

Stemming the tide: putting an end to plastic pellet pollution



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Foreword



Peter Thomson

The health of the ocean is declining and anthropogenic activities are the cause. Degrading coastal ecosystems, ocean warming, acidification, deoxygenation, over-fishing, and intolerable levels of chemical and plastic pollution are accelerating because of heedless human habits. The harm being caused by plastic and microplastic pollution to the environment, to the ocean, marine creatures and ultimately to ourselves is as perverse as it is inexcusable.

We are still in the process of discovering the degree of damage being done by microplastic pollution to the ocean and associated ecosystems, not forgetting the effects of these on our own well-being. But what we have learnt thus far is cause for great alarm. Plastic pellets are inherently toxic as a result of the additives they contain, and because they adsorb persistent background toxic chemicals present in the marine environment. They are entering the marine food chain, a large element of which involves ingestion by humans.

Of all the sources of microplastics, plastic pellets – so-called nurdles – deserve special attention. They are the building blocks for most of the plastic items produced today, and poor handling and transportation practices have resulted in massive losses of them into the environment. By weight, pellets are estimated to be the second largest direct source of microplastic marine pollution and they are known to cause serious harm to ocean life. The terrible *X-Press Pearl* disaster in 2021, in which more than 1,600 tonnes of plastic pellets spilled into the ocean around Sri Lanka, brought mainstream attention to the problem of pellet pollution at sea.

Fauna & Flora International has started to piece together the complex value chain of plastic pellets and the under-studied issue of pellet loss from container ships. This report highlights the risks inherent in acute pellet loss at various stages of global supply chains, and should serve as a positive resource for companies, policymakers and stakeholders in the plastics value chain as they seek to meet this challenge.

Thankfully, there is no lack of creative, intelligent thinking being applied to the challenges we face and this report is an example of that. Ultimately, we have to accept that all human-created problems have human solutions and this report points us in that direction.

A handwritten signature in black ink, appearing to read 'Peter Thomson'.

Ambassador Peter Thomson

UN Secretary General's Special Envoy for the Ocean



Introduction

Plastic pellets litter an important site for Atlantic grey seals in Norfolk, UK.

Plastic pollution is causing serious harm to wildlife and ecosystems, as well as human welfare and livelihoods, both through its immediate impacts and the longer-term effects associated with its degradation and with the chemical properties of plastic.

While plastic pollution and the harm it is causing will not be news to most people, many will be unaware of the specific issue of plastic pellet pollution[†].

Plastic pellets are lentil-sized pieces of plastic that are melted together to create almost all plastic items in existence. As the feedstock for the global plastics industry, pellets are transported around the world and are a significant source of microplastic pollution; it is estimated that billions of individual pellets enter the ocean every year as a result of spills on land and at sea.

In this report we explain why pellet pollution is a threat to biodiversity, describe how pellets enter the environment from land and sea-based sources, and explain key processes and players that move pellets through global supply chains. We highlight how pellet loss prevention measures to date have relied on

voluntary measures and have mainly focused on land-based sources of pollution, and we illustrate why there is a critical need for complementary action that will tackle sea-based sources of pellet pollution as well.

We end with clear recommendations on the key measures that need to be taken to stop the worst of this pollution on land and at sea. We make the case for an urgent move towards a regulatory approach with mandatory requirements that are supported by rigorous standards and certification schemes.

If followed, these recommendations will allow the global community to vastly reduce the quantity of pellets entering our ocean both through chronic spills over time and during maritime disasters. They will also ensure that, if these disasters do occur, they are dealt with rapidly and effectively to minimise their impact on wildlife and livelihoods.

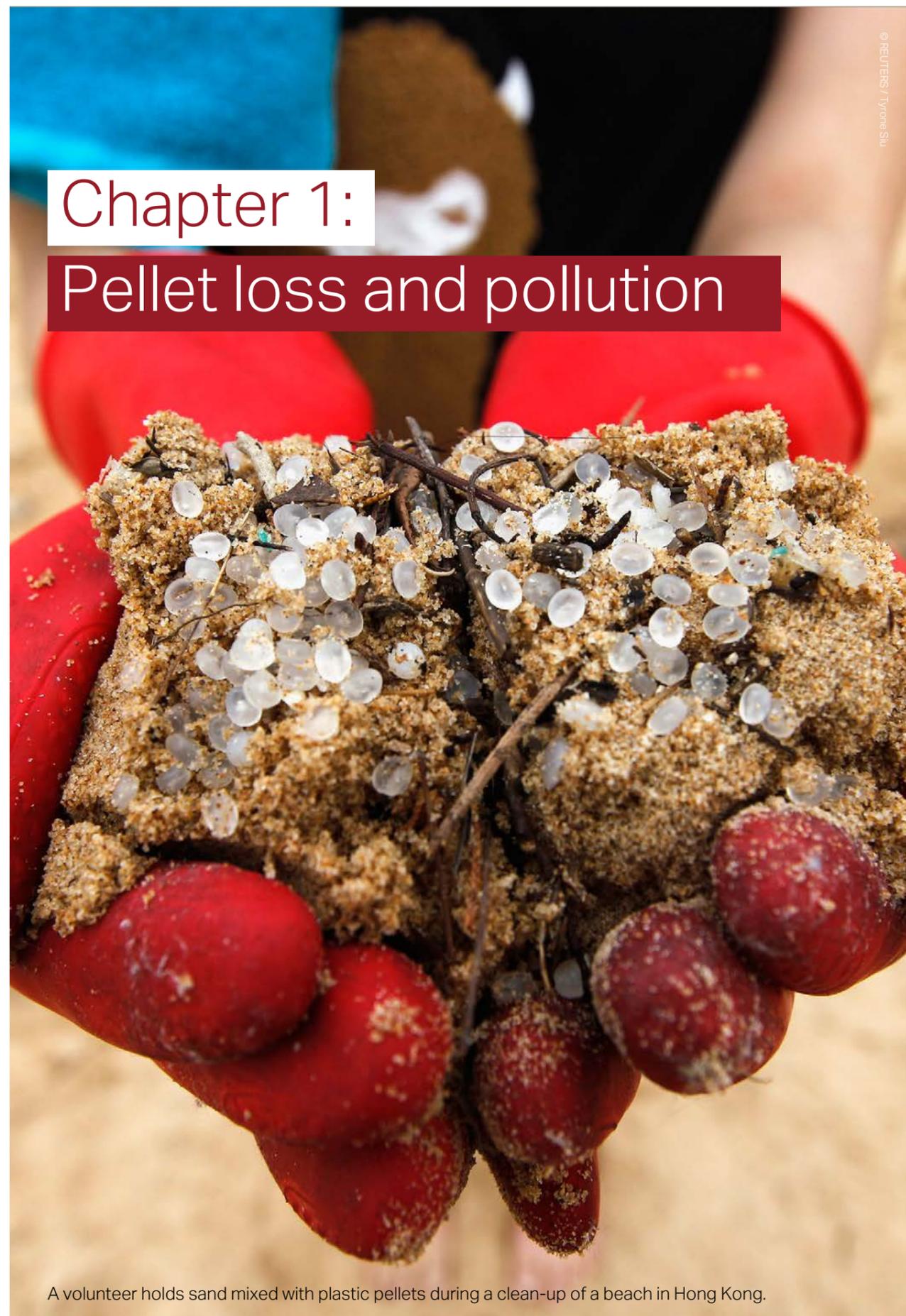
These much-needed measures would join up the dots in global supply chains, level the playing field and drive the systemic shift in practices that could make pellet loss a thing of the past.

Who is this report for?

This report will be useful for all those who want to have a better understanding of what pellets are, why they are a problem, and what could – and should – be done to tackle this source of microplastic pollution.

This report will also be a useful reference tool for policymakers who are considering the most effective interventions to stop pellet pollution on a national, regional and international basis, not least as the world comes together to consider regulatory action by the International Maritime Organization (IMO) and, in parallel, negotiate solutions to the global plastic pollution crisis under the auspices of the United Nations Global Plastic Treaty.

[†] Throughout this report, the word 'pellets' (or 'nurdles') is used as a catch-all term to refer to the various forms that plastic feedstock can take, including flakes, powders and granules.



Chapter 1:

Pellet loss and pollution

A volunteer holds sand mixed with plastic pellets during a clean-up of a beach in Hong Kong.

Plastic pellets or 'nurdles' are lentil-sized pieces of plastic that form the building blocks of almost all plastic items in existence – from food packaging to fridges. Pellets are melted together and shaped to create plastic products, with one tonne of 'raw' plastic composed of around 50 million individual pellets. Pellets are a significant source of microplastic pollution globally, yet they are largely overlooked in the plastic pollution debate.

How extensive is pellet pollution?

Pellets are spilled on land and at sea in staggering numbers, with billions entering the environment every year.¹ At various stages of plastic manufacturing supply chains, pellets are handled and moved between many different sites by a variety of stakeholders. At each stage, the risk of loss is high if pellets are mishandled, making plastic pellets the second largest direct source of microplastic pollution entering the ocean.²

The impact of this pollution is becoming more visible: pellets can be seen accumulating on beaches and coastlines around the world. Plastic pellets were first found in any significant quantity on coastlines in the 1970s³ and, since then, they have been found everywhere they have been searched for – from the Arctic to the Galapagos Islands.⁴ The Great Global Nurdle Hunt, an annual event run by the environmental NGO Fidra, in which people around the world scour beaches for pellets, has helped to reveal just how ubiquitous pellet pollution really is.⁵

An increasing problem

Plastic production has boomed over the last fifty years. By 2019, 460 million tonnes was produced annually⁶ and forecasts predict that, without action to slow production, 540 million tonnes a year will be produced globally by 2040.⁷

As pellets are the building blocks of almost all plastic items, the number of pellets produced and transported around the world for manufacturing will grow in tandem, meaning that – without effective measures to prevent pellet spills across the supply chain as a whole – pellet pollution will also increase.

Despite the current volume of pollution, the lack of formal requirements to prevent pellet loss or report pellet pollution incidents means that the full extent of pellet loss on land and at sea can only be estimated. And, despite increasing awareness from companies across the supply chain that pellets are entering the environment in large numbers, transparency is low and voluntary efforts to stem the problem have been inconsistent, with limited success to date.⁸

“The impact of pellet pollution is becoming more visible; these tiny pieces of plastic can be seen accumulating on beaches and coastlines around the world.”

Pellet loss at sea

Over the last 30 years, efforts to address pellet pollution⁸ have focused on losses originating from production and manufacturing sites, which are known as 'land-based sources' of pellet pollution. Far less attention has been given to pellets that are being lost during transport – especially at sea. Yet recent, catastrophic losses from container ships indicate that this is likely to be an additional, significant contributor to the problem.

Plastic pellet pollution is both a chronic problem and an acute one. Chronic loss results from smaller-scale leaks and losses occurring over time and on an ongoing basis during the various stages of pellet handling, transportation and manufacturing. Acute loss refers to large numbers of pellets entering the environment in one go, such as during the 2021 MV X-Press Pearl shipping disaster. It is critical that both chronic and acute pellet pollution is prevented. Coordinated international action to improve conditions and processes at all stages of the pellet supply chain are required to eliminate this pervasive source of microplastic pollution.

POLLUTING EFFECTS

Plastic pellets are far more than just an eyesore, littering beaches and sites of natural beauty. Pellets are mistaken for food by marine life and are regularly eaten or ingested, filling the stomachs of marine life and leading to starvation; one study found 19 pellets in the stomach of a dead fulmar⁹ (a seabird of the open ocean), in addition to a broad range of other plastics. And while pellets themselves are a microplastic, they also break down over time into smaller and smaller pieces, creating further environmental hazards.

Biodiversity impacts

Research studying the effects of plastic and microplastic pollution on wildlife and humans has proliferated in recent years and the picture is becoming clearer – and increasingly worrying (see diagram on page 10).

A study in 2022 reported that every marine species group has come into contact with microplastic pollution, with 90% of assessed species negatively impacted.¹⁰ The productivity of several important marine ecosystems, including mangroves and coral reefs, are also seriously affected by plastic pollution.¹⁰ The study found that plastic pollution in several regions of the world, including the Mediterranean, the East China Sea and the Arctic has already exceeded levels that cause significant ecological risks.¹⁰

Pellets are known or suspected to be harming species across the taxonomic spectrum – from seabirds to sea turtles (particularly juvenile turtles) to mammals such as seals.

Fourteen million tonnes of microplastics are estimated to be polluting the ocean floor,¹¹ and zooplankton – organisms at the base of the marine food web that are essential to maintaining healthy marine ecosystem function – are ingesting microplastics.¹² Ingestion of plastic by zooplankton has been shown to lower both nutritional intake and reproductive output.¹³ Another study found that zooplankton ingesting microplastics could have the potential to reduce oceanic oxygen production by disrupting their role in the function of the ocean's biological pump.¹⁴ Microplastic has been found to act as a vector that transports pathogens into the tissue of organisms, which can lead to alterations in both the ecological and functional roles of a species in the ecosystem.¹⁵ A study of freshwater zooplankton indicates that exposure to microplastics can lead to reduced reproduction in parents as well as subsequent generations that were not directly exposed to plastic particles.¹⁶

Plastic pellets form a significant part of the microplastic problem for wildlife and ecosystems. They are eaten by a wide variety of marine life (perhaps because of their resemblance to fish eggs), as well as indirectly consumed by species that feed on prey containing pellets.¹⁷ Pellets are known or suspected to be harming species across the taxonomic spectrum – from seabirds¹⁸ to sea turtles (particularly juvenile turtles)¹⁹ to mammals such as seals.¹⁷ In some areas that are badly affected by spillages, pellets are even suspected to be smothering seagrass meadows, reducing the ability of these plants to photosynthesise and threatening the myriad species that use these meadows as a breeding or feeding ground.²⁰

Autopsies carried out in 2019 on dead Manx shearwaters in the Faroe Islands revealed that, along with their natural diet, these migratory seabirds are eating plastic pellets.²¹

In recent years, a staggering 93% of northern fulmars sampled have been found to contain fragments of plastic, including an average of two industrial pellets per bird.²² Two pellets may not sound like a significant number; however, they take up a lot of space given the small size of the bird's stomach and may give the animal a false sense of being full. What is more, evidence indicates that pellets can cause physical and toxicological harm.



Marine litter and plastic pollution workshop, Kenya.

Pellets are inherently hazardous due to the toxic additives they contain. They also act like a sponge, adsorbing and accumulating bacteria and persistent environmental pollutants that are present in sea water.²³ When pellets come into contact with – or are eaten by – marine animals, the toxins, chemicals and bacteria can potentially be transferred to the animal,²⁴ effectively acting as a poisoned pill for marine life (and potentially for humans, if affected seafood is eaten).²⁵

A study investigating the adsorption of trace metals by pellets in fresh water found that weathered pellets may be a vector for metals in freshwater environments.²⁶ Another study, which looked at ingested plastic as a route for trace metals in the Laysan albatross and Bonin pterodroma from Midway Atoll in the central North Pacific, found that pellets were the second most common type of plastic ingested (after plastic fragments), and that there was a correlation between the levels of trace metals in the birds' bloodstreams and plastic ingestion.²⁴

Experimental evidence, meanwhile, demonstrated that feeding ground pellets to seabass caused significant damage to the intestine after one to three months, and that the damage was particularly pronounced when the pellets had been previously left to adsorb contaminants (e.g. persistent hormone disrupting chemicals like DDT) from seawater.²⁷

Impacts on human health

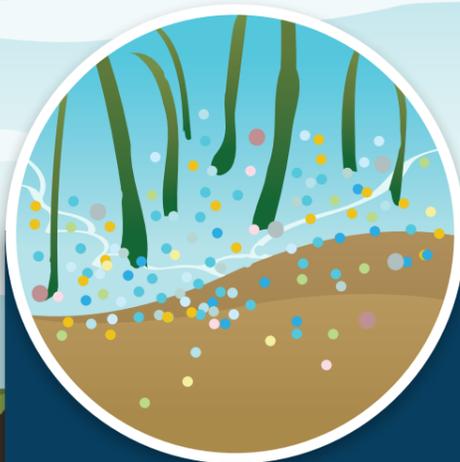
Studies into the potential impact of microplastics in human bodies are currently ongoing. We know, however, that microplastics are now in the food we eat,²⁵ the water we drink²⁸ and even the air we breathe.²⁹ An estimated 10 million metric tonnes of microplastics are diffused into the atmosphere each year globally through a variety of mechanisms: ocean spray, vehicles spraying plastic-laden rainwater from roads into the air, and agricultural practices.³⁰

Microplastic exposure in humans has been found to disturb gut microbiota and critical intestinal functions, such as affecting nutrient uptake and digestive function.³¹ Microplastics have also been found to induce an immune system response in the human body by stimulating the production of cytokine and chemokine, proteins that have been associated with inflammatory disease.³² Physical presence of microplastics – and associated toxins – could be raising the risk of cancer in humans.³³ Researchers looking for mechanisms by which microplastics may be entering human brains found microplastics were able to cross the blood-brain barrier in mice.³⁴ Most recently, microplastics have been detected in human blood for the first time³⁵ and deep in the lungs of patients undergoing surgery.²⁹

How plastic pellets enter the environment and harm wildlife

Pellets spilled at industrial sites enter ocean via drains and waterways.

Poorly packaged pellets can leak from damaged containers during transport at sea.



Pellets become embedded in coastal habitats, destabilising ecosystems.

Pellets spill from ships during accidents or when containers fall overboard.

Pellets floating on the ocean surface are mistaken for food by wildlife.

Pellets mistaken for food fill the stomachs of birds and other animals and can cause starvation.

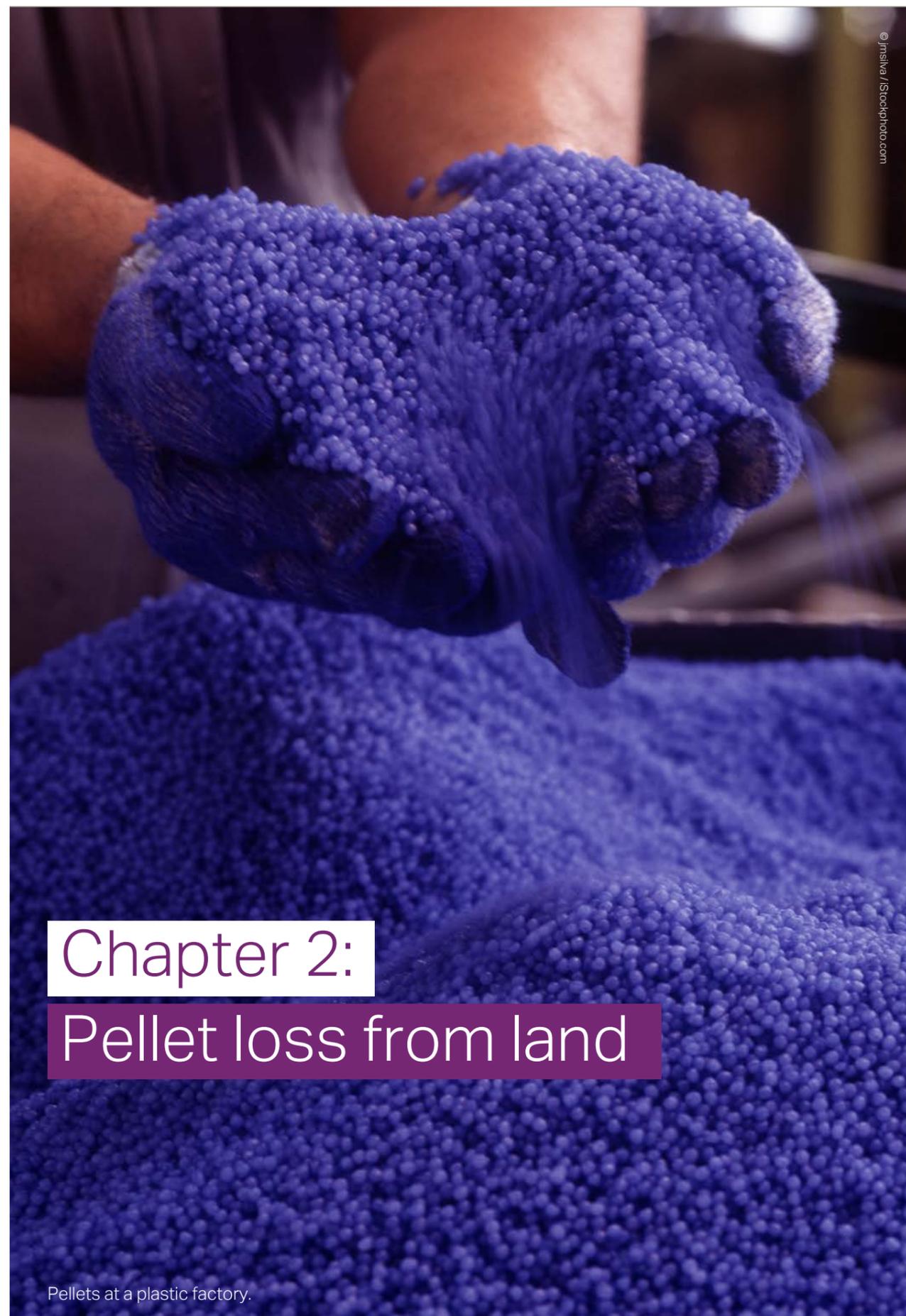


Toxicity of pellets increases over time in the ocean. These toxins transfer to marine life eating them.

Pellets (and their associated chemicals) can travel up the food chain if predators eat prey containing pellets.

Pellets have been found in the mouths and stomachs of dead fish.





Chapter 2:

Pellet loss from land

Pellets at a plastic factory.

Almost all the plastic items in use today start life as plastic pellets, which are handled by many different actors across global supply chains. Careless handling, poor training and limited awareness of the impact that pellet pollution has means that pellets are at risk of being lost to the environment at every stage of the supply chain (see diagram on page 16).

Pellet loss during production

Conventional plastic is largely derived from crude oil or natural gas, though it is also possible to produce alternative plastics using bio-based feedstocks, such as corn starch or vegetable oils. In Europe, nearly 50% of plastic products are manufactured using polyolefins¹ - a large family of versatile plastic polymers that includes polyethylene and polypropylene. Polyolefin pellets are therefore produced in vast quantities to supply this market.

Pellet production tends to be concentrated in large, heavily industrial petrochemical complexes. Once produced, pellets are generally transported elsewhere for use in plastic manufacture, so plants need ready access to transport networks. Pellets are routinely spilled at these industrial sites and swept into waste water drains or washed into storm drains after falling on the floor.²

Careless handling, poor training and limited awareness of the impact that pellet pollution has means that pellets are at risk of being lost to the environment at every stage of the supply chain.

Pellet loss during transport

After the pellets have been produced, they are packaged and loaded onto trucks where the risk of loss is high. Newly created pellets are usually bagged in 25 kg sacks made from thin, plastic film and are stacked up on pallets to create one tonne loads that are subsequently loaded into lorries and containers, usually by forklift trucks. These sacks are easily ripped or punctured during manual and mechanical handling – particularly if over-filled or poorly sealed – and are at risk of damage from poor storage, giving rise to ongoing, or chronic, losses of pellets.³

Loss from rail hoppers, a railroad freight car used to transport loose bulk commodities, is also common. Loose pellets are normally top-loaded into rail hoppers which can often have leaking valves and connection points, resulting in chronic losses of pellets to the environment.² In other examples, loose pellets destined for container ships can be loaded into what are known as 'bag in box' cargo containers, which means that billions of pellets are contained simply by a thin sheet of plastic packaging within the metal container. If the containers become damaged during loading or unloading, or when the ship is in transit, there is little to prevent chronic (or acute, depending on the extent of the damage) losses of loose pellets to the environment.⁴

Pellet loss during conversion

The next stage in the production chain is the conversion of pellets into products, a process undertaken by converter companies that buy pellets and manufacture them into either an intermediate form or a final product. Unlike the early stages of the pellet production process, which are dominated by a few large fossil fuel companies, the conversion process is far more diffuse across a much larger number of small- and medium-sized companies. In Europe, for example, there are over 50,000 plastics converter companies, manufacturing a wide range of products.⁵

Pellets can be lost at the converter stage in a number of ways depending on the type of conversion process underway. Converters often store large quantities of pellets outside, sometimes in open air sacks and other times in large silos. Ways in which pellets can be lost during the plastic conversion stage include pellets being blown from open-air

sacks; pellets on the floor being washed or swept into drains and waterways; spills that occur when pellets are loaded and unloaded into on-site storage areas from lorries or rail hoppers; and poor maintenance of silos/sacks, resulting in spills from damaged or poorly sealed containers.⁶

Converters use a variety of processes and equipment which, in turn, introduces a multitude of ways in which pellets can be spilled, if poorly managed. For example, injection moulding requires handlers to transfer large quantities of pellets into machinery that heats, melts and injects liquid polymer to different-shaped moulds. Another example is the conversion – or expansion – of polystyrene pellets; this hot and humid process can result in both expanded and unexpanded beads escaping to the environment via air ventilation systems and via on-site drainage.

Recyclate

When plastic products reach the end of their life, they enter into waste management systems in some parts of the world and – depending on the polymer type and product in question – might be sent to recycling centres. Plastic recyclate, once processed, is normally re-pelletised (often in the form of flakes) and re-enters supply chains for further manufacturing cycles. This material, often handled and transported in the same way and through the same supply chains as virgin plastic pellets, is also subject to the same risk of spillage and loss as virgin plastic pellets.

Influencing better practice

In addition to the direct handlers of plastic pellets, there are a number of stakeholders that can influence conditions and behaviour across the pellet life cycle, including brands and retailers (who buy, use and sell the resulting plastic packaging or products), investor companies, insurers and policymakers. Unlike other very visible and well-known forms of plastic pollution, awareness of the extent and impact of pellet loss is low. Despite growing awareness of this issue amongst some enabling players (as highlighted in the next chapter), generally speaking, few stakeholders outside of the manufacturing life cycle are engaged on the issue, which has resulted in limited drivers for change across global supply chains to date.



A plant covered by plastic pellets on Hong Kong's Lamma Island.

Pellet loss across the supply chain

Enabling players

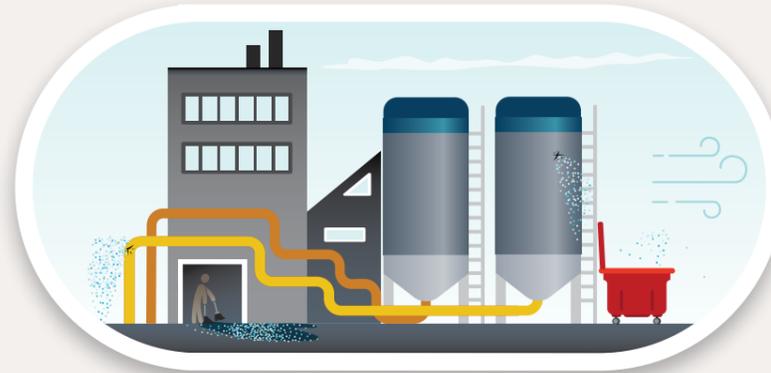
Limited awareness of pellet loss issue and impact



Focus primarily on cleaning up pellet spills as opposed to requiring loss prevention measures



Pellet loss prevention not widely included in procurement and sustainability policies



1 During production

- ✗ Inadequate investment in pellet loss prevention
- ✗ Poor staff training and housekeeping protocols
- ✗ Missing spill trays, insufficient equipment and poor site layout
- ✗ Incorrectly sealed hoses and pipes, and leaking silos
- ✗ Ineffective drain guards and filters mean pellets are swept into wastewater



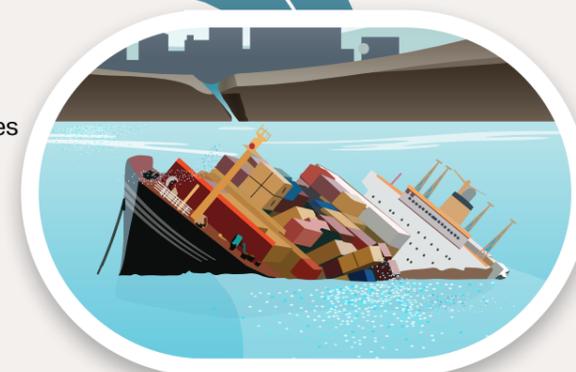
2 Preparing pellet cargo for transport

- ✗ No standard requirements for primary packaging
- ✗ Overfilled and poorly sealed packaging vulnerable to impact
- ✗ Thin packaging easily ripped during physical and mechanical handling
- ✗ No visible labelling warning handlers of dangers to marine life



3 Transport by trucks and rail

- ✗ Damaged and improperly sealed containers and hoppers spill pellets



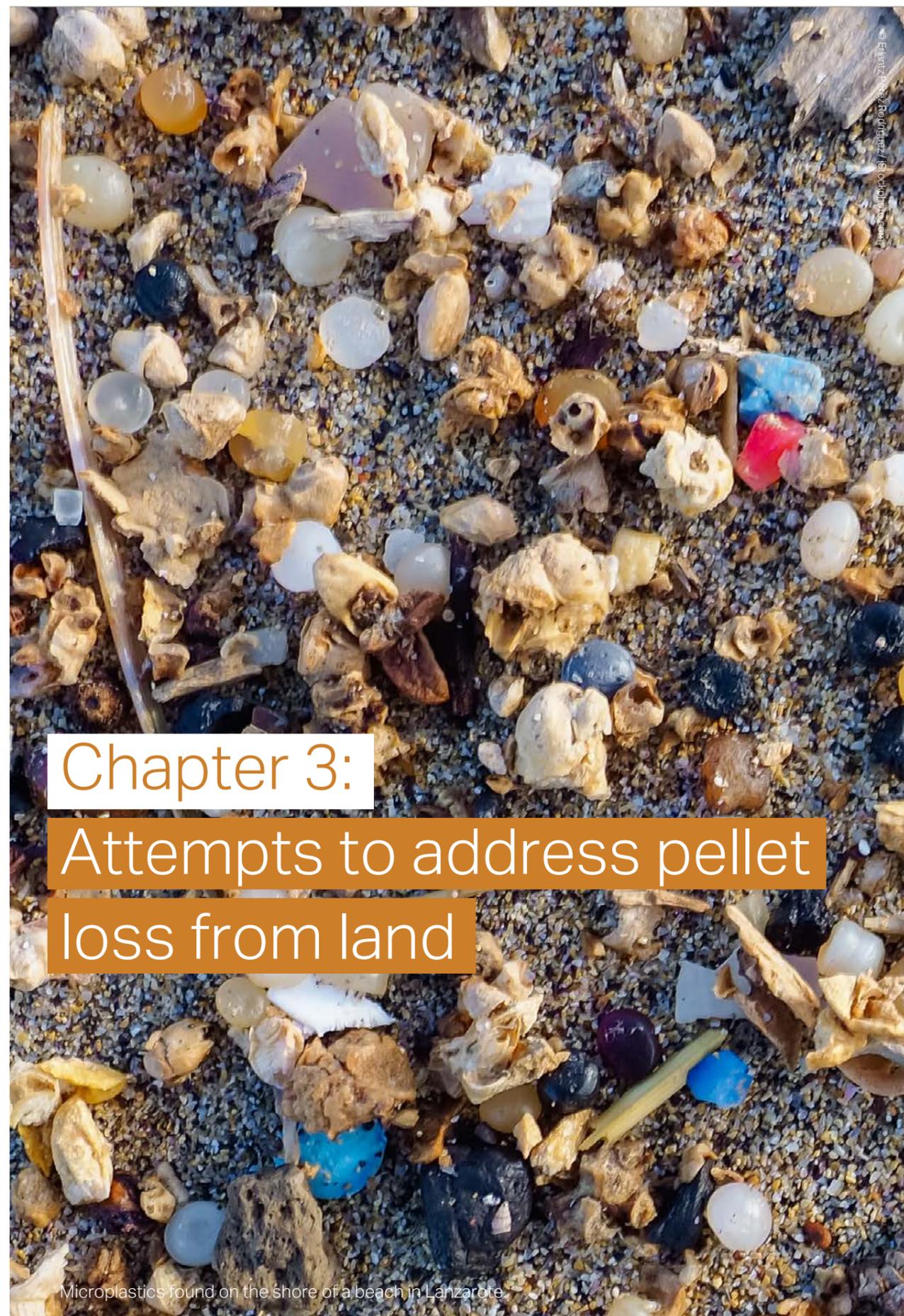
4 Transport at sea

- ✗ Damaged and improperly sealed containers can spill pellets
- ✗ Unsecured containers can fall overboard

5 Pellets converted into products by plastics manufacturers

- ✗ Pellets are spilled when sacks are unloaded at manufacturing sites
- ✗ Poor storage increases risk of chronic and acute loss
- ✗ Pellets spilled during conversion processes can be lost down drains or blown away





Chapter 3:

Attempts to address pellet loss from land

Microplastics found on the shore of a beach in Lanzarote.

Plastic pellet pollution from land-based sources has been documented since the early 1970s; in the 50 years since then, a number of voluntary initiatives and regulatory measures have been instigated in an attempt to stop this source of microplastic pollution. Here we outline some of these steps and note that, despite these efforts, pellet pollution is likely today to be at an all-time high given the ever-rising volumes of plastic being produced around the world.

Operation Clean Sweep®

In the early 1990s two US-based trade associations – The Society of Plastics Industry (now known as PLASTICS) and the American Chemistry Council – launched the first voluntary scheme to prevent pellet pollution, in response to documented evidence of pellets accumulating in the environment near industrial facilities. Known as Operation Clean Sweep® (OCS)¹ this scheme provides companies that make, use and move pellets with a manual that offers guidance for businesses of different types and sizes to help them improve handling practices and prevent the loss of pellets. Under the scheme, signatory companies pledge to improve their operations and train their staff to prevent and address spills, with the aim of ultimately reaching zero pellet loss from their operations.² There is no time limit set for this goal.

Plastic trade associations around the world have endorsed OCS and today it is the primary tool made available to association members that handle pellets. However, participation in the scheme is entirely voluntary (few trade associations have made sign up a mandatory requirement of association membership) and roll-out of the scheme differs significantly between different trade associations.³ Further, where companies do sign up to OCS, a lifetime membership is offered for whole companies as opposed to specific sites; this membership does not require independent, third-party audits to verify that OCS has been fully implemented and is being maintained at participating sites. Importantly, there are no penalties or repercussions for those that do sign up but fail to take action.

While hundreds of companies have signed up to OCS, the numbers represent a small percentage of the overall number of companies that handle pellets across the globe. Demonstrable impact is unproven and pellet loss continues – including from companies

known to have signed up to OCS.³

PAS 510 - an independent pellet handling standard

To improve confidence in industry commitments to prevent pellet loss, there was a clear need for an independently auditable standard to be developed – building on OCS but overcoming a number of the scheme's obvious limitations. A standardised approach to preventing pellet loss allows companies to demonstrate and, crucially, verify commitment to good practice in pellet handling and management across all sites.

In July 2021, the world's first pellet handling standard was published by the British Standards Institution (BSI), the UK National Standards Body.⁴ Known as the PAS 510, this Publicly Available Specification, or PAS, is a fast-tracked standard, developed by an expert, multi-stakeholder steering committee coordinated by BSI, with financial support from the Scottish Government, the British Plastics Federation and a group of nine investor companies co-ordinated by the Investor Forum.

PAS 510 is freely available from the BSI online shop and internationally applicable for all companies involved in plastics supply chains (including producers, transporters, converters, brands and retailers, and external stakeholders).

Key features include:

- All sites must complete a regular risk assessment to identify points at risk of pellet spills and losses.
- Sites are required to develop appropriate prevention and containment procedures in accordance with the risk assessment findings and install appropriate prevention and containment equipment accordingly, in particular in areas at risk of spills and losses.

- All staff who handle pellets must be trained on the importance of the issue and their own role in minimising risk, and must be shown how to handle pellets to prevent loss as well as how to contain and clean up spills. Companies must monitor and evaluate the effectiveness of pellet loss prevention measures in order to demonstrate year-on-year improvements towards a goal of zero pellet loss.

- Annual audits are required as part of the company's performance evaluation.

- A recommendation that companies establish a process for communicating pellet loss prevention policies with other stakeholders.

In order to provide the level of assurances needed by external stakeholders, standards such as the PAS 510 should form the basis of well-governed pellet loss prevention certification schemes which in turn set transparent, overarching rules and procedures on acceptable standards, certification and accreditation, building trust in the system and ensuring equivalent practices are upheld across all participating businesses.

Investor initiatives

Companies that invest in plastic producers and manufacturers have an important role to play in influencing environmental performance and, as such, are well positioned to play a significant role in tackling pellet pollution.

Following the publication of the PAS 510 in 2021, the investor co-sponsors, with the support of the Investor Forum (a membership organisation of institutional investors in the UK), committed to using this auditable standard when engaging with companies in their portfolios and to better inform their assessment of environmental risk management processes.⁵ The availability of the standard was seen as a significant development by those organisations wanting to ensure the companies they invest in were doing all that is possible to reduce their environmental impact with respect to pellet pollution.

In 2018, the global asset management company operating under the trade name Stewart Investors launched an investor-led pellet loss initiative with technical support from the Scottish-based NGO Fidra, in collaboration with the plastics working group of the United Nations Principles for Responsible Investment.

The initiative provides technical support and advice to 44 asset owners managing over US\$2 trillion of assets, who are collaborating to ask large companies that handle, use and transport pellets to introduce mandatory auditing and reporting on pellet loss. Within 12 months of the initiative launching, Stewart Investors reported that one of the world's largest consumer goods companies has integrated zero pellet loss into its sustainable procurement policies.⁶

Also in 2018, the United States-based shareholder advocacy group called As You Sow began challenging seven of the largest plastic resin manufacturers in the USA to disclose the actions they are taking to prevent and remediate loss of plastic pellets from their land-based facilities. In 2021, As You Sow reported a landmark result: 81% of DuPont's investor companies approved a shareholder resolution calling for the company to report on spills of plastic pellets to the environment. In total, As You Sow has been successful in seven shareholder resolutions filed in the USA aimed at reducing pellet spills, with public reporting of spills seen as the first step in improving corporate accountability for pellet pollution in the absence of national legislation. However, it is worth noting that to date, just three of the companies have reportedly started sharing any data.⁷

Reasons for limited uptake of best practices

It is possible for governments to mandate minimum requirements for standards and certification schemes as part of broader regulatory interventions. Where standards and certification schemes meet regulatory minimum requirements, they can be a useful tool for companies needing to verify compliance.

Pellet handling standards (with or without certification) are, however, still voluntary approaches and require commitment from pellet handlers as well as pressure from buyers of plastic goods to drive uptake through supply chains. For this reason, standards and certification schemes are still likely to have limited uptake and do not level the playing field for businesses across the supply chain in the absence of robust legislation enforcing measures across the supply chain as a whole. Investor initiatives are not a strong enough driver for universal uptake either. Given the global nature of plastics supply chains, attention must therefore turn to coordinated, regulatory measures that take into account pellet handling and pellet loss prevention measures on land and at sea (see Chapter 5).

National, regional and international regulations

In more recent years, and in response to increased recognition of the impact that pellet pollution has on the environment, a number of national, international and regional regulators have explored and introduced options for tackling pellet loss, though the focus has largely been on land-based sources.

Given the global nature of plastics supply chains, attention must therefore turn to coordinated, regulatory measures that take into account pellet handling and pellet loss prevention measures on land and at sea.

For example, the need for comprehensive action on pellets was recognised by The Convention for the Protection of the Marine Environment of the North-East Atlantic, commonly known as the OSPAR Convention. Coordinated action on pellet loss was included in the 2014 regional action plan for marine litter and, in 2021, OSPAR adopted a recommendation to reduce plastic pellet loss into the marine environment by requiring the "timely development and implementation of effective and consistent pellet loss prevention standards and certification schemes for the entire plastics supply chain." OSPAR recommendations are binding to all 16 contracting parties to the Convention, which includes the EU, and can therefore be influential in shaping national legislation.⁸

In 2021, France (one of the OSPAR contracting parties) issued Decree No.2021-461 to address loss of plastic pellets from sites producing, handling or transporting plastic pellets under its Environmental Code. This national legislation obliges industrial operators to prevent dispersion of pellets to the environment; however, the requirement only applies to businesses handling a certain tonnage of pellets per site. In reality, this means that there will be an ongoing risk of pellet pollution from companies operating with tonnages below this threshold.⁹

Building upon commitments adopted within the 2018 EU Plastics Strategy to reduce unintentional releases of microplastics to the marine environment,¹⁰ the European Commission consulted on policy options to tackle pellet pollution in 2022.¹¹ The regulatory options included a supply chain approach – measures addressing handling and transport of plastic pellets at all stages of the life cycle. The precise mechanism that would be used for legislation is not yet clear, but a requirement for independent certification of compliance to a recognised pellet handling standard is one possibility. In parallel to this process, the European Chemicals Agency (ECHA), has recommended that pellets be subject to more stringent labelling and reporting requirements under the European REACH regulation as part of numerous measures designed to address microplastic pollution from sources where the microplastics have been intentionally added.¹² The final details of both the European Commission's and ECHA's proposed measures are still pending (due to be finalised late 2022) and it is not yet clear whether the measures would bring about reduced losses during the movement of pellets at sea (see Chapter 4).

In the USA, there have also been some regulatory efforts to tackle aspects of the problem. In California, Assembly Bill 258 amended the California Clean Water Code in 2008 to include a chapter called the "Preproduction plastic debris programme", which requires all companies making or handling pellets in California to apply for state storm water drain permits as part of a package of measures aimed at controlling discharge of pellets via stormwaters.¹³ In 2017, two California-based plastics companies were fined \$67,900 by the US Environmental Protection Agency for poor practices that led to discharges of plastic pellets into storm drains and local waterways in violation of the California Water Code.¹⁴ Efforts to regulate at a federal level are being explored.

Most of the initiatives covered in this chapter are largely focused on land-based sources of pellet pollution. Losses during maritime transport are also a highly significant source of pellet pollution, but one that has been largely overlooked by efforts to date. This is the subject of the next chapter of this report.

Chapter 4: Pellet loss at sea

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Container ship at sea.

Maritime transport plays a fundamental role in supporting global supply chains. Over 90% of global trade moves around the world by sea,¹ transported along shipping lanes that span every ocean basin and pass every coastline. Over 800 million containers are shipped around the world every year according to recent estimates,² and the size of container ships has roughly doubled in just 20 years, with the largest ships now able to transport³ approximately 24,000 containers on a single voyage. Loading and unloading containers onto ships is a fully mechanised process, and ports operate 24 hours a day to keep up with busy schedules and tight turnaround times.

Because plastic pellets produced on one side of the globe are often converted into plastic goods on the other side, they are regularly transported on container ships along these shipping lanes, with just one standard container capable of carrying millions of individual pellets. Considering the sheer number of pellets that each container ship can carry, and the fact that any spillage would enter straight into the ocean, maritime transport of plastic pellets significantly increases the risk of marine pollution incidents.

As outlined in the previous chapter, land-based sources of pellet loss and pollution have, to date, been the primary focus for policy and industry initiatives. Shipping as a source of pellet pollution has received much less attention despite the fact that pellets are known to reach the ocean from containers and containers ships. In a 2016 report on the accumulation of pellets in ports and harbours, The Group of Experts on the Scientific Aspects of Marine Environmental Protection (GESAMP) stated that the shipping industry is considered to be a significant source of microplastic pollution for reasons that included mishandling of cargo, routine cleaning operations (e.g. of hulls and containers) and accidental spills.⁴

Pellet losses can occur when the primary packaging housing pellets becomes damaged and they leak out into the containers. If those containers are damaged or improperly sealed, or if they are opened for inspection or cleaning, loose or poorly packaged pellets can escape into the environment. In 2019, Frontier Logistics (a shipping facility in South Carolina where plastic pellets are packaged for export after arriving by train from manufacturing facilities along the US Gulf Coast) reached a US\$1 million settlement over claims of chronic pellet loss from its facility.⁵

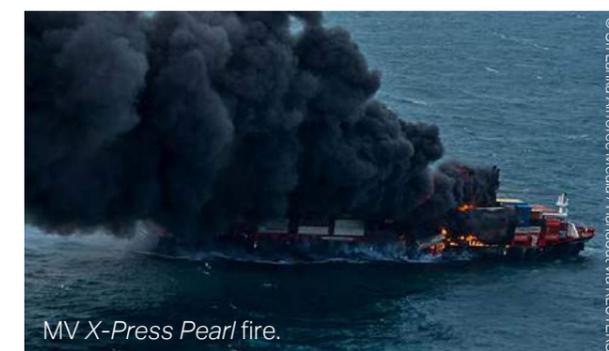
The settlement was one of the largest of its kind related to pellet pollution.

In addition to chronic and acute losses in the nearshore environment, severe offshore pellet pollution incidents have occurred around the world in recent years as a result of maritime shipping disasters. In each of these examples, whole containers of pellets have been lost overboard or become damaged during transport, resulting in pellet pollution. The impact of these losses is significant and, in some cases, catastrophic for marine life, livelihoods and economies.⁶

Maritime pellet disasters

One of the most infamous pellet spills at sea happened in May 2021 when the Singaporean-registered container ship *MV X-Press Pearl* caught fire and an estimated 1,680 tonnes of pellets (approximately 84 billion pellets) being carried onboard were spilt into the Indian Ocean off the coast of Sri Lanka when the vessel sank. Shortly afterwards, pellets began washing up on beaches in western Sri Lanka, in some cases accumulating in piles two metres high.⁷ The pollution has caused serious economic, social and environmental impacts: in the months following the spill, 20,000 fishers were unable to fish in the area and marine life and habitats were heavily affected. Hemantha Withanage, Executive Director of the Centre for Environmental Justice in Sri Lanka said in an interview with *The Guardian* following the spill that the pollution “will not just affect marine life and human health, but also tourism and livelihoods, for years to come”.⁸ Scientists expect pellets from the spill to end up as far away as Malaysia and Somalia because of the reversing monsoon currents in the Indian Ocean, demonstrating that a pellet spill is not purely a localised pollution event, and reinforcing the need for an international approach and action.⁹

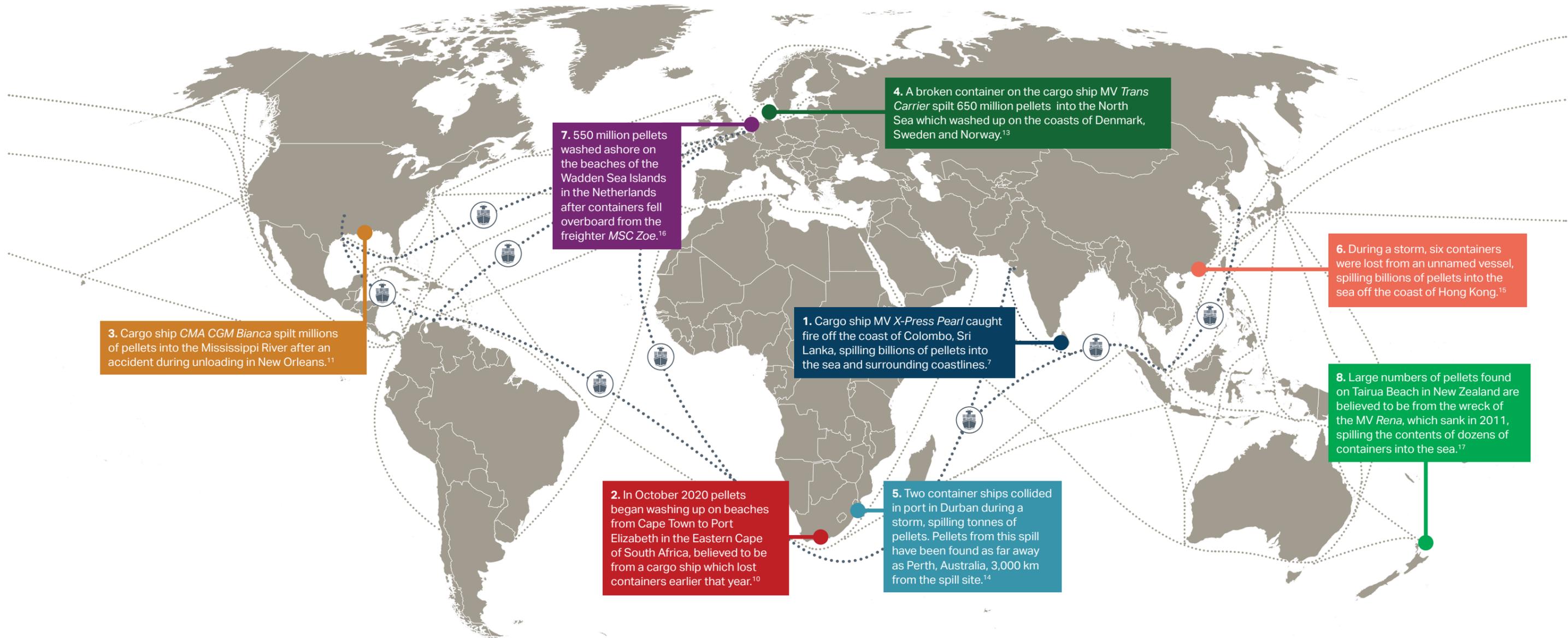
The *MV X-Press Pearl* disaster was not unique, however.



MV X-Press Pearl fire.

© Sri Lanka Airforce Media / Handout via REUTERS

Catastrophic pellet losses at sea during maritime transport



8

incidents

1
trillion

pellets

RECORDED LOSSES AT SEA

- | | | | |
|----------|---|----------|---|
| 1 | Sri Lanka, 2021
1,680 tonnes (est. 84 billion) pellets lost ⁷ | 5 | Durban, South Africa, 2017
49 tonnes (est. 2.45 billion) pellets lost ¹⁴ |
| 2 | Plettenberg Bay, South Africa, 2020
Quantity lost, unknown ¹⁰ | 6 | Hong Kong, 2012
150 tonnes (est. 7.5 billion) pellets lost ¹⁵ |
| 3 | New Orleans, USA, 2020
25 tonnes (est. 1.25 billion) pellets lost ¹² | 7 | Wadden Islands, Netherlands, 2012
11 tonnes (est. 550 million) pellets lost ¹⁶ |
| 4 | Norway, 2020
13 tonnes (est. 650 million) pellets lost ¹³ | 8 | New Zealand, 2011
150 tonnes (est. 7.5 billion) pellets lost ¹⁷ |

In 2012, 150 tonnes of pellets (approximately 7.5 billion), were spilt into Hong Kong Harbour when six containers fell overboard from a single vessel caught in Typhoon Vincent. Pellets quickly began washing up in huge numbers along the coastline and volunteers spent hundreds of hours on the clean-up effort. The absence of standardised disaster response protocols or a clean-up methodology, however, meant that these volunteers had to rely on whatever tools were at their disposal in their attempt to clean up the spill.¹⁵ It was estimated that roughly two thirds of the spilt pellets were removed from the environment following the disaster, meaning that over 2 billion pellets were lost to the environment in this single incident. Volunteers involved in the clean-up effort reported pellets still washing up on the coastline five weeks after the disaster. Slow degradation times of plastic in the environment and the propensity for pellets to adsorb environmental toxins onto their surface means that these lost pellets will pose a serious threat to marine life long into the future.¹⁸

In 2017, 49 tonnes of pellets (around 2.45 billion), spilt into Durban harbour in South Africa when a storm damaged several ships including the *MSC Susanna*, which was carrying pellets. Lack of knowledge about the best way to contain pellet spills at sea, and the absence of a planned response to pellet spillages contributed to the pellets spreading over thousands of kilometres from Cape Town to the coastline of Western Australia.¹⁴ Despite the efforts of volunteers and officials over three months, it was estimated that less than 25% of the lost pellet cargo was retrieved. The legacy of this pollution event will have serious implications for coastal ecosystems, wildlife and local economies for years to come.

The Norwegian coastline suffered a similar fate in 2020 when the *MV Trans Carrier*, which was transporting 26 tonnes of pellets from the Netherlands to Norway, was struck by an overnight storm in the German Bight. The ship remained intact, but crew reported damage to one of the containers aboard the vessel from which pellets were spilling. Approximately 13 tonnes, or 650 million pellets, ultimately polluted a huge sea area from the west coast of Sweden to southern Norway.¹³ This was the second pellet pollution incident to affect European nations bordering the North Sea in as many years. In 2019, the *MSC Zoe* lost 350 containers overboard in the North Sea during a heavy storm. A full inventory of the ship's cargo is

not available (which is notable in its own right), but containers are known to have broken open, spilling millions of pellets into the water.¹⁶

These high profile spills were all linked to accidents or adverse weather events, and the result in each case was the same: widespread, highly damaging pellet pollution and costly, time-consuming and ineffective clean-up operations.

International Maritime Organization: preventing pollution from ships?

Once pellet cargo reaches the vessel it is going to travel on, international maritime laws – governed by the International Maritime Organization (IMO) – become relevant. As a body of the United Nations, the IMO is governed by an assembly with global representation. National administrations are responsible for working together under the auspices of the IMO to develop the international regulatory framework that prevents pollution from ships. The main technical work of the IMO is carried out by a number of committees and sub-committees which bring together experts from a wide range of stakeholder groups including national and regional administrations, financiers, insurance companies, shipping associations, industry representatives, NGOs and academics.

With respect to controlling and preventing environmental pollution from ships, the most important committee is the Marine Environment Protection Committee (MEPC). For example, the MEPC is where matters relating to an international agreement known as MARPOL are discussed.

At least a trillion pellets are estimated to have spilled into the sea from eight maritime disasters alone.



MARPOL

The International Convention for the Prevention of Pollution from Ships (known as MARPOL) is the main global regulatory mechanism covering pollution of the marine environment by ships. The convention, together with a protocol and various annexes added later, cover oil pollution prevention and regulate the discharge of more than 250 harmful substances identified as marine pollutants. Annex V entered into force in 1988 to prevent garbage pollution from ships, and today prohibits the deliberate disposal of all forms of plastics into the sea.¹⁹ Annex III to the convention covers standards on packing, marking, labelling, documentation and stowage of certain goods in packaged form, but these provisions do not currently apply to plastic pellets.²⁰

One hundred and fifty-six states have signed the convention, covering more than 99% of the world's ocean-going tonnage, but not all signatories have ratified or implemented the minimum legislation needed to enforce the rules and regulations,²¹ reducing overall effectiveness.

The IMDG Code

The International Maritime Dangerous Goods (IMDG) Code is a code of the Maritime Safety Committee of the IMO. It is the main international legal instrument regulating the safe transport at sea of dangerous goods and substances in packaged form, including marine pollutants. It contains procedures and policies

for shippers, handlers and other relevant authorities on safely handling and stowing goods that are classified as dangerous or hazardous goods. The rules and regulations laid out in MARPOL Annex III apply to substances listed by the IMDG Code as marine pollutants, but plastic pellets are not currently included in this list.²²

The HNS Convention

The International Convention on Liability and Compensation for Damage in Connection with the Carriage of Hazardous and Noxious Substances by Sea (known as the HNS Convention) is an IMO convention that sets out the rules covering compensation to be paid in the event of accidents at sea involving hazardous and noxious substances, as well as covering the risks of fire and explosion, loss of life, personal injury and loss of or damage to property. It is not yet in force as too few States have ratified it.²³

Its provisions would require ship-owners to take out liability insurance in the first place, and would establish a fund for incidents not covered by that insurance. The convention covers a wide range of substances including oil and other liquids defined as noxious or dangerous; liquefied gases; dangerous, hazardous and harmful materials and substances carried in packaged form; and solid bulk materials defined as possessing chemical hazards. The convention does not currently cover pellets; however, when it enters force, it has the potential to do so if the IMO were to reclassify pellets so that they are covered by the IMDG code.

Contents unknown

While the IMO has introduced various pieces of legislation pertaining to pollution prevention and to the safe loading and unloading of containers to protect the lives of seafarers, none of the existing legislation adequately addresses the conditions in which pellets are shipped. Unless the cargo housed in containers is subject to IMDG Code restrictions – which pellets are not – there is currently no requirement for the container contents to be disclosed to the ship operator. This has a few consequences, one of which is that the operator can stow containers holding pellets anywhere on the ship – including above deck in positions where they are more vulnerable to being lost overboard.

In 2016, a new IMO regulation entered into force requiring the gross mass of a container to be verified before it is loaded onto a ship. This was introduced to better distribute the weight of containers on ships and to reduce the likelihood of top-heavy stacks toppling overboard during transit. Where containers are lost overboard, it is only mandatory to report the loss of those containers that carry harmful or dangerous goods, as classified under the IMDG Code.

Over the course of 2020-2021, just 3,000 containers were reported to have been lost overboard.²⁴ Although this number would appear to be a tiny fraction of the millions of containers reportedly shipped around the world every year, the number is an estimated 400% increase on the previous year, and it is widely understood that the actual number of containers lost annually is likely to be higher than the reported numbers.²⁵

Given that the IMO's role includes preventing pollution from ships there is a clear need for the different stakeholders represented at the IMO to act to prevent further catastrophic pellet pollution incidents. More needs to be done to improve how pellets are packaged and stowed on ships and information pertaining to the presence and quantity of pellet cargo needs to be communicated to ship operators to prevent pellet loss and pollution in the future. These changes can be achieved through the collaborative work of the various IMO committees and – once enacted – can be transposed into national law.



Attempts to quench the fire aboard MV X-Press Pearl.



Chapter 5:

It's time to act - end pellet pollution with mandatory measures

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Global action is needed to solve the pellet pollution problem.

Pellet loss is a preventable source of microplastic pollution, yet it continues largely unabated throughout the supply chain, as detailed in this report. Here, we make the case for a complementary set of measures that will improve practices on land and at sea, and bring about the systemic change needed to halt pellet pollution.

Pellets are directly handled by many different actors across their life cycle; to date, voluntary efforts have not been effective in tackling pellet loss from plastics supply chains. Companies cannot currently procure plastic pellets – or products made from plastic pellets – in the knowledge that pellet loss prevention measures are being upheld throughout the supply chain. Solutions to the problem must be applied in a holistic, coordinated and complementary fashion – across both land and sea. The goodwill of individual pellet handling companies cannot be relied upon to fix the problem – achieving the goal of zero pellet loss requires a fundamental change in practices to prevent this pervasive form of pollution (see page 38).

A supply chain approach means that every company – regardless of size or location – across the whole plastics supply chain (from manufacture to point of sale) is required to prevent pellet loss. A mandatory obligation on the whole supply chain will ensure that no individual company or sector is disadvantaged by behaving responsibly, and would ensure consistency, transparency and continuity in practices that would make pellet loss a thing of the past.

Preventing pellet loss with mandatory measures

Regulation based on a supply chain approach is urgently needed to ensure that all companies involved in the handling of plastic pellets at every stage of the supply chain can verify that pellet loss prevention measures are being adhered to.

Policymakers can have an immediate, positive impact by passing legislation that sets mandatory requirements for all pellet handlers across the supply chain, ensuring pellet loss prevention extends beyond those voluntarily choosing best practice. This will ensure that all businesses are held accountable to the same level of performance, and will provide a formal mechanism for enforcement of agreed best practices and a means of monitoring compliance.

Regulations would help investors, insurers, retailers and brands ensure that they are not contributing to pellet pollution when investing in, insuring or procuring from plastics producers. This is important in terms of:

- risk management;
- environmental and social governance;
- compliance with pollution policies; and
- transition to a more circular economy by reducing waste and improving resource efficiency.

Leaking pellets from supply chains undermines each of these principles.

Voluntary efforts have not succeeded in eliminating pellet loss from plastic supply chains. Policymakers can have an immediate, positive impact by setting mandatory requirements for all pellet handlers, ensuring pellet loss prevention extends beyond those voluntarily choosing best practice.

It is important that policymakers around the globe work together to ensure that new regulations governing the handling and transportation of plastic pellets are effective in eliminating chronic and acute losses of pellets from both land and sea.

We are calling for a series of complementary measures, based on a true supply chain approach, to bring about a systemic change in the way pellets are handled and transported on land and at sea, and ultimately achieve the goal of zero pellet loss.

1 Regulations to tackle pellet pollution from land

1.1 All companies that handle plastic pellets must be legally required to provide independent, third-party verification that pellet loss prevention measures are implemented, maintained and monitored for effectiveness at every stage of the supply chain.

To be effective, regulatory measures intended to prevent pellet loss must work successfully at a local, national, regional and international scale in order to adequately capture all stages of the pellet life cycle and must:

- Apply to all companies handling plastic pellets regardless of company size or location, including – but not limited to – raw material providers (e.g. polymer producers), transporters (e.g. haulage and distribution companies, including maritime transporters), converters (e.g. plastic manufacturers), buyers (e.g. retailers and brand owners) and plastic recyclers.
- Stipulate that all sites, facilities and operations handling pellets are audited annually by an accredited third party to verify implementation and maintenance of effective pellet loss prevention measures.
- Require all sites, facilities and operations that handle pellets to regularly and transparently report on implementation and effectiveness of pellet loss prevention measures.
- Require the sharing of information on origin, quantities and types of pellets between all stages of any given supply chain to ensure that records of pellet loss prevention measures are upheld and communicated between actors.



Spills at manufacturing sites are common.

1

1.2 Standards and certification schemes must meet minimum requirements established in legislation.

Provided that they are rigorous enough to meet legislative requirements, pellet handling standards (such as the PAS 510) and well-governed certification systems would allow companies to independently verify compliance with mandatory, regulatory measures.

As well as providing a mechanism for the implementation of comprehensive pellet legislation, standards and independent certification schemes can – in advance of broader legislation being in place – provide assurance that pellets are well managed throughout a product's supply chain. In both cases, in order to provide this level of assurance, standards and certification schemes must meet some key minimum criteria.

Standards must:

- Be developed and published by a recognised standards body, through a fair, transparent and multi-stakeholder process.
- Be accessible and applicable to all stakeholders across the whole plastics supply chain.
- Require companies to evidence continual improvement towards the goal of zero pellet loss.
- Prioritise pellet loss prevention ahead of containment, clean-up and mitigation measures at all stages of the supply chain.
- Require regular staff training to alert handlers to the environmental impact of pellet pollution and the need for improved handling practices to minimise risk of leaks and losses. Training programmes must also cover spill containment and clean-up protocols for a range of environments to minimise long-term damage to the environment.
- Require companies to work with customers and suppliers to ensure best practice across the supply chain.

Certification Schemes must:

- Be developed and managed transparently to allow regulators and the general public to understand what the scheme entails and how effective it is.
- Include independent, multi-stakeholder governance structures.
- Include a chain of custody to allow for the tracking of certified pellets and products made from them along the full supply chain.
- Only certify sites that have been independently audited against agreed standards by third-party auditors accredited by a recognised authority.
- Comply with regulations that facilitate the safe transport of pellets by sea (see section 3).
- Facilitate public reporting of progress towards the goal of zero pellet loss.

2 Improved packaging and labelling of pellets for transport

2.1 In addition to regulatory measures that improve the handling and transportation of plastic pellets, legislation should also stipulate the use of improved packaging labelling and communication throughout the supply chain to reduce risk of chronic and acute pellet loss on land and at sea.

It is important that the primary packaging used to prepare pellet cargo for onward travel is improved so that – at a minimum – it is both impact- and tear-resistant, as well as resistant to degradation in the marine environment. This is particularly important for cargo destined for maritime transportation, but would also significantly reduce the risk of losses during road and rail transportation.

Pellets being prepared and packaged for onward transport should display clear warning labels, indicating that the contents are dangerous goods and highlight the risk of harm to aquatic environments. This would improve communication, care and attention when loading and unloading cargo being prepared for onward transport by road, rail or sea.



A container from the MV X-Press Pearl disaster.

3 Regulations to prevent sea-based sources of pellet pollution

There is a clear and pressing need to introduce measures that would eliminate the risk of both chronic and acute losses of pellets from ships, and prevent further pollution disasters such as that experienced in Sri Lanka in 2021 following the sinking of the MV X-Press Pearl (see Chapter 4).

There are three key measures that the IMO should take to ensure pellet loss at sea is minimised:

3.1 The IMO must legally classify pellets as marine pollutants in recognition of their persistent, polluting nature and the harm to marine life and ecosystems.

In doing so, pellets would be subject to a number of measures that would significantly reduce the risk of future pollution incidents, including:

- Stipulated minimum requirements for primary packaging to ensure that pellets are packaged in impact-, tear- and marine-resistant packaging (see section 2).
- Safe stowage rules for the transport of pellets in containers – with priority given to below deck stowage or, when unavailable, inner-stack stowage as a minimum.
- Improved communication between cargo owners and ship operators (utilising the established chain of custody and cargo labelling stipulated in sections 1.2 and 2), alerting crews to the presence of pellets and environmental risk associated with their transport at sea.

3.2 National administrations, under the auspices of the IMO, must work together to develop standardised disaster response protocols to aid containment and clean-up of future off-shore, near-shore or coastal shipping disasters that result in acute losses of plastic pellets. These should:

- Be informed by nations and volunteer groups with recent experience of tackling serious pellet loss incidents.
- Establish a clear, internationally agreed early warning system in the event of accidental loss of pellet cargo to alert relevant authorities and launch agreed disaster response protocols.
- Include training requirements for:
 - all onboard staff on effective containment and clean-up protocols and use of appropriate equipment, which must be installed on board during transit; and
 - all relevant national authorities in coastal nations that are responsible for protecting the marine environment to train them in how to react to acute pellet loss incidents.
- Be adopted immediately and on a voluntarily basis as a short-term measure until legal requirements can come into force under IMO procedures.

3.3 Clear protocols or guidance related to liability and compensation claims in the event of accidental loss must be established. To achieve this:

- All IMO Member States should ratify or accede to the HNS Convention to provide countries impacted by acute pellet loss incidents with compensation and remedial funding based on the polluter pays principle.

4 Additional measures that should be explored by the IMO to reduce the risk of pellet loss at sea:

- The introduction of minimum requirements for the maintenance of containers that house pellets to ensure that they are inspected and kept in good working order with no faults or cracks and with effective seals to ensure that pellet cargo cannot escape during transit.
- The introduction of legal limits on the volume of loose pellets being transported within containers, to reduce the risk of loss if containers become damaged during transport.



Pellets polluted coastlines following the MV *Trans Carrier* accident.

MV *Trans Carrier* spill – a compelling case for action

In February 2020 the cargo ship MV *Trans Carrier*, sailing from the Netherlands to Norway, spilt 13.2 tonnes of pellets (around 620 million individual pellets), polluting a large area of coastline from the western coast of Sweden to southern Norway. A year-long clean-up effort managed to remove a little over four tonnes of pellets, with almost nine tonnes irretrievable from the environment.¹

Norwegian authorities believe that, had the pellets been covered by rules in the IMDG Code, the pellet containers on board the *Trans Carrier* would have been stored differently and the incident could have been prevented.² Furthermore, the relevant authorities would have been alerted to the pollution incident much faster and a national response would have been triggered immediately, which would have aided containment and clean-up of the lost pellets. In reality, time was lost debating whether the pellets were a pollutant requiring a national response or litter requiring only a local response.³

With this experience in mind, Norway is a lead country urging the IMO to pursue changes, including classification to ensure pellets are covered by the IMDG Code.

A supply chain approach to eliminating pellet loss

Enabling players



Investors



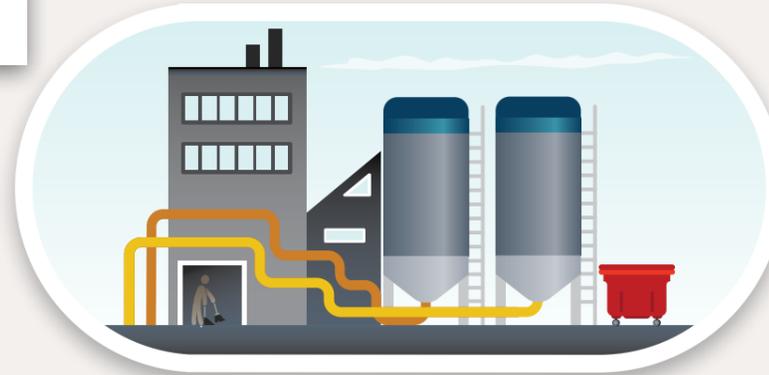
Insurers



Brands and Retailers

Solutions driven by legislation based on a supply chain approach

Legislation based on a supply chain approach provides the assurances needed by enabling players.



1 During production

- ✓ Training for all pellet handlers
- ✓ Regular risk assessments
- ✓ Implementation of effective pellet loss prevention measures
- ✓ All pipes and leak points checked regularly and sealed
- ✓ Monitoring and reporting on progress towards zero pellet loss



2 Preparing pellet cargo for transport

- ✓ Training and monitoring to ensure zero loss during loading
- ✓ Use of robust tear-proof packaging



3 Transport by trucks and rail

- ✓ Independent audits and monitoring to ensure zero pellet loss during storage and transport



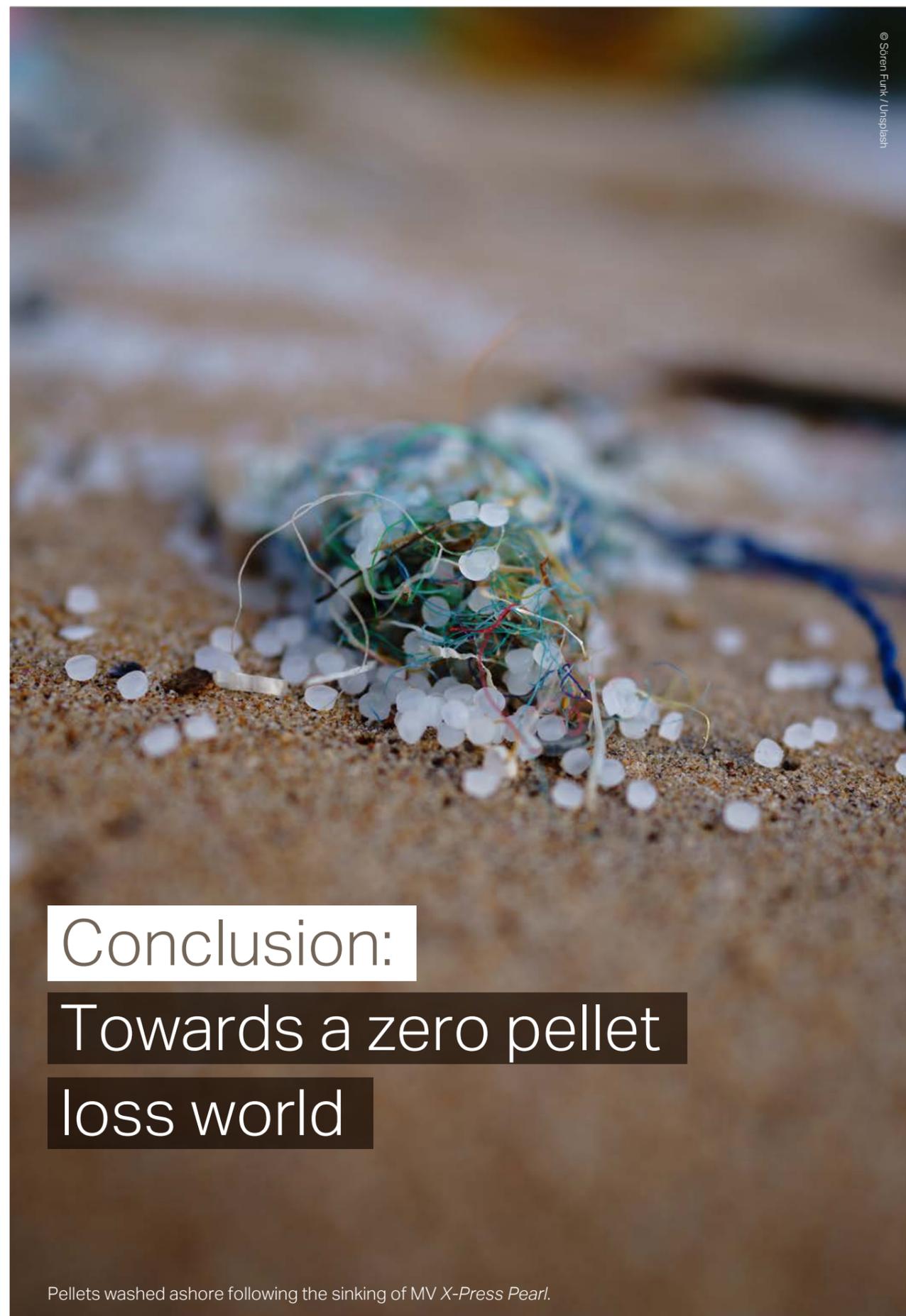
4 Transport at sea

- ✓ Classification of pellets as marine pollutants to improve stowage, packaging and communication requirements
- ✓ Rapid containment and implementation of agreed clean-up protocols to reduce impact



5 Pellets converted into products by plastics manufacturers

- ✓ Training for all pellet handlers
- ✓ Regular risk assessments
- ✓ Verified compliance with pellet loss prevention standards
- ✓ Pellets stored in sealed or protected areas



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Conclusion:

Towards a zero pellet loss world

Pellets washed ashore following the sinking of MV X-Press Pearl.

A growing body of evidence documenting the sheer scale of plastic pollution, the harm it causes to marine life and its impacts on human health and livelihoods shows there is a pressing need for action.

Preventing pellet pollution is achievable. As a problem that begins and ends prior to the consumer of the finished plastic item, the responsibility to act lies solely with industry. As this report demonstrates, we already know enough about the scale of the problem and the failures of existing systems. It is time to act.

While the early advocates for tackling pellet loss and adopters of voluntary methods should be applauded for their efforts, it is clear that voluntary methods alone are insufficient to level the playing field and drive the systemic change needed to stop this form of pollution, both on land and at sea.

Given the scale and pervasiveness of pellet pollution, it is time that all companies across the supply chain that handle, move, manufacture or store pellets are required by law to verify that appropriate pellet loss prevention measures are implemented, maintained and monitored for effectiveness.

Companies procuring plastic goods must require evidence that their supply chains are free from the risk of pellet loss so that they can buy with confidence and provide assurances to the companies that invest in or insure them.

The general public should be able to purchase items that have not contributed to marine plastic pollution before they were even manufactured.

Governments must not delay in stepping up - both in terms of bringing about changes in national or regional legislation and also in international rules being negotiated at the IMO. Classification of pellets as marine pollutants by the IMO would trigger significant improvements in the way that pellets are packaged, labelled, stowed and transported around the world. These changes in practice would help reduce the likelihood of routine loss of pellets at sea (but also on land due to consequential effects that would be felt upstream) and would mitigate the potentially huge single incident losses during shipping catastrophes.

2021 saw a landmark resolution adopted by the United Nations with governments around the world committing to negotiate the world's first Global Plastics Treaty. This agreement to tackle plastic pollution, including microplastic pollution, in a globally coordinated way for the first time is a hugely positive step. Stopping pellet pollution should be seen as a low hanging fruit as negotiations get under way. The world is calling for action on plastic pollution. The Global Plastics Treaty creates a timely opportunity to truly level the global playing field, by ensuring all nations and regions around the world make a commitment to end pellet pollution, and by ensuring compatibility between 'land-based' laws and maritime law. If formulated well, the Global Plastics Treaty could bring together and enhance the power of the various pellet loss initiatives currently being pursued and help to bring pellet pollution to an end.

The ocean faces extreme pressure in the coming years; biodiversity loss, climate change and soaring pollution levels are exceeding planetary boundaries. The direction of travel is clear and national administrations, regulators, companies and investors must not wait any longer; action to reverse sources of plastic and pellet pollution must be initiated now and serve as positive examples of change. A world free from pellet pollution would be a significant step forward in efforts to pass on a healthy, sustainable world for future generations, and is one we should strive to achieve.

“Governments must not delay in stepping up - both in terms of bringing about changes in national or regional legislation and also in international rules being negotiated at the IMO.”

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Authors: Tanya Cox, Nathan Williams, Sophie Benbow,
Georgina Magin, Catherine Weller

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For more information, please contact:
Tanya.Cox@fauna-flora.org

Fauna & Flora International
The David Attenborough Building,
Pembroke Street, Cambridge,
CB2 3QZ, United Kingdom.

www.fauna-flora.org