



# Charting a Course to Healthy Seas

## PLASTIC DRAWDOWN

A new approach to addressing  
plastic pollution from source to ocean

Summary for policy makers

## About Common Seas

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Common Seas' mission is to quickly and significantly reduce the amount of plastic waste produced and stop it polluting our Ocean.

We're here to provide the right people with the right tools to navigate the complexity of tackling plastic waste at source, deliver new ways to manage and re-use plastic and stop plastic entering our rivers, seas and oceans.

Our research and on-the-ground work harnesses the collective expertise of communities, governments and businesses to implement action to halt the threat of ocean plastic.

We currently do this through four programmes:

### Plastic Drawdown

Supporting governments to identify optimal policy interventions



### Clean Blue Alliance

Building a global network of plastic waste-free islands



### Ocean Plastics Academy

Inspiring a generation of sea champions



### Healthy Me, Healthy Sea

Researching the human health effects of plastics



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## THE PLASTIC DRAWDOWN APPROACH

### The problem with plastics

Rapid economic growth and fast-expanding populations have led to a global plastic pollution crisis that results in up to 12 million tonnes of plastic waste being dumped in our oceans every year.<sup>[1]</sup>

Plastic ocean pollution is now recognised as having a profound impact on our environment, our health, our communities and our livelihoods. For example, plastic has been found to be toxic to marine wildlife, and when ingested by commercial fish species can enter into the human food chain.<sup>[2]</sup>

Addressing the complex range of global social and economic drivers of plastic pollution requires a systematic approach that maps key plastic waste flows, from use to ocean, and builds consensus around effective policy responses. The Plastic Drawdown model is designed specifically for this purpose.

### The Plastic Drawdown model: How it works

**I: Models a country's plastic waste generation and composition from now until 2030**  
Plastic Drawdown combines country-level waste and consumption data for 24 macroplastics and five microplastic items (plastic pieces of less than 5mm in diameter) to provide annual estimates of plastic emissions (leakage) between now and 2030. This provides baseline data for policy evaluation.

**II: Maps the pathway between plastic use and leakage into oceans**  
Plastic Drawdown models how macro- and microplastic material flows through waste pathways, quantifying the proportion that is captured by waste management infrastructure and what is emitted into water bodies.

**III: Analyses the impact of key policies**  
Drawing on expert advice and global best practice, Plastic Drawdown models the potential impacts of 18 policy interventions, targeted to the key plastic waste leakage points identified in step II. Model parameters are fine-tuned to meet the specific circumstances of individual countries.

**IV: Facilitates building consensus around key policies across government, community and business stakeholders**  
The central output of Plastic Drawdown is a model that visually demonstrates how each policy could reduce plastic leakage over time. Users can explore alternative policy scenarios across actions, timing and sequencing. In this way, Plastic Drawdown can facilitate collaboration between government, industry and community stakeholders to build an effective consensus on tackling plastic pollution.

Plastic Drawdown has been implemented in Indonesia, Greece and the United Kingdom, and is ready to be applied worldwide.

## KEY PROBLEM PRODUCTS

The Plastic Drawdown model explicitly models the impact of 29 high priority plastics – roughly divided into two groups of microplastics (plastics of less than 5mm in diameter) and macroplastics (everything else).

These plastics are:

### Macroplastics:

- |   |                                      |                          |
|---|--------------------------------------|--------------------------|
| • Grocery bags (plastic)                    | • Straws, stirrers                   | • Cups, plates (foam)    |
| • Other plastic bags                        | • Food wrappers (candy, chips, etc.) | • Cups, plates (plastic) |
| • Beverage bottles (plastic)                | • Single-serve sachets (food)        | • Forks, knives, spoons  |
| • Bottle caps (plastic)                     | • Single-serve sachets (non-food)    | • Balloons               |
| • Lids (plastic)                            | • Take out/away containers (foam)    | • Wet wipes              |
| • Other plastic bottles (oil, bleach, etc.) | • Take out/away containers (plastic) | • Diapers                |
| • Cigarette butts                           |                                      | • Condoms                |
|   |                                      | • Sanitary pads, tampons |
|   |                                      | • Fishing gear           |

### Microplastics:

- |              |                   |              |
|--------------|-------------------|--------------|
| • Tyre dust  | • Clothing fibres | • Microbeads |
| • Brake wear | • Plastic pellets |              |

## FROM CONSUMPTION TO THE OCEAN

The journey from consumption of problem plastic products to the ocean is complex and varies depending on a range of local factors such as infrastructure, services and waste management habits. Plastic Drawdown models waste flows to identify where plastic pollution is being 'leaked' from these pathways into the environment. An overview of three significant pathways is presented in Figure 1, and discussed in more detail on pages 8–10.

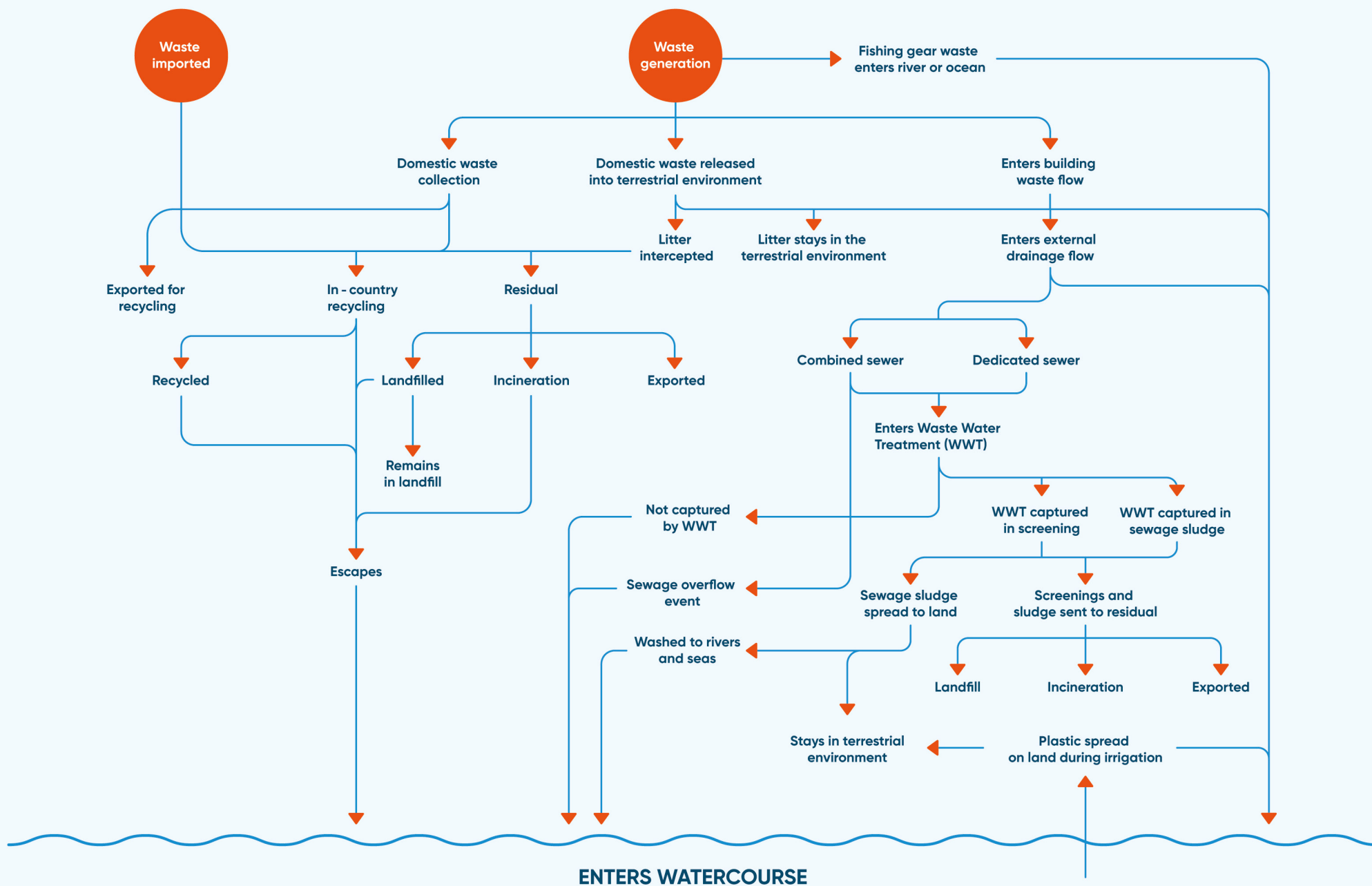
### These flows are:

1. Plastic waste that enters the environment through lack of waste infrastructure
2. Plastic waste that is collected but leaks into the environment due to insufficient waste collection systems
3. Plastic that enters the watercourse through waste water management or drainage flows

Figure 1

## PLASTIC PATHWAY FLOW DIAGRAM

How does plastic waste flow from consumption into our rivers and oceans?





## FLOW ONE

### Plastic waste that isn't collected and enters the environment

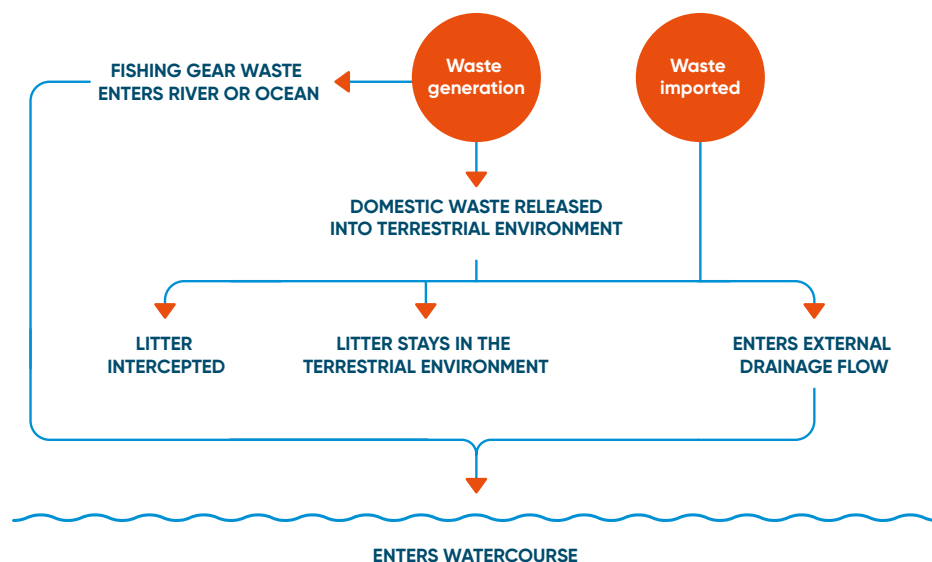
In many countries, waste management systems have struggled to keep pace with rapid population growth and increasing use of plastic materials. As a result, access to proper waste collection systems and management from households, industrial, commercial or agricultural sources is limited outside major urban centres.

Lack of collection means that communities are often limited to open dumping or burning as a form of waste management. Some waste may be dumped directly into a watercourse or waste may end up in watercourses after being blown or washed in from the land.

Some waste may be intercepted, for example by the informal sector (who target high value materials like rigid plastics), by street sweepers (predominantly in urban areas) or by trash-screens (debris filters) in waterways. This waste is usually too contaminated to recycle and ends up in landfill (itself a source of leakage).

Fishing gear waste is often unmanaged and tends to be abandoned, lost or discarded directly into the marine environment, where it can harm wildlife (also known as 'ghost gear').

Figure 2



## FLOW TWO

### Collected plastic waste that escapes into the environment

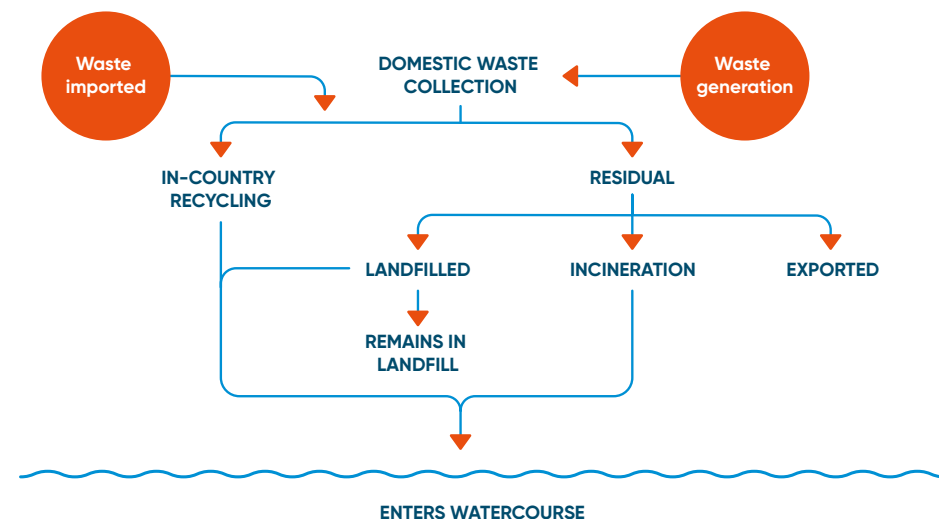
A well-functioning waste management system is critical to preventing leakage of plastic into the environment. But this is a complex system and requires long-term financing, management and enforcement.

Inadequate standards for collection, storage, transportation and management can create waste leakage before it reaches a sorting plant or treatment facility. This can include, for example, not using covers, screens and nets to prevent waste being blown from bins, collection trucks or storage facilities.

Illegal and poorly managed landfill sites that lack litter control measures are vulnerable to wind and rain erosion, which can wash plastic into nearby watercourses. Some countries import waste plastic from other nations. This is often of variable quality and contamination levels, and its mismanagement can create leakage.

When recycling efforts are restricted by poor infrastructure, low quality inputs or weak (or non-existent) end markets, waste is often sent to landfill instead – which increases the risk of leakage. Burning plastic creates harmful dioxins and if incinerators are inefficient, these leak into the environment.

Figure 3



## FLOW THREE

### Plastic that enters the watercourse through drainage flows

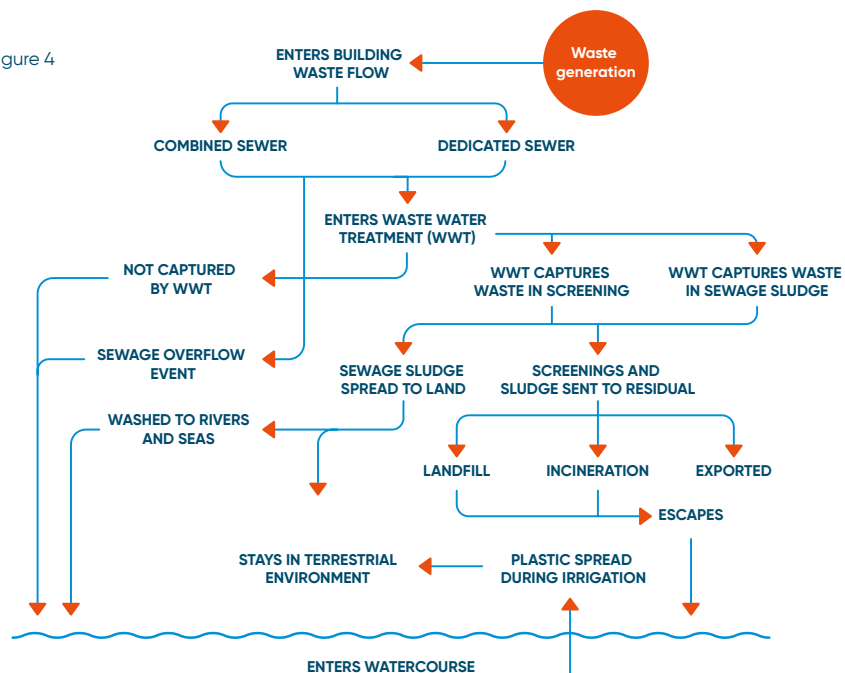
Water drainage flows are complex and vary significantly between urban and rural areas. Wealthier cities have better access to sewerage and waste water treatment (WWT). In rural areas, where drainage infrastructure is less developed, it is more common to see septage systems or waste flowing directly into watercourses (e.g. via a drainage ditch).

Where sewerage systems are in place, macroplastic items like sanitary pads, wet wipes, condoms and cotton buds are commonly flushed. Other small macroplastic waste that is either littered or escapes from a waste management system can enter watercourses as a result of storm or surface water runoff. This all contributes to plastic leakage if it is not intercepted by a screening system or a WWT plant.

Poorly managed sewerage and septage systems can release waste plastics directly into the environment. For example, heavy rainfall can lead to blockages and overflow. Industrial effluent pipes and storm/surface water drains also often discharge plastics into watercourses.

For microplastics, the most common pathway is direct transfer into the environment, for example dust from vehicle tyres or spilt plastic pellets. Some microplastic emissions enter WWT, but capture is extremely challenging and most of the emitted material will enter the environment.

Figure 4



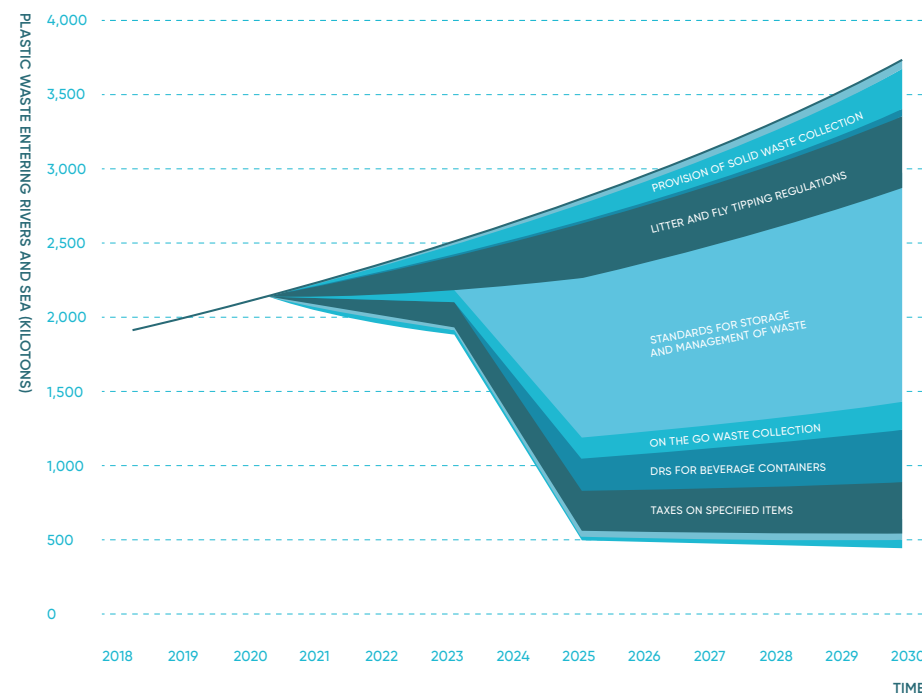
## INTRODUCTION TO PLASTIC POLICY

Common Seas, along with specialist experts, have drawn on a global review of best practice waste management to identify 18 policy interventions, at the government level, considered to be the most effective in reducing plastic pollution. These are summarised and discussed in the rest of this booklet.

These 18 policies are built into the Plastic Drawdown model as specific options for analysis and discussion in steps III and IV. These options act across the plastics value chain to reduce the production of plastic, improve waste management, reduce waste generation or improve litter capture.

A key output of Plastic Drawdown is a 'wedges' model that visualises the impact of different policies on reducing plastic flows into waterways and oceans. Figure 5 provides an example of what this may look like – with the impact of each policy visualised by a 'wedge' that shows the mass of plastic that could be prevented from entering the watercourse each year until 2030, compared to a "business as usual" scenario.

Figure 5



## POLICIES THAT REDUCE PLASTIC PRODUCTION

### Policy 1 – Item bans for specific plastics

#### How it works

Prohibit the import, manufacture and/or sale of specific plastic items. By banning plastic items that are either unnecessary or have suitable recyclable or reusable alternatives, this policy can significantly (and perhaps completely) reduce the waste generation of that item.

#### Success story

In China, a 2008 ban on lightweight plastic bags (less than 25 microns thick) together with a tax on thicker bags led to a 60–70% reduction in the overall use of plastic bags in supermarkets and shopping centres.<sup>[3]</sup>

#### What's it best for?

This intervention can theoretically be used for any problematic plastic item, although it is most effective when it targets items that are either unnecessary and/or have reusable alternatives. This includes bags, straws, stirrers, foam takeaway containers, cups and plates, plastic bottles, plastic cutlery and microbeads.

#### How effective is it?

If properly designed, implemented and enforced, an item ban should generate close to a 100% reduction in waste generation for that item. However, there are limiting factors that can significantly reduce effectiveness, such as poor enforcement or the lack of availability of suitable alternatives.

#### Factors affecting success

- Viable and cost-effective alternatives
- Phased enforcement to reduce backlash and allow adaptation
- Public awareness campaigns
- Consistent regional and national policies, and cooperation across international borders

### Policy 2 – Taxes on specific items to discourage use

#### How it works

Apply a tax to problematic plastic items that have an available reusable or plastic-free alternative. Increasing the market cost of the plastic item discourages its use while encouraging consumers to swap to a reusable or recyclable alternative. This policy can also raise revenue to support plastic pollution mitigation activities.

The best-known example of this policy in action is the 'plastic bag tax'.

#### Success story

In 2002, Ireland imposed a €0.22 tax on plastic grocery bags at point of sale, which led to a 95.7% reduction in plastic bag consumption.<sup>[4]</sup>

#### What's it best for?

This policy works best for plastic items with an 'elastic' demand (i.e. consumer demand responds to price changes) and a substitute that makes good sense to consumers. This includes:

- Plastic bags (primarily but not exclusively plastic grocery bags)
- Takeaway containers, cups and plates
- Single-portion plastic food packaging
- Balloons
- Wet wipes

#### How effective is it?

This policy's effectiveness varies significantly according to local factors (such as available alternatives and local behaviours) and the item being taxed. Overall, it is estimated that a tax can reduce plastic waste from the key items listed above by anywhere between 15% and 95%.<sup>[5]</sup>

#### Factors affecting success

- The ease of behaviour change for consumers through the clear availability of alternatives
- Effective enforcement and levy collection
- Flexible and responsive long-term approach to item charges to maintain effectiveness with consumers
- Easy and affordable for retailers to comply
- Appropriate use of revenues to further prevent plastic waste

## Policy 3 – Deposit return scheme for beverage and other containers

### How it works

Deposit return schemes (DRS) require a consumer to pay a deposit when purchasing an item in a plastic container, which can be refunded once the product has been used and the plastic container is returned to a collection point. Encouraging consumers to return their plastic waste using a DRS can reduce littering and optimise the efficiency and effectiveness of recycling streams.

### Success story

There are lots of DRS success stories, particularly from the USA and Europe. Return rates for deposit-bearing containers in the USA and Europe range from 51% in Connecticut right up to 98% in Germany.<sup>[6]</sup>

### What's it best for?

This intervention is ideal for most kinds of rigid plastic containers, although it is most commonly used for plastic beverage bottles.

### How effective is it?

Using a range of sources, it is estimated that the plastic waste reduction of plastic beverage bottles and caps by DRS ranges from 70%–95% impact, alongside increased recycling rates and possible job creation.<sup>[7]</sup>

### Factors affecting success

- A simple structure and sufficiently high deposits to encourage returns
- Convenient deposit points for consumers
- Align with existing waste collection system (i.e. extended producer responsibility scheme)
- Engage with all relevant stakeholders (i.e. producer, retailer, system operator).
- Effective governance and mechanisms to limit fraudulent activity
- Appropriate ownership and use of material revenue to ensure broad support

## Policy 4 – Provision of potable water supply

### How it works

Apply policies to improve the provision, distribution and use of potable (drinkable) water, such as providing reliable water treatment and a safely managed piped water supply. Increasing the number of citizens who use a potable water supply over bottled water can reduce the use of plastic bottles.

### Success story

Potable water delivers a range of health and social benefits, but there are no studies on how the provision of clean drinking water supply impacts the use of plastic water bottles. Market analysis of the top bottled water consuming nations shows that the relationship is complex and the impact of this policy will depend on local factors. In particular, favourable local perceptions of water taste and quality seem to play a key role.

For example, Mexico and Indonesia, which have the highest per capita disposable water bottle consumption, both have low levels of safely managed piped water supply. Conversely, 50% of the top 20 disposable water bottle consuming nations are located in North American and European countries which have almost universal coverage of potable water supplies.

### What's it best for?

This policy works to reduce waste generation of plastic water bottles and bottle caps.

### How effective is it?

Due to a lack of data, the impact of this policy is uncertain. Using the best available information, we can estimate this policy will reduce plastic water bottle use by between 5% and 17.5%.

### Factors affecting success

- Capability to install a fully functioning and properly maintained potable water supply system
- Reliability of the system
- Public information campaigns to highlight water quality and encourage uptake



## Policy 5 – Increasing access to and use of water refill schemes

### How it works

Create refill schemes that allow people to access free tap water. Encouraging the use of reusable water bottles will reduce the number of plastic bottles bought and disposed of as waste.

### Success story

So far, governments have not been widely involved in refill schemes. There is great potential for scaling up through the use of regulation and public communication campaigns, as well as the example models developed by NGOs and the private sector. For example, a water fountain scheme across nine train stations in the UK saved the equivalent of 150,000 plastic water bottles from landfill between February and September 2018.

### What's it best for?

Refill schemes reduce waste generation transport costs and CO2 emissions from plastic beverage bottles and bottle caps. Most schemes target water bottles, but carbonated refill schemes could also be developed to reduce softdrink bottle waste.

### How effective is it?

Using the limited amount of data available, it is estimated that water refill schemes can reduce plastic beverage bottle waste by between 5% and 35%.

### Factors affecting success

- Engage early with water utility companies
- Normalisation of refill schemes (relies on reliable potable water supply, a wide refill network and effective signposting)
- Public awareness campaigns to change behaviour
- For the highest impact, schemes should include soft-drinks dispensing

## POLICIES THAT REDUCE WASTE GENERATION

## Policy 6 – Pre-production plastic pellet handling standards and regulations

### How it works

Prevent the loss of plastic pellets along the supply chain. Enforcing best-practice standards for transport, handling and storage of plastic pellets before they are turned into plastic items could significantly reduce leakage along the supply chain.

### Success story

There are currently no government programmes or regulations on management of plastic pellets. However, the international plastics industry initiative Marine Litter Solutions provides a voluntary stewardship programme designed to help companies keep plastic materials (pellets, flakes, powder, etc.) out of water bodies. Currently, 75 plastics associations (and their members) in 40 countries have signed the Global Declaration for Solutions on Marine Litter.<sup>[8]</sup> However, this initiative does not cover all plastics, with coverage rates, for example, at around 45% in the UK.<sup>[9]</sup>

### What's it best for?

This policy addresses plastic pellets, which are used in their billions each year in plastic production and comprise a major source of plastic leakage.

### How effective is it?

This policy has the potential to be highly effective when it takes a supply chain approach, which requires management and accreditation at every stage of the plastic pellet pre-production journey. Under these conditions, the plastic waste reduction impact ranges from 50%–95%.<sup>[10]</sup>

### Factors affecting success

- Vertical integration of best practice along supply chain
- Enough support for regulatory bodies to conduct audits
- Transparency along the supply chain

## Policy 7 – Fibre release thresholds standards and clothing labelling regulations for textile products made from synthetic fabrics

### How it works

Remove or discourage consumers from purchasing clothing and other textiles that release high volumes of plastic microfibres when washed. Creating a standard measure to test fibre release allows the worst performing materials to be banned. In addition, providing information to consumers about shedding rates and how to reduce shedding can influence consumer washing practices and guide purchasing behaviour towards more sustainable options.

### Success story

The Californian State Legislature is currently considering regulations to identify best practice microfibre management for clothing manufacturers and mandate the use of filters in industrial and commercial laundries to capture microfibres from clothing.<sup>[11]</sup>

### What's it best for?

This policy is best for the management of microfibres used in garments and other textile products made from synthetic (plastic) fibres.

### How effective is it?

No data is available on the effects of this policy, but EU research suggests the likely impact of a fibre emissions threshold is between 16% and 36%. The research also estimates the impact of labelling to lead to a 10%–16% reduction in microfibre waste generation.

### Factors affecting success

- Standardisation of the method for testing fibre-release from clothes
- Identification and communication of the factors affecting fibre release (e.g. material types, weaves, washing temperatures and washing cycle length)
- Creation and enforcement of a maximum threshold for fibre release
- Research and testing of consumer labelling for care instructions and fabric choice

## Policy 8 – Regulation and labelling of tyres

### How it works

Introduce mandatory labelling for tyre tread abrasion rates (the rate at which a tyre wears out) to encourage consumers to choose more durable tyres and set minimum limits on wear rates to remove worst performers on the market.

### Success story

This is a novel policy initiative and is yet to be trialed.

### What's it best for?

All types of tyres.

### How effective is it?

Estimates suggest a 5%–13% reduction in plastic emissions from tyres could be achieved through these measures. However, the novelty of the approach means there is a high level of variability in overall impact.<sup>[12]</sup>

### Factors affecting success

- Increased recycling, particularly avoiding down cycling
- Regulation to develop standardised tests for tyre wear abrasion rates
- A transparent national standard for wear rates
- Regulation for standardised consumer-facing labelling

## Policy 9 – Deposit return scheme for fishing gear with Extended Producer Responsibility

### How it works

Deposit return schemes (DRS) require consumers to pay a deposit upon the purchase of plastic fishing gear, which can be refunded once the gear is returned (usually after the end of its useful life). To complement this, the Extended Producer Responsibility (EPR) system makes companies that produce and sell fishing gear responsible for end-of-life disposal and recycling once customers return the gear.

### Success story

The Icelandic fisheries' EPR system collects an estimated 59% of plastic material and recycles 90% of the materials that are considered recyclable.<sup>[13]</sup>

### What's it best for?

Increasing the collection and recycling rates of fishing gear at its end of life stage.

### How effective is it?

The limited roll-out of these schemes affects our ability to predict success rates, but current estimates suggest that 40%–80% of fishing gear waste could be collected, and as much as 90% could be recycled in well-designed schemes.

### Factors affecting success

- Monitor the amount of fishing nets generated and lost in the sea
- Transparent, effective governance with well-structured fee levels, administrative processes and legislative support
- The existence of markets for recycled material to provide financial incentive for participation
- Mandated participation by fishers, including funded training and awareness campaigns
- Appropriate use of funds collected – e.g. using them to fund gear removal or litter retrieval activity

## Policy 10 – Gear zoning of fishing areas

### How it works

Implement zoning controls to limit or prohibit the use of conflicting gear types in fishing areas. The use of certain different types of fishing gear in the same area can lead to situations in which one or more types of gear are damaged or lost. For example, a long line can interfere with a gill net. Zoning controls reduce or eliminate the risk of gear conflicts, and therefore reduce loss and waste of fishing gear.

### Success story

This is a novel approach for reducing plastic emissions from fishing fleets and there are no case studies to report specifically on plastic reduction. However, there is some evidence that shows gear conflict as a major source of gear loss at sea.<sup>[14]</sup>

### What's it best for?

Reducing plastic emissions from damaged or lost fishing gear.

### How effective is it?

This policy approach targets gear conflicts only, and not other drivers of gear loss (e.g. abandonment). As such, the impact on waste generation, by itself, is estimated to be around 1%–20%.

### Factors affecting success

- Clear identification of hotspots for gear conflict
- Clear policy and legislative backing with strong enforcement mechanisms
- Strong stakeholder support with clearly communicated restrictions and information

## USING PLASTIC DRAWDOWN TO SOLVE GREECE'S PLASTIC POLLUTION PROBLEM

Using Plastic Drawdown, Common Seas is working with the Greek Government, business and community groups to tackle Greece's plastic pollution problem.

### The challenge

Greece's population triples in the summer, contributing €35b to the economy (almost 20% of GDP in 2017). Tourists flock to the islands for their beautiful beaches and clean seas, but the population surge sees a similar increase in plastic waste. This represents a significant environmental and economic risk to Greece.

Historically, the country has struggled to implement EU directives on solid waste management and has low rates of recycling. Solving this challenge is not straightforward, and requires long term planning, multi-stakeholder buy-in and active collaboration.

### The solution

Using Plastic Drawdown, we are working with a wide range of in-country stakeholders to understand the plastic problem in Greece, test solutions and implement the right portfolio of policies for maximum positive impact.

This work follows a set process:

- Interviewing experts and conducting research to gather national and EU data on waste generation and waste management in Greece
- Using this data to model the national policy landscape, describe the volume and characteristics of plastic leakage, and identify the policy interventions with the most relevance and potential for positive impact
- Testing and strengthening data, and considering local influencing factors to understand likely success of available policy instruments through workshoping with the key in-country stakeholders
- Outlining a plan, and generating engagement and support for it from the necessary decision-makers (including, for example, a wide range of government departments)
- Collaborating with the Government to design and budget a roadmap for policy implementation
- Investing in demonstration projects to build confidence, stakeholder buy-in and understanding of how policies deploy in practice.

### Plastic Drawdown in action

After mapping the Greek policy landscape, we identified Paros as a pioneering community to pilot and test strategies identified by Plastic Drawdown. We are demonstrating in practice how Greece could implement these policies to deliver the most significant reduction of plastic entering Greek rivers and seas. Working closely with island stakeholders, we are gathering baseline data on social factors that create waste, undertaking in-depth waste and marine litter audits, and piloting opportunities that can stop plastic entering the sea.

The project was announced in April 2019 is currently underway. We are pleased with its progress so far.

- We are designing and are piloting systems to support bans on common plastic items and proved the value of separate collections for plastic packaging waste – both of which are high priority goals of the EU and the Greek Government
- We are piloting the design and roll out of a separate system to collect clear plastic drink bottles and containers (PET and PP). Through a better understanding of the volume and the costs and benefits of collection and re-use, the project will help identify and drive high-value post-use markets for these recycled plastics
- We are exploring demonstrating a deposit-return scheme and reviewing extended producers responsibility for fishing gear and plastic packaging.

### What's next?

Based on the lessons learnt from Paros, to work with the Greek Government to use Plastic Drawdown to design and support the implementation of the country's 2020-2030 plastic pollution strategy.

To find out more about our work in Greece and how Plastic Drawdown can help you deliver a plastic mitigation strategy for 2030, please visit [www.commonseas.com](http://www.commonseas.com)

## POLICIES THAT IMPROVE WASTE MANAGEMENT

### Policy 11 – Providing waste management collection system with or without an Extended Producer Responsibility scheme.

#### How it works

Provide a waste management collection system and removal of household and commercial waste through an appropriate public authority to prevent waste dumping and littering. Approaches vary depending on local factors, such as door-to-door collection or a 'bring back' system.

An Extended Producer Responsibility (EPR) system requires companies that produce and sell plastics to take responsibility for the disposal and recycling of these items at the end of their useful (commercial) life. For example, using a levy for every sale of a plastic item can generate revenue to fund municipal waste collection and recycling.

These two policies can work well together. The EPR places a 'duty of care' on companies that produce and sell plastic and encourages them to consider alternatives, thereby reducing plastic waste at source. The levy can reduce the financial burden of waste collection on local governments and help fund recycling infrastructure.

#### Success story

Primary research investigating the impact of waste collection on plastic pollution is very limited. However, modelling waste flows in Indonesia as part of Plastic Drawdown shows that improving waste collections could result in a 90%+ reduction in plastics entering the sea for many high leakage items.

#### What's it best for?

This intervention is effective in reducing environmental leakage for all kinds of household plastic waste. With appropriate EPR systems in place, it can drive innovation in design and recycling – key elements in developing a circular economy.

#### How effective is it?

Providing effective solid waste management is relatively complex and implementation is likely to be long term. Although concrete data is lacking, waste collection is known to be highly effective, with experts predicting that 94%–99% of plastic waste can be collected.

#### Factors affecting success

- A clear waste policy and strategy for the collection, sorting, treatment of plastic waste
- Strong governance, transparent levies, laws and regulations, enforcement and stakeholder engagement
- Well-functioning operational systems, including minimum service standards, waste hierarchy management, consistent reporting of waste data and environmental monitoring

### Policy 12 – Standards for storage and management of collected waste

#### How it works

Develop and enforce standards that reduce or prevent leakage during the storage, transport and management of plastic waste from collection to final treatment or disposal site. This includes mandating the use of covers over bins and waste transit vehicles and the use of screens or nets at waste storage facilities to reduce how much litter escapes into the local environment. It also requires waste management sites to have adequate containment, management and litter prevention measures in place.

#### Success story

To control litter escapes, US Federal Landfill Regulations (40 CFR 258) require cover material to be placed over landfill at the end of each operating day, or more frequently if required. Many states also require landfill sites to have a litter control plan. This can involve daily patrols of the facility, rejecting litter from uncovered vehicles and implementing litter screens.<sup>[15]</sup>

#### What's it best for?

This policy tackles all kinds of plastic waste, including microplastics and small plastic waste items that are more likely to blow or wash away during storage, transportation and management.

#### How effective is it?

Avoiding plastic leakage is often just one factor in such standards (e.g. alongside health and hazardous waste regulations), so it is hard to isolate its effect. Plastic Drawdown's waste management experts suggest that well-enforced standards could reduce the total plastic waste that is blown or washed away during the handling, transportation and management of waste by as much as 99.05%.

#### Factors affecting success

- The appropriate design and site selection of waste facilities to ensure isolation from the environment
- Appropriate selection of effective leakage prevention techniques, including load management, soil cover and compaction
- Litter controls, such as fencing, to prevent 'blowing litter'



## Policy 13 – Providing on-the-go waste collection

### How it works

Provide 'on-the-go' waste collection, like street cleaning and litter bins, with accompanying interventions for maintenance, engagement and behaviour change. Creating systems to promptly remove plastic waste and litter at a street level will significantly reduce leakage into local waterways.

### Success story

In a study of urban litter in stormwater drains in Cape Town, sweeping two or three times a day in the commercial business district removed up to 99% of the total litter load from the streets.

### What's it best for?

This policy is good for tackling macroplastic waste of all kinds, but particularly waste related to on-the-go use, such as bottles, takeaway containers and packaging.

### How effective is it?

The effectiveness of on-the-go waste collection is driven by the management and positioning of street bins and the regularity and quality of street cleaning. The impact also depends on existing efforts, particularly from the informal sector, as well as local geography, weather conditions and littering behaviours. A conservative estimate suggests on-the-go waste collection can reduce litter reaching water bodies by 5%–20%.

### Factors affecting success

- Appropriate bin location and density to ensure ease of access by users and for collection
- Regular collection and monitoring to prevent overflow and ensure appropriate use
- The right bin design for local conditions, e.g. to ensure litter is not blown from bins, to capture different waste types (like cigarette butts) and to prevent scavenging by animals
- Public awareness campaigns to encourage bin use, including clear signage for 'on-the-go' consumers

## Policy 14 – Litter and fly-tipping regulations

### How it works

Create strict regulations that tackle illegal waste behaviours. Creating and enforcing adequate penalties to deter either littering or the unlicensed dumping of waste (fly-tipping) can reduce unmanaged plastic waste and therefore leakage.

### Success story

In the UK, fly-tipping is considered to be a serious criminal offence and can carry fines of up to £50,000 or imprisonment. Enforcement is up to local councils.

Some cities are moving towards a zero-tolerance approach and implementing innovative solutions to manage littering. For example, Coventry City, in the UK encourages residents to report littering and fly-tipping online, while Doncaster Council engages high profile patrols to encourage good litter behaviour and to issue fines where appropriate.

### What's it best for?

A policy to tackle fly-tipping works for all types of plastic waste, including household and construction waste. Regulating littering behaviours primarily impacts on-the-go plastics, including bottles, cups, packaging and containers.

### How effective is it?

Littering and fly-tipping regulations are usually part of a wider waste management strategy and there is no data that isolates its effectiveness on plastic. However, experts believe these regulations can be effective, with an optimistic scenario predicting they could lead to a 25% reduction in litter entering the watercourse.

### Factors affecting success

- Penalties that are high enough to act as deterrents
- Clear division of powers and responsibilities around enforcement, alongside consistent communication
- Taking a long-term view and designing solutions that work in the local context
- Infrastructure to support members of the public in reporting incidents

## POLICIES THAT IMPROVE LITTER CAPTURE

### Policy 15 – Waste Water Treatment infrastructure

#### How it works

Use Waste Water Treatment (WWT) to clean waste water so it can return to the water cycle. This approach varies considerably, with different mechanical, biological and chemical processes occurring across a number of treatment phases. Larger plastic pieces can be captured during preliminary screenings and other types of macro- and microplastics are captured using techniques like gravity separation and surface skimming.

#### Success story

A large waste water treatment plant in Glasgow removes around 98.41% of microplastics from the final effluent produced.<sup>[16]</sup>

#### What's it best for?

This policy tackles macroplastics that enter drainage flows, as well as larger microplastics.

#### How effective is it?

Some studies demonstrate a high success rate, with an estimated removal rate of between 95% and 99%. However, for microplastics this depends on the installation of advanced WWT technologies. In many countries, a large proportion of the microplastics are either not captured or are released into sludge bound for agriculture fertiliser use, which can then make its way into waterways.

#### Factors affecting success

- Most effective as a combination of physical, chemical and biological treatment processes
- Requires minimum standards and substantial capital investment in the collection and treatment of plastics in the waste water system
- Phased implementation should target large population areas first

### Policy 16 – Sewage and stormwater catchment systems

#### How it works

Install sewage systems to capture and transport waste from domestic, commercial and industrial sources through pipes for treatment and disposal. Install stormwater systems to manage surface runoff. Collectively, these systems direct plastic litter and waste to treatment plants for appropriate management.

#### Success story

In cities prone to heavy rainfall, where stormwater runoff is combined with sewage, the high volumes of water captured by the system can mean that plastic contaminated waste bypasses treatment facilities. As a result, some cities are diverting stormwater to green infrastructure, such as sustainable urban drainage systems (SUDS) and wetlands, to manage water flow. One key benefit of this is a reduction in plastic pollution release during high rainfall events.<sup>[17]</sup>

#### What's it best for?

Capturing plastics that enter drains.

#### How effective is it?

The effectiveness of sewage systems largely depends on the WWT facilities they are connected to. The literature suggests that well managed sewage systems (e.g. regular deblocking to prevent overflow) connected to advanced WWT can capture as much as 99% of plastic. Stormwater systems often bypass treatment facilities and flow directly into a watercourse with minimal screening.

#### Factors affecting success

- Policies should specify standards for design and access
- Ensuring the system is designed for local geographical and climate conditions
- Making sure the system is regularly inspected and well maintained

## Policy 17 – Track and trace systems for fishing gear

### How it works

Tag fishing gear to the vessel in which it is deployed. Then, if the gear is abandoned and subsequently retrieved, charge or fine the owner for its recovery. Deterring fishing associated with higher gear loss acts as a preventative action. It can also incentivise the reporting of losses, whereby fines can be avoided, which supports future mitigation and recovery.

### Success story

This is a novel policy development that is yet to be deployed.

### What's it best for?

This policy is best for reducing gear loss and abandonment at sea by fishing vessels.

### How effective is it?

Plastic reduction impacts are highly uncertain and are conservatively estimated at between 1%–20%. Further benefits could be obtained through the use of gear-tracking and tracing to help combat illegal, unregulated or unreported fishing.

### Factors affecting success

- Clear guidelines on marking requirements, including the use of GPS technology to facilitate ease of location identification and centralised reporting
- Strong enforcement to incentivise compliance and reporting

## Policy 18 – Implementing flat fees for waste disposal in port facilities

### How it works

Fishing vessels often pay by weight for the disposal of waste when returning to port. This incentivises disposal at sea or the avoidance of litter retrieval at sea, in order to save costs. A 'no special fee system' replaces this approach with a flat waste disposal fee for all vessels, regardless of the amount of waste disposed of. Supporting the return of waste gear and other plastic items to port could facilitate recycling and other forms of responsible disposal.

### Success story

This is a novel approach that is yet to be tested.

### What's it best for?

This policy targets waste fishing gear and other plastic items that might be found at sea.

### How effective is it?

Experts consulted during the development of the Plastic Drawdown model estimate the impact reduction of this proposal could range from 5%–20%.

### Factors affecting success

- Clear and transparent fee structure for waste disposal at port
- Engage with relevant stakeholders such as Port Authorities
- Appropriate port reception facilities to allow for easy discarding of waste and appropriate containment
- Adequate training and communication around appropriate use of facilities, including dissemination online

Figure 4

## Intervention Matrix

			POLICIES THAT REDUCE PLASTIC PRODUCTION					POLICIES THAT REDUCE WASTE GENERATION					POLICIES THAT IMPROVE WASTE MANAGEMENT				POLICIES THAT IMPROVE WASTE MANAGEMENT															
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	
		Item Ban	X	X					X				X		X		X											X				
		Taxes on Specified Items	X	X										X		X		X	X													
		Deposit Return scheme for Beverage containers			X	X		X																								
		Provision of Potable Water Supply			X	X																										
		Water refill scheme			X	X																										
		Pre-production plastic pellet handling standards and regulations																									X					
		Fibre-release threshold standards and clothing labelling regulation																								X						
		Regulation and labelling of tyres																					X									
		Deposit refund scheme for fishing gear with extended producer responsibility																				X										
		Gear zoning of fishing areas																				X										
		Provision of solid waste collection, with or without Extended Producer Responsibility	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X									X	
		Standards for storage and management of collected waste	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X					X		X	X		
		On-the-go waste collection system	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X		X											X	
		Litter and fly-tipping regulations	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X											X	
		Waste Water Treatment (WWT) infrastructure																	X		X	X		X	X							
		Sewerage and stormwater catchment systems																	X		X	X		X	X	X	X	X				
		Track and trace systems for fishing gear																					X									
		Implementing flat fees for waste disposal in port facilities																					X									
		# Interventions per Item	5	5	7	7	4	3	4	5	4	4	4	5	5	5	5	5	6	4	4	4	4	3	2	2	3	2	1	4	150	





## NEW EU RULES ON SINGLE USE PLASTICS TO REDUCE MARINE LITTER

**In March 2019, the European Parliament agreed to take decisive action to tackle the marine litter from 10 used single-use plastic products commonly found on European beaches, alongside adopting measure to address fishing gear and oxo-degradable plastics.**

Forming a key element in the broader EU Commissions Circular Economy Action Plan, The "Single-Use Plastics Directive" comprises of four transformational measures:

- A ban on selected single-use plastic products for which alternatives exist: cotton bud sticks, cutlery, plates, straws, stirrers, sticks for balloons, as well as cups, food and beverage containers made of expanded polystyrene and on all products made of oxo-degradable plastic.
- Measures to reduce plastic food and beverage container use, including labelling requirements.
- Extended Producer Responsibility schemes for cigarette filters and fishing gear to cover clean up costs.
- A 90% recycled collection target for plastic bottles by 2029 and a target to incorporate 30% of recycled plastic in PET bottles in all plastic bottles as from 2030.

When implemented the new measures will bring about both environmental and economic benefits, including avoiding 3.4 million tons of CO<sub>2</sub> equivalent and saving consumers a projected €6.5 billion



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## ACKNOWLEDGEMENTS

Common Seas would like to thank its supporters and project advisors who generously gave their time, resources and expertise in this project.

In particular we thank Lucy Woodall from Oxford University, Dr Arturo Castillo Castillo from Imperial College, London, Dr Jessive Van Der Grient from Oxford University, Dr Richard Thompson from Plymouth University and Kristian Teleki from the World Resources Institute.

Further thanks to Paul Hawken's 'Project Drawdown', Simon Reddy, Pew Charitable Trusts, Princetown University, Carbon Mitigation Initiative's 'Climate Stabilization Wedges' and the United Nations Environment Assembly, whose ideas and encouragement all helped to inspire Plastic Drawdown.



## ARE YOU PART OF THE FIGHT AGAINST MARINE PLASTIC POLLUTION?

Plastic Drawdown is a powerful, practical tool for change. It provides a common language to galvanise stakeholders, build consensus and identify the most locally effective strategies.

We are keen to support governments, organisations and any change-makers that are working on regional, national and global solutions to plastic pollution. If you'd like to connect, please contact Ben Jack, Director of Programme Delivery, at [ben@commonseas.com](mailto:ben@commonseas.com)





