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# Managing microplastics

A study of recent development in the EU and the  
UN

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# Summary

Due to the ubiquity of plastics in the world's oceans, legal instruments are developed to combat the adverse environmental effects of plastics. This essay critically analyses two recent legal developments in international environmental law: the EU Microplastics Restriction (as a part of the REACH initiative) and the development of a UN Treaty on Plastic Pollution. The essay examines whether the two legal developments cover the sources of microplastic pollution. To accomplish this, the opening chapter determines the sources and effects of microplastic pollution, using peer-reviewed scientific research. In its closing chapter, the essay discusses other potential legislative solutions to combat marine microplastic pollution from an environmental sustainability perspective.

The essay concludes that while the two selected legal developments do not fully cover the sources of microplastic pollution, it will still likely offer protection against the adverse effects of microplastic pollution to a certain extent. The lack of a completely comprehensive legal instrument speaks for the need of regulations on national, regional, and international levels.

Regarding potential legislative solutions, different schemes are discussed such as imposing tax on certain products, regulations of product design and bans on problematic plastic products. The essay finds that targeting the entire life cycle of plastics is crucial to combat microplastic pollution. The production stage is considered especially decisive.

# Sammanfattning

På grund av plastics ubikvitet i världens hav utvecklas rättsliga instrument för att motverka de negativa miljöeffekterna av plast. Denna uppsats analyserar kritiskt två nya rättsliga utvecklingar inom den internationella miljörätten: förordning (EU) 2023/2055 om mikroplaster (som en del av REACH-initiativet) och utvecklingen av ett globalt FN-plasttraktat. Uppsatsen undersöker huruvida de två rättsliga utvecklingarna täcker källorna av mikroplastförorening. För att åstadkomma detta fastställer det inledande kapitlet källorna och effekterna av mikroplastförorening, med hjälp av kvalitetsgranskad vetenskaplig forskning. I uppsatsens slutliga kapitel diskuteras potentiella lagstiftande lösningar för att motverka marin mikroplastförorening ur ett miljömässigt hållbarhetsperspektiv.

Slutsatsen är att även om de två valda rättsliga utvecklingarna inte fullt ut täcker källorna av mikroplastförorening, så kommer de troligtvis innebära en viss nivå av skydd mot de negativa effekterna av mikroplastförorening. Avsaknaden av ett heltäckande juridiskt instrument talar för behovet av regleringar på nationell, regional och internationell nivå.

Gällande potentiella lagstiftande lösningar, diskuteras olika tillvägagångssätt såsom att ålägga skatt på vissa produkter, införa regleringar för produktdesign och förbud på problematiska plastprodukter. Uppsatsen når slutsatsen att det är avgörande att inrikta sig på hela livscykeln för plast för att motverka mikroplastförorening. Produktionsstadiet anses vara av särskild vikt.

# Abbreviations

ECHA	European Chemicals Agency
MPP	Marine plastic pollution
SDGs	Sustainable Development Goals
UN	United Nations
UNCLOS	United Nations Convention on the Law of the Sea
UNEA	United Nations Environment Assembly
UNEP	United Nations Environment Programme
INCPP	Intergovernmental Negotiating Committee on Plastic Pollution
OCS	Operation Clean Sweep

# 1 Introduction

## 1.1 Background

Plastic pollution in the world's oceans has reached unprecedented levels.<sup>1</sup> Since 2005, there has been a consistent and rapid increase of plastics in the oceans. It has been estimated that there were more than 170 trillion plastic particles, primarily microplastics, in the ocean in 2019. The current state can be described as a layer of plastic smog that covers the ocean's surface.<sup>2</sup> Data from 2016 suggests that in a business-as-usual scenario, the rate at which plastics enter the marine environment will approximately increase 2.6-fold by 2043.<sup>3</sup>

Collisions with macroplastics can be fatal for birds and marine life. Plastic fragments have been found in the guts of a wide range of marine species and can cause suffocation, starvation and disturb the respiratory systems of algae, zooplankton, and fish. Microplastics can transfer toxic chemicals into open surface waters, where they might be ingested.<sup>4</sup> These effects threaten several Sustainable Development Goals (SDGs), such as Goal 14 on life below water and Goal 12 on sustainable consumption and production.

The abundance of plastics and its detrimental effects on the marine environment urgently require international policy intervention to minimise adverse impacts on species and ecosystems.<sup>5</sup> These policies can be realised on the national, regional, and international level. 2 March 2022 was a significant milestone in the development of international policy against plastic pollution as 193 United Nations (UN) Member States adopted resolution UNEP/EA.5/Res.14, deciding to establish an intergovernmental negotiating

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<sup>1</sup> Eriksen et al. (2023) p. 7.

<sup>2</sup> Eriksen et al. (2023) p. 5.

<sup>3</sup> Lau et al. (2020) p. 3.

<sup>4</sup> UNEP (2021) p. 23.

<sup>5</sup> Borrelle et al. (2020) p. 3.

committee to develop a legally binding instrument on plastic pollution, including in the marine environment.<sup>6</sup> This forthcoming instrument will be referred to as “the UN Treaty on Plastic Pollution”.

The momentum of policy intervention regarding plastic pollution resulted in the EU Commission adopting measures to restrict intentionally added microplastics under the EU regulation on the registration, evaluation, authorisation, and restriction of chemicals (REACH), in September 2023. The Commission Regulation (EU) 2023/2055 of 25 September 2023 will from hereon be referred to as “the EU Microplastics Restriction”.<sup>7</sup>

## 1.2 Purpose and Research Questions

The aim of this essay is to examine whether recent legal development concerning microplastic pollution cover the sources of the pollution. One regional and one international legal development will be studied: the EU Microplastics Restriction and the development of a UN Treaty on Plastic Pollution. Furthermore, this essay will discuss other possible approaches to accomplish safeguards against the sources of marine microplastic pollution through international agreements. To achieve this purpose, the following research questions will be answered:

1. Do the two new legal developments (UN Treaty on Plastic Pollution and EU Microplastics Restriction) cover the different sources of marine microplastic pollution?
2. What are some potential future legislative solutions to establish comprehensive coverage of the sources of microplastic pollution?

## 1.3 Delimitations

The purpose of this essay is not to give a full overview of the legal instruments that attempt to control or cease marine plastic pollution (MPP). While the question of jurisdiction and enforcement of legal instruments regulating these

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<sup>6</sup> UNEA Res. 5/14 p. 3.

<sup>7</sup> Commission Regulation (EU) 2023/2055.



issues are interesting subjects to study, these themes will not be elaborated upon due to the limited scope of this essay. The question of funding, which often appears in discussions of future legislative solutions, will not be discussed further as I think there is a point in discussing what solutions are appropriate and comprehensive before considering funding. Regarding potential future legislative solutions, there are countless interesting approaches. However, the discussion will only raise some of these, selected from the background of the findings of this essay.

## 1.4 Methodology and Materials

When selecting the two legal developments to be studied, two criteria were set out. One, the development of the legal instrument must have made some progress during the year 2023, through negotiations or otherwise. Two, one of the studied instruments must be regional and the other must be an international legal development. Based on these criteria, the EU Microplastics Restriction was chosen as a regional instrument for its specific aim towards microplastics. On an international level, the negotiations for a UN Treaty on Plastic Pollution were chosen.

To answer the first research question, the scope of the two chosen legal instruments was analysed against the background of the found sources of marine microplastic pollution. Therefore, it was first necessary to outline the sources of marine microplastic pollution. For this purpose, peer-reviewed scientific research pieces from established scientific journals such as *Science* was reviewed. The study of the accord between the sources and the two recent developments was conducted through legal doctrinal methodology. The most important characteristic of doctrinal research is that arguments are derived from authoritative sources, such as rules, principles, and precedents.<sup>8</sup> The primary authoritative sources are the rules manifested in the legal instruments. Because of the novelty of the EU Microplastics Restriction and the fact that the UN Treaty on Plastic Pollution has not yet been concluded, there is no relevant case law at present. The text of the EU Microplastics Restriction was

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<sup>8</sup> Watkins (2013) p. 9–10.

studied to analyse the coverage of the EU regulation. As this is a recent regulation, no commentary of its substantial effects was applied. Since the UN Treaty on Plastic Pollution is under negotiation, the key material for this essay was the working documents that were available at the time of writing. This included material from the first three sessions of the Intergovernmental Negotiating Committee on Plastic Pollution (INCPP), primarily the Zero Draft text from 4 September 2023.<sup>9</sup> This should not give the reader the impression that the draft text is in any way representative of what the final product of negotiations might become. The draft text was released September 4, 2023, which was 11 days before the deadline for written submissions from members of the Committee (15 September 2023). Part I of the draft was left with placeholders in lieu of definitions, principles, and scope. It also gives two options for objective. Having not yet agreed on these foundational ideas of the treaty and not awaited the submissions of all members of the Committee, it is questionable if the draft text reflects the views of the negotiating parties. Therefore, the discussion of the future instrument's scope is hypothetical, based on the currently available material.

To answer the second research question, legal argumentation is needed. The legal argumentation is based on the findings of the first research question. The analysis applies a sustainability perspective. Sustainability rests on three main pillars: environmental responsibility, social fairness, and economic prosperity.<sup>10</sup> Sustainable development was defined by the United Nations Brundtland Commission in 1987 as “meeting the needs of the present without compromising the ability of future generations to meet their own needs.”<sup>11</sup> The perspective of this essay is limited to environmental sustainability, as it is most consistent with the purpose of the essay. This entails that the focus is not reduced to only maintaining human society, but also maintaining biological diversity and ecosystems.<sup>12</sup> The analysis is therefore critical and based on the view that current society is not sustainable and suggests solutions from

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<sup>9</sup> The Zero Draft text refers to UNEP/PP/INC.3/4.

<sup>10</sup> Ayers (2017) p. 2.

<sup>11</sup> Report of the World Commission on Environment and Development: Our Common Future (1987), pt. 27.

<sup>12</sup> Ayers (2017) p. 13.

an environmental sustainability perspective.<sup>13</sup> What is best from an environmental sustainability perspective will be based on available scientific research.

## 1.5 Previous Research

Potential future legislative solutions to protect against MPP invokes interest in many, as the challenge of plastic pollution is a largely interdisciplinary subject. Most relevant for this essay, however, is the research of global governance in relation to plastic pollution, such as the work of Karen Raubenheimer. In her PhD thesis from 2016, Raubenheimer analysed measures to prevent sea- and land-based sources of plastic pollution as well as reviewed the feasibility of a new legal instrument relating to this. Raubenheimer found that there is a global duty to protect the marine environment from sea-based sources of pollution, but that the international legally binding framework is too generalised to be an effective safeguard against land-based sources of pollution.<sup>14</sup> Building on this research, it is interesting to examine whether the recent policy development of MPP corresponds with the sources of pollution.

## 1.6 Disposition

To provide a background for the examined policies, the essay firstly pinpoints the problems with and the sources of microplastic pollution. Following that, the contents of the two chosen legal developments are reviewed. In the final chapter, the two developments' coverage of the previously established sources is presented and potential legislative solutions to cover the sources of microplastic pollution is discussed.

## 1.7 Terminology

*Microplastics* is a term that generally is defined as small plastic pieces that are less than five millimetres long. Microplastics can be divided into *primary*

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<sup>13</sup> Cf. Sandgren (2018) p. 75–76.

<sup>14</sup> Raubenheimer (2016) see especially p. 124–125.

and *secondary microplastics*. For the purposes of this essay, primary microplastics will be defined as plastics deliberately manufactured to be microplastics, while secondary microplastics represent the fragmentation of larger objects.<sup>15</sup>

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<sup>15</sup> UNEP (2021) p. 11.

## 2 The problems and sources of microplastics

Plastic is globally present, whether it be in the oceans, the soil, the atmosphere, or animal biomass.<sup>16</sup> The ubiquity of plastics has compelled some to suggest that *the Plasticene* is the current stage within the Anthropocene.<sup>17</sup> Concentrating on microplastics specifically, it has been estimated that the global release of primary microplastics amounts to 1.5 million tonnes annually.<sup>18</sup> Moreover, macroplastics released to the environment can disintegrate into microplastics after sunlight exposure and oxidation.<sup>19</sup> Identifying *how* microplastics enter the oceans and the *consequences* of this phenomenon is crucial to constructing a comprehensive regulation against MPP.

### 2.1 Mapping out the consequences of microplastics

While the effects of macroplastic pollution are more well-known, the study of possible ecological or human health risks of microplastics is a relatively new area of research and has not yet been consistently demonstrated.<sup>20</sup> However, ingestion of microplastics has been documented in organisms and species across all positions in the food chain and at all depths of the ocean. Consequently, microplastics are increasingly found in the human food system.<sup>21</sup> Microplastics appearing at the base of the food chain, such as in zooplankton, can have severe consequences. Estimates based on feeding rates of zooplankton indicate that adult salmon would ingest 91 microplastic particles/day, while the humpback whale would ingest more than 300,000 microplastic particles/day.<sup>22</sup>

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<sup>16</sup> Lau et al. (2020) p. 1455–1461.

<sup>17</sup> Rangel-Buitrago et al. (2022).

<sup>18</sup> Boucher and Friot (2017) p. 20.

<sup>19</sup> Seltenrich (2015) p. A 37.

<sup>20</sup> GESAMP (2015) p. 30; Lau et al. (2020) p. 1. For effects of macroplastic pollution, see e.g. UNEP (2021) p. 22–23.

<sup>21</sup> Lau et al. (2020) p. 1.

<sup>22</sup> Desforges et al. (2015) p. 328.

The implications of these findings for human health are not yet resolved, but a common viewpoint among academic sources is that although there is lacking definitive evidence of human health impacts, this does not invalidate the hypothesis or incentives to address plastic litter entering the world's oceans.<sup>23</sup> This is also in line with the precautionary principle, introduced in Principle 15 of the 1992 Rio Declaration, which states that “where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation”. Furthermore, executing scientifically sound experiments is challenging as plastics often are co-contaminated with other chemical pollutants.<sup>24</sup> The toxic chemicals that microplastics may be the bearer of, are known to cause cancer and disruptions to reproductive, metabolic and development systems.<sup>25</sup> There is also a risk that the effects of MPP are only detected when the problem has reached a planetary-scale – meaning that there is a time delay between exposure and effects and that the effects are only observable on a global scale.<sup>26</sup>

Although there are some difficulties in determining the effects of microplastics, a quality review of over 100 microplastic effect studies found that at least three adverse effects of microplastics on aquatic biota can reliably be concluded: microplastics (1) inhibit food assimilation and/or decrease the nutritional value of food, (2) cause internal physical damage, and (3) cause external physical damage.<sup>27</sup> For example, the energy balance of the Pearl Oyster *Pinctada margaritifera* was adversely affected by ingestion of microplastics, suggesting that the exposed oysters had to draw their energy from reserves.<sup>28</sup> Internal physical damage was demonstrated through e.g. inflammation and oxidative stress in zebrafish gut and external physical damage was concluded

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<sup>23</sup> Seltenrich (2015) p. A 40.

<sup>24</sup> GESAMP (2015) p. 23.

<sup>25</sup> Raubenheimer (2016) p. 66.

<sup>26</sup> MacLeod et al. (2014) p. 11058; Villarrubia-Gómez et al. (2018) p. 216.

<sup>27</sup> De Ruijter et al. (2020) p. 11701.

<sup>28</sup> Gardon et al. (2018) p. 5283.

through malformations on the upper shell of a species of water flea, *Ceriodaphnia dubia*.<sup>29</sup>

A substantial removal of microplastics from the marine environment is unfeasible given the astronomical costs, vast scale, and risk of harming tiny organisms or causing ecological damage such an operation would entail. These complications combined with the ubiquity of plastic debris make the environmental effects of MPP essentially irreversible at present.<sup>30</sup> This makes the current situation of increased pollution even more dire.<sup>31</sup> Prevention at source is therefore key to reduce increases in marine debris.<sup>32</sup>

## 2.2 Transgressing the planetary boundaries

The concept of planetary boundaries was first conceptualised in 2009.<sup>33</sup> The planetary boundaries can be described as “values for control variables that are either at a ‘safe’ distance from thresholds [...] or at dangerous levels”.<sup>34</sup> There are nine planetary boundaries that cannot be transgressed without jeopardising the safety of humanity and causing unacceptable environmental change. Transgressing one of them may seriously threaten the ability to stay within safe levels for the other boundaries, as the boundaries are tightly coupled.<sup>35</sup> In January 2022, 14 scientists concluded that the planetary boundary concerning novel entities, including plastics, had been exceeded. Alarming, they also concluded that the transgression of this boundary will still be a threat to keeping humanity within the safe operating space *even if* a stabilisation or reduction of production and releases could be managed, due to the persistence of many novel entities.<sup>36</sup> Some researchers suggest that globally capping

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<sup>29</sup> Qiao et al. (2019); Ziajahromi et al. (2017).

<sup>30</sup> Law and Thompson (2014) p. 144-145; Villarrubia-Gómez et al. (2018) p. 215; UNEP (2015) p. 9.

<sup>31</sup> Eriksen et al. (2023) p. 5.

<sup>32</sup> STAP (2011) p. 11.

<sup>33</sup> Rockström et al. (2009a).

<sup>34</sup> Rockström et al. (2009b).

<sup>35</sup> Rockström et al. (2009a); Rockström et al. (2009b).

<sup>36</sup> Persson et al. (2022) p. 1517.

emissions of novel entities (including plastic) is the only way to get back within a safe operating space.<sup>37</sup>

## 2.3 The sources of microplastic pollution

A necessary step of addressing MPP is identifying the origins of plastic litter. J. M. Veiga et al. chooses to distinguish between the *source* (the economic sector or human activity from which litter originates), *the means of release* (the way in which an item leaves the intended cycle and/or enters the environment and becomes a problem), and the *geographic origin* (where the release took place).<sup>38</sup> Understanding all of these factors: the source, the means of release and the geographic origin, is crucial in determining what measures can effectively combat MPP. The solutions might vary depending on factors such as whether the source is land-based or sea-based, if the geographic origin is near or distant to where the litter is found, if it concerns a primary or secondary microplastic, or if the MPP is a result of industrial or consumer activity. Nevertheless, tracing plastic litter to a specific source or geographic origin can sometimes be practically impossible. Some plastic litter can easily be identified confidently, such as attributing fishing nets to the fishing industry, while other items have several potential sources.<sup>39</sup> When discussing microplastics, this becomes even more challenging as microplastics often are small fragments of other products.

The sources of plastic litter are not necessarily local to their geographic origin, as litter easily can be transported by ocean currents and wind.<sup>40</sup> For instance, even decades ago high quantities of industrial plastic pellets were found in remote, non-industrialised regions of the Pacific such as Tonga and Fiji.<sup>41</sup> Distinguishing waste that is generated locally, regionally, and globally is important as this can affect what measures are appropriate.<sup>42</sup>

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<sup>37</sup> Persson (2022) p. 1517.

<sup>38</sup> Veiga et al. (2016) p. 9.

<sup>39</sup> Veiga et al. (2016) p. 12.

<sup>40</sup> Veiga et al. (2016) p. 9.

<sup>41</sup> Gregory (1999) p. 605.

<sup>42</sup> Veiga et al. (2016) p. 9.



### 2.3.1 Primary and secondary microplastics

Primary microplastics seemingly make up a smaller portion of the world's microplastics.<sup>43</sup> However, there is still good reason to focus on primary microplastics – especially since there currently are alternatives available. Thus, the emissions are predominantly avoidable.<sup>44</sup> Examples of primary microplastics include microbeads in cosmetics and industrial “scrubbers” and pellets.<sup>45</sup> Microbeads in facial scrubs and other cosmetics can generate considerable amounts of microplastics through the sewers and into the oceans.<sup>46</sup> Personal care products account for 2% of the global release of primary microplastics to the world ocean.<sup>47</sup>

Examples of secondary microplastics include erosion of tyres and fragmentation of textiles and paint.<sup>48</sup> The fragmentation of macroplastics into (secondary) microplastics mean that even if inputs of macroplastics into the ocean decrease soon, the amount of microplastic debris in the marine environment will continue to increase.<sup>49</sup>

It is important to consider that the main sources and types of plastic pollution differ between regions. Europe places relatively high in release of primary microplastic per capita, although East Asia and Oceania as well as North America are larger primary microplastic polluters. The key source of release in Europe is abrasion of tyres. Europe distinguishes itself by emissions of primary microplastics being almost equivalent to secondary microplastics from mismanaged waste.<sup>50</sup>

### 2.3.2 Land-based and sea-based sources

The majority of MPP sources are land-based.<sup>51</sup> Land-based sources include litter from towns and industrial sites that has blown or washed into the oceans

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<sup>43</sup> UNEP (2021) p. 11.

<sup>44</sup> UNEP (2015) p. 27.

<sup>45</sup> GESAMP (2015) p. 18.

<sup>46</sup> Napper et al. (2015).

<sup>47</sup> Boucher and Friot (2017) p. 21.

<sup>48</sup> GESAMP (2015) p. 18.

<sup>49</sup> Villarrubia-Gómez (2018) p. 215; GESAMP (2015) p. 18.

<sup>50</sup> Boucher and Friot (2017) p. 26.

<sup>51</sup> UNEP (2021) p. 46.

as well as via sewage outlets.<sup>52</sup> The impact for microplastics in wastewater streams largely depends on regional coverage and efficiency of wastewater treatment systems.<sup>53</sup> Two major sources are laundry of synthetic textiles and abrasion of tyres while driving.<sup>54</sup> Other major sources are industrial processes such as shot blasting and accidental loss of plastic pellets during transport or handling.<sup>55</sup>

As previously stated, macroplastics can fragment into secondary microplastics. One major source of macroplastic pollution is mismanaged waste and landfill sites. In 2010 mismanaged waste was estimated to generate between 4.8 million and 12.7 million metric tons of MPP. The regional discrepancies become evident here, as inadequate waste management infrastructure will cause waste build-up even in countries where there is low per capita use of plastics.<sup>56</sup> Other sources of secondary microplastics include agricultural runoff and wastewater treatment plants.<sup>57</sup>

Although most sources are land-based, sea-based sources are still relevant.<sup>58</sup> Sea-based sources of MPP include fishing, shipping, and ship-based tourism.<sup>59</sup> Dumping of waste directly into the ocean, accidental loss of cargo, paints and sealants used in industries are examples of sea-based means of release of primary microplastics. Secondary microplastics might derive from erosion of fishing gear.<sup>60</sup>

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<sup>52</sup> Veiga et al. (2016) p. 11, 13.

<sup>53</sup> Boucher and Friot (2017) p. 17.

<sup>54</sup> Boucher and Friot (2017) p. 21.

<sup>55</sup> Veiga et al. (2016) p. 13; UNEP (2021) p. 49.

<sup>56</sup> UNEP (2021) p. 48.

<sup>57</sup> UNEP (2021) p. 49.

<sup>58</sup> Boucher and Friot (2017) p. 19.

<sup>59</sup> Veiga et al. (2016) p. 11; UNEP (2021) p. 50.

<sup>60</sup> UNEP (2021) p. 52.

## 3 What solutions does the law offer?

As plastic has become ubiquitous, calls for international collaboration through commitments of targets to reduce plastic emissions into the oceans has increased.<sup>61</sup> International campaigns such as The Plastic Soup Foundation’s “Beat the Microbead” movement have aimed to spread awareness of microbead pollution.<sup>62</sup> The idea of creating international regulations for MPP was not born in 2023. Numerous efforts lay the foundation for the development we see today – efforts made on national, regional, and international scales. This chapter will briefly explore some existing legal instruments and subsequently examine the two chosen legal developments.

### 3.1 Existing legal instruments

Today, there are binding as well as voluntary approaches to regulate MPP. In the United Nations Conference on Sustainable Development 2012 (Rio+20), the representatives committed to taking action to reduce the prevalence and impacts of MPP on marine ecosystems – including through effective implementation of relevant conventions.<sup>63</sup> Major legal instruments that are relevant for MPP include the London Convention 1972,<sup>64</sup> MARPOL 73/78,<sup>65</sup> the Plastic Waste Amendments to the Basel Convention 2019,<sup>66</sup> and the Stockholm Convention<sup>67</sup>. On a regional European level, there is Operation Clean Sweep (OCS) that resulted in an OCS Europe certification scheme. The scheme contains requirements targeting minimisation of plastic pellets in the entire supply chain and aspires to control compliance with the requirements.<sup>68</sup>

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<sup>61</sup> Borrelle et al. (2017) p. 9994; Villarrubia-Gómez et al. (2018) p. 214.

<sup>62</sup> Read more about the initiative here: <https://www.plasticsoupfoundation.org/en/what-we-do/microplastics/beat-the-microbead/>.

<sup>63</sup> UNGA A/RES/66/288, pt. 163.

<sup>64</sup> Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter.

<sup>65</sup> International Convention for the Prevention of Pollution from Ships.

<sup>66</sup> Annexes II, VIII and IX to the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal.

<sup>67</sup> Stockholm Convention on Persistent Organic Pollutants.

<sup>68</sup> OCS Europe (2022).

The 1982 United Nations Convention on the Law of the Sea (UNCLOS) is the only global binding instrument that addresses all sources of pollution relevant to marine plastic litter and microplastics. UNCLOS provides an obligation for all states to take the necessary measures to prevent, reduce and control pollution of the marine environment, no matter the source.<sup>69</sup> However, as it is a framework instrument it only provides broad obligations and does not specifically address MPP.<sup>70</sup>

In 2017, the United Nations Environment Programme (UNEP) concluded that the existing global and regional legal instruments are fragmented. While they could address significant aspects of MPP, this would be difficult to attain as they vary in geographic and substantive scope, many are non-binding global strategies, some lack developed protocols to address land-based sources of pollution and others are not yet in effect.<sup>71</sup>

### 3.2 The UN Treaty on Plastic Pollution

In UNEA Resolution 5/14,<sup>72</sup> the United Nations Environment Assembly (UNEA) decided to develop an international legally binding instrument that addresses the *full life cycle* of plastic.<sup>73</sup> In the Zero Draft text, this becomes evident through its broad scope – ranging from striving to regulate production of primary plastic polymers and extended producer responsibility (EPR), to addressing non-plastic substitutes, product design, existing plastic pollution and waste management (including more detailed ambitions like improving working conditions in the waste management sector).<sup>74</sup> EPR is based on the polluter-pays principle and refers to the idea of producers of the plastic products being held responsible for financing and organising prevention and management of waste, deriving from their products.<sup>75</sup> The question is if the draft text accurately addresses the different sources of MPP. The following account

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<sup>69</sup> UNCLOS, art. 194.

<sup>70</sup> UNCLOS, art. 192; UNEP (2017) p. 54.

<sup>71</sup> UNEP (2017) p. 54–55.

<sup>72</sup> Titled “End plastic pollution: Towards an international legally binding instrument”.

<sup>73</sup> UNEA (2022) p. 3, para. 3.

<sup>74</sup> UNEP/PP/INC.3/4 p. 19.

<sup>75</sup> UNEP (2022) p. 3.

will be divided according to three different approaches: limiting production, post-consumption management and lastly outreach and information.

### 3.2.1 Limiting production of microplastics

One approach to regulating MPP is limiting production of microplastics. This approach strives to eliminate MPP *at the source*, at the production stage. Regarding primary microplastics, this implies intentionally added microplastics. The Zero Draft text presents two options regarding intentionally added microplastics:

1. a full prohibition of the production, use in manufacturing, sale, distribution, and import/export of products containing intentionally added microplastics, with the option to specify exceptions in an annex, or
2. identifying intentionally added microplastics and taking the necessary measures to manage, restrict and, where appropriate, not allow the production, use in manufacturing, sale, distribution, and import/export of products containing intentionally added microplastics.<sup>76</sup>

The second option is a more open-ended effort. What qualifies as “the necessary measures” opens up to discussion, while a full prohibition with some specified exceptions limits the potential differing interpretations.

As mentioned in chapter 2.3.1, secondary microplastics cannot be limited without addressing macroplastics. The Zero Draft text aspires to do this as well, presenting options to:

1. specify reduction targets in an annex,
2. oblige the Parties to reduce the global production of primary plastic polymers to achieve a global target set out in an annex and developing nationally determined targets, or

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<sup>76</sup> UNEP/PP/INC.3/4 p. 9–10.

3. oblige the Parties to take measures to reduce global production of primary plastic polymers and reflect these in national plans.<sup>77</sup>

By encompassing product design and non-plastic substitutes, the Zero Draft text also addresses the early production stage. The preventative elements become evident here, calling for Parties to reduce the demand for plastic products, increase the reusability and reparability of plastic products and minimise emissions from plastic products, including microplastics. Other propositions include creating minimum design and performance criteria and establishing certification procedures and labelling requirements for plastics. Other suggestions are promoting and incentivising the development of environmentally sound non-plastic substitutes as well as settling minimum reduction, reuse, refill and repair targets.<sup>78</sup>

### 3.2.2 Post-consumption management

On the cusp between limiting production and post-consumption management, the text suggests voluntary or binding incitement to establish and operate EPR systems. These systems will aim to incentivise recyclability and enhance the producers' and importers' accountability for environmentally sound management of plastics throughout their life cycle. The draft text also suggests a more general obligation for treaty parties to prevent and eliminate emissions of plastics, including microplastics, across their life cycle. The text specifically mentions plastic pellets and proposes a regulation that requires parties to prevent and eliminate emissions and release of plastic pellets from production, handling, and transport.<sup>79</sup>

Regarding waste management, the draft proposes an obligation to prevent ocean dumping and invest in waste management infrastructure. The text suggests setting out minimum requirements for collection, recycling, and disposal of plastic waste in an annex or national plans.<sup>80</sup> Attempting to monitor

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<sup>77</sup> UNEP/PP/INC.3/4 p. 7.

<sup>78</sup> UNEP/PP/INC.3/4 p. 10–13.

<sup>79</sup> UNEP/PP/INC.3/4 p. 14.

<sup>80</sup> UNEP/PP/INC.3/4 p. 15.

existing plastic pollution, the draft text suggests cooperation between parties to identify pollution hotspots and organise clean-up activities.<sup>81</sup>

### 3.2.3 Outreach and information

Part IV of the Zero Draft text makes room for both information exchange between parties and obligations to raise awareness of the issue in different manners. The proposed obligations include awareness-raising programmes, citizen campaigns, plastic pollution entering the curricula of educational institutions as well as communication regarding the health risks of plastic pollution.<sup>82</sup> Additionally, there are other regulations aimed at raising awareness throughout the text such as making publicly available information on behaviours that lead to plastic pollution.<sup>83</sup>

## 3.3 The EU Microplastics Restriction

The EU Microplastics Restriction is a part of the EU regulation REACH. The first paragraph bans microplastics on their own or intentionally added microplastics from being placed on the market. There are, however, several exceptions to the ban.

### 3.3.1 The scope and limiting production

The existence of secondary microplastics is acknowledged in the preamble of the EU Microplastics Restriction, yet the regulation chooses to target primary microplastics.<sup>84</sup> While the commission regulation is called the “EU Microplastics Restriction” in this essay, it is important to note that its scope does not extend beyond primary microplastics.

Paragraph 4 reveals the exceptions to the restriction, namely microplastics used at industrial sites, medicinal products, EU fertilising products, food, and food additives. Paragraph 5 extends the exception to microplastics that are

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<sup>81</sup> UNEP/PP/INC.3/4 p. 18.

<sup>82</sup> See UNEP/PP/INC.3/4 p. 26–27.

<sup>83</sup> UNEP/PP/INC.3/4 p. 19.

<sup>84</sup> See preamble 2 of Commission Regulation (EU) 2023/2055.

prevented from being released to the environment when used in accordance with the instructions.

The regulation establishes certain transitional periods that vary between products. These mostly target cosmetic products, such as fragrances and lip products. However, there are also transitional periods for detergents, granular in-fill on synthetic sports surfaces and agricultural products (such as plant protection products, other fertilising products than EU fertilising products).

### 3.3.2 Post-consumption management

An example of a post-consumption management approach in the regulation is that manufacturers or industrial downstream users of microplastics at industrial sites will be required to report a description of their uses of microplastics and an estimated quantity of microplastics being released to the environment (including during transportation) to the European Chemicals Agency (ECHA).<sup>85</sup> This is an attempt to monitor the effectiveness of the obligation to provide instructions for use and disposal.<sup>86</sup>

### 3.3.3 Outreach and information

The EU Microplastics Restriction aims to regulate products affected by the sale ban during the transitional periods as well as products that will not be affected by the sale ban. Primarily this is illustrated through requiring products to provide instructions regarding the use and disposal of the product, to prevent microplastics entering the environment. This is an example of outreach and information targeted at customers, that can subsequently affect post-consumption management at the customer level. The exempted microplastics used at industrial sites, will eventually be obligated to provide such instructions as well as information on quantity and concentration of microplastics.<sup>87</sup> Lip products containing microplastics will for instance also be obligated to inform customers of this.<sup>88</sup>

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<sup>85</sup> Commission Regulation (EU) 2023/2055, para. 11–12.

<sup>86</sup> Commission Regulation (EU) 2023/2055, preamble 26.

<sup>87</sup> Commission Regulation (EU) 2023/2055, para. 7.

<sup>88</sup> Commission Regulation (EU) 2023/2055, para. 9.



## 4 Discussion and conclusion

### 4.1 The accord between the examined legal developments and the sources of MPP

Based on the previous findings, the major sources of microplastic pollution are loss of plastic pellets during e.g. transport, industrial shotblasting, abrasion of tyres, laundry of synthetic textiles, cosmetic products, poor waste management and dumping in the ocean. This chapter analyses to what extent the EU Microplastics Restriction and the Zero Draft for a UN Treaty on Plastic Pollution cover the mentioned sources.

The UN Treaty on Plastic Pollution draft aims for a substantially larger scope than the EU Microplastics Restriction. The resolution supporting the UN treaty explicitly states that it will address the full life cycle of plastic. No such aspirations are declared in the preambles of the EU Microplastics Restriction. As the UN Treaty has a more comprehensive approach towards plastic pollution, both primary and secondary microplastics are targeted. Meanwhile, the EU Microplastics Restriction is limited to primary microplastics. In the regional context of Europe, EU's focus appears logical as secondary microplastics from mismanaged waste makes up a significantly smaller source of MPP compared to other regions.<sup>89</sup> This underlines the need for measures going beyond regulating waste management. However, the delimitation to primary microplastics prevents the EU Microplastics Restriction from covering *all* sources of microplastic pollution.

The Zero Draft text of the UN Treaty on Plastic Pollution, as needed of a draft text, leaves much room for negotiation. No specific requirements or minimum criteria have been determined, nor has “the full life cycle of plastic” been defined. How far the treaty will be able to reach is at present difficult to conclude. Based on the observations in chapter 3 the draft text addresses several important sources of microplastic pollution – however to varying degree of

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<sup>89</sup> See chapter 2.3.2.

detail. A common theme throughout the draft text is indecisiveness of approach, manifested through several different attitudes being represented. There appears to be a conflict between nationally determined requirements and common requirements determined in annexes, which can be a result of the inclusion of taking “national circumstances and capabilities” into account in the resolution.<sup>90</sup> This relates to the hesitation between a legally binding or voluntary approach, as well as if there will be a punitive compliance and implementation mechanism. Seemingly, there are differing views regarding what stages should be targeted – for instance whether the treaty should only regulate the pollution in itself and consequently focus its efforts on post-consumption management (such as waste management) or if the efforts should be broader and focus on production and consumption as well. Herein lies the difficulty of not having properly defined “the full life cycle of plastic”. There are also differing views in terms of solution: on one hand we see recycling being pushed as a primary solution, on the other hand preventative measures such as developing plastic substitutes are being advanced. Most of these approaches are represented in the draft. It is not necessarily negative to present several different approaches, especially as an international agreement demands compromise. However, a fragmented treaty can obstruct the comprehensibility. The ultimate agreed approach will greatly affect the comprehensiveness of the treaty regarding the sources of MPP.

The current legislative state has been criticized for being too fragmented and not effective as many existing legal instruments are non-binding and necessary protocols to address the issue are not developed. Based on the draft, I perceive a risk that the finished UN Treaty on Plastic Pollution will be diluted compared to its aspirations to regulate the full life cycle of plastic. While a global treaty on plastic pollution might in all cases seem like great progress towards a sustainable world, its contents will decide if it truly can block the sources of MPP. Comparatively, the EU Microplastics Restriction includes binding restrictions.

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<sup>90</sup> UNEA Res. 5/14 para. 3.

Microplastics deriving from industrial activities are not directly banned by the EU Microplastics Restriction. However, they are subject to regulations in the form of obligations to report the use and estimated emissions of microplastics. In terms of coverage, this implies that the regulation will not demand the reduction of microplastic emissions from industrial sites but may spread awareness of the issue and indirectly affect industry decisions regarding the management of microplastics. The UN Treaty draft presents the option of a full prohibition of intentionally added microplastics, which would include plastic pellets from industry activities unless exempted from the scope. This would naturally provide solid coverage of this source. However, more open-ended options regarding intentionally added microplastics are included in the draft, which could result in a regulation like that of the EU Microplastics Restriction. In that case, the draft text includes a more specific regulation requiring parties to prevent and eliminate emissions and releases of plastic pellets from production, handling, and transport. The draft, accepted with this provision, would therefore cover the mentioned microplastic source.

The EU Microplastics Restriction is heavily focused on personal care products, made apparent through several transitional periods regarding different types of cosmetic products. Once the transitional periods have expired, the EU Microplastics Restriction will cover this microplastic source. At first glance, personal care products can seem less significant than other sources, making up around 2% of global microplastic pollution. However, it may constitute more waste than one might think. Given the estimate of the global annual release of microplastics, two percent amount to 30 000 tonnes of microplastics annually.<sup>91</sup> The UN Treaty draft will, as mentioned above, cover this source if a full prohibition of intentionally added microplastics without exempting personal care products is agreed upon. If a full prohibition is not decided, there is still the possibility that the parties will conclude a restriction of intentionally added microplastics, which would cover this microplastic source to a limited extent.

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<sup>91</sup> Cf. Boucher and Friot (2017) p. 20.

Major sources of secondary microplastics are abrasion of tyres and laundry of synthetic textiles. As mentioned, secondary microplastics fall outside the scope of the EU Microplastics Restriction. These sources of MPP are therefore not covered. The UN Treaty draft does not explicitly mention these sources, but they could fall within broader obligations, such as the obligation to prevent and eliminate the emissions and releases of microplastics across the life cycle of plastic products.<sup>92</sup> Regulations regarding product design and non-plastic substitutes could also indirectly reduce emissions from these microplastic sources. If tyres were made of non-plastic materials, the microplastic deriving from the abrasion of tyres would evidently decrease. The same argument can be applied to laundry of synthetic textiles. However, this source could also be addressed through improved wastewater management infrastructure. This is not directly included in the draft but could be traced to the obligation to prevent emissions of plastic throughout its life cycle.

The UN Treaty draft explicitly mentions dumping and waste management. Yet again, the conflict between nationally determined plans and common requirements are evident. Nevertheless, the draft attempts to cover plastic debris deriving from poor waste management. If the treaty succeeds in impacting parties' waste management in a constructive way, secondary microplastics deriving from plastic debris entering the marine environment via waste management would likely reduce.

## 4.2 Potential legislative solutions

The presentation in chapter 2.1 is not an exhaustive catalogue of the effects of microplastic pollution. Yet, it provides a convincing ground for the urgency of global action to mitigate the effects of MPP.

Marine microplastic pollution often originates from land but has global effects. Combatting this issue therefore requires regulations on all levels: national, regional, and international regulations. The difficulty of attribution to a certain state and the fact that a theoretically flawless state might still be

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<sup>92</sup> UNEP/PP/INC.3/4 p. 14.

affected by other states' actions, emphasises the benefits of international regulation. Nonetheless, the incentive to continuously develop regulations on both regional and national levels remain. The main sources of pollution and the starting points differ between regions – there are consequently diverse challenges ahead that may benefit from being regulated separately from a global regulation. The urgency of the matter also sustains the demand for regional and national regulations. Despite the ambition to complete negotiations for the UN Treaty on Plastic Pollution by the end of 2024, it will in my judgment likely take years for it to be fully negotiated, enter into force, and have an impact. Agreements made on a regional level may be easier to conclude promptly since there arguably are fewer national interests at stake. Cost-effective solutions to managing plastic waste vary considerably across geographic regions and social settings, reinforcing the expediency of regional legal instruments.<sup>93</sup>

In the previous chapters, the two selected legal developments have been analysed according to three approaches:

1. Limiting production
2. Post-consumption management
3. Outreach and information

All three approaches are important to consider when constructing a comprehensive legal instrument for MPP. Due to the unfeasibility of large-scale removal of microplastics, an environmentally sustainable regulation of this issue requires plastics to cease entering the ocean. Therefore, I consider the first approach to be decisive. The risk of mismanagement at the post-consumption stage can largely be avoided by focusing on the development and production stage of plastic products. Efforts of outreach and information can take a secondary role, although still relevant. In lieu of more general obligations to take “necessary measures” to prevent adverse impacts on the environment, narrow

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<sup>93</sup> Lau et al. (2020).

obligations aimed at the production stage would in my opinion be an appropriate measure against MPP. This could include complete bans on certain environmentally problematic plastic products, e.g. single-use plastics. Such measures would likely encourage the development of environmentally sustainable alternatives. Similarly, regulations that incentivize and benefit the development of environmentally sustainable products could be a complementary effort to regulations of prohibitive character. Imposing a tax on certain uses of plastics can be expected to incentivize corporations and consumers to opt for more environmentally friendly alternatives.

To lessen the microplastic pollution deriving from synthetic textiles, measures according to all three approaches are suitable. One option is to aim for a post-consumption approach by developing regionally efficient wastewater treatment systems and improving filtering devices on washing machines. Another approach would be to reduce the production and consumption of synthetic textiles. Outreach and information efforts are meaningful to impact consumer behaviour. Regulations of product design could be enforced here and as there are plenty of alternative textiles available the shift from synthetic textiles is accessible. A combination of these efforts would likely be most comprehensive. Likewise, regulating product design in favour of environmentally sustainable designs can reduce secondary microplastics if for example the design of tyres is affected in a way that does not generate microplastics. In my judgement, it is important to consider the surrounding infrastructure. As mentioned, improving wastewater treatment systems and waste management is appropriate. However, I think that even more far-reaching attempts such as designing roads to reduce abrasions should be considered.

Based on the distinction between the *source*, the *means of release* and the *geographic origin* that J. M. Veiga et al. makes, different approaches appear constructive regarding the different aspects of the release of MPP. The foregoing discussion primarily targets the source, the activity from which the plastic litter originates. Focusing on the geographic origin of plastic litter can entail identifying plastic emission hotspots and directing efforts towards these

geographic areas. In my view, this could be a substantially effective measure as it singles out the most acute origins of plastic litter.

### 4.3 Conclusion

The amount of plastic in the ocean is rapidly increasing and the demand for transnational agreements is clear. A review of two legal developments from 2023 demonstrates that the sources of microplastic pollution are not fully covered by the two, although they still likely will offer meaningful protection against the effects of microplastic pollution to some extent. In my opinion, it is unlikely that an international agreement that is completely all-encompassing of all sources of microplastic pollution will be reached in the near future. In light of this, it is not my view that a regulation that does not cover all sources of microplastic pollution is automatically flawed. Rather, it speaks for the urgent need of separate regulations made on all fronts to encompass all sources of microplastic pollution as well as the necessity to consider to what extent new legal development encompasses the sources of MPP. As the two reviewed legal developments cover different sources of microplastic pollution, they validate the argument that regional and global frameworks can cooperate to reach maximum coverage against microplastic pollution. From my viewpoint, it is crucial that global governance of MPP targets the entire life cycle of plastics, starting at the production and design stage.

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