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IMPACT ASSESSMENT

Reducing Marine Litter: action on single use plastics and fishing gear

Accompanying the document

Proposal for a Directive of the European Parliament and of the Council on the reduction of the impact of certain plastic products on the environment

{COM(2018) 340 final} - {SEC(2018) 253 final} - {SWD(2018) 255 final} -
{SWD(2018) 256 final} - {SWD(2018) 257 final}

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1. INTRODUCTION

Plastics play an important role in our economy and daily lives but the way it is currently produced, used and discarded harms the environment. The amount of marine litter in oceans and seas is growing, to the detriment of ecosystems, biodiversity and potentially human health causing widespread concern. At the same time, valuable material that could be brought back into the economy is lost, once littered. The potential economic and environmental benefits of a more resource-efficient and circular approach are not realised. The need to tackle these problems and reduce the environmental, economic and social harm is widely recognised.

Being widely available, persistent and used for applications prone to littering plastic[1] is the main source of marine litter as it is hardly biodegradable and it can have toxic and other harmful impacts. Due to its persistency, these impacts are growing as each year we generate more plastic waste. It is a global problem as acknowledged by many initiatives worldwide[2] but Europe is a source and suffers the impacts.

In addition to harming the environment, marine litter damages activities such as tourism, fisheries and shipping. For instance, the cost of marine litter to EU fisheries is estimated at between 1%[3] and 5%[4] of total revenues from catches by the EU fleet. It threatens food chains, especially seafood.

Europe has a responsibility to deal with its part of the problem and committed to act globally. As part of the Plastics Strategy, the European Commission committed itself to look into further action to address plastic marine litter that builds on the piecemeal efforts underway in EU Member States. The problem of marine litter is transboundary by nature, as litter moves in the marine environment and litter originating from one country can affect another. Joined-up action is needed, also to ensure a single market with high environmental standards and legal certainty for businesses. This Impact Assessment supports a legal initiative aiming to reduce marine litter, as part of a wider approach:

1. **This initiative is an integral and complementary part of a much wider, comprehensive approach**, namely the Plastics Strategy, the Circular Economy Action Plan and the revised waste legislation.

   The Plastics strategy already tackles the design part of the cycle, for example, through a review of the essential requirements of the Packaging Directive. The strategy pushes an ambitious approach for plastic packaging recyclability, in line with our revised

[1] 'Plastic' shall mean a polymer, within the meaning of polymer as defined by Article 3(5) of Regulation (EC) No 1907/2006 of the European Parliament and of the Council, to which additives or other substances may have been added

[2] Such as the UN Global Partnership on Marine Litter; action plans put forward by the G7 and the G2; the international 'Our Ocean Conference', which the Commission hosted in October 201; a Resolution adopted at the third United Nations Environmental Assembly (UNEA) held in Nairobi (4-6 December 2017).

[3] Acoleyen et al. (2013)

[4] Marine Anthropogenic Litter, Editors: Bergmann, Melanie, Gutow, Lars, Klages, Michael (Eds.), 2015 Springer, ISBN 978-3-319-16510-3

waste legislation. It also includes a strong response on microplastics, a significant source of marine pollution. The revised Waste Framework Directive has strengthened general principles and objectives; ambitious 2030 recycling targets for municipal waste and plastic packaging are also set; however these can be reached without in depth efforts on littering or waste prevention.

The legislative initiative that this Impact Assessment accompanies complements all of these actions on design, recycling and microplastics and goes one step further. The main objective is prevention – reducing plastic marine litter of single use plastic and fishing gear e.g. by market restrictions and producers paying for clean-up. As a result, innovation for new business models (such as reuse models), multi-use items or material substitution will be boosted. In cases where marine litter will still occur, the resulting shift from single use plastics to reusable solutions and many natural, untreated alternative materials should lead to a reduced environmental impact. The initiative also tackles lost fishing gear because of its direct pathway to the sea. The main objective here is to incentivise bringing all fishing gear ashore and improve its handling there.

2. **It is a targeted and proportionate initiative** that directly addresses the two main sources of marine litter in Europe – i) single use plastics and ii) fishing gear. Together, these constitute 84% of plastic marine litter items[5], among them the most environmentally harmful items in the marine environment. Non-plastic marine litter is often inert (stone) or biodegradable (paper, wood) and thus poses a lower environmental threat.

i. **Single use plastics ("SUP")**, i.e. plastic packaging or other consumer products made of plastic that are designed to be used once, often away from home, and thrown away after a brief use. These items are particularly litter prone. Single use plastics include small packaging, bags, disposable cups, lids, straws and cutlery. The top 10 most commonly found SUP makes up 86% of all SUP in beach litter and is responsible for more than half of *plastic* marine litter. This list has been stable in recent years and over different regional seas within Europe. The list is very similar to lists in the US and other countries that consistently find the same SUP in their marine litter. Whilst the dominance of this top 10 is stable, legislation will have a review clause allowing for possible changes in the products or measures covered.

ii. **Fishing gear** (more precisely fishing and aquaculture gear) that is either lost or abandoned, including nets, makes up around a third of beach plastic litter by count and a higher proportion by weight. Abandoned, Lost or Disposed of Fishing Gear (ALDFG) includes:

- larger parts of fishing gear (such as pots and traps, nets, or lines) that are voluntarily abandoned on fishing grounds or accidentally lost due to adverse weather conditions, interactions and conflicts between gear users. These may entangle marine life ("ghost fishing") (such as pots and traps, nets, or lines) with worn out gear material (netting, lines) voluntarily dumped overboard

[5] Based on JRC analysis and further data analysis provided by Eunomia

rather than properly disposed of in port to avoid nuisance or cost related to handling this waste.

- fragments of gear (ropes, nets, etc.) or personal equipment, packaging, monofilament fishing lines, resulting from fragmenting or from normal fishing activities and maintenance of fishing gear and other equipment that are washed or thrown overboard.
- Fish Aggregating Devices (FADs), which are a special category of fishing device, extensively used for tropical tuna fishing, including by EU fleets[6].

3. **Member States are taking national action against single use plastic.** France has banned plastic cups and plates, Italy and France are banning plastic cotton buds, the UK wants to ban straws, joined by the Brussels region recently, and other countries like Ireland and Portugal are considering measures. The EU must act now to ensure these diverse actions do not fragment the single market. Businesses need a level playing field, with clarity and legal certainty, and the possibility to develop economies of scale for new markets and alternative materials.

Legal context

In 2015, the Circular Economy Package included proposals modernising the EU waste legislation on which an agreement between the Institutions was reached in December 2017. The new legislation includes general provisions on waste prevention and marine litter.

On 16th January 2018, the Commission adopted the "European Strategy for Plastics in a Circular Economy"[7] which recognises that marine litter remains an issue and that plastic is a significant source of pollution. It sets out, in its action plan, that additional action on fishing gear, including Extended Producers Responsibility and/or deposit schemes will be examined.

The Common Fisheries Policy Control Regulation[8] contains measures on retrieval and reporting on lost fishing gear, as well as the requirement to mark fishing gear. The European Maritime and Fisheries Fund (EMFF)[9] allows Member States to financially support the collection of marine litter as well as invest in port facilities for waste collection.

The Commission's 2018 legislative proposal on port reception facilities[10] includes measures to ensure that waste generated on ships or gathered at sea be returned to land and adequately managed. It refers explicitly to the Commission's consideration for further action on fishing gear. In spring 2018, the Commission will adopt a proposal for a review of the Fisheries

[6] It is considered that 65% of all the purse seine sets made globally are on FADs (both by distant fishing nations and coastal states). Setting on FADs accounts for nearly 40% of global tuna catches and 50% of global skipjack catches.

[7] COM(2018) 28 final

[8] Council Regulation (EC) No 1224/2009 of 20 November 2009 establishing a Community control system for ensuring compliance with the rules of the common fisheries policy.

[9] Regulation (EU) No 508/2014 of the European Parliament and of the Council of 15 May 2014 on the European Maritime and Fisheries Fund.

[10] Proposal for a Directive of the European Parliament and of the Council on port reception facilities for the delivery of waste from ships, repealing Directive 2000/59/EC and amending Directive 2009/16/EC and Directive 2010/65/EU, COM/2018/033 final - 2018/012 (COD).

Control System[11], which will improve the rules on reporting of lost fishing gear, e.g. through the introduction of e-reporting, and on its retrieval.

Public context

The public is sensitive to the environmental impact of plastics. Eurobarometer surveys found that 74% of European citizens are concerned about the impact on their health (74%) and on the environment (87%) of everyday products made of plastics. Documentaries such as A Plastic Ocean[12] or BBC Blue Planet II[13] brought the dimension of this global problem to attention of a wider public. 33% of Europeans identified marine pollution as the most important environmental issue[14].

The implementation of the Plastic Bag Directive[15] shows that restrictive measures can bring immediate results and public acceptance. Its implementation shows that even small levies on light plastic bags (around 0.10€) can lead to significant reductions in consumption in a short period. In Ireland the introduction of a tax on plastic shopping bags resulted not only in a 90% reduction of plastic bags provided in retail outlets (Convey et al., 2007) but also in a marked decline in bags found on beaches, from an average of 18 plastic bags/500m in 1999 to 5 in 2003[16].

The public consultation, that took place between December 2017 and February 2018, received more than 1800 contributions and showed that both with the wider public and with stakeholders there is an awareness of the need for action on Single Use Plastics 98.5% of respondents consider that action to tackle single use plastic marine litter is “necessary”, and 95% consider it “necessary and urgent”. More than 70% of manufacturers and more than 80% of brands and recyclers considered action "necessary and urgent". Legal clarity, and investment certainty over a unified single market is essential to all businesses involved in the plastic value chain

[11] At the time of drafting this document, this initiative was only planned but not yet adopted.
[12] https://www.plasticoceans.org/about-film
[13] http://www.bbc.co.uk/programmes/p04tjbtx
[14] Special Eurobarometer 468 (EC, 2017) 27,881 EU citizens from 28 Member States were interviewed between 23 September and 2 October 2017
[15] Directive (EU) 2015/720
[16] According to Coastwatch beach monitoring data, p.32 in http://ec.europa.eu/environment/marine/good-environmental-status/descriptor-10/pdf/MSFD_identifying_sources_of_marine_litter.pdf

2. PROBLEM DEFINITION

2.1. The problem

Marine litter is found on beaches and in the seas. It causes economic, social and environmental damage. The "plastic soup" that forms in the oceans endangers ecosystems and biodiversity and potentially human health; notably through plastics in the food chain. Socioeconomic impacts include clean up and retrieval costs, damage to tourism, shipping, fishing and aquaculture as well as the loss of valuable resources that could be reinjected into the economy. In the North Sea, 93% of the fulmars (marine bird species) analysed have ingested plastics. In a recent EU-funded project, covering the Mediterranean and Northeast Atlantic, 150 turtles have been analysed, 85% of the 120 individuals contained ingested litter, at an average of 1.3 g and 16 items[17].

While the problem is global, it has a clear European dimension. South East Asia is the largest source of marine litter but Europe is also a significant source, it both suffers the consequences and pollutes other regions including the Artic[18]. Not all marine litter in European seas or beaches originated in the European Union[19], although European sources are significant (see Annex 3). Plastics are found on all beaches of European Seas. The majority of items found on a beach in Texel, the Netherlands, originated from the Netherlands or neighbouring regions[20]. European countries bordering the Baltic and North Sea are likely to be the origin of plastic found there but, of course, all plastic coming from Europe either ends up in Europe's waters or in waters elsewhere in the world. Indeed, marine litter can travel large distances, even as far as the Artic[21].

The problem is marine litter found on beaches, on the seabed and floating. Most plastic floats, but some plastic items, such as fishing nets and bottles, end up at the bottom of the sea. Marine litter moves around thanks to currents, weather and degradation, from seabed to sea surface to beaches. What you see on the beach is a reasonable indicator for what is found at sea (floating and non-floating) as well.

2.1.1. What types of marine litter do we find?

The identification of the origin, pathway and type of marine debris can be difficult, as litter degrades and fragments over time. Some plastics enter the marine environment as 'macro plastics' and then degrade slowly into smaller fragments. Others enter directly in the form of microplastics, which are plastic particles with a diameter less than 5mm. Some of these microplastics are intentionally added to products (e.g. scrubbing agents in cosmetics, detergents, paints) or to serve as input for further processing (e.g. plastic resin pellets). Others originate from the abrasion of large plastic objects during manufacturing or use (e.g. tyre dust, textile fibres). The Plastics Strategy already includes specific measures on micro

[17] Matiddi et al. 2017: http://dx.doi.org/10.1016/j.envpol.2017.06.054
[18] https://www.marinetechnologynews.com/news/arctic-floating-plastic-547464
[19] Obviously, this is particularly true for the outermost regions that are surrounded by third countries, in particular in the Caribbean Sea.
[20] Van Franeker (2005)
[21] https://www.marinetechnologynews.com/news/arctic-floating-plastic-547464

plastics: restrictions through REACH for deliberately added microplastics in products as well as for micro plastics from other sources (tyres, textiles and plastic pellets)[22]. **This initiative hence focusses on single use plastics and fishing gear,** which are macro-plastics**.**

Percentage contribution to beach litter can be calculated by item count, weight, volume, or surface area/volume ratio. Beach litter item counts are internationally accepted as a reasonable indicator of the composition of marine litter, and as suitable to inform policy. Similar counts lead to similar results in terms of beach litter composition internationally (notably in US, Australia, Korea, Taiwan, Japan). In the EU, guidance is available[23] to support monitoring and will be further improved by a 2017 Commission Decision on criteria and standards for determining Good Environmental Status[24].

A representative sample of European beaches was used to establish a database of marine litter from 276 beaches of 17 EU Member States and 4 Regional Seas during the year 2016. The 355.671 items observed are ranked by abundance. Litter on beaches has been monitored for a number of years (for instance more than 10 years in the Northeast Atlantic). Annex 3 contains details, a discussion of the statistical robustness and an analysis of litter found by regional seas.

While there are differences between what is found on beaches and what is found in the seas, the two are linked and available evidence suggests that **litter counts on beaches is a reasonable indicator of marine litter in general**[25]. In more detail:

- The regional seas analysis suggests that a single list of litter items is suitable for a European policy approach, as opposed to different policy approaches by regional sea. While there is some **regional variation**, the top ten items-by-count found on beaches changed very little even if rankings differ.
- Counts reflect the **potential impact of marine litter** as marine species and activities are more affected by the number of items found than by weight (see Section 2.1.2).

The accuracy of beach litter as a proxy for total marine litter **in all compartments, floating and non-floating** (i.e. beach, surface, water column, sea floor), varies according to the sea and its tides as well as the products and pathways. Depending on ocean currents and beach situation, the coasts accumulate litter from the sea or they act as a reservoir for washed-up litter. Small items resulting from the breakup of fishing gear over time are more likely to end up onshore; large items are more likely to end up on the sea floor. Some plastic sinks, and then can reappear due to tides and currents. Seafloor samples show higher proportions of fishing gear than is found on beaches, particularly those with little tidal range. Beach litter is

[22] Public consultation investigating options for reducing releases to the environment of microplastics https://ec.europa.eu/info/consultations/public-consultation-investigating-options-reducing-releases-environment-microplastics_en

[23] "Guidance on Monitoring of Marine Litter in European Seas", JRC

[24] Commission Decision (EU) 2017/848 of 17 May 2017 laying down criteria and methodological standards on good environmental status of marine waters and specifications and standardised methods for monitoring and assessment, and repealing Decision 2010/477/EU

[25] See Annex 3 for more detailed discussion

therefore a better indicator for the types of SUP litter than for sea-based activities but is reasonable for both.

2.1.2. Measuring SUP in item counts versus weight

Measuring by item counts is the chosen option for this Impact Assessment, as it is the best indicator for the overall environmental, social and economic impacts. However, no type of measurement is perfectly correlated with all the different types of impacts:

- Environmental impacts are varied, from harm to wildlife by entanglement and ingestion, harm to ecosystems through smothering, abrasion and the spread of invasive species, and effects on the movement of persistent organic pollutants (POP) within and between habitats as well as in the food chain. The number of items is fairly closely related to ingestion by marine fauna (fish, birds, reptiles, some mammals), as well as microplastic generation in the short term (many smaller items with a larger surface area to volume ratio will wear and degrade faster – over years and decades - than dense items of large mass).
- For fishery related items harm is caused by "incidents" i.e. encounters between wildlife and lost fishing gear. Therefore, the number of fishing gear litter items is of relevance. Of course, a bigger net can cause more harm. While there is still little information about seafloor litter, the available trawling data from areas surveyed by video[26] confirm the existence of litter in the deepest areas and at locations very remote from land.
- Measuring by count is a reasonable way to indicate the impact on tourism: the aesthetic disturbance by litter, related to the acceptance by tourists, does not depend on the individual litter properties (with some exceptions, if particularly unhygienic or dangerous) but more on the number of visible items.

Tonnage of items is best correlated with the generation of microplastics over the long term (hundreds of years) and subsequent ingestion at all levels of the food chain including the lower levels such as invertebrates, with the associated POP related impacts. Additionally, the quantitative units listed above do not capture other features, such as shape (ability to lacerate, trap or entangle), location of emissions (whether item also has accrued terrestrial litter impacts) or likelihood of ingestion (related in turn to shape, colour and material type), which cannot be easily in an objective way.

While item counts are opted for in this Impact Assessment, analysis was also undertaken to explore the data using weights, rather than counts. Doing so, plastic marine litter is dominated by a few heavy multi-use sources such as tyres, shoes, and car parts. Those items would require a different policy approach as some of it is related to negligence, and some rather to deliberate waste dumping in the sea, for which better enforcement of existing legislation would be the appropriate response.

[26] Pham at al. 2014: https://doi.org/10.1371/journal.pone.0095839

The analysis also needs to be seen in the perspective of the overall figures on plastics marine litter, as shown in the Table below[27]. Microplastics form a major part (in weight) of plastics marine litter. Concentrations are increasing, but there is no overall mass balance of transfers between coasts, rivers, shipping and the sea on a European or global scale. Microplastics are tackled by specific actions under the Plastics Strategy (as discussed in Section 2.4).

The focus of this initiative is on the approximately 27,000 tonnes of plastic from fishing gear and SUP that enter the marine environment each year. This focus has been chosen, because SUP are:

- The source of plastics marine litter that the existing legislation in its current form does not address fully, and so there is a legislative gap; and
- Highly harmful to environment, with a significant negative social and economic impact; a mere weight-based approach would not demonstrate this harm and impact.
- Abandoned and discarded fishing gear is highly harmful.
- Current and proposed legislation and other measures covering fishing gear[28] presuppose more targeted measures, including the development of an appropriate waste as well as reuse/recycle stream adapted to its specific characteristics.

Table 1. Estimations of weight of marine plastics litter, per year, per source, in the EU

Plastics marine litter	Tons	Source
Total	150.000 – 450.000	Eunomia (2016), based on Jambeck *et al.* (2015)[29]
• Microplastics	75.000 – 300.000	Eunomia (2018), published
• Macroplastics: - Single use plastics - Fishing gear	 15.600 11.000	 Eunomia (2018), in preparation See annex 7

2.1.3. How big is the contribution of SUP and fishing gear to plastics marine litter?

Plastics makes up 80-85% of **marine litter** by count. The non-plastic part (15-20%) is often inert (e.g. construction material) or biodegradable (e.g. paper, wood) and therefore has a lower environmental impact. About half of identifiable plastic pieces are 'single use plastics' (e.g. crisps packets, cotton bud sticks etc.).

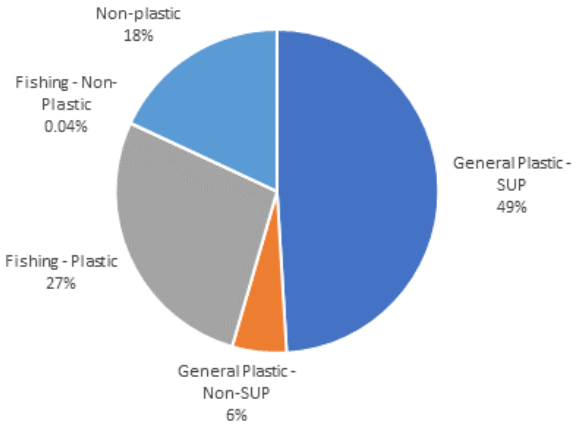
Of the plastic part, around 30% remains unidentified, but probably has a similar composition as the identifiable part. This means that that SUP makes up around half of all beach litter items counted. Plastics from fishing gear makes up another 27% of marine litter items.

[27] It should be underlined that all figures are estimates with a considerable margin of error but that this is particularly the case for microplastics. Also, estimates come from different sources, using different methodologies that are not always consistent. Indeed, as part of the underlying analysis for this Impact Assessment the estimates for plastic marine litter have changed noticeably from the figures available a few years ago.

[28] COM (2018) 33 final, COM (2018) 28 final (PRF Directive proposal, and plastics strategy, respectively)

[29] Jenna R. Jambeck et al. (2015), Plastic waste inputs from land into the ocean, Science, 347 (6223), 768-771 (DOI: 10.1126/science.1260352)

Figure 1. Composition of Marine Litter (items)



Source: Eunomia, based on JRC data

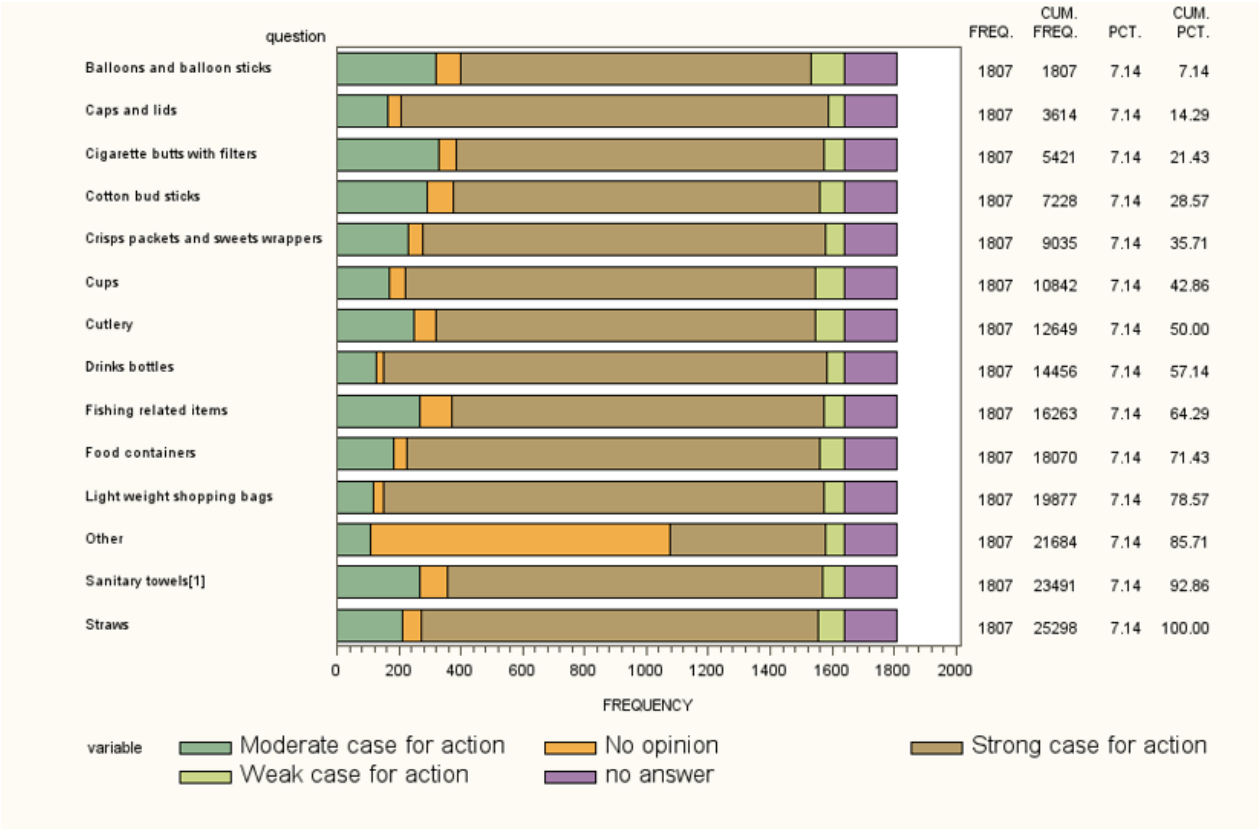
The top 10 most found of the SUP are 86% of the number of all SUP items found on the beaches (which can be expressed as 43% of all marine litter or half of all the plastic items). This approach thus excludes only 14% of the SUP items. Adding more items, would mean chasing very small sources: number 11on the list is shotgun cartridges. The way and methodology for the aggregation of the items are extensively explained and discussed in Annex 3. Also, looking at items 11 onwards, they are not just small in count and so in environmental damage potential, but a number of them do not have clear alternatives available making policy responses less obvious. To refer to a limited list of items (Top 10) also makes it easier to communicate the relevant policy measure to the public. **The categories of SUP listed in Table 2 below are the basis of further analysis.**

Table 2. Sampling numbers of top ten SUP items

Ranking	Item	Total number
1	Drinks bottles, caps and lids	24,541
2	Cigarette butts	21,854
3	Cotton buds sticks	13,616
4	Crisp packets / sweet wrappers	10,952
5	Sanitary applications	9,493
6	Plastic bags	6,410
7	Cutlery, straws and stirrers	4,769
8	Drinks cups and cup lids	3,232
9	Balloons and balloon sticks	2,706
10.	Food containers including fast food packaging	2,602

The Public Consultation[30] demonstrated that public concern about plastic items is closely aligned with the top 10 list. Concern was expressed for all items, but with priority given to caps and lids, drinks bottles, cups and straws.

Figure 2. Responses to the Question – For each type of plastic litter, and fishing gear, *"to what extent do you agree that action should be taken to reduce their presence in the environment?"*



Marine litter from sea-based activities is also significant. Any plastic waste lost from marine transport, offshore platforms, recreation, fishing or aquaculture will enter the marine environment[31]. The Impact Assessment[32] for the revision of the Directive on Port Reception Facilities[33] found that much waste from ships, including fishing vessels and recreational craft, that should be delivered to ports is not (up to 30%) and may end up being discharged at sea. The greater part however comes from fishing and aquaculture. This is reflected in the largest single category of beach litter items being strings and cords, which largely come from fishing gear.

[30] https://ec.europa.eu/info/consultations/reducing-marine-litter-action-single-use-plastics-and-fishing-gear_en

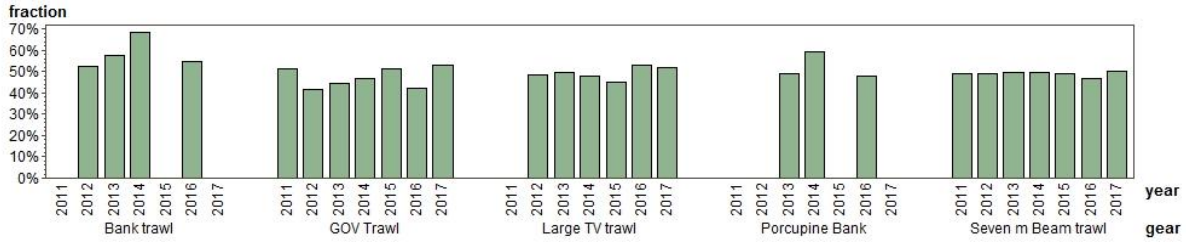
[31] Only around 2,000 of the at least 80000 boats that reach their 'end of use' each year in Europe are dismantled, a significant number of the remaining boats are left abandoned, potentially ending up in the ocean and becoming marine litter (Commission Staff Working Document on Nautical Tourism, SWD(2017) 126 final).

[32] SWD(2018)21

[33] Directive 2000/59/EC

The proportion of items from sea-based activities on beaches with strong tides[34] is higher, suggesting that the proportion in the water may be even higher. An analysis of what has been brought up in fishing nets in western Atlantic and the Baltic indicates equal numbers of items coming from fishing as from single used plastics. The majority of plastic found in Arctic waters derives from fishing[35].

Figure 3. Density of plastic items per unit area from fishing as proportion of the total number from single use plastics and fishing gear



Source: ICES DATRAS database and analysed by EMODnet

A complementary approach to beach counts and counts following retrieval actions from the sea floor was to calculate the fishing gear contribution to waste and to marine litter based on sector statistics based on production statistics from the PRODCOM database and sampling. The total loss of plastic waste (netting and non-netting) from fishing gear and aquaculture is estimated at 11,000 tonnes per year (see annex 7). For comparison, the input from single use plastics are estimated at 15,604 tonnes per annum.

Finally, plastic pollution is also found in freshwater and soil. Riverine litter is a contributor to marine litter: the available evidence shows strong similarities in the composition[36].

How future proof is this selection – consistency over time and place

The top 10 SUP items are the ones that are consistently found in beach counts in Europe, over recent years and over the different seas. In the various samples, the exact number of counts and order within the top 10 might change, but not the top 10 as such.

Currently at EU level, only one specific SUP item is regulated, namely plastic bags, through the Plastic Bags Directive. At Member State level, most of the items that are (or are planned to be) regulated are part of the top 10. The notable exception is plastic plates, which counts for only 0,02% of the items found on beaches and is not seen as significant at the EU level.

[34] Unger and Harrison "Fisheries as a source of marine debris on beaches in the United Kingdom" Mar Pollut Bull. 2016 Jun 15;107(1):52-58.

[35] Ingeborg G. Hallanger and Geir W. Gabrielsen, 2018 Plastic in the European Arctic 045 Norwegian Polar Intituite Brief Report

[36] JRC Technical Report "Riverine Litter Monitoring - Options and Recommendations", 2016

Table 3. Items examined or addressed in Member States or regions

Member State/Region	Item
France	Cups, glasses, plates, cotton buds
Italy	Cotton buds
Italy	Cigarette buds
Scotland	Cotton Buds
Scotland	Straws
Spain – Balearic Islands	Single use consumer plastics, e.g. cups, plates, cutlery, straws; wet wipes, bottles
Brussels region	Straws
Ireland	Single use plastics: coffee cups, plastic cutlery etc.

An American study[37] found broadly the same list of items. The authors argue that action should be focused on this list, as these are the plastic applications that cause the most harm in America. Of the EU Top 10 only plastic cotton buds are not found in the US list, as these products are mainly made of hard paper in the American market (and thus are biodegradable).

A comparison of actions taken globally shows a diverse list, but most items from the EU Top 10 are included, in particularly plastic bags, cutlery, wipes and food containers (sometimes referred to Styrofoam or Polystyrene), straws, cups. The list of items addressed around the world (Annex 3, Section 4.1.4) is thus similar to the EU Top 10. Ultimately, the top 10 list of items found through beach counting, seabed trawling etc. will change due to the actions that will be taken. Some items should disappear, which would be a sign of success. The upcoming legislation will foresee the possibility to evaluate the effectiveness of the measures taken and the items that are recorded as marine litter on our beaches. In order to be future-proof, the legislator can then change the list of items, actions or targets as necessary (see Section 8). Similarly, it is important that legislation avoids regrettable substitution, hence the need to closely follow scientific and technical developments to understand when it will be possible to develop clear criteria for marine biodegradability.

2.1.4. The impacts of marine litter

Marine plastic litter persists in the environment, and there is a continuous build-up. It is not possible to remove all the marine litter as the seas and oceans have a combined surface of 350 million km² and a volume of 1.300 million km³. Marine litter harms the economy, society and environment in different ways. UN Environment estimated the total natural capital cost to marine ecosystems of plastic littering damage at USD 13 billion per year[38].

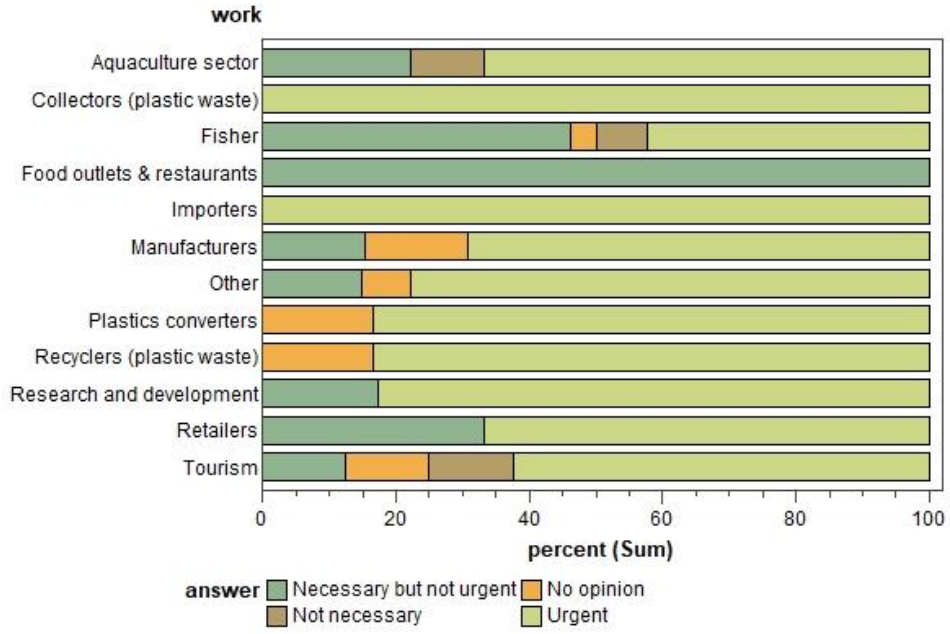
The JRC Report on "Harm caused by marine litter" (2016), summarises the impacts as: *"Marine litter impacts organisms at different levels of biological organization and habitats in a number of ways namely: through entanglement in, or ingestion of, litter items by individuals, resulting in death and/or severe suffering; through chemical and microbial*

[37] www.5gyres.org
[38] UNEP (2014) Valuing Plastics: The Business Case for Measuring, Managing and Disclosing Plastic Use in the Consumer Goods Industry"

transfer; as a vector for transport of biota and by altering or modifying assemblages of species. Marine litter is a threat not only to marine species and ecosystems but also carries a risk to human health and has significant implications to human welfare, impacting negatively vital economic sectors such as tourism, fisheries, aquaculture or energy supply and bringing economic losses to individuals, enterprises and communities."

There is a consensus amongst all stakeholders that something needs to be done, with a majority believing that the issue is urgent (see Figure 4).

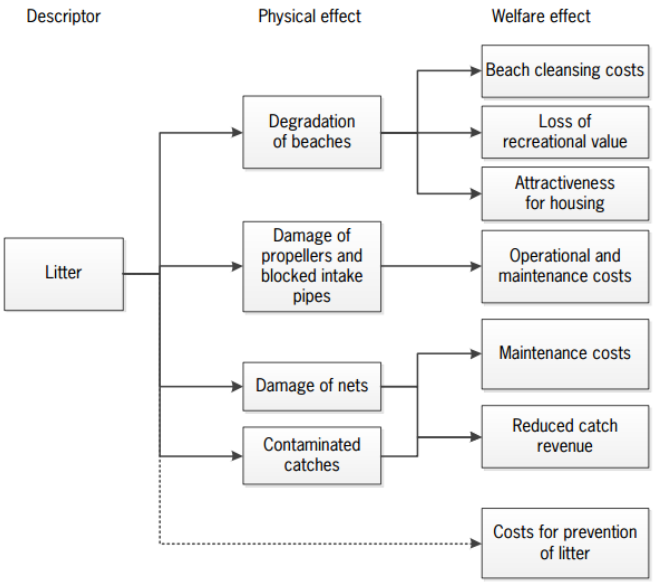
Figure 4. Answers in open stakeholder consultation to question "*Please indicate whether you think action to address the amount of marine litter (including fishing gear) in the seas and on beaches is:*"



2.1.4.1. Economic impacts

Marine litter damages business in economic sectors such as tourism, fisheries, aquaculture, navigation and energy as well as the respective local communities.

Figure 5. "Logical Diagram of Impact"



Source: JRC, 2016, "Harm caused by marine litter"

The economic impact on the most obvious affected sectors is described below:

- **Fisheries and aquaculture**
  - The removal of litter from nets, as well as the damage caused to the catches themselves can lead to a significant reduction of catches, as well as time and costs associated with repairing fishing gear damaged by marine litter; entangled propellers and obstructed cooling systems. Lost or abandoned fishing gear can continue to fish ("ghost fishing"). This can lead to a direct catch reduction in its vicinity and, cumulatively, the risk to reduce affected fish stocks' abundance. Furthermore, litter near fishing grounds and aquaculture cages can damage the image of the seafood produced. At the European level, Acoleyen et al. (2013) estimated that the costs due to damage and losses reaches approximately €61.7 million, equivalent to a reduction of nearly 1% of the total revenue generated by the EU fleet in 2010. Other sources[39] put the level at 5%.
- **Shipping and ports**
  - Marine litter and ALDFG can create navigation hazards that can cause accidents at sea, damage boats and pose a threat to navigation safety e.g., through blockages of ship propellers and entanglement of divers.
  - Over 71% of harbours and marinas surveyed in the UK reported that their users had experienced incidents such as fouled propellers, fouled anchors, fouled rudders and blocked intake pipes and valves. Marine litter costs the ports and harbours industry in the UK around €2.4 million each year (implying costs for the EU as a whole of around €30 million each year).

[39] Bergmann, Melanie, Gutow, Lars, Klages, Michael (Eds.), 2015. Marine Anthropogenic Litter, Springer

- **Clean-up activities.** Targeted clean-ups of floating marine litter or litter deposited on the sea- floor are restricted to scattered initiatives and programmes. These are, in most cases, voluntary-based or funded by private entities, local authorities[40] or the EU. For example, the current European Maritime and Fisheries Fund envisages the investment of €22 million for support of fishing for litter operations over the period 2014 to 2020. In comparison to the previous funding period, the number of Member States planning 'fishing for litter' operations doubled compared to those undertaken in the European Fisheries Fund. The number of planned operations increased by 130% and the planned EU funding by 320%.
- **Coastal communities and tourism.** There are economic costs to coastal municipalities in the form of the costs of keeping beaches clear of litter and its wider implications for tourism and recreation, as litter puts tourists off from visiting and from sea-based activities. Acoleyen et al. (2013) estimated that cleaning costs for the more than 50,000 kilometres of EU coastline amounted between approximately €194 and €630 million.
- **Long term impacts.** The damage to economic activities and the livelihoods of communities are known to a certain extent. However, the unknown unknowns are of far more concern. The long-term year-by-year accumulation of material in all levels of the food web poses an existential threat to these activities and these communities. There are about 150,000 fishermen in Europe. Another 60,000 people work in aquaculture and 120,000 in processing. Many more are employed in the retail and restaurant trades. Consumer concerns could cause major disruption well before the actual damage to human health is known as was shown when unfounded suspicion that Spanish cucumber was responsible for e-coli deaths in Germany caused Spanish farmers to lose $256 million[41].

2.1.4.2. Environmental and human health impacts of plastic marine litter

The impacts of plastic marine debris on the environment and human health are well documented and can be structured according to the size of the plastic litter[42], as explained in detail in Annex 3.

- Impacts of macroplastics (i.e. pieces of plastics larger than 5mm): ingestion, entanglement, "ghost" fishing, decreased biodiversity, sea floor pollution;
- Impacts of microplastics (i.e. pieces of plastics smaller than 5mm): ingestion or absorption, impact nanoparticles;
- Impacts of toxic substances associated with plastic debris: chemical toxicity, persistent organic pollutants

As explained above, the impact will be related with different features of the plastic waste such as weight, shape, location of emissions or likelihood of ingestion which are difficult to determine. There is no specific literature available yet that differentiates the impacts of the different items under examination in this impact assessment.

[40] http://www.kimointernational.org/fishing-for-litter/
[41] https://www.aljazeera.com/news/europe/2011/06/20116771510528902.html
[42] Eunomia, ongoing.

However, as all the items are frequently littered, their overall impact will be important. The model used calculates (table 27 of Annex 6) that the total amount of littering of the top 10 SUP items would be almost 7 billion items in 2030. Even the smallest group within the top 10 SUP, would be littered several million times in the European Seas. As an illustration, the smallest of the categories, stirrers, is still estimated to be contributing 17 million items a year in 2018, rising to 20 million in 2030, to the marine environment. Scenario 2c is modelled to reduce the 2030 estimate by 3.6-3.8 billion items. While these are modelled figures and should be carefully considered, they give an idea of the order of magnitude.

Whilst the impact of plastic marine litter is acknowledged, it is not possible to establish impacts for individual litter categories in a statistical way. For example, evidence may come from birds found dead on beaches or from turtles. Each of the Top 10 SUP items has been found to cause harm: besides monitoring of birds and turtles, there is anecdotal and empirical evidence (e.g. observations and photos), Moreover:

- only a small sample of incidents end up being visible on the beach;
- the identification of source can be difficult because of weathering and fragmentation, and so studies tend to report plastic more generally and not by type of item[43].

A survey of 340 academic papers produced the following summary of impacts on 693 species.[44] Notably, the debris categories were wider:

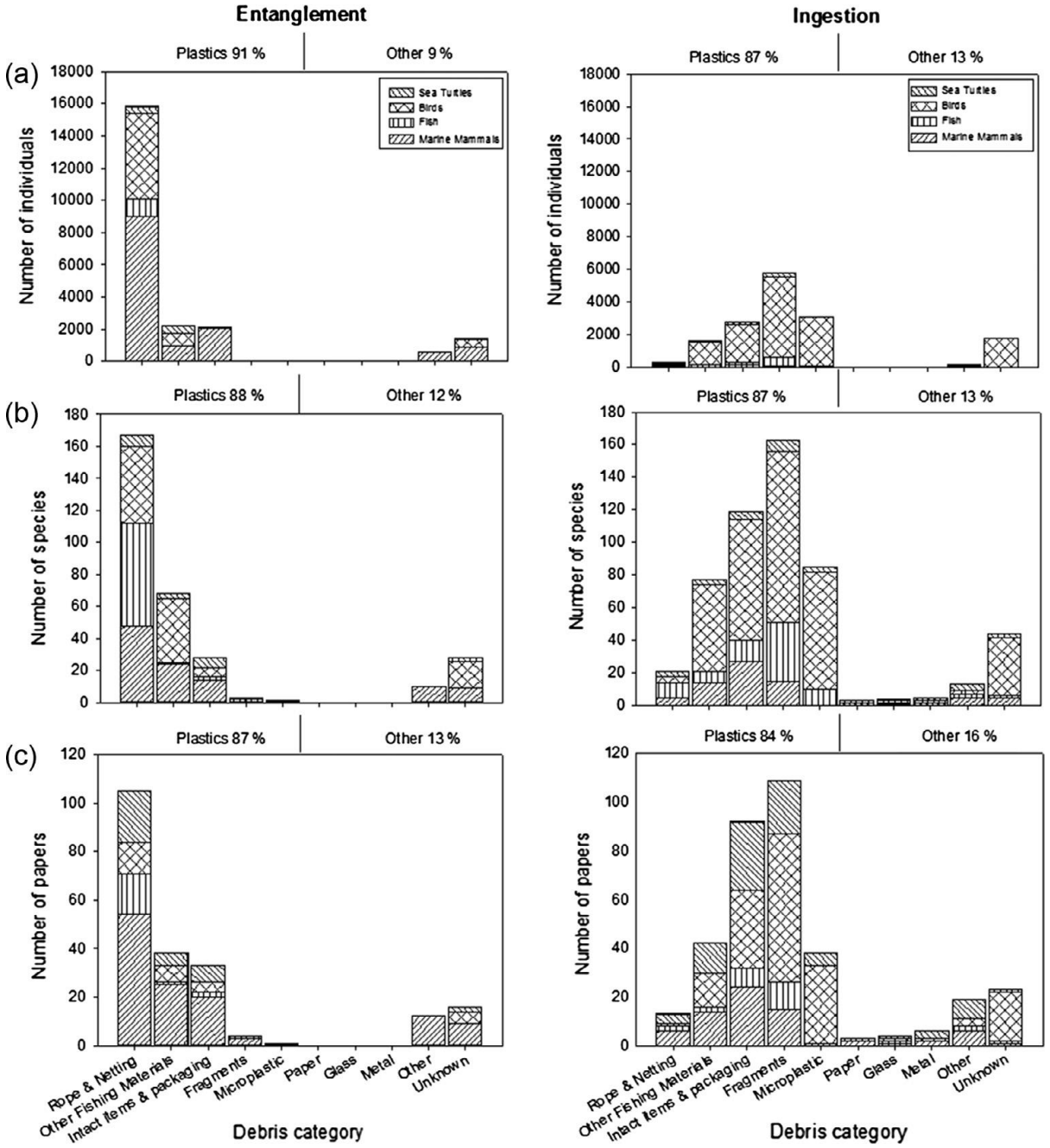
- Plastic: Rope and netting, other fishing materials, intact items and packaging, fragments, microplastic,
- Paper,
- Glass,
- Metal,
- Other,
- Unknown.

The result is that it is not possible to provide a statistical analysis of the relative harm caused by each of the Top 10 SUP items individually. An item may make up 5% of plastic marine litter, but it is not possible to say whether it causes more or less than 5% of harm; whilst it is possible to state that it accounts for a share of the overall harm. Given that even the least found items are found in their millions in the oceans, it seems reasonable to state that they are sufficiently harmful to warrant further analysis.

[43] A fulmar typically weighs 700g, with a stomach only a few cm across meaning that most plastic found in them will be broken up and in small pieces

[44] Gall, S.C., and Thompson, R.C. (2015) The impact of debris on marine life, *Marine Pollution Bulletin*, Vol.92, Nos.1–2, pp.170–179

Figure 6. Impact of various debris on marine life



Source: Gall and Thompson, 2015

There are however many cases where impacts have been demonstrated for specific items. For example: a case of a turtle having ingested a drinking straw which then became lodged in the animal's nostril[45]; a case of a plastic fork having been ingested by a turtle[46,47]; the review of

[45] https://news.nationalgeographic.com/2015/08/150817-sea-turtles-olive-ridley-marine-debris-ocean-animals-science/

[46] https://www.earthtouchnews.com/environmental-crime/pollution/first-a-straw-now-a-fork-turtles-are-choking-on-our-plastic-trash/

items found in whale stomachs, including bags, drinks cups, plastic caps as well as a host of other items[48]; images of Midway Island albatross[49] with plastic caps easily identifiable amongst ingested items; examples of balloon remnants found in fulmar stomachs[50]. These all demonstrate that even larger items are directly ingested whole in some circumstances.

It is therefore possible, on the basis of available literature and monitoring, to conclude that there is a differentiation in the degree of harm from each item. Table 1 reflects the impacts of the targeted top 10 items. Ultimately plastic macro litter, if it remains long in the sea, becomes microplastics, which facilitates ingestion by marine animals and entry in the food chain, as well as the release of chemicals. Aside the environmental impacts, there are also impacts on tourism (e.g. landscape degradation) and on the fisheries industry (e.g. litter removal, entanglement of propellers, ghost fishing, material loss through nets encountering).

Table 4. Assessment of the impacts of top 10 items

	Entanglement of marine wildlife	Ingestion by marine animal	Pollution of marine waters (chemicals release, microplastics)	Transport of invasive species (rafting)	Microbial contamination	Economic impacts on tourism	Economic impacts on fisheries	Potential human health impacts
Drinks bottles & caps	+	++	+	+++	+++	+++	+	+
Cigarette butts	-	+++	+++	+++	+++	++	++	+
Cotton buds sticks	-	+++	+	+++	+++	++	+	+
Crisp packets	+	+++	+	+++	+++	+++	++	+
Sanitary applications	+	++	++	+++	+++	+++	++	+
Plastic bags	+++	+++	+	+++	+++	+++	+++	+
Cutlery, straws & stirrers	+	+++	+	+++	+++	++	+	+
Drinks cups & lids	+	++	+	+++	+++	+++	+	+
Balloons & sticks	+	+++	+	+++	+++	+	+	+
Food containers	++	++	+	+++	+++	+++	++	+
Fishing gear	+++	++	++	+++	+++	+++	+++	+

Current evidence strongly suggests that, in addition to its impact on ecosystems, plastic marine litter constitutes a public health issue. Human beings could be exposed to micro- and nanoplastics in different ways, including through the food chain. The risk to human health will be further examined by ECHA following the mandate, given by the Commission, to prepare a REACH dossier on microplastics intentionally added to products.

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[47] The mouth cavity of turtles is lined with tough, backwards facing spines to inhibit the escape of prey; however it means that the animals can egest things only with great difficultly and for this reason, items get lodged in their nasal cavities. http://seaturtleexploration.com/inside-of-a-sea-turtles-mouth/

48 de Stephanis, R., Giménez, J., Carpinelli, E., Gutierrez-Exposito, C., and Cañadas, A. (2013) As main meal for sperm whales: Plastics debris, Marine Pollution Bulletin, Vol.69, Nos.1–2, pp.206–214

49 http://www.chrisjordan.com/gallery/midway/#CF000313%2018x24

50 Andries, J., and Van Franeker, J. Plastic Soup is Everywhere https://www.wur.nl/upload_mm/0/b/2/020f791b-3b58-4f39-9f08-09924fa9b15d_PLASTIC%20LUNCH-UK.pdf

2.1.4.3. Natural resources and waste impacts

The design, production and use of single use plastic contributes to the depletion of natural resources and the increase of waste. This inefficiency of the current production, consumption and disposal patterns is reflected in the loss of valuable resources (e.g. between €70 and €105 billion of plastic packaging value lost to the global economy annually[51]). The continued use of oil as feedstock for plastics production complicates the efforts to phase out fossil fuel production and extraction and the emission of CO_2 linked to production and incineration of plastics (approximately 400 million tonnes of CO_2 a year globally)[52]. The inappropriate disposal of single use plastics is a further problem in this regard since a relevant percentage is not recycled nor easily recyclable.

Disposal and end-of-life treatment of fishing gear is low. The level of recycling in the EU is[53] 1 to 5%, low when compared to rates in countries such as Iceland and Norway[54].

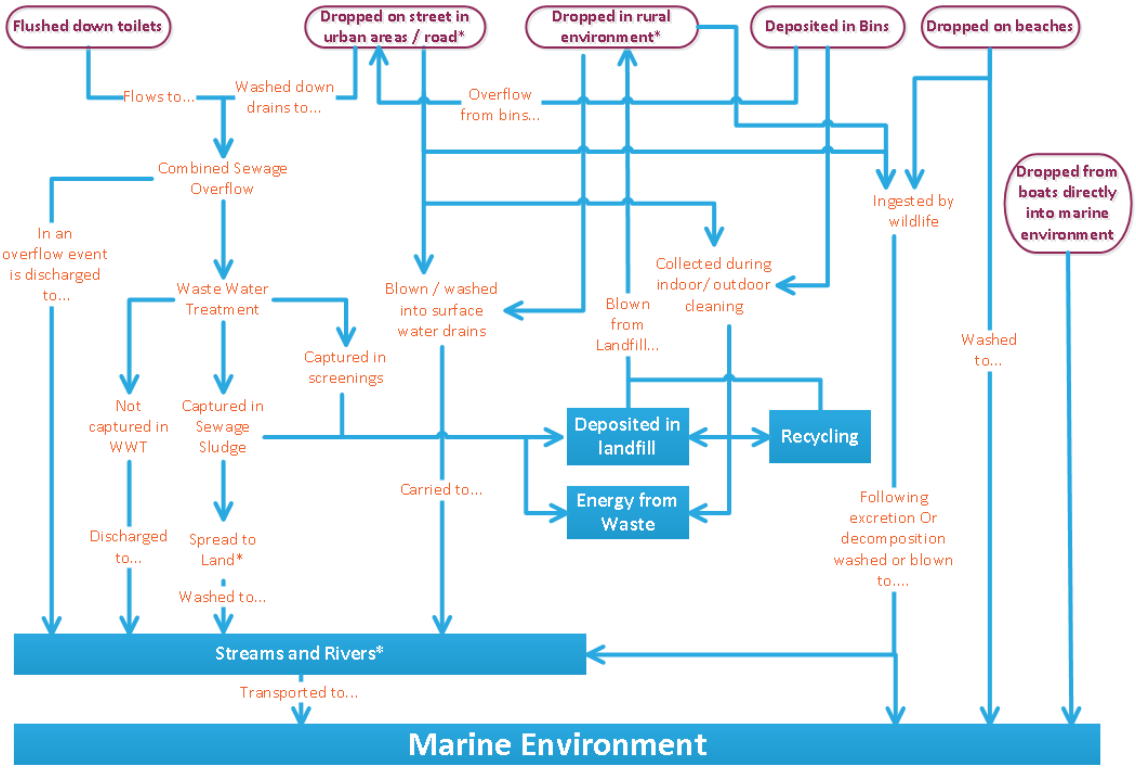
2.2. Marine litter pathways and drivers

2.2.1. Most likely pathways

Marine litter has a source (i.e. the sector or activity leading to marine litter), a means of release (i.e. reason for not being properly captured by waste management infrastructure), and a pathway and transport mechanism (i.e. means by which it enters the marine environment). To understand the terminology and provide an example, a cotton bud stick may be flushed down the toilet (means of release) by consumers (source) and enter the marine environment through the wastewater release system (pathway)[55]. Depending on the level of treatment but also on the organisation of the wastewater collection network, plastics could be captured or not[56]. Annex 3 includes a table with details for different types, and Figure 6 summarises this.

[51] World Economic Forum, Ellen MacArthur Foundation and McKinsey & Company, The New Plastics Economy — Rethinking the future of plastics, (2016, http://www.ellenmacarthurfoundation.org/publications).
[52] Plastics Strategy, COM(2018) 28
[53] EUNOMIA (2017)
[54] EUNOMIA (2017)
[55] See JRC Technical Report "Identifying sources of marine litter", 2016 for analyses for different items
[56] Most cities have combined sewer systems where wastewater and storm water are drained in one sewerage system. During heavy rainfalls, volumes of flow are high and water needs to be diverted to combined sewer overflows (CSOs). In some cases they may be discharged without restriction or, pertinent to this case, without extracting small pieces of debris such as a cotton bud.

Figure 7. Multiple sea- and land-based sources pathways



It is recognised that:

- Two distinct actions contribute to marine litter originating from SUP, namely the purchase of plastic items, and the actual littering. Changing these two actions will require different policy responses, such as market interventions for the former and behavioural interventions for the latter.
- The amount of marine litter is proportional to the amount of plastics produced, placed on the market and purchased, all things equal.
- Often buying plastics is not a deliberate decision by consumers. The purchase is determined by the easy availability and low cost of plastics and by the absence of alternatives. Some SUP are provided to consumers free. Therefore, a combination of a trend towards (on-the-go) convenience, lack of incentives to collect items after use, limited collection infrastructure (e.g. bins) and uncivil consumer behaviour contributes to littering.

Streams and rivers are a common pathway of land-based litter into the ocean. The available data are very approximate (estimates for riverine litter in Europe range from 500 to 20 000 tonnes annually[57] to 9,300 tonnes[58] and 10,500 tonnes[59]). Currently, Member States are not

[57] http://ec.europa.eu/environment/marine/good-environmental-status/descriptor-10/pdf/MSFD%20Measures%20to%20Combat%20Marine%20Litter.pdf

[58] Laurent C. M. Lebreton, J. v.-W. (2017, June 7). River plastic emissions to the world's oceans. *Nature Communications, 8*.

[59] Christian Schmidt, T. K. (2017, October 11). Export of Plastic Debris by Rivers into the Sea. Environmental Science and Technology, 51(21), 12246–12253.

obliged to take measures against litter in surface waters. In any case, it is technically not possible to install a fine enough mesh screen to stop a cotton bud stick, without affecting economic activities and ecosystems at the same time.

2.2.2. Underlying drivers of the problem

The underlying drivers are complex, with several factors leading to the current situation:

- *Wide availability of plastic as a cheap and convenient option*: the purchase of plastics is often easy and convenient, with only few and/or less convenient alternative options available. In the case of fishing and aquaculture, plastic materials have been essential in reducing production costs, improving product quality and hygiene as well as producers' health and security.
- *Consumer trend for convenience:* We live in a throwaway society, where convenience is valued highly and an on the go trend favours convenient single use plastics. The result is increased consumption of short-lived or disposable items rather than reusable alternatives, even where they exist and are environmentally preferable.
- *Market fragmentation:* Member States are taking individual initiatives, notably to limit the access to the market of some problematic products, which will lead to a fragmentation of the European market (see the chapter on the "Current policy framework").
- *Market failure*: The externalities of litter in the environment are not internalised into the costs of single use plastic items. This is one of the reasons why there is limited economic incentive to develop or choose items with a better environmental footprint. The cost of collection and transport of end-of-life fishing nets can be reduced or spread out more evenly if organised with the involvement of materials producers, as well as on a regional or national basis. At present that cost is mostly left to the ports, of which there are hundreds in the EU – this is particularly relevant in a sector where both ports, and the operators in the sector are often small-scale, with some ports' activities either overly dependent on or even exclusively limited to fishing. In short, under current and currently proposed legislation the cost is borne by ports and shippers/fishers, not by the producing sector.
- *Lack of market incentives* for the effective participation in separate collection (such as 'pay as you throw' schemes) or for the return of (beverage) containers in the form of deposit return schemes. These schemes lead to less marine litter by encouraging better waste management, are currently limited to a minority of EU countries. It also relates to complex products or packaging formats not designed for recyclability. Despite the removal of financial penalties for fishermen to bring gear ashore under the proposed revision of the Port Reception Facilities Directive, the effects of paying even indirect fees may not be sufficient as an incentive to completely exclude disposing of damaged gear at sea if storage space on board is at a premium. In addition, as the negotiations in the context of the recent proposal for the PRF Directive demonstrate, there is a significant risk that the obligation to set-up additional port reception facilities, in smaller or fisheries dependent fishing ports in particular, will lead to an increase of overall port fees.
- *Poor waste management infrastructure:* e.g. insufficient number of bins, or infrequent emptying (especially in tourism hotspots during high season), or, improper treatment of waste which then ends up as marine litter (for example, plastics released through storm overflow basins). Despite the potential value of some of the fishing gear, recycling is very limited and left to a few innovative operators. There is currently at EU level, no structured approach to setting up specific mechanisms or tackling the costs of dealing with fishing gear containing plastic once landed in port.

- *Consumer behaviour:* Consumer behaviour contributes to marine litter through the purchase of plastics (especially SUP), and the act of littering. For some plastic products, citizens have little knowledge whether they will end up as marine litter or whether they are made of plastic that will not bio-degrade in the environment. For example, most people who throw away a cigarette stub do not know that the filter is made of plastic (rather than paper), and people flushing a cotton bud down a toilet probably assume it will either degrade or be captured in the wastewater treatment. Fishers may be not fully aware of the long lifetime and lasting impact of gear lost at sea.
- *Potential harm of marine litter and associated slow disintegration of plastics:* Plastics is harmful for the environment, as discussed in Annex 3 (Sections 2.13 and 2.14 in particular). Biodegradation in the marine environment is particularly challenging. For the time being, there is no recognised method to test biodegradation of plastic in the extremely varied conditions of the coastal and marine environment.
- *Abandoned or discarded fishing gear:* Even though full implementation of existing rules such as MARPOL or the EU Control Regulation would imply that fishing gear should not be abandoned or discarded intentionally, there is evidence that this is happening at a significant scale, including because of lack of incentives to handle gear waste differently. This is mostly an issue of cost, of the burden of bringing broken gear back, and of retrieving lost gear. Given the near-impossibility of controlling whether gear is discarded or abandoned, improving on this issue is considered to be mostly a question of enhancing compliance through incentives and/or facilitation.
- *Accidental loss of fishing gear:* Gear conflict, adverse weather, vandalism and theft may result in loss of gear. Gear conflict is the contact of passing vessels with active or even passive gear. Re-locating gear at sea can be difficult because of damage by marine organisms, gear becoming snagged, removal of marker buoys and entanglement. Even though loss of fishing gear in good shape is a significant financial loss, which fishermen try to avoid, retrieving accidentally lost gear, whilst required by the EU Fisheries Control Regulation[60], may be perceived as too time and cost intensive.
- *Lack of standardised monitoring, retrieval and locating systems*. Fishermen from different flag states fish in the same waters. Information exchange and cooperation of authorities to effectively target and retrieve their lost gear is lacking. The European Maritime and Fisheries Fund promotes and supports the retrieval of lost gear, but not all countries take up this option in their operational programmes.
- *Fishing gear is expensive to recycle:* Fishing gear is often built-up material that needs to be dismantled before entering waste management or recycling. Resources are not made available for the dismantling, cleaning, and sorting needed before recycling. The few existing recycling facilities in, for example, Denmark, Lithuania and Slovenia, are running below capacity. The Icelandic and Norwegian experience with EPR-type and take-back schemes show that dedicated schemes can lead to fairly high recycling rates to the benefit of the economy in general and the fishing industry[61] in particular.

[60] Council Regulation (EC) No 1224/2009 of 20 November 2009
[61] Sverinsson (2017). Marine litter. The Icelandic approach to take back of fishing nets

2.2.3. Linking pathways and drivers to the top 10 SUP

A central issue is the understanding of the pathways and drivers for each of the ten SUP items. While it is not always easy to estimate exactly the pathway of each item of marine litter, we have a relative good general view.

- For items like cotton bud sticks, wet wipes and sanitary napkins, improper flushing is the main problem. Items that are improperly flushed could benefit from a targeted information campaign or a better information display on the product to explain consumers that these items should not be flushed and that if they are, they cause considerable harm to marine life.
- For items such as food containers, drink bottles, cutlery/straws, food containers and drink cups, poor waste management is the main pathway. A main driver is the on-the-go consumption of food product and the demand for more convenience.
- Cigarette butts are mostly littered due to uncivil behaviour. There are consumers, who might reduce their littering, if they know that butts are made of plastic.
- Balloons and balloon sticks are let floating in the open air, and land in nature.

Table 5. Drivers and Pathways for SUP items

Item	**Underlying drivers**						**Pathways**		
	Availability of plastic as cheap convenient option	Consumer trend for convenience	Market failure	Low levels of collection and recycling	Poor infrastructure	Consumer behaviour	Disposal in toilet and insufficient waste water treatment and sewage management	Littering	Poor waste management
Drinks bottles	++	++	++	++	+	+		++	++
Cigarette butts	++			+	+	++	+	++	
Cotton bud sticks		+		+	++	++	++		+
Crisps packets	++	++		+		++		++	
Sanitary applications	+			+	+	+	++	+	
Plastic Bags	+	++	+	+		++		++	+
Cutlery, straws & stirrers		++		+	+	++		++	++
Drinks cups & lids	+	++	+	+	+	++		++	+
Balloons & sticks	++			+		++		+	+
Food containers	+	++	+	+	+	++		+	++

Note: if there is a non-plastic alternative, then availability of plastic as cheap convenient option will be ranked low; market failure is scored highly if markets could play more of a part by reflecting the environmental damage; low levels of recycling is scored highly if recycling could play more of a part; poor infrastructure relates to whether if properly disposed of, it still finds its way on to beaches.
Source: based on JRC Technical Reports.

2.3. Who is affected, in what ways, and to what extent?

EU citizens: Citizens are affected by marine litter, in terms of unsustainable resource consumption and the pollution of marine environments that lead to death of marine life, loss of fish stocks, degradation of landscapes, contamination of the food chain and public health impacts. EU citizens also bear the costs of collection, treatment and cleaning up of waste. The public consultation, that received more than 1800 contributions, shows that marine litter is a significant concern. Recent Eurobarometer surveys found that 74% of European citizens are concerned about the impact on their health (74%) and on the environment (87%) of everyday products made of plastics.

Non-EU citizens: Marine litter from Europe or European producers affects citizens in countries outside the EU due to the cross-border nature of pollution and marine littering.

Fishing industry: The pollution of the sea affects the marine ecosystem and results in losses in fishing stocks, for example due to 'ghost fishing', which translates into a loss of 'raw material' for the fishing industry as well as loss of fishing time and extra costs due to damaged equipment and security and navigation hazards. Accumulation of plastics in the food chain could become detrimental to the image of the products of the seas. The lack of dedicated mechanisms across the EU to manage fishing gear waste mean that disposing of waste gear is seen as a burden for fishers rather than part of the normal lifecycle of a product, the burden of which is shared across all relevant parts of the value chain, from producer to end-user. The PRF Directive goes some way in tackling the problem, but on balance is likely, without additional measures, to lead to extra cost for fishers at least in some cases.

Public authorities are affected by the increased costs and administrative burden associated with littering (cleaning operations on roads, beaches, in cities, in the neighbourhood of fast food restaurants, etc.) as well as enforcement of prevention measures and treatment costs.

Tourism industry and local businesses: Littering incurs an aesthetic cost to society, which can affect local businesses, especially the coastal tourism industry as it makes beaches and marine environments less attractive recreational destinations. This may have dramatic consequences for territories basing their development on tourism, such as many EU islands.

Brands: As the issue of marine litter is of a significant concern for people, brands suffer from reputational damage when their products (including packaging) are found on beaches and in the aquatic environment. NGOs target specific brands through marine litter campaigns.

Plastics industry: The plastics industry image is damaged by marine litter, and the public opinion on plastics in general is becoming negative, which could affect (or at least dampen the increase in) demand for SUP and plastic products in general, exemplified by " no-plastic" campaigns, which reach a growing number of citizens. In absence of effective solutions, countries inside or outside the European Union are increasingly considering or even applying radical approaches often detrimental to the plastic industry.

Plastics recyclers: Marine litter represents a loss of valuable resources. These specific plastic items could have turned into secondary raw materials. It therefore affects the European plastic value chain, in particular recyclers due to the non- resource efficient approach for these specific plastic items. This is particularly noticeable in the fishing gear context, where

appropriate mechanisms to organise treatment and recycle or reuse of gear material are not frequent, which contributes to low recycling rates of what is often very high quality material.

2.4. Current policy framework

Marine litter has long been recognised as a problem. Over the years, a number of measures and obligations relating to marine litter have been integrated into the policy framework related to water and marine policy, to waste and product policy as well as to Common Fisheries. These policies target different pathways but are fragmented in terms of focus and ambition. They do not *specifically* target the ten most littered items and mostly contain only general measures. Consequently, they have not had the necessary impact on preventing or reducing marine litter. The recently adopted Plastics Strategy highlights the gaps in the current legal and policy framework to tackle marine litter. Annex 5 sets this out in more detail.

The Marine Strategy Framework Directive (MSFD) requires Member States to reach Good Environmental Status (GES) by 2020. Marine litter is one of the eleven descriptors for which, wherever feasible, 'threshold values' are developed. Member States have to provide Programmes of Measures to make sure that GES will be met on time. These programmes are broad as they tackle all pressures on marine waters. A first ongoing assessment shows that they provide a useful overview of the actions undertaken or planned, but that additional, more concrete actions are needed to reach Good Environmental Status. Given the propensity of litter, like other contaminants, to be carried by wind, currents and tide, the problem is transboundary in nature and co-operation between countries is necessary. Given that this does not happen on its own, EU action and support is needed to ensure a coherent and comprehensive approach.

Other legislation tackles specific pathways, such as the urban wastewater treatment directive (UWWTD) which is currently being evaluated and is relevant because some items (e.g. improperly flushed) might be captured or not depending on the organisation of the wastewater collection system and the level of treatment applied. One of the limitations of this Directive relates to the requirements on capture and treatment of the storm waters overflows, which would need to be re-considered.

Waste legislation has a role in ensuring waste is collected and treated. Ambitious recycling targets for municipal waste (65% by 2030) and plastic packaging waste (55% by 2030) will increase capture of plastic waste. However, whilst Member States will need to improve their collection systems to achieve those targets they can reach them without in depth efforts to prevent littering. Moreover, the provisions in the revised Packaging Directive on waste prevention are more general in nature, e.g. an obligation to "encourage" reuse of packaging. Fully applying and enforcing waste legislation will therefore not solve the problem, as there will still be littering and leakage of plastics into the environment. A more detailed assessment of the gaps in the existing legal framework can be found in Section 5.2.1.

So far, the only product-focussed legal instrument specifically tackling a SUP item, the Plastic Bags Directive, has been a success in reducing consumption of lightweight plastic carrier bags, while reducing related environmental impacts and stimulating reuse. Building on the success of this directive a similar, targeted, approach is now adopted for a wide range of other, specific single-use plastic products, which, like plastic bags, constitute the most littered items in the Union beaches. The measures identified in the Plastic Bags Directive (a

consumption reduction target and economic instruments) are part of the preferred option of this initiative. The preferred option goes beyond these measures for some products, where good substitutes exist, by fully restricting their market access.

All of the Top 10 SUP items share with plastic bags the characteristic that if not littered (generally on land with a proportion then being transported into the seas) or improperly disposed of through sewers (such as flushed down the toilet), they would not end up as marine litter. Anti-littering policies are well established, as is an anti-littering culture, but the evidence suggests that littering will continue and that there are limits to enforcement of anti-littering / improper flushing policies including behavioural policies to shift cultures.

As part of the Circular Economy Action Plan, an aspirational target to reduce marine litter by 30% was adopted by the Commission in 2015. This objective was subsequently endorsed by the Council, but it was not linked to specific measures and obligations.

Waste from fishing gear is regulated through a range of EU instruments; most of them are currently under revision in the legislative process. They tackle some of the problem drivers for abandoned and lost fishing gear but leave gaps in several respects. The following instruments apply:

- Proposed revision of the Port Reception Facilities Directive[62]. This sets out a number of measures to tackle marine littering caused by fishing gear:
    - Introducing a 100% indirect fee for garbage from ships, including derelict fishing gear, as well as passively fished waste, thereby reducing disincentives stemming from port fees to bring back fished up waste ashore. However, if the total amount of waste brought ashore increases, the charge to all fishing vessels will also increase, particularly in small fishing ports with few or no existing facilities. No compensation for potential increases in port fees due to the need to set up new or significantly extended port reception facilities is envisaged.
    - Requiring Member States to improve port reception facilities for waste from ships. However, the proposed Directive does not envisage setting-up separate fishing gear collection and treatment streams for recovery of valuable material used in fishing gear for recycling.
    - Finally, in the Commission's proposal it was underlined that "*additional measures for reducing lost or abandoned fishing gear are examined, such as extended producer responsibility and deposit-refund schemes for commonly littered fishing gear*"[63].

- The planned review of the Fisheries Control Regulation[64]:
    - Requires to mark gear (Article 8)[65], to carry retrieval equipment on board, to retrieve lost gear or to report its loss in case it cannot be retrieved (Article 48).

[62] COM(2018)33 final
[63] Explanatory memorandum, section 1
[64] REGULATION (EU) No 508/2014
[65] Detailed requirements are included in the Control Implementing Regulation

The planned revision will introduce daily electronic reporting for all vessels and remove the exemption of small vessels from the obligation to carry retrieval equipment; it does not deal with the port side aspects of returning gear, nor provide any incentives to improve on the rate of abandonment of gear itself.

- European Maritime and Fisheries Fund (EMFF)[66]
    - 2014-2020: 108 operations to support the removal of litter from the sea are included in authorities' operational programmes. Infrastructure improvements at ports and community led local development projects can also lead to more appropriate trreatment of marine litter although it is not possible to determine the level of funding envisaged. Post 2020: It is envisaged, in line with the Commission's Plastics Strategy, to make marine litter a funding priority under the new programming period, which could include support for the costs schemes to manage treat and recycle fishing gear material.

At the international level, the FAO voluntary Guidelines on the Marking of Fishing Gear adopted in February 2018 are expected to be endorsed in July 2018 and then implemented.

The recently adopted Plastics Strategy highlights the gaps in the current legal and policy framework to tackle marine litter and proposes targeted measures to improve the prevention, collection and recyclability of plastics, in particular, of plastic packaging. It also aims to develop a regulatory framework for plastics with biodegradable properties to prevent harm to ecosystems. It highlights the perspective of additional measures specifically on fishing gear. The European Chemicals Agency is preparing restriction dossiers for microplastic particles intentionally added to preparations, such as cosmetics, and the use of oxo-degradable plastics. Besides, the problem of micro-plastics for marine litter, the Strategy identifies single-use plastics as a specific problem for the marine environment.

Overall, there is a wide range of polices and instruments touching upon the issue of marine litter and plastics – reflecting the wide range of sources, means of release and pathways of marine litter. However, there is a gap between the problems identified, their drivers and the availability of legislative tools and measures that can effectively target the sources of marine litter. Existing legislation in its current form, even if fully implemented and enforced will not significantly reduce the harm caused by marine litter, and in particular does not target the most commonly found SUP items adequately. It also leaves a gap regarding the specific requirements related to fishing gear which could benefit from dedicated and well financed mechanisms supporting the needed specific waste and recycling streams.

In conclusion, the existing waste acquis is not sufficiently focused and detailed to deal with the issue of marine litter in a systemic way, prioritising prevention both in terms of items covered (currently only plastic bags are specifically targeted by qualitative and quantitative objectives) and the measures across the value chain (i.e. upstream measures implementing the polluter-pays principle through product design, extended producer responsibility and information tools versus downstream waste management). To cover the full range of most relevant single-use items and deal with them in a targeted way (including the upstream design

[66] REGULATION (EU) No 508/2014

part), specific EU level legislation is needed to focus the requirements of waste prevention, based on an item-by-item analysis and, where appropriate, addressing market access or consumption reduction, design features, labelling or specific EPR measures.

2.5. How will the problem evolve?

There is a baseline scenario in the form of Option 1, to quantify how the situation in relation to marine litter may develop if the EU decided to limit itself to implementing policies and instruments currently available. In this section, the focus is on the likely development of the underlying drivers.

- *Wide availability of plastic as a cheap and convenient option for single use applications:* Production of plastics and plastic packaging is forecasted to grow, and so are most of the SUP categories.
- *Consumer trend for convenience:* There is no evidence that the growth in the use of short-lived or disposable items at the expense of reusable alternatives will halt or even slowdown. On the contrary, demand for such items continues to grow.
- *Market fragmentation:* Other Member States will follow the recent examples of France, Italy and UK. Ireland and Portugal for instance are examining the use of economic instruments. When these limit the access to the market of some of the problematic products, it will lead to a fragmentation of the European market.
- *Market failure:* market incentives will increase with the use of Extended Producer Responsibility to reduce the percentage of plastic bottles not collected and recycled. Further financial incentives to reduce consumption of lightweight plastic bags may be put in place. However, those incentives will not capture the full externalities. Regarding fishing gear, requirements on separation of waste material streams on boards and at ports will improve adherence to the waste hierarchy but will not directly address the issues around end destination and incentivisation of compliance. They will also not address the specific costs of returning fishing gear waste, particularly for small ports and fishing operators. Nor will they promote the development of currently infrequent but needed specific waste management and recycling/re-use cycles supported by materials manufacturers.
- *Lack of public awareness and lack of market incentives*: the policies in place and in the pipeline should increase awareness of the impact of litter, but probably with limited results. E-reporting under the Fisheries Control Regulation may improve compliance with reporting requirements for lost gear, but not reduce the losses themselves. The revised Port Reception Facilities Directive removes a disincentive by stipulating that the fee for landed waste should not depend on the amount of waste delivered, but does not add specific incentives for fishers to land gear waste.
- *Poor waste management infrastructure:* infrastructure will improve over time to capture more recyclable waste avoiding landfill and incineration, but will not directly target marine littering. The lack of adequate and sufficient infrastructure for the collection of waste fishing gear will be mitigated through the revised Port Reception Facilities directive, but this is unlikely to eliminate all disincentives related to transporting cumbersome and heavy gear material onward from the ports. Recycling benefits from economies of scale. It works on a national scale as in Iceland but is not worthwhile for individual ports as happens at present. The measures related to port reception facilities will not impact similar issues related to inland waters, or aquaculture facilities not linked to commercial ports.

- *Consumer behaviour:* paradoxically, while there is considerable public pressure for marine litter to be tackled, there is relatively little sign of people's behaviour changing with regard to the purchase, use and inappropriate disposal of plastics.
- *Potential harm of marine litter and associated slow disintegration of plastics:* Plastics will remain harmful for the environment. While research and innovation are ongoing to make some plastics biodegradable in the marine, standard to verify just claims still need to be developed. Further, it is important to keep in mind that upstream measures, such as prevention, are often more effective and one should not to give the message to consumers that items can be littered.
- *Abandonment or discarding of gear:* If the legislative measures already proposed are adopted, unaltered, the current situation will improve to some extent with a reduction of the disincentive related to returning waste to port (in accordance with the PRF Directive) and, if they are monitored and enforced, with the strengthening of the obligations under the Fisheries Control Regulation. However, their impact will be limited if not complemented with action to reduce unnecessary costs for the sector.
- *Accidental loss of gear*: The main causes for loss of gear: Gear conflict, adverse weather, vandalism and theft that result in loss of gear will not disappear.
- *Lack of standardized monitoring, retrieval and locating systems.* Although the reporting obligations under control regulation have been strengthened, and vessels <12 m are now also required to carry retrieval equipment on board, no mechanism has been envisaged for monitoring gear abandonment or loss on the sea-basin scale that is necessary for retrieval.
- *Fishing gear expensive to recycle*: No changes are envisaged.

3. OBJECTIVES: WHAT IS TO BE ACHIEVED?

The **general objective** is to curb the negative economic, environmental and social impacts arising from plastic marine litter. More **specifically**, to:

- Limit plastic marine litter (found on the beach, the seabed and floating on the sea surface), and – if still littered – limit the negative economic, environmental and social impacts from (a) Single Use Plastics (SUP) placed on the market in Europe and (b) abandoned, lost and otherwise discarded fishing gear (ALDFG) from the European fishing sector;
- Tackle a common and transboundary problem in a coordinated and coherent way across the EU, enabling effective action at scale while complementing national measures;
- Ensure a continued proper functioning of the internal market by avoiding fragmentation of measures across Member States;
- Avoid disadvantages for small ports and fishing operators who might be disproportionately affected by the development of new PRFs and could benefit from additional measures supporting the development of specific waste and recycling streams for fishing gear, and from burden sharing mechanisms such as EPR that involve producers of gear materials in the management of the problem;
- Ensure a shared direction and framework to guide future actions and to support strategic innovation into materials, products, technologies and business models within the EU (i.e. “future-proofing”).

4. WHY SHOULD THE EU ACT?

4.1. Legal Base

EU competence stems from the articles of the Treaty on the Functioning of the European Union (TFEU) related to the protection of the environment (Article 192 (1) TFEU) and the internal market (Article 114 TFEU). The measures identified in the preferred option pursue the objectives: to prevent and reduce the environmental impacts; to define market restrictions and product requirements ensuring a proper functioning of the internal market with high environmental standards and avoiding fragmentation by national approaches.

Measures to reduce marine litter are already included in EU legislation through the Waste Framework Directive, the Marine Strategy Framework Directive, the Packaging and Packaging Waste Directive and the Fisheries Control Regulation under the EU Fisheries common policy and these acts are mainly based on environmental legal basis in Article 192 TFEU.

The CFP manages EU fisheries as a common policy. It should contribute to the protection of the marine environment, to the sustainable management of all commercially exploited species, and in particular to the achievement of good environmental status by 2020, as set out in Article 1(1) of Directive 2008/56/EC of the European Parliament and of the Council.

With respect to the environmental dimension, the EU's right to act stems from the fact that marine litter represents both a common *and* a transboundary challenge, with marine litter travelling considerable distances.

4.2. Necessity of EU action and EU added value

Marine litter is a transboundary issue. European policy would have a direct impact on marine litter in European seas, and beyond. Litter that starts in Europe can travel long distances and is found, for example, in the Arctic. Hence, European policy would tackle the European contribution to both the problem of marine litter in the EU and outside the EU. In addition, action at the European level legitimises the EU position as a global leader in ocean governance and may catalyse action in other countries and regions as in other international areas such as e.g. climate policy.

The public consultation indicated overwhelming support for action to tackle single use plastic marine litter, with 98.5% of respondents considering such action “necessary”, and 95% “necessary and urgent”. More than 70% of manufacturers and more than 80% of brands and recyclers considered action necessary and urgent.

While marine litter is a transboundary issue, current action by Member States is fragmented in terms of scope, focus as well as ambition. Most measures against marine litter are adopted in the framework of MSFD. In that context, the first measures reported by Member States in order to reach GES by 2030 address a variety of sources and types of marine litter, but they do not consistently address all major sources of marine litter and they are not coordinated among the neighbouring countries and within a marine region. These measures taken by Member States are of different level of intensity and intervention from product to product and from country to country.

The actions taken at Member State level have had some effect, but do not tackle the problem in a comprehensive and coordinated way. Current experiences in a good number of EU Member States indicate that without a more targeted EU-wide initiative on marine litter specifically focussing on the most littered items, EU wide impact is unlikely. Also, without such an initiative, EU-wide markets for alternative solutions with sufficient economies of scale will not develop. New national actions targeting a diverse list of products (such as Italy's ban on plastic cotton buds and French rules defining national biodegradability criteria for the marketing of plastic SUPs) cannot by themselves solve the problem.

There is a risk that further efforts at the national level will result in a scattered approach with each Member State taking action separately targeting different products in different ways. For some items (e.g. caps and lids), the problem of littering can be tackled through product design changes. In such cases there is a clear link to 'product policy' and market access in the internal market where a level playing field for businesses is important.

A more detailed analysis is contained in table 6 below as well as in Annex 3. The fragmentation of policies, measures and level of ambition in this area would lead to variable restrictions of market access (with a potential to favour national industries), barriers to the free circulation of goods and unfair competition, possibly linked to protective measures, between producers in different countries.

Many of these measures have not yet entered into force or had time to have full effect on the functioning of the internal market. As science and the public opinion are advancing, other Member States are planning to take action. This will add to the layer of complexity and variable geometry hence increasing the risk of creating uneven playing field for the economic operators.

It is a problem for the internal market even if, for example, cutlery is subject to marketing restrictions in one country but not in another. This is problematic because of the increasing complexity of supply chains, harmonised production for the whole or large parts of the European market, and the incredible complexity that could arise with 28 countries adopting different legal and policy approaches to diverse and different products (with inevitably multiple cases of bordering countries having different approaches). The degree of the fragmentation of national or even regional and local approaches will depend on these factors and the extent of variation among neighbouring countries in particular.

Table 6. Examples of existing measures regarding SUPs across EU Member states

Member State/ Country/Region	Measure	Item Addressed / Detail	Year
Belgium – Brussels Region	Ban	Ban of ultra-lightweight plastic bags	Sept. 2018
Denmark, Island of Samsø	Ban	All plastic bags	2018
France	Ban	Plastic cups, glasses, plates and cutlery. Includes plastic coffee cups (exception for home compostable ones and/or partly or fully made of bio-based plastics)	2020
France	Ban	Plastic cotton buds	2020
France	Ban	Ultra-lightweight plastic bags "produce bags" e.g. those used to pack fruit and vegetables, meat and fish. Compostable bags are exempt	2017
France	Ban	Oxo-fragmentable bags	2015

Member State/ Country/Region	Measure	Item Addressed / Detail	Year
Italy	Ban	Non-Biodegradable plastic cotton buds	2019
Italy	Ban	Ban on ultra-lightweight bags e.g. used to pack fruit, vegetables, meat and fish. Compostable (CEN 13432:2002) and bio-based (UNI CEN/TS 16640) bags of less than 50 microns are exempt	From 2016
Italy	Ban	Throwing cigarette buds into the environment	2016
Portugal	Ban / restriction	Budget law established a working group to propose actions to limit SUP in the framework of green taxation	Proposal by May 2018
Scotland	Ban	Plastic Cotton Buds – Proposal to introduce a ban will be put to public consultation	2018 (proposed)
Scotland	Ban	Investigating the potential for banning plastic straws	Proposed ban
Scotland	Ban	Single Use Plastics – Ensure plastic is reusable / recyclable by 2030	2030
Spain – Balearic Islands	Ban – Regional	All single use consumer plastics – items will have to become "easily recyclable" or switch to biodegradable alternatives	2020
Spain – Balearic Islands	Law – Regional	Wet wipes will be required to be clearly labelled as to prevent flushing	2020
Spain – Balearic Islands	Law - Regional	Law will address plastic bottles by requiring restaurants to provide tap water free of charge.	In discussion

Source: Eunomia (2018)

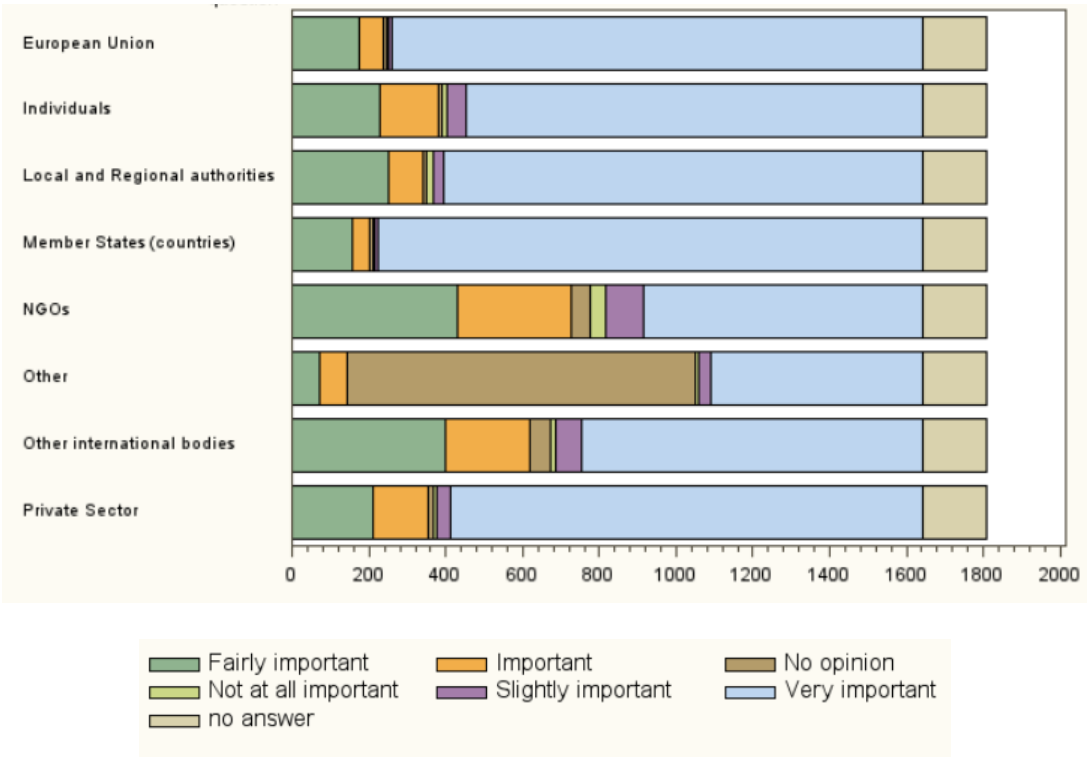
The public consultation, which is also relevant for national policy makers, has shown that action is considered desirable at all levels (Member States, the EU, local and regional authorities and the private sector, in that order, followed by individual responsibility).

The public consultation revealed strong support for action at EU level: 59% regarded an approach based on new EU measures as "very effective"; 54% regarded better enforcement of existing measures would be "very effective".

Only 2% of respondents believed that there should be no new measures at European level and 79% believed that not taking EU measures would mean ineffective measures. Also notable is that of those calling for European level action 36% specified this should be focused on maintaining a level playing field in respect of single market and competition rules.

A number of EU-level instruments deal with fishing gear. Complementing these instruments would be done most effectively by EU-level action ensuring a continued uniform approach. By way of example, the programmes of measures under the MSFD targeting fishing gear are being designed by Member States on an individual basis, where some of the proposed actions (e.g. EPR, recycling) would be better done on a common footing. A number of actions to tackle sea-based sources of marine litter are already taken at EU level (e.g. the Port Reception Facilities directive). The Common Fisheries Policy, whose objective is the conservation and management of marine biological resources, is implemented through EU legal instruments such as the Control Regulation. Any action to complement the existing legal framework at an EU level would maximise its added value. Conversely, action to complement the existing framework but taken at national or regional level would risk undermining the existing framework by distorting the "level playing field".

Figure 8. Public consultation – views on importance



In some cases[67], there are regional or national measures which aim to incentivise in particular fishers to bring back fished up waste and gear to shore by for example waiving port fees or waste fees. This can impact the competitiveness of fishing operations on the one hand, by providing an advantage to local fishers over their neighbours or jeopardise an otherwise positive measure by making it unsustainable because it would attract waste from non-local operators, resulting in disproportionate costs for the local ports or regional organisations. EU action in support of such mechanisms across the EU would level the playing field whilst improving the overall collection rate of fishing gear waste.

Similarly, the advantages of an indirect port fee system excluding separate charges for waste collection can be reduced in cases where the implementation of enhanced port reception facilities leads to a de facto increase in port costs, particularly in small ports and for small operators, notably in the fishing sector. Complementing the measures envisaged in the revised PRF Directive with action that minimises or eliminates the additional cost for ports and small scale operators as a result of envisaging extended producer responsibility for fishing gear containing plastic would strengthen the overall impact of EU level measures to reduce marine litter.

The added value of EU action would lie in providing a framework for more specific coordinated action that is effective and efficient in achieving the common goal to prevent and reduce the impact of marine litter in the EU. Action at EU level would:

[67] Denmark is one example, KIMO (North Sea) another

- avoid disruption in the free movement of goods in the Union market, which results from scattered measures at national level targeting different products or same products, but with different measures, as for example different product bans country by country
- provide a clear and strong signal to the product markets because EU action would increase the scale and viability of the proposed actions and that would help to create a wider market for the alternative products or business models and consequent positive impacts in, growth and jobs;
- reduce implementation costs for economic actors, in particular, by providing a harmonised, EU-wide framework for measures such as marketing bans and requirements and consumption reduction targets and by facilitating cross-border partnerships to save costs – for instance to deal with waste fishing gear;
- address the transboundary nature of marine litter and ensure a level playing field among the Member States and their economic operators' efforts in tackling marine litter;
- complement and reinforce existing EU legislation to effectively tackle the different drivers and pathways of marine litter in a more specific and targeted manner;
- facilitate the sharing of positive experiences and best practices.

Some measures (such as product bans, design requirements etc.) would be best established at EU level, whilst for other measures (such as reduction targets for products without sufficiently available substitutes or information campaigns) Member States should have freedom to choose among specific implementation methods, in line with the subsidiarity principle. This follows the approach of the Plastic Bags Directive (EU) 2015/720 that sets a clear common direction at EU level, but gives Member States some choice on the measures, including the use of economic instruments. The Directive has led to drastic cuts in lightweight plastic bags to the approval of citizens across Europe.

4.3. Consistency of these objectives with other EU policies

Given its focus on more efficient resource use and a more effective and circular plastics economy/value chain with better economic and environmental performances, the initiative is fully in line with the objectives of the Circular Economy policy. The Circular Economy is an integral part of the 10 priorities of the President, in particular the one on jobs, growth and investment.

The initiative aims at preserving the internal market from fragmentation, which is – by essence – one of the key objectives of the Union.

The initiative is fully consistent with the overall objectives of EU waste policy and the EU waste hierarchy according to which waste prevention should be given the highest priority. The initiative serves the objectives of the EU's Packaging and Packaging Waste Directive – environmental protection and preservation of the internal market. The initiative is also in line with the provisions of the soon to be amended Waste Framework Directive notably on the prevention objective to halt the generation of marine litter and to the requirement to take measures to combat all types of litter. While in line with all the waste acquis, the initiative goes one step further and addresses the gap in the current legislation which lacks specific provisions for the most harmful items from a marine littering perspective (besides microplastic for which separate action is already foreseen in the Plastics Strategy).

The initiative complements the measures against marine litter, undertaken by the Member States under the Marine Strategy Framework Directive (MSFD) and will support its effective implementation.

The stakeholder consultation on the initiative yielded strong support for additional action to incentivise the return of gear to shore and ensure compliance, and which supports the proposed initiative. In the response of the stakeholders to the question about the **selection of measures to help reduce lost and discarded fishing gear** with the most selected options:

1. Incentive to bring fished up litter and end-of-life gear ashore (88%)
2. Better collection and sorting facilities on vessels and at ports (70%)
3. Incentives/Funding of retrieval action (68%), and
4. Better enforcement of existing rules (67%)

Similarly, the public stakeholder consultation asked which additional targeted m**easures would support the bringing fishing gear back ashore**. Respondents favoured with 59% deposit return schemes levied on fishers and with 53% an extended producer responsibility scheme including a levy on gear.

The initiative complements existing measure at EU level that aim at tackling the problems related to ALDFG, by proposing measures that: provide additional incentives for the users of fishing gear to return gear waste to shore, enhancing compliance with the existing framework of rules; allowing for the development of schemes for the proper inclusion of fishing gear waste in waste management and recycling streams.

In doing so, the initiative will complement and reinforce the legal framework proposed by the Commission for the reception and management of waste from ships in ports (COM(2018)33 *legislative proposal for a new Directive on port reception facilities for the delivery of waste from ships*). This framework also includes requirements for providing cost recovery systems for this type of waste based on a 100% indirect fee for garbage (MARPOL Annex V).

Action under the objectives of the Common Fisheries Policy (CFP), including the requirement to implement an ecosystem approach to fisheries management that ensures that negative impacts on the marine ecosystems are minimised. It takes advantage of provisions under the EU's Common Fisheries Policy (CFP), in particular those of the Fisheries Control Regulation addressing ALDFG, and of the EMFF Regulation encouraging the involvement of fishermen in the reduction of marine litter. It complements the Technical and IUU Regulation where they do not provide provisions specifically targeting ALDFG.

Internationally, this initiative is consistent with the Communication on International Ocean Governance and the commitments taken in Malta at the Our Ocean Conference. This initiative is coherent with the 2017 Strategy "Towards the Outermost Regions". Finally, the initiative is consistent with the EU's international obligations in the area of trade policy, notably by ensuring equality of treatment for products produced in the EU and imported products.

5. POLICY OPTIONS

5.1. Options and products for detailed analysis

5.1.1. Options not analysed in detail

Recommendation: This would essentially reconfirm the current situation of an indicative non-binding target, as expressed in the 2015 Circular Economy Action Plan. A Recommendation by itself would therefore not bring any added value.

Sanctioning the loss and abandonment of fishing gear by reducing fishing quotas. This option would likely be counterproductive and almost impossible to control without disproportionate administrative and financial effort.

Voluntary recycling schemes by fisheries associations. Fishers take back to port end-of-life or broken gear and are compensated by recyclers for delivering clean, sorted plastics depending on the quality and type of material. Although in Iceland, such a scheme is running successfully - 70% of the retrieved gear can be recycled and 90% of it is sent for recycling to Lithuania – the variety and decentralised nature of EU fisheries precludes such a voluntary approach.

5.1.2. Prioritisation of sources of marine littering and products for further analysis

The prioritisation method aims to reflect the prevalence and environmental impact of different sources along with the existence of ongoing efforts to tackle them. Where such efforts are ongoing, there is little value-added in including them for further analysis. As such:

- **Microplastics intentionally added to a product** are excluded, as they are being assessed by ECHA through the preparation of a distinct restriction dossier under REACH. Similarly, **primary micro plastics coming from other sources** (tyres, textiles and plastic pellets) requires completely different policy answers and therefore are not covered in the analysis. These policy answers are detailed in the Plastics Strategy and will include a combination of standardisation, labelling, product requirements and actions along the whole value chain.
- **Litter emanating from sea-based sources** are partially covered by international obligations (in particular MARPOL Annex V) and at the EU level by the PRF Directive and its revision. There is scope for complementing that legislation, in particular, by targeting the specificities of fishing gear, which will be examined below. End-of-use recreational boats are an important source of sea-based litter – with only around 2,000 boats being dismantled of the 80,000 that annually reach the end of their lives and the remaining likely to be left abandoned will also not be covered here.
- **Non-plastic debris** is excluded – in many cases this does not persist, in other cases, it is mostly inert materials, and with relatively low environmental damage, (though it may be relatively visible).
- **Plastic bags:** Directive (EU) 2015/720 defines an obligation for Member States to take measures to reduce consumption of lightweight plastic carrier bags by defining a maximum consumption level (to be attained by end of 2019) and/or by requiring that such bags are provided to consumers at the point of sale free of charge (measures to be put in place by end of 2018). Member States have to report the annual consumption of lightweight plastic carrier bags as of May 2018. An overall picture of the effect of

the measures in the EU is not yet available but evidence from Member States such as Ireland that is already applying such a policy, show convincing results in the reduction of the use of plastic bags (90% reduction in just over one year) and of the presence of such bags in marine litter. New measures on plastic bags await an assessment by the European Commission on the effectiveness of current measures and on whether new measures are required for the reduction of "other plastic bags" by November 2021.

The focus is therefore on two areas that form the main sources of plastic marine litter that are either not addressed by existing legislation, or where relevant legislation does not include in its scope adequate measures:

- The Top 10 Single use Plastics (SUP), with this Top 10 making up 43% of total beach counts;
- Fishing gear (which makes up around 27% of total beach counts).

5.2. Description of the policy options

5.2.1. Option 1: "baseline scenario"

This option covers the current regulatory framework that includes measures and policies at EU level that have been recently adopted or proposed by the Commission. This option entails an increased focus in the existing legislation on items already covered today in separate collection schemes (e.g. packaging such as beverage bottles, bags) and on fishing gear. It also includes the general expected changes in consumption for single use plastics items.

The measures included in this option include:

- Measures on waste management, including those of the recently revised Waste Framework Directive and Packaging and Packaging Waste Directive (that will enter into force in 2020, when Member States will have to transpose these amendments):
  - The Packaging Directive, as amended, will re-focus the prevention objectives on re-use of packaging, however, the substantial obligation will merely require Member States to "encourage" the reuse of packaging. More ambitious and concrete measures in the Packaging Directive are envisaged only with regard to one SUP item - plastic bags. For other SUP items, due to the general nature of the prevention and reuse obligations and the flexibility for Member States to choose the measures, positive effects are much more uncertain. The review of the essential requirements for packaging for purpose to facilitate separate collection and recyclability in view of the circular economy objectives is already announced, for 2020, in the EU Plastics Strategy.
  - The Packaging Directive, as amended, will also establish higher recycling targets – 50% by 2025 and 55% by 2030 for plastic packaging[68]. This would require Member States to improve their separate collection in terms of both capture and quality of the collected material and divert that waste from landfill and incineration to recycling.

[68] Not to be confused with the reduction targets proposed in this Impact assessment for certain items.

However, the increase in recycling rates as such does not necessarily require in depth efforts to reduce littering or/ an extension or improvement of separate collection close to water bodies where the waste loads have large seasonal variations.

- The revised Packaging and Packaging Waste Directive requires all Member States to introduce extended producer responsibility (EPR) schemes for all packaging by 2025. However, non-packaging single-use plastic products are not covered by these schemes. Moreover, for plastic packaging single-use products this is unlikely to lead to reduced marine litter as in most Member States EPR schemes have already been in place for many years for household packaging, which represents half of the top 10 SUP items.
- The amendments to the Waste Framework Directive will set minimum requirements for EPR schemes. The requirements make it optional for Member States to require that EPR schemes contribute to waste prevention, including through prevention campaigns or clean-up of litter.
- The Waste Framework Directive contains new, general waste prevention objectives requiring Member States to take measures (a) aiming to halt the generation of marine litter as a contribution to UN SDG 14 to prevent and significantly reduce marine pollution of all kinds; (b) to take appropriate measures to prevent and reduce litter from products that are the main sources of littering notably in the marine environment; and (c) to organise information campaigns to raise awareness about waste prevention and littering. These measures ("that shall aim to") do not require Member States to achieve or demonstrate the attainment of the objective pursued and they leave significant flexibility with regard to the products that Member States may choose to target and the measures to do that, including through possible market restrictions. As described above this may lead to a fragmentation of the internal market.
- The Waste Framework Directive contains a requirement on Member States to revise their (a) waste prevention programmes to reflect the general objectives with respect to the prevention of (marine) litter and (b) waste management plans to provide for general measures to combat and prevent all forms of littering and to clean up all types of litter (not limited to land based litter). Member States will also be required to coordinate these plans and measures on litter with other plans and measures that they are required to adopt under international and EU water legislation to tackle litter in the aquatic environment[69]. It is not possible to calculate by how much the quantities of marine litter will be reduced exactly as a result of this obligation, in particular, because it is a more procedural requirement with no measurable outcome.

- The Marine Strategy Framework Directive (MSFD), Urban Waste Water Treatment Directive and Water Framework Directive:
  - Under the MSFD, Member States had to adopt measures to address marine litter by 2016. On the basis of the information contained in the programmes of measures submitted (in 2016) by the Member States, it is not possible to calculate by how much the quantities of marine litter will be reduced. The Commission's assessment of the measures shows that the most common type of measures reported by Member States include beach clean-ups and 'fishing for litter'. These are costly downstream measures, as opposed to upstream measures to improve waste management and prevention, and

[69] Regional Seas Conventions, Directive 2008/56/EC and Directive 2000/60/EC

that do not prevent the littering at source. Therefore, they only have a modest impact on reducing the pressure, although they do raise awareness. Targeted measures for beach litter, such as by limiting the proliferation of single-use plastics, or for the reduction of microplastics and of litter from aquaculture were largely absent in Member States' programmes of measures under the MSFD. Some Member States have taken measures to limit the use of certain plastics in view of its impact on the marine environment, but have not reported them as part of their programme of measures.

- The Urban Waste Water Treatment Directive provides minimum requirements for the infrastructure for the collection and treatment of urban waste water and quality criteria for the treatment. However, this Directive is not effective with respect to the requirements on capture and treatment of storm water overflows and concerning microplastics, which are not covered by the directive. This is in particular an issue for flushed items such as plastic cotton bud sticks and sanitary applications for which the pathway into the sea is through sewage systems. The Water Framework Directive requires Member States to adopt programmes of measures to achieve good ecological status (GES) of the water bodies but it does not specifically require action against marine litter or as criteria against which GES should be assessed. Improvements in its implementation should be expected as a result of the new requirement to coordinate these programmes with those under the MSFD and Waste Framework Directive.

- Port Reception Facilities Directive:
  - Introduces a 100% indirect fee for waste from ships, as well as passively fished waste, and includes fishing vessels and recreational craft in the indirect fee regime. This reduces some of the disincentive caused by specific waste fees to bring back fished up waste and gear ashore. However, there is no compensation for the inconvenience of sorting and storing the waste on board, some of which will not be from the vessel concerned.
  - Requires port reception facilities to effectively implement the waste hierarchy in the context of management of waste from ships, including the separate collection of waste from vessels in port in view of further reuse/recycling. That separate collection obligation does not, however, require separate collection of fishing gear. Also the obligation to collect and subsequently treat waste would thus fall on the ports and their fees for ships, including notably small-scale fishers, would increase, unless compensated by other sources such as extended producer responsibility schemes. The cost increase could be considerable notably in small fishing ports which currently have either no, or very small port reception facilities.
  - Dedicated enforcement regime for fishing vessels over 100 GT (minimum 20% inspection target)
  - The Commission's proposal for a revision of the Port Reception Facilities Directive was intended to be one of several measures contributing to the Commission's Circular Economy Strategy[70] and the Commission's Strategy on Plastic[71]. Accordingly, the Commission's proposal for a revision of the Port Reception Facilities states that: "*additional measures for reducing lost or abandoned fishing gear are examined, such*

[70] COM(2015)614 final
[71] COM (2018) 28 final

as extended producer responsibility and deposit-refund schemes for commonly littered fishing gear"[72].

- Fisheries Control Regulation:
  - Full implementation of the current requirements to mark gear (Article 8)[73] to carry retrieval equipment on board, to retrieve lost gear or to report its loss in case it cannot be retrieved (Article 48). A planned revision will introduce daily electronic reporting for all vessels and remove the exemption of small vessels from the obligation to carry retrieval equipment. However, this will increase costs for fishers without adding any positive incentive to bring more gear back to shore.
- European Maritime and Fisheries Fund (EMFF)
  - 2014-2020: includes operations targeting marine litter, including removal of litter from the sea, and infrastructure improvements at ports.
  - Post 2020: It is envisaged, in line with the Plastics Strategy, to make marine litter a funding priority under the new programming period.
- The UN Food and Agriculture Organisation voluntary Guidelines on the Marking of Fishing Gear adopted in February 2018 are expected to be endorsed in July 2018 and subsequently implemented.

Finally, the implementation of the actions included in the EU Plastics Strategy and the Communication on the interface between chemical, waste and product legislation are also relevant.

5.2.2. Set up of new EU level measures to reduce marine litter in options 2 and 3

Measures for SUP are proposed as part of option 2 and for fishing gear as part of option 3. The approach takes into account differences in design, material and chemical composition, use and pathways for littering between products.

For each product, there is a ladder of measures with the bottom of the ladder being the current amount of litter caused by a product. The baseline scenario in all cases already leads to a first step up the ladder, leading to an impact on the level of littering of each product. The subsequent steps of the ladder are determined by the policy measures that could lead to a reduction of littering: the more ambitious the measures, the bigger the reduction in littering. Different steps of the ladder may require different legal instruments to enable them.

For some products, the ladder can be climbed all the way to the top (in other words, if the product is banned, marine litter from EU sources would be completely stopped). For other products, the Impact Assessment will show that it is only possible or desirable to climb part of the way, for example, because there are no obvious suitable alternatives (such as currently for cigarettes, sanitary applications, balloons).

[72] Explanatory memorandum, section 1
[73] Detailed requirements are included in the Control Implementing Regulation

5.2.3. Sub-option 2a to 2d: Single use plastics

The analysis for single use plastics is undertaken on a product-by-product basis. Annex 6 goes through the analysis in detail, but the main steps are set out here and continue in Section 6.2.

Step 1: A range of measures was identified that could cover some or all of the different products. These are measures either taken by some regions or Member States or at the international level and / or identified in discussions with experts and stakeholders. They are in broadly increasing order of ambition:

- Information campaigns – to raise awareness and based upon using behavioural insights;
- Voluntary action – in the form of commitments or agreements with business and industry;
- Labels - the mandatory labelling of specific products to inform the consumers on the potential implications in terms of marine litter of unappropriated behaviour (e.g. such as "do not litter" or "do not flush");
- Extended producers responsibility (EPR) systems – for packaging EPR is already an existing obligation but it does not cover clean-up which would be added. For non-packaging, there is no existing EPR obligation, but the new measure would make the minimum requirements of the new waste legislation mandatory. In addition, it would add the responsibility to cover clean-up costs (see also sub-option 3a to 3b);
- Specific Requirements on Product Design, in particular tethering the cap to a bottle;
- Putting in place Deposit Return Systems for beverage containers (or equivalent measure);
- Reduction targets for specific single use plastic products, with Member States free to choose the measures to reach the target, for instance through a charge. These may make sense when alternatives exist in some contexts, but not for all. It would allow Member States freedom in terms of the policy measures they pursue;
- Bans of SUP items;
- Setting technical standards for Waste Water Treatment Works (WWTW) and Combined Sewer Overflows (CSOs): "best practices for WWTW".

Each measure pushes the substitution of single use products by shifting behaviour towards alternative use models, multi-use versions or a substitution of the plastic in the single use item. In this last case, plastics would be replaced by materials which biodegrade in the marine environment in a sufficiently short timeframe to avoid harm to human health and the environment, such as paper and wood which have not been treated with hazardous chemicals that can be released into the environment. Testing potentially biodegradable plastics would require an accepted scientific standard on marine biodegradability, currently lacking at EU level[74].

[74] Currently, few test methods for the assessment of the biodegradation of materials in the marine environment are available from ISO and ASTM. No European CEN test method has been developed so far. Marine biodegradability pre-normative research will be the focus of a H2020 SC2 2019 research topic.

The measures would trigger responses in the market. For example, there would be research and innovation into material and product substitution (plastics and other types) making the product more cost-effectively recyclable, biodegradable or harmless when littered.

The Stakeholder consultation confirmed the need for a range of measures adapted to different SUP products. An EU-wide prevention target was preferred. With respect to regulatory measures, such as bans, the importance of public support was highlighted. Discussions around the limitations of potential measures highlighted in particular that:

- There is limited evidence on the effectiveness of awareness raising campaigns, which are not sufficient as a standalone measure.
- Bans are a good way of enforcing the redesign of specific low-value items but can interfere with the operation of the single market if applied at (sub) national level.
- Charges were seen as a preventive measure, which can influence consumer behaviour; and generate a new stream of revenue. Industry representatives highlighted, and others agreed, that a legislative approach was needed to ensure broad application and a level playing field.
- Setting targets for reduction in consumption of specific items was generally seen as an appropriate measure for EU-level action.
- An alternative option is requiring that SUP are not given away free at the point of sale.

Reactions to the Impact Assessment Roadmap also argued that the diversity of SUPs mean that a differentiated approach is required depending on whether plastic marine litter is the result of items that can be profitably recycled, items for which more sustainable alternatives exist, or finally items for which there is no readily available alternative.

Step 2: The availability of alternatives to Single Use Plastic items was considered, ranging from alternative business models, multi-use products, single use non-plastic alternatives, or different consumer behaviour. Annex 3 includes a non-exhaustive list of the single and multi-use alternatives available for the different products, but for example:

- For some products, alternatives are available with lower environmental impact if the items were still littered, such as plastic cotton bud sticks moving to paper stemmed, or wood substitutes that would pose no inconvenience to consumers, while reducing the negative impact if littered.
- For other products, the preferred alternatives might be a mix of change in model, product and material. Therefore, reusable cutlery offers a clear alternative to single use and if reuse would be difficult, there should be a material substitution (e.g. untreated wood) and items should be recyclable, in line with the waste hierarchy.
- For some other products, the acceptability of the available alternatives is less clear, such as plant-derived cellulose filters for cigarettes (although the market share of these appears to be increasing).

This is important because items with good alternatives are the best candidates for demanding measures. For items for which the market for alternatives is still developing, then there is a need for measures to promote new business models and alternative materials. Meanwhile, for items for which legislation already exists (bottles) or without substitutes (cigarette butts…) then the best measures may be more soft measures such as awareness raising and producer's

responsibility to pay for clean-up. Table 6 below groups the items broadly by alternatives, but it should be noted that each has its own specificities and so this is only indicative.

Table 7. Product matrix according to availability of alternatives to SUP products

Items with none or difficult alternatives	Items with some alternatives	Items with clear alternatives
Cigarette butts Beverage bottles Crisp packets and sweet wrappers Sanitary towels Balloons	Food containers Cups Wet wipes	Cotton bud sticks Cutlery, straws and stirrers Balloon stick

Step 3: The feasibility of the measures was considered for each product. For example, for 'drinks bottles, caps and lids', feasible measures would include information campaigns, voluntary agreements, product design, a deposit return systems or equivalent measure for beverage containers and EPR to cover cost of littering. However, for 'drinks bottles, caps and lids', best practices for WWTW would not be feasible (they would have no effect as this is not a relevant pathway). Across the different products, around 80 to 90 measures are feasible.

Step 4: Four sub-options were generated. These involve choosing amongst the 80 to 90 feasible measures available and packaging them into four sub-options (a, b, c and d). Some comments on the way the sub-options are put together:

- The effectiveness is measured first by the decrease of litter and in particular marine litter. The choice between measures is based on the availability of alternatives, impact on convenience for the consumer, implementation feasibility and further reduction potential. This is relevant for the choice between reduction targets and bans.
- It does not make sense to present sub-options with the same measure or intensity for all products. For example, presenting a sub-option of a ban for all products would not reflect the availability of alternatives or the importance of different drivers for different products. Hence, the four sub-options include different measures for different products reflecting their alternatives, pathways and drivers;
- The criteria for going from sub-option 2a to 2b to 2c to 2d is that each steps involves increasing effectiveness towards the general objective of curbing the negative impacts arising from marine litter but also, in general, increasing implementation difficulty and or costs.
- Not all products have additional measures in each sub-option. For example, sub-option 2c reflects additional effort on wet wipes, cutlery, straws and stirrers and balloon sticks. For the other products, the measures are unchanged from 2b.
- This approach presents packages of measures, but of course, this is based on aggregating analysis of individual measures on individual products and there is scope to move measures between different sub-options. The underlying analysis is presented in Annex 6 (Tables 25 to 28) and allows for an individual measure for an individual product to be identified in isolation and moved between sub-options.

The table below presents in tabular form the different components of each sub-option.

Table 8.Option 2 Product-sub option matrix with modelled measures

Item	Sub option 2a	Sub option 2b	Sub option 2c	Sub option 2d
Cigarette butts	**Information campaigns** **Voluntary action**	Information campaigns Voluntary action **EPR-cost of litter**	Information campaigns Voluntary action EPR-cost of litter	Information campaigns Voluntary action EPR-cost of litter **Label** **Reduction target (30% by 2025, 50% by 2030)**
Drinks bottles	**Information campaigns** **Voluntary action**	Information campaigns Voluntary action **EPR-cost of litter** **Product design**	Information campaigns Voluntary action EPR-cost of litter Product design	Information campaigns Voluntary action EPR-cost of litter Product design **DRS for beverage containers**
Cotton bud sticks	**Information campaigns** **Voluntary action** **Label**	**Ban**	Ban	Ban
Crisp packets	**Information campaigns** **Voluntary action**	Information campaigns Voluntary action **EPR-cost of litter**	Information campaigns Voluntary action EPR-cost of litter	Information campaigns Voluntary action EPR-cost of litter
Wet wipes	**Information campaigns** **Voluntary action** **Label**	Information campaigns Voluntary action Label **EPR-cost of litter**	Information campaigns Voluntary action Label EPR-cost of litter **Reduction target (30% by 2025, 50% by 2030)**	**Best practices for WWTW**
Sanitary towels	**Information campaigns** **Voluntary action** **Label**	Information campaigns Voluntary action Label **EPR-cost of litter**	Information campaigns Voluntary action Label EPR-cost of litter	Information campaigns Voluntary action Label EPR-cost of litter **Reduction target (25% by 2030)**
Cutlery; Straws; Stirrers	**Information campaigns** **Voluntary action**	Information campaigns Voluntary action **EPR-cost of litter** **Reduction target (30% by 2025, 50% by 2030)**	**Ban**	Ban
Drinks cups & lids; Food containers	**Information campaigns** **Voluntary action**	Information campaigns Voluntary action **EPR-cost of litter** **Reduction target (30% by 2025, 50% by 2030)**	Information campaigns Voluntary action EPR-cost of litter Reduction target (30% by 2025, 50% by 2030)	Information campaigns Voluntary action EPR-cost of litter Reduction target (50% by 2025, 80% by 2030)
Balloons	**Information campaigns** **Voluntary action** **Label**	Information campaigns Voluntary action Label **EPR-cost of litter**	Information campaigns Voluntary action Label EPR-cost of litter	Information campaigns Voluntary action Label EPR-cost of litter
Balloon sticks	**Information campaigns** **Voluntary action** **Label**	Information campaigns Voluntary action Label **EPR-cost of litter**	**Ban**	Ban

Additional measures compared to the sub-option on the left are written in **bold**:

- All measures in 2a are in bold because they are not in the baseline. To follow an example, for cigarette butts, in 2b EPR for the cost of litter is added, 2c is the same as 2b for this product and then 2d includes labels and a reduction target.
- When a ban is introduced, then there is no need for labels, information campaigns etc.

Sub-option 2a

The first sub-option is relatively cheap and straightforward to implement, but has a low effectiveness with regard to curbing the negative impacts arising from marine litter, especially against the baseline option. Broadly, there are two groups of measures:

- information campaigns and voluntary actions for all SUP in scope,
- measures related to labelling of improperly flushed items: cotton bud sticks, wet wipes and sanitary towels (the main driver for marine litter for these items, is that they are flushed, while they should not). This labelling would inform the consumers on the potential implications in terms of marine litter of for example flushing. Labelling would also apply to balloons (informing consumers not to let fly balloons in the open air as they potentially harm nature).

The public consultation revealed scepticism about the effectiveness of awareness and labelling measures alone, with only 30% of respondents believing that these would be "very effective", although higher levels were registered from some sectors, notably plastics converters (63%) and manufacturers (58%). Similarly, voluntary actions by business were considered "very effective" by only 29% of respondents, again with some variations, for example with fewer plastics converters and manufacturers finding them very effective (20% and 19% respectively), but more retailers and food outlets (41% and 50%) considered voluntary actions very effective.

Sub-option 2b

The second sub-option is more effective, while becoming more challenging to implement (bringing with it more costs and burden for those affected). It includes the same measures as the first sub-option, and in addition:

- A ban of plastic cotton bud sticks, where there is a very clear alternative. This also means that information campaigns etc. are dropped for this product).
- EPR to contribute to the cost of cleaning up litter for SUP that are either frequently littered (cigarette butts, drinks bottles, crisp packets and sweet wrappers, straws, stirrers, drinks cups and lids, food containers, balloons) or flushed when they should not be and then end up in the sea (wet wipes, sanitary towels);
- Product design measures for drink bottles related to tethered caps;
- Reduction targets for single use plastic products where there are alternatives on the market and/or behaviour could change (cutlery, straws, stirrers, drinks cups and lids, and food containers: 30% by 2025 and 50% by 2030). Member States will be obliged to introduce national reduction targets, i.e. legally binding reductions in consumption from a base year, or other measures that would obtain the same result, such as levies, deposit refund systems, nudging policies (behavioural response policies) etc., which makes this approach similar to that in the Plastic Bags Directive.

Sub-option 2b implies an increasing trade-off between being ambitious in terms of expected impact (see Annex 6) and being feasible to implement, e.g. alternatives are already on the market, or Member States have sufficient control on how to tailor measures to local conditions (subsidiarity principle).

In the public consultation 44% of respondents considered legislative requirements to use alternative materials as "most appropriate (effective, proportionate, economically efficient and socially acceptable)", an option amounting effectively to a ban on plastic versions of this product. About 40% considered extended producer responsibility schemes as appropriate for such items.

Respondents to the public consultation overwhelmingly favoured the use of EPR schemes to cover the costs of cleaning up litter, with 91% considering that cigarette companies should contribute financially to clearing up of cigarette butts in this way, and 6% against (20% of those in the "manufacturers" category were against). 79% believed that producers of sanitary items should contribute to cleaning up costs of sanitary towels, with 11% against. For bottles, 33% of respondents expressed support for reduction targets and 20% for design requirements. These responses were on an "either-or" basis for first preference, and it is not clear how many would opt for design measures in addition to their first preference.

With regard to products where there are alternatives on the market and/or behaviour could change, the public consultation indicated support for a mix of measures, with some variations depending on category of respondent.

Table 9. Public consultation – views on responses by stakeholder group

CUTLERY	Legislative requirements for substitute materials	Minimum Design Requirements	Reduction Target for Use
All respondents	**42%**	**14%**	**34%**
Food outlets & restaurants	71%	14%	29%
Retailers	51%	27%	32%
Waste collectors	56%	26%	41%
Importers	54%	31%	8%
Brands	18%	18%	27%
Manufacturers	34%	33%	17%
Plastics converters	41%	39%	17%
Recyclers	62%	28%	23%
R&D	57%	18%	45%
Tourism	55%	18%	39%
Wholesalers	25%	50%	8%

For other products for which there are alternatives on the market, the overall balance of appropriate measures was similar, but legislative measures for substitute materials were considered slightly more pertinent in relation to caps & lids and food containers.

Table 10. Public consultation – views on responses by products

	Legislative requirements for substitute materials	Minimum Design Requirements	Reduction Target for Use
Straws & Stirrers	42%	14%	34%
Cups	42%	14%	35%
Caps & Lids	45%	17%	28%
Food Containers	47%	17%	27%

Breaking down the reduction target to look at how Member States might achieve reductions, there was a fairly balanced split between measures. For example, in respect of single use

drinks cups, 34% of respondents expressed a preference for direct measures such as restrictions or charges, 31% preferred use of incentives (such as price reductions) for consumers bringing reusable cups onto premises, and 30% felt preferred awareness raising measures.

Sub-option 2c

The third sub-option would have a higher effectiveness still. It includes the same measures as the second sub-option and includes in addition:

- reduction targets for wet wipes, which was not included in sub-option 2b as the alternatives are less clear: 30% by 2025 and 50% by 2030;
- bans for a group of single use plastic items, where there are alternatives on the market: cutlery, straws and stirrers, balloon sticks (meaning other measures related to these products are no longer needed);

The public consultation showed strong support (93% of respondents) for policies to phase out disposable non-biodegradable plastic tableware (such as cups, plates, cutlery and stirrers) in favour of reusable alternatives or those made with more biodegradable materials. However, about 50% of plastics converters were against such actions.

Sub-option 2d

This sub-option has the highest effectiveness in terms of reducing marine litter but would be the most challenging and costly to implement. It includes the same measures as sub-option 2c (unless these became redundant, e.g. in case of a ban). The measures, which reflect differences in alternatives and feasibility across products, include:

- Best practices for waste water treatment: for wet wipes, as the pathways are the key issue and there is no easy alternative. This would require a longer time horizon and large investments, which EPR could not cover. Investing in improving the wastewater infrastructure makes sense for several reasons – i.e. to further reduce the release of the 'classical' organic pollutants. Better capturing wet wipes would be a positive consequence, but probably not a sufficient argument for these additional investments.
- Deposit refund system (DRS) or equivalent measure[75] for beverage containers. The added value may vary between Member States. A DRS for beverage containers is implemented in some Member States (resulting in increased collection rate and reduced littering), but faces opposition driven by a (sometimes real, sometimes perceived) cost argument. While there is public support for DRS (see Open Public Consultation), in countries where EPR schemes are well established, the added value of DRS systems might be limited. Discussions ongoing in several Member States show that the industry (producers of products) is generally not in favour, because it might require investments in new infrastructure in addition to their responsibility to

[75] Experience shows that DRS systems are able to reach high levels rates of capture of bottles placed on the market. Equivalent systems could also be set up for instance in combination or in complement to existing EPR systems targeting similar capture rates.

set up and maintain existing separate collection systems that target similar and other waste.
- EPR to cover the full cost of littering crisp packets, sweet and wrappers;
- Reduction targets for sensitive SUP, from a public opinion perspective: sanitary towels (25% by 2030), and cigarette filters (50% by 2025, 80% by 2030).
- Higher reduction targets for drinks cups and lids, and food containers (50% by 2025, 80% by 2030) compared to sub-options 2b and 2c (30% by 2025, 50% by 2030).

The public consultation showed 47% of respondents were in favour of deposit return schemes (with brands, importers and manufacturers less enthusiastic). 77% of respondents stated they would be prepared to pay a small charge on plastic bottles, to be refunded on return, with a further 7% saying that this was already the case in their country.

5.2.4. Sub-option 3a to 3b Fishing gear

Actions already underway or planned as part of the baseline scenario will already reduce the amount and inflow of plastic from fishing gear in the sea. However, whilst reducing some financial disincentives for fishermen to return their damaged, end-of-life or fished up gear to ports, there would still be no incentives for actions that mean extra work for them in terms of sorting or storing waste fishing gear on board other than ad-hoc actions organised by local authorities.

In addition, increases in port fees due to the need for additional waste management facilities, such as for separate collection and sorting in PRFs would result in cost increases for fishers notably in small fishing ports which currently have either no, or very small PRFs. This is already being flagged as a potential issue in the on-going negotiations on the revised PRF Directive. Nor would there be specific incentives for organising dedicated waste and recycling stream for fishing gear once returned to port, mechanisms to share best practice and increase efficiency of retrieval operations[76] or development of more environmentally-friendly gear. Finally, current measures address the return to ports only, but do not address the overall aspects of treating waste fishing gear outside the context of port reception facilities, such as in aquaculture installations.

5.2.4.1. Extended Producer Responsibility

Extended Producer Responsibility (EPR) is a policy approach under which producers are responsible for the separate collection and subsequent transportation and treatment of products at the end of their life. It allows environmental costs, including costs of waste gear recovery and recycling, to be internalised by "polluters". Establishing an extended producer responsibility scheme could be a mechanism to support improved waste management services for fishing gear waste, including separate collection, sorting and cleaning, recycling, education and awareness, research and possibly even facilitate retrieval operations for lost fishing gear. This would be an additional measure to financially support the appropriate return, separate collection and subsequent treatment of waste fishing gear. This would reduce the cost for ports of management of waste gear returned to port and consequently would have

[76] Active fishing for litter operations.

a softening impact on any potential increases of port fees affecting the fishing sector as a result of the revised PRF Directive. In doing so, it enables full realisation of the expected positive impact of the revised PRF Directive on increasing the returning of fishing gear. It also involves fishers and fishing gear producers in taking full responsibility for the environmental impact of their gear whilst ensuring fair distribution of costs.

Although no EPR schemes yet exist for plastics used in the fisheries and aquaculture sectors, within the framework of marine environmental law there are compensation schemes (i.e. Civil liability and Fund Conventions regulating compensation for oil pollution damage caused by tankers). These schemes also include subsidiary or 'top-up' liability for cases where the actual polluter is not known (such as the oil industry's IOPC Funds, 2018). EPR schemes may shift consumption away from harmful products or discourage the use and/or abandonment of plastic components of fishing gear, which are easily damaged during use, e.g. plastic dolly rope, and polystyrene floats and buoys not sealed in a protective cover.

Despite EPR being, in theory, an individual obligation, in practice producers and manufacturers often exert this responsibility collectively, including in how fees are set, modulated, and passed on to users. In cases where the product market is competitive, fees are often absorbed by the producers rather than passed on wholesale to users. In collective schemes, a Producer Responsibility Organisation (PRO) is set up, either by producers or through legislation, to implement the EPR principle on behalf of all the adhering companies (the obligated industry). It then becomes responsible for meeting the recovery and recycling obligations of the individual producers.

The responsibility of the producer could include:

- handling the waste stream. The producers are responsible for the separate collection of the material from the port and transporting it for treatment (recycling, incineration or landfilling) and related monitoring obligations under the applicable waste legislation. It would operate in a similar way to the Icelandic Recycling Fund[77] (Úrvinnslusjóður) which is funded by a levy on imported goods or local production.
- a deposit scheme. The producers are responsible for administering and financing a scheme whereby fishermen are paid for the return of end-of-life, damaged gear or fragments of gear. In order to reduce administrative costs, the amount returned would not distinguish between different gears or plastics but rather be determined by the weight of litter returned with the sole proviso that it be fishing gear. The deposit would be included in the price of gear. A scheme in Korea whereby fishers are paid for gear returned to port is reported to be "highly effective in terms of recovery and disposal of gear"[78].
- achieving a target for recycling of fishing gear.
- the organisation of retrieval operations. This would include maintenance of a database of lost gear and retrieval operations including their cost, duration and success rate which would guide subsequent retrieval operations.

[77] Gudlaugur Sverrisson, Icelandic Recycling Fund Marine litter – The Icelandic approach to take back of discarded fishing nets, presentation in Brussels, July 2017

[78] Macfadyen et al, 2009 Abandoned, lost or otherwise discarded fishing gear, UNEP

5.2.4.2. Product design and distribution

This would include a potential ban or levy on materials susceptible to loss and/or difficult to recycle and substitution of plastic products in fisheries such as plastic feedbags in aquaculture or polystyrene fish boxes. This measure would achieve a phase-out or reduction in consumption of the use of materials that are difficult to recycle (e.g. combination cordage i.e. that made of mixed materials) or susceptible to loss and/or abrasion (e.g. dolly rope). It could be particularly appropriate for fish aggregating devices (FAD) which float and drift with currents and are difficult to locate and recover. The particular challenge of biodegradability may apply to a lesser extent as the conditions under which the material should operate and degrade are known.

5.2.4.3. The options

These measures can be grouped into three options that are not mutually exclusive.

Option 3a Extended Producer Responsibility for handling waste stream

Option 3b Extended Producer Responsibility including deposit on fishing gear
Extended Producer Responsibility with a recycling target

Option 3c Extended Producer Responsibility for coordinating retrieval

6. ANALYSIS OF IMPACTS

6.1. Types of impacts

Environmental impacts

Estimates are provided for the main environmental benefit, by looking at the **reduction in plastic marine littering rates**. Reductions in marine littering from SUP will often be associated with reductions in terrestrial littering and lead to changes in production, and improved waste prevention. This leads to changes in **greenhouse gas emissions**.

The focus on reducing plastic marine litter could have unintended consequences (are you switching to something that causes different problems?). **Life Cycle Analysis (LCA)** was undertaken to compare the environmental impacts of the alternatives to SUP, both non-plastic single use and multi-use items. The main parameters show a decrease in impacts, though for some options, there might be a minor increase in land use due to a switch to paper and wood.

Monetised estimates of the environmental impacts are provided where possible but need to be treated with caution. In particular, direct comparisons between the figures used for fishing gear and SUP should not be made given the different methodologies and assumptions used.

Economic and social impacts

Measures to reduce the littering of single use plastic, especially regulatory measures, will entail some **compliance costs**, falling both on the public and on the private sector, and perhaps being passed on to consumers, to ensure implementation and enforcement. The extent will depend on the choice and the exact design of the measures to be implemented[79].

6.2. Analysis of Single Use Plastic Sub-options

6.2.1. Approach

Single use plastics is analysed on a product-by-product basis. While section 5 went through the four steps related to building sub-options, section 6 examines how they were analysed.

Step 5: The model was populated with baseline data covering baseline growth rates for consumption of the different products, recycling assumptions, littering rates etc. For the SUPs considered here, the total tonnage of items ending up as litter is 270,174 tonnes, while the tonnage of items flushed sums to 41,896 tonnes. Of this 312,070 tonnes of items, the amount then entering the marine environment is calculated to be around 15,604 tonnes of SUP in the baseline option (option 1). Less than 5% of plastic land litter ends up as plastic marine litter.

The model is an adapted waste model. Some mass flow aspect, e.g. and in average on littering, were used for the modelling work under the Plastics Strategy. This was built upon for the different products, as waste models do not normally model down to such a specific product level as e.g. stirrers. Baseline projections reflect trend analysis and the impact of recycling and landfill target rates specified in EU legislation. Many of the waste management related impacts, including externalities, were taken from the European Environment Agency's 'European Reference Model on Municipal Waste Management', which has been developed over the last 10 years, and thoroughly tested. This was complemented by further LCA studies of the different products and possible alternatives.

Step 6: Modelling assumptions were made about the costs and impacts of different measures. This involved an examination of a 'ladder' for each product (see Annex 6). This allows for estimation of impacts throughout the economy. Important assumptions for SUP are how different measures affect littering rates, consumption rates (and the split between SUP and alternatives both multi use and non-plastic). This needs to reflect the impact of different measures on the different pathways and underlying drivers. In addition, the costs to different actors needs to be estimated for each of the different measures. These assumptions are based on literature review and past experience. Changing them would not change significantly the conclusions of the assessment.

[79] In Ireland, where measures to reduce single-use plastic bags have been successful, charges are paid into an environment fund. Annual revenues have risen to €23.4m in 2009. Collection and associated administration costs are low, at about 3% of revenues. The remainder of the revenues are used to support environmental programmes, such as recycling centres and cleaning up illegal landfill sites.

Step 7: The different measures were modelled and results presented for the four sub-options. Each of these sub-options results in different environmental, economic and social impacts, which are modelled compared to the baseline scenario.

6.2.2. Results of the environmental analysis

Sub-option 2d leads to the largest reduction in plastic marine litter. Reduction estimates were first made by weight (tonnes) and then translated into items by count.

Table 11. Percentage reduction for Top 10 SUP compared to the baseline (by weight & count)

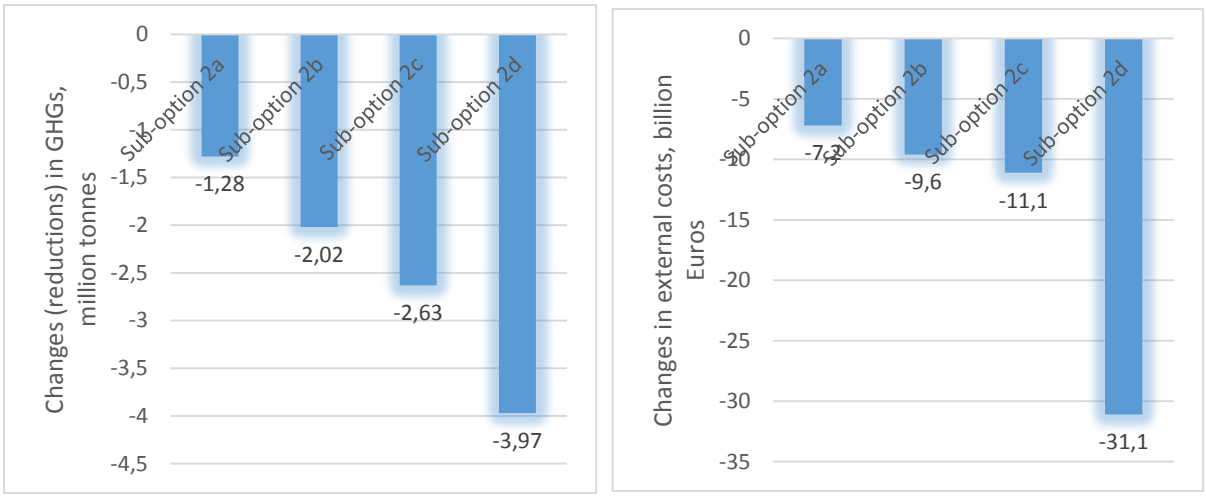
	By weight	**By count**
Sub-option 2a	21%	**16%**
Sub-option 2b	32%	**50%**
Sub-option 2c	35%	**56%**
Sub-option 2d	82%	**74%**

Table 12. Percentage reduction by count and by item (millions of items)

Item	**Marine litter, millions of items, predicted in 2030**	**Scenario 2a**	**Scenario 2b**	**Scenario 2c**	**Scenario 2d**
Cigarette filters	4,778	-693	-2,628	-2,628	-3,703
Wet wipes	775	-112	-112	-112	-388
Straws	372	-102	-330	-372	-372
Cotton buds	95	-12	-62	-62	-62
Drinks bottles	182	-34	-23	-157	-157
Sanitary towels	252	-30	-37	-37	-90
Drinks cups and lids	146	-27	-113	-113	-132
Crisp packets	74	-11	-41	-41	-41
Food containers	64	-18	-50	-50	-58
Cutlery	18	-5	-14	-18	-18
Stirrers	20	-5	-18	-20	-20
Grand Total	**6,776**	**-1,049**	**-3,426**	**-3,609**	**-5,041**

Estimates of external costs are provided. These are significant with, for example, sub-option 2c having reduced costs (benefits) of €11.1 billion Euros in 2030 (these calculations use monetised estimates of disamenity from litter in particular and are only partly financial benefits).

Figure 9. Environmental impacts a) Changes in GHG Emission (million tonnes CO2 equivalent); b) changes in external costs, €billion



6.2.3. Results of the economic analysis

Half of global plastics production is located in Asia and 19% in Europe. Analysis suggests that most single use plastic items are produced outside Europe. In the context of generally buoyant and increasing demand for plastic products, producers (plastics converters) are likely to be negatively affected by any reduction in demand for single use products but they have an opportunity to redirect production to reusable and recyclable items.

There is no detailed information on what proportion of the products put on the market by EU and non-EU plastics converters is composed of the items identified as most likely to be littered, and so it is difficult to see how impacts fall in or outside the EU. The sector is expanding, so the possibilities to divert from production of low-value disposable SUP products to other markets are therefore clear. Higher value products for construction, insulation, agriculture, automotive, telecommunications and electronics industries tend to be made with other types of plastic (PE, PVC, PUR, PS and others) which account for more than 70% of EU demand from plastics converters.

Trade figures suggest that Asia accounts for about 57% of global exports of disposable plastic tableware, compared to just over 25% for the EU, with Asia the primary source of most SUP items. Table 11 provides an overview of production sources for SUP. There is less information on where the production of multi-use plastics and, especially, non-plastic alternatives will come from but there could be future opportunities for EU markets (see Annex 6). For the alternative materials for single use items, innovations and solutions could come from the bio-economy.

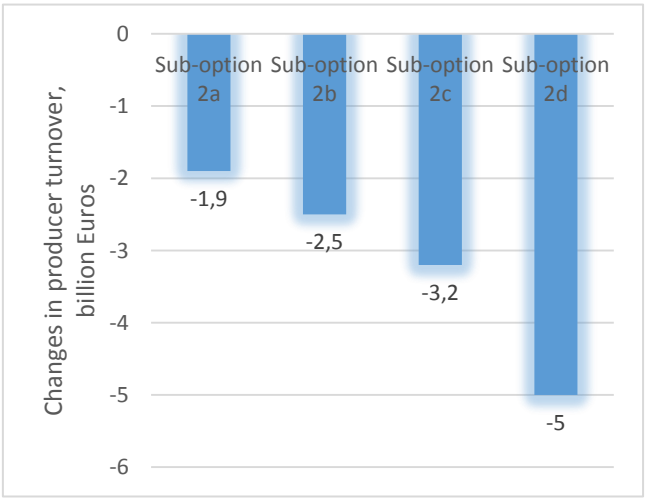
Table 13. Production sources for SUP

Item	Production scenario
Cigarette filters	Acetate tow is produced by five main companies, based in the US, Japan and Germany. It is undetermined where cigarettes are principally produced.
Drinks bottles	Drinks bottles are mainly produced and filled at factories within the EU.
Cotton buds	Europe is a net importer of cotton buds. Countries in the Asia-Pacific region (specifically China, India, Taiwan and the Philippines) and the US are the major

Item	Production scenario
	manufacturers of cotton buds, due to labour costs and/or the availability of cotton.
Crisps / sweets	Flexible packaging is produced in rolls that are used in product manufacturing plants to make crisps packets and sweet wrappers. The original flexible material is mainly produced in the EU.
Wet wipes	The majority of nonwoven wipes used in the EU are produced in the geographical region of Europe. The report includes Turkey within this region, who is a major producer of nonwoven wipes for Europe, so further analysis is needed to determine whether wet wipes production is centred within the EU or the non-EU geographical region.
Sanitary towels	The European geographical region is a net exporter of hygiene products such as sanitary towels.
Cutlery	These items are predominantly and increasingly imported from the Asia-Pacific region into Europe. For example, Huhtamaki, one of the principal food service packaging businesses in Europe, owns 14 manufacturing centres in India. An internet search for suppliers of plastic stirrers by location reveals 127 suppliers located in the EU, compared with 214,112 in China, 4,982 in Honk Kong and 1025 in Vietnam. Industry estimates on balloon sticks suggest that more than 50% come from China, but that between 50 and 75% of balloons on the EU market (total market of about €540m p.a.) are manufactured in the EU.
Straws	
Stirrers	
Drinks cups	
Drinks cup lids	
Food containers	
Balloon sticks	

Overall, producers' turnover would fall under option 2 relative to option 1, but not significantly compared to the market size; and, much of this production takes place outside the EU.

Figure 10. Producer Turnover (2030), € billion (2018 prices)



For food and drink related items (food containers, cups and cup lids, cutlery, straws and stirrers), the food service (HoReCa) industry and retailers pay for the single use plastic items that they provide to customers 'free of charge'. Although the cost might not be evident to customers, the consumer will normally cover it in the overall price. With a shift to reusable items, a single upfront purchase by the retailer will avoid future regular costs of purchasing the single use items, and thus may lead to a saving.

There will be a cost to providing reusable items for consumption on site, but savings from not providing single use items. The balance of the costs and savings will vary for different

retailers and determine whether a switch away from SUP can 'pay for itself' over time. However, the shift to non-plastic single use alternatives may lead to an increase in costs to retailers if these are more expensive, and if they do not to pass these costs on to consumers.

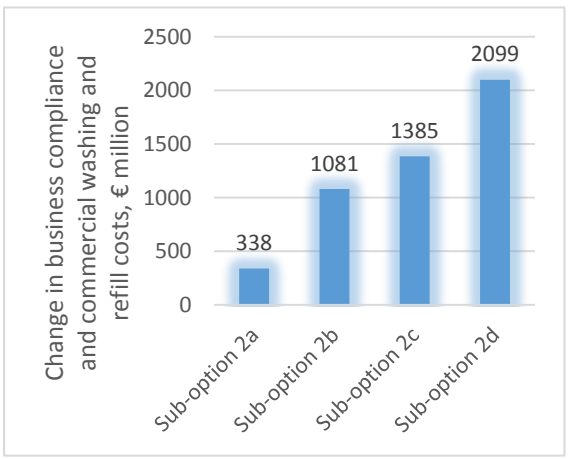
For other single use items such as wet wipes, sanitary towels, and cotton buds, that retailers sell on directly to customers (rather than use to contain the food or drink they are selling), the impacts will vary based on the difference between the wholesale price and the retail price of the non-plastic single use alternative. Where retailers sell multi-use alternatives, while the number of sales will be lower, the effect on profits will depend on the per item margin that the retailer makes versus the margin on the current single use plastic items.

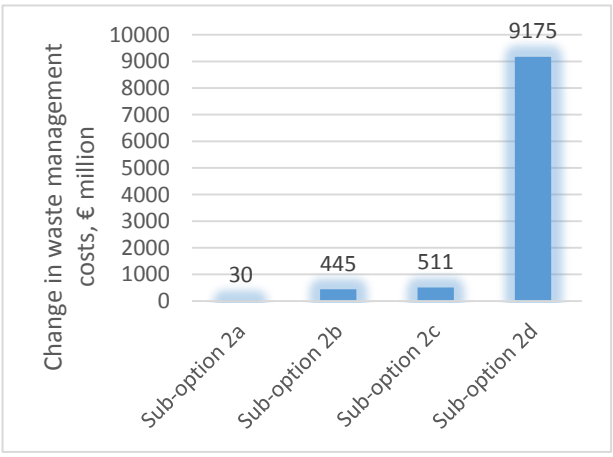
For retailers engaged in a deposit refund scheme, there will be costs to operating refill schemes, or from washing items. However, these costs may be compensated through the receipt of handling fees for every used beverage container returned.

Waste prevention will lead to some savings of waste treatment for public authorities (where public authorities cover such costs). Reduced levels of litter also mean reduced costs of litter collection and management. Recycling costs generally fall, but are forecast to increase under some measures, such as where DRS for beverage containers is introduced. Overall, costs increase across the scenarios, and are much higher for scenario 2d because of the assumption that screens are fitted as best practice for WWTW.

The figures below show a) the costs for businesses of complying and the cost of washing and refill schemes (not shown are information campaign costs, that may be paid for by Member States or business) and b) the change in waste management costs (including sewerage treatment). These are partial estimates – other businesses will benefit from production of alternatives, and there will be direct savings that offset (partially or fully) some of the costs.

Figure 11. a) Business compliance and commercial washing and refill costs, € million (2018 prices) b) Waste management costs, € million (2018 prices)



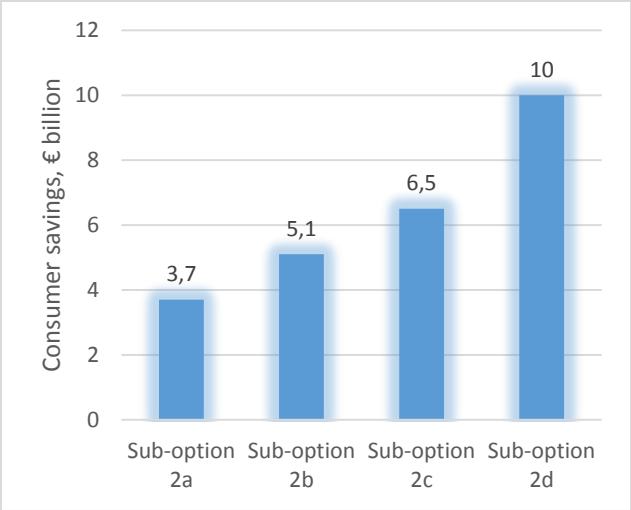


There are likely to be financial benefits for consumers. When consumers use their own MU items, they will need washing in order to keep them clean and usable. Therefore, there may be some additional costs from washing the items. However, as they are no longer purchasing many SUP items, the overall cost is likely to fall. For individual consumers, the impacts will vary depending on their consumption habits and their own pre-existing preferences in respect of using reusable items. For example, a nudging policy might be to expand consumer choice

by making tap water an available alternative to having to buy (or at least feeling that one has no choice but to buy) bottled water.

These elements need to be compared with convenience for consumers. However, as seen with the plastic bags Directive, the large majority of consumers will accept stringent measures in order to reduce marine litter, in particular when alternatives are available.

Figure 12. Consumer savings, € billion (2018 prices)



Most of the 50,000 companies in the plastic converters sector in the EU (who take plastic resin, in the form of pellets, powders and flakes and turn it into products and packaging) are SMEs. The effect upon them will depend upon whether their business is dependent upon SUPs, and their ability to switch to manufacturing other plastic items. As stated above, for many SUP items the majority of production takes place outside the EU.

Many retailers, especially in food service retail, are SMEs. They may be positively impacted where they avoid the need to purchase single use items that accompany or contain the food or drink they sell. Whilst reduced consumer spending will translate almost into reduce retail sales, there will be rebalancing as consumers spend their money on alternatives, and favour innovative responses. New business models will develop for making available multi use items to consumers and this could reduce costs, especially as options are scaled up.

One of the key aspects that business frequently calls for is a clear policy steer. The European Commission's Plastics Strategy has been expected for some time, and some producers have already begun anticipating and considering their options. For example, some restaurant chains are already phasing out plastic drinking straws, voluntary actions such as refill schemes are becoming more widespread, and a growing number of Member States are considering introducing deposit refund schemes for beverage containers.

Social impacts

Some small changes in employment are expected. Employment impacts are most positive with a switch to more labour-intensive practices (such as refillable take-away box schemes). These offset reduction in staffing at manufacturing related to decreased turnover. The nature and location of any impact will also depend on where saved money is spent by consumers,

and whether alternative products are produced inside or outside Europe. However, given the uncertainty around employment impacts and the possibility of rebound effects, the overall impacts on employment are not seen as significant.

Overall impacts

The modelling of the sub-options reflects an assessment of how adequately measures would address the underlying drivers and pathways of marine litter. In the baseline scenario, the evolution of two specific drivers towards an increase in marine litter, may outweigh the others, namely "wide availability of plastic as a cheap and convenient option for single use applications" and "consumer trend for convenience". Hence, the impact of proposed measures on these two drivers is especially important:

- **Scenario 2a** would address the drivers in a limited way. Information campaigns, voluntary actions and labelling could increase general awareness (e.g. on the litter issue, typical pathways, correct disposal), and thus consumer behaviour, including the trend for convenience. However, it is unclear what the outcome will be as there is little evidence of such awareness actually changings those people's behaviour.
- **Scenario 2b and 2c** would address the underlying drivers more adequately, as they go further to change consumer behaviour. Product design measures for drink bottles for tethered caps would have a direct impact on the leakage of caps into the environment. Reduction or ban of SUP items would have a positive impact on collection rates. In cases of items still leaking into the environment, damage would be mitigated when using alternatives, which are fully biodegradable under marine conditions. Well-functioning EPR schemes covering the full cost of littering crisp packets and sweet wrappers, together with cigarette filters, drink bottles, wet wipes sanitary towels and food containers would improve the management and infrastructure for collection and sorting, and address the market failure for this segment for which alternatives are currently limited. When combined with modulated fees, an EPR scheme could shift from SUP to reusable or single use alternatives, directly affecting the availability of plastics, and the linked consumer behaviour.
- Sub-option 2c offers a higher effectiveness than sub-option 2b in terms of reducing plastic marine litter, but with additional costs (though much smaller than the difference between 2d and 2c). The additional advantage of 2c over 2b is that the increased use of bans in 2c sends a clear signal and will work better in ensuring the proper functioning of the internal market by avoiding fragmentation between Member States (some Member States are already acting on items: cutlery, straws and stirrers). A ban that is not foreseen in 2b is also easier for Member States to implement. Monitoring the measures foreseen under option 2 c will also be easier for member States. Alternatives are available, so consumers are expected to accept a ban. Given these advantages, and the fact that increased environmental benefits outweigh the increased costs, 2c is an effective and efficient package of measures and so is the preferred sub-option.
- **Scenario 2d** would better address the underlying drivers, but at a higher cost (both financial and in the form of 'hassle' or possible subsidiarity issues). DRS or equivalent systems would entail additional cost (around 1,4 billion €) but would further reduce marine litter. As already shown in several Member States, deposit systems for beverage bottles have a direct, positive impact on collection and recycling, increasing collection rates and quality of the collected material, and reducing littering rates. Best practices for wastewater treatment works would improve infrastructure, increasing wet wipes collection. The main additional cost in 2d is the additional investment needed to

disseminate best practices for urban wastewater collection (around 7.7 billion Euros per annum). This measure is difficult to justify simply to solve the wet wipe issue, but is relevant to a much wider range of pollution releases. The ongoing evaluation of the Urban Waste Water Treatment Directive (UWWTD)[80] will consider the measure of 'best practices for WWTW' in more detail than above, and in a wider context[81].

All scenarios involve a shift away from SUP towards alternatives. These substitutes could include alternative business models (e.g. reuse with or without deposits), innovative product design (e.g. integrating smaller parts with larger items) and use of other materials (e.g. paper). To avoid unintended consequences regarding economic, environmental and social impact, the transition towards alternatives should be outcome-oriented and have a broad potential solution space. Such an approach would be in line with the Innovation Principle, making the legislative proposal forward-looking ('future-proofing') and innovation-friendly.

Clarity is needed on what could be labelled as "alternative". Material characteristics need to ensure full biodegradability in marine environments, which requires criteria on material degradation and related timeframe relative to the specific environmental conditions. At EU level, there is currently no accepted scientific standard on marine biodegradability which highlights the urgency for the Commission to ask the European Committee for Standardization to develop a separate standard for Marine biodegradability[82].

Table 12. Summary of model analysis per sub-option

	2a	2b	2c	2d
Marine litter by count (as % of SUP Top 10)	**-16%**	**-50%**	**-56%**	**-74%**
Marine Litter, tonnes	**-2,750**	**-4,450**	**-4,850**	**-12,070**
Change in GHG, million tonnes	**-1.28**	**-2.02**	**-2.63**	**-3.97**
External Costs, € billion	**-7.1**	**-9.5**	**-11.1**	**-30.9**
Savings for consumers, € billion	**3.7**	**5.1**	**6.5**	**10.0**
Impact on producer turnover, € billion	**-1.8**	**-2.5**	**-3.2**	**-5.0**
Information campaign costs, € million	**714**	**698**	**596**	**596**
Business compliance, commercial washing & refill scheme costs, € million	**338**	**1081**	**1385**	**2099**
Waste management costs, € million	**30**	**445**	**511**	**9175**
Employment, 000 FTE	**-3.8**	**3.8**	**4.0**	**5.0**
Feasibility	**High**	**Med**	**Med**	**Low**
Ensure Internal Market	**-**	**+**	**++**	**++**

[80] https://ec.europa.eu/info/law/better-regulation/initiatives/ares-2017-4989291_en

[81] This is not a question of enforcement of the current legislation, but of the collection and the treatment infrastructures and their ability to capture and remove pieces of plastics. Some plastics are not transiting through waste water treatment plants as they are authorised to 'by pass' the treatment infrastructures in case of heavy rains (CSOs). More quantification on these issues will be provided in the context of the evaluation to be finalised by mid 2019.

[82] Currently, few test methods for the assessment of the biodegradation of materials in the marine environment are available from ISO and ASTM. No European CEN test method has been developed so far. Marine biodegradability pre-normative research was initiated on FP7 project OPENBIO and will be the focus of a H2020 SC2 2019 research topic.

- Impacts are expressed against the baseline option 1 for the year 2030, in current 2018 prices.
- Impacts do not take account of rebound effects.
- GHG emissions are given in million tonnes CO_2 equivalent in 2030, for EU changes.
- Externalities are monetised for litter removal (land and sea) using disamentity, and supplemented by LCA analysis.
- Marine litter reductions: figures expressed as a percentage of current litter from Top 10 SUP estimates which is estimated to be 15,604 tonnes per annum in total, with 86% from the Top 10.
- Feasibility represents the technical difficulty and hassle factor of undertaking the different measures for consumers and retailers.
- Analysis of the individual measures making up each of the sub options can be found in Annex 6, Section 2.4 'Model Outputs'.

In terms of their effectiveness of reducing plastic marine litter, 2d would be the most effective. However, the cost of 2d is much higher than for 2c (because in particular of the costs associated with improving waste water treatment). For this reason, option 2d is not chosen.

6.3. Impacts for Fishing gear sub-options 1 and 3a and 3b

6.3.1. Option 1 – the baseline of no action over and above those already in the pipeline

The actions underway will already have a positive impact. We will analyse the financial cost of each of these actions and the environmental benefit in terms of reduction of plastic entering the sea. From this we can estimate the economic impact.

a) We can assume that the annual input of marine litter from land, fishing and aquaculture is up to 25,000 tonnes[83] and that the amount of plastic in the ocean represents 10 years of this input, then preventing 1,000 tonnes from entering the sea or fishing out 1,000 tonnes is equivalent to reducing the impact of marine litter by 0.4%.
b) Litter causes damage to fisheries through fouling of propellers, blocked intake pipes and valves, snagging of nets, silting of cod ends and contamination of catch. Efforts to estimate the cost of this to fishers range from 1%[84] to 5%[85] of revenue. For the whole of the EU fleet, this amounts to between €70 million and €350 million per year. Thus, removing one thousand tonnes of litter would have a value to the fishing industry of between €250,000 and €1,000,000 a year.

Similarly, we can calculate the purely economic impact on other activities.

[83] See detailed analysis in Annex 7
[84] JRC Technical Report: Harm caused by Marine Litter, 2016
[85] Marine Anthropogenic Litter, Editors: Bergmann, Melanie, Gutow, Lars, Klages, Michael (Eds.), 2015 Springer, ISBN 978-3-319-16510-3

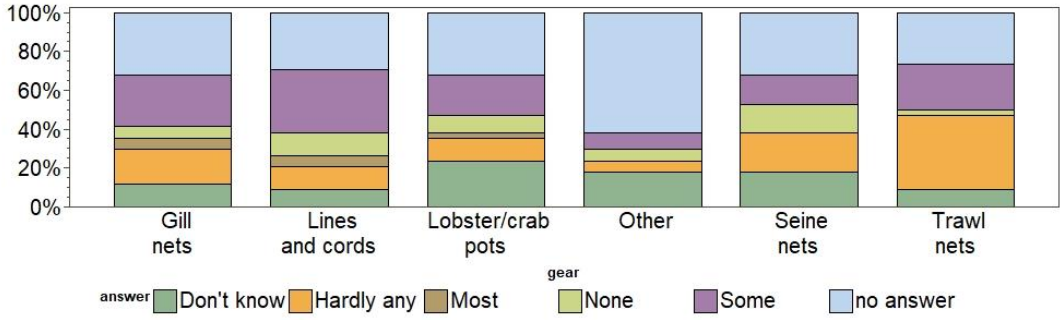
Table 13: Economic benefit of marine litter removal (using impacts from section 1.1.5)

Industry	Harm from marine litter	benefit of removing 1000 tonnes of marine litter or avoiding 1000 tonnes being added through loss/dumping
fishing	Between €60 and €300 million	€250,000 to €1,000,000
ports	€30 million	€100,000
beach tourism	Between €194 and €630 million	€750,000 to €2,500,000
TOTAL		€1,000,000 to €4,000,000

6.3.1.1. Current balance

According to PRODCOM[86] 27,000 tonnes of netting have been sold in the EU in 2016 and studies of floating flitter[87], beach litter[88] and trawls[89] indicates that netting represents significant fraction of plastic material from fishing and aquaculture in the sea; the rest being made up of buoys, pots, feed sacks, gloves, boxes etc. Samples in areas close to shore with high concentrations of aquaculture show significant concentrations of plastic from this source although in other regions this is not the case. For the purposes of this analysis, based on the comparison of available studies we assume an average of 50% is netting. Studies (see annex 7) conclude that best practice currently is in Iceland where 90% of the annual purchase of gear is eventually brought ashore, but over the EU as a whole, the total is only 80%.

Figure 13. Replies by fishermen to question on proportion of gear lost in the open stakeholder consultation



This estimate of gear not brought ashore is a higher proportion than that derived from fishers' reports[90] of lost gillnets[91]. Nevertheless, a significant number of fishers who replied to the open stakeholder consultation as part of this impact assessment reported "some" loss of gear.

[86] "PRODuction COMmunautaire" provides statistics on the production, exports and imports of manufactured goods in the EU

[87] Eriksen et al. 2014 Plastic Pollution in the World's Oceans: More than 5 Trillion Plastic Pieces Weighing over 250,000 Tons Afloat at Sea, PLoS ONE 9(12): e111913

[88] Legambiente, 2016, Beach litter 2016

[89] KIMO, 2015 Fishing For Litter Scotland Final report 2014-2016

[90] Gilman et al, 2016. Abandoned, lost or otherwise discarded gillnets and trammel nets. FAO Technical paper 600

[91] This is a passive fishing technique where vertical panels of netting, normally set in a straight line, trap fish and sometimes considered as making a major contribution to ghost fishing

The main assumption is that 55.000 tonnes of plastic are used by the fishing and aquaculture sector each year. Of this, around a fifth is lost or discarded and enters the seas as marine litter. A number of measures currently underway or planned will contribute to reducing this figure over the next years.

6.3.1.2. European Maritime and Fisheries Fund.

This measure is described for completeness' sake. In its current form it does not reduce marine litter inflow, but only results in taking litter out of the sea. It is also broader in that it targets all forms of fished-up litter, and not fishing gear specifically. A total of €53.07 million has been allocated by EU Member States under Article 40.1(a) of the European Maritime and Fisheries Fund for the "*collection of waste by fishermen from the sea such as the removal of lost fishing gear and marine litter*" in the years 2014-2020. While the operational programmes do not contain a precise enough breakdown, under the previous European Fisheries Fund a split of the budget going to the different activities is available. Assuming the same breakdown and the same efficiency as the operations, we can estimate the environmental impact in terms of litter removed (Table 14). This activity, also known as "fishing for litter", removes litter that is already in the sea ("the stock").

"Investments in facilities for waste and marine litter collection" can also be supported by the European Maritime and Fisheries Fund but as operational programmes bundle this with other activities, it is not possible to identify how much this will amount to[92].

Table 14: Costs of marine litter removal

Action	Proportion	Annual cost to public budget	Plastic removed annually (tonnes)
Collection of lost fishing gear / 'fishing for litter'	46%	€3,500,000	3,500[93]
Litter collectors/bags on board and in port (renting and transport, purchase)	25%	€2,000,000	5,500[94]
Treatment/processing of litter	17%	€1,300,000	n.a.
Awareness raising among fishers	5%	€400,000	n.a.
Research related to marine litter	5%	€400,000	n.a.
Recovering/recycling of plastics	2%	€150,000	n.a.

The reduced environmental impact of 9,000 tonnes per year translates to between €10 million and €35 million in economic benefit for fishing, port and tourism industries (see annex 7). The amounts of plastic removed are estimates based on the operations conducted in Norway.

[92] Fame (2017)

[93] Assuming removal is €1000 per tonne which is based on Norwegian campaigns. Eunomia estimate €818-1275 per tonne. This is probably on the high side for current operations but efficiency can be expected to increase as better reporting of lost gear under the Control Regulations allows more accurate identification of hot spots

[94] Although there is wide variation in performance in different fleets, OSPAR estimate average cost per vessel for "passive" fishing for litter is €500 including organisation and reporting and that each vessel brings back 0.7 tonnes in a year.

These measures are retrieving gear and other plastic lost in previous years and therefore reducing the total mass in the sea *but not the annual inflow*.

6.3.1.3. Fisheries Control

Two measures under consideration for simplifying the Common Fisheries Policy and improving its implementation through the Fisheries Control Regulation will address the issue of entry of fishing gear into the sea.

Table 15. Fisheries control

Measure	Cost to fishermen	Benefit
Use of electronic logbook for reporting lost gear	Negligible marginal cost because introduced at the same time as other modifications to logbook	More accurate reporting and improved effectiveness of recovery operations. Efficiency of these operations varies considerably. A 20% increase in efficiency would add 350 tonnes per year to operations funded under EMFF and a similar amount to the amount recovered in option 3c
Removal of the current derogation applicable to vessels < 12m to carry on board the necessary equipment for the retrieval of lost gear.	€50 million, half the 50,000 vessels in the EU fleet under 12 metres need to spend around €2,000 on winches	Recovery of gear that otherwise would have been abandoned may become possible. There is no information on how much is being retrieved at present (see section 2.2.2).

6.3.1.4. Revision of Port Reception Facilities Directive

The proposed revision of the Port Reception Facilities Directive will turn a number of operations currently financed under the European Maritime and Fisheries Fund into "business as usual".

Table 16. Port Reception facilities

Measure	Cost	Benefit in terms of reduction of annual inflow of fishing gear	Benefit in terms of fishing gear and other plastic lost in previous years
100% indirect fee, so no additional financial cost for bringing waste, including passively fished waste, ashore* * There may be additional costs in the case of smaller, particularly fishing ports which will now need facilities and may need to raise ports fees to pay for them.	-€2,000.000 because the expenditure under OSPAR, KIMO and EMFF schemes to collect, monitor and count litter brought ashore would no longer be necessary or targeted differently.	Equivalent to 2,700 tonnes year (see annex 7)	Equivalent to 2,700 tonnes year (see annex 7)

Measure	Cost	Benefit in terms of reduction of annual inflow of fishing gear	Benefit in terms of fishing gear and other plastic lost in previous years
Member States have to ensure that adequate PRF are available in their fishing ports to deal with this waste in accordance with the waste hierarchy (this includes separate collection of the waste delivered)		Impact assessment for Port Reception Facilities[95] indicates little change in litter brought ashore; although interviews with fishers indicate that current poor facilities may be a disincentive	
Inspection targets for vessels greater than 100 GT and reporting of the advance waste notification made obligatory for fishing vessels longer than 45 metres.		Limited (80% of the EU fishing fleet is below 100GT and/or 45m)	

The reduced environmental impact of approximately 5,500 tonnes per year[96] translates to between €6 million and €20 million in economic benefit for fishing, port and tourism industries. Additional costs such as the possible increase in port fees due to implementation of the PRF Directive are difficult to estimate at this point, but would be borne by the sector in the absence of any additional and/or burden sharing mechanism.

6.3.1.5. Member States Programmes of Measures under the MSFD

Table 17. Member State measures

Measure	Cost	Benefit
Programmes of measures to achieve GES by 2020, including a reduction of lost fishing gear found at sea	Zero. These measures are already included under other options	Better monitoring of marine litter

6.3.1.6. FAO Guidelines

Table 18. FAO Guidelines

Measure	Cost	Benefit
Authorities should introduce or marking of gear, a register of gear by the authorities and sharing of information between authorities	Zero. Implementation would already be covered by the Control Regulation and its proposed revision	Zero over and above what is already being done

[95] SWD/2018/021 final

[96] This includes plastic that does not derive from fishing (see annex 7).

6.3.2. Option 3a – Medium level of impact[97]

6.3.2.1. Extended Producer Responsibility – Basic scheme

This assumes that the producers of plastic material incorporated in fishing and aquaculture gear have responsibility for setting up an organisation to ensure that waste is collected at port, sent to appropriate recycling facilities, incineration plants or landfill sites and reporting.

Table 19. Extended Producer Responsibility- basic

Measure	**Costs estimated in study for this impact assessment (annex 7)**		**Benefit**
Gear producers have responsibility for taking back end-of-life fishing and aquaculture gear	€9.7 million	Annual cost for sorting, transport and processing	Specific reduction by this measure: 2600 tonnes per year (see annex 7). This adds to actions already underway/planned[98] Therefore, total cumulative reduction of ALDFG litter (including impact of Port Reception Facilities Directive) 5,500 tonnes per year.
	€6.3 million	Set-up costs	
	€1.3 million	annual administrative costs	

This option would add a maximum of about 4% to the cost of gear, under the unlikely assumption that producers would pass all costs on to users. The extra cost is 0.16% of annual revenue of the EU fishing fleet. The reduced environmental impact of 2,000 tonnes per year translates to between €2 million and €7 million in economic benefit for fishing, port and tourism industries. Note that the cumulative benefit achieved through the combination with other measures listed above would be much higher.

The establishment of an EPR scheme for fishing gear should, in addition, be considered in its interaction with the overall legislative framework. In particular, EPR schemes take over costs for the separate collection and treatment of waste which otherwise fall on the port facility which in turn passes these costs through to ship operators including fishers as part of the indirect fee. The establishment of EPR schemes for fishing gear would therefore reduce ports costs, and correspondingly port fees, related to the treatment of fishing gear. The costs impact would be most notably relevant in small fishing ports which currently have either no, or very small PRFs.

6.3.3. Option 3b – High level of impact

6.3.3.1. Extended Producer Responsibility - with Deposit Return Scheme

This is a scheme whereby a deposit is included in the price of the gear that is being purchases, but is then paid back to the fishermen by weight of fishing gear brought ashore as waste including complete nets, fragments of nets and other plastic fishing gear including buoys, pots etc. Whilst the revised Port Reception Facilities Directive removes disincentives for bringing waste ashore, this would provide a positive incentive to do so.

[97] NB: for all subsequent options, adequate measures need to be taken to ensure full integration with other fee collection schemes, including port fees.

[98] Implementation of PRF, revised CR, EMFF support

This would also be complementary to, and add to the impact of, the strengthened provisions of the revised control regulation, which aim to strengthen marking, retrieval, and reporting of loss. In particular, it would provide an incentive for anglers to return fishing gear waste to shore, leading to higher compliance with both these instruments. Finally, it would ensure adequate disposal, and insertion into the waste stream, of fishing gear waste, adding to the potential of re-use or recycling of the plastic material and potentially reducing overall cost.

Table 14. Extended Producer Responsibility- deposit return

Measure	Cost		Benefit
Fishers refunded for returning end of life or fished up fishing gear material (e.g. with manufacturers directly, via a port collection facility etc.)	The study in annex 7 estimates that that the set-up and administrative costs would be three times that of the simple EPR referenced under 6.3.2.1. The costs below are in addition to those in that option.		Can be assumed to reduce the amount of lost gear to the truly irrecoverable 5%. Reduction of ALDFG inflow into the sea by 2,600 tonnes per year over and above the other measures
	€12 million	set-up costs	
	€2.6 million	administrative costs	

This option would add over 5% to the cost of gear (or 0.2% of revenue). The reduced environmental impact of 2,500 tonnes per year provides between €3 million and €10 million in economic benefit for fishing, port and tourism industries. A successful scheme in Europe could be rolled out elsewhere, thus providing jobs for the service companies running the scheme.

6.3.3.2. Recycling target

Apart from fishing gear in most cases not being pure and clean, other characteristics may make it more challenging to recycle. For example, most fishing nets consist of several separate parts and hence of several types of plastics and material which will not all to the same degree be fit for recycling. In addition, the value of the different types of material can differ rendering for example only the recycling of specific parts economically feasible. Case in point is the Nylon 6/polyamide retrieval from fishnets, which is currently used as base material for i.a. clothing.

Table 15. Recycling target

Measure	Cost	Benefit
Member States have target for recycling	Zero. Once the litter is brought into proper waste management system, the relative costs of landfill, incineration and recycling are similar. Administration costs would already be taken care of in option 1a, the basic EPR system	There would be no direct benefit in terms of reduced litter inflow to the sea. However, adding recycling targets can add incentives for action aimed at increasing the amount of fishing gear brought back to shore.

Nevertheless, this option – in combination with an EPR which could stimulate its development – could provide an additional incentive for producers to undertake measures leading to the collection and reprocessing of returned gear, some of which may generate additional income. It has already and will continue to lead to innovation in the form of

encouraging the production of recycled products made from fishing gear material[99], and provides an incentive and critical mass, which will to reduce the costs of recycling, and may also contribute to reducing the overall costs of an EPR. It also is in line with the overall objectives of the circular economy initiative, which aims at reducing landfill, and incineration and increasing re-use of resources and raw materials.

6.3.4. Option 3c – Maximum level of impact

6.3.4.1. Extended producer Responsibility - with included retrieval operations

Without retrieval actions, the amount of litter from fishing in the sea will continue to increase because, whatever measures are taken to avoid loss of gear, some will always escape. In addition, given the long lifetime of plastic, even a modest annual input of litter will accumulate. In this option we assume that the extended producer responsibility covers the administrative costs of monitoring and the actual recovery by the European Maritime and Fisheries Fund or its successor.

Table 16. Extended Producer Responsibility- with retrieval

Measure	Cost	Benefit
Producer of plastic incorporated in fishing gear has responsibility for supporting retrieval actions	€3 million to set up and 500,000 per year for operations	More effective recovery of lost gear and the possibility of reducing the amount of plastic in the sea.

This option would also generate job opportunities for the handling, cleaning, and dismantling of fishing gear, not to mention its actual recycling. The retrieval of marine litter in general and fishing gear in particular is already being supported financially including through measures under the EMFF. It is therefore realistic to assume that Member States would continue to make use of such funding opportunities in the future based on their specific needs and circumstances (subsidiarity).

This would be even more relevant in case EPRs for fishing gear were imposed through legislation. The compulsory inclusion of retrieval action as part of an EPR therefore is not likely to provides much added value. The decision on whether or not to launch specific retrieval schemes can be left to Member States under the subsidiarity principle.

6.3.4.2. Substitution of plastic products in fisheries and ban

Most fishing gear is composed of different materials, of which plastics are an important component. Choices over which materials to use under which circumstances are usually based on characteristics such as the strength, flexibility, durability, buoyancy, price and past experiences in using certain materials or designs. In this way, fishing gear can consist of a heterogeneous compilation of materials with different characteristics. As such, fishers usually opt for the most cost-effective options. Such choices do however, not always reflect the most environmentally friendly options (such as biodegradability in seawater, recyclability of parts and/or possibility to track lost or abandoned gear).

[99] Some operators currently on the market for recycling fishing gear break even only by importing gear from outside the EU. Viool V. et al. (2018). Study to support impact assessment for options to reduce the level of ALDFG Final report.

So far, we have no knowledge of materials that both meet the operational requirements for fishing gear as well (or better than) those currently used by the sector, and at the same time do not have the potential to cause long-term harm to the environment if lost or abandoned at sea[100]. It is thus not possible to propose such a measure, let alone estimate its cost or impact.

6.3.5. Comparison of Impacts

The annual reduction in marine litter exceeds the current volume entering the sea, reflecting the fact that plastic already in the sea will be removed by the measures put in place.

Table 17. Comparison of impacts for fishing gear – NB – the impacts are cumulative

Measure	Investment cost (€ million)		Annual running cost € million		Annual reduction input to sea from fishing gear (tonnes)	Annual extraction of fishing gear and other plastic from previous years (tonnes)
	Private	Public	Private	Public		
EMFF				7.8		9,000[101]
Control Regulation	50.0				350	
Port Reception Facilities				-2	2,700[102]	2.700
Marine Directive						
Extended Producer Responsibility (EPR)	10.0		1.3		2,600	
EPR with deposit[103]	12.0		2.6		2,600	
Recycling target						
EPR with retrieval[104]	3.0		0.5			
Substitution of material						

[100] There is currently only one convincing example of research being conducted into replacement of material used in certain types of fishing gear with the objective of making this gear more environmentally sustainable [ref Dolly Rope project]. This project is, however, limited in scope and not yet at the stage of allowing conclusions.

[101] This is a aspirational target based on EU countries matching the efficiency of Norwegian operations

[102] This is reduction of inflow

[103] Over and above what is already planned

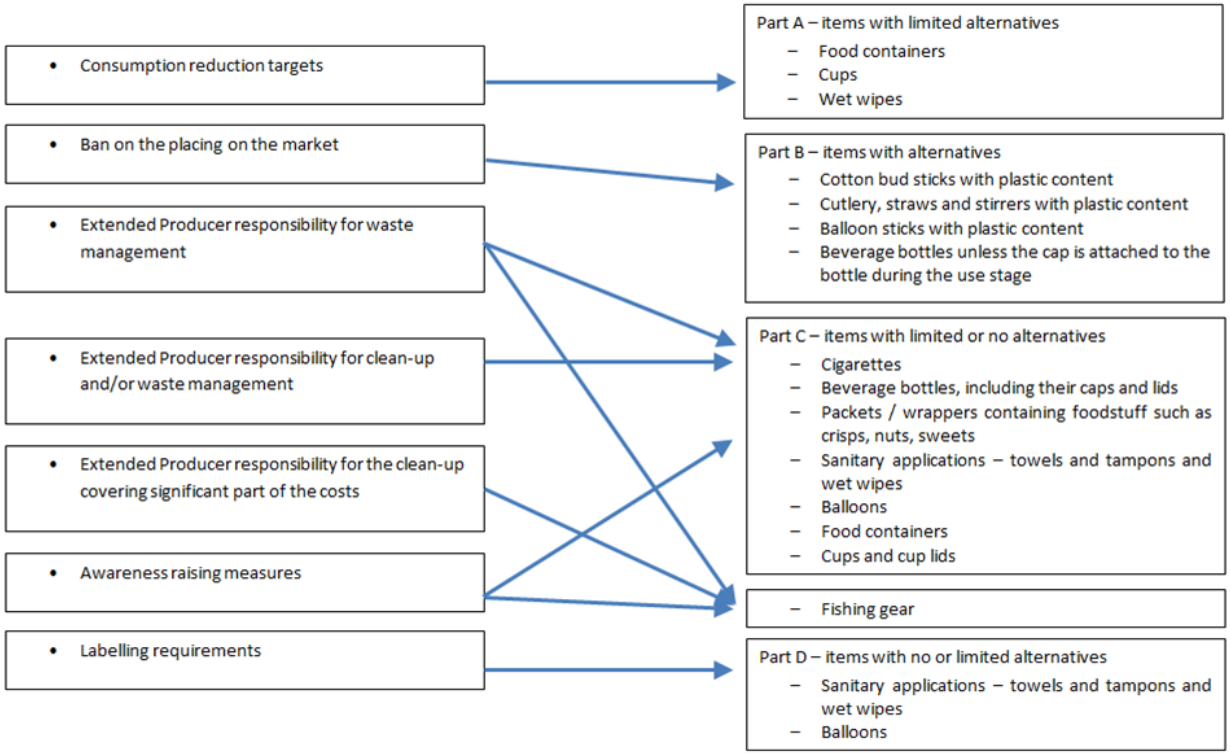
[104] Over and above what is already planned; only administration, costs of operations paid from public budget

7. PREFERRED OPTION

The option with the highest potential to deliver ambitious environmental results, while achieving positive economic impacts, limiting negative effects on employment, ensuring public acceptance, and contributing to wider resource efficiency would be sub-option 2c and sub-option 3a. Whilst estimates of marine litter volumes need to be treated with caution, the preferred measures could **significantly reduce marine litter from single use plastics and fishing gear**. These are the main sources of plastic marine litter in Europe, accounting for 84 per cent of European plastics entering the marine environment by count, which is the best indicator of the environmental, social and economic impacts. The measures on fishing gear will also lead to the removal of some plastics already in the seas.

The option includes additional measures for SUP and fishing gear and fills gaps in EU level action including legislation that are only partially closed by recent efforts such as the revision of the Port Reception Facilities Directive, the revised waste legislation, the Plastic Bags Directive, and measures in the Plastics Strategy. Figure 13 shows the preferred option grouped by different items.

Figure 14. Preferred choice (2c and 3a)



7.1. Recommended option for SUP

The recommended option would reduce SUP marine litter by half and includes:

- bans on the placing on the market of single use plastic versions of cotton bud sticks, balloon sticks, cutlery, straws and stirrers;

- reduction targets for single use plastic versions of drinks cups and lids, wet wipes, and food containers: 30% by 2025 and 50% by 2030;
- Extended Producer Responsibility schemes to contribute to the cost of prevention, waste management, including clean-up of litter for the items that are not packaging such as cigarette filters, sanitary applications including wet wipes, drinks cups and lids, food containers, balloons.
- for those items that are considered to be packaging, as defined under the Packaging Directive, the existing Extended Producer Responsibility will be extended to cover the clean-up cost.
- labelling requirements for sanitary towels, wet wipes and balloons; and
- product design measures for drink bottles related to tethered caps.

Setting EU-wide targets for different SUP would 'guide' measures to be adopted by Member States, ensuring that they are ambitious enough to achieve the desired effect. The costs to implement these targets will ultimately depend on the choice and design of the measures adopted at national level. Section 5 highlighted a wide range of complementary measures that can be used in a targeted way. In particular:

- There is continuing successful experience with the use of behavioural 'nudge' policies that could be used to shift consumer behaviour, and lead to efficient reductions. Analysis of behavioural economics suggests that consumers face scarcity of time and attention, and already receive too much labelling and information. Instead, it suggests that a more bottom-up approach would be working more actively with different actors (this would indirectly translate into natural awareness-raising initiatives through social networks and the press). Indeed, behavioural insights suggest that social norms and myopia – among other behavioural biases – apply in this context. Bottom-up campaigns – by making visible the environmentally friendly behaviour of the progressive group - would be more appropriate to activate virtuous behaviour via social norms.
- Businesses (both producers and retailers) are showing a willingness to pledge voluntary action. The preferred option will send a clear policy signal and reward early action.

This combination of measures relating to each type of single use plastic item reflects the messages from the public consultation, stakeholder workshops and the conference. It is coherent with the view in the public consultation that legislative requirements to better design or to produce with materials with low life cycle impact are generally the most effective approach, followed by reduction targets. It strikes a balance between measures, recognising the effectiveness of reduction targets for drinks cups and food containers, and EPR schemes for several types of items.

7.2. Recommended option for fishing gear

The recommended option for fishing and aquaculture gear is the introduction of an Extended Producer Responsibility for producers of fishing gear containing plastic.

This option has overall the highest potential impact on the reduction of the ALDFG contribution to marine litter. It builds on, complements and facilitates full implementation of action under option 1. It would underpin and facilitate full implementation of other instruments. In particular, it adds the specific support of a producer-financed dedicated

mechanism targeting the collection and treatment of waste fishing gear as an additional incentive for the return and collection of waste fishing gear to port, which is already the object of both the Control Regulation and the revised Port Reception Facilities Directive. It can notably contribute to easing cost burdens for small scale ports and/or fishing operators by ensuring that some or all of the costs linked to increased collection and treatment of litter from fishing gear in ports, and treatment beyond the framework of the PRF Directive, is taken over by the producers of fishing gear.

This type of positive incentive was seen by the majority of stakeholders as the most effective means of reducing the loss of gear into the sea.

Setting up an extended producer responsibility scheme for fishing gear containing plastic implies a cost which, if it were passed on to the fishing sector, would be marginal with regard to its overall turnover (≈0.16%). Experience shows that in competitive markets (for fishing gear materials, 60% of the material is imported) producers tend to absorb all or part of the EPR scheme's costs. It is therefore unlikely that the full cost of the EPR scheme would be passed on to fishing operators. In addition, current provisions under EU funding instruments, notably the EMFF, also allow Member States to finance actions leading to the reduction of the accumulation of lost fishing gear in the marine environment. This type of financial support, if taken in addition to the EPR would allow to offset initial costs of the above EPR scheme, both for producers, for local administrations, and for fishers.

In sum therefore, a genuine reduction in costs for fishers as compared to the baseline scenario should be expected. Finally, and in line with the Plastics Strategy's objective of integrating and completing EU action on plastics and marine litter, the EPR would be integrated as appropriate with the management of port reception facilities, including by contributing to its costs.

Option 1, which consists of the full implementation of existing measures and proposal already on the table, will lead to progress in reducing the amount of fishing gear litter ending up in the sea.

- In particular and as noted before, the revised Port Reception Facilities Directive would reduce disincentives for fishers to bring gear and other litter back to port. As stated explicitly by the Commission in its proposal for a revision of the Port Reception Facilities Directive, additional measures for reducing lost or abandoned fishing gear, were still being examined from the outset, such as Extended Producer Responsibility[105]. Such additional measures can ensure the treatment of plastic components of fishing gear in a dedicated waste management cycle, including the potential re-use or recycling, with the advantages set out above. Without this next step however, the envisaged encouragement of fishers to return gear to shore under the measures set out under the PRF Directive may not yield maximum returns, because in a number of cases notably affecting the small scale fishing sector and smaller ports, the increased port fees may have an impact on the fishers.

[105] Explanatory Memorandum of PRF Directive, section 1

Option 3b, which consists of strengthening even further the proposal for an EPR by adding a deposit scheme and a recycling target would further enhance the level of return of gear. It is however more costly to implement potentially increasing costs for the sector whilst also increasing administrative burden. In addition, in the case of fishing gear, and as opposed to land-based plastic material, the risk of losing the deposit is relatively high, potentially diminishing its impact as an incentive.

Setting a recycling target would on balance create complexities in defining such a target, administrative burden and costs of its monitoring would be considered disproportionate – in particular where setting up an EPR scheme in itself is already likely to stimulate the development of the current small market for the recycling of fishing gear materials.

Option 3c includes the obligation to fund a compulsory retrieval scheme for fishing gear under the EPR, is considered to be:

- Disproportionate, in that it makes compulsory to finance a measure which is based on voluntary participation and is currently being supported by i.a. EU financial instruments, support which will in all likelihood continue and be strengthened in the future.
- Potentially duplicative, to the extent that gear retrieval is included as an obligation in the proposal for a revision of the Control Regulation under the Common Fisheries Policy

7.3. Nature of the instrument

The decision to favour a **dedicated legislative instrument** (lex specialis) was motivated by:

- some existing legal instruments are general in their objectives, and their measures to tackle marine litter do not specifically target products so this would go beyond their original scope;
- other instruments are too narrow in their scope to address the identified ten SUPs, such as in the case of the Packaging directive that regulates only packaging (but even then has specific targeted measures only for one SUP item, namely plastic bags);
- fishing gear is already subject to a regulatory regime spread across different EU policies - fisheries, transport (PRF) and environmental policies (e.g. WFD, MFSD). None of the existing legal acts could reflect the wide variety of measures foreseen in the new instrument to effectively target the marine problem upstream.
- a dedicated legal instrument to address a specific waste stream (i.e. a sub-group of plastic waste) or environmental risks of a specific activity (e.g. the landfill directive that addresses one of many disposal operations - the landfilling of waste) is common in the waste legal regulatory framework (e.g. directives on batteries, packaging).

The possibility of amending existing legislation was considered. In view of the wide variety of measures in the preferred option, it would require the amendment of several existing legal instruments, such as the Marine Strategy Framework Directive, the Packaging and Packaging Waste Directive, the Waste Framework Directive, the proposed Port Reception Facilities Directive, or the Fisheries Control Regulation. The approach to amend multiple legal acts would lead to further fragmentation of the legal framework and bring more confusion and complexity for the Member States, economic operators and consumers in terms of transposition and implementation.

With regard to the nature of the legal act, a Directive is the appropriate legal instrument for the attainment of the envisaged objectives and measures. It allows:

- the definition of harmonised and clear objectives (e.g. binding consumption reduction targets) and measures (bans and product requirements for placing on the market, extended producer responsibility that harmonises the level of financial responsibility of producers for prevention and waste management objectives) that will ensure a level playing field across the Member States in terms of scope and ambition of action;
- Member States - for some but not all measures - to choose the most appropriate legal, administrative and economic instruments to implement them. This is in line with the subsidiarity principle. Existing legal acts concerning other waste streams but containing similar measures (awareness raising campaigns, consumption reduction targets and extended produce responsibility schemes) also envisage same level of flexibility to Member States to choose the appropriate instruments. More prescriptive instruments to implement the goals and measures would be difficult to justify based on the principle of subsidiarity. The measures targeting products that have alternatives or that justify stricter intervention measures – i.e. marketing restrictions and product and labelling requirements – would leave no room for adapted Member States measures.

Bans on placing on the market, product requirements and labelling requirements are compatible with a Directive and many existing EU waste directives contain such measures. They can be clearly defined to avoid any divergence in their implementation (e.g. by setting clear entry-into-force rules, harmonised labelling rules). On the other hand, a regulation – by the fact that it is addressed to economic operators and should be implementable without specific Member State transposition measures – is incompatible with the measures envisaged in the preferred option, namely consumption reduction targets, EPR and awareness raising campaigns, because they require the adoption of national and even local transposition and implementation measures to complement already existing regulatory regimes.

8. MONITORING AND EVALUATION

8.1. Monitoring and evaluation arrangements

The **main indicator** for progress towards meeting the objectives set for this policy initiative will be the beach counts of litter. Member States shall use the methodology developed by the MSFD Technical Group, and as set out in JRC Technical Reports. A revised Commission Decision was adopted in April 2017 establishing criteria and methodological standards for the determination of Good Environmental Status (GES) for marine litter. This Commission Decision requires that litter shall be monitored in the coastline in all cases and may additionally be monitored on the sea surface and the seabed.

At the same time, threshold values are to be established at Union or other levels (regional/sub-regional) for quantities of litter on beaches/water column/seafloor, for litter ingested by marine animals and for adverse effects (entanglement, other types of injury or mortality or health effects, of the species concerned due to litter). These values will be set through a collaborative and inclusive process and will facilitate evaluating effectiveness of measures against specific sources of marine litter.

Work on baselines and thresholds started in 2017. It is not feasible to finalise it and have it reflected in the next reports (expected in October 2018) from Member States (under the MSFD Directive). However, it will be used for the next round of monitoring programmes (2020) and inform the updated programmes of measures (2022) against marine litter.

Monitoring will also be required with regard to measures to reduce the consumption of SUP. The measurement methodology will be established in the waste committee established under EU waste legislation. Where possible it should take advantage of existing EU production and trade databases (PRODCOM[106] and COMEXT[107]) managed by Eurostat and regularly updated with information provided by Member States. Synergies should also be used with regard to existing reporting mechanisms, in particular, for the measurement and reporting of consumption reduction of plastic bags under the Plastic Bags Directive.

In line with the principle of subsidiarity, the exact data collection methods will depend on the internal organisation of each Member State and the nature of the implementing instruments chosen, where there is flexibility.

In addition, in accordance with the Waste Framework Directive (as it will be amended in 2018), Member States are obliged to reflect their waste prevention measures in their Waste Prevention Programmes, including measures to monitor and assess their implementation.

With regard to fishing gear, the implementation of the revised Control Regulation will improve the capacity for monitoring and analysing the extent to which fishing gear is returned or lost at sea. In line with the existing legislation, Members States take measures to accurately identify, quantify and track the number of fishing gear being deployed, monitored, set upon and recovered, including via satellite technology; and unique identifiers for fishing gear would allow for tracking and deriving estimates on effort levels. Over and above this, in accordance with the minimum requirements for Extended Producer Responsibility schemes established in the Waste Framework Directive, the producers of fishing gear would be expected to monitor fishing gear placed on the market and waste fishing gear deposited in appropriate port reception facilities and the subsequent waste treatment.

In line with the Interinstitutional Agreement between the European Parliament, the Council of the European Union and the European Commission on Better Law-Making Better Regulation, an evaluation of the legal instrument will be envisaged to assess how the implementation of the legislation.

8.2. Operational objectives

The **operational objectives** of the initiative are to:

- remove single use plastic versions of cotton bud sticks, balloon sticks, cutlery, straws and stirrers from the market;

[106] Survey for the collection and dissemination of statistics on the production of industrial (mainly manufactured) goods, both in value and quantity terms, with at least an annual frequency, in the EU.
[107] Eurostat reference database for EU external trade, including imports and exports.

- reduce single use plastic versions of drinks cups and lids, wet wipes, and food containers: 30% by 2025 and 50% by 2030;
- reduce marine litter from single use plastic versions of cigarette filters, drinks bottles, crisp packets and sweet wrappers, wet wipes, sanitary applications including wet wipes, drinks cups and lids, food containers, balloons;
- Encourage and facilitate the retrieval of lost fishing gear, in particular by improving the availability and reliability of information on its location and compliance with legal obligations regarding this reporting and retrieval; and
- Maximise the entry of end-of-life gear from the fisheries and aquaculture sector, including retrieved ALDFG, into an efficient waste management regime by setting up adequate incentives, schemes and infrastructures to collect, sort, dismantle, transport and recycle used plastic materials in a cost-effective way.