

## **Integration of results from three Marine Litter Studies**

This chapter brings together in a comprehensive way the results of three studies on marine litter financed by the European Commission. It also provides a 'reading guide' to certain elements of these three studies (See table 1 for the overview of the three projects).

### **Background**

Marine litter poses a serious threat to the marine environment around the globe and raises growing environmental, economic and health concerns. It contains a range of persistent, manufactured or processed solid materials (such as plastic, glass, wood, metals, etc.) which are discarded, disposed of or lost into the sea and on beaches, including materials which are transported into the marine environment from land by rivers, drainage or wind.

Plastics are the most abundant debris found in the marine environment and comprise more than half of marine litter in European Regional Seas. More than half of the plastic fraction is composed of plastic packaging waste with plastic bottles and bags being predominant types of plastic packaging. However, the lack of a systematic approach to monitoring marine litter means that determining trends in the amount and type of litter is difficult. Recent information indicates that significant differences exist in the types of marine litter found between the seas bordering the EU. Additional beach surveys performed as part of one of the studies, confirmed these findings. Predominant types of litter other than packaging materials include sanitary waste, smoking-related material and fishing-related material.

Considerable efforts have been made to combat the problem of marine litter. However, the problem is growing in scale, in particular due to non-degradability or slow degradation of litter in the marine environment. At local, regional, national and international scale numerous measures and initiatives have been taken, either targeting marine litter specifically or comprising general litter management or environmental stewardship and sustainable practices. Coordination of these actions within a coherent strategy, with exchange of experiences by learning from good practice examples or drawbacks and taking account of the origin, activities and actors to which marine litter is linked, should enable the implementation of measures that successfully mitigate/prevent the (increasing) pressure of (plastic) litter in the coastal and marine environment.

### **Three new projects on marine litter – an overview**

The European Commission is a very active player in addressing the issue of marine litter. Commission policies, strategies, legislation and environmental projects, research and other initiatives aim to increase the knowledge base and to foster cooperation and dialogue.

Three studies have been contracted by the European Commission, DG Environment (see table below) to aggregate data on marine litter in European Marine Environments, to contribute to achieving good environmental status with respect to descriptor 10 on marine litter of the Marine Strategy Framework Directive and to help to further develop (European) policy for marine litter. The results of the three studies will also contribute to the Rio +20 commitment to take action to achieve significant reductions in marine debris and the achievement of the goals and strategy objectives of the Honolulu strategy<sup>1</sup>.

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<sup>1</sup> The Honolulu Strategy, published by UNEP and the NOAA Marine Debris Program [UNEP 2012], is a framework for comprehensive and global effort to reduce the ecological, human health, and economic impacts of marine debris. It is intended to help improve collaboration and coordination among the multitude of groups and governments across the globe in a position to address marine debris. It is intended to serve as a common frame of reference for action among these communities, as well as a tool for groups to develop and monitor marine debris programs and projects. (<http://ec.europa.eu>)

## Honolulu strategy - Main goals

**Goal A:** Reduced amount and impact of land-based sources of marine debris introduced into the sea

**Goal B:** Reduced amount and impact of sea-based sources of marine debris including solid waste, lost cargo, Abandoned, lost or otherwise discarded fishing gear (ALDFG), and abandoned vessels introduced into the sea

**Goal C:** Reduced amount and impact of accumulated marine debris on shorelines, in benthic habitats, and in pelagic waters

All three projects propose a mixture of feasible and affordable measures in order to improve the situation concerning marine litter whilst adopting a slightly different focus, as shown in the following project overview:

Table 1: Project overview of the three marine litter studies

Project	<b>PROJECT 41</b>	<b>PROJECT 42</b>	<b>PROJECT 43</b>
	Pilot project '4 Seas': Case studies on the plastic cycle and its loopholes in the 4 EU regional seas (ENV.D.2/ETU/2011/0041)	Anti-Littering Instruments: Feasibility study of introducing instruments to prevent littering (ENV.D.2/ETU/2011/0042)	Plastic Packaging Loopholes: Loopholes in the flow of plastic packaging material (ENVD.2/ETU/2011/0043)
Contractor	ARCADIS (MILIEU, EUCC) www.arcadisbelgium.be	RPA (ARCADIS, ABPmer) www.rpald.co.uk	BiPRO GmbH www.bipro.de
Objectives	<ul style="list-style-type: none"> <li>Identify main sources and loopholes of marine litter in the 4 regional seas</li> <li>Focus on four case studies: Oostende (North Sea), Barcelona (Mediterranean Sea), Riga (Baltic Sea) and Constanta (Black Sea)</li> <li>Building on local knowledge through regional workshops and stakeholder interviews</li> <li>Proposal of possible measures and feasibility assessment</li> </ul>	<ul style="list-style-type: none"> <li>Identify best practices in plastic and other littering prevention and cleaning up</li> <li>No geographic restriction</li> <li>Build on initiatives concerning plastic bags and biodegradable plastic as well as initiatives outside the field of litter</li> <li>Assessment of the feasibility of different options to prevent littering (including plastic) and increase public awareness</li> </ul>	<ul style="list-style-type: none"> <li>Identify loopholes in the plastic packaging cycle</li> <li>Focus on Member States (MS) lagging behind and 3 non-EU Mediterranean Countries</li> <li>Build on initiatives concerning plastic bags and biodegradable plastic</li> <li>Proposal of possible measures and feasibility assessment</li> </ul>
Differentiation	<ul style="list-style-type: none"> <li>Marine litter including PPW</li> <li>Geographical area: 4 selected case studies</li> <li>Bottom-up approach</li> </ul>	<ul style="list-style-type: none"> <li>All litter sources including PPW</li> <li>Policy support</li> <li>No geographical limitation but case studies cover specific areas</li> </ul>	<ul style="list-style-type: none"> <li>Plastic packaging waste (PPW)</li> <li>Geographical area: selected EU MS (BG, CY, EE, ES, FR, GR, IE, IT, PL, RO, UK) + Egypt, Lebanon, Morocco</li> <li>Top-down approach</li> </ul>

Synergies	<ul style="list-style-type: none"> <li>• Identification and proposal of measures</li> <li>• Feasibility assessment</li> <li>• Include bags, bottles</li> <li>• Policy support</li> </ul>	<ul style="list-style-type: none"> <li>• Identification and proposal of measures</li> <li>• Feasibility assessment</li> <li>• Include bags, biodegradable plastics and all types of litter</li> <li>• Policy support</li> </ul>	<ul style="list-style-type: none"> <li>• Identification and proposal of measures</li> <li>• Feasibility assessment</li> <li>• Consideration bags and biodegradable plastics</li> <li>• Policy support</li> </ul>
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## Common methodology

In order to recommend a programme of measures, the three studies looked at existing measures which address the problem of littering, each with their specific focus (Table 1). These long-lists of measures were structured according to the goals and strategies of the Honolulu strategy for project 41. Project 42 divided the measures into three major types linked to the different factors driving littering behaviour. The three major types of measures are to reduce littering by influencing behaviour, to prevent littering and to clean up litter. In project 43 the measures were allocated to the steps of the plastic packaging life cycle and most relevant actors who are in the position to close existing plastic packaging loopholes.

These long-lists of measures were further screened to produce short-lists of measures which were then analysed in greater detail (feasibility assessment). This aimed to determine how effective and efficient these measures were at achieving the objectives of preventing, cleaning up and reducing the quantity of litter that could potentially reach the marine environment.

As a result of the synergies taking place between the three EU marine litter studies, all short-listed measures have been described according to a common template. The template for the Marine Litter Fact Sheets has been based on the template developed for the Marine Litter Toolbox<sup>2</sup>, and extended with criteria to feed the feasibility assessment. A long list of common feasibility criteria has been developed between the three studies. The full list of criteria can be found in the main report. The main criteria categories are listed in Table 2. It should be noted that even though the project gained substantial information from stakeholder interviews (project 41 and 43) and literature reviews, it appeared that the level of detail was insufficient to score all criteria. Detailed results of the feasibility assessment can be found in Chapter 6 of report 41, Chapter 4 of report 42 and in Chapter 9 and Annex 6 of report 43.

Table 2: Main groups of evaluation criteria used for the feasibility assessment

<b>Category</b>	<b>Evaluation issue</b>
1. Feasibility	1.1 Administrability
2. Costs	2.1 Financial
3. Effectiveness	3.1 Relevance
	3.2 Effectiveness
	3.3 Coherence
	3.4 Community added value
	3.5 Sustainability
	3.6 Monitorability
4. Distributional analysis/ stakeholder analysis	4.1 Who causes the problem?

<sup>2</sup> Toolbox developed for the marine litter high-level preparatory meetings of which the third preparatory meeting took place in Brussels on 27 February 2012.

## 5. Wider issues

- 4.2 Who pays (incurs costs)
- 4.3 Who benefits (positively impacted)
- 4.4 Who loses out (negatively impacted)
- 5.1 Transferability (applicability)

In addition, case studies were used in project 42 to identify the success factors and barriers to particular measures. The case studies incorporated the analysis of similar instruments in different Member States, the analysis of different measures targeted at particular types of litter, the analysis of different measures aimed at particular target groups, and the analysis of different measures targeted at a particular location.

This common approach allowed an exchange of relevant measures between the three studies to compose an adequate mixture of policy measures and strategies targeting all relevant key actors and pathways.

The proposed mixture of affordable and feasible measures in the three studies target the most important materials and sources contributing to marine litter: sanitary waste, cigarette butts, ropes & nets and plastics (project no 41), specifically plastic packaging (project no 43) as well as other relevant waste materials (project no 42).

### **Main findings**

1. The three projects showed that plastic is the dominant fraction and that plastic packaging waste (PPW) in marine litter comes primarily from land based activities, although with some important regional differences (see below). The most relevant plastic packaging items present in marine litter are plastic bags and bottles, and consumer packaging (e.g. crisps/sweets). Therefore, measures within a strategy to close the largest loopholes in the plastic packaging cycle should target plastic bottles and plastic bags, and specifically address the responsible actors in the production, consumption and waste management stage of plastic packaging which could bring about improvements by changing their behaviour and implementing practical actions to do so. More specific information on selected feasible and affordable measures to close the largest loopholes contributing to marine litter in plastic packaging flows is available in Chapter 9 and Annex 6 of report 43, Chapter 5 of report 41. Information on measures targeting packaging, which could be adapted for use in different Member States, can be found in Chapter 4 and Annex 3 of report 42.
2. The three studies identified individual behaviour and people's attitudes and perceptions as a major influential factor with regards littering. Other important factors include context (e.g. cleanliness of the area, administrative capacity and competences, etc.) and available waste infrastructure (e.g. sewerage systems) and facilities (e.g. port reception facilities, suitable receptacles).

Consumer's purchasing, consumption and disposal behaviour is also considered a key aspect which needs to be changed in order to close the largest loopholes by which marine litter, including plastic packaging, enters the marine environment. Therefore, the measures should in particular influence these specific behaviours and involve all relevant actors which could influence consumer behaviour.

There is a key role here for retailers, as they are in direct contact with millions of consumers daily, the tourism industry to address coastal tourists and residents, waste management companies to improve consumer's disposal behaviour and local competent authorities to provide for relevant informative, economic, administrative and infrastructural measures. Consumers could also have a direct impact by modifying their behaviour. The combination of individual actions will lead to significant and measureable results in terms of the reduction

of plastic waste in the environment. Simply starting to reject single use bags in stores, use alternative cotton bags, drink tap water (where possible) instead of buying bottled water, discard your waste properly, etc. can make an impact on litter levels. Other ways of improving management of waste in our society and preventing it from becoming marine litter is outlined in each report (Chapter 5 of report 41, Chapter 4 and 5 of report 42 and Chapter 10 of report 43).

Due to the important impact that individual behaviour has on marine litter, increased knowledge of the behaviour of individuals and organisations responsible for litter can assist with the formulation of effective policy measures to address the problem of marine litter.

3. Project 41 and 43 show that appropriate waste management is another crucial issue to close the largest loopholes for household waste including plastic packaging waste. Therefore, relevant actors in waste management (waste collectors, operators of waste treatment facilities) must improve the performance of the waste management system. This could be managed by, for example, increasing the waste collection frequency, increasing capacity of municipal waste services during busiest tourist days (summer season), better maintenance of and improvements to the sewerage system, provision of information to consumers on proper disposal behaviour, organisation of training for personnel involved in waste collection and disposal, etc. (see Chapter 5 of report 41, Chapter 10 of report 43 for further specific recommendations).
4. Finally, producers should be involved and fulfil the extended responsibility over the whole product life cycle and should implement measures to optimise the performance of the PPP (plastic packaging products) production (e.g. through design for re-use, recycling, prevention, low material demand, etc.). The plastic industry can prove its commitment to contribute to the GES indicator 10 by supporting and financing various types of measures which aim at improving the situation concerning plastic packaging litter in the marine environment (see Chapter 10 of report 43 for further specific recommendations) or by providing more environmentally friendly alternatives to, amongst others, sanitary products use (Chapter 5 report 41).

In addition to these common findings, the studies - particularly project 41 and 42, identified variability with regards to marine litter across Europe and its regional seas. This variability spans types, sources and trends in litter. While land-based activities, for example, generate most of the marine litter in the Mediterranean, Baltic and Black Sea (also confirmed by the findings of the project 43, Chapter 4 and Annex 2), sea-based activities are almost equally important in the North Sea region (including ropes and nets). Project 41 highlights the importance of sanitary waste in the Mediterranean and Baltic region, while this is not observed in the surveys from the North Sea and Black Sea cases. Equally, the factors influencing littering behaviour can be very context specific (project 41, 42 and 43).

On the basis of the evidence collected from literature, together with the (rather limited) data on costs and effectiveness of individual measures the key finding of the assessment showed that the measures need to be tailored to particular circumstances in order to successfully prevent (marine) littering. This makes it rather difficult to recommend a single programme of measures that are equally cost-effective and applicable across Europe. However, by tailoring measures to particular contexts it ensures that the measures which are implemented are those which are most suitable to the circumstances in which they are applied.

The three studies therefore, set out an approach for responsible authorities to identify and select measures for particular circumstances. Policy mixes have been proposed per regional sea as part of project 41 and are available in Chapter 7 and Annex 17 to 20. The recommendations cover actions at

different levels, by different actors (local/regional authorities, Member State governments and the Commission as well as other partners) and focus on coordination and partnerships to maximise the effectiveness:

- Local (and/or regional) authorities have a key role in litter prevention. An overall reduction in the amount of litter entering the environment, both at inland and coastal locations, is likely to result in a reduction in marine litter. The three projects set out an approach which local authorities could take to help solve the marine litter problem. This includes a wide range of measures such as identifying the problem, educational/informative initiatives and actions to raise environmental awareness among different target groups according to their needs, promotion and reward for good practice examples, promotion of measures to prevent PPW becoming marine litter, provision of adequate waste collection and treatment infrastructure, monitoring the measure post-implementation, etc.
- Regarding Member States, it is recommended that they assist and work with local and regional authorities to enhance their programmes of action on marine litter. Member State authorities can support the local authorities' programmes through facilitating funding, adjusting and enforcing regulative provisions and drafting new legislative requirements which can be placed on relevant market players, exchanging experiences, working through partnerships, and coordinating efforts at regional sea levels.
- The role of the policy makers at EU level would be to provide a platform for national and local authorities thus supporting their actions. Moreover, policy makers could further utilise social media applications to engage stakeholders and the public in the prevention and clean-up of marine litter. Their role would also consist of making additional funding available, facilitating further exchange of experience, coordinating efforts across regional seas and enforcing the existing European guidelines.

Policy should establish specific targets to be achieved at these different levels (local, regional, national or EU wide) for the long term reduction of plastic packaging in marine litter. This can be accomplished by adopting targets aiming to reduce litter inputs to the marine environment by improving the resource efficiency, waste management, consumer behaviour or specific pollution sources (for example by increasing targets for re-use, recycling and recovery of PPW and setting targets to divert plastic packaging from being landfilled) or by establishing environmental targets regarding the presence of marine litter in European Regional Seas (e.g. to decrease beach litter 50% per decade). Further recommendations on actions and measures to reduce marine litter applicable on a local/regional or EU wide level can be found in Chapter 4 and 5 of report 42 and Chapter 10 of report 43.

### **Recommendations and Follow-up**

The three projects shall provide important input for the development of a "Marine Litter Strategy" as a systematic approach addressing mitigation and prevention actions, identifying responsible actors and policy instruments in order to reduce/prevent future inputs of litter into the European Seas.

In practice each stakeholder can take specific action against marine litter. The measures proposed within the three projects seek to provide information on possible ways to support actions by stakeholders to prevent and mitigate the impact of littering. The following messages can be addressed to specific stakeholders.

#### **What can consumers do?**

- Reject single use plastic bags and bottles and use re-usable alternatives
- Drink tap water (where possible)

- Think before you buy! Consider environmental impacts whilst purchasing
- Buy regional/local products (reduction of primary, secondary, tertiary packaging)
- Separate waste at home and participate in systems for separate collection and deposit refund systems
- Do not litter! Take your waste with you during consumption “on the go”, “away from home” and “on the beach”
- Don’t flush domestic sanitary waste down the toilet! Change to the solid waste route for the disposal of this waste
- Participate in organised clean-ups

#### **What can the plastic industry do?**

- Promote and support closed loop business models and eco-design (promote re-use and recycling, and use less (plastic) material for products and their packaging)
- Extend and improve producer responsibility over the entire product life cycle
- Exchange information, knowledge and best practices on innovative technologies, production processes and sustainable plastic packaging products
- Promote and finance marine litter initiatives
- Incorporate eco-labelling criteria in product design

#### **What can retailers do?**

- Motivate and inform your customers on sustainable consumption
- Participate in separate collection and deposit refund systems for bottles and bags and promote and establish individual small scale deposit systems at local level
- Provide your customers with alternatives to plastic bottles and bags
- Procure re-usable and recyclable packaging
- Commit to targets for reduction of plastic packaging
- Exchange ideas and best practices with other retailers

#### **What can the tourism and recreational sector do?**

- ... do generally the same as retailers, and
- Sensitise tourists to the impacts of litter on the marine environment
- Provide eco-alternatives for plastic beach ashtrays
- Establish water dispensers in the hotel lobbies and other communal areas
- Participate in eco-tourism certification schemes
- Create and promote stewardship concepts such as adopt-a-beach
- Clean-up plan for events

#### **What can waste management professionals do?**

- Inform, motivate and encourage inhabitants to improve source separation
- Organise training for professionals in waste operations (collection, disposal, etc.) to introduce simple measures to improve waste management and minimum requirements for landfills
- Exchange ideas and best practices with other waste professionals, municipalities, etc.

### **What can policy makers at local/regional level do?**

- Invest in research and monitoring activities for:
  - Identifying the problem: what are the main types of litter and who are the main litterers;
  - Determining what the main targets for a litter prevention/clean-up programme should be;
  - Mapping existing relevant measures that are already being implemented in the area and analyse gaps that need to be filled;
  - Selecting measures to fill the gaps;
  - Working with the local community, voluntary organisations, businesses etc. to agree the programme and to help to deliver it; and
  - Monitoring the impacts of the programme
- Motivate and inform citizens on sustainable consumption (e.g. initiate public awareness, establish public water dispensers, promote consumption of tap water, seasonal bans on plastic bags in coastal cities, ban plastic bottles during beach events and concerts, avoid plastic packaging in public procurement, etc.)
- Inform, motivate and encourage inhabitants to improve source separation
- Inform, motivate and implement beach and street cleanliness
- Check and improve local waste management services (availability of collection infrastructure, bin design, bin marking, regulatory compliance of landfills, eradication of illegal dumpsites, consideration of littering in local waste management plans and river management, etc.)
- Cooperate with retailers/tourism and waste management professional and exchange best practices with other municipalities
- Increase waste management services during top days (bathing season)

### **What can policy makers at Member State level do?**

- Establish and adopt environmental targets aiming to reduce litter inputs to the marine environment
- Share information with local authorities, NGOs and stakeholders in the private sector on amounts and sources of marine litter, particularly from monitoring to meet the requirements of the MSFD;
- Encourage NGOs and stakeholders in the private sector to launch relevant behavioural, preventive and clean-up initiatives by increasing funding and facilitating bottom-up approaches to take place
- Assist local authorities to identify target groups responsible for littering
- Ensure that neighbouring authorities i.e. within the context of regional seas are aware of each other's actions, to facilitate coordination
- Provide a platform for local authorities, NGOs and stakeholders in the private sector to share information and collaborate, allowing for the expansion of programmes and projects
- Provide guidance and resources to help local authorities select and implement measures to address marine litter
- Assist local authorities and NGOs to monitor the effectiveness of measure

### **What can policy makers at EU level do?**

- Support the actions of local and Member State authorities by funding research
- Facilitate experience and information exchange; e.g. through hosting a database of published marine litter survey information, guidance on marine litter monitoring, common recording templates, etc.
- Coordinate efforts across regional seas and enhance networking between authorities and other stakeholders
- Host an expanded version of the marine litter toolbox (ideally including broad costs of measures) Provide information or links to locally implemented measures to encourage working in partnership and consistency between neighbouring authorities
- Foster effective enforcement of existing waste legislation
- Foster effective enforcement of extended producer responsibility scheme
- Increase existing recycling targets for plastic packaging waste and establish reduction targets for plastic (packaging) waste being sent for disposal in landfills
- Establish (ambitious) environmental targets for marine litter reduction
- Strengthen the relationship between water and waste management policies
- Support development of Strategic Regional Action Plans on marine litter and their inclusion in relevant Regional Seas Conventions
- Support international activities to combat marine litter such as the Honolulu Strategy and the Rio +20 commitment to take action to achieve significant reductions in marine debris
- Establish a harmonized EU monitoring strategy for beach litter, floating litter and litter on the seabed, as well as for micro litter.