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PART 2/3

COMMISSION STAFF WORKING DOCUMENT

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

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ANNEX 1: PROCEDURAL INFORMATION

Lead DG: Directorate General Environment (ENV) and Maritime Affairs and Fisheries (MARE)

Agenda Planning Reference AP N°	Short title	Foreseen adoption
PLAN/2017/2170	Reducing marine litter: action on single-use plastics and fishing gear	Spring 2018 (Commission Proposal)

1 ORGANISATION AND TIMING

Work has been ongoing for a number of years on marine litter, reflected for example in the in the ‘Marine Strategy Framework Directive’ (MSFD) adopted in 2008 with the aim to achieve ‘Good Environmental Status’ (GES) for the European seas¹ by 2020 ‘ or the ‘aspirational marine litter reduction target 30% by 2030 with 2015 baseline’ set out in the Circular Economy Package.

On 15 December 2017, the Inception Impact assessment Roadmap "Reducing marine litter: action on single-use plastics and fishing gear" was published. At its closure, on 12 January, 28 reactions were received, which are being analysed now. ENV leads the work on single-use plastics (SUP), MARE on fishing gear, in close collaboration with each other.

The Inter Service Steering Group (ISSG) for the Impact Assessment was set up by the SG in January 2018 and includes the following additional DGs and Services: SJ, GROW, TRADE, ENER, JUST, EMPL, MOVE, SANTE, CNECT, ECFIN, TAXUD, RTD, AGRI, EAC, REGIO, CLIMA, COMP.

Meetings were organised between January 2018 and May 2018. Further consultations with the ISSG were carried out by e-mail.

The ISSG discussed the Inception Impact Assessment and the main milestones in the process, in particular the consultation strategy and main stakeholder consultation activities, key deliverables from the support study, and the draft Impact Assessment report before the submission to the Regulatory Scrutiny Board.

2 CONSULTATION OF THE REGULATORY SCRUTINY BOARD

The Regulatory Scrutiny Board ("RSB") received the draft version of the present Impact Assessment report on 5 March 2018. The RSB had previously given some indications of what was required through an upstream support meeting. Further to the meeting with the RSB on 21 March 2018, the RSB gave a negative opinion on 23 March 2018. The opinion included

¹ GES is assessed against 11 descriptors, one of the descriptor relates to marine litter levels.

recommendations, which have been addressed in the revised IA report as explained in the table below and were discussed in an Inter Service Steering Group meeting.

Comments from the Regulatory Scrutiny Board

Main considerations	Further considerations	How these issues have been addressed in the IA Report
1. The report does not state clearly whether focussing on 10 single use plastic items and fishing gear is meant to reduce significantly marine litter or to address its most hazardous part. It does not demonstrate how newly emerging problematic plastic items would be addressed.	what problem the initiative wants to tackle: the mass of marine litter in the ocean, or the number of plastic items on the beach or in the ocean.. The report should. The report should in the main report and the annexes.	Section 1 has been redrafted to explain this is a complementary initiative to other efforts (to circular economy and microplastics initiatives). It targets the main sources of macro plastics. This is further elaborated in redrafting throughout Section 2.1, where discussion of the Top 10 SUP has been included and explained for the first time. Section 2.1.2 addresses weights or counts issue directly
	demonstrate and motivate why the scope of the initiative has to be limited to the top 10 single use plastic items and lost or abandoned fishing gear	Section 1 and 2 redrafted to explain the focus on macroplastics and not microplastics. Section 2 explains better how the initiative addresses 84% of plastic marine litter by count Section 5.1 further elaborates.
	demonstrate the relevance of the list of 10 items and that it is future proof, in particular in comparison to national and international initiatives	Section 2.1 redrafted to make clear that the Top 10 covers 86% of SUP, and so is a wide list for now. The additional items are explained in more detail in Annex 3. Section 8 better explains how changes in the occurrence of plastic items on beaches and in the seas could be dealt with in the future.
	check the consistency and qualify the robustness of the various figures on marine litter and plastic marine litter	Text has been clarified throughout Section 2 (and Annex 3) and new headline figures added to make relevance clearer
	The analysis of impacts and comparison of options should reflect the revised problem analysis	Section 6 redrafted to better link with section 2
2. The report does not analyse shortcomings of existing environmental, fisheries and maritime legislation in preventing the named items from ending up in the sea	Analysis of why existing legislation does not succeed to prevent the identified items from becoming marine litter.	Section 2.4 redrafted to clarify why this is not an enforcement issue. Detailed clarifications and gaps of the current legislation are included in Section 5.2.1.
	consider measures to improve implementation instead of introducing an additional layer of legislation	The issue of better implementation is discussed in Section 2.4 and 5.2.1
3. The report does not argue convincingly that this is a cross-border	the facts that the Commission has an abundance of data and that Member States have decided (not)	Sections 3 and 4 redrafted to make clearer that this is a transboundary issue, make clearer the secondary / additional arguments

<i>Main considerations</i>	<i>Further considerations</i>	<i>How these issues have been addressed in the IA Report</i>
problem that is best addressed at EU-level. It also does not consider the role and impact of existing legislation, especially for fishing gear	to take different measures resulting in a patchwork approach are insufficient evidence that EU-level legislation is justified	on subsidiarity and the link to existing legislation
4. The construction, the description and the comparison of the options does not make clear that the final package combines the most cost-effective solutions for the different product	How the proposed actions address the problem drivers and complement existing legislation.	Section 5.2.3 redrafted to better explain how the sub-options address the drivers and pathways and complement existing legislation
	Explain the logic behind the grouping of measures for each plastic item into the different option packages. This makes it difficult to understand the effectiveness of the individual measures and packages, so that the choice for the preferred options is not sufficiently substantiated.	Section 5.2.3 now explains the grouping and that the underlying analysis per measure is found in Annex 6. Section 6.2 includes further analysis of the different sub-options, their make-up and the trade-offs and comparison between them.
	The options for fishing gear need to be complemented and developed from types of measures into well-defined interventions. The report also needs to discuss how this initiative would tackle marine litter in the long-term.	
	describe the numerical models and assumptions used for the analysis	Section 6 includes additional information on the underlying assumptions and further information is added into the underpinning Annexes
5. The report misses the views of the stakeholders throughout the document	discussion should illustrate whether the preferred option varies among stakeholders and which mitigation measures are being considered to address stakeholder concerns	Stakeholder discussion included where relevant in main text and in particular in Section 5

The RSB gave consequently a positive opinion with reservations on 16 April 2018. The recommendations included in this opinion have been addressed in the revised IA report as explained in the table below.

Comments from the Regulatory Scrutiny Board

<i>Main considerations</i>	<i>Further considerations</i>	<i>How these issues have been addressed in the IA Report</i>
(1) The revised report still fails to make a compelling case for additional measures on fishing gear, beyond the recent revisions of legislations.	For fishing gear, it remains problematic that this initiative intends to add new layers of legislation, while parts of the existing or proposed legislation appear to have already addressed the issue. The revised report states that the main shortcoming of the existing legislation is the insufficient incentives for fishermen to bring back their gear to shore. However, the legislation in the pipeline not only makes it illegal to dump garbage into the ocean, it requires the mandatory marking of fishing gear, its retrieval in the event of loss, the notification of the loss in case retrieval is not possible, and the inclusion of this information in the electronic reporting obligations. Furthermore, the proposal for the revision of the Port Reception Facilities Directive introduces clear incentives for delivery of waste. It foresees the removal of financial disincentives to return waste to the port and has increased reporting and inspection obligations for fishing vessels. This proposal also foresees that a reduced waste fee would be applied for ships that can demonstrate sustainable and environmentally sound waste management on board. Finally, the European Maritime and Fisheries Fund can also provide financial support for the recovery of lost gear and for the waste handling on ships. In the current state, the report does not make the case for actions on fishing gears and proposes initiatives which are unnecessary and burdensome.	Section 2.2.2 "underlying drivers" and section 2.4 "current policy framework" and section 6.3.1.4 "Revision of Port Reception Facilities Directive" point out that whilst individual fishermen will not be penalised for bringing waste ashore, port fees will increase if more waste is brought ashore and waste handling facilities need to be upgraded, especially in the small fishing ports that many vessels use. The text has also been modified to strengthen the argument concerning economies of scale if the sorting, transport and disposal of waste is carried out at a regional or national scale.
	A number of options address recycling of macro plastics, which does not directly tackle the main	This comment related to fishing gear. The report already indicates that there are no direct benefits in terms of litter

<i>Main considerations</i>	<i>Further considerations</i>	<i>How these issues have been addressed in the IA Report</i>
	problem of plastics in the seas. While recycling improves the use of natural resources, it does not in itself reduce littering or increase the percentage of waste returned to ports. The report should re-assess the appropriateness of including such options.	input in the sea. Nevertheless the setting of targets was identified as an essential component of the successful Icelandic system that helped the fishermen develop ownership of the scheme. Furthermore, since monitoring the final destiny of waste is an integral part of the EPR option, the marginal cost is almost zero.
(2) Although the report makes it clearer that the 10 most frequently found single-use plastics are harmful as a group, this is not shown for each individual item, especially for those that are least frequently found.	The report discusses the harmful effects of the 10 most frequently found single-use plastics as a group, while it foresees measures for each of the items individually. It should therefore show that each of these items is sufficiently harmful to warrant the proposed measures. This is particularly relevant for those items that are found less frequently, as they represent only a small proportion of the macro plastics in the seas.	Section 2.1.4.2 has been redrafted to state that, there is some evidence (although with little scientific literature available yet) that differentiates the impacts of the different items. The global impact is however high and the chosen option (2c) would, according to the modelling referred in table 27 of Annex 6 (and based on the underlying assumptions), reduce 464 million items in marine litter, compared to the baseline scenario. Even for the smallest group in relation to littered items, cutlery, this option would reduce the inflow into the marine environment with 18 million items.
3) The report does not analyse why it is better to introduce new legislation for single-use plastics. It does not explain why improving implementation of existing legislation, in particular on waste management is not the way forward.	For single-use plastics, the analysis of the current policy framework (section 2.4) should clarify to what extent plastics end up in the oceans as a result of a lack of ambition of current legislation or because of weak implementation. It should also demonstrate that introducing measures to reduce the occurrence of each of the 10 most found single-use plastics is more effective and/or efficient than strengthening the existing legislation or its implementation.	Section 2.4. has been redrafted to reinforce the fact that the waste legislation will have effects mainly on increasing recycling by using plastics that are now either incinerated, landfilled or exported, with marginal impact on littering. Upstream measures are also more efficient.
	The case for taking action at EU-level on marine litter has been reinforced in the revised report. However, some of the arguments could be further strengthened. Besides cross-border protection of the environment, the revised report cites market fragmentation as the legitimation to introduce Europe-	Section 4.2 has been redrafted to reinforce that some MS are already taking action on acting and others are planning to do so in line with new scientific findings and public pressure. The diverse regulatory approaches will increase the risk of uneven ambition and different rules for economic operators with consequent negative impact on the

<i>Main considerations</i>	<i>Further considerations</i>	<i>How these issues have been addressed in the IA Report</i>
	wide measures. However, it does not prove that fragmentation indeed poses a problem either for the market or for addressing marine litter.	market.
	The revised report has clarified the use of statistics on plastics in the seas. However, there remain inconsistencies in the data that are not highlighted in the presentation. In particular, different parts of the report state that single-use plastics represent half of all items (plastics and non-plastics) on the beach, but also that they represent half of the count of plastic items, which cannot both be correct. More generally, the report should avoid imprecise and/or unfounded assumptions and statements. Additionally, the report should explicitly mention the large uncertainties of the modelling and its assumptions regarding the effectiveness of the proposed measures.	We agree: SUP represent about 50% of all marine litter in counts. As plastics is around 85% of all marine litter, this means the SUP represent about 60% of all <u>plastic</u> marine litter. The text was changed to clarify this difference. The text was also improved in general, and uncertainties of the modelling be added.

3 EVIDENCE USED IN THE IMPACT ASSESSMENT

The IA report and the options considered in the IA report were developed based on the following documents, sources and evidence:

- **Main studies**

The Commission sought external expertise through a contract for a support study with Eunomia (for SUP) and Deloitte (for fishing gear). From the deliverables of these contracts, the IA report used in particular the analysis and modelling of the different policy options. In addition, JRC Technical Reports provide a significant underpinning:

- Cambridge Econometrics and Denkstatt “Links between production and the environment”, ongoing
- ICF and Eunomia “Plastics, reuserecycling and marine litter”, ongoing
- Deloitte “Study to support impact assessment for options to reduce the level and detrimental impact of plastic from fishing gear”, ongoing
- Joint Research Centre (JRC), Anna Maria Addamo, Perrine Laroche, Georg Hanke, JRC Technical Reports, “Top Marine Beach Litter Items in Europe”, 2017
- Joint Research Centre (JRC), Georg Hanke, JRC Technical Reports, “Marine Beach Litter in Europe – Top Items”, 2016

- Joint Research Centre (JRC), Joana Mira Veiga, David Fleet, Susan Kinsey et al., JRC Technical Reports, “Identifying Source of Marine Litter”, 2016
- Joint Research Centre (JRC), Stephanie Werner, Ania Budziak, Jan van Franeker et al., JRC Technical Reports, “Harm caused by Marine Litter”, 2016
- Joint Research Centre (JRC), Daniel González, Georg Hanke, Gijbert Tweehuysen et al., JRC Technical Reports, “Riverine Litter Monitoring – Options and Recommendations”, 2016
- Joint Research Centre (JRC), MSFD Technical Subgroup on Marine Litter, JRC Scientific and Policy Reports, “Guidance on Monitoring of Marine Litter in European Seas”, 2013
- **Additional external expertise (non-exhaustive list)**
 - Target review project, DG ENV support contract for the preparation of the impact assessment, Eunomia with Argus, Öko Institute and Copenhagen Resource Institute and Satsuma Media, final report in approbation process, <http://www.wastetargetsreview.eu/>
 - Past and future climate benefits from better municipal waste management in Europe, EEA 2011, <http://www.eea.europa.eu/publications/waste-opportunities-84-past-and>
 - Technological, Socio-Economic and Cost-Benefit Assessments Related to the Implementation and Further Development of EU Waste Legislation, Eunomia with Argus, Öko Institute and Copenhagen Resource Institute and Satsuma Media, final report in approbation process, <http://www.wastemodel.eu/>
 - Use of economic instruments and waste management performances, Bio Intelligence Service with IEEP, Eunomia, Ecologic, Arcadis and Umweltbundesamt, April 2012, http://ec.europa.eu/environment/waste/pdf/final_report_10042012.pdf
 - Application of the ‘producer responsibility’ principle in the context of waste management, Bio Intelligence Service with IEEP, Eunomia, Ecologic, Arcadis and Umweltbundesamt, December 2013, <http://epr.eu-smr.eu/>
 - Support to Member States in improving waste management based on assessment of Member States' performances, Final report, May 2013, BiPro with Arcadis and Enviroplan, http://ec.europa.eu/environment/waste/framework/support_implementation.htm
 - Managing municipal solid waste – a review of achievements in 32 European countries, EEA report N° 2/2013, EEA 2013, <http://www.eea.europa.eu/publications/managing-municipal-solid-waste>
 - Treating waste as a Resource for the EU Industry. Analysis of Various Waste Streams and the Competitiveness of their Client Industries - Final report, ECSIP Consortium for the European Commission, DG ENTR, August 2013
 - Study of the largest loopholes within the flow of packaging material, Bipro Final Report (ENV.D.2/ETU/2011/0043)
 - Implementing EU Waste Legislation for Green Growth – Final report, Bio Intelligence Service for the European Commission DG ENV, November 2011 <http://ec.europa.eu/environment/waste/studies/pdf/study%2012%20FINAL%20REPORT.pdf>
 - EEA report 8/2011, "Earnings, jobs and innovation – the role of recycling in a green economy", EEA 2011

- Resource saving and CO2 reduction potentials in waste management in Europe and the possible contribution to the 2020 CO2 reduction target in 2020, PROGNOS and IFEU, October 2008 <http://www.prognos.com/CO2-study.609.0.html>
- Is structural measures funding for municipal waste management infrastructure projects effective in helping Member States achieve EU waste policy objectives? European Court Auditor special report N° 20, 2012 <http://www.eca.europa.eu/>
- Municipal Solid Waste Management Capacities in Europe (Draft), EEA-ETC/SCP, January 2014
- Investment potential for the treatment of bio and recyclable municipal waste in the EU, final report, EIB with the support of Prognos and Lameyer KW consult, November 2013
- How to improve EU legislation to tackle marine litter, IEEP for Seas at Risk, July 2013
- Diverting waste from landfill - Effectiveness of waste-management policies in the European Union. EEA Report No 7/2009, <http://www.eea.europa.eu/publications/diverting-waste-from-landfill-effectiveness-of-waste-management-policies-in-the-european-union>
- Danish Government (2013) Denmark Without Waste: Recycle More - Incinerate Less, November 2013, http://www.mst.dk/NR/rdonlyres/EBE9E5D4-B765-4D4E-9954-9B713846E4CF/162130/Ressourcestrategi_UK_web.pdf
- Jakus P. M., et al. (1996) Generation of Recyclables by Rural Households, Journal of Agricultural and Resource Economics, Vol 21 (1), pp 96-108; and Tiller K. H., et al. (1997) Household Willingness to Pay for Dropoff Recycling, Journal of Agricultural and Resource Economics, Vol 22 (2), pp 310-320). A. Bruvoll, B. Halvorsen and K. Nyborg (2002), Households' Recycling Efforts, Resources, Conservation and Recycling, 36: 337-354
- Bipro Final Report (ENV.D.2/ETU/2011/0043): Study of the largest loopholes within the flow of packaging material, p. 22
- Analysis of the key contribution to resource efficiency, BIO Intelligence Service for DG ENV, April 2012
- EIMPack (2011) *Economic Impact of the Packaging and Packaging Waste Directive – literature review*, http://eimpack.ist.utl.pt/docs/Literature%20Review_final.pdf.

4 LIST OF ACRONYMS, ABBREVIATIONS AND GLOSSARY

- **ALDFG** – Abandoned lost and otherwise discarded fishing gear
- **BAU** – Business as usual
- **BAT** – Best Available Technique
- **BEP** – Best Environmental Practice
- **C&D waste** – Construction and demolition waste, which includes concrete, bricks, gypsum, wood, glass, metals, plastic, solvents, asbestos and excavated soil arising from activities such as the construction of buildings and civil infrastructure, total or partial demolition of buildings and civil infrastructure, road planning and maintenance

- **CFP** – Common Fisheries Policy
- **CR** – Control Regulation
- **CIR** – Control Implementing Regulation
- **EEA** - The European Environment Agency
- **ETC/SCP** - European Topic Centre on Sustainable Consumption and Production
- **EMFF** – European Maritime and Fisheries Fund. One of the five structural and investment funds of the funding period 2014-2020. Successor to the European Fisheries Fund (EFF).
- **Energy recovery** – The use of waste as fuel or other means to generate energy. Directive 2008/98/EC introduced specific new criteria to determine the efficiency level at which incineration in municipal waste incinerators can be deemed an energy recovery rather than disposal activity
- **EPR** - Extended Producer Responsibility – these systems makes those placing goods on the market – producers, importers - responsible for the waste collection and treatment of the waste generated
- **FADs** – Fish Aggregating Devices, used especially in tuna fishing in international waters
- **GDP** - Gross Domestic Product
- **IA** - Impact Assessment
- **IASG** - Impact Assessment Steering Group
- **Industrial waste** – Industrial waste is waste generated in industrial and manufacturing processes such as basic metals, food, beverage and tobacco products, wood and wood products and paper and paper products
- **LCA** – Life cycle assessment (or analysis) – the investigation and evaluation of the environmental impacts of a given product or service caused or necessitated by its existence
- **MBT** – Mechanical Biological Treatment facilities – facilities combining different mechanical and biological treatment usually aiming at treating residual waste (after separate collection)
- **MS** – Member State
- **MSW** – Municipal solid waste – Article 2 of Directive 1999/31/EC defines municipal waste as waste from households, as well as other waste which, because of its nature or composition, is similar to waste from households
- **MSFD** – Marine Strategy Framework Directive (2008/56/EC)
- **NPP** – National prevention programmes – Article 29 of the WFD requires MS to prepare waste prevention programmes by end 2013
- **Preparing for re-use** – Article 3 of Directive 2008/98/EC defines preparing for re-use as ‘checking, cleaning or repairing recovery operations, by which products or components of products that have become waste are prepared so that they can be re-used without any other pre-processing’

- **PAYT** – 'Pay as you throw' systems. These systems also called variable rate pricing are systems in which residents are charged according to the waste they actually produced. There are different ways of metering the waste produced either sophisticated systems where waste is weighted or more simple systems where a tax is applied per waste bag according to its volume
- **PPWD** – Packaging and Packaging Waste Directive
- **PRO** – Producer Responsibility Organisation – collective organisation aiming at ensuring that the obligations of financing/meeting waste management targets (reuse/recycling) laying on producers/importers when they place goods on the EU market are fulfilled
- **Recovery** – Article 3 of Directive 2008/98/EC defines recovery as 'any operation the principal result of which is waste serving a useful purpose by replacing other materials which would otherwise have been used to fulfil a particular function, or waste being prepared to fulfil that function, in the plant or in the wider economy'
- **Recycling** – Article 3 of Directive 2008/98/EC defines recycling as 'any recovery operation by which waste materials are reprocessed into products, materials or substances whether for the original or other purposes. It includes the reprocessing of organic material but does not include energy recovery and the reprocessing into materials that are to be used as fuels or for backfilling operations'. There are some differences in the definition of the concepts of 'recycling', 'recovery', 'reuse' and municipal waste between the WFD, the Landfill and the PPWD
- **Re-use** – Article 3 of Directive 2008/98/EC defines re-use as 'any operation by which products or components that are not waste are used again for the same purpose for which they were conceived'
- **Waste Hierarchy** – Article 4 of Directive 2008/98/EC makes the waste hierarchy a 'priority order' in waste prevention and management legislation and policy, and defines it as, in order of preference: (a) prevention; (b) preparing for re-use; (c) recycling; (d) other recovery, e.g. energy recovery; and (e) disposal
- **Waste prevention** – Article 4 of Directive 2008/98/EC defines prevention as 'measures taken before a substance, material or product has become waste, that reduce: (a) the quantity of waste, including through the re-use of products or the extension of the life span of products; (b) the adverse impacts of the generated waste on the environment and human health; or (c) the content of harmful substances in materials and products'
- **WFD** – Waste Framework Directive originally adopted in 1975 and revised in 2008 as Directive 2008/98/EC

ANNEX 2: STAKEHOLDER CONSULTATION – SYNOPSIS REPORT

1 INTRODUCTION

The consultation objectives were to gather views, concerns and ideas from a wide variety of interested stakeholders on the best means to achieve a reduction in marine litter, particularly originating from Single-Use Plastics (SUPs) and from fishing gear. The results of the consultation activities described in this document have fed into the Commission's Plastics Strategy² and the Impact Assessment on SUPs and fishing gear.

2 STAKEHOLDER GROUPS COVERED BY CONSULTATION

The combination of a number of consultation activities (described in the next section) employed as part of this project captured the opinions of a broad range of stakeholder groups and interests. Consultations engaged with members of the public, EU and Member State representatives, academics, representatives of business and industry associations (manufacturers, plastics converters, retailers and Research and Development companies), NGOs, government bodies and public authorities and consumer associations.

3 CONSULTATION ACTIVITIES

The consultation approach involved a range of tools made available through a range of the Commission's ongoing work on plastics and the marine environment. This document draws on the following consultation activities:

- Two stakeholder workshops, carried out on 16 June and 14 September 2017, exploring the root causes and potential measures to deal with single-use plastics.
- The Reinventing Plastics Stakeholder Conference³ held on 26 September 2017, which included a specific session on marine litter and single-use plastics.
- The 2018 Circular Economy Stakeholder Platform Conference on 20 February, which included a high-level session on plastics covering SUPs and fishing gear.
- Responses received to the Inception Impact Assessment open consultation/feedback.
- Interviews/ad hoc consultation with stakeholders.
- The recent Special Eurobarometer 468 (EC, 2017)⁴ and Flash Eurobarometer 388 (EC, 2014)⁵.
- The Online Public Consultation (OPC) on '*Reducing marine litter: action on single-use plastics and fishing gear*' launched from 15 December 2017 to 12 February 2018.

The results of each of the above engagement activities were separately analysed and are summarised in this document under respective sections. Synthesis and further analysis of the results was undertaken focusing on themes and cutting across consultation activities on issues around Single-Use Plastics and Fishing gear. These are reported across stakeholder categories

² A European Strategy for Plastics in a Circular Economy; COM(2018) 28 final, 18.1.2018. <http://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1516265440535&uri=COM:2018:28:FIN>

³ https://ec.europa.eu/info/plastics-conference_en

⁴ <http://ec.europa.eu/commfrontoffice/publicopinion/index.cfm/Survey/getSurveyDetail/instruments/SPECIAL/surveyKy/2156>

⁵ http://ec.europa.eu/commfrontoffice/publicopinion/flash/fl_388_en.pdf

drawing out key messages on stakeholder views around issues, actions and responsibilities in dealing with plastics in the marine environment and highlighting any differences in opinions by a particular sector or stakeholder, where these existed.

4 RESULTS OF STAKEHOLDER CONSULTATIONS ON SINGLE-USE PLASTICS

4.1 Stakeholder workshops and conferences

Two stakeholder workshops on SUPs took place on 16 June and 14 September 2017, each attended by 12-13 stakeholders representing producers, industry associations, NGOs, local authorities and Member States. The workshops focussed on gathering stakeholder views on the problems and root causes of single-use plastics and identifying measures to address ‘single-use’ plastic items.

In an attempt to define SUPs, workshop participants generally agreed that items classifying as SUPs, should fulfil the following criteria: Prevalence in marine environment; Short use phase; Consumed predominantly away from home and; Reusable or non-plastic alternatives exist, though some exceptions to the above will exist.

The root causes of the leakage of SUPs into the environment were discussed, and the overarching problems identified included low levels of re-use and low levels of recycling. In this context various causes were also discussed, such as item design of products and materials and consumer behaviour, with several participants arguing that a lack of regulatory measures to address these issues could also be seen as a root cause (though not as the only mechanism to address these).

A range of measures, of both regulatory and voluntary nature, was discussed including (but not limited to): incentives for producers and consumers (financial and behavioural), improvements in plastic waste collection, introduction of standards and bans and obligations introduced in product design and waste reporting. The respondents favoured an EU-wide waste prevention target and argued for cooperation between stakeholders to develop a holistic approach to address SUPs. With respect to regulatory measures, such as bans, the importance of public support was highlighted through examples. Discussions around the limitations of potential measures highlighted in particular that:

- There is limited evidence on the effectiveness of awareness raising campaigns, whilst there was general agreement that these are not sufficient as a standalone measure.
- Bans were considered a good way of enforcing the redesign of specific low-value items.
- However, if applied only at a national level such measures can interfere with the operation of the single market.
- Caution is advisable in the timeframe of implementation to ensure that substitution materials meet the standards and consumers are prepared.
- Charges were seen as a preventive measure, which can effectively influence consumer behaviour, while at the same time generating 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.

- There was the alternative option of ensuring that SUPs are not given away free at the point of sale.

Other potential measures identified included amending the Waste Framework Directive, better respect the waste hierarchy, the use of green public procurement to leverage sustainable materials and voluntary agreements to complement regulatory measures.

A stakeholder conference on *Rethinking plastics* took place on 26 September 2017 in Brussels. On the subject of SUPs, stakeholders suggested that in order to achieve the 50% marine litter reduction target voted by the European Parliament, an ambitious EU-wide strategy was required putting in place specific policy measures. It was further proposed that different measures might be appropriate for different SUPs.

Recognising the relationship between consumption and littering, and the priorities according to the waste hierarchy, binding consumption reduction targets linked to achievable time frames, were proposed. Consumer incentives, deposit-return schemes and provision of infrastructure for recycling were identified as potentially appropriate measures. As well as targeting the items, it was suggested that sources and pathways of marine litter should also be addressed. In this context, the effectiveness of public awareness initiatives was discussed with stakeholders noting a lack of demonstrable results, linked in particular to under-resourced campaigns. A mandate on green procurement was thought to be a good way of increasing demand in the market for alternatives to SUPs. There was consent that a holistic, balanced solution could be achieved by recognising shared responsibility amongst all stakeholders and employing a combination of measures that cut across reduction, reuse and recyclability. The omission of enforcement in the discussion was noted, with stakeholders arguing that revisions requested to the Waste Framework Directive would require littering to be made a criminal offence in all Member States.

The 2018 Circular Economy Stakeholder Platform Conference⁶ also took place on 20-21 February 2018 and contributed to the existing consultations with further insights on actions and good practices for addressing plastics in the marine environment.

4.2 Inception Impact Assessment feedback

Feedback on the Inception Impact Assessment was received from 28 respondents across stakeholder categories. Representatives from the private sector emphasised on the importance of economic viability of recycling, poor implementation of existing rules and regulatory gaps. Across stakeholders, there was strong support for intervention at an EU level, with retailers and producers expressing a preference for voluntary approaches over regulatory measures. A number of respondents highlighted the need for a circular or life-cycle approach that supports prevention, and called for incentives on innovation and the removal of regulatory barriers at a national level. An extended scope was suggested by a number of respondents that would include an assessment of the impacts of primary and secondary microplastics and nanoplastics.

In discussions around potential measures, the diversity of SUPs gave rise to a differentiated approach depending on whether plastic marine litter is the result of items that are being recycled, items for which more sustainable alternatives exist, or finally items for which there is no readily available alternative. For items already captured, strong interest was expressed in Extended Producer Responsibility (EPR) Schemes, which were seen by many as highly

⁶ http://www.eesc.europa.eu/sites/default/files/files/circular-economy-stakeholder-conference-programme_v20180212-2.pdf

effective. However, some did warn that such schemes are unable to address the leakage of plastics resulting from poor consumer behaviour towards recycling. Several respondents also referred to the success of deposit-return schemes (e.g. for bottles), although some recognised there are negative, and potentially disproportionate, economic implications for retailers. Factors that were identified as crucial to the success of such schemes included the efficiency of existing waste management systems, consumer behaviour, local infrastructure, the item's reuse potential, enforcement by Member States, as well as, EPR fees that are EU harmonised, consistent, scientifically reliable and allow for innovation. For items that could be replaced by more sustainable alternatives, retailers argued that this would be best achieved at a consumer level through awareness-raising and positive incentives. In decisions around substitute materials, priority should be given to materials that are readily recyclable. There was some caution towards the use of biodegradable plastics with several calling for clarity in the information provided and labelling for consumers. A number of respondents argued that the replacement of SUPs should be a priority, where no sustainable alternatives exist. Business representatives highlighted that any restrictions must take account of single market requirements and administrative burdens.

4.3 Interviews/ad hoc consultation

During the course of the study a range of ad-hoc, consultations were carried out in order to help develop the problem and impact analyses. These included a range of formal and informal interviews with stakeholders from public institutions, NGOs, industry associations and businesses. The number of stakeholders consulted in this way was in excess of 30. These interviews typically sought to shape and test potential intervention measures, to see what was technically feasible and the likely primary effects. Interviews were also used to gather specific data related to performance and costs and how these may change as a result of potential intervention measures.

A range of formal and informal interviews with relevant stakeholders from public institutions, NGOs, industry associations and businesses were also carried out, alongside the stakeholder workshops mentioned above, in order to help develop the impact analysis. The number of stakeholders consulted was around 30. The views of the stakeholder helped shape the measures, in relation to what was technically feasible, and provided data related to performance and costs.

Stakeholders across groups highlighted the importance of understanding the availability and function of the single-use non-plastic or multi-use alternatives, and the potential cost to manufacturers to switch materials in the production processes. In addition, consulting with the operators of multi-use refill schemes and water companies helped develop a better understanding of the operation of such schemes and the challenges they face.

4.4 Eurobarometer consultations

In their responses to the Special Eurobarometer 468 (EC, 2017)⁷, around a third (33%) of Europeans identified marine pollution as the most important environmental issue. In response to questions on plastic waste and littering, around three-quarters of Europeans (72%) stated they have reduced their use of single-use plastic carrier bags, while a large percentage of those (38%) said they have cut down their use in the last 12 months.

⁷ 27,881 EU citizens from 28 Member States were interviewed between 23 September and 2 October 2017.

The majority of respondents (between 89% and 94%) considered the following measures as important in reducing plastic waste and littering:

- products should be designed in a way that facilitates the recycling of plastic;
- industry and retailers should make an effort to reduce plastic packaging;
- people should be educated on how to reduce their plastic waste; and
- local authorities should provide more and better collection facilities for plastic waste.

With regard to consumers' responsibility in reducing plastic waste, 61% of respondents considered important that *consumers pay an extra charge for single-use plastic goods*.

Across the EU, there has been an increase in the numbers of Europeans who believe that decision-making on environmental protection should be taken jointly within the EU as opposed to the decision being taken by the national government alone.

A similar Eurobarometer consultation with European citizens in 2014 (Flash Eurobarometer 388) revealed Europeans' support⁸ towards an EU-level target to reduce marine litter.

4.5 Open Public Consultation

The Online Public Consultation (OPC) on '*Reducing marine litter: action on single-use plastics and fishing gear*' launched from 15 December 2017 to 12 February 2018. This consultation complemented previous exercises conducted by the Commission, such as an OPC (October to December 2013) focussing on possible actions, by different stakeholder groups, to address the issue of marine litter⁹. The consultation received a total of 1,807 responses across Member States.

Across respondents, harm to animal welfare, human health risks and the impact on ecosystem services, ranked as the three most important issues linked to marine litter and SUPs. The vast majority of respondents (95%) across all stakeholder categories agreed that action to address the impacts of SUPs is both necessary and urgent. Most stakeholders were of the opinion that the EU should support mandatory instruments at a global or at least at European level. Government and public authority stakeholders diverged from this view noting that certain measures should be delivered at the European level whilst some may be best addressed at the local or national level.

A strong case was also made for reducing the presence of SUPs in the environment, with caps, lids and drinking bottles on the list of priorities. With reference to specific measures, respondents were in favour of beach cleaning, active 'fishing for litter' and the regular quantification of marine and beach litter. Industry and trade associations were the only stakeholder category that did not support active 'fishing for litter'. Recovery of marine litter found in fishing nets and recovery of fishing gear also generated support across most stakeholders.

In response to questions on their own use of SUP a large number of respondents noted a decrease in their use of light weight shopping bags, drink bottles and caps and lids. The consumption of crisps packets and sweet wrappers was the one that had changed the least. For those respondents that reported reductions in their use of SUP, the overwhelming majority attributed this change to increasing awareness of the environmental impacts of SUP. Respondents appeared most keen to reduce their use of plastic bottles above all items, with more than half of them reported that they had already done so. 77% of respondents stated that

⁸ 26,595 EU citizens from 28 Member States were interviewed between the 3rd and 7th of December 2013.

⁹ http://ec.europa.eu/environment/consultations/pdf/marine_litter.pdf

they would be willing to pay a small additional amount as part of a deposit refund scheme on plastic bottles. Extensive support (93%) was also expressed for policies, which would phase out disposable non-biodegradable plastic tableware in favour of those made with biodegradable materials or reusable alternatives, even when they involved a small price increase. Industry and trade association representatives were split in their willingness to pay because of such policies though they were still in favour of phasing out SUPs.

Considerable support (91%) was expressed for the introduction of rules that require cigarette companies to contribute financially to the costs of clearing up cigarette butts. Industry and trade associations were more reluctant to support this measure. Amongst the 5% of respondents to spoke against this measure were plastics converters and manufacturers though they only represented part of their sectors' responses. A similar suggestion for producers of sanitary items was also supported by the majority of respondents (79%), with the exception of representatives from the arts and entertainment sector and some of the manufacturers.

Members of the public also shared their opinions on diverse measures and approaches that could effectively reduce the environmental impacts of different SUPs. With reference to drink bottles, Deposit Return Schemes (DRS) were considered the most appropriate response (47%) followed by the option to set targets for use reduction (33%). Minimum design requirements found less support (20%) amongst respondents and were not favoured by business representatives. A different course of action was suggested for lightweight shopping bags with stakeholders across categories being in favour of a use reduction target (62%). For SUP, which could be replaced by more sustainable alternatives, such as cotton buds and cutlery, respondents supported legislative action (to better design or more sustainably produce these items) and use reduction targets. Similar legislative measures were thought to be appropriate even for items for which no obvious and proportionate alternative existed, such as cigarette butts and sanitary towels. For items falling under this SUP category, extended producer responsibility schemes were viewed as equally suitable.

Around 100 respondents provided links and 36 respondents provided attachments. Most of the links referred to NGO websites, petitions and initiatives as well as news and social media articles revolving around marine litter. Many of the uploaded attachments were explanatory statements from stakeholders providing further details on their response to the OPC. Other attachments contained policy statements from stakeholders and NGOs, such as EUROOPEN, Suez, FoodDrinkEurope, Plastics Europe, Friends of the Earth, Starbucks and Veolia, as well as documents providing facts and figures on marine litter and beach clean-ups in various locations around the EU and the world. The last category varied between peer-reviewed academic papers and NGO fact-sheets. These documents helped corroborate the list of items covered in the analysis, however provided no data that could be used in the analysis.

4.6 SUP conclusions

Distinct measures were deemed appropriate for different SUP items. Diverse measures were discussed depending on existing legislation, the availability of separate waste collection and the availability of sustainable alternatives. Extended producer responsibility measures were viewed favourably by respondents across most categories. Implied costs associated to some of the measures and the importance of understanding these prior to any action were highlighted by industry and business representatives.

Extended producer responsibility was suggested as an important measure by workshop participants and OPC respondents alike. Stakeholders participating in these consultation activities also found merit in legislative approaches. The workshops provide a greater degree of granularity discussing the appropriateness of specific options, such as bans and charges, for

different levels or action. Reduction targets were popular across stakeholders although discussions around their effectiveness included caveats depending on the conditions of their implementation (e.g. time-bound targets).

Setting reduction targets for the consumption of specific SUPs was a popular choice in the OPC while it also emerged in stakeholder discussions during the workshops and conferences. However further individual measures and policies were broadly thought to be necessary in order to achieve overarching EU targets.

Across Eurobarometer and OPC consultations, stakeholders have indicated their willingness to pay for more sustainable alternatives to SUPs or their willingness to accept an extra charge acting as penalty for the use of SUPs.

Awareness campaigns were seen, by workshop and conference participants, as complementary measures to be employed in conjunction with other regulatory and voluntary measures.

4.7 Mitigation of Stakeholder concerns

Extended Producer Responsibility (EPR) Schemes

EPR schemes were seen by many as highly effective, but some producers argued that they are not suitable to address leakage into the oceans, which is caused by bad consumer behaviour, and indeed producers should not shoulder the cost for this misbehaviour, which is not related to their own economic activities and their treatment of waste.

EPR schemes under the preferred option would involve obligations to cover clean-up costs for certain products, which is in line with the principle of producer responsibility for post consumption, but contributions would be spread across the sectors concerned and under established rules of financial and operational transparency.

Deposit Return Schemes

Take-back schemes deliver up to 90% return rates and make high quality feedstock available to manufacturing businesses, but retailers (including Eurocommerce) stated that they can have major economic and operational impacts for their businesses; these respondents advised that schemes should be tailor made and implemented at national level. Small retailers feared facing disproportionate burdens for example in storing and managing waste.

Take-back schemes are one possible approach that may be taken, and may be considered as a form of EPR scheme. Member State and sectors concerned can decide if such schemes would be effective and viable. Existing schemes in MS and other countries have demonstrated that costs for retailers are generally covered by the scheme, and for smaller retailers exemptions are often possible or use of manual rather than automated deposit-return.

Charges at Point of Sale

Some retailers argued that charges at the point of sale could mislead and reduce environmental benefits; they therefore called for upstream solutions (obligations on manufactures and importers).

The preferred approach of the impact assessment would enable charges at the point of sale should MS decide that such a measure would be effective for a particular product in reaching reduction targets. This approach has been highly effective in the case of single-use lightweight plastic carrier bags, with significant benefits at little or no cost (or indeed negative cost). Such an approach may be effective also for other products,

with costs to economic operators depending on how it is designed. SUP products are often given away free by (for example) food outlets but imply a cost, therefore a reduction in their use through a charge would in most cases imply a reduction in costs. Other measures (such as market restrictions or design requirements) would imply adaptations for upstream operators (producers and importers) rather than at point of sale.

Demand for secondary plastic

Some companies noted that a strong market for recycled materials is needed to ensure high recycling rates. This needs good quality recyclates, and competitive price for recycled materials. A chemical industry representative advised that measures should not create uncertainty along the value chain about certain established SUP applications, as this could impede investments in the transition to a circular economy.

The wider Plastics Strategy, of which this proposal forms a part, includes initiatives aimed specifically at boosting the use of recyclates and incentivizing investment in recycling capacity in Europe. The relative market prices of virgin and recycled plastic will depend mainly on factors that are outside the competence of the Commission and MS.

Food contact materials

Food and drink producers noted that not all plastic materials are suitable for food contact and safety (according to EU legislation), quality and avoiding food waste should be priorities. For food packaging biodegradable plastics fulfil the requirements of food contact approval (e.g. toxicity testing) and eco-toxicity tests.

Food contact legislation and hygiene standards would continue to apply.

Single Market

Business representatives reminded that any restrictions must take account of single market requirements.

The legislative basis of the proposal would ensure that any requirements relating to placing products on the market would be applied at the EU level, whilst other initiatives for reduction, such as those concerning consumer behaviour could be taken at the more appropriate level in accordance with the subsidiarity principle.

Inclusion of Microplastics

Some citizens and NGOs noted that the approach ignores the non-visual aspects of plastics pollution. It implies that clean-up and recycling alone will be sufficient to solve this problem. Microplastics should be considered, even if not in the scope of this proposal.

Most microplastics result from the decomposition of the plastic litter that finds its way into the marine environment. The proposal therefore tackles this pathway. Intentionally added microplastics are dealt with through the referral of these to the Chemicals Agency as another initiative under the Plastics Strategy. Microplastics released in the environment as a result of the use of products are also tackled under this Strategy by focused actions.

5 RESULTS OF STAKEHOLDER CONSULTATION ON FISHING GEAR

5.1 Inception Impact Assessment feedback

DG Mare received feedback on the Inception Impact Assessment from several stakeholders on 6 February 2018. The feedback centred around three main areas: (1) the baseline and its assumptions; (2) the policy options and (3) the interview questionnaire.

The main assumption of the baseline is the loss rate of plastic fishing and aquaculture gear for European seas. Initially, a loss rate of 30% was used, which was highlighted several times as too high. The feedback has been addressed by lowering the loss rate to 15% in the final report after revisiting the original sources, including interview results, adding additional sources and discussing the representativeness of these sources in Annex 5 of the main report.

Further, baseline feedback was received on the percentage weight distribution between aquaculture and fishing. Initially, the weight distribution was 77% plastic waste from aquaculture and 23% plastic waste from fishing. However, the distribution was based on Norwegian data, which is not representative for the EU-28. In the final report, the feedback has been addressed by changing the weight distribution for EU-28 to 60% plastic waste from aquaculture and 40% plastic waste from fishing by accounting for the differences of total fish catch and aquaculture production for Norway versus EU-28.

Lastly, feedback for the baseline was provided to include the effects of the revised PRF, revised Control Regulation and Waste Framework Directive in the baseline. These legislations and directives have now been taken into account, under the assumption that full implementation have taken place.

In regards to the policy options, the initial selection of four policy options to be evaluated remained. Therefore, the policy options outlined in the report are:

1. Extended producer responsibility (without deposit scheme);
2. Extended producer responsibility and deposit scheme;
3. Target setting (recycling target);
4. Alternative materials and product design.

The feedback provided on the policy options pointed out the importance of the impact quantification. Therefore, quantitative indicators for economic impact, administrative burden, environmental impact and social impact were identified and quantified to the best extent possible. Effects on stakeholders of the different policy options have been compared in a relative way using “+”, “0” and “-”.

Lastly, feedback was provided on the interview questionnaire, the third major area. The feedback has been incorporated in a revised questionnaire used for all interviews increasing the richness and depth of questions.

5.2 Interviews/ad hoc consultation

A total of 16 interviews and 2 follow-up calls with relevant stakeholders have been conducted. The stakeholders interviewed comprise of different Directorate Generals of the EC, national ministries, advisory councils, fisheries organizations, fishers, recycling companies and funds, NGOs and producer organizations.

Additionally, more than 15 other stakeholders including advisory councils, NGOs and ports have been contacted via email and telephone. Due to the short timelines, some stakeholders had difficulties to provide coordinated and quantified inputs.

The purpose of the interviews was to receive qualitative and quantitative input for the description, quantification and evaluation of the four policy options. The stakeholders had been selected based on their relevance to achieve the purpose of the interviews. The interviews conducted were guided by the interview questionnaire, but remained open for additional input and further discussion.

Stakeholders provided valuable insights and quantified data, which enriched and sharpened the policy options presented in the final report. The stakeholders agreed that it is necessary to reduce plastic marine litter from fishing and aquaculture. However, none of them was able to quantify the extent of plastic marine litter from fishing and aquaculture for European seas.

Further, they agreed that political action is required, also on a European level to address the loss of plastic fishing and aquaculture gear in European seas. The majority of stakeholders view the proposed four policy options as the right choice, while pointing out the general challenge to implement, enforce and monitor policies and measures at a European scale.

Among the policy options discussed, extended producer responsibility (EPR) with and without deposit scheme has been viewed as the most beneficial policy options for the purpose of reducing plastic fishing gear entering European seas. Extended producer responsibility has been viewed favourably because it can on the one hand cover costs for sorting, dismantling and transporting as well as on the other hand pay for retrieval operations. A deposit scheme has also been mentioned as favourable, as this would create a financial incentive for returning end-of-life gear to ports. However, concerns have been presented that such a scheme, would punish fishers for non-retrievable lost gear and create incentive for fishing for the intact set gear of others. Successful examples from Iceland, Norway and Denmark were repeatedly mentioned as reference cases. Recycling targets have been discussed as beneficial to divert end-of-life gear from landfill or incineration to recycling facilities. However, stakeholders described that better market uptake for recycled materials from fishing and aquaculture gear is required and that it was necessary to allocate parts of an EPR funding or government subsidies to create a competitive position for recycled materials from the packaging industry. Alternative materials were mentioned favourably, while at the same time it was said that research and development was lacking or they were currently too expensive. Additionally, biodegradable plastics were deemed to be too expensive. It was also said that biodegradable plastics are currently not widely available, especially not plastics that would be biodegradable in salt water and large depths. Further, some stakeholders pointed out that biodegradable material would set the wrong incentive and would lead to disposing plastic fishing gear in the sea rather than returning it to port.

Overall, the conducted interviews enriched the report with first-hand knowledge and reflected the views of major stakeholders. The interview results have been incorporated in the final report.

5.3 Open Public Consultation

The Online Public Consultation (OPC) on *'Reducing marine litter: action on single-use plastics and fishing gear'* launched from 15 December 2017 to 12 February 2018 complemented previous exercises conducted by the Commission, such as an OPC (October to December 2013) focussing on possible actions, by different stakeholder groups, to address the issue of marine litter¹⁰. Each question has been analysed by excluding all respondents not answering the question at hand. To get the complete picture, respondents were allowed to

¹⁰ http://ec.europa.eu/environment/consultations/pdf/marine_litter.pdf

choose “Do not know” for answers, which always comprise a certain percentage. For questions with the possibility to select multiple options responses have been evaluated by amount of stakeholder responding and not by total of options mentioned. The details and highlights of the analysis are elaborated on in the following paragraph, including an overview of the responses to open questions.

Some 340 people responded to the fisheries specific part of the OPC. Of those, 24% come from academia, 21% from NGO's, 16% from government or public authorities, 7% from fisheries organizations, 7% from business, 6% from industry and trade associations and 16% indicating “Other” as category while the remainder with less than 1% per category comes from trade unions, regional sea conventions, international bodies, intergovernmental organisations, consumer associations or European institutions.

According to the open stakeholder consultation, 95% of respondents replied positively to the statement that action to **address the amount of marine litter** (including fishing gear) in the seas and on beaches is necessary and urgent (Question 2b - General). Focusing specifically on the amount of fishing gear in the seas and on beaches, 79% of the respondents think that it is necessary and urgent to act (Question 2 - Specific). The issue of impacts of marine litter on fisheries and aquaculture are considered by 100% of respondents of fisheries organizations as quite or very important (Question 1 – General). Of the total respondents, 53% consider it very important or quite important. Additionally, clean-up costs of litter are considered by 84% of respondents as very important or important (Question 1 - General).

Assessing the role of **stakeholders playing an important role for taking any further action** the EU, Member States, Local and regional authorities, fishers and fisheries organization are considered important (Question 3 - Specific). Only other international bodies, NGOs and the private sector seem to not play such an important role for reducing leakage of fishing gear into the marine environment. Especially, the latter one is surprising as the private sector could establish extended producer responsibility schemes to reduce marine litter or redesigning fishing gear. The most important role play the fishers, as they are the direct users of the gear (80% indicate fishers as very important stakeholders in this issue).

The stakeholder consultation also asked for the **assessment of the proportion of gear lost and discarded at sea per year**. For all gear lost (Question A - Specific), only 1% of respondents indicate that all gear is lost on an annual basis. There is larger variation per type of fishing gear among the stakeholders indicating that most gear is lost ranging from 3% for seine nets to 23% for lines and cords. The majority of responses is that some gear is lost ranging from 28% for seine nets to 54% for gillnets. Between 6% and 28% indicate that hardly any gear is lost and between 1% and 4% none. The remainder of the respondents (between 22% and 36%) indicated that they do not know.

For all gear discarded (Question B - Specific), only between 1% and 2% indicate that all gear is discarded per year and 3-13% indicate that most gear is discarded. The majority indicate that some gear is discarded. The indication of some fishing gear discarded varies per type of fishing gear ranging between 22% for seine nets and 43% for lines and cords. Between 7% and 22% indicate that hardly any fishing gear is discarded and between 4% and 11% indicate none. Looking as reference specifically at responses from fisheries organizations about discarded gill nets, 40% claim that some are discarded, 25% hardly any and 25% none.

Analysing the open fields in the stakeholder consultation it becomes apparent that there is no widely accepted estimate for lost and discarded fishing gear out there and there is a lack of data related to this topic. Therefore the open comments varied widely from 50% loss (reference to SPEKVIS project Belgium for dolly rope) and only 0.8% for demersal gillnets

(reference to Ayaz et al., 2010), with other respondents citing 10% (reference to Gilman, 2015) or 20% (anecdotal evidence). In absolute terms comments vary from 5,500-10,000 net fragments lost per year (reference to Baltic Seas 2020) to 640,000 tons lost annually worldwide (reference to Macfadyen et al., 2009).

The response of the stakeholders to the question about the **selection of measures to help reduce lost and discarded gear** (Question 5 - Specific, multi-option) the most selected options are:

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%)

The open field comments expanded on the list above. First, stakeholders went one step ahead by proposing EPRs as measure to reduce ALDFG. Other comments were made by stakeholders requesting higher penalties for the fishing and aquaculture industry punishing its role in the pollution. Further, several respondents elaborated on the risk and inefficiency of retrieval actions, which have to be carefully evaluated before undertaken. Other comments underpinned the importance of education and awareness raising of fishers to reduce plastic fishing and aquaculture gear ending in the seas. The introduction and enforcement of gear marking was mentioned repeatedly. Additionally, respondents highlighted that high harbour costs lead to more discarding of gear at sea, even though suitable port reception facilities exist. Lastly, several respondents agreed that the lack of suitable port facilities are a disincentive for fishers to return gear to port entering formal waste management.

One further issue revealed is **reporting and retrieving of lost gear** (Question 6 and 7 - Specific). 56% respond that hardly any lost gear is reported and 52% state that hardly any is retrieved. Only 3% of the respondents state that most or all is reported and only 5% state that most or all lost gear is retrieved. Gear retrieval is considered most successful if better retrieval equipment is available and more incentives to bring fished up litter and end-of-life gear ashore as well as incentives/funding of retrieval actions. In the open comments, specifically a stakeholder pointed out that often gear cannot be retrieved due to either safety limitations or simply traceability of lost gear in sea. Further, a relevant comment is that in certain countries legislation has to be changed to make gear retrieval possible as for example in Italy retrieved gear are classified as special waste and thus their disposal has to be paid by fishers.

According to the stakeholder consultation (Question 9 – Specific, multi-option), **public funds** should be used mainly for the recovery of marine litter found in fishing nets during normal fishing activities ("passive fishing for litter") and recovery of fishing gear and marine litter washed up on beaches. However, here stakeholders highlighted specifically that rather than public funds fishers and producers should be charged and that focus should be placed on prevention rather than retrieval. Lastly, a strong comment has been made that subsidizing the fishing gear recycling industry would be useful to help it grow and encourage better end of life treatment of fishing gear.

Further, the open stakeholder consultation addresses which additional targeted **measures would support the bringing back of gear ashore** (Question 10 - Specific, multi-option). Respondents favour with 59% deposit return schemes levied on fishers and with 53% extended producer responsibility scheme including a levy on gear. More than one third of the stakeholders consulted see public support as a suitable additional measure, whereas, 13% do not know and another 13% see additional other measures as useful. In the open field

addressing other measures as well as additional comments, stakeholders raise doubts about deposit schemes as they might punish fishermen, who might not get their deposit back, for unintentionally lost or not recoverable gear. Additionally, stakeholders remark that deposit schemes for gears with long lifespans render return scheme inefficient. Further, they highlight that disposal at port should not be more expensive than illegal loss at sea, wherefore an EU-wide registration of nets as well as sample controls are proposed. Lastly, a stakeholder highlighted that an exclusive focus on collection is not sufficient, therefore the focus has to be shifted to the recycling of fishing gear. However, the stakeholder points out that support is required for gear recycling companies as they face challenges selling their recycles proposing therefore an incentive for market uptake and (mandatory) use of a % recycled content in various products

Reviewing the sorting of waste at the port in line with EU waste legislation and as envisaged in the PRF proposal (Question 11 - Specific), of the 50% providing another answer than “do not know” 60% agree that there is any sorting of waste. However, the remaining 40% point out that there is no sorting of waste at ports, which are normally mandated by the Port Reception Facility Directive.

Additionally, the open stakeholder consultation sheds light on the **recycling** focusing on current recycling of gear and potentially recycling of gear (Question 12 - Specific). Only 6% indicate that more than 25% is recycled, however 42% of the respondents indicate that potentially more than 25% could be recycled. Further, the stakeholder consultation assesses which measures could potentially increase recycling rates (Question 13 - Specific, multi-option), which 28% indicate investment in recycling facilities and another 28% preferring the introduction of EPR or bring back schemes. Also, 26% believe that the preferred measure to increase recycling rates is to improve the transport of gear from ports to waste management/recycling facilities. 54% indicate not knowing whether re-use is undertaken in their country or sea area, 18% indicate that no re-use is happening, 21% state occasionally and only 7% say routinely (Question 14 - Specific). Lastly, an open field in the stakeholder consultation also allowed to indicate additionally which gear or material is currently recycled, which revealed an interesting fact that an Italian recycling company can only reach breakeven capacity, if used fishing nets are imported from China because they do not receive enough from Italian fisheries and ports. On the one hand repair of recycling can be also seen as a sort of recycling then leading to a 100% recycling rate, whereas on the other hand also incineration sometimes accounts for recycling rates.

Lastly, in the light of **alternative product design and materials**, it is assessed which gear has the best potential for substitution of plastics with other materials (Question 15 - Specific, multi-option). The answers are very equal, however among the four options cords/lines, fish aggregating devices, buoys and dolly ropes, dolly ropes is selected with the least potential despite the dolly rope free project being the only project for fishing gear attempting to replace plastics and innovate with materials.

5.4 Fishing gear conclusions

The picture arising from the different sources consulted is that stakeholders highlight where action is necessary and urgent to reduce the detrimental effects of plastics from ALDFG. The policy options of extended producer responsibility and deposit scheme were favoured in addition to better port reception facilities. Analysis of the options favoured by respondents also shows that EPR combined with a deposit scheme is deemed to have positive cost-benefit effects and to contribute to the target of the plastics strategy to reduce the level of plastics in European seas.

5.5 Mitigation of Stakeholder concerns

That non-EU vessels will not be covered

Fishy Filaments Ltd, a plastic recycler wrote

Increased attention to sources of nets from fishers operating in international waters, especially from fleets outside the EU (Russia, China, etc). Satellite monitoring of IUU fisheries should include assessment of net disposal actions.

At the moment, satellite technology does not allow such actions to be monitored. However, introduction of a successful system for the EU will encourage other authorities to follow suit.

That we have not adequately considered biodegradable fishing nets as a solution

Novamont SpA, manufacturers wrote

The European Commission is funding research for biodegradable applications used in the marine environment. Open-bio , follow-up project of a previous one funded under the FP7, has developed new methodologies for the analysis of marine biodegradation. Through these test methods it was possible to show that some MATER-BI materials achieved biodegradation of 90 % in less than a year. These results have been verified within the EC Environmental Technology Verification (ETV) pilot project. MATER-BI is therefore a suitable material for the production of plastic objects with high risk of dispersion in the sea (fishing gears or fish-farming gears). <http://www.life-ghost.eu/index.php/en/project/objectives/8-news/109-mater-bi-of-new-generation-an-italian-biodegradable-plastic-material-to-be-used-for-fishing-gears>

An NGO wrote

Prohibition of storm loss grants provided to buy new plastic pots when old ones are lost. If grants are given then only for natural materials. Jobs and revival of traditional willow and hazel pot making would benefit the industry and the target species.

Research is still at an early stage. The Commission is looking into new ways of bringing innovative ideas to market through the use of financial instruments that reduce investor risk.

That port authorities are not motivated to treat waste adequately.

A.M.A. - Associazione Mediterranea Acquaicoltori wrote

Nel caso delle reti da molluschicoltura sarebbe opportuno che fossero gli allevatori a occuparsi, anche in maniera consorziate, di conferirle alle società di raccolta e smaltimento. Ora, in base alla normativa italiana, quando applicata, spetta all'autorità portuale.

The proposed Extended Producer Responsibility for fishing gear would remove responsibility from the ports. It will be up to Member States to set up an appropriate system but one would expect the producers to have a say in how it is implemented.

ANNEX 3: CURRENT SITUATION: FACTS AND FIGURES

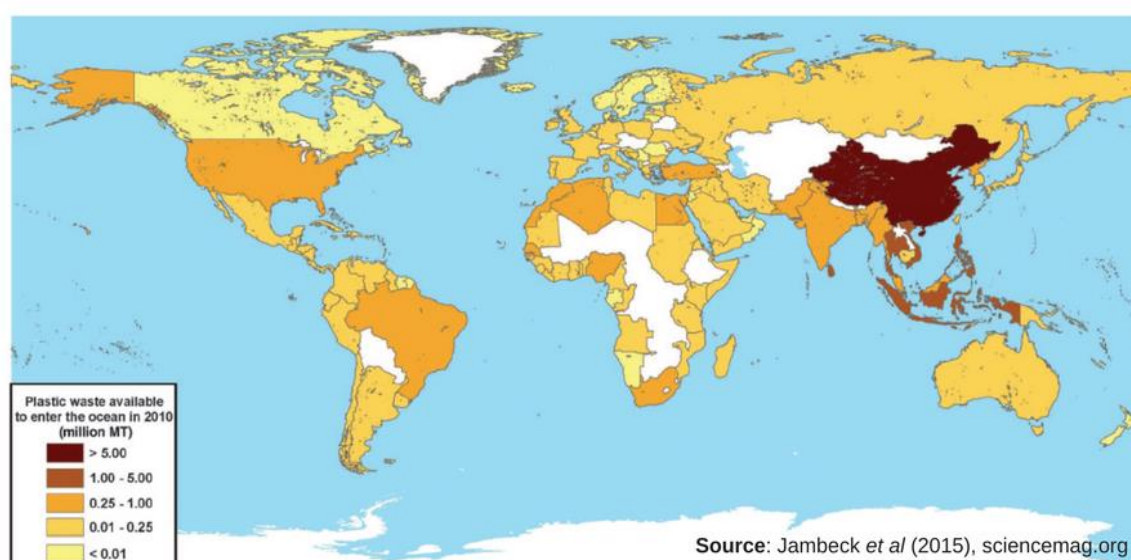
1 MARINE LITTER AS A GLOBAL ISSUE

Major land based sources of plastic marine litter are: storm water discharges, sewer overflows, tourism-related litter, wastes released from dumpsites near the coast or river banks, illegal dumping, industrial activities, improper transport, consumer cosmetic products, synthetic sandblasting media or polyester and acrylic fibers from washing clothes. Sea-based sources include: shipping, fishing, aquaculture and offshore.

1.1 Litter volumes entering the oceans

It is estimated¹¹ that 4.8 to 12.7 million tonnes of plastic waste enter our oceans per year. These figures need to be treated with caution but they do give an idea of magnitude of the problem.

Figure 1. Plastic waste available to enter the oceans (million tonnes) (2010)¹²



According to Jambeck *et al.* (2015)¹³, over 50% of the global leakage into the marine environment currently comes from five emerging markets in Asia.

River networks facilitate the transport of plastics, thus connecting most of the global land surface to the ocean¹⁴. According to Schmidt *et al.* (2017), rivers from the 10 top-ranked catchments contribute between 88% and 94% of the total plastic debris (again, figures to be treated with caution).

¹¹ Jenna R. Jambeck *et al.* (2015), Plastic waste inputs from land into the ocean, *Science*, 347 (6223), 768-771 (DOI: 10.1126/science.1260352), <http://science.sciencemag.org/content/347/6223/768>

¹² Global map with each country shaded according to the estimated mass of mismanaged waste (million tonnes) generated in 2010. Countries not included in the study are shaded in white (Jambeck *et al.*, 2015, p. 769).

¹³ Jenna R. Jambeck *et al.* (2015), Plastic waste inputs from land into the ocean, *Science*, 347 (6223), 768-771 (DOI: 10.1126/science.1260352)

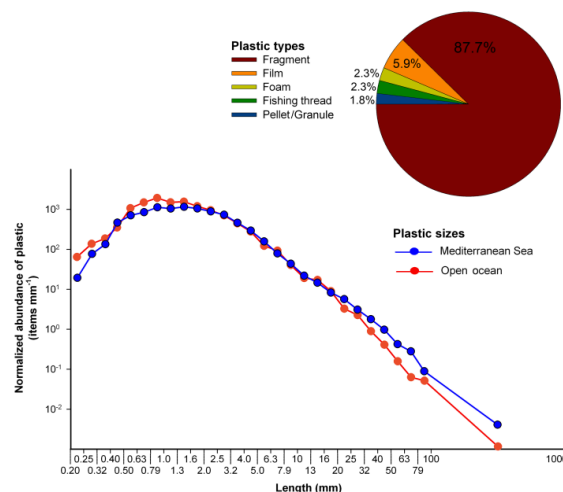
¹⁴ Christian Schmidt, Tobias Krauth, Stephan Wagner. Export of Plastic Debris by Rivers into the Sea. *Environmental Science & Technology*, 2017; DOI: 10.1021/acs.est.7b02368

1.2 Accumulation of plastics in the environment

Since 1980, over 150 million tonnes of plastic marine litter are estimated to have accumulated, out of which between 1.4 and 3.7 million tonnes in the EU. Deep-sea sediments accumulate microplastics and retention of macro and microplastics in particular sea-bed locations is increased by topographic features. Research¹⁵ suggests that Europeans currently consume up to 11,000 pieces of plastic in their food each year as a result of consumption of seafood.

Waste patches in the Atlantic and the Pacific oceans are estimated to be around 100 Mt, about 80% of which is plastic. Plastic is accumulating in the Mediterranean Sea at a similar scale to that in oceanic gyres (the rotating ocean currents in the Indian Ocean, North Atlantic, North Pacific, South Atlantic and South Pacific)¹⁶. Plastic debris found in the Mediterranean surface waters are composed by millimetre-sized fragments, together with a proportion of large plastic objects, larger than the one present in oceanic gyres.

Figure 2. Size distribution and aspect of the floating plastic debris collected in the Mediterranean Sea¹⁷



The accumulation of plastic in the Mediterranean Sea is likely to be the result of a significant regional plastic input combined with a limited export to the Atlantic Ocean. In addition to this, the Mediterranean Sea acts as a convective basin, absorbing floating plastic originating from the Atlantic and many other terrestrial and maritime sources (e.g. the inputs from the Nile River). The figure below shows the concentrations of plastic debris in surface waters of the Mediterranean Sea compared to the plastic concentrations reported for the global ocean.¹⁸

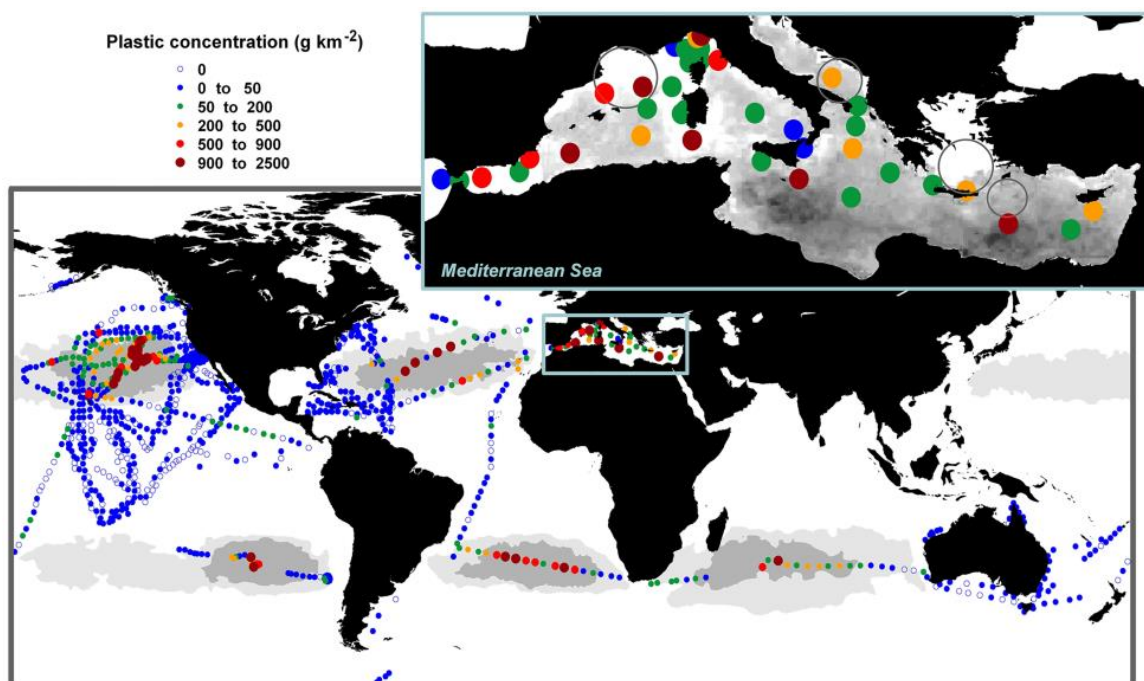
¹⁵ Unpublished study cited in <http://news.sky.com/story/micro-plastics-in-seafood-could-be-a-health-risk-experts-fear-10739835>

¹⁶ PLOS, A Cozar, Plastic Accumulation in the Mediterranean Sea, 2015

¹⁷ Ibidem

¹⁸ Ibidem

Figure 3. Concentrations of plastic debris in surface waters of the Mediterranean Sea compared to the plastic concentrations reported for the global ocean¹⁹



2 MARINE LITTER FROM EUROPE

2.1 Marine litter measurement

The Marine Strategy Framework Directive (MSFD) requirement to ensure that properties and quantities of litter do not cause harm to the environment implies that baselines and threshold values have to be set at EU level. This work is being coordinated at EU level and a related JRC report²⁰ on the most frequently found litter items on beaches provides a good assessment of marine litter. This work is ongoing with a view to facilitate reaching the aspirational target of the Circular Economy Package to reduce by 30% the amount of beach litter and fishing gear lost at sea by 2020.

The European Marine Observation and Data Network EMODnet partnership in collaboration with regional sea conventions are assembling and harmonising the data in order to provide a better overall picture of the concentrations in European seas and sea-beds that will help assess progress in meeting targets and support remedial action. Additional data will be made publicly available during 2018.

The European Environmental Agency EEA has developed Marine Litter Watch²¹, a citizen science based tool that can help fill data gaps relevant for policy, while raising awareness about the problem of litter and the policy response to it; it is already being used in European-wide campaigns and complements many private initiative tools.

¹⁹ Ibidem. Note that this study sampled only microplastic, with a net of 1 m opening. Macro plastic (for which a much larger sampling area is needed in order to derive representative results) was not considered.

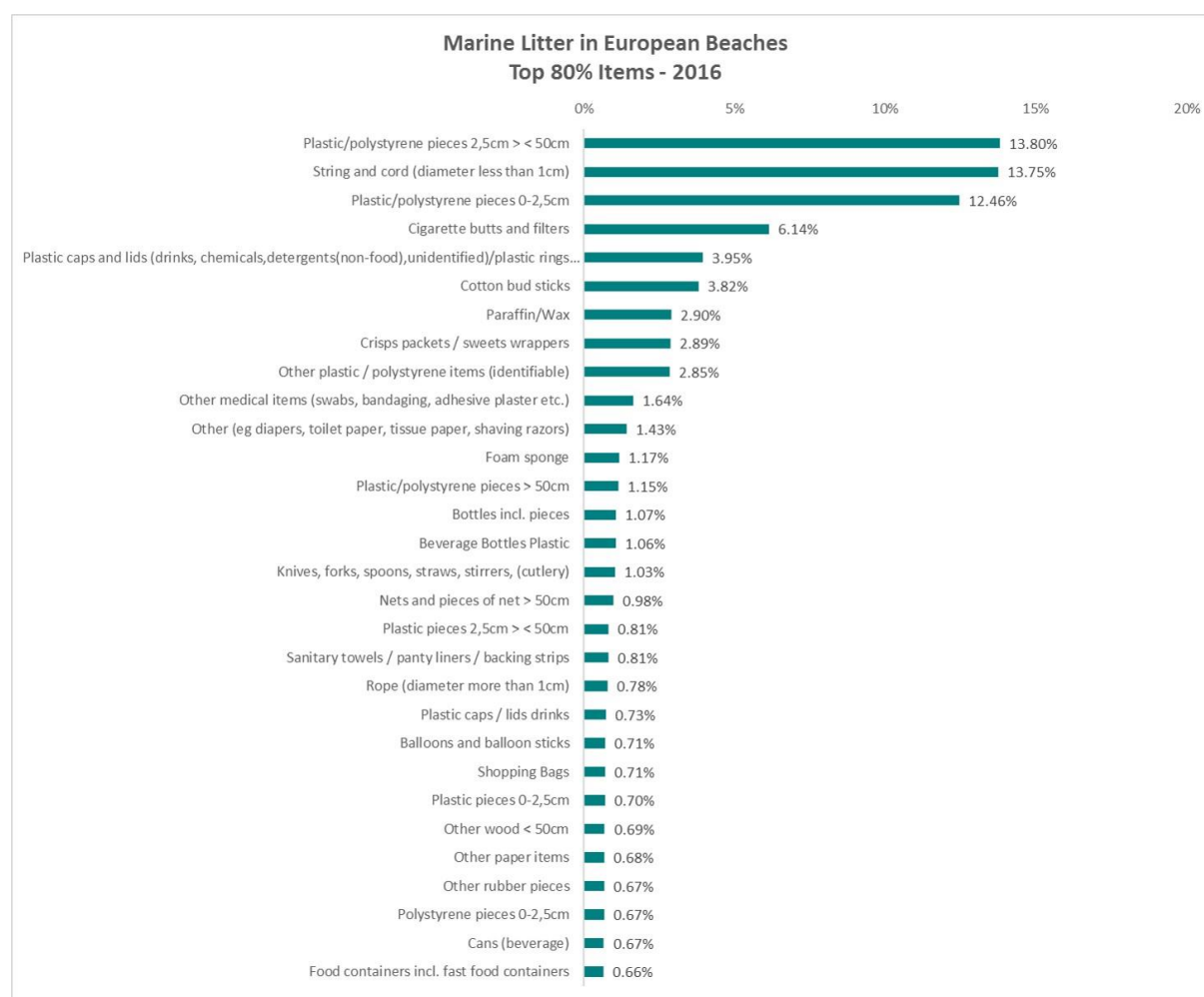
²⁰ Top Marine Beach Litter Items in Europe. JRC108181, Authors A.M.Addamo, P.Laroche and G.Hanke

²¹ <https://www.eea.europa.eu/themes/water/europes-seas-and-coasts/marine-litterwatch#tab-news-and-articles>

EU funding is being deployed to understand marine litter²², supporting global, national and regional action.

For the purpose of this Impact Assessment, the best information comes from beach counts. The table below shows information about marine litter items found on European Beaches from the JRC's Technical Group of Marine Litter Activities (monitoring programmes, clean-up campaigns and research projects), collected from 276 beaches of 17 EU Member States and 4 Regional Seas during the year 2016. A total of 355,671 items observed during 679 surveys are ranked by abundance, mainly according to the MSFD Master List Categories of Beach Litter Items.

Table 1: Marine litter items found on European beaches, share (%) by item-count, top 80%, 2016



The following table shows the same information but along with a longer list covering the top 125 along with the code and number of items found.

²² For instance, in the Arctic Region, the Circular Ocean INTERREG project is testing new opportunities for reusing old fishing nets, including a material to remove pollutants from water (<http://www.circularocean.eu/>). In the Baltic Sea Region, the BLASTIC project maps potential litter sources in urban areas and monitors litter levels in the aquatic environment (<https://www.blastic.eu/>). Both projects are supported by the European Regional Development Fund.

Table 2: Marine litter items found on European beaches, share (%) by item-count, 2016

Ranking	Material	General Name Litter Item	Master List Code	Number of Items	%
1	Plastic	Plastic/polystyrene pieces 2,5cm > < 50cm	G76	49082	13,80%
2	Plastic	String and cord (diameter less than 1cm)	G50	48919	13,75%
3	Plastic	Plastic/polystyrene pieces 0-2,5cm	G75	44309	12,46%
4	Plastic	Cigarette butts and filters	G27	21854	6,14%
5	Plastic	Plastic caps and lids (drinks, chemicals, detergents (non-food), unidentified)/plastic rings from bottle caps/lids	G20-G24	14064	3,95%
6	Plastic	Cotton bud sticks	G95	13579	3,82%
7	Chemicals	Paraffin/Wax	G213	10305	2,90%
8	Plastic	Crisps packets/sweets wrappers	G30	10267	2,89%
9	Plastic	Other plastic/polystyrene items (identifiable)	G124	10142	2,85%
10	unidentified	Other medical items (swabs, bandaging, adhesive plaster etc.)	G211	5841	1,64%
11	Plastic	Other (e.g. diapers, toilet paper, tissue paper, shaving razors)	GX1	5077	1,43%
12	Plastic	Foam sponge	G73	4156	1,17%
13	Plastic	Plastic/polystyrene pieces > 50cm	G77	4103	1,15%
14	Glass/Ceramics	Bottles incl. pieces	G200	3818	1,07%
15	Plastic	Beverage Bottles Plastic	G6-G8	3776	1,06%
16	Plastic	Knives, forks, spoons, straws, stirrers, (cutlery)	G34-G35	3666	1,03%
17	Plastic	Nets and pieces of net > 50cm	G54	3499	0,98%
18	Plastic	Plastic pieces 2,5cm > < 50cm	G79	2878	0,81%
19	Plastic	Sanitary towels/panty liners/backing strips	G96	2877	0,81%
20	Plastic	Rope (diameter more than 1cm)	G49	2792	0,78%
21	Plastic	Plastic caps/lids drinks	G21	2605	0,73%
22	Rubber	Balloons and balloon sticks	G125	2542	0,71%
23	Plastic	Shopping bags	G3	2520	0,71%
24	Plastic	Plastic pieces 0-2,5cm	G78	2504	0,70%
25	Processed/worked wood	Other wood < 50cm	G171	2468	0,69%
26	Paper/Cardboard	Other paper items	G158	2402	0,68%
27	Rubber	Other rubber pieces	G134	2385	0,67%
28	Plastic	Polystyrene pieces 0-2,5cm	G81	2385	0,67%
29	Metal	Cans (beverage)	G175	2373	0,67%
30	Plastic	Food containers incl. fast food containers	G10	2330	0,66%
31	Plastic	Shotgun cartridges	G70	2263	0,64%
32	Plastic	Strapping bands	G66	2239	0,63%
33	Plastic	Small plastic bags, e.g. freezer bags	G4	2131	0,60%
34	Plastic	Tangled nets/cord	G56	2108	0,59%
35	Plastic	Cups and cup lids	G33	1995	0,56%
36	Metal	Bottle caps, lids and pull tabs	G178	1982	0,56%
37	Paper/Cardboard	Cigarette packets	G152	1948	0,55%
38	Plastic	Nets and pieces of net < 50cm	G53	1865	0,52%
39	Glass/Ceramics	Other glass items	G210	1710	0,48%
40	Glass/Ceramics	Construction material (brick, cement, pipes)	G204	1626	0,46%
41	Plastic	Sheets, industrial packaging, plastic sheeting	G67	1441	0,41%
42	Metal	Foil wrappers, aluminium foil	G177	1414	0,40%
43	Plastic	Fishing line/monofilament (angling)	G59	1351	0,38%
44	Cloth/Textile	Clothing/rags (clothing, hats, towels)	G137	1250	0,35%
45	Plastic	Toys & party poppers	G32	1234	0,35%
46	Plastic	Drink bottles ≤ 0,5l	G7	1188	0,33%
47	Plastic	Caps/lids	G21-G23	1160	0,33%

48	Plastic	Cleaner bottles & containers	G9	1148	0,32%
49	Plastic	Mussel nets, Oyster nets	G45	1142	0,32%
50	Metal	Household batteries	G195	1132	0,32%
51	Plastic	Drink bottles > 0,5l	G8	1131	0,32%
52	Plastic	Plastic bags (opaque and clear)	G2-G4	1093	0,31%
53	Plastic	Polystyrene pieces 2,5cm > < 50cm	G82	1039	0,29%
54	Cloth/Textile	Other textiles (incl. rags)	G145	1022	0,29%
55	Paper/Cardboard	Cups, food trays, food wrappers, drink containers	G153	956	0,27%
56	Processed/worked wood	Ice-cream sticks, chip forks, chopsticks, toothpicks	G165	850	0,24%
57	Plastic	Cigarette lighters	G26	795	0,22%
58	Cloth/Textile	Tampons and tampon applicators	G144	789	0,22%
59	Plastic	Foam packaging/insulation/polyurethane	G74	752	0,21%
60	Processed/worked wood	Other wood > 50cm	G172	717	0,20%
61	Glass/Ceramics	Glass or ceramic fragments > 2,5cm	G208	714	0,20%
62	Paper & cardboard	Paper (including newspapers and magazines)	G154-G157	694	0,20%
63	Plastic	Pens and pen lids	G28	642	0,18%
64	Plastic	Rope, string, cord	G49-G50	629	0,18%
65	Plastic	Shoes/sandals	G71	623	0,18%
66	Plastic	Other bottles & containers (drums)	G13	617	0,17%
67	Plastic	Crisp/sweet packets and lolly sticks	G30-G31	593	0,17%
68	Plastic	Plastic caps/lids unidentified	G23	576	0,16%
69	Plastic	Straws and stirrers	G35	566	0,16%
70	Paper/Cardboard	Cardboard (boxes and fragments)	G148	557	0,16%
71	Plastic	Plastic Pieces	G74-G83/G103-G106/G122	545	0,15%
72	Plastic	Cutlery and trays	G34	537	0,15%
73	Plastic	Medical/pharmaceuticals containers/tubes	G100	495	0,14%
74	Metal	Other metal pieces > 50cm	G199	482	0,14%
75	Rubber	Condoms (incl. packaging)	G133	480	0,13%
76	Plastic	Floats/buoys	G62-G63	478	0,13%
77	Plastic	Light sticks (tubes with fluid) incl. packaging	G60	458	0,13%
78	Metal	Wire, wire mesh, barbed wire	G191	455	0,13%
79	Plastic	Mesh vegetable bags	G37	452	0,13%
80	Plastic	Gloves (industrial/professional rubber gloves)	G41	445	0,13%
81	Paper/Cardboard	Cartons/tetrapak (others)	G151	434	0,12%
82	Plastic	Beach use related cosmetic bottles and containers, e.g. sunblockers	G11	422	0,12%
83	Plastic	Plastic bag collective role; what remains from rip-off plastic bags	G5	420	0,12%
84	Plastic	4/6-pack yokes, six-pack rings	G1	369	0,10%
85	Metal	Aerosol/spray cans (industry)	G174	369	0,10%
86	Plastic	Food containers, cups and cup lids	G10/G33	362	0,10%
87	Processed/worked wood	Corks	G159	348	0,10%
88	Paper/Cardboard	Newspapers and magazines	G154	337	0,09%
89	Wood	Processed timber and pallet	G160-G161	327	0,09%
90	Plastic	Bottles & jars	G6	322	0,09%
91	Metal	Gas bottles, drums and buckets (> 4L)	G189	320	0,09%
92	Glass/Ceramics	Light bulbs	G202	294	0,08%
93	Cloth/Textile	Shoes and sandals (e.g. leather, cloth)	G138	275	0,08%
94	Rubber	Tyres and belts	G128	259	0,07%
95	Cloth/Textile	Rope, string and nets	G142	243	0,07%
96	Processed/worked	Paint brushes	G166	234	0,07%

	wood				
97	Cloth/Textile	Carpet and furnishing	G141	232	0,07%
98	Metal	Industrial scrap	G186	232	0,07%
99	Metal	Cans (food)	G176	210	0,06%
100	Metal	Other metal pieces < 50cm	G198	208	0,06%
101	Plastic	Lolly sticks	G31	204	0,06%
102	Cloth/Textile	Sacking (hessian)	G140	203	0,06%
103	Plastic	Crates and containers/baskets	G18	199	0,06%
104	Plastic	Other cosmetic bottles & containers	G12	190	0,05%
105	Plastic	Plastic rings from bottle caps/lids	G24	185	0,05%
106	Plastic	Buckets	G65	179	0,05%
107	Plastic	Dog faeces bag	G101	178	0,05%
108	Paper/Cardboard	Paper bags	G147	178	0,05%
109	Organic	Fruit, food, pastry, candy and ice cream	GX21	176	0,05%
110	Plastic	Tags (fishing and industry)	G43	174	0,05%
111	Plastic	Jerry cans (square plastic containers with handle)	G16	170	0,05%
112	Plastic	Injection gun containers	G17	168	0,05%
113	Rubber	Balloons, balls and toys	G125-G126	164	0,05%
114	Plastic	Combs/hair brushes/sunglasses	G29	161	0,05%
115	Plastic	Syringes/needles	G99	160	0,04%
116	Pollutants	Wax small	GX2	153	0,04%
117	Plastic	Food containers, candy wrappers, cups and cup lids	G10/G30/G33	147	0,04%
118	Plastic	Tobacco pouches/plastic cigarette box packaging	G25	147	0,04%
119	Paper/Cardboard	Cartons/tetrapak milk	G150	145	0,04%
120	Plastic	Engine oil bottles & containers < 50 cm	G14	140	0,04%
121	Plastic	Car parts	G19	135	0,04%
122	Plastic	Gloves (washing up)	G40	132	0,04%
123	Plastic	Crab/lobster pots and tops	G42	120	0,03%
124	Plastic	Plastic sheeting from mussel culture (Tahitians)	G47	119	0,03%
125	Plastic	Fibre glass/fragments	G68	113	0,03%

Two items in the original long list merit some further explanation. “Other medical items” is rather a group that would need to be disaggregated into several items, each of which will then have a much smaller part in marine litter. Only parts of these are plastics. Foam sponge is coming from several products, mostly from different kind of mattresses, which are multi use. Such a product would call for a completely different policy approach.

A significant type - making up around half of marine litter - is ‘single-use plastics’. Marine litter from sea-based sources is also significant: plastic waste generated on boats and ships, fishing gear, and plastics used in aquaculture are more likely to end up in the marine environment (abandoned, lost and otherwise discarded fishing gear (ALDFG)).

The analysis of the beach litter reveals that 49% of all identifiable marine litter items, are single-use plastic items, while 33% are other plastic items such as those associated with fishing or items not considered to be single-use; and 18% are non-plastic items.

Figure 4: Composition of marine litter

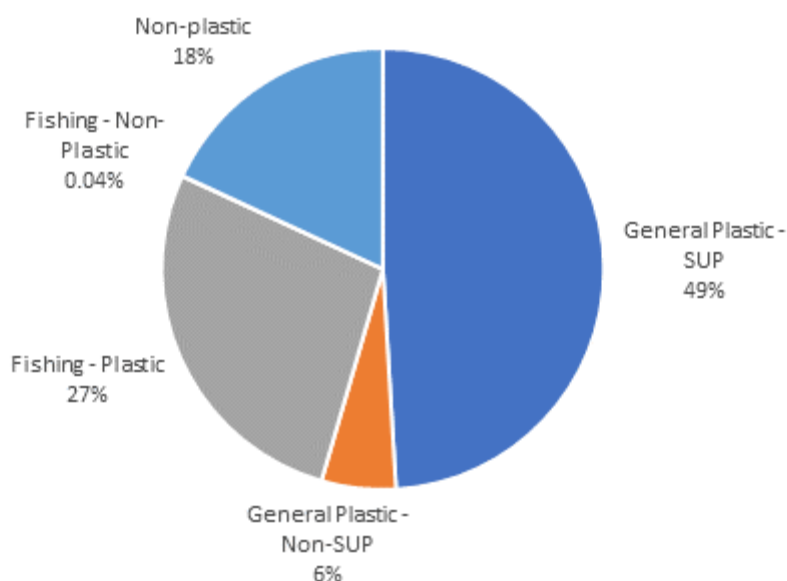
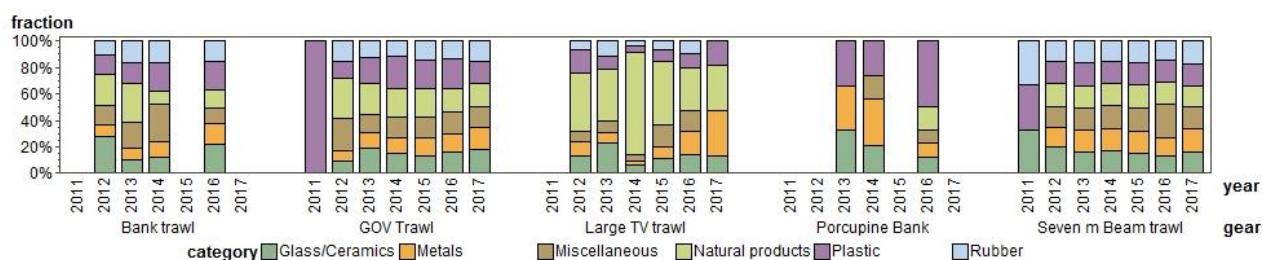


Figure 2. Composition of items found in nets in western Atlantic and Baltic (2011-2017)



Source: ICES DATRAS database²³ and analysed by EMODnet²⁴

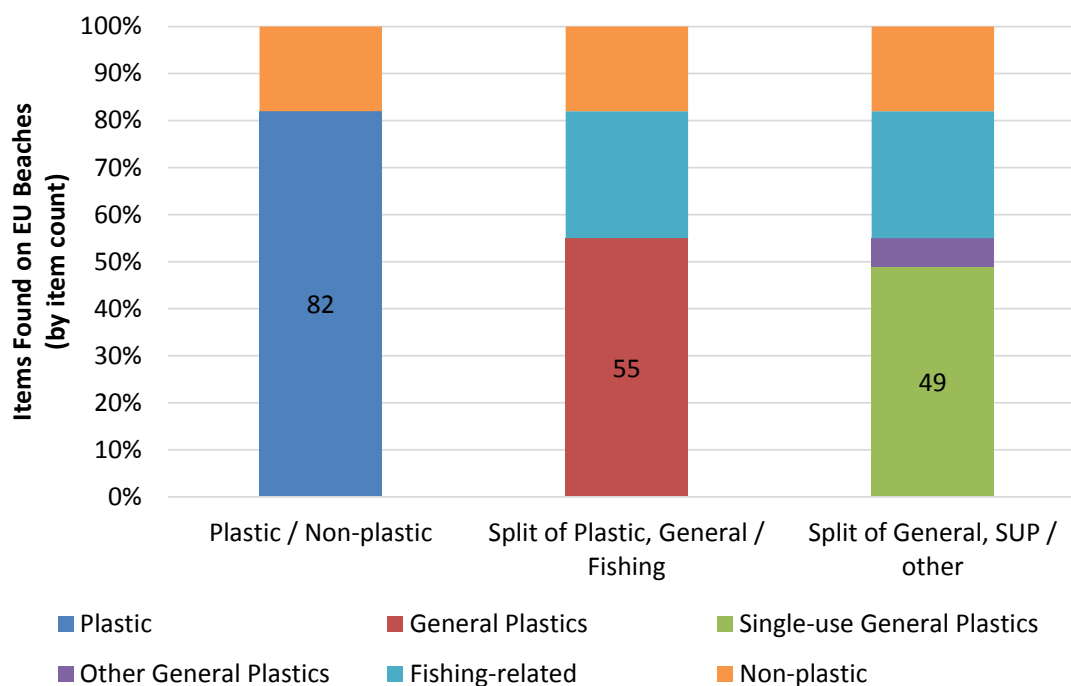
Harmonisation of records of marine litter composition on seafloor is also underway. Figure 2 shows what has been brought up in the nets of fishing vessels 2011-2017²⁵. It covers an analysis of nearly 3,000 hauls throughout the western Atlantic Ocean and the Baltic Sea.

²³ <http://www.ices.dk/marine-data/data-portals/Pages/DATRAS.aspx>

²⁴ <http://www.emodnet.eu/>

²⁵ EU's European Marine Observation and Data Network, EMODnet, stored in the ICES DATRAS database: <http://www.emodnet.eu/>

Figure 3. Composition of Marine Litter



Source: *Eunomia, based on JRC data*

The following table provides another perspective, viewing the data from the question of whether they are packaging or not and SUP or not.

Table 3: Marine litter items – splits by single-use categories

Non-packaging, Non SUP	
Non-packaging SUP	
Packaging, Non SUP	
Packaging SUP	

Supercategories, item type	Amount	% Amount	Amount as % of supercategory
PLASTIC			
Cigarette butts, Paper/plastic	27416	7%	19%
Caps and lids - drinks, Plastic	18417	5%	13%
Cotton bud sticks, Sanitary	13928	4%	10%
Crisps packets / sweets wrappers, Plastic	11366	3%	8%
Other, identifiable, non-packaging, non SUP <100 items, Plastic, Polystyrene, Rubber	10841	3%	8%
Drinks bottles, Plastic	7716	2%	5%
Other, Sanitary	5840	2%	4%
Sanpro - Towels / panty liners / backing strips; Tampon applicators / tampons, Sanitary	3704	1.0%	3%

Supercategories, item type	Amount	% Amount	Amount as % of supercategory
Shopping bags, Plastic	3700	1.0%	3%
Other bottles, Plastic	3460	0.9%	2%
Other bags, Plastic	3280	0.9%	2%
Straws and stirrers, Plastic	3040	0.8%	2%
Balloons and balloon sticks	2723	0.7%	2%
Food containers inc fast food packaging, Plastic, Polystyrene	2715	0.7%	2%
Cup and cup lids, Plastic, Polystyrene, Paper/plastic	2618	0.7%	2%
Cutlery, Plastic	2597	0.7%	2%
Strapping bands, Plastic	2321	0.6%	2%
Shotgun cartridges, Plastic	2279	0.6%	2%
Sheets, industrial packaging, plastic sheeting	1493	0.4%	1%
Toys & party poppers, Plastic	1492	0.4%	1%
On-the-go food, drinks use, Paper/Plastic	1218	0.3%	1%
Pens and pen lids, Plastic	951	0.3%	1%
Caps and lids - other, Plastic	943	0.2%	1%
Cigarette lighters, Plastic	905	0.2%	1%
Other, unidentifiable packaging, Plastic	774	0.2%	1%
Shoes / sandals, Plastic, Rubber	761	0.2%	1%
Gloves, Plastic, Rubber	618	0.2%	0.4%
Mesh bags, sacks, Plastic	550	0.1%	0.4%
Medical / pharmaceuticals containers / tubes, Sanitary	497	0.1%	0.4%
Cartons / tetrapak (others), Paper/Plastic	474	0.1%	0.3%
4/6-pack yokes, six-pack rings, Plastic	398	0.1%	0.3%
Lolly sticks, Plastic	368	0.1%	0.3%
Wheels, tyres, belts, Plastic, Rubber	287	0.1%	0.2%
Tobacco pouches / plastic cigarette box packaging, Plastic	233	0.1%	0.2%
Crates and containers / baskets, Plastic	217	0.1%	0.2%
Combs/hair brushes/sunglasses, Plastic	214	0.1%	0.2%
Cartons / tetrapak milk, Paper/Plastic	203	0.1%	0.1%
Car parts, Plastic	185	0.0%	0.1%
Injection gun containers, Plastic	172	0.0%	0.1%
Other, packaging <100 items, Plastic	163	0.0%	0.1%
Plastic construction waste	141	0.0%	0.1%
Nappies, Sanitary	32	0.0%	0.0%
Other, SUP, non-packaging <100 items, Plastic	26	0.0%	0.0%
Subtotal	141277	37%	100%
NON-PLASTIC			
Bottles, Glass, Ceramic	4497	1%	10%
Bottle caps, Metal	2968	1%	6%

Supercategories, item type	Amount	% Amount	Amount as % of supercategory
Drinks cans, Metal	2760	1%	6%
On-the-go food, drinks use, Wood	969	0.3%	2%
Bags, Paper	195	0.1%	0.4%
Other packaging, Non-plastic	6456	2%	14%
Other, identifiable, Non-plastic	29014	8%	62%
Subtotal	46859	12%	100%
Fishing, PLASTIC			
Line, Rope, Chord, Plastic, Textiles	56333	15%	86%
Fishing net & pieces, Plastic	5659	1%	9%
Octopus/Lobster/Crab pots & tops, Plastic	177	0.0%	0.3%
Other fishing related, non-packaging, Plastic, Polystyrene, Rubber, Textiles	2310	1%	4%
Other fishing related, packaging, Plastic, Polystyrene	780	0.2%	1%
Subtotal	65259	17%	100%
Fishing, NON-PLASTIC			
Fishing items, non-packaging, Non-plastic	95	0.03%	90%
Fishing items, packaging, Non-plastic	11	0.00%	10%
Subtotal	106	0.03%	100%
UNIDENTIFIED			
Non-identifiable, Plastic, Polystyrene, Rubber	115281	31%	93%
Non-identifiable, Non-plastic	9047	2%	7%
Subtotal	124328	33%	100%
Grand total	377829	100%	

Finally, the contribution of fisheries and aquaculture related activities to marine litter is significant as around 17% of beach litter items found on beaches are likely to come from these activities. This is mostly as pieces of gear, boxes and bags for packaging fish and feeds, and personal protection equipment such as gloves and boots (the third of our above 3 categories to which both aquaculture and fishing contribute), when ALDFG (the other two categories to which only fishing is likely to contribute) are more likely to be found on the sea floor. However, fishing gear litter at beaches is a more ambivalent approximation for its total abundance than for SUP, seen that e.g. abandoned nets due to their density or entanglements are more likely to be prevalent on sea floors.

Table 4: Marine litter items – splits by fishing categories

Rank	General name	Items	% of all ML
1	String and cord (diameter less than 1cm)	48919	13,75%
1	Nets and pieces of net > 50cm	3499	0,98%
2	Tangled nets / cord	2108	0,59%
3	Nets and pieces of net < 50cm	1865	0,52%
4	Fishing line / monofilament (angling)	1351	0,38%

Rank	General name	Items	% of all ML
5	Mussel nets, Oyster nets	1142	0,32%
6	Floats/Buoys	478	0,13%
7	Rope, string and nets	243	0,07%
8	Tags (fishing and industry)	174	0,05%
9	Crab / lobster pots and tops	120	0,03%
10	Fish boxes	104	0,03%
11	Fish boxes - expanded polystyrene	68	0,02%
12	Fishing related (weights, sinkers, lures, hooks)	58	0,02%
13	Octopus pots	53	0,01%
14	Fishing line (entangled)	50	0,01%
15	Oyster trays (round from oyster cultures)	27	0,01%
16	Other fishing related	20	0,01%
17	Fish boxes - plastic	17	0,00%
18	Buoys	15	0,00%
19	Fish boxes	11	0,00%
20	Fishing net	11	0,00%
21	Foam buoys	11	0,00%
22	Fishing gear (lures, traps and pots)	10	0,00%
23	Lobster / crab pots	6	0,00%
24	Mesh bags (vegetable, oyster nets and mussel bags)	5	0,00%
25	Nets and pieces of net	5	0,00%
26	Fishing related (sinkers, lures, hooks, traps and pots)	4	0,00%
27	Crab / lobster pots	4	0,00%
28	Fishing Net Pieces	3	0,00%
29	Fish hook remains	2	0,00%
30	Octopus pots	2	0,00%
31	Fishing Buoys Pots Traps	1	0,00%

Around one third of the marine litter found cannot be identified in terms of its source, but it can be assumed that its source is broadly the same as the identified items.²⁶

2.2 Methodological note on beach litter as a proxy for sea litter

Beach litter can arrive to the shore by: Transport from the sea, by tidal action, waves, currents; Dropping, loss on the beach; Transportation from land by run-off, rivers, wind or

²⁶ As always, whilst this is broadly reasonable there will be some items disproportionately unidentifiable. For example, wet wipes are moistened with some liquid and packaged so that they can be used to clean without availability of water. A reasonable assumption is that these are relatively quickly unidentifiable, as they will appear as pieces of paper (the basic material appears to be plain cellulose (paper)) if dried when flat lying, which is unlikely after use or in small clumps. So, whilst included under sanitary items, they may well be reported in other categories.

other relocation. Beach litter is therefore used not only as a proxy for what comes from the sea, but also for what can potential enter the sea (or affect marine species on the beach, also including the socioeconomic harm on tourism caused by littered beaches). The proportion of the three pathways (the third one presumably being of less importance) will depend much on the local situation including frequentation by visitors/tourists (littering locally) and the beach morphology (sand, gravel, slope, exposition). Note that most touristic beaches with regular (even daily) cleaning are not considered by the monitoring schemes.

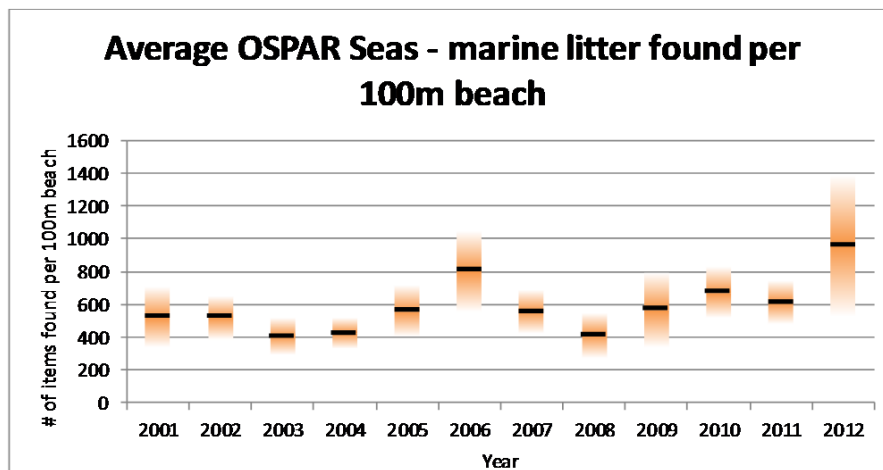
A general comment about beach litter data quality is that most of the data have been derived from observations and from clean-up events. There is now longstanding experience and the use and harmonisation of monitoring protocols has improved the situation. Still beach litter monitoring is not as precise as e.g. chemical contaminant measurements. The fate (and thus concentration) of litter items on the beaches depends on multiple factors, on top of the observer induced variability. This concerns e.g. wind (sweet wrappers can easily be blown away (and be blown back)), and visitor number (plastic items can be mixed under soft sand), etc., thus changing the observed items, while they can still affect the environment. Therefore this type of data can only be interpreted in a statistical distribution way and being aware of the variability²⁷.

For the sea surface harmonised methodologies are still being set-up. For seafloor litter data from International Bottom Trawling Surveys are available. The MSFD Technical Group on Marine Litter is working on the updating of the MSFD Guidance on litter monitoring²⁸.

2.3 Evolution of marine litter over time

Time series data from marine litter monitoring programmes (OSPAR, 2012) do not indicate a reduction of the amount of marine litter in European seas.

Figure 5: Marine litter found on European shores (number of items per 100m of coastline)



Source: OSPAR (in Panteia, 2015)

2.4 Categorisation of marine litter

Marine litter is usually categorised using the MSFD Master List Categories of Beach Litter Items that is the approach to provide a consistent identification of litter categories across

²⁷ JRC, 2016, Marine Beach Litter in Europe JRC 103929

²⁸ <http://publications.jrc.ec.europa.eu/repository/bitstream/JRC83985/lb-na-26113-en-n.pdf>

Europe. There are still different lists in use, some of them not easily comparable across all categories. The MSFD Technical Group is tackling that issue in its 2018 work programme. This sets out a number of types and their most prominent sources.

Table 5: Marine Conservation Society full list of litter items and attributed sources (MCS, 2013)

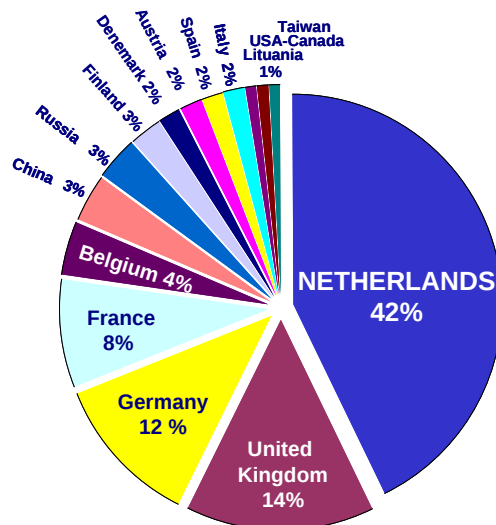
Public Litter:	4/6 pack yokes, plastic bags (including supermarket), plastic drinks bottles, plastic food containers, plastic toiletries bottles, plastic caps / lids, cigarette lighters / tobacco pouches, combs / hair brushes / sunglasses, crisp / sweet / lolly / sandwich wrappers, cutlery / trays / straws / cups, pens, plastic shoes / sandals, shotgun cartridges, toys / party poppers / fireworks / dummies, polystyrene fast food containers / cups, balloons / balloon string, clothing / shoes / beach towels, disposable barbecues, metal bottle caps, metal drink cans, foil wrappers, household batteries, animal faeces in bags, animal faeces not in bags, paper bags, cartons / tetrapak (e.g. fruit juice), cigarette packets, cigarette stubs, paper cups, newspapers / magazines, corks, ice lolly sticks / chip forks, glass bottles, glass pieces.
Fishing:	Fish boxes, fishing line, fishing net and net pieces <50cm, fishing net and net pieces >50cm, floats (fishing buoys) / reels, plastic lobster / crab pots and tops, string and cord diameter <1cm, polystyrene buoys, polystyrene fish boxes, rubber boots, heavy duty gloves, tyres with holes, fishing weights / hooks / lures, metal lobster / crab pots and tops, wood lobster / crab pots and tops.
Sewage-Related Debris:	Condoms, cotton bud sticks, nappies, tampon applicators / tampons, toilet fresheners, towels / panty liners / plastic backing strips, wet wipes, other sanitary items.
Shipping:	Plastic cleaner bottles, foreign plastic bottles, plastic oil bottles, industrial packaging / crates / sheeting, mesh bags (e.g. vegetable), Rope diameter >1 cm, strapping bands, aerosol cans, metal food cans, oil drums, cartons / purepak (e.g. milk), pallets / crates, light bulbs / tubes.
Fly Tipped:	Traffic cones, tyres without holes / wheels, cloth furnishings, car parts / car batteries, scrap metal / appliances / paint tins, pottery / ceramic.
Medical:	Inhalers, plasters, syringes, other medical items.
Non-Sourced:	Plastic pieces <2.5cm, plastic pieces >2.5cm, other plastics, fibreglass, foam / sponge / insulation, polystyrene packaging, polystyrene pieces <50cm, other polystyrene items, light weight gloves, rubber pieces <50cm, other rubber items, cloth pieces, sacking, other cloth items, wire / wire mesh / metal pieces, other metal items, cardboard, other paper items, paint brushes, wood pieces (not twigs), other wood items.

2.5 Travelling of marine litter

It is common to ask where the litter found on a particular beach has come from. This can be estimated using labels and bar-codes on litter, which provides information on the country of production, the manufacturer, the product type and the age of litter items. However, labels can be lost or become illegible and only items with a label or bar-code (not items like cigarette butts or cotton-bud-sticks) can be included in the analysis and sometimes the bar code could be misleading (bought in one country, discarded in another). Therefore, this type of information should be analysed with caution.

Van Franeker (2005) categorised items found on a beach clean in Texel in the Netherlands to a country of origin. The majority of items originated from the Netherlands or neighbouring regions, indicating that this method can be used to provide information on the likelihood of litter items originating from given sources as well as on their geographical origin (see below).

Figure 6: Proportions of countries of origin as derived from barcodes or label information on litter items found on Texel, April 2005 (translated from van Franeker, 2005)



2.6 Marine litter aggregation – creating a ‘top 10’

2.6.1 General data

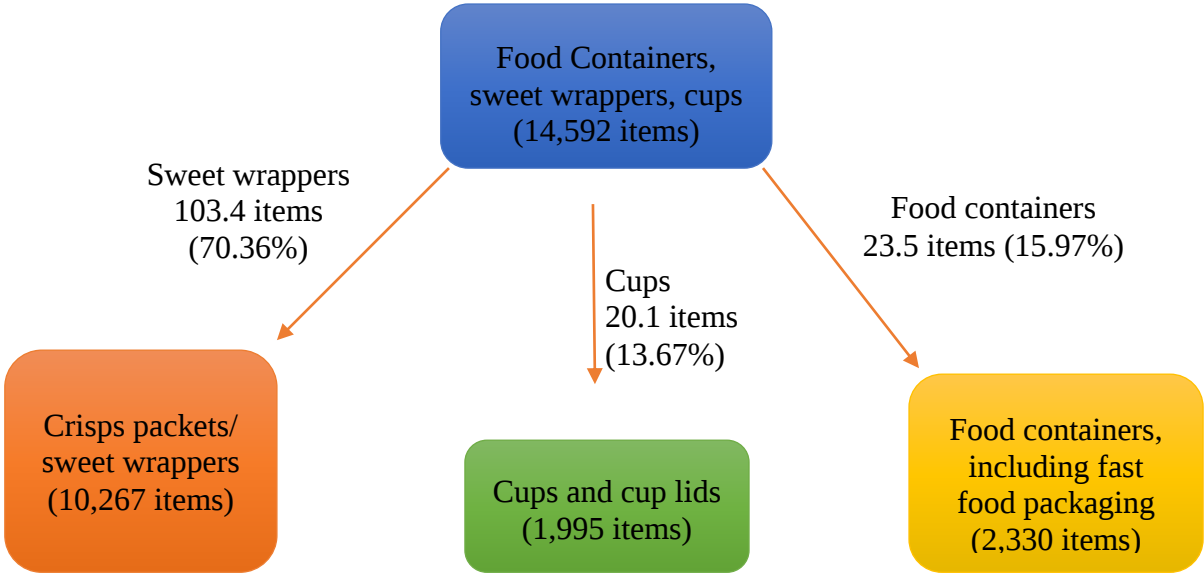
The MSFD Master List Categories of Beach Litter Items is highly detailed. This makes sense for identifying what is on beaches, but it makes less sense from a policy perspective. For this reason, categories that are very similar have been grouped together (aggregated).

The JRC Technical Report: Top Marine Beach Litter Items in Europe lists marine litter items collected in 2016. The JRC list identifies 251 different types of litter and a total of 355,744 items. First, as the list does not identify plastics specifically, or single-use items, the list was divided into plastic, non-plastic and fishing items. Plastic items were then assessed as single-use or non-SUP.

As countries and regions have adopted different methods, there is significant over-lap between some categories (such as “4/6-pack yokes, six-pack rings” and “4/6-pack yokes, six-pack rings/bags/shopping bags including pieces/small plastic bags, e.g. freezer bags including pieces”) and some items could potentially be listed in a number of categories.

The JRC list was then used to compile a shorter list of discrete classifications that provide the relative contributions of items that are alike in terms of source, use or material and are generally under the domain of a defined policy area. From the JRC list, 31 SUP categories were disaggregated so that the items could be re-allocated to different groups. For example, “Food containers, sweet wrappers, cups” was divided into: “Food containers including fast food packaging”; “Cups and cup lids”; and “Crisps packets/ sweet wrappers”, as illustrated below.

Figure 7: The disaggregation of “Food containers, sweet wrappers, cups”



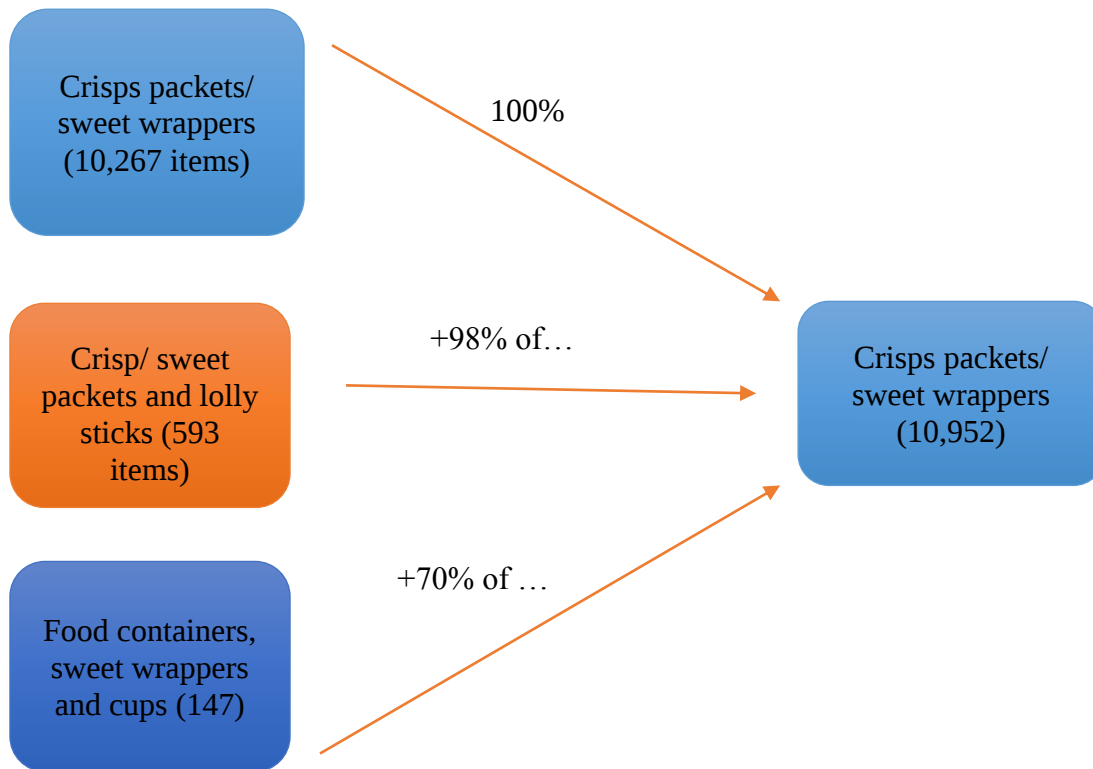
The process for apportioning the items affects the final rankings and there is no completely objective way to do this. The method adopted ensures that the top ten items reflect an accurate assessment of the data collected from the disparate studies, without misrepresenting the prevalence of any given item.

The items were disaggregated proportionally, based on the compositions of other categories with similar items. For example, food containers were known to account for 16% of the total number of original items in the three categories “Food containers, sweet wrappers and cups”, therefore were disaggregated (2,330 out of 14,592). It was assumed that 16% of those 147 items were food containers and 23.5% were re-allocated to “food containers, including fast food packaging”.

Once the broader groupings had been disaggregated into the most relevant specific category, they were aggregated into similar categories and those where, for the purpose of this analysis, it was not important to distinguish between relatively similar items. Considering material composition, manufacturing, usage and policy approach, for instance, it was not considered necessary to distinguish between crisp packets and sweet wrappers. Conversely, sweet wrappers and food containers are qualitatively different, so are split. Similarly, beverage bottles were disaggregated from other types of plastic bottle.

This process generated 17 classifications of SUP, representing 141,277 units; **Figure 8** illustrates the composition of one of these 17 classifications.

Figure 8: The aggregation of “Crisps packets/ sweet wrappers”



The table below lists the top ten items following the disaggregation and aggregation process. The complete list, including a full breakdown of the categories contributing to the top ten and the proportions allocated, is included in Annex 1 (Eunomia report).

The table demonstrates that by focussing on these items, potentially 77% of the general plastic items found on beaches can be addressed by the measures proposed; while a full 86% of the single-use plastic items that are found on beaches could be addressed.

Table 6: Top ten SUP Items

Ranking	Item	Total Number on sample of beaches monitored in 2016	% as proportion of general plastic items ¹	Cumulative % of items in scope as a proportion of general plastic items ¹	% as proportion of single- use plastic items ²	Cumulative % of items in scope as a proportion of single-use plastic items ²
1	Drinks bottles, caps and lids	24,541	19%	19%	21%	21%
2	Cigarette butts	21,854	17%	36%	19%	39%
3	Cotton buds sticks	13,616	11%	46%	12%	51%
4	Crisp packets/ sweet wrappers	10,952	9%	55%	9%	61%

Ranking	Item	Total Number on sample of beaches monitored in 2016	% as proportion of general plastic items ¹	Cumulative % of items in scope as a proportion of general plastic items ¹	% as proportion of single- use plastic items ²	Cumulative % of items in scope as a proportion of single-use plastic items ²
5	Sanitary applications	9,493	7%	62%	8%	69%
6	Plastic bags (CBD & non-CBD)	6,410	5%	67%	6%	74%
7	Cutlery, straws and stirrers	4,769	4%	71%	4%	79%
8	Drinks cups and cup lids	3,232	3%	73%	3%	81%
9	Balloons and balloon sticks	2,706	2%	75%	2%	84%
10	Food containers incl. fast food packaging	2,602	2%	77%	2%	86%

¹"General plastic items" – is the group of items excluding non-identifiable items such as fragments, non-plastic items, and items associated with fishing and aquaculture.

²"Single-use plastic items" – is the group of items excluding non-identifiable items such as fragments, non-plastic items, items associated with fishing and aquaculture, and non-single-use plastics.

Some understanding of the aggregation groups is needed. For example, Sanitary applications are a fairly aggregated category, and comprise a number of different items:

- Wet wipes
- Sanitary towels/ panty liners/ backing strips;
- Sanitary (nappies, cotton buds, tampon applicators, toothbrushes);
- Tampons and tampon applicators;
- Other (e.g. diapers, toilet paper, tissue paper, shaving razors);
- Toilet fresheners;
- Syringes/ needles; and
- Condoms (including packaging).

This list is based on the MSFD or OSPAR category codes, where wet wipes is not a separate category. The UK and the Republic of Ireland are the only locations where the frequency of wet-wipes is recorded as a specific category. The data comes from parallel monitoring efforts – the Great British Beach Clean (run by the Marine Conservation Society – MCS) in the UK and the Clean Coasts Big Beach Clean in the Republic of Ireland. These produced the following statistics:

- UK – wet wipes are 45% of sanitary items. When cotton buds are separated out (as our analysis for the top ten does), they constitute 80% of sanitary items; and
- Republic of Ireland – wet wipes are 51% of sanitary items. Excluding cotton buds, they are 72% of sanitary items.

None of the other nations collect litter data on wet wipes as a distinct category. However, they may well be a dominant part of this category.

Table 7: Additional ranked SUP items

Ranking	Item	Total Number on sample of beaches monitored in 2016	% as proportion of general plastic items ¹	Cumulative % of items in scope as a proportion of general plastic items ¹	% as proportion of single- use plastic items ²	Cumulative % of items in scope as a proportion of single-use plastic items ²
11	Shotgun cartridges, Plastic	2263	2%	79%	2%	88%
12	Strapping bands, Plastic	2239	2%	81%	2%	90%
13	Cigarette lighters, Plastic	795	1%	82%	1%	91%
14	4/6-pack yokes, six-pack rings, Plastic	372	0%	82%	0%	91%
15	Lolly sticks, Plastic	216	0%	82%	0%	91%
16	Tobacco pouches / plastic cigarette box packaging, Plastic	148	0%	82%	0%	91%
17	Nappies, Sanitary	21	0%	82%	0%	91%

¹ "General plastic items" – is the group of items excluding non-identifiable items such as fragments, non-plastic items, and items associated with fishing and aquaculture.

² "Single-use plastic items" – is the group of items excluding non-identifiable items such as fragments, non-plastic items, items associated with fishing and aquaculture, and non-single-use plastics.

2.6.2 Regional seas data

Findings vary to some extent across Europe depending on region (and indeed vary by beach within a given region):

- North-East Atlantic: Maritime activities – fishing, commercial shipping, ferries and cruise shipping, leisure boat traffic, offshore installations and aquaculture facilities – and land-based tourism and recreational activities account for about 80 per cent of waste input. Other sources include discharges from municipal waste through rivers and canals, and solid waste from industrial facilities, dumpsites or sewage systems near the coast.
- Baltic Sea: The majority of the finds can be traced to consumer waste, with a relatively high share of household goods and equipment associated with tourism (including toiletries). Its input path is rivers and coastlines. The greatest sea-based source of input is the fishing industry.
- Mediterranean Sea: Land-based sources account for the majority: about 40-50 per cent of litter input owes to tourism, with volumes rising significantly during the holiday season. An estimated additional 40 per cent consists of household items (including toiletries). In

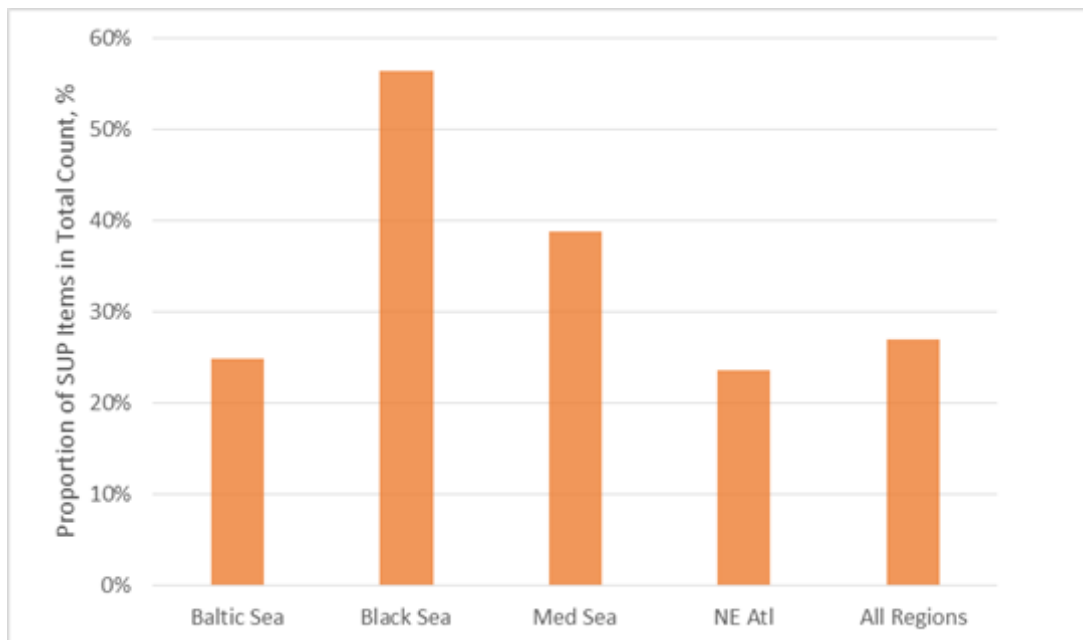
addition to inputs from the fishing industry, cigarette butts are also present on a substantial scale along the Mediterranean.

- **Black Sea:** Relatively little data is available, and the results of investigations differ both regionally and locally. Some data points to municipal waste which is discharged in sewage, e.g. from poorly managed dumpsites, as a dominant factor. Next are inputs from maritime transport, ports and coastal tourism. Investigations at beaches near Constanta in Romania, however, indicate that the main local source of input is tourism (inland and coastal), followed by part-time fisheries. Many household items (including toiletries) are also found. Illegal fishing activities are also identified repeatedly as a major source.

Analysis of top 10 by regional sea

The regional data was analysed to understand whether the problem appeared to be constrained to certain areas of the EU or whether it was wide spread. The total counts vary significantly by sea, related to the length of coastline and number of surveys. It is clear that the Black and Mediterranean Seas have higher incidences of SUP items in the beach counts.

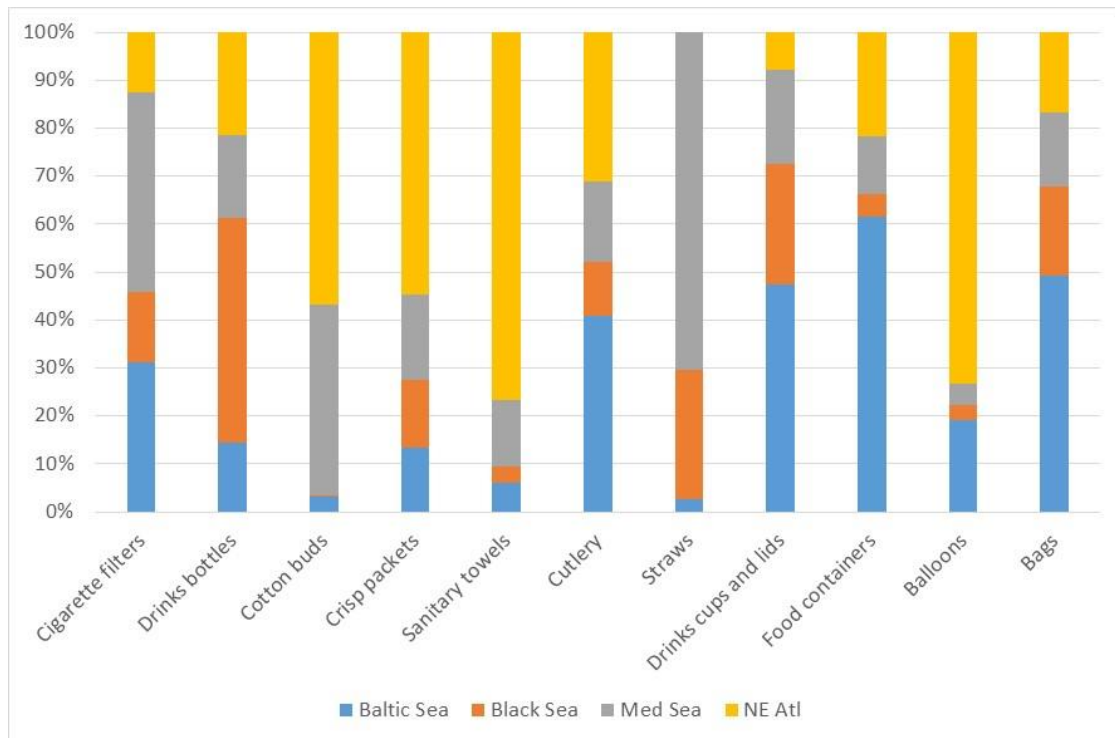
Figure 9: Proportion of top 10 items in total beach litter counts



Secondly, the relative shares of the key items vary by sea but all items are present in all seas. The supposed lack of straws in the NE Atlantic is a factor of the categorisations, rather than an absence of the items.

Whilst distributions vary, the top 10 categories account for a large proportion of SUPs in each sea, but with variation in the rankings (so what is first somewhere, may be 5th elsewhere but there is no evidence that as a grouping the top 10 does not seem reasonable prioritisation in each sea). The regional seas analysis, therefore, suggests that the top ten list above is suitable for analysis in this Impact Assessment.

Figure 10: Relative shares of key items by sea

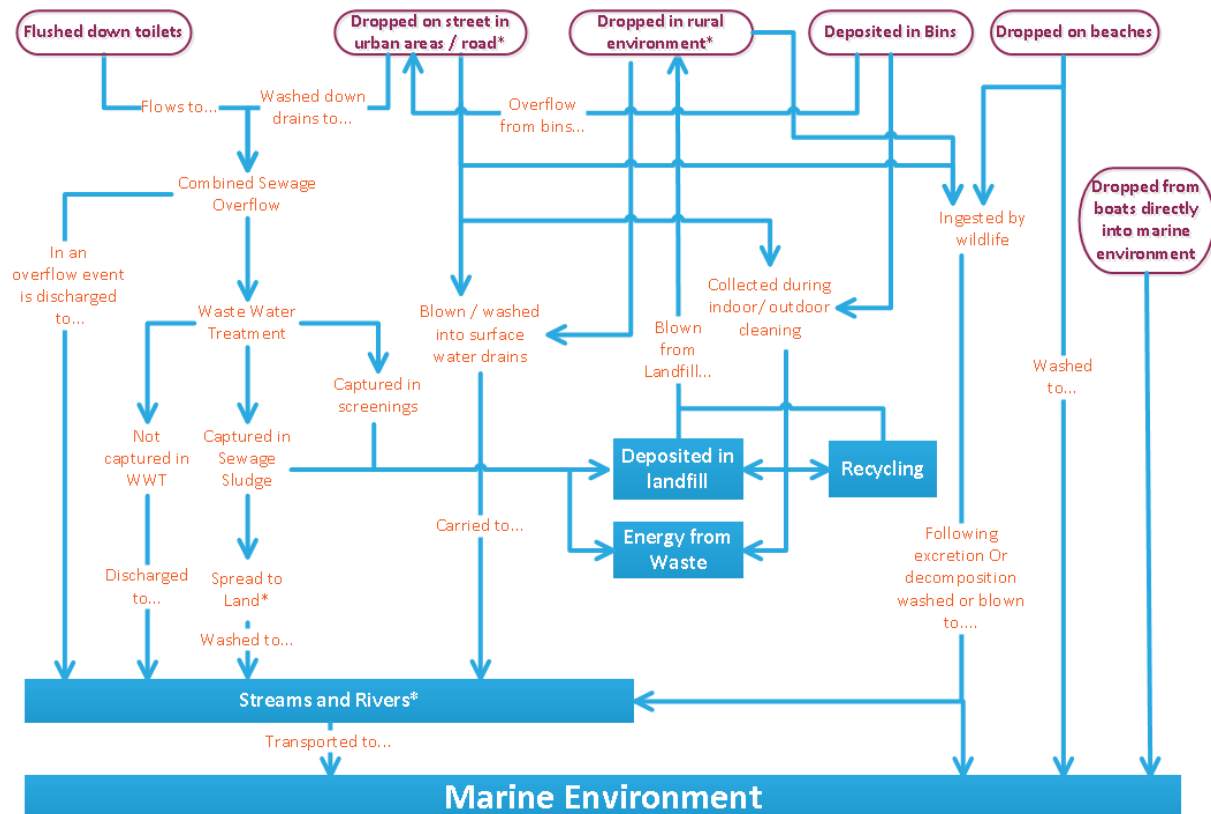


2.7 Pathways for marine litter

In general terms, the key pathways for the SUP items to reach the marine environment, are:

- Consumers drop litter on the ground in the urban or rural environments. This is to some extent due to the lack of convenience of the alternative, i.e. responsible management, but also the lack on incentives, economic or otherwise, to do the right thing. Many consumers will do the right thing, but a section of society is either unaware or uncaring of the consequences of dropping litter; and
- Consumers flush items down the toilet or drains (e.g. cotton buds, wet-wipes and sanitary towels). The driver in this instance is somewhat convenience but potentially more weighted towards perceived health risks from dealing with soiled sanitary items, or from the assumption that they will be properly treated in the sewerage system (ie few people understand that a flushed cotton bud stick may end up in the sea).

Figure 11: SUP pathways



The following table looks at this more closely for specific items, and elaborates the transport mechanism and sources.

Table 8: Examples of sources, means of release, geographic origin, pathways and transport mechanism for a few marine litter items found on the Northern coast of Germany²⁹

	Source	Means of release	Geographic origin	Pathway	Transport mechanism
COTTON BUD STICKS	Consumers / General Public	Improper disposal down the toilet	Households	Sewage systems and/or rivers	Sewage, rivers, ocean currents and tides
PLASTIC BAGS	Coastal tourism & recreation	Littering (e.g. on beach)	Local (e.g. coastal town or beach nearby)	Direct entry (beach) or e.g. windblown (if town nearby)	Wind and tides
	Consumers / General Public	Littering (e.g. on street, from car, in natural area)	e.g. Distant (inland town)	Distant - Wind (blown) and/or rivers	Wind, rivers, ocean current and tides
	Waste management at	Overflowing open bin	Beach	Direct input	Wind, tides and currents

²⁹ Source: JRC Technical Report, Identifying Sources of Marine Litter, 2016

	beach				
NETS AND PIECES OF NETS	Fisheries	Discard or unintentional loss over board during net repair work at sea	E.g. Local fisheries, regional fisheries or distant fisheries	Direct entry - nets get washed or thrown overboard	Winds(drift), currents and tides
	Fisheries	Loss of nets and pieces of net during fishing (snagging)	E.g. Local fisheries, regional fisheries or distant fisheries	Direct entry - nets get snagged on wrecks, rocks etc. ripped off pieces of net remain attached to objects underwater or are released into the water column (ghost nets)	Winds (drift), currents and tides
	Fisheries and/or harbours	Discard or unintentional loss during net repair work on land or/and runoff from harbours	E.g. local fishing harbours	Direct entry - nets washed, blown or thrown (swept) into harbour basins and washed out to sea	Winds (blow-off), tides and currents
INJECTION GUN CARTRIDGE (Grease)	Shipping including fisheries	Discard or unintentional loss overboard at sea	Local (cartridges recorded on beaches are not fouled, not battered)	Direct entry from ships at sea	Winds (drift), currents and tides
TAHITIAN S (Plastic sheeting to protect mussel cultures)	Aquaculture	Unintentional loss or discard after use	Distant – International - Northwest France/Atlantic coast of France	Direct input	Winds, currents and tides

2.8 Sea and land based split of marine litter

Attributing marine litter to different land and sea based sources is a challenge. Litter on the beach is the easiest to count and use for monitoring, but in many cases could be attributed either to land or sea based sources with different degrees of probability. Also, beach litter as discussed above, is an imperfect indicator and it is acknowledged that some items will be disproportionately found on beaches.

For example, a study by Sá et al (2015) finds evidence that significant higher concentrations of waste float near dense shipping routes (operational waste and packaging material),

compared to the areas with little shipping traffic, indicating the contribution of the (merchant) shipping sector to waste at sea.

For the fisheries sector, more specific estimates exist in relation to fisheries equipment, including so-called abandoned, lost or otherwise discarded fishing gear (ALDFG), ranging up to 220,000 tons per year for the EU as a whole (calculations based on Eunomia, 2016). Data from fishing for litter programmes initiated over the past decade suggest that the amount of ALDFG is gradually decreasing, but still a lot of ‘old’ ALDFG is in Europe’s seas. ALDFG is to be passively fished and delivered to port, which is supported by fishing for litter programmes or independently.

Plastics are the most abundant debris found in the marine environment and comprise more than half of marine litter in European Regional Seas. Figures estimated point at 54,000 to 145,000 tonnes of plastic per year entering the marine environment from land-based sources (Eunomia, 2016). Visual surveys and surface trawls indicate a stock of plastics floating near the surface to be in the order of 268,000 tons, to which European seas are accounting at least 30% (Five Gyres Institute, 2014 as reported in Eunomia, 2016). These figures do not take into account plastics that sink or to microplastics that cannot be visually observed, indicating that the overall stock of plastics in the marine environment is significantly larger.

Analyses of the *origins of marine litter* found in European seas and on shore indicate that a substantial part originates from ships, but various sources use different estimates, caused by different measurement methods.

Table 9: Share of marine litter from sea based sources

Source	Baltic Sea	North East Atlantic	Mediterranean	Black Sea	EU average
Ocean Conservancy (2012) – waste count		20%			12%
Idem, weight corrected (Eunomia, 2016)					32%
Arcadis (2012)	18%	48%	16%	50%	34%
Of which fishing sector	51%	88%	58%	48%	65%
Of which other shipping	49%	12%	42%	52%	35%

Eunomia (2016) discusses the limitations of data and methods applied by Ocean Conservancy and Arcadis, and, also referring to other sources (Van Franeker et al., 2010 and Ioakeimidis et al., 2014), assumes a general split of 20-40% of marine litter being derived from sea-based sources.

2.9 Riverine and soil litter

There are clearly close links between marine and riverine litter, with the latter usually ending up in the former. Efforts to reduce marine litter through prevention will generally lead to a reduction of litter found on land (in soil) or in rivers. JRC analysis of litter found in rivers provides evidence of this link, with similarities between the incidence of different types of

litter in rivers and found on marine beaches. Analysis of floating macro litter from 52 rivers found 8,599 items with following frequency distribution.³⁰

Table 10: Types of litter found in rivers

Ranking	Items	% of total items
1	Plastic pieces	38.59%
2	Plastic bottle	9.55%
3	Cover / packaging	8.42%
4	Bag	7.77%
5	Polystyrene pieces	6.35%
6	Other paper	4.01%
7	Paper packaging	3.61%
8	Sheets	2.93%
9	Foam	2.70%
10	Cans	2.05%
11	Other plastic/polystyrene items	1.98%
12	Plastic container	1.81%
13	Other metal	1.48%
14	Newspapers & magazines	1.19%
15	Beams / Dunnage	0.99%
16	Other rubber	0.95%
17	Wood boards	0.72%
18	Synthetic rope	0.71%
19	Other textiles	0.57%
20	Pallets	0.48%
21	Balls	0.47%
22	Fish boxes - polystyrene	0.47%
23	Clothing	0.40%
24	Rubber boots	0.24%
25	Rope / string and nets	0.22%
26	Fish boxes - plastic	0.21%
27	Buoys	0.21%
28	Gloves	0.17%
29	Sails / canvas	0.13%
30	Fishing net	0.13%
31	Barrels	0.12%
32	Balloons	0.10%
33	Carpet & Furnishing	0.10%
34	Wire	0.08%
35	Tyres and belts	0.06%
36	Crates	0.02%
37	Fishing related	0.02%
38	Other litter	0.01%

2.10 Plastics overview

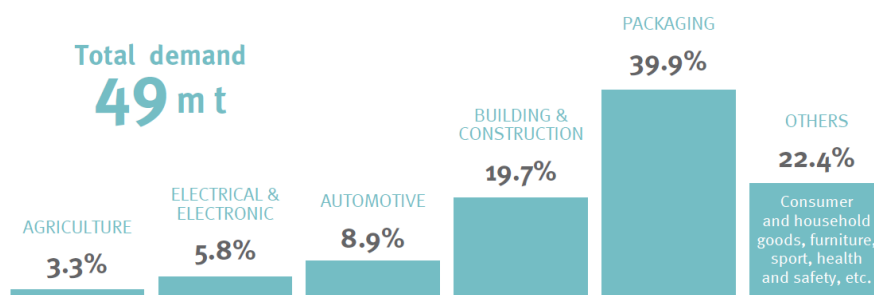
A plastic material is an organic solid, essentially a polymer, i.e. chain of several thousand of repeating molecular units of monomers, or combination of polymers. The monomers of plastic are either natural or synthetic organic compounds. The term resin is sometimes used as synonym of a commercial polymer³¹.

³⁰ See JRC Technical Report “Riverine Litter Monitoring - Options and Recommendations”, 2016 for an overview discussion.

³¹ Source: Plastics Europe

Within Europe, plastics are primarily used in packaging (40%), while the building sector is the second user (20%). Automotive, electrical & electronic and agriculture are the three other sectors with significant plastic use, as explained in the following figure.³²

Figure 12: Distribution of European (EU-28+NO/CH) plastics demand by segment in 2015³³



Plastics are traditionally derived from fossil sources, mainly oil and gas. Plastics can also be made of alternative feedstock such as renewable resources currently mainly derived from different types of agriculture (biomass), organic waste and residues, gaseous effluents (e.g. CO₂). And finally, plastics can also be made from secondary materials obtained through the chemical or mechanical recycling of collected plastic waste.

In Europe 57 million tonnes of primary plastics were produced in 2016, the share of bio-based plastics being 0.5 and 1% of EU annual plastic consumption. The European plastics industry is a big part of the chemicals industry and plays a vital role in the EU economy. It employs about 1.45 million people and has a turnover of 350 billion (including plastic converters and technology providers).

Plastic often follows a "take-make-consume-dispose" pattern of lifecycle. It is commonly agreed that this type of model does not correspond to a sustainable growth principles in a sense that it is based on the assumption that resources are abundant, available, easy to source and cheap to dispose of. Strained natural resources and climate change are however becoming an ever more tangible reality. Therefore, a model that is circular has become necessary in order to keep the added value in products for as long as possible and eliminate as much as possible waste generation. The circular economy model acknowledges that resources are limited and should be used in an efficient way.

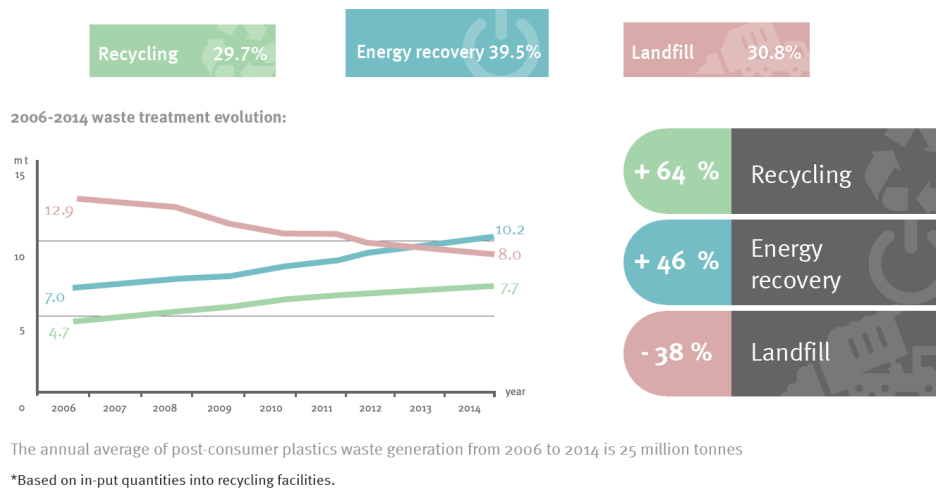
In 2014, the EU generated about 25 million tonnes of post-consumer plastic waste of which only 30 % was recycled. The performance as regards recycling of plastics wastes, although in progress, shows there is ample room for improvement. For example, the current target for recycling of plastic packaging waste is 22.5%. The average recycling rate of plastic packaging waste being 39.8% in 2015³⁴ clearly demonstrates that this target is obsolete. A more ambitious target was needed to provide incentives for increasing recycling; hence the recently proposed amendment to the Packaging and Packaging Waste Directive (55% of plastic packaging waste to be recycled by 2025).

³² http://www.plasticseurope.org/documents/document/20161014113313-plastics_the_facts_2016_final_version.pdf

³³ Source: Plastics Europe (2016). Plastics - the Facts 2016

³⁴ Source: Eurostat: http://ec.europa.eu/eurostat/statistics-explained/index.php/Packaging_waste_statistics

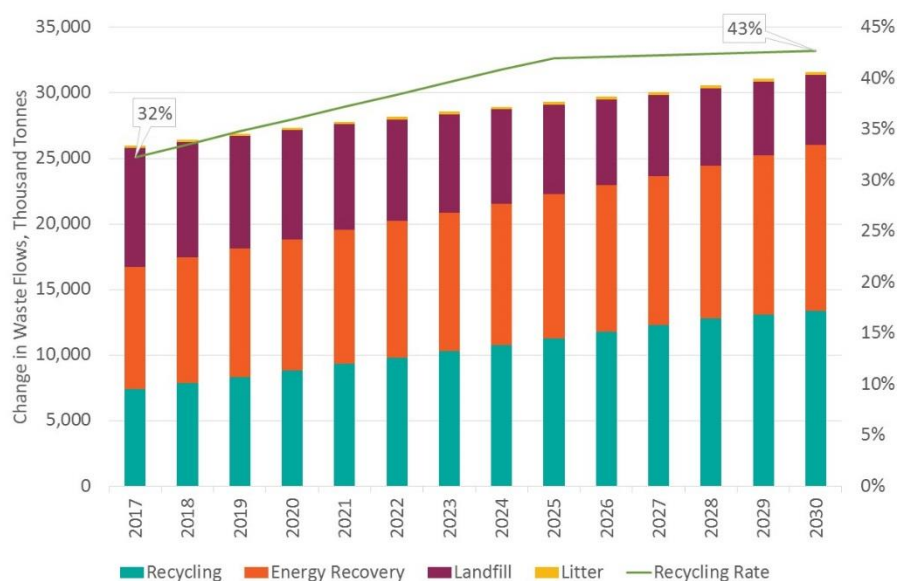
Figure 13: Waste treatment evolution 2006-2014³⁵



Once plastic wastes are considered as a resource to be kept as long as possible in the value chain the lifecycle should be modified accordingly.

In terms of the management of plastic wastes, it is estimated that around 32% are currently recycled, with this projected to increase to 43% in 2030 as a result of the baseline policies taking effect: the baseline includes the European Commission's proposed revisions to the Waste Framework Directive and waste stream Directives, which, at the time of writing, have been agreed between the co-legislators.

Figure 14: Overall EU-28 Plastic Waste Flows³⁶



Littering rates appear small in relative terms, but this still amounts to more than 200 thousand tonnes of plastic entering the environment, including the marine environment, each year by

³⁵ Source: Plastics Europe (2016). Plastics - the Facts 2016

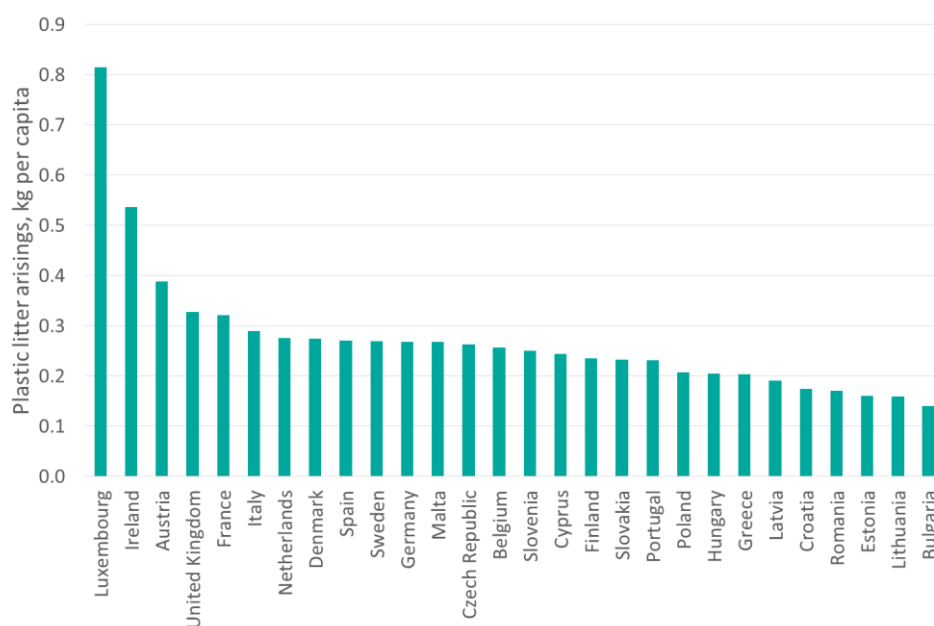
³⁶ Source: Eunomia waste flows model, data sources by sector

2030. Once again, the basis for this estimate is such that limited confidence can be attached to the estimate.

2.11 Plastic litter estimates

It is estimated that a total of 139 thousand tonnes of plastic packaging litter are generated in the EU-28 each year, of which 41 thousand tonnes are beverage bottles. The arising of plastic packaging litter in each Member State (normalised by total population) are shown below.

Figure 15: Arising of Plastic Packaging Litter by Member State in 2014, kg per capita



2.12 Waste from fishing gear

Plastic products are common in the fishing and aquaculture sectors. Aquaculture is distinguished from the fishing sector by the fact that fishing involves actively or passively catching wild fish and shellfish species; while in aquaculture, the species are farmed in enclosures or on structures that are tethered. These industries are reliant on plastic material to provide affordable, lightweight and durable equipment. Various types of plastic are utilised for different types of gear and equipment; an overview is given below.

Table 11: Overview of plastic types utilized in fishing and aquaculture gear

Material	Use
Nylon (Polyamide)	Nets (mostly gillnet and seine nets), lobster and crab pots
Polypropylene	Nets (mostly gillnet and trawl net), rope, mesh
Polyethylene	Nets (mostly trawl net, purse seine net); longlines; Aquaculture: rope, cage, floats, tubes, disks
HDPE	Trawl doors, dredges, small parts and cladding
Polystyrene, Polyurethane	Insulation, floats and buoys, including in fish aggregation devices (FADs)
PVC	Aquaculture: cages, tubing and piping
Acrylonitrile butadiene styrene (ABS), Polyvinyl difluoride (PVDF)	Aquaculture: valves

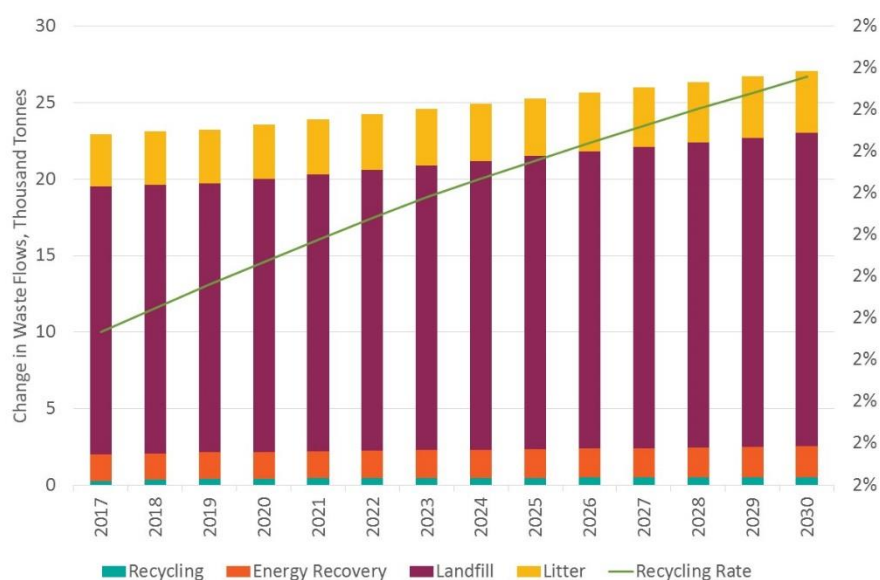
Aramids, Ultra High MW Polyethylene, Aromatic polyester	Rope, net (newer technology)
GFRP (glass fibre reinforced plastic)	Aquaculture (newer technology)

There are few estimates of plastic waste generation in the fishing and aquaculture sector and only partial data on the annual consumption of plastics by the sector. The amount of fishing gear that is abandoned, lost, or discarded at sea is only roughly estimated. An analysis based on the PRODCOM database and reports of what is found at sea is presented in annex 7.

Recycling rates are based on data from NoFir's EU-wide recycling programme, EUFir.³⁷ This is the only recycling programme to the Commission's knowledge that operates in the EU. Countries, which are not currently involved in the scheme, have been given a nominal recycling rate of zero. This yields an EU-wide recycling rate of around 1.5%. Residual treatment destinations were based on information from a Norwegian study³⁸, which indicated that little netting ends up in incinerators, as they are not usually equipped with net handling gear or adjusted for such high-calorific feedstock. Therefore the majority of gear has been allocated to landfill (76%), with a smaller proportion (8%) to incineration.

Future waste generation projections were based on historic trends in fishing and aquaculture production. Overall waste growth across the EU-28 is projected to increase by 298 tonnes per year from 2015 onwards, equivalent to 1.6% of total waste arising in 2015. The recycling rate is envisaged to remain relatively static, with little growth over time, in the absence of a more co-ordinated effort to fund and increase recycling in the sector EU-wide. The littering rate is held to be likely to remain constant, if no action is taken; and landfill and incineration rates also to remain relatively unchanged.

Figure 16: Summary of baseline waste flows for fishing gear plastics



³⁷ <https://nofir.no/>

³⁸ p57, Table 11 Mepex (2013) Økt utnyttelse av ressursene i plastavfall (Increased utilization of resources in plastic waste), Report for Klima - og forurensningsdirektoratet (Norwegian Climate and Pollution Agency), March 2013

2.13 Impacts on the environment, health and economy

Once in the environment - particularly in the marine environment - plastic waste can persist for hundreds of years. The 10 million tonnes of litter, mostly plastic, which ends up in the world's oceans and seas annually, turning them into the world's biggest plastic dump³⁹, harm the coastal and marine environment as well as aquatic life.

Marine litter causes enormous harm to ecosystems : impacts include mortality or sub-lethal effects on plants and animals through entanglement⁴⁰ (e.g. from ghost nets⁴¹) physical damage, smothering, ingestion of plastic by animals such as turtles or birds, including microplastics; these microplastics have the potential to accelerate accumulation of chemicals throughout the food chain, with potential negative impacts on human health. Furthermore, marine litter facilitates the invasion of alien species, altering benthic community structure⁴². Most plastic debris eventually comes to rest on the seabed⁴³.

The number of species known to be affected by the marine litter are now almost 800, the proportion of cetacean and seabird species has risen to 40% and 44% respectively, while some surveys show that 100% of turtles are affected by ingestion of litter. A recent technical report from JRC provides insight about the major negative impacts from marine litter by describing the mechanisms of harm⁴⁴.

Microplastics are ubiquitous and reach even the most remote areas⁴⁵ with a concentration in water sometimes higher than that of plankton. These micro plastics, and the chemical additives they contain, if ingested in large quantities by marine fauna may have a high potential for contaminating the food chain through predator-prey interaction.

Plastic is not inert. Conventional plastic contains chemical additives which can be endocrine disruptors, carcinogenic or provoke other toxic reactions and can, in principle, migrate into the environment, though in small quantities^{46,47}. Persistent organic pollutants (POPs), such as pesticides like DDT and polychlorinated biphenyls (PCBs)⁴⁸ since 1970s have been progressively banned but, as they are very persistent in the environment and sometimes still present in some materials or products in use, their presence can still be detected. They can attach themselves from the surrounding water to plastic fragments which can be harmful⁴⁹ and

³⁹ Wurpel G., Van den Akker J., Pors J., Ten Wolde, Plastics do not belong in the ocean. Towards a roadmap for a clean North Sea. IMSA Amsterdam (2011), p. 13.

⁴⁰ UNEP, 2009, Marine Litter: A global challenge, http://www.unep.org/pdf/unep_marine_litter-a_global_challenge.pdf

⁴¹ A phenomenon by which large lumps of derelict fishing nets float in water, unintentionally catching large amounts of fish.

⁴² Deudero S., Alomar C. (2015) "Mediterranean marine biodiversity under threat: Reviewing influence of marine litter on species" in Marine Pollution Bulletin, Volume 98, Issues 1–2: 58-68

⁴³ Near large cities and offshore canyons, the density could extend to 100,000 pieces per square kilometre. See further: Wurpel, G. loc.cit., p. 32, 35.

⁴⁴ <https://ec.europa.eu/jrc/en/publication/harm-caused-marine-litter>

⁴⁵ BIOIS, Plastic waste in the Environment, loc.cit, p. 114

⁴⁶ Most additives are fillers and reinforcements, plasticizers, colorants, stabilizers, processing aids, flame retardants, peroxides and antioxidants, each representing a whole family of chemicals.

⁴⁷ COM(2013) 123, GREEN PAPER on a European Strategy on Plastic Waste in the Environment

⁴⁸ Mato Y., Isobe T., Takada H., Kanehiro H., Ohtake C. and Kaminuma T. (2001) "Plastic resin pellets as a transport medium for toxic chemicals in the marine environment" in Environmental Science and Technology 35(2): 318-324

⁴⁹ Rios, L.M., Moore, C. and P.R. Jones (2007) "Persistent organic pollutants carried by synthetic polymers in the ocean environment" in Marine Pollution Bulletin 54: 1230-1237

enter the food chain via marine fauna which ingest the plastics (Trojan horse effect)⁵⁰. These POPs do not break down naturally very easily but accumulate in body tissue, potentially having carcinogenic, mutagenic and other health effects⁵¹.

Given the high leakage worldwide of plastics in the natural environment with harmful effects for a very long period of time, solutions have been sought to design plastics in a way that they can biodegrade in different environmental compartments. These solutions will however only make sense as a complement to a paramount effort to reduce plastic leakages. Complete biodegradation of plastics, a process involving microbial action, occurs when none of the original polymer remains⁵². Most currently available biodegradable plastics generally degrade under specific conditions, which may not always be easy to find in the natural environment, and can thus still cause harm to ecosystems. Biodegradation in the marine environment is particularly challenging even though recent research projects⁵³ have shown some progresses made regarding this issue.

Marine litter not only affects economic activities such as tourism and fisheries and entails substantial cleaning costs, fighting against it also creates economic opportunities. Innovation in product design to avoid plastic litter and microplastics, but also investments for marine litter prevention (e.g. in waste and waste-water treatment, in port reception facilities or recycling of fishing nets) can create jobs and strengthen technical and scientific skills and industry competitiveness in areas of growing global interest.

The impacts of plastic marine debris on the environment and human health can also be structured according to the size of the plastic litter⁵⁴:

- **Impacts of macroplastics (i.e. pieces of plastics larger than 5mm)**

- **Plastic ingestion** is increasing (identified in 27% of species in 1997 and 44% in 2014), and can cause mortality directly or can affect animals through slower sub-lethal physical and chemical effects reducing the growth rate or the reproductive ability of the affected animals. According to one estimate, “99 per cent of all seabirds will have ingested plastic by mid-century⁵⁵”. This may also affect fish population thus reducing marine fisheries productivity and profitability. There is an abundance of case studies displaying the magnitude of the issue. Between January and February 2016 more than 30 sperm whales beached along the North Sea coast. From the 22 carcasses investigated, 9 had netting, ropes, foil, packaging material and even a part of a car in their gastrointestinal tracts. In the Mediterranean Sea, a deceased sperm whale was found with 7.6 kg of ingested plastic debris, leading to a rupture of its stomach.
- **Entanglement incidents** (for example with cords, plastic wrappings, netting) with marine life also appear to be increasing and affect many species; including 100 % of

⁵⁰ Rios, L.M., Jones, P.R., Moore, C. and U. Narayan (2010) “Quantification of persistent organic pollutants adsorbed on plastic debris from the Northern Pacific Gyres’ “Eastern Garbage Patch””, accepted in Journal of Environment Monitoring

⁵¹ BIOIS (2010) Plastic waste in the Environment, final report, European Commission, p. 117
<http://ec.europa.eu/environment/waste/studies/pdf/plastics.pdf>

⁵² <https://wedocs.unep.org/bitstream/handle/20.500.11822/7468/->

Biodegradable Plastics and Marine Litter Misconceptions, concerns and impacts on marine environments-2015BiodegradablePlasticsAndMarineLitter.pdf.pdf?sequence=3&isAllowed=y

⁵³ Bio-based biodegradable PHA/PHB EU FP7 Open-Bio project – Marine biodegradation work package

⁵⁴ Eunomia, 2016 ...

⁵⁵ Petter Malvik, UN Environment Programme’s Communications Officer
<http://www.un.org/apps/news/story.asp?NewsID=56638#.Wmm8Ymd5bcI>

marine turtles (7 of 7 species), 67 % of seals (22 of 33 species), 31 % of whales (25 of 80 species) and 25 % of seabirds (103 of 406).⁵⁶ Entanglement causes serious harm: for example, entangled organisms may no longer be able to acquire food and avoid predators, or become so exhausted that they starve or drown. This may pose a serious risk for threatened populations of marine mammals, reptiles and birds with a special protection status.

- **"Ghost" fishing:** While around one-third of beach litter has the potential to entangle animals, lost or abandoned fishing gear poses a particular risk as it may continue to fish for years or even decades) to various degrees. This depends on such factors as the type of fishing gear, the place where it has been lost and prevailing oceanographic conditions, with the fishing capacity of ghost nets estimated at 6-20% of their initial fishing capacity over their remaining life time. According to Sancho et al. (2003), lost tangle nets in northern Spain catch about 5% of the total commercial catch of monkfish. An analysis of data collected by ghost-gear retrieval initiatives in the USA estimated that annually more than 3.5 million animals were entangled in 5000 removed nets, including 1300 marine mammals, 25 000 birds, 100 000 fish and over 3 million invertebrates.
- **Decreased biodiversity:** By colonising floating plastic and using it to travel longer distances than otherwise possible, the extension of the range of certain species or the introduction of new ones can occur. This may cause significant changes in population structure. One study predicted that global marine species diversity might decrease by as much as 58% if worldwide biotic mixing occurs.⁵⁷ The increase of human structures and litter in the ocean may be contributing to the increase in jellyfish blooms⁵⁸
- **Sea floor pollution:** debris can smother the sea floor and reduce coral cover or decrease the oxygen content in the benthos that could alter the composition of life on the sea floor.⁵⁹ This is particularly the case when large quantities of plastic material are illegally thrown overboard rather than brought back to port. A recent study⁶⁰ found that the likelihood of disease increases from 4% to 89% when corals are in contact with plastic. This study also estimates that 11.1 billion plastic items are entangled on coral reefs across the Asia-Pacific and projects this number to increase 40% by 2025.
- **Impacts of microplastics (i.e. pieces of plastics smaller than 5mm)**
 - **Ingestion or absorption:** The small size of microplastics enables them to interact with a particularly wide range of marine organisms where they can affect the marine food chain via ingestion or absorption. Recent samples taken in the context of deep-sea research found that in the bottom of the Mariana Trench, every single invertebrate

⁵⁶ Kühn, S., Rebolledo, E.L.B., and Van Franeker, J.A. (2015) Deleterious Effects of Litter on Marine Life, in Melanie Bergmann, Lars Gutow, and Michael Klages, (eds.), *Marine Anthropogenic Litter* (2015) Springer International Publishing

⁵⁷ McKinney, M.L. (1998) On predicting biotic homogenization: species-area patterns in marine biota, *Global Ecology & Biogeography Letters*, Vol.7, No.3, pp.297–301

⁵⁸ See p.89 of http://ec.europa.eu/environment/marine/good-environmental-status/descriptor-10/pdf/Marine_plastic_debris_and_microplastic_technical_report_advance_copy.pdf

⁵⁹ Goldberg, E.D. (1997) Plasticizing the Seafloor: An Overview, *Environmental Technology*, Vol.18, No.2, pp.195–201

⁶⁰ Lamb, JB et al (2018) Plastic waste associated with disease on coral reefs, *Science*, January 2018,, pp 460-462

collected had ingested at least one piece of microplastics. A recent study⁶¹ confirmed the evidence for a potential risk to environmental organisms from the toxic and physical effects to be exhibited on exposure to microplastics. The study concluded that a potential risk to the environment may arise from the presence of microplastic particles used in the production of various products for consumer and professional use that get into the aquatic environment, and that these risks need to be addressed on a EU-wide basis.

- **Impact nanoparticles:** The impacts of microplastics are also likely to hold true for particles of nanosize, especially regarding migration to animal or human body tissue, but more data is needed.
- **Impacts of toxic substances associated with plastic debris**
 - **Chemical toxicity:** Plastics contain a variety of potentially toxic chemicals incorporated during manufacture, which could be released to the environment.⁶² Research has identified that many of these chemicals can have toxicological effects on fish, mammals and molluscs, hence a risk could exist if plastic fragments containing these chemical are ingested by marine organisms.⁶³ Microplastics ingested by marine animals can contain chemicals that can pass through to human body tissue if ingested, for example, plastic found in the fish's guts (processed to make fish food) or in the fatty tissues of wild caught or farmed fish. There is though no clear conclusion as to whether the chemicals pose additional harm over and above those already ingested through water and the like.
 - **Persistent organic pollutants:** Furthermore, plastic debris can absorb persistent organic pollutants (POPs) like PCBs, DDE, and nonylphenols (NP) that are present in the oceans from other sources.

Overall, a global assessment of the number of marine species affected by marine litter (CBD, 2016) found that 154 more species were affected since the previous review in 2012 (CBD, 2012). The total in 2016 of impacted species was 817, a 23 per cent increase. Restricting the assessment to ingestion and entanglement records for marine and coastal species revealed that a further 136 species are known to be affected, bringing the total number of affected species to 519. The main bulk of new species records were for the ingestion of plastics, including microplastics, and entanglement in lost or abandoned fishing gear (predominantly line, nets or pots). Many of the affected species are protected. For example of the 120 marine mammals species listed on the IUCN Red List of Threatened Species (IUCN, 2014), 54 (45 %) were reported to have interacted (ingestion and/or entanglement) with marine litter. About 15% of the marine mammal species affected through entanglement and ingestion are on the IUCN Red List. Cross-referencing only the 154 new records of affected species with the IUCN Red List indicated that approximately 10 per cent are threatened, vulnerable, endangered or critically endangered, including large baleen whales and geographically restricted sea bird

⁶¹ Risk Assessment and socio economic analyses: 'Intentionally added microplastics in products' - <http://ec.europa.eu/environment/chemicals/reach/pdf/39168%20Intentionally%20added%20microplastics%20-%20Final%20report%2020171020.pdf>

⁶² Lithner, D., Larsson, Å., and Dave, G. (2011) Environmental and health hazard ranking and assessment of plastic polymers based on chemical composition, *Science of The Total Environment*, Vol.409, No.18, pp.3309–3324

⁶³ Oehlmann, J., Schulte-Oehlmann, U., Kloas, W., et al. (2009) A critical analysis of the biological impacts of plasticizers on wildlife, *Philosophical Transactions of the Royal Society B: Biological Sciences*, Vol.364, No.1526, pp.2047–2062

species. In addition, a further nine species of affected cetacean were identified as either not assessed by the Red List to date or were data deficient, including five species of toothed whales. It is highly likely that there are substantially more marine species affected by marine litter, either directly or indirectly, given the ubiquitous presence of litter items, such as persistent microplastics in the marine environment (CBD, 2016).

2.14 Economic impacts from environmental externalities

The economic activities directly affected by marine plastic litter and microplastics include shipping, fishing, aquaculture, tourism and recreation. The cost associated could be estimated to be at least \$8bn per year (UNEP, 2016). For the EU, costs to the tourism and recreation sector (extrapolated from beach cleaning costs) have been estimated up to €30 million per year; costs to the fishing industry up to €57 million. The "best estimate" within this range is a total of almost €470 million. Economic damage from litter on marine industry users was estimated to be \$1.26bn per annum to marine industries in the Asia Pacific region. UN Environment estimates the damage to marine environments globally to be at least \$8bn per annum.

Sources for economic impacts

Firstly, the costs to the fishing industry up to €57 million are taken from UNEP (2016), Marine plastic debris and microplastics – Global lessons and research to inspire action and guide policy change, United Nations Environment Program, Nairobi, and based on Mouat et al. 2010 in Arcadis 2014:

Table 12: Fishing and aquaculture gear material flow, 2015

Type of cost	Cost per vessel (€)	Estimated cost for the EU (M€)	Calculation method
Reduced catch revenues (contamination forces fishermen to use more time for the selection of their catches and to discard part of them)	2,340	28.64	The cost estimated by Mouat et al. (2010) for Scottish vessels (€2,200 per vessel per year), actualised in 2013 prices, was multiplied by the number of EU trawlers (EU vessels that use seafloor fishing gear), i.e. 12,238
Removing litter from fishing gear	959	11.74	The time needed to remove litter from fishing gear, as estimated by Mouat et al (2010) for Scottish vessels (41 hours per vessel per year), was multiplied by the average EU27 labour cost (€23.4 per hour) and then by the number of EU trawlers (EU vessels that use seafloor fishing gear), i.e. 12,238.
Broken gear, fouled propellers	191	16.79	The cost related to broken gear and fouled propellers, as estimated by Mouat et al. (2010) for Scottish vessels (€180 per vessel per year), actualised in 2013 prices was multiplied by the total number of fishing vessels in the EU (87,667 according to Eurostat).

Costs to the tourism and recreation sector are taken from Arcadis, 2014, “Marine Litter study to support the establishment of an initial quantitative headline reduction target”. The total quantified cost of degradation is estimated to be 259 M€ to 694.7 M€. These however represent a small portion of actual costs as it has not been possible to quantify impacts to all economic sectors. The monetised costs are attributed to tourism and recreation (up to 630 M€) and fisheries (up to 62 M€) as the ‘main affected sectors’. It has not been possible to monetise the costs of all the affected groups and sectors, such as shipping and voluntary beach cleaning, or cleaning of harbours and marinas.

In turn, this study used the JRC Report “Harm caused by Marine Litter” 2016, which reported on the basis of a comparatively small sample size, wide fluctuation in the clean-up costs between bathing and non-bathing beaches, as well as between countries. The JRC report then quoted an estimate of the costs of marine litter clean-up at the European level for the more than 50,000 kilometres of EU coastline of between approximately 194 and 630 M€, assuming that all beaches would be cleaned.

3 REDUCING MARINE LITTER

A detailed analysis of marine litter was included in SWD (2018) 16 accompanying the Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions on “A European Strategy for Plastics in a Circular Economy”, COM(2018) 28. This SWD covered many of the issues above from a plastics perspective, and also measures to curb plastic waste and littering. The following chapter summarises this analysis.

3.1 Single-use plastics: issues, definition and insights from existing measures

3.1.1 Issues at stake

In a recent UNEP report, States are encouraged to “*develop and implement laws to ban or diminish the production of single-use trash items and other waste that is commonly found in marine litter*”⁶⁴.

Whether an item is a single-use item or reusable, once it is littered in the environment, it has the same negative environmental impact. Plastic degradation in open environment can take hundreds of years. During this period plastics fragment into smaller pieces. Plastic debris causes sea species to suffer from entanglement or ingestion. Microplastics causing harm to fauna and flora are generated and are potentially harmful for human health. This represents both a common and a transboundary challenge.

A single-use plastic item reaches its end-of-life in a very short time, which shows that resources are not efficiently used. Indeed, if this item were designed for reuse and effectively reused, this would save the resources and energy that were used in their production.

Moreover, such items once disposed of, becomes waste that needs to be collected and sorted thereby implying costs for public authorities. Although such items could be recycled, most of the time they are not. Causes are multiple and often interlinked: insufficient public waste management infrastructure, food and organic material contamination once put in the right bin, etc. Therefore, this leads to consider that not only resources are wasted in their production phase but the value of materials is not kept in the loop which is the contrary of a circular

⁶⁴ UNEP : “Marine Litter Legislation: A Toolkit for Policymakers”

economy concept and can also be seen as contrary to the waste hierarchy enshrined in the Waste Framework Directive which states that policy should also aim at reducing the use of resources, and favour the practical application of the waste hierarchy in accordance to which prevention should be considered in priority to other waste management options such as recycling for instance.

Several Member States are already taking action regarding single-use items by implementing the Marine Strategy Framework Directive⁶⁵. France for example plans to restrict the use of several of these SUP by 2020, unless they are home-compostable and at least 50% bio-based (pushing thus for a substitution by paper, cardboard, wood and others)⁶⁶. United Kingdom and Ireland area also considering actions. Regional and more local actions have been taken, such as:

- In Navarra the sale of single-use plastic cutlery, trays and cups is to be banned by 2020, the provision of tap water in public spaces and in restaurants will be made obligatory, and the sale of bottled water prohibited in all public buildings except hospitals.
- In Bristol, consumers can refill their reusable water bottles for free in many cafes, restaurants and others. An app locates the closest refill station. The project is expanded to five other cities.
- In Vienna and Munich, portable washing stations provide a specific service to wash reusable containers in food markets.
- Vienna introduced an obligation to use reusable items at big events.
- Hamburg bans disposable packaging in public buildings, which includes bottled water and beer, plastic plates and cutlery.

3.1.2 Definition of single-use plastics

Currently a legal definition nor official statistics exist for single-use plastic production.

Given that plastic packaging is almost exclusively single-use, especially in business-to-consumer applications, such items could be defined in the Packaging and Packaging Waste Directive (PPWD). In the latter, a distinction is made between packaging, i.e. all products made of any material of any nature to be used for the containment, protection, handling, delivery and presentation of goods, from raw materials to processed goods, from the producer to the user or the consumer, and "non-returnable items" used for the same purposes. One could consider therefore that "non-returnable items" are equivalent to single-use items.

Acknowledging that single-use items are currently not defined from a legal perspective, the Commission worked with stakeholders establishing criteria for what should be targeted as relevant single-use items:

- Prone to littering and prevalently ending in the marine environment;
- Short use phase;
- Consumed predominantly away from home;
- Reusable or non-plastic alternatives exist.

⁶⁵ Member States have to monitor marine litter and draft/implement programmes of measures notably to reduce marine litter in their marine waters.

⁶⁶ Loi de Transition Énergétique pour la Croissance Verte (LTECV) du 18/08/ 2015

3.1.3 Insights from the Plastic Bags Directive

Plastic bags is a specific case of Single-Use Plastics. The EU has already taken steps by setting requirements for Member States to adopt measures to cut the consumption of plastic bags.

In 2010, an estimated 98.6 billion plastic carrier bags were placed on the EU market, which amounts to every EU citizen using 198 plastic carrier bags per year. Out of these almost 100 billion bags, the vast majority are lightweight bags, which are less frequently re-used than thicker ones. Consumption figures vary greatly between Member States, with annual use per capita of lightweight plastic carrier bags ranging between an estimated 4 bags in some Member States and 466 bags in other Member States.

Lightweight plastic carrier bags are considered to be packaging within the meaning of Directive 94/62/EC⁶⁷ on packaging and packaging waste (PPWD). Member States may take a wide range of actions, which shall include at least one of the following measures:

- a national maximum consumption level of plastic carrier bags of maximum 90 bags per person per year by 31 December 2019 and maximum 40 bags per person per year by 31 December 2025;
- instruments ensuring that, by 31 December 2018, lightweight plastic carrier bags are not provided free of charge to customers at a point of sale.

Very lightweight plastic carrier bags (i.e. with wall thickness below 15 microns) are mainly used for the packaging of loose fruits and vegetables may be excluded from the above 2 measures.

It is not yet possible to provide EU-wide statistical data on reduction of consumption of these bags. By mid-October 2017, six Member States had not notified implementing measures, but informed that measures would be adopted still in 2017. Nevertheless, some Member States currently apply measures ahead of the deadlines and these Member States find considerable reduction in the consumption of lightweight plastic carrier bags.

The implementing measures to reduce use of plastic bags have met little resistance from consumers, and are rather welcome and seen as an effective measure. They are also very efficient in reducing littering in coasts and seas. The tax on plastic shopping bags in Ireland, in 2002, 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, according to Coastwatch beach monitoring data⁶⁸.

3.2 Plastic waste from sea-based sources: sources and existing EU measures

Plastic products are common in the fishing, aquaculture, shipping (cruise ships, merchant vessels, fishing and recreational craft) and other offshore activities⁶⁹. These industries have become reliant on plastic material to provide affordable, lightweight and durable equipment. Very few estimates of plastic waste generation in the fishing and aquaculture sector exist though.

⁶⁷ Directive 94/62/EC on packaging and packaging waste; OJ 1994 L365 of 31.12.1994, p. 10

⁶⁸ From an average of 18 plastic bags/500m in 1999 to 5 in 2003. See p.32 of JRC report on sources of litter: http://ec.europa.eu/environment/marine/good-environmental-status/descriptor-10/pdf/MSFD_identifying_sources_of_marine_litter.pdf

⁶⁹ Eunomia (2016), Van Franeker (2010), UNEP (2009), GESAMP (2007)

Whilst on average the overall quantities of plastic waste discarded at sea are small compared to waste not dealt with properly on land, the impact is significant because the pathway to the sea is direct, and in some sea regions, such as the North East Atlantic and the North Sea, is significant. Of these sources, the loss of fishing gear is easiest to identify and quantify because it is instantly recognisable. Video inspection of seafloors⁷⁰ and surveys of northern beaches⁷¹ indicate that fishing gear makes up a high proportion of distinguishable objects. This plastic creates the same problems as that from land based-sources as it breaks down into smaller pieces but causes an additional and well-documented harm to marine life through entanglement in nets.

Several causes of discharging litter at sea were identified during stakeholder interviews⁷² as well as collating information on reviews on the causes of abandoned, lost or otherwise discarded fishing gear:

- Accidental and sometimes irretrievable loss of material, limited life-span of some items and nature of fishing method;
- Mismanagement of waste, including plastic waste e.g. dumping on land or sea, due to high cost of waste handling, inadequate facilities and/or handling on board or lack of adequate reception facilities in ports for waste storage and consignment, lack of operators willing to handle gear or waste;
- Lack of incentives to handle waste from ships, including recycling, reuse, retrieval of lost gear or consign end-of-life gear;
- Lack of end markets for re-use and recycling outputs and lack of operators willing to handle gear.

3.2.1 Shipping and other offshore installations

The shipping sector includes all seagoing vessels, from large cruise ships to small fishing vessels and pleasure craft. There are no indications from recent studies and assessments that the amount of garbage from ships (marine litter) has decreased in recent years. On the contrary, time series of marine litter on European shores indicate that the problem has persisted since the implementation of the PRF Directive (Directive 2000/59/EC). Although garbage delivered in ports has increased since the introduction of the Directive, a significant delivery gap remains, estimated between 60,000 and 300,000 tonnes, i.e. 7% to 34% of the total garbage waste to be delivered annually⁷³.

A revision of the PRF Directive was recently adopted, and will reduce further this source of marine litter.

3.2.2 Abandoned, lost and otherwise discarded fishing gear (ALDFG)

Commercial fishing gear lost, abandoned or discarded annually at sea or in the world's oceans may continue to fish for years or even decades, a process referred to as "ghost fishing". In an EU context, the extent and consequences have been subject to a number of EU funded

⁷⁰ Pham et al. Marine Litter Distribution and Density in European Seas, from the Shelves to Deep Basins PLOS ONE, 1 April 2014, Volume 9, Issue 4

⁷¹ Marine Pollution Bulletin Volume 107, Issue 1, 15 June 2016, Pages 52–58

⁷² In the context of the impact assessment for the revision of the PRF Directive, which included a specific survey for the fishing sector and also built on the outcome of the 2016 Eunomia study on sea-based sources of marine litter.

⁷³ Eunomia study 2016; and DG MOVE Impact Assessment for the revision of the PRF Directive, to be published in January 2018 together with the proposal for a new Directive

studies^{74,75,76}. In general terms, it appears likely that substantial lengths of netting are lost each year. Each nation's fleet may be losing several hundred kilometres. Most nets are lost as a result of events like storms or being towed away by trawlers. Indications are that a majority of nets lost in such circumstances are either disabled or have a low residual catch efficiency. The FAO report concludes *"that ghost fishing from 'active' fishing gears such as trawl nets and from 'static' pot fishing is not significant in European Union (EU) waters"*. According to scientific research the remaining fishing capacity of ghost nets varies from 6-20% of their initial fishing capacity⁷⁷.

In relation to the total number of nets used in EU waters, the rates of permanent net loss appear to be below one per cent of nets deployed. Most nets are deployed in shallow waters, and a significant proportion of lost nets are recovered through the use of global positioning systems (GPS); fishers typically go to considerable lengths to recover nets given their cost. During the evaluation of the Control Regulation, only one Member State authority reported that it routinely collect notifications of lost gear⁷⁸.

A number of Member States undertake retrieval surveys based on reported losses and other evidence. Many Producer Organisations report the position of static gears on a daily basis to minimise conflict between static and mobile fishing gears. Such initiatives can reduce the levels of gear loss and can benefit from the support of the European Maritime and Fisheries Fund (EMFF). In response to the studies on ghost fishing, the EU Control Regulation⁷⁹ and the associated implementing regulation⁸⁰ introduced mandatory requirements to report lost nets, and improvements and specifications for the marking of fishing gear in order to mitigate such losses.

3.2.3 Aquaculture

Aquaculture contributes to marine litter also, though to a minor extent, with the main sources associated with sea-based farms, such as cages, longlines, poles and other floating and fixed structures used for the culture of marine animals and plants. There are no reliable estimates of the contribution of aquaculture to marine litter to date.

The types of material lost would depend on the type of culture systems, construction quality, vulnerability to damage, and management practices and could be nets and cage structures (for

⁷⁴ Project N° 94/095: Incidental impact of gill-nets (FANTARED)

⁷⁵ A study to identify, quantify and ameliorate the impacts of static gear lost at sea (FANTARED 2). EU Study Contract FAIR CT98-4338

⁷⁶ FISH/2006/15/Lot No.5", SI2.466030 "Recuperation of fishing nets lost or abandoned at sea" (DEEPCLEAN)

⁷⁷ Werner, S., Budziak, A., van Franeker, J., Galgani, F., Hanke, G., Maes, T., Matiddi, M., Nilsson, P., Oosterbaan, L., Priestland, E., Thompson, R., Veiga, J. and Vlachogianni, T.; 2016; Harm caused by Marine Litter. MSFD GES TG Marine Litter - Thematic Report; JRC Technical report; EUR 28317 EN; doi:10.2788/690366.

⁷⁸ <http://publications.jrc.ec.europa.eu/repository/bitstream/JRC104308/lbna28317enn.pdf>.

Year	2010	2011	2012	2013	2014
number of reports of lost gear (Portugal)	65	79	93	180	89
number of reports of lost gear (other Member States)	8	8	14	6	2

⁷⁹ 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

⁸⁰ Commission Implementing Regulation (EU) No 404/2011 of 8 April 2011 laying down detailed rules for the implementation of Council Regulation (EC) No 1224/2009 establishing a Community control system for ensuring compliance with the rules of the Common Fisheries Policy

marine fish cages), lines or floating raft structures (for seaweed systems) or poles, bags, lines, and plastic sheeting (for mollusc farming). Because many of these items are expensive, one might expect farmers to take considerable care to avoid losses.

A Canadian study⁸¹ showed that greater concentrations of micro plastics were measured in farmed mussels than in wild mussels, which may be a result of farming practices that use polypropylene lines to anchor the mussels, or it may be due to differences in micro plastic concentrations in the different locations from which the farmed mussels and wild mussels originated.

Another study⁸² found that mussel nets are among the most common items found in areas of the Adriatic and Ionian seas with intensive and extensive aquaculture activities. Shellfish farming techniques and any potential litter generated differ according to local conditions in the sea basin.

However, given that global aquaculture production accounts for more than 50% and marine aquaculture of fish and molluscs for nearly 15% of global seafood production, the contribution of the sector to marine litter may be rising in importance⁸³.

3.2.4 End-of-life recreational boats

End-of-life recreational boats could become a significant source for marine litter. Yachts' average lifespan has been estimated at 30 years, although in some instances this may stretch to 40-45 years. This lifespan has further increased over time due to the use of stronger materials, such as fibre reinforced polymer (FRP). It is thought that between 1% and 2% of the 6 million boats kept in Europe, in other words at least 80,000 boats, reach their 'end of use' each year. However, only around 2,000 of those are dismantled. A significant number of the remaining boats are left abandoned, potentially ending up in the ocean and becoming marine litter⁸⁴.

3.2.5 Tourism

While tourism is a major source of littering on beaches, the proportion of this litter finding its way into the sea is unknown.

3.2.6 Existing EU measures for sea-based sources of marine litter

The Commission has been tackling sea-based sources of marine litter with a variety of policy instruments.

⁸¹ Mathalon A., P. Hill Microplastic fibers in the intertidal ecosystem surrounding Halifax Harbour, Nova Scotia Mar. Pollut. Bull., 81 (2014), pp. 69-79

⁸² On beaches located along the coastline of the Adriatic and Ionian Seas mussel nets were the seventh most frequent items found (Vlachogianni et al., 2016). Furthermore, in surveys carried out along the Italian coastline, mussel and oyster nets were among the top three items recorded on beaches, while the results obtained from the seafloor surveys show that litter from aquaculture accounts for 15% of total items recorder (Pasquini et al., 2016). Indicatively some preliminary results from Fishing for Litter activities in the area show that mussel and oyster nets account for almost 30% of the total weight of the items collected. (JRS report: Sources of marine litter).

⁸³ Elaboration from FAO State of World Fisheries and Aquaculture 2016; Total global aquaculture production (including freshwater fish, aquatic plants, and marine fish and molluscs) accounts for more than 50% of world seafood production. Marine fish and mollusc aquaculture accounts for 26% of global aquaculture production or nearly 15% of total global seafood production.

⁸⁴ Commission Staff Working Document on Nautical Tourism, SWD(2017) 126 final

Directive 2000/59/EC on port reception facilities for ship generated waste and cargo residues aims at reducing discharges of waste from ships at sea. It requires the provision of adequate waste reception facilities in ports, and ensures the use of those facilities through a mandatory delivery requirement for ships before departure from any EU port. The Directive also requires the establishment of cost recovery systems which are based on the application of an indirect fee, to be paid irrespective of delivery, in order to provide no incentive for ships to discharge their waste into the sea. Since the adoption of the PRF Directive, volumes of ship-generated waste and cargo residues delivered to EU ports have increased significantly⁸⁵. However, waste continues to be discharged at sea. Other waste streams, such as oily waste and sewage, also continue to be discharged at sea in contravention with existing discharge norms/prohibitions⁸⁶. Important underlying drivers of these problems were found to be: the unavailability of adequate reception facilities in ports, the lack of enforcement of the mandatory delivery obligation for ships, and the lack of economic incentives for delivery⁸⁷.

Of particular relevance to the fishing and aquaculture sectors are instruments preventing or prohibiting the voluntary discarding of plastic waste, in particular derelict gear, on the one hand, and instruments mitigating or promoting the recovery of lost gear which may generate ghost fishing. While the former can be addressed through environmental protection measures, the latter has led the Commission to undertaking studies on estimating the magnitude and impact of ghost fishing⁸⁸ and on the recovery of ALDFG⁸⁹.

The Control Regulation⁹⁰ requires the mandatory marking of gear as well as the notification and retrieval of lost gear. A more detailed assessment of the implementation of the requirements of the Control Regulation will provide important information on its impacts and potential improvements.

The European Maritime and Fisheries Fund (EMFF) allows for financing a variety of activities combating litter from sea-based activities and especially so-called passive fishing for litter, whereby fishers bring litter fished up in nets while fishing back ashore. Other potential activities are retrieving lost gear, the provision of litter bags for collection at sea, investments in facilities for waste and marine litter collection and processing, recovery and recycling of nets.

Over the seven year period 2014-2020, 14 Member States envisage a total of 108 fishing for litter operations that are supported with around €22M from EU funds, equalling 2% of the EMFF. While the allocation is still rather modest, the increase in comparison to the previous funding period is significant with the planned EU financial contribution having more than tripled and the number of Member States funding marine litter activities with the EMFF as well as the number of projects having at least doubled. . A recent call for proposals will be complementing these activities with a number of transnational projects on the reduction, monitoring, removal and recycling of marine litter being supported 2019-2020 focussing on long term sustainability and buy in from stakeholders.

⁸⁵ Ex-post evaluation of the PRF Directive, Panteia, 2015

⁸⁶ Ecorys (2017). Op. cit.

⁸⁷ The REFIT Evaluation that was undertaken for the PRF Directive 2000/59/EC in 2015

⁸⁸ Ghost fishing by lost fishing gear (August 2005) DG FISH/2004/20 institute for European environmental policy, Poseidon aquatic resource management

⁸⁹ Recuperation of fishing nets lost or abandoned at sea (September 2009) Graham, N. 1*, Hareide, N-R.2, Large, P.A.3, MacMullen, P.4, Mulligan, M .5, Randall, P.J.3, Rihan, D.5, and Peach, D

⁹⁰ 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

3.3 Microplastics

Microplastics are plastic particles of a size below 5 mm. Some of these microplastics are produced to be 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), or after these objects have leaked into the environment.

The potential impacts of microplastics on the environment, associated with their intentional or incidental use in products, have generated a lot of concerns worldwide. The Council has invited the Commission to take measures on microplastics, in particular from cosmetics and detergents under the Strategy on Plastics.

During the preparation of the EU Strategy on Plastics an Open Public Consultation on microplastics was organised with almost 500 responses (roughly 50% from individuals vs companies). Citizens are most concerned about harm to marine life, there's high awareness of cosmetics and textiles microplastics, and with the highest concern for textiles, legislative measures are generally favoured at the European level with the cost burden put on the manufacturers and bans are favoured for all of the intentionally added ingredients.

A recent study⁹¹ estimated that the total number of floating macro- and microplastics in the open oceans is 5,25 trillion pieces, weighing 269,000 tonnes. Microplastics were calculated in the order of 200 thousand tonnes in the EU⁹².

Table 13: Annual microplastics emissions to surface waters from the EU (+Norway and Switzerland)⁹³

Source	Upper (tonnes)	Midpoint	Lower (tonnes)	Source Data Year
Automotive Tyres	136,000	94,000	52,000	2012
Pellets	91,000	47,000	3,000	2015
Washing of Clothing	23,000	13,000	4,000	2016
Road Markings	21,000	15,000	10,000	2015
Building Paint	8,000	5,000	2,000	2013
Fishing Gear	9,000	5,000	1,000	2015
Automotive Brakes	5,000	2,000	100	2012
Artificial Turf	3,000	2,000	300	2012
Marine Paint	400	400	400	2013
Leave on PCP	526	-	86	-
Fertilisers	400	-	85	-
Rinse off PCP	373	-	114	-
Building Paint	141	-	0.40	-
Detergents	94	-	30	-
Total	300,000		72,500	

⁹¹ Eriksen et al.2014

⁹² EU microplastics. Ongoing study for the Commission: <http://www.eumicro-plastics.com/eumpwp/wp-content/uploads/investigating-options-eunomia-draft-report-v4-main-report-public.pdf>

⁹³ Note: Data for the calculation of emissions comes from different years for each emission source. The results are normalised to 2017 for the baseline calculations using the midpoint. All Figures except for those from 'intentionally added' products (highlighted in red) are rounded, therefore totals may not add up.

Note: Data for the calculation of emissions comes from different years for each emission source. The results are normalised to 2017 for the baseline calculations using the midpoint. Figures are rounded therefore totals may not add up

Some companies have already taken measures to phase out progressively the use of certain microbeads in some of their products.

3.4 Existing measures: EPR and Deposit Return Systems

3.4.1 EPR fee modulation and more transparency

Extended Producer Responsibility (EPR) is defined as “an environmental policy approach in which a producer’s responsibility for a product is extended to the post-consumer stage of a product’s life cycle”⁹⁴. There are a variety of EPR policy measures and instruments that aim to shift the negative environmental externalities of products from taxpayers to producers and to incentivise producers to take environmental considerations into account at the product design phase.

Such measures can also take the form of EPR schemes whereby producers are made responsible for the financing and organisation of the waste management of their end-of-life products. The objectives of such EPR schemes are to

- relieve public authorities (partially) of the cost of managing a specific waste stream, transferring the financial burden from taxpayers to consumers;
- internalise the cost of end-of-life management of a product in the price of new products, thus providing an incentive for ecodesign approach; and
- ensure effective and environmentally sound collection and treatment of that waste stream.

By internalising costs and establishing a well-designed fee system, EPR can encourage a change in behaviour of relevant actors involved in the product value chain from plastic manufacturers to consumers and recyclers. Design for reuse and for recycling and more sustainable products are awarded.

It is to be noted that the existing EPR schemes, including for packaging, already provide for some fee modulation based on simple criteria such as type, material or weight of packaging.

3.4.2 Deposit return schemes (DRS)

DRS are based on additional fees on some products, which have to be paid by the consumer at the sales point of a given item in the form of a deposit. The deposit fee is returned to the consumer when bringing back the item. Most deposit schemes have been set up for packaging waste, especially for drinking bottles, but also for transport packaging (boxes and pallets). They are usually established at national level, although there are some deposit systems with a regional or local scope. In the case of packaging, the fee is usually determined by the packaging material and the container size and is indicated via a label on the packaging.

Deposit schemes provide an economic incentive to waste holders to bring their waste back to return points. This ensures usually high return rates (above 95% or more in Germany and the Netherlands) and are thus an effective means to combat littering. In addition, the items that

⁹⁴ Source: RELOOP <http://www.cmconsultinginc.com/wp-content/uploads/2017/10/Fact-Sheet-Economic-Impacts-to-Municipis-New.pdf>

are returned are clean sorted fractions with very little contamination, and are therefore perfectly suitable for their reuse or recycling. The best documented case is the introduction of DRS for beverage containers, where the littering reduction potential usually exceeds 80% and the recycling levels for the beverage containers covered by the scheme attain 90-98%⁹⁵.

Table 14: Total return rate of deposit schemes in the EU⁹⁶

Country	Data year	Total return rate
Croatia	2015	up to 90%
Denmark	2014	89%
Estonia	2014	78,6%
Finland	2014	92,6%
Germany	2014	97%
Lithuania	2016	74%
Netherlands	2014	95%
Sweden	2014	88,25%

DRS can be applied to a number of waste streams. They usually are effective in achieving a massive reduction of littering and in increasing recycling to very high levels. In addition, DRS provide an excellent basis for reuse of these materials (as is the case e.g. for refillable bottles in Germany), which generally constitutes a better option from an environmental point of view than recycling, as in line with the waste hierarchy.

DRS schemes can be part of EPR schemes or complement them. DRS can increase the quantity and quality of plastic waste collected and reduce litter. Therefore, the Commission recommends Member States to introduce DRS for waste types that have either a high polluting potential (e.g. fishing gear and agricultural plastics) or are managed in a sub-optimal way (low separate collection rates), which does not allow exploiting the recycling potential of that waste (e.g. plastic packaging in some Member States).

The level and the structure of the costs will depend on a number of social and geographical factors. DRS are mostly financed by unclaimed deposits (i.e. bottles that consumers do not return) and result in net savings for municipalities. Several studies⁹⁷ reported significant net cost savings from the municipalities that implemented DRS resulting from the reduced or avoided costs of collection, treatment, and disposal by the municipal waste management systems. However, DRS may result in additional costs to producers⁹⁸ as the level of the fees usually exceeds the level of the fees in the previously existing EPR scheme.

⁹⁵ Technical, environmental and economic viability study of the implementation of a deposit refund scheme (DRS) for single-use beverage in Catalonia, 2017

⁹⁶ Source: RELOOP <http://www.cmconsultinginc.com/wp-content/uploads/2017/09/Fact-Sheet-Performance-New2.pdf> ; Waste Framework Directive, Article 8.1

⁹⁷ Technical, environmental and economic viability study of the implementation of a deposit refund scheme (DRS) for single-use beverage in Catalonia, 2017

⁹⁸ In the case of the planned DRS for Catalonia, the net savings for municipalities are projected to amount to €14.9 million (approx. €2 per inhabitant). This is expected to result in additional costs to producers worth €8.3 million (or €1.1 per inhabitant). Additional costs appear to be very low and justifiable in view of the achievable environmental and resource efficiency benefits. Source: RELOOP <http://www.cmconsultinginc.com/wp-content/uploads/2017/09/Fact-Sheet-Performance-New2.pdf>

3.4.3 The Commission proposal to introduce minimum requirements and providing a possibility for fee modulation for EPR schemes

Mandatory EPR schemes are established in EU legislation for end-of life vehicles (Directive 2000/53/EC), for waste electrical and electronic equipment (Directive 2012/19/EU) and batteries and waste batteries (Directive 2006/66/EC). Most Member States have established EPR schemes for packaging in support of the implementation of the packaging and packaging waste Directive (Directive 94/62/EC), even if this is not required by the Directive. In the EU, Member States have set up more than 200 schemes covering these and other products, such as expired medicines, lubricants, pharmaceuticals, tyres, chemicals, agricultural foil etc.

The Waste Framework Directive (Art. 8) lays down some general principles for the implementation of EPR. This directive is currently under review with the objective to introduce minimum requirements for EPR schemes to improve their governance, transparency, cost-efficiency and a level playing among the different schemes across the EU.

One of the minimum requirements proposed by the Commission is to introduce an obligation on the Member States to ensure that the fees paid by the producers fulfilling their EPR obligation are modulated based on the product's environmental impact. Such 'modulated fees' hence take into account the actual end-of-life costs of individual products or groups of products, in particular, by taking into account their recyclability and re-usability. These minimum requirements on fee modulation would also apply to WEEE, ELV and batteries where EPR is obligatory under EU legislation, and some MS have already applied it even if not required specifically (e.g. France on electronics, packaging and printed paper). Also, existing EPR schemes, including for packaging, already provide for some fee modulation based on simple criteria such as type, material or weight of packaging.

Targeted and meaningful fee differentiation allows rewarding or penalizing the producers regarding design-related factors that have an impact on the end-of-life performance (reusability, dismantlability, recyclability...). For products containing plastic or made of plastic, fees have therefore a potential to be an effective instrument in promoting better product design, labelling, improved collection and treatment of waste in line with the waste hierarchy and more resource efficient use of plastic. Differentiated product fees with a notable economic impact have been identified as being capable of bringing a real change in practices and product design although it is too early to establish a generalised appreciation of such an impact. There are some limitations to the scope of this principle. Fee modulation may not be feasible or possible for all materials or design practices for numerous reasons such as the availability of waste management infrastructure and the technical feasibility of an alternative design fit for purpose or substitution of certain materials.

It is to be noted that the existing EPR schemes, including for packaging, already provide for some fee modulation based on simple criteria such as type, material or weight of packaging.

By internalising costs and establishing a well-designed fee system, EPR can encourage a change in behaviour of relevant actors involved in the product value chain from plastic manufacturers to consumers and recyclers. Design for reuse and for recycling and more sustainable products are awarded.

A variety of practices on fee modulation are already available in the EU and the Commission can assist Member States by facilitating the exchange of best practices and by developing guidelines. For instance, feedback from 'eco-modulation of fees' as applied in France in the

implementation of EPR under the WEEE Directive⁹⁹ has also pointed to factors of success. Amongst these factors the setting of eco-modulated criteria in a process that involves public authorities, producers as well as non-governmental consumer and environment organisations. The necessity for the approach and criteria to apply it at the EU level to become fully effective was also identified as a key element. Moreover, in the case of electronics, modulated fees also have the potential to support design changes for products for a global market.

In addition, In its proposed waste review, the Commission has emphasised the use of economic instruments to prioritise waste prevention and recycling at national level. For instance, high or gradually rising fees or taxes on landfilling and incineration could improve the economics of plastic recycling by clearly internalising the environmental costs of alternatives.

3.5 Examples of good practice

3.5.1 Examples of good practice related to SUP

General Commitments From Public Authorities Against Single-Use Plastics

United Kingdom: Commitment to eliminate avoidable plastic waste within 25 years. The UK is considering the implementation of a tax on single-use plastics.

Medway Council, on a local level, is planning to phase out plastic bottles, cutlery, cup, drinking straw in all Council buildings at Council events by June 2018.

Scotland: adopted a national litter strategy and a marine litter strategy in 2014 (communications toolkit, marketing campaign and adapted legislation to increase the fixed penalties for litter- £80 for anyone who drops litter.) Scottish Landfill Tax was introduced in April 2015. 70% set recycling rates target by 2025. Grants will be given to private companies to set up plastics recycling centres. Plans to ban single-use plastics by 2030;

The Netherlands: [Dutch marine litter policy](#):

- Cooperation with stakeholders
- reduce solid waste by regulating products and improving waste management
- undertake cleanup projects;
- increase communication and awareness
- Targets for 2020 to reduce visible litter on the beach, and decrease the amount of litter found in marine organisms.

Spain Officials in Majorca, Menorca and Ibiza plan to end the sale of all single-use consumer plastics by 2020. Coffee capsules, disposable tableware, plastic cups and ear sticks, non-rechargeable lighters, disposable razors and non-reusable printer toners.

Wet wipes will not be banned as it would be problematic in terms of competition/markets legislation.

Costa Rica: Announced in 2017 a ban on single-use plastics by 2021

⁹⁹ The French Eco-modulation on electric equipment was updated in July 2015; now comprising 17 product types: fridge, freezer, washing machine, dishwasher, vacuum cleaner, coffee machine, kettle, tea machine, computer, notebooks, tablet, printer, phone, drilling machine, screwdriver, games console, lamps).

Haiti: [bans](#) the production, import, commercialization, and use in any form of plastic bags and objects made of styrofoam for food purposes, such as trays, bottles, bags, cups, and plates.

City Of Vancouver: developing since 2016 a Single-Use Item Reduction Strategy to explore how they can reduce waste from:

- Disposable hot and cold drink cups
- Plastic and paper shopping bags
- Polystyrene foam and other take-out containers

Currently launching a second consultation with all stakeholders groups.

Cigarette butts

RAISING AWARENESS

Clean Up Australia (NGO): [Education](#) on cigarette butts littering and clean-up campaigns

British American Tobacco Australia (Tobacco industry): has established an independent Butt Littering Trust (BATA 2002) with funds of up to \$1 million in the first two years for actions to reduce the impact of cigarette butt litter. → Publishes reports, distributes information materials to Australian Council on butt littering issues, and undertakes awareness projects about butt littering (but biased position on danger to smoke).

MITIGATION FEE

San Francisco: implemented a [cigarette litter abatement fee](#) in 2011 by increasing the per pack price of all cigarettes by \$0.20. By increasing the price of cigarettes, it discourages smoking and corresponding litter, and the proceeds from the abatement fee are used to finance street cleaning and environmental remediation directly related to cigarette waste.

DEPOSIT RETURN SYSTEM

New York: in 2015, developed a [cigarette butts recycling program](#): A. Establishing a State wide System and redemption facilities for the collection of used cigarette butts via automated or non-automated recycling equipment. B. Establishing a deposit and refund value for individual cigarette butts returned to collection facilities of not less than 1 cent per cigarette returned. Fiscal plan created to allocate funds to education campaigns about the harm cigarette butts cause to the environment and labelling projects for cigarette packs.

EPR SCHEME

Australia: a [public consultation](#) has been conducted regarding cigarette butts and a variety of public and private stakeholder have pledged for the efficiency of an EPR scheme for cigarette butts.

SMOKE FREE AREAS

Canada: banned smoking on its freshwater beaches in 2013.

R&D

Terracycle: any customer can buy a special cardboard box and then ship it back to [TerraCycle](#) for recycling. The collected waste will be shredded and separated. The plastic

(such as the cigarette filters) will undergo pelletization and extrusion to be molded into various recycled plastic products. The paper will be recycled and the tobacco and other organics will be composted.

Receptacles are also proposed for distributing standardizing cigarette recycling in small or large-scale outdoor environments like in [Davos since 2017](#) or in [Vancouver](#), for instance.

Greenbutts: Start-up launching in 2018 “[greenbutts](#)”, that are a biodegradable cigarette filter made from natural materials using no chemicals or artificial binders.

Green Bins: eco-friendly [bins](#) for cigarette butts with an integrated process for biodegradation and detoxification.

Plastic bottles, caps and lids

PUBLIC POLICIES

UK Green Public Procurement: Plan to ban plastic bottles + plastic straws from Royal Estates.

Copenhagen: The city has put up more than 60 drinking fountains all over Copenhagen, where citizens and guests can enjoy tap water for free. [Map](#) created, showing the drinking fountains available all year and the ones only available in summer.

London: Twenty new [drinking fountains](#) will be installed across London within a Plastic Free City initiative pilot scheme starting this summer. Collaboration with civil society: [#OneLess campaign](#), led by the Zoological Society of London, who is supplying the fountains and will analyze whether the initiatives reduce the levels of plastic ending up in the environment.

Balearic Islands: Government officials are considering forcing bars and restaurants to offer free tap water to customers in a bid to reduce the amount of plastic bottles discarded on the islands.

California: [California Assembly Bill 319](#) - From January 1, 2020, a retailer shall not sell or offer for sale, in the state, a single-use beverage container with a cap, unless the container meets one of the following conditions: (a) The cap is tethered to the container in a manner that prevents the separation of the cap from the container when the cap is removed from the container. (b) The cap includes an opening from which the beverage can be consumed while the cap is screwed onto or otherwise contiguously affixed to the container.

Melbourne: 60 water fountains now installed across the city through a joint initiative between VicHealth and the City of Melbourne. The City of Melbourne website features a [map of the drinking fountains](#).

Barbados (Antilles): Barbados’s beverage [law](#) provides that: “no distributor or dealer shall sell or offer for sale, at wholesale or retail in Barbados, any beverage that is contained in a beverage container without government permission.” Distributors and dealers who have “an adequate system for the recycling of beverage container” may be exempted. The law imposes a fine of up to \$500 and three months imprisonment for violations.

DEPOSIT RETURN SCHEME

Table 15. Countries in the EU with Deposit Return Schemes (source RELOOPo

Country	Population (million)	Mandate Enacted	Mandate Implemented
1. Croatia	4.3	2005	2006
2. Denmark	5.6	2000	2002
3. Estonia	1.3	2004	2005
4. Finland	5.4	N/A	1996, 2008 (PET), 2012 (Glass)
5. Germany	81.9	1991	2003
6. Iceland	0.3	1989	1989
7. Lithuania	3.0	2014	2016
8. Netherlands	16.8	2003	2005
9. Norway	5.0	1999	1999
10. Sweden	9.5	1982, 1991 (PET)	1984, 1994 (PET)

Scotland: The Scottish Government is already planning to introduce [a deposit return scheme](#) which would see customers pay a surcharge on plastic bottles which will be refunded when they return them to a shop. [Zero Waste Scotland](#) is commissioned to design the system. A public consultation is to be expected in spring 2018.

ECONOMIC INCENTIVES

Ganamos Reciclando (Recycling we all win): [Spanish company](#) providing, on a franchisee-agreement basis, reverse vending machines (RVMs) to be placed at food retailers, schools, sport centres and all kind of businesses. The customer returns the empty beverage packaging, the machine identifies the type of container by its barcode and provides on return either coins or a discount ticket for a small amount of money to be used in the shop or businesses adhering to the scheme during a certain period. It works similarly to a deposit-refund system, but it is fully private, independent from policy processes. There is no deposit; price of the product does not increase.

R&D

Ecover: Launch of the [Ocean Plastic bottle](#). Made out of bioplastics (Plantplastic that is plant-based polyethelene), recycled and recyclable plastic. Can be produced by any company and be a mean to communicate awareness messages.

Ooho: [spherical flexible package](#) that can contain water and liquids like soft drinks, spirits and cosmetics. Biodegradable and edible, it is created from calcium chloride and sodium alginate, a seaweed derivative.

Onya (Australia): company that creates reusable products such as reusable shopping bags, produce bags, backpacks & coffee cups, stainless steel drink bottle.

VOLUNTARY AGREEMENT/COMMITMENT

Coca-Cola: [Commitment](#) to collecting and recycling the equivalent of 100% of its bottles, cans, and other packaging by 2030 + it aims to make bottles with an average of 50% recycled material. Planned investment in promoting understanding of recycling, working with local communities to improve recycling infrastructures as well as other nonprofit and corporate partners.

Danone: [announced](#) that it will produce all its plastic bottles from 100 percent recycled plastic by 2025.

English Businesses: [Shops, cafes and businesses will offer free water refill points](#) in every major city and town in England by 2021. The new scheme has been set up on the back of a previous initiative, the Refill campaign, which currently has more than 1,600 refill stations across the UK and operates in 13 towns and cities in England.

- **Bristol:** In 2015, the city adopted the campaign and the city now has more than 200 points.

- **London:** this bottle-refill initiative, in which businesses make tap water available to the public, will be set up across five areas of the capital over February and March 2018. If successful, it will be rolled out to the rest of the city in the summer. Plastic cups, bottles and cutlery will also no longer be available at City Hall under the plans.

- Businesses offering free tap water to the public will display signs in their windows. **Whitbread** (owning Costa Coffee and Premier Inn) is the first to sign up to the initiative and will provide water in all of its branches from March 2018.

Cotton bud sticks

PUBLIC POLICIES

France: Ban on cotton bud sticks with plastic stems from [1st January 2020](#) as part of the 'LOI n° 2016-1087 du 8 août 2016 pour la reconquête de la biodiversité, de la nature et des paysages'

Scotland: Announced in January 2018 a [plan to ban plastic cotton buds](#). The Scottish Government plans on carrying out a public consultation about it.

Italy Plans to ban non-biodegradable plastic cotton bud sticks from 01/01/2019.

RAISING AWARENESS & ALTERNATIVES

Bag It And Bin It – Don't Flush It: In 2007 and 2008, the MCS and Surfers Against Sewage encouraged manufacturers and retailers to improve labelling of cotton buds and to replace the plastic cotton bud stick with a paper one. The [campaign](#) received support from leading retailers (Tesco, Sainsbury's, Safeway, Morrison's, Somerfield, ASDA, Co-op, Superdrug, and Boots) and key manufacturers (e.g. Johnson & Johnson and Smith & Nephew), who included the campaign logo and/or the correct disposal messages on products that consumers might flush. Results from the 2007 MCS Beachwatch event marked a decrease in the number of cotton bud sticks observed on UK beaches, from 172 items/km in 2006 to 97.5 items/km in 2007.

The Cotton Buds Project or “Switch the Stick”: have called upon industry and retailers to replace plastic cotton bud stems with biodegradable alternatives. The [two projects](#) have slightly different approaches. The first engages with producers and retailers directly, asking companies to phase out the use of plastic, and provides consumers with information on which companies are offering alternatives to plastic. The second asks consumers to sign a petition asking UK retailers to stop making plastic cotton buds by the end of 2017.

VOLUNTARY AGREEMENT/COMMITMENT

Johnson & Johnson (Pharmaceutical Company): no longer sells cotton buds made with plastic handles since 2017, in favor of paper handles ones to prevent toxic waste reaching waterways and seas.

Sainsbury, Tesco, Co-Operative, John Lewis, The Body Shop, etc.: phased out plastic handles cotton buds from their own-brand products.

Northlink (Ferry Operator): [removed plastic cotton buds](#) from its board shops

Crisps packets/sweets wrappers

VOLUNTARY AGREEMENT/COMMITMENT

Marks & Spencer: in 2017, launched the '[Project Thin Air](#)' → more than 140 of its best-selling products have been redesigned and repackaged in smaller, less bulky packets containing the same amount of food as before. The biggest reductions have been achieved in the retailer's popular popcorn range, with a 37% slimming down in pack size. Across its hand-cooked crisp range, M&S is now using 20% less plastic. The changes have led to 75 tonnes of packaging being saved each year.

R&D

Terracycle: has created a [zero waste solution for snack wrappers](#). It proposes to customers to buy a special cardboard box and then to ship it back to TerraCycle for recycling. It recycles: Individual, multipack and family-size snack bags and wrappers, including chip, candy and granola wrappers.

Polyflow: company that boasts an [innovative technology](#) that allows the mixing of "dirty plastic" and rubber waste: ability to turn candy wrappers and potato chip bags, into products like gasoline and diesel fuel, adhesives, household and industrial cleaners and paint.

Wet wipes

LABELLING

Balearic Islands require clear labelling of wet wipes by 2020;

Sanitary applications

RAISING AWARENESS

Ireland: In a study of over 1000 people in Ireland, 3 in 10 admitted to flushing such items down the toilet. Of these, 58% admitted to flushing baby wipes down the toilet, 40% facial wipes, and 24% tampons. More than half of those who flush these items down the toilet did so simply due to a lack of knowledge of the impacts.

Bag It And Bin It – Don't Flush It: The aim of the [campaign](#) was to reduce the incidence of sanitary items and other sewage-related debris (SRD) on UK beaches and riverbanks through a programme of education and partnership, encouraging people to dispose of personal waste carefully, and a better labelling of these products by manufacturers and retailers. In 2002, a school campaign was launched across 6,000 UK schools within which a variety of campaign materials were produced, (leaflets, posters, and stickers).

'Let's Stop The Block': [awareness campaign](#) against the flushing of wipes, nappies, cotton buds and sanitary products.

Bags

PUBLIC POLICIES

[16 EU Members States have already imposed a tax on light-weight single-use plastic bags and two EU MS chose to implement a ban](#) on these same items, following the [2015/720 EU directive](#) requirement to significantly reduce the consumption of lightweight (thickness below 50 microns) plastic bags in the EU.

These measures, apply most of the time, to thicker plastic bags (e.g. reusable) sold in supermarkets. According to the result of the Impact Assessment on thicker plastic bags on the marine environment, the scope of the EU legislation could be extended to a larger category of plastic bags.

France Ban of oxo-fragmentable bags (regardless of the 2015/720 Directive on lightweight plastic bags);

INTERNATIONAL COALITION

'Stop Plastic Waste Coalition': [International coalition](#) against plastic waste and most specifically against single-use plastic bags, initiated in 2016 by France, Monaco and Morocco.

Members: France, Morocco, Monaco, Chile, Australia, Bangladesh, Italy, Senegal + representatives from the civil society

[Commitment](#) from members: to promote, in particular, elimination of these plastic bags in a consistent manner with existing international instruments and policies, and to share experience, expertise and best practice gained by States that already take action on this matter. + Financial contribution from France to the Global Partnership on Marine Litter for 2017-2020.

BAN ON ALL PLASTIC BAGS (regardless of thickness)

Bangladesh: [First country to ban all “polythene shopping bag\[s\]”](#) which means a bag ... or other container which is made of polyethylene or polypropylene or any compound or mixture thereof and is used for purchasing, selling, keeping or carrying another article.” Bags manufactured for export are exempt from the ban. The law imposes a fine and up to ten years imprisonment for those who “manufacture, market or import” plastic bags, compared to up to six months imprisonment for those who “sell, exhibit for sale, stock, commercially transport or commercially use” them.

Rwanda: Legislators not only [banned the manufacture and sale of all polythene bags](#) within its borders in 2008, but also banned the import of all such bags. Violators face stiff penalties and fines. The law requires anyone wishing to “manufacture, import, use and sell” polythene bags to send a written request to the Rwanda Environment Management Authority, along with the “reasons for the request and the ways through which he or she will manage the polythene waste.”

Tamil Nadu (India): subnational ban on all plastic bags. This [ban also covers](#) "cup, tumbler, plate, spoon, fork, knife, straw, box, string, cord, sheet, mat or other article made of, or containing, plastic.”

Denmark Ban of all plastic bags (regardless of the 2015/720 Directive on lightweight plastic bags).

EPR SCHEME

Ghana: In 2004, the Government of Ghana [created a Recycling Taskforce](#) to hire waste collectors to collect and deliver plastic bags to warehouses for recycling. Plastics manufacturers are required to help fund the project.

TAX ON PLASTIC BAGS

South Africa: [banned plastic bags under 30 microns and imposed a 46-rand cents levy](#) on thicker bags. Violators are subject to a fine and imprisonment up to 10 years.

China: In 2008, [China banned the “production, use and sale of ultrathin shopping bags”](#), defined as bags less than 25 microns in thickness, and mandated that retailers impose fees on thicker bags

Cutlery, straw and stirrers

PUBLIC POLICIES

Balearic Islands: Majorca, Menorca and Ibiza plan to ban the sale of plastic cutlery and straws by 2020, except the ones that can be proved to be 'easily recyclable' or biodegradable.

Scotland plans to ban plastic straws by end of 2019.

Belgium: tax passed in 2007 on plastic films (such as dry cleaning bags), aluminum foil, and disposable cutlery.

UK Green Public Procurement: Plan to ban plastic bottles + plastic straws from Royal Estates.

France Ban of disposable plastic plates from 01/01/2020 (exception for home compostable ones and/or partly or fully made of bio-based plastics);

California: [Assembly Bill](#) introduced on January 17, 2018 aiming at making a criminal offense for restaurant employees to provide patrons with single-use plastic straws (up to six months jail and \$1,000 fine). Measure would only apply to sit-down restaurants, and not fast food or similar locations.

Miami Beach (Florida-US): [city ordinance](#) in 2012 prohibiting beachfront hotels from serving drinks with straws.

R&D

Simplo: Start-up that uses SFC-certified wood particles to produce elegant and lightweight [disposable utensils](#). They are 100% biodegradable, reduce loss of raw material, improve transport efficiency and can include publicity or messages targeting the end user. As the cutlery comes attached, SIMPLO also avoids the use of a plastic wrap to keep the cutlery utensils together.

The Plastic Straw: [Project](#) created by the Plastic Pollution Coalition and that lists on this page about twenty alternative solutions to plastic straws: paper straws, glass straws, steel straws, titanium straws, bamboo straws, etc.

RAISING AWARENESS

The Last Straw [Petition](#): On Change.org, newspaper The London Evening Standard is calling on all food and drink businesses across London to ban plastic straws or draw up plans to phase them out by the end of 2018.

The Final Straw Campaign: spearheaded by Josie and Rob da Bank, founders of Bestival, aims to ‘purge plastic straws from the festival landscape’, starting with their own events – Bestival, Camp Bestival and Common People. They then aim to eradicate all single-use plastics – like cups and cutlery – at festivals in the following years.

VOLUNTARY AGREEMENT

Iceland (Supermarket): The Company has already removed plastic disposable straws from its own-label range.

Waitrose (Supermarket): announced that it will stop selling packs of disposable straws from September 2018.

Wetherspoons (Pub chain): is replacing plastic straws with biodegradable paper straws.

Northlink (Ferry Operator): is replacing plastic straws with paper ones on all its sailings.

Diageo (spirits producer): has [committed](#) to phasing out the use of all plastic straws and stirrers from its offices and by 2020.

Balloons and balloon sticks

RAISING AWARENESS

Balloons Blow: NGO that organises balloon clean-up on beaches, prevention of mass balloon releases, and promotion of alternatives to balloons and communication of information about current legislations essentially in the US on intentionally releasing balloons.

Netherlands: [Study](#) on the environmental impact of balloon in the environment: approximately one million balloons were launched in 2014 in the NE. Scan analysis shows that over 50% of societal costs related to balloon originate from the cleaning cost in the end-of-life phase.

PUBLIC POLICIES

UK: Oxford, Brighton, Plymouth, Shetland and Worcester have [banned balloon releases](#) on their lands (in open-spaces and parks)

USA: In 2017, the State of New-Jersey introduced a [Bill](#) prohibiting intentional release of balloons inflated with lighter-than-air gases. Florida and Virginia have also banned balloon releases.

Australia: In Queensland, the release of balloons into the environment is considered littering under the [Waste Reduction and Recycling Act 2011](#)—whether released deliberately or by accident.

Under the WRR Act, if a person fails to comply with a compliance notice they may face further [penalties](#).

Food containers including fast food

VOLUNTARY AGREEMENT/COMMITMENT

Mark&Spencer: committed in its [Plan A 2020](#) to drastically reduce plastic packaging from its aisles, including with the creation of a Food Packaging Charter.

- All PVC was removed from food packaging by 2000.

- Development of a safe system for the use and labelling of recycled materials in plastics.
- Since 2004, M&S has used 8,000 tonnes of recycled PET (rPET) plastic across produce, food-to-go, chilled drinks and deli products. During 2007- 2008, 63% of PET packaging contained a minimum of 50% post-consumer waste. This was further extended to the plastic films on packs.
- In 2007, M&S replaced foamed plastic trays across all apple and hard pears and it has been extended to all stone fruit and soft pears.
- Important cooperation with charity organizations Waste and Resources Action Programme (WRAP) & Marine Conservation Society (MCS).

McDonald's: By 2025, 100 percent of the company's guest packaging will come from renewable, recycled or certified (preferably by the Forest Stewardship Council) sources. By 2020, [the company intends](#) for 100 percent of its fiber-based packaging to come from recycled or certified sources where no deforestation occurs. As part of this goal, McDonald's will eliminate the use of polystyrene foam packaging globally by the end of 2018 + goal to recycle 100 percent of its restaurant packaging.

Iceland (Supermarket): [committed](#) in January 2018 to replace all plastic packaging from its own-brand products with fully recyclable paper and pulp-based alternatives by 2023.

Waitrose (Supermarket): [From the end of 2018, all Waitrose own-label meat, fish and produce will no longer be packaged in black trays.](#) The company has already removed 65 percent of black plastic packaging from fresh fruit and vegetables. By 2025, Waitrose intends to make all its brand-owned packaging widely recyclable, reusable or compostable. Since 2009, it has reduced its overall packaging by nearly 50 percent.

R&D

Pulpworks: [Company](#) that designs and manufactures sustainable packaging: compostable products, moulded from 100% post-consumer waste paper and agricultural waste such as bagasse (sugar cane), bamboo, wheat straw and renewable plants like switch grass. It is compliant with ISO 14000 and European Green Dot standards, facilitating internationalization. PulpWorks was the Grand Prize Winner at the 2013 "Think Beyond Plastic" competition sponsored by the international Plastic Pollution Coalition, at the 2014 North Bay Innovation Summit.

Miwa: introduces a [digital solution that connects all stakeholders along the value chain](#) – from the farm that produces the food to the customer that buys it. It allows anyone with a mobile phone to order any desired amount of a product to be delivered in reusable packaging to either their nearest store or directly to their home.

The **Fraunhofer Institute for Silicate Research ISC** has developed a coating with silicate and biopolymers that can be used in many different food packaging applications protecting biopolymer packaging and food against premature degradation and is fully compostable. <https://newplasticseconomy.org/innovation-prize/winners/fraunhofer-institute-for-silicate-research>

PUBLIC POLICIES

France: system currently in place in France, where supermarkets are taxed less for using sustainable and recyclable packaging, and more for using materials that aren't.

UK Considered taxes and charges on single-use items such as takeaway containers;

Vanuatu: Polystyrene takeaway boxes will be [banned](#) end of January 2018.

Zimbabwe: outlawed styrofoam containers for fast food. Ahead of implementation, snack bar owners were encouraged to offer their customers a place to sit in and eat.

Cup and cup lids

PUBLIC POLICIES

Ireland: Cork City Council [banned](#) in January 2018 single-use coffee cups from their canteens and offices.

[Meath County Council](#) replaced disposable cups for all staff in 2015.

Balearic Islands: Majorca, Menorca and Ibiza plan to ban the sale of plastic cups by 2020, except for the ones that can be 'easily recyclable' or biodegradable.

United Kingdom: according to the government, all disposable coffee cups should be recycled by 2023.

British MPs proposed to impose a [25p "latte levy"](#) on every disposable coffee cups (under discussion).

France Ban of disposable cups/glasses from 01/01/2020 (exception for home compostable ones and/or partly or fully made of bio-based plastics).

REUSABLES

Cup Club is the world's first reusable coffee cup system. With smart cups available at coffee shops, easy-to-find drop-off points and high-tech wash hubs that deliver the cups to the coffee shops again, Cup Club is an easy, free and extra-large extra-hot step towards sustainable living. <http://www.cup-club.co.uk/>

Freiburg (Germany): [Freiburger Abfallwirtschaft und Stadt-reinigung \(ASF\)](#), a public-private partnership between REMONDIS & the City of Freiburg, has developed the Freiburg Cup and a strategy to reduce waste together with café operators. The most important partners of the Freiburg Cup are the operators of cafés and bakeries that sell coffee to go. As an alternative to disposable coffee cups, the ASF produces its reusable cups from stable plastic that holds up in dishwashers. Café businesses do not incur any costs, the City of Freiburg is bearing the costs for launching the system, while coordination is in the hands of the ASF. The deposit on the Freiburg Cup is 1 euro. Used cups can be returned at any one of the 60 businesses in the inner city taking part in the initiative. The cups are washed there, with defective or missing cups being replaced by the ASF.

Pret A Manger: has set a discount of 50p on hot drinks for customers who use reusable cups

Starbuck: in up to 25 London stores, will start a three months trial from February 2018 of 5p charge for disposable cups.

The Eden Cafe: Otago Polytechnic University in New Zealand [banned single-use cups](#) and provided second-hand china instead. These cups can be left at drop-off sites dotted around the campus where they are collected, washed and reused.

Hamburg (Germany): system for reusable to-go coffee cups since 2016. Customers pay €1.50 (about \$1.63) to obtain a black "[Refill It!](#)" cup made from biodegradable, plant-based lignin. They fill it up with the beverage of their choice at one of 11 cafes participating in the programme. When it's empty, they can fill it up again or return it and get their money back.

Festival Republic (a leading UK music events producer): Introduced a £2 deposit on each reusable cup, which people get back when returning the cup to the bar.

RAISING AWARENESS

NGO Hubbub: bins shaped like [giant coffee cups](#) branded with 'Recycle your coffee cup here'.

Responsible Coffee Label: In Australia, participating cafes get a [poster](#), an information sheet outlining the issue of single-use cups, and bi-yearly metrics on the benefits of the programme. An [online map](#) features the closest "responsible cafes" committed not to sell any disposable coffee cups.

R&D

TrioCup, a on-the-go coffee cup with an origami-style no-spill lid <https://cooper.edu/engineering/news/100k-innovation-prize-awarded-former-invention-factory-winners>

3.5.2 Examples of good practice related to fishing gear

Product design

Netherlands: Under the Green Deal for Fishing in Support of a Clean Sea there is significant effort put into research into alternatives to the use of dolly ropes. In 2017 Phase 5 of the Dolly Rope Free project was finalised and will be followed with a testing phase of alternative materials (i.e. yak leather, biodegradable rope, polyethylene ropes, etc.). Once the most suitable material has been identified, the commercial market is expected to take over follow-up developments.

Voluntary agreement for collection systems

Iceland: Voluntary agreement on collection of fishing gear made of synthetics between the Federation of Icelandic Fishing Vessel Owners (LIU) and The Icelandic Recycling Fund (since 2005 based on Art.8 Processing Charge Act No. 162/2002). LIU (now Fisheries Iceland) operates and finances a collection system. Under this agreement, fishing nets made of synthetic materials are exempted from recycling fees. The collected nets are mostly exported and recycled abroad.

Estimated recovery of fishing nets today: 80%, thanks to continuously increasing recycling targets.

Norway: Nofir: private nationwide company which collects discarded equipment from fishing and fish farming around Europe. Supported since 2012 by the EU Eco Innovation Scheme, it was created in 2008 by a fish net producer and a waste management company. Between 2012 and 2014 the Norwegian system had collected 4886 tonnes of material, mainly in Norway.

Extended producer responsibility

It makes the manufacturer responsible for the recycling/reuse treatment of their fishing gear products. In effect, this removes the inconvenience and cost factors associated with waste management from the fishers.

Norway: In Norway, the Ministry of Climate and Environment has announced their goal to introduce a producer responsibility scheme for fishing and discarded marine equipment from the aquaculture industry.

Deposit refund systems

The consumer pays a deposit upon the purchase of fishing gear, fish boxes, etc.. Once the gear reaches the end of life stage, the consumer could return the net and retrieve the deposit that would otherwise be burned, dumped or irresponsibly managed. No systems are currently known to be in place for fishing gear.

Reward schemes

Similar to “litter retrieval” and “litter retention” programmes, these “gear buy back” schemes encourage fishermen or other authorities to collect marine litter and bring it back to shore for a reward and appropriate disposal. No volunteer basis like for the other programmes.

A recycling initiative could offer the same kind of reward system, but the source of money would be from the recycling market itself instead of taxes from local or regional governments.

Hawaii: Pilot project → fishers are asked to report derelict fishing nets at sea. A team of trained volunteers then go to the reported location and remove the fishing gear. Once the gear is professionally retrieved, the commercial fishers are awarded cash according to the weights of the reported derelict nets or gear (Brink et al., 2009).

South Korea: programme within which fishers are responsible for reporting and retrieving the gear themselves. The programme provides fishers with durable bags to collect fisheries-related marine litter while at sea. The budget for this programme is shared between the central and local governments (Macfayden et al., 2009).

"No-fault" approach

Washington: In 2002, the Washington State legislature passed State Senate Bill 6313, establishing the Derelict Fishing Gear Removal Program, which is responsible for removing derelict gear from Puget Sound. The programme includes a popular method of reporting which takes a no-fault approach. A “no-fault” approach focuses on cleaning up the gear rather than focusing on who is responsible for losing it

Anti-dumping laws

China: China is a party to MARPOL, including Annex V, and has implemented [national legislation](#) in accordance with its regulations. China has passed an environmental protection law, which includes anti-dumping provisions. The law prohibits any dumping of garbage from vessels, specifically stating that “[n]o unit is permitted, without approval of the State competent authority being in charge of marine affairs, to dump any wastes into the sea areas under the jurisdiction of the People’s Republic of China.” Any vessels wanting to dump waste in the Chinese marine environment must obtain a permit.

Namibia: [Regulations](#) Relating to the Exploitation of Marine Resources. [A fisher in Namibia](#) “may not, without a written authorization by the Minister, leave any fishing gear or any other non-biodegradable object utilized for harvesting marine resources on or in the sea or on the sea shore on the termination of harvesting.” If a fisher does lose or abandon their fishing gear, they will incur all costs relating to the collection of the gear and if the State recovers the gear, the fisher will then be indebted to the State.

South Africa: Fishing line recycling bins on beaches. PVC pipes were converted into bins that were erected on beaches. These pipes are resistant to the elements and corrosion and prevent the lines from blowing away. www.plasticsinfo.co.za

Port waste management systems

Norway: PRF Directive/Norwegian Pollution Control Act requires ports to charge vessels “indirect” waste handling fees. In this indirect port fee system, all vessels pay a set amount to use the port and its waste handling services. This means that all vessels pay the same no matter how much waste the vessels bring back to the port for disposal. = Lower administrative burden to calculate the amount of waste and no incentive to reduce one's waste by throwing it aboard.

Netherlands: Since 2016, sea-going vessels have been able to dispose of plastic waste’ free of charge in the ports of Rotterdam Rijnmond and the North Sea Channel district. The waste must be presented separated and clean. The port authorities of Rotterdam and Amsterdam agreed on this with the waste collectors in the ports.

This action was implemented as part of the Green Deal Ships’ Waste Supply Chain that the Minister for Infrastructure and the Environment, Schultz van Haegen, entered into with the sector on.

10 September 2014. Participants in the Green Deal: Port of Rotterdam Authority, Port of Amsterdam, Zeeland Seaports, Groningen Seaports, Port of Den Helder, NVVS (ships’ suppliers), KVNOR (ship owners), collectors of ships’ waste, ILT and Stichting De Noordzee.

The Green Deal has been operating for three years and the separate collection of plastic ships’ waste has grown steadily. Extra quality requirements have been incorporated into new and renewable licences for waste collectors when it comes to collecting, sorting and recycling plastic. In addition, Dutch and Flemish ports have agreed on a joint financing system for the waste collection.

The Deal focuses on the implementation of a number of measures, with varying levels of progress. The measures to improve the removal of operational maritime waste and domestic waste, and the fine-tuning of port-based collection facilities has resulted in all fisheries ports being able to facilitate the collection of segregated waste streams. However, disposing end-of-life fishing gear in ports is still problematic. To attempt to solve this issue, a location-sensitive mobile app for fishers will be launched, which enables seafarers to notify port authorities of the type and quantity of waste they will bring ashore ahead of landing. The app also reminds fishers to prepare and dispose of their waste properly.

Penalty scheme

This scheme would impose a penalty on a vessel that does not discharge any waste at port (meaning they did it at sea)

Environmental tax

Internalizing the environmental costs of fishing and aquaculture by increasing the final product’s selling price. The government could achieve this by implementing an environmental tax.

Raising awareness

AUSTRALIA: The [Caring for our Country](#) initiative jointly administered by the Department of the Environment, Water, Heritage and the Arts and the Department of Agriculture, Fisheries and Forestry, Projects include: “ghost net” cleanup projects across northern Australia; regional and local marine debris monitoring and cleanup, including education and awareness raising; and industry initiatives.

Gear marking

Identification marking, which helps in identifying the ownership of lost or deliberately abandoned gear. → Authorities can better enforce penalties for intentionally dumping fishing gear and nets into the sea. It also creates an opportunity to return gear that was accidentally lost to the owner for reuse. + To increase the visibility of gear. For example, floating gear markings attached to stationary nets under the surface can help notify vessels about the risk of entanglement in the area (see above reference to FAO guidelines adopted in February 2018).

Norway: the Norwegian Resources Act does require fishers in Norway to mark their stationary gear for visibility and identification purposes.

Washington: Washington State Department of Fish and Wildlife has established [guidelines](#) to minimize the likelihood of lost crab pots: each pot must be clearly marked, attached to a buoy, and have a biodegradable panel to allow marine life to escape if it does become abandoned

Navigational technology

Fishers can avoid accidental gear loss by attaching tracking devices, called transponders. These transponders use either radio channels or satellite systems to communicate their location in the water to the vessel.

Retrieval schemes

Global Ghost Gear Initiative: GGGI is a global organisation aiming to tackle the problem of ghost fishing gear. They work in collaboration with a number of retrieval schemes, such as **Ghost Fishing** in The Netherlands, **MCB Seafoods** in the United Kingdom, project **GHOST**, aiming to reduce the impacts of ALDFG in the coastal areas of the north Adriatic Sea and more.

Waste Free Oceans: WFO collaborates with fishers and brand owners to retrieve and recycle marine litter (including fishing gear) into new products.

Blastic: This project (2016-2018) is co-funded by the European Regional Development Fund and takes regional and national strategies into use on a local level and also produces updated local action plans (including retrieval schemes) to reduce the plastic (also from fishing gear) into the Baltic Sea.

Fishing for litter

Germany: In 2012 a cooperation between Naturschutzbund (NABU) and Niedersachsen Wattenmeer National Park has developed a Fishing for Litter scheme. In two years, the cooperation landed more than 6 tons of litter, of which 80 % was plastic, 13 % rubber, and 9 % metal. NABU also developed other Fishing for Litter programmes in the North Sea.

Netherlands: Under the Green Deal for Fishing in Support of a Clean Sea the fishing for litter initiative continuous to receive direct funding from the government. From 2019 funding will decrease, with the aim of allowing the fishing sector to take over the initiative. This will also be a build-up to the implementation of the new Port Reception Facilities Directive in 2020.

Marineclean: Running between 2011 and 2014 this project targeted the reduction of marine litter through collection of marine litter with new light equipment produced at Turna. Other activities included production of edible and biodegradable packaging produced at EcoCortec;

through fishing nets produced at Turna and TC PoliEko that can be easily traced, collected and recycled when lost; and through advocacy.

KIMO: This organisation is an association of coastal local authorities whose goal is to eliminate pollution from the Northern Seas. KIMO has 75 member authorities from the UK, Sweden, Denmark, The Netherlands, Belgium, Lithuania, Estonia, Germany, Faroe Islands and the Isle of Man.

Recycling of Fishing Gear

Plastix Global: This Danish company recycles discarded fishing nets and trawls into reusable green raw materials such as HDPE, PP and PA. In 2016, the company had a capacity of 12 000 tons per annum, Plastix is one of the few recycling companies capable of recycling most of the material in fishing gear. For this reason, a number of schemes have partnered up with the company.

MCB Seafoods Recycling Scheme allows fishers in ports of Newhaven, Shoreham and Eastbourne (UK) to deposit their end-of-life fishing gear free of charge, which is then collected and sent for recycling to Plastix.

Nofir: Based in Norway with facilities in Turkey and Lithuania, Nofir recycles discarded plastic equipment from fishing and aquaculture and regenerates it into ECONYL yarn to use for new textile products (i.e. clothes, furniture, carpets, etc.). Between 2011 and 2016 the company collected and recycled 26314 tons of end-of-life fishing gear.

Aquafil: The company is based in Italy with headquarters in Slovenia, Croatia, Germany, UK, USA, Thailand and China. It recycles fishing gear and turns it into yarn used in the production of carpets. Similarly to Plastix, the company is in partnership with various organisations.

Gwr Polymers Ltd collects and transports baled nets to Slovenia, and recovers costs by selling on the regenerated pellets.

Ecoalf: This company uses nylon made from discarded fishing nets and turns it into fashion products.

Bureo: This American company based in Chile recycles discarded fishing nets and turns it into skateboards and toys. They have recycled more than 80 000 kg of discarded materials up to today.

Intco Environmental Protection Machinery: INTCO developed Greenmax Machines, a recycling unit that recycles fish cooling boxes made from Styrofoam (EPS) and turns it into high-quality EPS blocks. The company has a buy-back scheme, making the purchase of such a unit financially sustainable for a company.

Nets-To-Energy: This programme in Hawaii, USA collects fishing nets and then transports it to a scrap-metal recycler facility. Here the nets are chopped into small pieces suitable for combustion at the City and County of Honolulu's H-Power Energy from Waste Facility.

Net-Works: The project empowers coastal communities in developing nations to collect and sell discarded fishing nets, which are recycled and turned into yarn to make carpet tile.

4 GLOBAL ACTION

4.1 Existing actions involving EU

4.1.1 Multilateral cooperation at the United Nations and through environmental agreements

The United Nations Environment Assembly (UNEA) has consistently highlighted marine plastic debris and microplastics amongst the issues of global importance. At the second UNEA session (UNEA-2) in 2016, resolution UNEP/EA.2/Res.11 on marine plastic litter and microplastics was adopted, in which governments requested an assessment by the United Nations Environment Programme (UNEP) of the effectiveness of relevant international, regional and sub-regional governance strategies and approaches to combat marine plastic litter and microplastics, taking into consideration the relevant international, regional and sub-regional regulatory frameworks. The resolution called for identification of possible gaps as well as options for addressing these gaps.

The UNEP assessment¹⁰⁰, prepared in response to the aforementioned UNEA-2 resolution, highlights that in the current set-up there is no global institution with the mandate to coordinate current efforts and manage the issue upstream from the extraction of raw materials, design and use phases of plastic polymers and additives to final treatment and disposal. Also, among a number of other conclusions, it notes the lack of harmonised binding standards at the global level for the mitigation of pollution by plastic waste, particularly from land-based sources; a lack of global standards for national monitoring and reporting on consumption, use, final treatment and trade of plastic waste, as well as a lack of global industry standards for environmental controls and quality specifications of plastics. Concerning in particular liability and compensation from damages resulting from marine litter, the UNEP assessment notes that, despite the widespread damage resulting from marine litter, liability and compensation for damage to the marine environment from accidental or intentional discharge of solid material in the sea is not covered by any international instrument. The existing instruments that apply in the context of marine litter and microplastics have geographical limitations as they fail to cover internal waters and watersheds. The costs of remediation for environmental damage by marine plastic litter and microplastics are not currently represented in any product or any other liability legislation with potential compensatory arrangements for environmental damage. Furthermore, the assessment underlines that extended producer liability and any other appropriate schemes (e.g. liability and financial compensation schemes for the shipping sector) would need to be used to induce change in the plastic producing industries. Next to suggesting consideration of the overall governance set-up to UNEA, the assessment proposes a number of areas and steps in need of immediate progress. This comprises to give consideration, in the context of marine plastic litter and microplastics, to the definition of damage, the measure of damage, responsibility, who can claim and what remedial activities can be claimed for.

Moreover, several initiatives have been launched to address specifically the impacts of plastic waste entering the sea from land and include *inter alia*: UNEP's Global Programme of Action for the Protection of the Marine Environment from Land-based Activities (GPA) and the

¹⁰⁰ UNEP (2017), Combating marine plastic litter and microplastics: An assessment of the effectiveness of relevant international, regional and subregional governance strategies and approaches (EA.3/INF/5)

Global Partnership on Marine Litter (GPML)¹⁰¹, the 2015 G7 Action Plan to Combat Marine Litter¹⁰², and the 2017 G20 Marine Litter Action Plan¹⁰³.

Concerning plastic waste and other types of waste discarded from ships, the International Maritime Organisation (IMO) has also developed action to address the issue, in particular by further regulating the discharges of garbage from ships in the context of the MARPOL Convention¹⁰⁴. Annex V to MARPOL prohibits the discharge of all types of garbage into the sea from ships, except in the cases explicitly permitted under the Annex (such as food waste, cargo residues, cleaning agents/additives that are not harmful to the marine environment). MARPOL also recognizes that some sea areas require higher degrees of protection and can be designated as Special Areas under MARPOL. Garbage from ships includes all kinds of food, domestic and operational waste, and comprises all plastics as well as fishing gear. Annex V applies to all types of ships operating in the marine environment, including fishing vessels and recreational craft. Yet, although MARPOL provides comprehensive framework addressing ship-source pollution from different polluting substances, it does not provide for a compliance mechanism. The success of compliance with the MARPOL discharge norms depends on the availability of adequate port reception facilities where the garbage can be delivered and managed appropriately. The EU Port Reception Facilities Directive¹⁰⁵ transposes these requirements into EU law through a ports based approach, is instrumental for implementing and enforcing the MARPOL regime, including its ban on plastic discharges.

The EU takes an active part in the decision-making processes under the relevant multilateral environmental agreements (MEAs) and processes that set legally binding requirements and provide guidance for all countries, e.g. on chemicals and waste management¹⁰⁶. In particular, under the Basel Convention¹⁰⁷, Parties have adopted a number of measures including an Environmentally Sound Management (ESM) toolkit that they can use in shaping their national policies to ensure a sound management of waste, so contributing to achieving the SDGs. The ESM toolkit consists of practical manuals on waste management and fact sheets covering specific waste streams; and guidance for developing efficient strategies on waste prevention¹⁰⁸. It includes incentives to encourage private sector investments, training materials, checklist for self-assessment of national capacity, pilot projects, ESM criteria and case studies on the promotion of ESM in the informal sector. At the 13th meeting of the Conference of the Parties to the Basel Convention (COP13 held in April 2017), Parties have engaged in developing new tools, such as a practical manual on extended producer responsibility (EPR), guidance on waste prevention and minimisation, factsheets on specific waste streams and manuals on EPR and financing systems for ESM. Another outcome of COP13 was the establishment of a new household waste partnership¹⁰⁹ and the inclusion of

¹⁰¹ <https://www.unep.org/gpa/what-we-do/global-partnership-marine-litter>

¹⁰² https://www.g7germany.de/Content/EN/_Anlagen/G7/2015-06-08-g7-abschluss-eng_en.html

¹⁰³ https://www.g20.org/Content/DE/_Anlagen/G7_G20/2017-g20-marine-litter-en.html?nn=2186554

¹⁰⁴ [http://www.imo.org/en/about/conventions/listofconventions/pages/international-convention-for-the-prevention-of-pollution-from-ships-\(marpol\).aspx](http://www.imo.org/en/about/conventions/listofconventions/pages/international-convention-for-the-prevention-of-pollution-from-ships-(marpol).aspx)

¹⁰⁵ Directive 2000/59/EC on port reception facilities for ship-generated waste and cargo residues

¹⁰⁶ London Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter; Basel Convention on the Control of Transboundary movements of Hazardous Wastes and their Disposal; Stockholm Convention on Persistent Organic Pollutants; Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade; etc.

¹⁰⁷ Basel Convention on the Control of Transboundary movements of Hazardous Wastes and their Disposal

¹⁰⁸ <http://www.basel.int/Implementation/CountryLedInitiative/EnvironmentallySoundManagement/Overview/tabid/3615/Default.aspx>

¹⁰⁹ <http://www.brsmeas.org/?tabid=4332&blogId=5148>

marine plastic litter and microplastics in the work programme of the Basel Convention's Open-ended Working Group¹¹⁰ for 2018-2019.

Parties under the Convention on Biological Diversity have adopted decision XIII/10 to prevent and mitigate the potential adverse impacts of marine debris on marine and coastal biodiversity and habitats¹¹¹. The decision invites Parties and other governments to consider extended producer responsibility for providing response measures where there is damage or sufficient likelihood of damage to marine and coastal biodiversity and habitats from marine debris.

4.1.2 G7 and G20

Both the G7 and now also the G20 have addressed the issues of resource efficiency and marine litter. Concerning resource efficiency, the G7 Alliance on Resource Efficiency¹¹² is a forum to share knowledge and create information networks, in collaboration with businesses, SMEs, and other relevant stakeholders. The objective is to advance opportunities offered by resource efficiency, promote best practices and foster innovation, including through innovative public private partnerships and by collaborating with developing countries. The Toyama Framework on Material Cycles¹¹³ provides a common vision and a guide for future actions to deepen G7 efforts on resource efficiency and the 3Rs (reduce, reuse, recycle). The Five-year Bologna Roadmap on resource efficiency¹¹⁴ was a key deliverable of the 2017 G7 Environment Ministers' Meeting drafted with the active involvement of all G7 countries and the EU. It contains a specific reference to plastics¹¹⁵. The current Canada presidency of G7 is proposing that the G7 will adopt a "Plastics Charter" addressing marine litter. The G20 Resource Efficiency Dialogue¹¹⁶ aims at supporting the transition to a sustainable and efficient use of all natural resources and contributing to poverty eradication, acknowledging that an efficient and sustainable use of natural resources is vital for implementing the SDGs. The work on resource efficiency in both the G7 and the G20 is of particular interest to the EU because of its own domestic action on a transition towards a circular economy. As to marine litter, the G7 Action Plan to Combat Marine Litter¹¹⁷ commits G7 members to priority actions and solutions to combat marine litter and stresses the need to address land- and sea-based sources, removal actions, as well as education, research and outreach. A similar approach has recently been adopted by the G20 through the G20 Action Plan on Marine Litter¹¹⁸, where the G20 recognised the urgent need for action to prevent and reduce marine litter in order to

¹¹⁰ For more info on the Basel Convention's Open-ended Working Group see:

[http://www.basel.int/TheConvention/OpenendedWorkingGroup\(OEWG\)/OverviewandMandate/tabid/2295/Default.aspx](http://www.basel.int/TheConvention/OpenendedWorkingGroup(OEWG)/OverviewandMandate/tabid/2295/Default.aspx)

¹¹¹ <https://www.cbd.int/doc/decisions/cop-13/cop-13-dec-10-en.pdf>

¹¹² https://www.g7germany.de/Content/EN/_Anlagen/G7/2015-06-08-g7-abschluss-annex-eng_en.pdf?__blob=publicationFile&v=2 (pp. 6-8)

¹¹³ <http://www.mofa.go.jp/files/000159928.pdf>

¹¹⁴ http://www.g7italy.it/sites/default/files/documents/Communiqu%C3%A9%20G7%20Environment%20-%20Bologna_0.pdf (pp. 13-15)

¹¹⁵ 'Assess the economic benefits and opportunities for improved product design and address barriers to recycling and reuse of plastic, in view of reducing the use of primary resources, the negative environmental and economic impacts over its life-cycle and avoid plastics leakage into the environment, in particular the seas and oceans (in coordination with relevant G7 work)'.

¹¹⁶ https://www.g20.org/Content/DE/_Anlagen/G7_G20/2017-g20-resource-efficiency-dialogue-en.pdf?__blob=publicationFile&v=4

¹¹⁷ https://www.g7germany.de/Content/EN/_Anlagen/G7/2015-06-08-g7-abschluss-eng_en.html

¹¹⁸ https://www.g20.org/Content/DE/_Anlagen/G7_G20/2017-g20-marine-litter-en.html?nn=2186554

preserve human health and marine and coastal ecosystems, and mitigate marine litter's economic costs and impacts.

4.1.3 Bilateral and regional cooperation

Prevention at source will be key to tackling the rising plastic waste tide, in line with the EU's circular economy approach. This will require the promotion of a circular plastics economy in third countries through policy dialogues on environment, industry and trade. The Commission has regular policy dialogues on e.g. environment¹¹⁹ with partner countries (notably those members of the G20, including China and India) and is in the process of developing such dialogues also with key regional organisations, such as the Association of South East Asia Nations (ASEAN). Beyond policy dialogues, the cooperation mechanisms established under Free Trade Agreements and in particular their Trade and Sustainable Development Chapters¹²⁰ and the Generalised Scheme of Preferences¹²¹ can also be used for these purposes.

4.1.4 Relevant EU policies and programmes with an international dimension

The EU organised events

The European Union hosted the fourth high-level Our Ocean Conference¹²² in Malta on 5 and 6 October 2017. The Conference has generated 437 concrete and tangible commitments for safe, secure, clean and sustainably managed oceans. Out of the 437 commitments in total, more than one hundred commitments (worth almost €3bn), were related to marine pollution including actions targeting plastics, which was one of the main themes of the event.

Development Cooperation

The EU supports improved and sound waste management in third countries through its bilateral and regional funds. From 2006 till 2013, the EU has dedicated €238 million to finance projects for water treatment, sanitation and waste management, a large part of which contributes to the circular economy. Building on this, the EU has committed to further €202 million for the timeframe 2014-2018.

The EU SWITCH to Green programmes (Switch Asia, Switch Africa Green and SwitchMed¹²³) supporting sustainable consumption and production (SCP) practices are one of the main EU contributions to the circular economy in partner countries. They also contribute to SDG 12 ('Ensure sustainable consumption and production patterns') and a number of other relevant SDGs. They cover a large range of key economic sectors in developing countries, for example agri-business, garments, manufacturing, construction materials, and SCP practices, including resource efficiency, eco-innovation, green products design, green products consumer demand, and green public procurement. They deliver policy support, promote green business development and facilitate networking among green businesses and with policy makers.

The programmes contribute to address plastic issues. The NEERE project in Burkina Faso for example, under SWITCH Africa¹²⁴ promotes eco-entrepreneurship through better waste

¹¹⁹ http://ec.europa.eu/environment/international_issues/index_en.htm

¹²⁰ <http://ec.europa.eu/trade/policy/countries-and-regions/negotiations-and-agreements/>

¹²¹ <http://ec.europa.eu/trade/policy/countries-and-regions/development/generalised-scheme-of-preferences/>

¹²² <http://ourocean2017.org/>

¹²³ On Switch-Med, see also section 0.

¹²⁴ www.switachaficagreen.org

management. Among others, it raises awareness on the impact of plastics pollution, supports plastic waste collection, and supports recycled plastics-based business development.

Enlargement and Neighbourhood Policies

Countries covered by the Enlargement and Neighbourhood policies are very valuable partners to promote circular economy and the Plastics Strategy, due to their political and historical proximity. EU action in these regions combines privileged political dialogues (e.g. sub-committee meetings) and assistance at regional and national level through institution building and financial instruments, including blending facilities. All these means could be further used to promote the circular economy objectives such as more recycling as well as a cost-efficient and effective waste management. This is all the more relevant for the candidates and potential candidate countries in the Western Balkans and Turkey, who have to comply with the EU environmental *acquis*, including revised legislative proposals on waste, upon accession.

Examples of EU action in these regions are:

- The regional ECRAN Programme has also helped the Balkan countries to transpose and implement the EU waste management *acquis* (Waste Framework Directive's requirements) and gradually move from dependence on landfills to separate waste collection and integrated waste management;
- A project on “Eco Awareness Campaign in Montenegro”, took place from April to December 2017, tackling the use of plastic bags and related pollution issues;
- There are also two flagship projects of EU regional cooperation with neighbourhood countries on the promotion and support of sustainable consumption and production patterns in beneficiary countries: SWITCH Med (EUR 20 million; 2013-2018) and EaP GREEN (EUR 10M; 2013-2017);
- The programme Horizon 2020¹²⁵ aims at depolluting the Mediterranean Sea, addressing municipal waste, urban waste-water and industrial pollution.
- The Commission services organised high-level dialogues, to raise awareness on circular economy (Casablanca in October and Kiev in November 2017).
- The EMBLAS II project to improve monitoring in the Black Sea.

Since 2014 bilateral and regional funding for waste and water management in these regions amount to about €970 million. Projects include regional assistance as well as blending facilities. Large part of these resources is dedicated to the Instrument for Pre-Accession Assistance (IPA)¹²⁶.

The Commission services have organised or are organising some high level dialogues, to raise awareness on circular economy (Casablanca in October, Kiev in November, and Belgrade in December 2017). A high level event will also take place in 2018 in Tunisia with the participation of relevant Commissioners, in view of strengthening cooperation with partners to promote adoption and implementation of these approaches.

Policy Dialogues

Prevention at source will be key to tackling the rising plastic waste tide, in line with the EU's circular economy approach. This will require the promotion of a circular plastics economy in

¹²⁵ <http://www.euneighbours.eu/en/south/eu-in-action/projects/horizon-2020-capacity-buildingmediterranean-environment-programme-h2020>

¹²⁶ The Instrument for Pre-accession Assistance (IPA) is the means by which the EU supports reforms in the 'enlargement countries' with financial and technical help.

third countries through policy dialogues on environment, industry and trade. The Commission has regular policy dialogues on e.g. environment¹²⁷ with partner countries (notably those members of the G20) and world regions, such as the Association of South East Asia Nations (ASEAN). Trade partners can also be used to this end, in the context of free trade agreements¹²⁸ and the Generalised Scheme of Preferences¹²⁹.

The Partnership Instrument

The EU's ambitious Circular Economy Action Plan fully corresponds to the objectives of the Partnership Instrument¹³⁰, namely to support EU action on global challenges including by promoting EU innovative solutions, thereby supporting market access and jobs in the Union.

The circular economy creates the right conditions for the EU to accelerate the global transition to a resource efficient, low-carbon and circular economy, and boost the competitiveness of our businesses. Actions can include improving access to the country's markets by enhancing trade, investment and business opportunities for European companies who have already adopted circular design and business models.

In that respect, the EU has adopted, under the Partnership Instrument, a number of actions that support the circular economy and, indirectly, the EU Plastics Strategy. These include the China EU Water Platform (CEWP), the India-EU Water Partnership (IEWP), and the Resource Efficiency Initiative (REI) in India, which bring together expertise from the EU and its Member States experts, and strongly engage with the private sector.

Regional Seas Conventions

The EU is already actively cooperating with the Regional Seas Conventions protecting the marine and coastal environment in the four marine regions around Europe¹³¹. Regional marine litter action plans are in place in three regions, and under preparation in the Black Sea; A project supporting implementation of the Regional Plan against marine litter of the Barcelona Convention is ongoing¹³².

The EU is a Contracting party to the Barcelona, OSPAR and HELCOM Conventions for the protection of the marine environment in the Mediterranean, the Northeast Atlantic and the Baltic respectively. The Commission, representing the EU in these Conventions has supported the adoption and implementation of action plans to combat marine litter in these marine regions. Their aim is to ensure coherent and efficient actions of the riverine countries to reduce marine litter and its impacts. Regular meetings take place for the coordination of the regional activities against marine litter among themselves, and with the implementation of MSFD at EU and national level.

¹²⁷ http://ec.europa.eu/environment/international_issues/index_en.htm

¹²⁸ <http://ec.europa.eu/trade/policy/countries-and-regions/negotiations-and-agreements/>

¹²⁹ <http://ec.europa.eu/trade/policy/countries-and-regions/development/generalised-scheme-of-preferences/>

¹³⁰ http://ec.europa.eu/dgs/fpi/what-we-do/partnership_instrument_en.htm.

¹³¹ The EU is member of the OSPAR (Northeast Atlantic), HELCOM (Baltic) and Barcelona Conventions (Mediterranean) and provides support to the Bucharest Convention (Black Sea).

¹³² http://ec.europa.eu/environment/marine/good-environmental-status/descriptor-10/pdf/Marine_litter_med_project_20_4_2016.pdf

Efforts are being undertaken with each of the Conventions to ensure a synergetic application of the EU plastic strategy. The Commission also supports financially and technically the development of such an action plan in the fourth European marine region, the Black Sea¹³³.

A project supporting implementation of the Regional Plan against marine litter of the Barcelona Convention is ongoing¹³⁴; in 2017 two big INTEREG projects (CleanAtlantic and Oceanwise) were launched, which contribute directly and substantially to the implementation of the OSPAR Action Plan against marine litter; a project on marine litter in Northern Periphery & Arctic region, dealing with the re-use of the lost fishnets is another example of how regional EU action supports entrepreneurship and efforts against marine litter (<http://www.circularocean.eu/>).

Table 17: Summary of existing measures regarding SUPs globally

Asia			
Bangladesh	Ban	Total ban on polyethylene plastic bags.	2002
Bhutan	Ban	Total ban on plastic bags.	2009
China – Jilin Province	Ban – Regional	Total ban on non-biodegradable plastic tableware (and bags) in the Jilin Province.	2015
Indonesia – Badung	Ban – Regional	Ban on the use of Styrofoam in the city of Badung.	2016
India - Karnataka	Ban – Regional	All Plastic – covers sale of plastic carrier bags, plastic plates/cups/spoons, and cling film.	2016
India - Delhi	Ban – Regional	All single use plastic items including plastic cups, bags, plates and cutlery, in the national capital territory area.	2017
Philippines	Ban	Ban on the sale and use of non-biodegradable plastic bags in >59 municipalities. Use of Styrofoam containers is prohibited in Manila.	2011
Sri Lanka	Ban	Ban on Styrofoam containers.	2017
Taiwan	Ban	Ban on beverage cups, straws, plastic bags and single use tableware.	2030
North America			
USA – San Francisco	Ban – Regional	Plastic water bottles on city properties.	2014
USA – New York City ¹³⁵	Ban- Regional	Ban on single-use Styrofoam containers in New York. The ban was challenged by a coalition of recycling firms and plastic manufacturers who claimed the material is recyclable. The ban was lifted in 2015 and reintroduced in 2017.	2013/ 2017

¹³³ Action Plan for the Mediterranean: http://ec.europa.eu/environment/marine/good-environmental-status/descriptor-10/pdf/decision_21_7_marine_litter_mediterranien.pdf

Action Plan for the Atlantic: http://ec.europa.eu/environment/marine/good-environmental-status/descriptor-10/pdf/atlantic_mlrp_brochure.pdf

Action Plan for the Baltic : http://ec.europa.eu/environment/marine/good-environmental-status/descriptor-10/pdf/baltic_regional_action_plan_marine_litter.pdf

¹³⁴ http://ec.europa.eu/environment/marine/good-environmental-status/descriptor-10/pdf/Marine_litter_med_project_20_4_2016.pdf

¹³⁵ Plastic Bag Ban Assessment DRAFT, IETC

USA – Washington D.C	Ban – Regional	On wet wipes labelled as flushable, unless it can be proven that they break down in normal sewer conditions.	2018
USA – Seattle, Washington, Portland, Oregon, Westchester, Berkeley and Malibu	Ban – Regional	Ban on styrofoam foodware.	Date not listed
USA – Laguna Beach and Santa Monica	Ban – Regional	Ban on polystyrene foodware.	Date not listed
USA - Seattle	Ban - Regional	Ban on plastic straws and plastic utensils.	2018
South and Central America			
Costa Rica	Ban	All single use plastics.	2021
Antigua and Barbuda	Ban	Total ban on the importation and use of plastic utensils and Styrofoam containers.	2019
Chile, Punta Arenas and coastal regions	Ban- Regional	Total ban on polyethylene bags in Punta Arenas. Total ban on the sale of plastic bags in 102 coastal villages and towns.	2014, 2017
Columbia	Ban	Ban on disposable plastic bags smaller than 30x30cm.	2016
Guatemala, San Pedro La Laguna	Ban - Regional	Total ban on plastic bags and Styrofoam containers in San Pedro La Laguna.	2016
Guyana	Ban	Ban on the import and use of Styrofoam items.	2016
Haiti	Ban	Ban on the import and production of plastic bags and Styrofoam containers.	2013
Jamaica	Ban	Ban on all non-biodegradable plastic bags below 50-gallon capacity and on Styrofoam containers.	2018
St Vincent and the Grenadines	Ban	Ban on the import of Styrofoam products, VAT removed from biodegradable alternatives to lower their costs.	2017
Australia/Oceania			
Australia, Hobart, Tasmania	Ban - Regional	Ban on plastic takeaway containers.	2020
Australia, Coles Bay	Ban - Regional	Ban on all non-biodegradable plastic bags.	2003
Australia, South Australia	Ban - Regional	Ban on lightweight plastic bags.	2009
Vanuatu	Ban Potential Ban	Ban on polystyrene takeaway boxes. Considering the introduction of a ban on the use and import of single use plastic bags and bottles.	2018 2018
Africa			
Benin	Ban	Total ban on import, production, sale, and use of non-biodegradable plastic bags.	2018
Cameroon	Ban	Total ban on non-biodegradable plastic bags.	2014
Cape Verde	Ban	Total ban on the sale and use of plastic bags.	2017
Eritrea	Ban	Ban on the import, production, sale and distribution of plastic bags.	2004
Guinea-Bissau	Ban	Total ban on the use of plastic bags.	2016
Kenya	Ban	Total ban on the import, production, sale and use of	2017

		plastic bags.	
Mali	Ban	Total ban on the production, import, possession, sale and use of non-biodegradable plastic bags.	2012
Mauritius	Ban	Ban on the import, manufacture, sale or supply of plastic bags.	2016
Morocco	Ban	Ban on the production, import, sale and distribution of plastic bags.	2016
Rwanda	Ban	Total ban on production, use, import and sale of all polyethylene bags.	2008
Tanzania	Ban	Total ban on all plastic bags.	2018
Zimbabwe	Ban	Total ban on Styrofoam products – was temporarily lifted after introduction to allow businesses time to replace Styrofoam containers with reusable, recyclable or biodegradable ones.	2017

4.2 Actions to be taken

4.2.1 UN Level

This year's third session of the United Nations Environment Assembly held in Nairobi on 4-6 December 2017, addressed the theme 'Towards a pollution-free planet'. UNEA-3 adopted inter alia a resolution tabled by Norway on marine litter microplastics and building on the above-mentioned UNEP assessment¹³⁶. The resolution decided the establishment of an Ad Hoc Open Ended Expert Group to further examine the barriers to, and options for, combating marine plastic litter and microplastics from all sources, especially land based sources. This working group will report back to the fourth session of the United Nations Environment Assembly in 2019 with recommendations for further actions.

4.2.2 G7 and G20

The EU will continue its engagement with the G7 Alliance on Resource Efficiency and in particular the work on plastic identified in the Bologna Roadmap adopted by the G7 Environment Ministers' Meeting in June 2017, the G20 Resource Efficiency Dialogue, and support current and upcoming G7/G20 Presidencies in implementing the G7 Action Plan to Combat Marine Litter and the G20 Marine Litter Action Plan, adopted in July 2017, respectively.

In particular, the Commission services organise a G7 workshop on plastic management in Brussels in March 2018, open to G20 experts, to assess the opportunities for improved product design, address barriers to recycling and reuse of plastic, and avoid plastics leakage into the environment, in particular the seas and oceans.

4.2.3 EU international actions

The EU will support the adoption and implementation by third countries of environmentally sound waste management approaches (ESM) and strategies, inspired by the waste hierarchy

¹³⁶ UNEP (2017), Combating marine plastic litter and microplastics: An assessment of the effectiveness of relevant international, regional and subregional governance strategies and approaches

and by extended producer responsibility (EPR) approaches. Examples of international action supported by the EU are:

- The Commission services are working on a Partnership Instrument project for contributing to reducing plastic waste and marine litter in East and South East Asia to be adopted by the end of 2018.
- With EU support, the Inter-American Tropical Tuna Commission (IATTC) has become the first fisheries organization to adopt binding provisions on the recovery of Fish Aggregating Devices (FADs).
- In February 2018 the Commission took part in the FAO Technical Consultation that adopted the Report and the Voluntary Guidelines on the Marking of Fishing Gear and that are expected to be endorsed in July 2018.
- Development of international industry standards on sorted plastic waste and recycled plastics to facilitate trade in these secondary raw materials, while at the same time protecting workers' health and the environment (see above). Moreover, this will further allow for the development of a stronger EU position during coming discussions at international level given the existing Vienna Agreement between CEN and ISO.