**Plastic Pollution**

  26th February 2020

Introduction

Plastic pollution has emerged as a significant maritime concern. While reported as a problem since the 1970s,[1](https://www.safeseas.net/evidence/2020/02/26/plastic-dumping/#easy-footnote-bottom-1-105) it is only recently that it has been identified as a global issue.[2](https://www.safeseas.net/evidence/2020/02/26/plastic-dumping/#easy-footnote-bottom-2-105). Plastic pollution is now ubiquitous across all oceans, including the polar regions.[3](https://www.safeseas.net/evidence/2020/02/26/plastic-dumping/#easy-footnote-bottom-3-105) Due to its durability, the lifespan of plastic is estimated to be hundreds to thousands of years.[4](https://www.safeseas.net/evidence/2020/02/26/plastic-dumping/#easy-footnote-bottom-4-105)

Plastic in the oceans damages ecosystems and cause harm to maritime wildlife, as well as having implications on fishing stocks and the food-chain. The origins and sources of plastic pollution as well as the impacts have been widely studied. Studies investigating perpetrators, or institutional responses to plastic dumping are very limited.

A pile of plastic bottles on the beach

Description automatically generatedPlastic pollution, [by Robert Vicol](https://www.flickr.com/photos/water_alternatives/47448001511/in/photolist-2fhPpMz-fDi9Te-271Wda1-MPWQLL-KKNLB8-2223fws-29LHVKH-G5kDUL-9upG52-MiPghA-26oirBw-Drvvuz-2aemmS8-261RGpj-b6EaUH-DKkkqb-9v36V4-9vbCoa-9vf521-9vez9U-9tbXqn-Y8jw8J-26CQsHP-26DKymw-YfzYpN-SqJkxd-Y8jCem-FGiKcw-9uq1Zk-dDnRRj-FsWLBE-Y8jxqJ-JVQPpF-YbT72H-25vw2Fk-ZagKxd-MiAt4Y-YPd8m9-248gMz7-amih3j-Y8jDiq-2eH86d1-YPdjrW-9tQgVm-ZafwgW-EXBdUN-FJTftA-28UUerU-J9t112-itaemE)

Characteristics

Plastic pollution is a complex issue due to the various of sources of plastic and the pathways that bring it to the sea.[5](https://www.safeseas.net/evidence/2020/02/26/plastic-dumping/#easy-footnote-bottom-5-105) Some of these pathways are linked to land-based issues and some are more easily linked to illegal activities than others. However, plastic pollution is increasingly recognised as an environmental or pollution crime that constitutes a transboundary global problem.[6](https://www.safeseas.net/evidence/2020/02/26/plastic-dumping/#easy-footnote-bottom-6-105) Due to asymmetries or ambiguities in national environmental regulations, plastic dumping into the ocean is often not technically a crime or even illegal. Even so, some criminologists have argued that it should be treated as such given the harms it entails.

There are varying estimates on how much plastic reaches the oceans indirectly from inland sources, and how much is dumped directly at sea. A report by Ocean Conservancy estimates that 80 per cent of ocean plastic has a land-based origin, while 20 percent comes from maritime sources.[7](https://www.safeseas.net/evidence/2020/02/26/plastic-dumping/#easy-footnote-bottom-7-105) They found that of the plastic originating from land about 75 percent relates to uncollected waste. 25 percent are leaks from the waste-management system, resulting from improper dumping or poorly located or controlled dump sites. While early assumptions saw leakage from coastal communities as the main inland sources,[8](https://www.safeseas.net/evidence/2020/02/26/plastic-dumping/#easy-footnote-bottom-8-105)current evidence suggests rivers and waterways are also (if not more) important[9](https://www.safeseas.net/evidence/2020/02/26/plastic-dumping/#easy-footnote-bottom-9-105). Microplastics from cosmetics also enter water channels and ultimately the oceans via domestic drainage.[10](https://www.safeseas.net/evidence/2020/02/26/plastic-dumping/#easy-footnote-bottom-10-105)

Ship-based pollution also remains a significant issue. A study undertaken in the North Sea, one of the world’s busiest shipping routes, suggested that 40 percent of marine litter is directly related to shipping, with as much as 90 percent of plastic found on beaches in the Netherlands originated from this source [11](https://www.safeseas.net/evidence/2020/02/26/plastic-dumping/#easy-footnote-bottom-11-105). These findings are supported by a study that analysed washed up plastic on an Atlantic island, which found that Chinese-flagged vessels appear to be the primary source of plastic waste.[12](https://www.safeseas.net/evidence/2020/02/26/plastic-dumping/#easy-footnote-bottom-12-105)

Not all plastic pollution results from illegal activities, and many of the illegal practices associated with it are not especially organised. Plastic may have been illegally dumped in the form of littering: a petty crime in many countries. This may result from a lack of collection capacity or high costs of collection. Larger scale dumping of waste from in-land sources results from illegal practices. In countries with poorly regulated waste-transport systems, there is evidence of companies and organisations dumping plastic waste directly into rivers in order to avoid paying landfill fees, reduce fuel expenses, and to save time. [13](https://www.safeseas.net/evidence/2020/02/26/plastic-dumping/#easy-footnote-bottom-13-105).

Other practices that have stronger degrees of illegality and organisation. Large quantities of plastics are illegally transported to countries in the Global South for disposal by organised criminal networks, who then dump it illegally at the terminus in informal and unregulated disposal sites, including in the ocean. Countries in East Asia with the highest quantities of leakage into the sea are also major recipients of plastic waste from the Global North.[14](https://www.safeseas.net/evidence/2020/02/26/plastic-dumping/#easy-footnote-bottom-14-105)

Ships use port reception facilities in order to dispose of waste, but these are sometimes seen as too expensive, too complicated, or inadequate – providing an incentive to dump waste otherwise, especially if it is taking up space. [15](https://www.safeseas.net/evidence/2020/02/26/plastic-dumping/#easy-footnote-bottom-15-105) This is an illegal practice because it contravenes international regulations such as the International Convention for the Prevention of Pollution from Ships.[16](https://www.safeseas.net/evidence/2020/02/26/plastic-dumping/#easy-footnote-bottom-16-105)

Scope

An estimated 8 million metric tons of plastic reaches the ocean each year from land-based sources through waterways and rivers.[17](https://www.safeseas.net/evidence/2020/02/26/plastic-dumping/#easy-footnote-bottom-17-105) Once this material reaches the ocean, it pollutes by either floating in seawater, travelling vast distances, accumulating in sediments on the seabed, or accumulating on coastal environments.[18](https://www.safeseas.net/evidence/2020/02/26/plastic-dumping/#easy-footnote-bottom-18-105)

Plastic debris floating in the ocean has been estimated at 5.25 trillion pieces, both constituted by single-use macro-plastics (over 5mm in size),[19](https://www.safeseas.net/evidence/2020/02/26/plastic-dumping/#easy-footnote-bottom-19-105) and micro-plastics (under 5mm in size). [20](https://www.safeseas.net/evidence/2020/02/26/plastic-dumping/#easy-footnote-bottom-20-105)Floating debris has become particularly visible due to the plastic ‘gyres’ throughout oceans, especially the ‘Great Pacific Garbage Patch’. [21](https://www.safeseas.net/evidence/2020/02/26/plastic-dumping/#easy-footnote-bottom-21-105)

Plastics have also polluted coastal regions. Debris numbers in an atoll of the coast of Australia only 14km2 in total size, for example, estimated 414 million pieces (with surface debris being made up of 50% macro and 50% micro debris), of which 95% were plastics.[22](https://www.safeseas.net/evidence/2020/02/26/plastic-dumping/#easy-footnote-bottom-22-105) This is not uncommon – the uninhabited Henderson Island in the South Pacific was estimated to have 38 million pieces of plastic ashore,[23](https://www.safeseas.net/evidence/2020/02/26/plastic-dumping/#easy-footnote-bottom-23-105)

The actual figures might be significantly higher. A report by Ocean Conservancy suggests these visible signs of plastic account for only 5 percent of plastic waste, with 95 percent being below the surface.[24](https://www.safeseas.net/evidence/2020/02/26/plastic-dumping/#easy-footnote-bottom-24-105)

Microplastics (or ‘microbeads’) are particularly problematic because they do not breakdown and are ubiquitous in all marine environments.[25](https://www.safeseas.net/evidence/2020/02/26/plastic-dumping/#easy-footnote-bottom-25-105) They result not only from degradation of macro-plastics (secondary microplastics), but also beads used in cosmetics and pharmaceuticals, as well as industrial abrasives (primary microplastics). Again, estimates vary depending on the area, but in the South Pacific ‘gyre’ it is estimated to be around 27,000 particles per km2. [26](https://www.safeseas.net/evidence/2020/02/26/plastic-dumping/#easy-footnote-bottom-26-105)

Impact

Plastic debris travels extensively, impacting all oceans as well as most coastal regions. It is a significant issue because it kills marine life, damages ecosystems, and ends up in seafood consumed by humans.

The first impact, and one in which is most visible, is entanglement. Marine life of all sizes can become entangled in plastic waste, causing starvation, suffocation, laceration and mortality.[27](https://www.safeseas.net/evidence/2020/02/26/plastic-dumping/#easy-footnote-bottom-27-105) Seals and turtles, for example, are often found as victims of entanglement.[28](https://www.safeseas.net/evidence/2020/02/26/plastic-dumping/#easy-footnote-bottom-28-105) Plastic bags and packing loops are particular sources of entanglement as they can directly cause suffocation or strangulation as animals grow.[29](https://www.safeseas.net/evidence/2020/02/26/plastic-dumping/#easy-footnote-bottom-29-105) The abandonment of plastic fishing gear at sea can also have large scale entanglement impacts, resulting in a phenomenon called ‘ghost-fishing’, where ALDFG continues to catch marine life, but on the seabed and out of sight. [30](https://www.safeseas.net/evidence/2020/02/26/plastic-dumping/#easy-footnote-bottom-30-105)

Ingestion is a significant problem, both by marine animals and birds.[31](https://www.safeseas.net/evidence/2020/02/26/plastic-dumping/#easy-footnote-bottom-31-105) Microparticles in particular, due to their small size, are easily accessible to a wide range of marine wildlife and ultimately transferred along the food chain as they do not degrade.[32](https://www.safeseas.net/evidence/2020/02/26/plastic-dumping/#easy-footnote-bottom-32-105)

The presence of microplastics was reported in approximately 30 percent of fish species.[33](https://www.safeseas.net/evidence/2020/02/26/plastic-dumping/#easy-footnote-bottom-33-105) This can lead to animals not eating as much, due to accumulation in their digestive system, and diseases as a result of plastics absorbing toxins which build up in cells and tissues.[34](https://www.safeseas.net/evidence/2020/02/26/plastic-dumping/#easy-footnote-bottom-34-105) Nanoplastics, 1000 times smaller than a grain of sand, can pass through cell walls with unknown health consequences.[35](https://www.safeseas.net/evidence/2020/02/26/plastic-dumping/#easy-footnote-bottom-35-105) Seventeen percent of species affected by plastic waste entanglement and ingestion are listed as threatened or near threatened.[36](https://www.safeseas.net/evidence/2020/02/26/plastic-dumping/#easy-footnote-bottom-36-105)

These impacts have also raised questions over the potential hazardous effects on humans, who can ingest microplastics through the consumption of fish and other seafood.[37](https://www.safeseas.net/evidence/2020/02/26/plastic-dumping/#easy-footnote-bottom-37-105) Possible negative impacts have been suggested including infertility, obesity, and cancer – though these links are not currently clear.[38](https://www.safeseas.net/evidence/2020/02/26/plastic-dumping/#easy-footnote-bottom-38-105) Microplastics have also been found in human blood.[39](https://www.safeseas.net/evidence/2020/02/26/plastic-dumping/#easy-footnote-bottom-39-105)

There are three impact areas which have not been less extensively studied. First, Gregory suggests that invasive species can attach to plastic and end up in new habitats, disrupting the local ecosystem.[40](https://www.safeseas.net/evidence/2020/02/26/plastic-dumping/#easy-footnote-bottom-40-105) Second, plastic in coastal environments can have a negative impact on tourism, creating economic problems for states and communities that rely on tourism.[41](https://www.safeseas.net/evidence/2020/02/26/plastic-dumping/#easy-footnote-bottom-41-105) Third, discarded plastic can cause damage for smaller vessels.[42](https://www.safeseas.net/evidence/2020/02/26/plastic-dumping/#easy-footnote-bottom-42-105)

Responses

Vince and Hardesty argue there is a significant gap in international law on plastics pollution. [43](https://www.safeseas.net/evidence/2020/02/26/plastic-dumping/#easy-footnote-bottom-43-105) While UNCLOS recognises marine pollution, for example, it does not focus in detail on technical rules.[44](https://www.safeseas.net/evidence/2020/02/26/plastic-dumping/#easy-footnote-bottom-44-105) Instead, states are directed to adopt their own laws. This approach is shared by the 1972 Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter, and Annex V of the 1973 International Convention for the Prevention of Pollution from Ships MAR-POL which specifically prohibits the disposal of plastics at sea.

There have been attempts to strengthen the international governance of plastic debris through the United Nations Environment Program’s 2009 guidelines for addressing marine pollution, and 2019 guidelines on monitoring and assessment of marine litter,[45](https://www.safeseas.net/evidence/2020/02/26/plastic-dumping/#easy-footnote-bottom-45-105) as well as the 2012 Honolulu Strategy which represents a global strategy to reduce marine debris.[46](https://www.safeseas.net/evidence/2020/02/26/plastic-dumping/#easy-footnote-bottom-46-105) These plans aim to encourage capacity building and the spreading of good practices among stakeholdrs.[47](https://www.safeseas.net/evidence/2020/02/26/plastic-dumping/#easy-footnote-bottom-47-105). However, contracted parties are expected to implement their own legislation. This means compliance has been an issue, and states are at varying phases of implementing domestic legislation and enforcement.

There have also been regional interventions. The ASEAN Regional Action Plan for Combating Marine Debris in the ASEAN Member States (2021-2025) outlines regional actions necessary to collectively address the issue of marine plastic pollution in ASEAN .[48](https://www.safeseas.net/evidence/2020/02/26/plastic-dumping/#easy-footnote-bottom-48-105) It recognises the lack of capacity many states have, and lays out potential areas of capacity building.[49](https://www.safeseas.net/evidence/2020/02/26/plastic-dumping/#easy-footnote-bottom-49-105)

Despite gaps in compliance, there have been some successful international enforcement activities. In 2019, for example, there was a month-long operation named ’30 days at Sea 2.0’ which included 200 enforcement authorities from around the world.[50](https://www.safeseas.net/evidence/2020/02/26/plastic-dumping/#easy-footnote-bottom-50-105)This resulted in 3,000 offences detected during 17,000 inspections. Operations such as this demonstrate the need for cooperation due to the transnational nature of the problem, but are limited because they are ad hoc or infrequent.

Governments themselves have struggled to reduce marine debris due to difficulties of enforcement even in areas that have regulated against plastic pollution.[51](https://www.safeseas.net/evidence/2020/02/26/plastic-dumping/#easy-footnote-bottom-51-105) In some cases governments have focused on the land sources of the issue, or ‘downstream’, with increasingly common levies on plastic bags and imposing bans on microbeads or plastic bag production [52](https://www.safeseas.net/evidence/2020/02/26/plastic-dumping/#easy-footnote-bottom-52-105) However, not all countries have introduced such measures or can enforce them successfully and enforcement actions remains relatively limited.

Dauvergne, and Xanthos and Walker, have argued the scientific community is particularly important for bringing attention to the problem.[53](https://www.safeseas.net/evidence/2020/02/26/plastic-dumping/#easy-footnote-bottom-53-105) Indeed, Dauvergne points to action against microbeads as being a successful case of a powerful environmental norm due to the quick phasing out of microbeads in cosmetics [54](https://www.safeseas.net/evidence/2020/02/26/plastic-dumping/#easy-footnote-bottom-54-105) He argues that anti-microbead campaigns have been able to shame microbead manufacturers and retailers on social media, threatening both brand value and consumer demand.

This demonstrates that it is not only governments and global regimes which have the ability to impact on responses and enforcement. Instead, many argue for a focus on bottom-up strategies. Producers of plastics, for example, can be persuaded to self-regulate in order to demonstrate Corporate Social Responsibility in the face of criticism from the public.[55](https://www.safeseas.net/evidence/2020/02/26/plastic-dumping/#easy-footnote-bottom-55-105) Bottom up strategies have also been advocated by NGOs such as Greenpeace and Beat the Microbead.[56](https://www.safeseas.net/evidence/2020/02/26/plastic-dumping/#easy-footnote-bottom-56-105)

Public awareness about the problems of plastic pollution is key to this approach. Some studies have demonstrated the importance of community-based litter picking projects or awareness raising campaigns, showing that NGOs have a significant role to play in advancing environmental regulation.[57](https://www.safeseas.net/evidence/2020/02/26/plastic-dumping/#easy-footnote-bottom-57-105)

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