download.aspx?d=UNEP-CHW-WAST-GUID-PlasticWastes.English.pdf>>.

⁵¹ *Ibid*, the Technical Guidelines, 6.

⁵² *Ibid*.

⁵³ UNEP, ‘Report of the Conference of the Parties to the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal on the work of its thirteenth meeting’, Decision BC 13/17 ‘Work programme and operations of the Open-ended Working Group for the biennium 2018–2019’ UNEP/CHW.13/28 (2017) Annex I.

⁵⁴ UNGA, ‘Report of the Secretary-General on Oceans and the Law of the Sea’ UN Doc A/60/30 (2005)) para 65.

⁵⁵ *Ibid*.

⁵⁶ UNGA, ‘Report of the Secretary-General on Oceans and the Law of the Sea’ UN Doc A/65/69 (2010) para 73.

Aspects ('UN Regular Process')⁵⁷, the UN Environment⁵⁸, and the Joint Group of Experts on the Scientific Aspects of Marine Environmental Protection ('GESAMP').⁵⁹ Despite this, the UNGA and UN Environment are still calling for further research, for example on 'transfer routes for plastic contaminants into human beings', 'effects of plastics on human beings', as well as 'effects of plastic and microplastics on fish stocks'⁶⁰ and the UN Environment Assembly has reiterated the call for capacity building.⁶¹

Within the CBD and IWC regimes, measures are focussed on plastics that negatively affect biodiversity⁶² and on understanding and mitigating the impact the plastics have.⁶³ The developments have tended to focus on the provision of (soft law) guidance. Thus in the CBD an expert workshop was established 'to prepare practical guidance on preventing and mitigating the significant adverse impacts of marine debris on marine and coastal biodiversity and habitats' within the marine and biodiversity work programme.⁶⁴ The outcome of the workshop was the report entitled 'Marine Debris: Understanding, Preventing and Mitigating Significant Adverse Impacts on Marine and Coastal Biodiversity' submitted to the Subsidiary Body on Scientific, Technical, and Technological Advice (SBSTTA) of the CBD.⁶⁵ The report provides information on the impact of marine debris including plastic on marine biodiversity and reassesses 'policy options and approaches that are in place or have been proposed to address the impacts of marine debris'.⁶⁶ Some of the challenges to the regulation of marine plastic litter and microplastics identified by this report are the need to ensure 'the wide-scale implementation of a range of land-based measures to prevent and reduce marine debris that will be able to match the projected increase in plastic production' and the lack of knowledge on the problem.⁶⁷

2.3 Conclusions on the Current Law

⁵⁷ UNGA, 'The First Global Integrated Marine Assessment (First Ocean Assessment)' (2016) <http://www.un.org/Depts/los/global_reporting/WOA_RegProcess.htm>. See Ch. 25 on Marine Debris.

⁵⁸ UNEP, 'Plastic in Cosmetics' (UNEP 2015); UNEP/NOAA, 'The Honolulu Strategy; A Global Framework for Prevention and Management of Marine Debris' (2012); UNEP, 'Marine Litter: A Global Challenge' (2009); UNEP, 'UNEP/IOC Guidelines on Survey and Monitoring of Marine Litter' UNEP Regional Seas Reports and Studies No. 186; IOC Technical Series No. 83.

⁵⁹ GESAMP, Sources, Fate and Effects of Microplastics in the Marine Environment (Part One), GESAMP Reports and Studies No. 90 (IMO 2015) GESAMP, Sources, Fate and Effects of Microplastics in the Marine Environment (Part 2) GESAMP Reports and Studies No. 93 (IMO, 2016). GESAMP, 'Proceedings of the GESAMP Workshop on Microplastic particles', GESAMP Reports and Studies No. 82 (2010).

⁶⁰ UNGA, 'Report on the work of the United Nations Open-ended Informal Consultative Process on Oceans and the Law of the Sea at its seventeenth meeting' UN Doc A/71/204 (2016), para 36. See also UNEP/EA.2/Res.11.

⁶¹ Ibid, UNEP.

⁶² UNGA 'Report of the Secretary-General on Oceans and the Law of the Sea' (2014) UN Doc A/69/71/Add.1, para. 85.

⁶³ See the IWC Pollution Project, <<https://iwc.int/understanding-the-threat-to-cetaceans-from-micropl>>.

⁶⁴ UNEP Conference of the Parties to the Convention on Biological Diversity at its Eleventh Meeting, 'Decision XI/18. Marine and coastal biodiversity: sustainable fisheries and addressing adverse impacts of human activities, voluntary guidelines for environmental assessment, and marine spatial planning' UNEP/CBD/COP/DEC/XI/18 (2012), para 26.

⁶⁵ Secretariat of the CBD, 'Marine Debris: Understanding, Preventing and Mitigating Significant Adverse Impacts on Marine and Coastal Biodiversity' UNEP/CBD/SBSTTA/20/INF/9 (2016) CBD Technical Series No. 83.

⁶⁶ Ibid, 2.

⁶⁷ Ibid, 3.

The discussion above illustrates that current legal developments in relation to the regulation of marine plastic pollution is rather patchy and subject to potentially competing norms of behaviour. Two approaches are being taken - one focussed on developing understanding and monitoring and another, emerging body of practice more focussed on reducing plastics pollution. The review highlights two further concerns. First, practice in the regions encompassing the States which are reported to be the largest sources of marine plastics pollution from land-based activities, is least developed. Second, while the regional seas provisions either currently mesh with the developing global regime under the GPA, or are moving in that direction, there is evidence of potentially competing norms in provisions developed through the CBD and IWC regimes. If one wanted to conclude that there was a binding (customary) norm focussed on reducing the volume of plastics entering the marine environment⁶⁸ this competing practice makes that unlikely. It also raises the risk that diverging standards will lead to a variety of practices by States, each of which may comply with one (version of a) norm relating to plastics pollution but not with others.⁶⁹ The variety of possible results of application of different standards, coupled with divergence in membership across the various instruments, paves the way for a number of interpretations of Article 207 each of which could be seen as illegitimate in the context of different regimes.⁷⁰

These issues point to the need for further action to be taken to address plastics effectively. That need is also evident in the growing problem of plastics pollution in the oceans and on land. In the next section we look at the types of developments that are needed to address marine plastics pollution effectively and the likelihood of any legal developments having success.

3. Next Steps in Tackling Marine Plastics from Land-based Activities

Before developing the way ahead we pause to consider whether in fact a regime is already emerging⁷¹ despite the differences in approach highlighted above. In this case the norms might be that plastics use be reduced, plastics be recycled and/or that we stop producing new plastics. Then practice must begin to coalesce around the norm. The norm then begins to develop greater clarity and starts to emerge as a binding norm, not merely a convenient

⁶⁸ On the development of binding norms or regimes see J. Brunnée and S.J. Toope, *Legitimacy and Legality in International Law : An interactional Account*, (Cambridge University Press, UK, 2010); Finnemore, M., & Sikkink, K. (1998) "International norm dynamics and political change" 52 *International Organization*, , 887–917; Finnemore, M., & Sikkink, K. "Taking stock: The constructivist research program in international relations and comparative politics" (2001) 4 *Annual Review of Political Science*, 391–416; Franck, T. M. *The power of legitimacy among nations* (Oxford University Press, 1990); Fuller, L. L *The morality of law* (Yale University Press, 1969); Hasenclever, A., Mayer, P., & Rittberger, V. *Theories of international regimes* (Cambridge University Press. 1997; Jacobsson, B., & Sahlin-Andersson, K. "Dynamics of soft regulations" and Mörtz, U. "Soft regulation and global democracy" both in M.-L. Djelic & K. Sahlin-Andersson (Eds.), *Transnational governance: Institutional dynamics of regulation* (Cambridge University Press, 2006).

⁶⁹ For examples of this in practice see Nele Matz-Lück " Norm Interpretation Across International Regimes: Competence and Legitimacy" in Margaret A. Young (2012) *supra* n 17 p.201

⁷⁰ *Ibid* on competing interpretations and legitimacy where treaties do not share the same parties. See also Martti Koskeniemi "Hegemonic Regimes" in Margaret A. Young (ed) *supra* n. 17 p305

⁷¹ J Brunnée and S Toope, *supra* n 68; Hasenclever et al *supra* n 68; L Lessig, 'Social meaning and social norms' (1996) 144 *University of Pennsylvania Law Review* 2181 – 2189; C R Sunstein, 'Social Norms and Social Roles' (1996) 96 *Columbia Law Review*, 903 – 968.

practice. Despite the diverging practices discussed above, there is evidence for a coalescence in practice around a reduce, recycled or prevention of production norm in pledges from some multi-national companies to reduce, or recycle their plastics⁷² and in the adoptions of laws banning or imposing charges for plastic bags being adopted by countries, from the United Kingdom to India.⁷³ These include Kenya's notable ban on the manufacture, use, import and export of plastic bags.⁷⁴ There is, however, also evidence to suggest that at least some of that practice is based in pragmatism rather than any form of commitment to a norm. For example, the same companies making pledges to reduce packaging in the UK have been lobbying government against increasing the amount they pay towards collecting and recycling plastic (and other) waste.⁷⁵ One might be concerned then that if public attention turned away from plastics that commercial or national commitments to tackling the problem would also wain.

A counter to any such concerns is that many of these initiatives around plastics are relatively recent. The term 'plastic' first formally appeared as an agenda item in the 66th session of the UN General Assembly,⁷⁶ for example. The fact that so many international organisations are focussing increasing attention on plastics suggests a rapidly growing practice and this is happening in a context in which the need to engage with all stakeholders to share responsibility is being recognised.⁷⁷ This has led to repeated calls for further developments of 'partnerships with industry and civil society to raise awareness of the extent of the impact of marine debris on the health and productivity of the marine environment.'⁷⁸ The result has been the establishment of the several partnerships to deal with land-based pollution, such as the GPML.⁷⁹ In addition, the focus on plastics was given further impetus following the United Nations Conference on Sustainable Development (Rio+20 Conference) held in Brazil, 2012 where States agreed that 'the health of the ocean and marine biodiversity are negatively affected by marine pollution, including marine debris, especially **plastic**, persistent organic

⁷² Coca-Cola pledges to recycle all packaging by 2030 BBC News 19 January 2018. See, <<http://www.bbc.co.uk/news/business-42746911>>; S Laville and R Smithers 'UK supermarkets launch voluntary pledge to cut plastic packaging' (The Guardian, 26 April 2018). See also M Landon-Lane 'Corporate social responsibility in marine plastic debris governance' (2018) 127 *Marine Pollution Bulletin*, 310 – 319.

⁷³ See Rafia Afroz, Aatur Rahman, Muhammad Mehedi Masud and Rulia Akhtar "The knowledge, awareness, attitude and motivational analysis of plastic waste and household perspective in Malaysia" (2017) 24 *Environ Sci Pollut Res* 2304

⁷⁴ *Supra* n 5.

⁷⁵ See, FOI release Meetings with Minister Thérèse Coffey about food packaging and recycling published 25 April 2018 <<https://www.gov.uk/government/publications/meetings-with-minister-therese-coffey-about-food-packaging-and-recycling>>.

⁷⁶ UNGA Resolution 66/70 (2011) para 92. According to the resolution, 'Marine debris includes persistent, manufactured or processed solid material discarded, disposed of or abandoned in the marine and coastal environment, such as plastics, glass, metal, styrofoam, rubber and lost or discarded fishing gear.'

⁷⁷ *Ibid*, para 104. See also, UNGA (2016) *supra* n 60, paras 24 – 25.

⁷⁸ UNGA, 'Report of the Secretary-General on Oceans and the Law of the Sea' UN Doc A/63/111 (2008), para 106; UNGA, Report of the Secretary-General on Oceans and the Law of the Sea' UN Doc A/62/215 (2007) para 89; UNGA, Report of the Secretary-General on Oceans and the Law of the Sea' UN Doc A/61/222 (2006), para 78; UNEP/EA.2/Res.11 para 13.

⁷⁹ *Supra* n 36. See also, UNEP, 'Progress in the implementation of the Global Programme of Action for the Protection of the Marine Environment from Land-based Activities at the national, regional and international levels over the period 2012–2017' (Advance Copy) UNEP/GPA/IGR.4/2 (12 July 2017), para 8.

pollutants, heavy metals and nitrogen-based compounds, from a number of marine and land-based sources.’⁸⁰

These developments support our suggestion earlier in the paper that practice is converging around two norms – developing understanding and monitoring, and reduction of plastics pollution. The question then is, what is the best way forward in development of the legal framework?

3.1 Potential Improvements Under the Current Legal Framework

An obvious solution to the plastics problem may be to continue to develop regulation through the IGR attached to the GPA and through treaties such as the Basel Convention and the CBD.

Options to build on existing measures include putting further efforts into educating the public regarding plastics use and disposal under each of the regimes, but such efforts are unlikely to yield much success unless alternative materials to plastic are available and effective waste disposal and recycling systems are in place. In addition, research from countries such as Malaysia show that significant efforts would be required in this area to achieve any level of willingness on the part of the public to participate on a voluntary basis.⁸¹

The GPA could focus further efforts on capacity building to tackle the plastics coming from, in particular developing States. With reports showing that the majority of plastics in the oceans come from 5 States,⁸² focussing capacity building efforts on those States is likely to yield significant returns. Thus knowledge and experience of implementing successful bottle deposit schemes could be shared with a view to rolling these out in more countries. So too could expertise on designing effective recycling facilities.⁸³ Indeed, some attention is already being paid to the issue of capacity building, though not necessarily on the States from which much of the plastics pollution emanates. For example, the UN General Assembly has called upon States to support, in particular Small Island Developing States to ‘raise awareness’, and to support ‘improved waste management practices’.⁸⁴ As a result of these calls there have been some developments. For example, the Regional Reception Facilities Plan for small island developing States in the Pacific region has been developed by the Secretariat of the Pacific Regional Environment Programme (SPREP).⁸⁵

⁸⁰ Emphasis added. UNGA Resolution 66/288 ‘The Future We Want’ (2012), para 163, 218; see also, UNGA (2016) (*supra* n 62), para 2.

⁸¹ Afroz et al *supra* n 73. See also Benjamin Bolaane “Constraints to promoting people centred approaches in recycling” (2006) 30 *Habitat International* 731.

⁸² Ocean Conservancy (*supra* n 1).

⁸³ See, for example, Kemal Özkan, Semih Ergin, Sahin Isik and Idil Isikli “A New Classification Scheme of Plastic Wastes Based Upon Recycling Labels” (2015) 35 *Waste Management* 29 on one aspect of design of recycling facilities.

⁸⁴ UNGA, ‘Report of the Secretary-General on Oceans and the Law of the Sea’ UN Doc A/72/70/Add.1 (2017), paras. 19, 80, and 89; UNGA, ‘Report of the Secretary-General’ (2016) (*supra* n 62) para 71; UNGA (2008) *supra* n 78, para 16; UNGA (2007) *supra* n 78 para. 14; UNGA (2006) *supra* n 78 para. 12; UNGA (2005) *supra* n 54, para 12

⁸⁵ Ibid, ‘Report of the Secretary-General (2016), para 71.

As understanding of the issues attached to plastics problems develops, capacity building efforts could turn to other issues. For example, the industrial development of plastic eating enzymes⁸⁶ as a means to tackle legacy plastics could prompt the development of standards related to best management of recycling and reuse of plastics standards under the GPA. Indeed, measures as Best Available Techniques and Best Environmental Practices approaches already have support in international reports.⁸⁷ Similarly greater efforts could be placed on increasing recycling rates amongst States generally through extended producer responsibility (for example, requiring commercial companies to increase their recycling of plastics packaging) or through support for domestic recycling through increased kerb side collection, deposit return schemes, or “pay as you throw” schemes. Each of these have shown some degree of success. For example, when a deposit return scheme was introduced in South Australia, the rates of return increased to 74% of sales compared to 36% in other Australian states.⁸⁸

These types of measures do, however, also face obstacles. The OECD’s 2016 updated report on EPR shows that although there has been significant uptake of EPRs (approximately 300 since 2001) it is hard to establish their precise impact on waste reduction, both because of a lack of data in general and because it is hard to separate their impact from the impact of other policies or initiatives.⁸⁹ In addition, while we might hope that EPR would help move producers away from oil-based plastics, practice, as reviewed by the OECD suggests that EPRs do not have a (significant) impact on product design.⁹⁰ A further issue with this approach is that while it is being embraced in the EU and north America, it is not so prevalent in other countries. Thus promoting it may require considerable investment in recycling technologies and in educational efforts to ensure it was effective in precisely the countries in which action is most required. As Par *et al.*, note, however, the use of EPR in developing countries has given rise to challenges including

“the absence of well-established waste management systems, limited recycling, absence of important stakeholders, heavier reliance on financial incentives, existence of a large informal sector, as well as weak regulatory and institutional requirements. The investigations of the e-waste EPR systems in China, Thailand, and India point to the difficulties in identifying producers-due to the prevalence of

⁸⁶ See, for example, HP Austin *et al.* ‘Characterization and engineering of a plastic-degrading aromatic polyesterase’ (2018) 115 (19) *Proceedings of the National Academy of Sciences*, E4350 – E4357; R Wei and W Zimmerman ‘Microbial enzymes for the recycling of recalcitrant petroleum-based plastics: how far are we?’ (2017) 10(6) *Microbial Biotechnology*, 1308 – 1322; S Yoshida, K Hiraga, T Takehana, I Taniguchi, H Yamaji, Y Maeda, K Toyohara, K Muiyamoto, Y Kimura & K Oda ‘A bacterium that degrades and assimilates poly(ethylene terephthalate)’ (2016) 351 (6278) *Science* 1196 – 1199. Cf. Y Yang, J Yang, & L Jiang ‘Comment on “A bacterium that degrades and assimilates poly(ethylene terephthalate)”’ (2016) 353 (6301) *Science* 759.

⁸⁷ UNEP (*supra* n 1).

⁸⁸ West, D. 2007 Container deposits: the common sense approach v.2.1 Sydney, Australia: The Boomerang Alliance. See also Afroz *et al supra* n. 73.

⁸⁹ OECD *Extended Producer Responsibility: Updated guidance for effective waste management* (OECD publishing, 2016).

⁹⁰ *Ibid* chapter 1.

producers without any registration, ... as well as greater opportunities for false-reporting due to subsidies given to collectors and recyclers”.⁹¹

Further problems may arise because, deposit return schemes, may lead to reduced sales, and to additional costs associated with administering the scheme. It may be challenging to set the deposit level at the correct rate to promote recycling - too low and the deposit will not influence some customers to recycle, too high and it may put others off purchasing the item in question.⁹² Thus, even though they may bring overall benefits to States,⁹³ their introduction may also face opposition from producers and retailers.⁹⁴ Indeed, some research has shown that members of the public are also unwilling to support the costs of additional recycling.⁹⁵ Take back schemes also raise questions of how recovered packaging such as bottles are returned to manufacturers where production takes place some distance from the location of recovery.⁹⁶ Other schemes, such as pay as you throw schemes, require sophisticated equipment, such as microchips for bins and weighing scales on rubbish trucks, with scales, for example, requiring regular recalibration and upkeep.⁹⁷ In addition, recycling is only profitable if more than 47% of materials sent for recycling are recoverable, yet contamination of recycled materials is a significant problem.⁹⁸

Even a focus on reduction may run into problems due to the need to refocus supply chains and distribution networks away from oil based plastics. The potential increase in costs for suppliers and distributors from switching or reducing plastics⁹⁹ means that those companies keen to make a change must convince all within the distribution network of the benefits. The switching costs¹⁰⁰ for all combined with business opposition to extended producer

⁹¹ Jooyoung Park, Nohora Díaz-Posada and Santiago Mejía-Dugand “Challenges in implementing the extended producer responsibility in an emerging economy: The end-of-life tire management in Colombia” (2018) 189 *Journal of Cleaner Production* 754, see also Afroz *supra* n. 73 and Bolaane *supra* n. 81.

⁹² Praveen Kulshreshtha and Sudipta Sarangi ““No return, no refund”: an analysis of deposit-refund systems” (2001) 46 *Journal of Economic Behavior & Organization* 379

⁹³ Doron Lavee “A Cost-benefit Analysis of a Deposit-refund Program for Beverage Containers in Israel” (2010) 30 *Waste Management* 338

⁹⁴ Daisuke Numata “Economic Analysis of Deposit-refund Systems with Measures for Mitigating Negative Impacts on Suppliers” (2009) 53 *Resources, Conservation and Recycling* 199.

⁹⁵ Randall Bluffstone and J.R. De Shazo “Upgrading municipal environmental services to European Union levels: a case study of household willingness to pay in Lithuania” (2003) 8 *Environment and Development Economics* 637

⁹⁶ Jefferson Hopewell, Robert Dvorak and Edward Kosior “Plastics recycling: challenges and opportunities” (2009) Vol. 364, No. 1526 *Philosophical Transactions: Biological Sciences*, p. 2115

⁹⁷ Juergen Morlok, Harald Schoenberger, David Styles, Jose-Luis Galvez-Martos and Barbara Zeschmar-Lahl “The Impact of Pay-As-You-Throw Schemes on Municipal Solid Waste Management: The Exemplar Case of the County of Aschaffenburg, Germany” (2017) 6 *Resources* 8

⁹⁸ M. Athanassiou and A. Zabaniotou “Techno-economic assessment of recycling practices of municipal solid wastes in Cyprus” (2008) 16 *Journal of Cleaner Production* 1474

⁹⁹ See K. Verghese & H. Lewis “Environmental innovation in industrial packaging: a supply chain approach” (2007) 45 *International Journal of Production Research* 4381 on costs to distribution of alternative packaging.

¹⁰⁰ W. Brian Arthur, “Competing technologies, increasing returns, and lock-in by historical events” (1989) 99 *Economic Journal* 116 -131; W. Brian Arthur, *Increasing Returns and Path Dependence in the Economy* (University of Michigan Press, 1994)

responsibility mean that a deminimus approach will likely be taken unless the law pushes them further.¹⁰¹

There are two further problems with developing measures through existing regimes. The first is that competing standards may emerge.¹⁰² It is possible for this danger to be addressed through the various conventions collaborating - adopting memoranda of understanding, for example, to help guide their actions. There are examples of other treaty bodies entering into such memoranda with a view, for example, to implementing particular approaches such as the ecosystem approach in a coordinated fashion.¹⁰³ Equally States may focus on and aim to achieve complementarity rather than conflict between regimes.¹⁰⁴ As Young notes, however, collaboration agreements can be used to (in effect) undermine one of the regimes¹⁰⁵ and States too may focus more on the aspects of interacting regimes that are in their “personal” interests rather than on, for example, environmental benefit.

The second problem is that these measures set out above take an incremental approach to tackling marine plastics pollution. As plastic accumulation in the oceans increases exponentially “from around 5 million tonnes in the 1950s to over 300 million tonnes today”¹⁰⁶ taking an incremental uncoordinated approach may leave the problem of plastics accumulation in the oceans to grow to an unmanageable scale (if it is not already there) with consequent impacts on marine fisheries and biodiversity and so to humans, either through loss of a source of protein, or potentially through consuming fish contaminated with plastics. In addition, as indicated at the start of this section, the measures outlined above would be designed to build on existing measures. Existing measures *are* proving to be too little and to be adopted and implemented too slowly to really tackle plastics in the marine environment.

3.2 A Plastics Treaty

3.2.1 Justification for a Treaty

Given the potential problems of continuing to build on existing regulatory responses to plastics pollution, we propose the adoption of a plastics treaty and argue that its effectiveness would likely be greater than that of a fragmented governance system containing variations in standards.¹⁰⁷ That does not mean that the existing efforts are not useful; they may feed into a global regime.

¹⁰¹ Jennifer Nash and Christopher Bosso “Extended Producer Responsibility in the United States” (2013) 17 *Journal of Industrial Ecology* 175

¹⁰² See for example, Young 2012 *supra* n.17; ILC Study Group Fragmentation in International Law: Difficulties arising from the diversification and expansion of international law Report of the Study Group of the International Law Commission finalized by Martti Koskenneimi (A/CN.4/L.682 and Corr.1) (13 April 2006).

¹⁰³ See for example, Memorandum of Understanding between the North-East Atlantic Fisheries Commission and the OSPAR Commission, 2008, <http://neaafc.org/system/files/Collective_Arrangement.pdf>.

¹⁰⁴ Thomas Gehring & Benjamin Faude “A theory of emerging order within institutional complexes: How competition among regulatory international institutions leads to institutional adaptation and division of labor” (2014) 9 *Rev Int Organ* 471

¹⁰⁵ Young 2011 and 2012 *supra* n 17.

¹⁰⁶ R C Thomson, ‘Future of the Sea: Plastic Pollution’ (Foresight, Government Office for Science, 2017) 5.

¹⁰⁷ For an example from practice see Sylvia I. Karlsson-Vinkhuyzen and Jeffrey McGee “Legitimacy in an Era of Fragmentation: The Case of Global Climate Governance” (2013) 13.3 *Global Environmental Politics* 56.

While it may be assumed that adoption of a plastics treaty is supported by a global consensus, the review of relevant instruments above coupled with a comparison of similar instruments in other fields indicates that is not yet the case. Consensus has emerged on the need to take action as most clearly evidenced by the United Nations Environment Assembly 2016 Resolution on Marine plastic litter and microplastics which calls for a global response to the problem of plastics pollution (the Plastics Resolution). However, the resolution is largely focused on the need to work with industry to find solutions to plastics pollution and to develop understanding. This reflects the way the international community is currently tackling plastics pollution (as described above). What the resolution does not do is clearly call for the negotiation of an international treaty to prevent, or control plastics pollution. This can be contrasted with the wording of other resolutions addressing global issues. For example, UN General Assembly Resolution 69/292 clearly calls for the development of an international treaty to address conservation and sustainable use of marine biodiversity in areas beyond national jurisdiction by using the words “Decides to develop an international legally binding instrument ... on the conservation and sustainable use of marine biological diversity of areas beyond national jurisdiction”¹⁰⁸ The plastics resolution contains no such language. We therefore set out proposals for a treaty below, but begin by exploring the likelihood of success of any such treaty given that there does not yet appear to be a consensus for the adoption of a plastics treaty.

Focus, Justification and Effectiveness

Like the measures we discussed under the current law, the treaty we propose would not be focussed solely on plastics linked to marine pollution from land-based activities. Instead the treaty would deal with plastics more generally. This broader focus is justified by the fact that it is impossible to distinguish those plastics that end up in the oceans from others. We also argue that the primary objective for the treaty should be a ban on oil based plastics. We recognise that focussing on a ban on plastics rather than, for example, deposit return schemes or other schemes designed to increase recycling, may be seen as radical, or alternatively as unnecessary. Our argument is, however, that such a treaty is both necessary to combat the rapidly growing plastics problem and more likely to be effective than the alternatives. In this we agree with Biermann *et al.* that the incremental approaches taken to tackling the world’s environmental problems are insufficient.¹⁰⁹ It also follows the well recognised OECD waste hierarchy which begins with prevention of waste formation followed by reuse and recycling¹¹⁰ and may help address the plastics pollution regardless of sources. For example it is now estimated that 46% of the plastics debris in the Great Pacific Garbage Patch arises from

¹⁰⁸ UN GA 2015 Resolution on Development of an international legally-binding instrument under the United Nations Convention on the Law of the Sea on the conservation and sustainable use of marine biological diversity of areas beyond national jurisdiction UNGA/RES/69/292 operative paragraph 1.

¹⁰⁹ Frank Biermann, Kenneth Abbott, Steinar Andresen, Karin Bäckstrand, Steven Bernstein, Michele M Betsill, Harriet Bulkeley, Benjamin Cashore, Jennifer Clapp, Carl Folke, Aarti Gupta, Joyeeta Gupta, Peter M Haas, Andrew Jordan, Norichika Kanie, Tatiana Kluvánková-Oravská, Louis Lebel, Diana Liverman, James Meadowcroft, Ronald B Mitchell, Peter Newell, Sebastian Oberthür, Lennart Olsson, Philipp Pattberg, Roberto Sánchez-Rodríguez, Heike Schroeder, Arild Underdal, Susana Camargo Vieira, Coleen Vogel, Oran R Young, Andrea Brock and Ruben Zondervan “Transforming governance and institutions for global sustainability: key insights from the Earth System Governance Project” (2012) 4 *Current Opinion in Environmental Sustainability* 51

¹¹⁰ OECD *Extended Producer Responsibility: a Guidance Manual for Government* (OECD Publishing, 2001).

discarded fishing gear.¹¹¹ These statistics suggest that focusing on one source of plastic alone somewhat misses the point.

We propose that the focus of the treaty would be on banning oil-based plastics and we argue that this focus will lead to a more effective treaty than other possible foci. We view effectiveness as a treaty exerting a strong compliance pull¹¹² and making a significant contribution to the control and eradication of plastics pollution.¹¹³ We argue that a treaty containing a ban has the potential to exert such a pull leading States (and private actors) to stop oil-based plastics production and use. Other approaches such as increasing rates of incineration, or recycling carry risks. Incineration would risk moving (plastics) pollution from one medium (land/sea) to another (air) through the potential for pollutants such as dioxins to be released.¹¹⁴ The problems with recycling and extended producer liability in general were discussed above, in the section dealing with potential improvements under the current framework.

A ban on plastics also raises questions of effectiveness. For example, as Afroz *et al* note a number of States have introduced bans on plastic bags, but not all have led to significant changes in behaviour, in part because of low enforcement and low awareness amongst the public.¹¹⁵ Key to success appears to be the creation of social norms.¹¹⁶ A treaty containing an oil-based plastics ban could aid with this. For it to do so, it must exert a strong compliance pull for which timeliness and what Oran Young refers to as the socio-economic context are key.¹¹⁷ In addition, we suggest that the relative simplicity of a ban would make monitoring of compliance more effective than monitoring of recycling rates, for example, could be.¹¹⁸

In the marine context new treaties or marked changes in the way treaties are applied are most likely to be adopted when a major disaster occurs, or where the public gain an awareness of an issue. For example, major developments in the control of oil spills took place after disasters such as the Erika and the Torrey Canyon which not only caused extensive

¹¹¹ L. Lebreton, B. Slat, F. Ferrari, B. Sainte-Rose, J. Aitken, R. Marthouse, S. Hajbane, S. Cunsolo, A. Schwarz, A. Levivier, K. Noble, P. Debeljak, H. Maral, R. Schoeneich-Argent, R. Brambini & J. Reisser "Evidence that the Great Pacific Garbage Patch is rapidly accumulating plastic" (2018) 8 *Scientific Reports* 4666

¹¹² Franck *supra* n 68.

¹¹³ Oran R. Young "The effectiveness of international environmental regimes: Existing knowledge, cutting-edge themes, and research strategies" (2011) 108 *Proceedings of the National Academy of Sciences* 19853–19860; Sylvia I. Karlsson-Vinkhuyzen and Jeffrey McGee "Legitimacy in an Era of Fragmentation: The Case of Global Climate Governance" (2013) 13.3 *Global Environmental Politics* 56

¹¹⁴ Hopewell *et al supra* n 96.

¹¹⁵ Afroz *et al supra* n73.

¹¹⁶ See for example, W. Kip Viscusi, Joel Huber, and Jason Bell "Promoting Recycling: Private Values, Social Norms, and Economic Incentives" (2011) 101 *American Economic Review: Papers & Proceedings* 101; Damiano Fiorillo "Household waste recycling: national survey evidence from Italy" (2013) 56 *Journal of Environmental Planning and Management* 1125

¹¹⁷ Oran R. Young, *The institutional dimensions of environmental change: Fit, interplay, and scale* (MIT Press, 2002).

¹¹⁸ On the importance of monitoring to treaty compliance see Ronald B. Mitchell "Regime design matters: intentional oil pollution and treaty compliance" (1994) 48 *International Organization* 425

marine pollution, but also caught the public eye.¹¹⁹ The compliance pull, or effectiveness, of these agreements, appears, however, to be more closely linked to public and media pressure than to the degree of scientific certainty or even to the existence of a disaster¹²⁰ thus fitting with Young's assessment of the effectiveness of regimes being dependent on their fit to the wider socio-economic or biophysical settings.¹²¹ The current attention being given to plastics pollution by the media and governments across the world, coupled with the mounting evidence of harm to the environment from plastics pollution indicates that time has come for plastics.

International law has, however, a number of treaties which have not achieved the ends intended. The UN Framework Convention on Climate Change,¹²² for example, does not appear to have made much of a dent in the emissions of greenhouse gases which have continued to grow at an exponential rate even after its entry into force.¹²³ This despite the fact that significant political and media attention has also been placed on climate change. There are, however, a number of factors that point to the possibility that a treaty on plastics need not befall the same fate as the Climate Change Convention. As noted earlier, a regime may be emerging and a treaty may help crystallise it. For a treaty to be successful, however, there also need to be alternatives to plastics available. In other words, again, it has to fit with the socio-economic context.¹²⁴ One of the elements that made the Ozone Convention¹²⁵ regime a success, for example, was that alternative chemicals existed or were quickly developed following national bans¹²⁶ and these could be used in place of those harming the ozone layer. Similarly, the whaling moratorium adopted under the International Convention for the Regulation of Whaling¹²⁷ became feasible because alternatives to whale oil and protein had been developed.¹²⁸ Similar developments are now being seen in relation to plastics. Alternatives to oil-based plastics (the problematic plastics) do exist.¹²⁹ That they are becoming more commercially viable is evidenced by the fact that companies are exploring how to use them.¹³⁰ A treaty addressing oil-based plastics may promote greater investment in these

¹¹⁹ K J Tan, *Vessel-Source Marine Pollution: The Law and Politics of International Regulation* (Cambridge University Press 2006).

¹²⁰ Elizabeth A. Kirk, "Marine Governance, Adaptation and Legitimacy" (2011) 22 *Yearbook of International Environmental Law* 110.

¹²¹ Young, *supra* n 117.

¹²² United Nations Framework Convention on Climate Change (adopted 9 May 1992; entered into force 21 March 1994) 1771 UNTS 107.

¹²³ World Meteorological Organization, 'Greenhouse Gas Bulletin' No. 13 (30 October 2017) <<https://public.wmo.int/en/media/press-release/greenhouse-gas-concentrations-surge-new-record>>.

¹²⁴ Young *supra* n.113 See also Ronald B. Mitchell "Problem Structure, Institutional Design, and the Relative Effectiveness of International Environmental Agreements (2006) 6 *Global Environmental Politics* 72

¹²⁵ Vienna Convention for the Protection of the Ozone Layer (adopted 22 March 1985; entered into force 22 September 1988) 1513 UNTS 293.

¹²⁶ R E Benedick, *Ozone Diplomacy: New Directions in Safeguarding the Planet* (Harvard University Press, 2009) 24.

¹²⁷ International Convention on the Regulation of Whaling, (adopted 2 December 1946; entered into force 10 November 1948) 161 UNTS 2124.

¹²⁸ See, for example, Y Nishi, 'Dolphins, Whales and the Future of the International Whaling Commission' (2010) 33 *Hastings International and Comparative Law Review* 285.

¹²⁹ J H Song, R J Murphy, R Narayan & G B H Davies, 'Biodegradable and compostable alternatives to conventional plastics' (2009) 364 (1526) *Philosophical Transactions of the Royal Society B: Biological Sciences* 2127 – 2139.

¹³⁰ D King "M&S, Plan A and a Polymer for all Reasons? Profile – Kevin Vyse" (Packaging News, January 2018).

alternatives to oil based plastics by creating confidence in industry and governments that a common market in these alternatives will emerge.¹³¹ Indeed such a commitment to banning of oil-based plastics is likely to send a stronger signal to the market than any that could be sent by using economic incentives or relying on extended producer liability to effect change.

There are, however, some factors which mitigate against the success of a plastics treaty. The first is that there is currently a lack of scientific certainty as to the harm to humans from plastics and even as to the pervasiveness of plastics pollution.¹³² The amount ingested by humans via, for example, fish they consume, is not known. As indicated in a variety of reports¹³³, however, certainty is quickly coalescing. The recent spate of papers about the pervasiveness and volume of microplastics and plastics in the oceans referred to above demonstrate a growing awareness of, and agreement on the scale of the problem. Nevertheless, laws to ban or limit the amount of plastics from land-based activities would have to be adopted on a precautionary basis. This lack of certainty as to the potential costs of not adopting a regime means that further factors may be necessary to convince actors to adopt a plastics treaty.¹³⁴ As Arthur notes, the potential switching costs associated with adopting a new way of working (in this case a new treaty to ban oil-based plastics) promote path-dependency in decision-making.¹³⁵ Thus there has to be a significant potential benefit to taking the new path, or significant cost to remaining on the old path. There are, however, examples of States acting on a precautionary basis. The Ozone regime again provides an example of States acting on such a basis to prevent potential harm to humans and other species. At the time of its adoption, while there was certainty as to the harm being done to the ozone layer, there was less clarity as to the potential harm to living organisms, including humans.¹³⁶ There is also support at the global and regional levels for precautionary action in relation to plastics.¹³⁷ We suggest, therefore, that the precautionary issue is not problematic in this case. This is particularly so as the world is coming to accept that we are entering a new age – the Anthropocene – an era characterised not only by the influence of humans but also by the fact that changes are often abrupt and irreversible, in contrast to the relative stability provided by the Holocene.¹³⁸ Recognition of the entry into the Anthropocene provides that added impetus for a precautionary approach. As Young notes, these changes demand that we enter into treaties such as a plastics treaty focussed on prevention which have the ability to stop us entering a tipping point of environmental harm.¹³⁹

What then might a plastics treaty look like?

¹³¹ For example, Hopewell et al *supra* n. 96 note that existing schemes in Germany and elsewhere had already increased the market value of recycled plastics in 2009. See more generally Young, O. R. "The behavioral effects of environmental regimes: Collective-action vs. social-practice models" (2001) *1 International Environmental Agreements*, 1, 9–29

¹³² See the various calls for further research on this point referred to *supra* n 60.

¹³³ See, for example, UNEP 2016 *supra* n.1

¹³⁴ See Young, *supra* n 131

¹³⁵ Arthur (1989) and (1994) *supra* n 100.

¹³⁶ Benedick, *supra* n.126

¹³⁷ UNEP *supra* n 1. See also the discussion of the regional seas action plans *supra*.

¹³⁸ Steffen, W., Grinevald, J., Crutzen, P., & McNeill, J. (2011). The Anthropocene: Conceptual and historical perspectives. *Philosophical Transactions of the Royal Society A*, 369, 842–867.

¹³⁹ Young, O. R. "Navigating the sustainability transition" In E. Brousseau, et al. (Eds.), *Global environmental commons* (Oxford University Press, 2012) (pp. 80–101).

3.2.2 Elements of a Treaty

We anticipate that that a treaty should address capacity building, the development of scientific understanding and public education as discussed earlier in relation to development of existing regimes. In addition, we believe it should be designed to phase out, rather than ban all oil-based plastics immediately, to support alternative technologies, to entrench common but differentiated responsibility and to address legacy plastics. These additional items are explored below.

Phasing Out Oil Based Plastics

Even given all the good omens we have outlined, an outright ban on all oil-based plastics is highly unlikely to succeed. Plastics are, like greenhouse gases, ubiquitous in modern life. Enforcing a complete ban at short notice would not therefore fit with the socio-economic context and agreeing one to come into force at some distant point in the future would do nothing to tackle the current issue. Once again, however, lessons can be drawn from treaties such as the Ozone Convention and the POPs Convention. While they are designed to prevent the production and use of harmful chemicals, the approach taken in them is to begin with the most harmful, or the most easily replaced, or those we are most aware of. Thus, for example the Montreal Protocol to the Ozone Convention phased out Halons more quickly than CFCs. The POPs Convention likewise began with 12 chemicals before adopting a ban on a further set of chemicals in 2009 and further bans in each of its subsequent meetings. A similar approach could be taken in a plastics treaty, though any bans ought perhaps to focus on use as much as form of plastic. Thus, items such as single use plastic bags and plastic straws may be subject to an immediate ban – alternatives to them exist, their use is non-essential and practice in banning or limiting their use is already emerging. In practice around 50% of the plastics used globally are single use plastics¹⁴⁰ and so focussing on them as an initial first step would have a significant impact on plastics pollution. The use of plastics in other products such as motorcycle crash helmets may be subject to longer time frames, as there may be no viable substitute materials at present. Where substitution with alternative materials (and hence an immediate ban) is not yet possible, provision could be made within the treaty to require and support increased recycling, with capacity building measures to support recycling in developing States a key element of the treaty, but such measures come with a health warning that public education of the environmental imperatives and the development of accessible recycling facilities are key to their success.¹⁴¹

Supporting Alternative Technologies

A second approach is to focus on supporting alternative technologies such as facilitating greater use of plant-based plastics. Again, practice is beginning to emerge at the commercial level with companies developing and using such plant-based plastics, however, there is no evidence yet of practice emerging at the State and global or regional levels. In addition, such a change in technology is complicated by the fact that oil-based plastics are currently recycled

¹⁴⁰ Hopewell et al *supra* n 96.

¹⁴¹ See generally Afroz et al *supra* n 73 and Bolaane *supra* n81

in many countries. While the Ozone Convention and Montreal Protocol address, for example, refrigerants found in refrigerators which may be recycled, the way in which refrigerators, which tend to be relatively large, come to be recycled is different to the way in which plastics may come to be recycled. The latter are likely to be collected from or deposited in a recycling bin containing other plastic items which will be collected for recycling as one. Refrigerators are more likely to be deposited at a recycling centre as single items. A move to plant based plastics would then require careful planning and public education to ensure that current recycling efforts are not undermined by plant based plastics contaminating the oil based plastics intended for recycling.¹⁴² Again though there is precedence: in the lead up to the adoption of the Ozone Convention UNEP and the US government undertook significant public education campaigns.¹⁴³ Similar education campaigns could be adopted and indeed to some degree are already underway in relation to oil based plastics. In addition, the problem of recycling contamination will be a more significant issue in States where recycling is already well established. Paradoxically, moving straight to non-oil based plastics rather than focussing on increasing recycling rates may be easier in States which do not have strong recycling at present. That is – both easier within those States and compared to States that are already recycling. It also has the potential to address problems that occur after extreme weather events such as typhoons. For example, Yang and Innes note that recycling rates reduced immediately following a typhoon in Taiwan, possibly in part because the government provided free waste collection at that point¹⁴⁴ and possibly simply because the public had more immediate concerns than long term environmental issues. A move to alternative technologies would mean that extreme weather events (which may increase due to climate change) and tsunamis would, in effect, be washing biodegradable materials into the environment rather than oil based plastics.

Common but Differentiated Responsibilities

Although the “common but differentiated responsibility” principle is found in other environmental agreements, (the Montreal Protocol (Article 5), for example, differentiates between developed and developing States, giving the latter longer in which to meet the phase out targets) it may not be appropriate in relation to plastics, at least not as the general rule. The volume of plastic finding its way from some developing States into the ocean is significant, with some such as China the most significant polluters in terms of plastic.¹⁴⁵ Peoples living in and around the coastline in many developing countries are also significantly affected by the

¹⁴² R C Thompson, C. Moore, F S vom Saal & S H Swan ‘Plastics, the Environment and Human Health: Current Consensus and Future Trends’ (2009) *Philosophical Transactions of the Royal Society B* 364, 2153 – 2166; Luc Alaerts, Michael Augustinus and Karl Van Acker “Impact of Bio-Based Plastics on Current Recycling of Plastics” (2018) 10 *Sustainability* 1487.

¹⁴³ Benedick *supra* n126 6.

¹⁴⁴ Hai-Lan Yang and Robert Innes “Economic Incentives and Residential Waste Management in Taiwan: An Empirical Investigation” (2007) 37 *Environmental & Resource Economics* 489

¹⁴⁵ J R Jambeck, R Geyer, C Wilcox, T R Siegler, M Perryman, A Andrady, R Narayan, K L Law ‘Plastic waste inputs from land into the ocean’ (2015) *Science* (13 February 2015) 768 – 771.

plastics, with once vital waterways clogged by plastic.¹⁴⁶ It may be appropriate to differentiate in the deadlines set for developed and developing States in relation to the phasing out of production of some plastics or uses of some plastics. A more appropriate focus would, however, be on the provision of further capacity building efforts to support developing States addressing the problem of plastics, such as those measures discussed earlier in this paper.

Legacy Plastics: A clean-up fund?

Each of the elements discussed so far is designed to stop further pollution of the oceans by plastics coming from land-based activities. They do nothing, however, to address the existing plastic pollution in the oceans. Here again, however, lessons could be drawn from other treaties. Our suggestion is that a fund be established to address these legacy plastics. How the fund would be financed would need careful consideration. It could fall under the ‘common but differentiated responsibilities’ principle with developed States contributing to the fund. Alternatively, the Basel Convention could be harnessed by linking contributions to the “Plastics Fund” to exports of plastic, in much the same way as the Fund Convention¹⁴⁷ is financed through contributions from importers and exporters of oil. The resulting fund could then be used to support the costs of capturing, removing and recycling plastics found in the ocean.

4. Conclusions

The international community has begun to address marine plastics from land-based activities through both research to develop understanding of the problems of plastics and measures under individual treaty and soft law instruments. These measures are, however, inadequate. This is, therefore, an opportune moment in time to consider how best to develop the law. A number of factors combine to point to this being an opportune moment to develop a treaty on oil-based plastics. A regime is emerging around responses to oil-based plastics, albeit it cannot be said to be fully formed as competing norms focussed on developing understanding and reducing pollution still exist. The socio-economic context is also suitable - alternatives to oil-based plastics are rapidly developing and the attention of the public, industry and governments is focussed on this issue. The rapidly increasing problem of plastics pollution fits with understandings that the “Anthropocene” may require more precautionary approaches to regulation. While each of these could be used as arguments to develop the existing regimes, as we demonstrate such an approach runs the risk of fragmentation and of too slow a development in the law to be effective.

¹⁴⁶ See, for example, G Gamage, N Thushari, S Chavanich & A Yakupitiyage ‘Coastal debris analysis in beaches of Chonburi Province, eastern of Thailand as implications for coastal conservation’ (2017) 116 *Maine Pollution Bulletin*, 121 – 129; PA Todd, X Ong & LM Chou ‘Impacts of pollution on marine life in Southeast Asia’ (2010) 19 (4) *Biodiversity and Conservation*, 1063 – 1082; PA Uneputty and SM Evans ‘Accumulation of beach litter on islands of the Pulau Seribu Archipelago, Indonesia’ (1997) 34 (8) *Marine Pollution Bulletin*, 652 – 655.

¹⁴⁷ 1992 International Convention on the Establishment of an International Fund for Compensation for Oil Pollution Damage (Fund Convention) UK Treaty Series No. 87 (1996) Cm 3433 Cm3432.

We suggest that not only do this combination of factors tell us it is time to adopt a plastics treaty, but they may be key to deciding where and how best to develop other international laws, in particular other international environmental laws. Thus, the emergence of a regime, the socio-economic context, a rapidly growing problem coupled with the danger of fragmentation and of too slow a response if existing approaches are built upon are key to determining when to adopt a treaty and when to build on existing measures.