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MARine Litter in Europe Seas: Social AwarenesS and CO-Responsibility

D1.3
REVIEW OF EXISTING POLICIES THAT MAY BE APPLIED TO MITIGATE THE IMPACT OF MARINE LITTER

MARLISCO
Stopping Marine Litter Together

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SEVENTH FRAMEWORK PROGRAMME

PROVINCIA DI TERAMO
Medaglia d'Oro al Merito Civile

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Document Information

D1.3 report provides a description of the main legal instruments which have the potential to be used to reduce the entry and impact of litter in the marine environment. It also provides examples of 'soft' mechanisms which have a similar aim, whether implemented at an international, regional seas, European or national/local scale.

Approvals

Date	Partner
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List of annexes

Annex1_ Hard' legally-binding instruments relating to the prevention of litter entering the ocean
Annex2_ Soft' non-legally binding mechanisms relating to the prevention of litter entering the ocean
Annex3_ Honolulu Strategy goals
Annex4_ Berlin Message
Annex5_ Template linking Best Practices with 'hard' and 'soft' mechanisms

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1 EXECUTIVE SUMMARY

This report aims to provide a review of existing policies that directly or indirectly may be applied to mitigate the impact of marine litter and where policy gaps might be. It also examines which actions and policies specifically designed to deal with marine litter reduction may be associated with legally-binding or 'hard' mechanisms (implemented under international, regional, EU or national legislation) or non-legally-binding 'soft' mechanisms, under a range of formal or informal agreements.

International, European, and national legislation concerning marine litter is mainly related to waste management on land (waste management, wastewater, landfill directives) as well as management of wastes coming from the navigation sector (Port Reception Facilities, MARPOL 73/78 Convention). Application of these dispositions seems to be a more appropriate means of achieving a reduction of litter at sea.

Main policy gaps could be summarised as follows:

- Lack of specific National legislation on marine litter;
- Lack of full application of existing legislation in all European Countries;
- A greater coordination within subjects involved in law implementation;
- Clear distinction of a competent authority that oversees a specific framework involving marine litter;
- Lack of systematic knowledge among several stakeholders of existing rules to be applied;
- Lack of well established strategies to be followed at national and local level (selection of main measures to be adopted);
- Lack of mention to marine litter in some Directves (UWWTD, BWD, WFD);
- Inadequate landfill practices, and lack of measures to adress the transboundary problem.

Modifications to dispositions of existing laws to assure a more effective reduction of marine litter could be helpful. There is a lack of consistency on EU port reception facilities. Some modifications of Port Reception Facilities and MARPOL 73/78 Convention are reported in box 1. Other proposals are discussed throughout the document ranging from exploring further Extended Producer Liability (EPL) systems, improving the coordination within institutions and stakeholders to the integration of clean up activities in the national legislation.

Although "soft" mechanisms may be non-legally-binding, such mechanisms can represent the first step towards a treaty-making process in which reference will be made to the principles already agreed. In the framework of marine litter we observe that this approach is often preferable to a legally-binding one. This is because solutions to the problems are complicated and multisectorial so that introduction of such a mechanism could serve as a testing ground for considering updates to existing legal instruments to better accomplish their specific objectives (e.g. reducing marine litter).

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1.1 List of abbreviations and acronyms

BAT	Best available techniques
BP	Best practice
BREF	Best available technique reference document
BWD	Bathing Water Directive
CBD	Convention of Biological Diversity
DGENV	Directorate General for the Environment of the European Commission
EPL	Extended producer liability
EU	European Union
FAO	United Nations Food and Agriculture Organisation
FEE	Foundation for Environmental Education
GES	Good environmental status
GESAMP	Joint group of experts on the scientific aspects of the marine environmental protection
GPA	Global programme of action for the protection of the marine environment from land-based activities
GPML	Global Partnership on Marine Litter
HELCOM	Helsinkin Commission
ICC	International coastal cleanup
IMO	Internartional Marine Organisation
IMP	Integrated Maritime Policy
IPPC	Integrated Pollution Prevention and Control
LBS	Land based sources
MARPOL	International Convention of the prevention of pollution from ships
MEDPOL	Convention for the protection of the Mediterranean Sea against pollution
MSFD	Marine Strategy Framework Directive
NGO	Non-Governmental Organisations
NOAA	National Oceanic and Atmospheric Administration
OSPAR	Convention for the protection of the marine environment of the North East Atlantic
REACH	Registration, Evaluation, Authorisation and Restriction of Chemicals
UNCLOS	Unioted Nations Law for the Sea Convnetion
UNDP	United Nations development programme
UNEP	United Nations Environmental Programme
UWWTD	Urban waste water treatment directive
WEEE	Waste Electrical and Electronic Equipement Directive
WFD	Water Framework Directive

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2 INTRODUCTION

The purpose of this report is: 'to provide a review of existing policies that directly or indirectly may be applied to mitigate the impact of marine litter and identify policy gaps'. The intended primary audience for the report consists of the MARLISCO partners, as the report is designed to provide a necessary background for exploration into how society can be motivated to help reduce the entry of debris into the ocean. It is anticipated that it will be of interest to a wider audience, but the reader should not expect to find an in-depth review of the effectiveness of EU legislation. This is been outside the scope of the project, as described in the Description of Work. The work programme for this deliverable involved a questionnaire exercise to allow the gathering of relevant information from partners and further consultation on specific aspects related to policy and best practice.

Actions and policies specifically designed to deal with marine litter reduction may be associated with legally-binding or 'hard' mechanisms - implemented under international, regional, EU or national legislation - or may be carried out through a series of non-legally-binding 'soft' mechanisms, under a range of formal or informal agreements. In addition, many actions and policies developed to deal with the consequences of a range of land-based or maritime activities, including waste management and conservation, may indirectly affect the entry of litter into the ocean.

In an international context, examples of 'soft' mechanisms include: Agreements, Resolutions, Declarations, Guidelines, Codes of Conduct and Action Plans. For instance, many Resolutions and Declarations of the UN General Assembly, UN Agency inter-governmental meetings and outputs from other Inter-governmental Organisations (IGOs) represent 'soft' mechanisms. Although they may be non-legally-binding, such mechanisms can represent the first step towards a treaty-making process, in which reference will be made to the principles already agreed. In addition, such mechanisms may have a direct influence on the usual practice of stakeholders involved, leading to the creation of customary law. 'Soft' mechanisms may provide a convenient option when, for political and/or economic reasons, proposition of legally-binding legislation could lead to a failure of negotiations. Adoption of a Resolution or Declaration at an international conference by a representative group of stakeholders (e.g. IGOs, Non-Governmental Organisations (NGOs), policy-makers, industry and technical experts such as scientists or engineers) can provide the impetus for Governments to pursue more formalized mechanisms, including legislation. Mechanisms that are not legally-binding can also serve as a testing ground for considering updates to existing legal instruments to better accomplish their specific objectives (e.g. reducing marine litter). Therefore, it is important to consider the influence of 'soft' mechanisms on the future development of hard law commitments. Changing legislation can become a slow and complicated process, whereas soft mechanisms are more flexible to adapt to new requirements or situations. Deficiencies in existing legislation may be overcome by applying innovative soft mechanisms that can provide a bridge between a lack of commitment and legally binding instruments.

The current report provides a description of the main legal instruments which have the potential to be used to reduce the entry and impact of litter in the marine environment. It also provides examples of 'soft' mechanisms which have a similar aim, whether implemented at an international, regional seas, European or national/local scale. A summary of 'hard' and 'soft' mechanisms is provided in Annexes I and II. In many cases Europe can learn from initiatives developed and implemented in other parts of the world (Chen and Liu, 2013).

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3 LEGALLY-BINDING INSTRUMENTS

3.1 Hierarchy of legislation

The relationships between institutions responsible for law making, and those individuals or groups in society to which the legislation applies are represented in a conceptual model (Figure 1). International law, in the context of normal trade and environmental standards, is not imposed on sovereign states without the state becoming a signatory to the appropriate Convention, having had the opportunity to contribute to the formulation of the Convention. It then becomes legally obliged to enforce the instrument. Similarly, EU Member States and signatories of Regional Seas Commissions have the opportunity to contribute to the formulation of policy and legislation. Once an EU Directive is agreed then a Member State is obliged to enact appropriate national legislation. If the European Commission considers that a Member State has not adequately implemented a Directive, or is not fulfilling its obligations under EU law, then the State can be taken to the European Court of Justice. Legislation may be introduced directly at EU/International level and be directed at specific land-based or maritime sectors (e.g. shipping under the IMO MARPOL Convention; chemical industry under the EU REACH regulations; see Annex I), but most legislation within the EU is introduced through national governments.

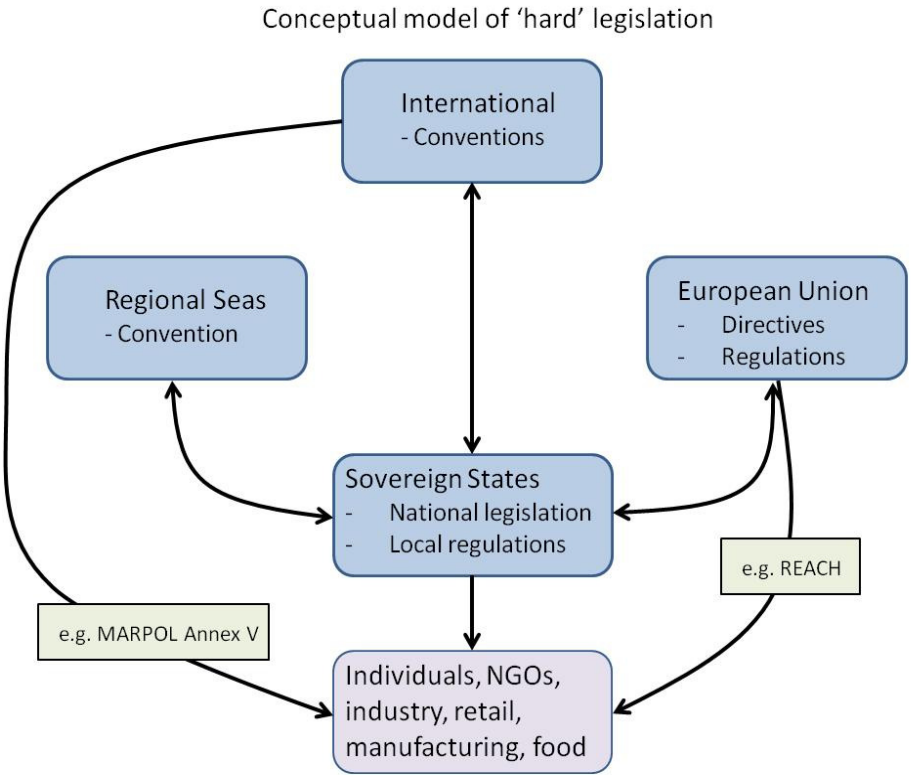

Figure 1. Conceptual model of the relationships between international, regional, European and national institutions, responsible for introducing or implementing legally-binding legislation, and the individuals and groups in society to which the legislation applies.

It is convenient to consider legislation related to the environment on a hierarchy of scales: international, regional seas, EU, national and local (Figure 2). Depending on the issuing competent authority, the legislative hierarchy refers to the order of legal rules or regulations by degree from higher to lower, from international through to local scales.

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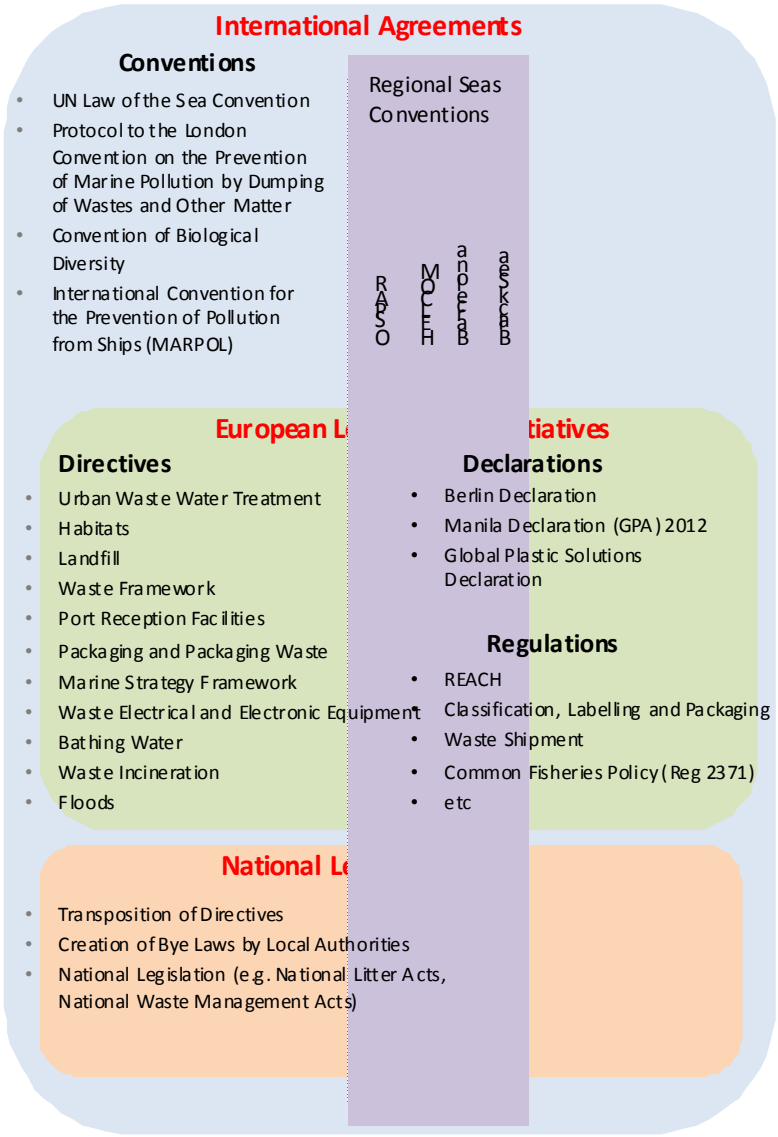

Figure 2. An example of the hierarchy of legislation concerning waste management of relevance to the reduction of litter entering the marine environment.

When considering the relative value of national, regional/European or international legislation it is instructive to consider the time taken to complete the process, from inception of a concept to the ratification and implementation of the legal instrument. For example, while it may be possible to introduce national legislation in a matter of months, it may take many years or decades for the international community to reach agreement on the purpose, extent, verification and implementation of a Convention. In matters of enforcement it is usually the responsibility of national authorities to police and bring to court those individuals or organizations deemed to have broken the law. Unfortunately, the existence of a legal instrument does not guarantee that illegal practices will cease. Sovereign states have a

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wide variety of structures to provide some form of sub-national autonomy (e.g. municipalities, devolved administrations) and this may allow additional legislation to be introduced at a local scale.

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3.2 International Conventions

There is a wide range of Conventions that include a consideration of marine litter, either directly or indirectly. A full list of Conventions that are relevant to the reduction of litter entering the oceans is presented in Annex I. The Convention of most immediate relevance is the International Convention for the Prevention of Pollution from Ships (MARPOL), in particular Annex V which deals specifically with the prevention of pollution by garbage. MARPOL 73/78 is the main international Convention for the prevention of pollution from ships. It applies to fishing vessels and pleasure craft, as well as commercial shipping.

Annex V "Regulations for Garbage Disposal at Sea" establishes rules for the management of garbage produced on board a ship (Figure 3). Garbage is defined as "*all kinds of food, domestic and operating waste, excluding fresh fish, generated during the normal operation of the vessel and liable to be disposed of continuously or periodically*"

These Regulations include a ban on discharge of all garbage into the sea, except if expressly provided otherwise. In the case of plastics, Annex V has been extended to ***a complete ban on the disposal of plastics***. This amendment came into force on 1st January 2013. On the other hand, MARPOL 73/78 imposes an obligation on the Parties to provide facilities for the reception of ship-generated residues and garbage (that cannot be discharged into the sea) and includes requirements on the delivery of ship-generated waste and cargo residues at Port Reception Facilities. According to the MARPOL Convention Annex V, discharge of waste outside of Special Areas such as the North Sea and Mediterranean is only allowed when more than 12 nautical miles from the coast.

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Type of garbage	Ships outside special areas	Ships within special areas	Offshore platforms and all ships within 500 m of such platforms
Food waste comminuted or ground	**Discharge permitted** ≥3 nm from the nearest land and *en route*	**Discharge permitted** ≥12 nm from the nearest land and *en route*	**Discharge permitted** ≥12 nm from the nearest land
Food waste not comminuted or ground	**Discharge permitted** ≥12 nm from the nearest land and *en route*	**Discharge prohibited**	**Discharge prohibited**
Cargo residues[1] not contained in wash water	**Discharge permitted** ≥12 nm from the nearest land and *en route*	**Discharge prohibited**	**Discharge prohibited**
Cargo residues[1] contained in wash water		**Discharge only permitted in specific circumstances**[2] and ≥12 nm from the nearest land and *en route*	**Discharge prohibited**
Cleaning agents and additives[1] contained in cargo hold wash water	**Discharge permitted**	**Discharge only permitted in specific circumstances**[2] and ≥12 nm from the nearest land and *en route*	**Discharge prohibited**
Cleaning agents and additives[1] contained in deck and external surfaces wash water		**Discharge permitted**	**Discharge prohibited**
Carcasses of animals carried on board as cargo and which died during the voyage	**Discharge permitted** as far from the nearest land as possible and *en route*	**Discharge prohibited**	**Discharge prohibited**
All other garbage including plastics, domestic wastes, cooking oil, incinerator ashes, operational wastes and fishing gear	**Discharge prohibited**	**Discharge prohibited**	**Discharge prohibited**
Mixed garbage	When garbage is mixed with or contaminated by other substances prohibited from discharge or having different discharge requirements, the more stringent requirements shall apply		

Figure 3. Summary of the discharge provisions of the revised MARPOL Annex V (Resolution MEPC.201(62) which entered into force on 1st January 2013[1], [2].

[1] Cargo residues: these substances must not be harmful to the marine environment

[2] Discharge shall only be allowed if:

a) both the port of departure and the next port of destination are within the special area and the ship will not transit outside the special area between these ports (regulation 6.1.2.2); and

b) if no adequate reception facilities are available at those ports (regulation 6.1.2.3)

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3.3 Regional Seas Conventions

The Regional Seas Conventions involving European Countries are:

- Barcelona Convention: Convention for the Protection of the Mediterranean Sea Against Pollution. This forms part of the global UNEP Regional Seas Programme. A Protocol on Land Based Sources deals specifically with the problem of marine litter. http://www.unep.ch/regionalseas/regions/med/t_barcel.htm
- Bucharest Convention: Convention for the Protection of the Black Sea Against Pollution. New "Protocol on the Protection of the Marine Environment of the Black Sea from Land-Based Sources and Activities", even not in force, includes marine litter in the list of hazardous materials. The Convention is administered by the Black Sea Commission http://www.blacksea-commission.org/_convention.asp
- OSPAR Convention: Convention for the Protection of the Marine Environment of the Northeast Atlantic. Marine litter forms a key part of its monitoring and assessment programme, and it supports direct measures of reduction through the initiative "Fishing for Litter" (http://www.ospar.org/html_documents/ospar/html/marine_litter_unep_ospar.pdf)
- Helsinki Convention: Convention on the Protection of the Marine Environment of the Baltic Sea Area. The Helsinki Commission has adopted several Recommendations directly or indirectly related to marine litter. http://www.helcom.fi/

The Regional Seas Conventions, together with the Action Plans adopted by them, also play a fundamental role in the implementation of the UNEP Global Programme of Action for the Protection of the Marine Environment from Land-based Activities (GPA). Litter is one of eight contaminant categories of the GPA.

The Barcelona and the Bucharest Conventions have Protocols to address land-based activities and sources of pollution (LBS/A). The Conference of the Parties of the Barcelona Convention recently (February 2012) adopted a strategy on marine litter which will be translated into an action plan (now in draft form to be amended and adopted). OSPAR is also developing a regional action plan on marine litter.

The Barcelona Convention is organized into several Protocols. The Protocol for the Protection of the Mediterranean Sea against Pollution from Land-Based Sources (LBS) explicitly recognized the importance of dealing with the problem of marine litter. The Mediterranean has been designated a Special Area for the purposes of Annex V of the MARPOL 73/78 Convention.

The Marine Pollution Assessment and Control Program of UNEP/MAP (MED POL) undertook a comprehensive assessment on the status of the management of coastal litter in the Mediterranean. The results of the assessment showed that the main sources of coastal litter in the region are run-off from rivers, tourist activities and coastal urban centers. This result indicates that inadequate coastal solid waste management is responsible for the presence of litter on beaches, floating on the water or on the sea bed. The abovementioned results are in contradiction with the fact that almost all of the Mediterranean Countries have policies for the management of coastal solid waste. In fact, the problem is related to the enforcement of the policies which is in general very weak because of the poor coordination between different national and local administrations dealing with solid waste management issues and the inadequate infrastructure and understaffed services. The problem is exacerbated by an apparent lack of awareness and environmental education amongst the population.

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3.4 European Union legislation

A broad range of EU policies and legislation relate to marine litter, addressing both its sources and impacts (EC SWD, 2012). This includes EU environmental legislation relating to waste management, urban wastewater or pollution from ships. Waste management legislation, for instance, should be seen in the broader context of enhanced resource efficiency. The EU's resource efficiency policy should have a beneficial upstream impact by influencing the use and design of plastic products and particularly of packaging. In terms of legislation dealing with the impacts of marine litter on the coastal and marine environment, the EU Integrated Maritime Policy (IMP) and the Marine Strategy Framework Directive as its environmental pillar address the development of sea-related activities in a sustainable manner (COM, 2007).

3.4.1 EU legislation that directly relates to the management and control of marine litter

Marine Strategy Framework Directive (MSFD) (2008/56/EC)
The MSFD is intended to assist Member States achieve or maintain a Good Environmental Status for 11 environmental Descriptors by 2020 at the latest. Marine litter is covered by Descriptor 10. Member States have to develop Marine Strategies which serve as Action Plans and which apply an ecosystem-based approach to the management of human activities, to achieve GES targets and introduce mitigation measures where necessary. The MSFD does not cover non-EU states which share European Seas. However, there are attempts to incorporate some of the MSFD principles into the management of Regional Seas, in recognition that marine litter is a trans-boundary issue. Guidelines for monitoring and assessment of marine litter are being developed by a Technical Support Group (JRC, 2011).

Port Reception Facilities Directive (2000/59/EC)
The main objective is to reduce discharges of ship-generated waste and cargo residues into the sea enhancing Port Reception Facilities at European level. The Directive requires all ships in European waters to deliver their waste to port reception facilities. It brings international requirements (MARPOL 73/78) into EU law and provides for additional obligations and mechanisms. Of particular note is the obligation on ports to develop and implement waste reception and handling plans, and the obligation on ships to deliver their waste at each port of call within the EU.

A significant proportion of ships still do not deliver their waste to port reception facilities. Reasons for not doing so include inadequate facilities (e.g. to take waste in the categories sorted on board) or excessive fees. Clearly there is the potential to enhance facilities and encourage the crew and ship owners to use them.

The Directive applies to all ships, including fishing vessels and recreational craft, irrespective of their flag. This Directive addresses the legal, financial and practical responsibilities of the different operators involved in the delivery of waste and residues in ports. It provides for the implementation of a cost recovery system (applying a waste fee), that should provide no incentive for ships to discharge their waste at sea. All ships calling at a Member State port will bear a significant part of the cost whether they use the facilities or not. This cost recovery system comprises this built-in, fixed element and, possibly, a variable element according to the amount and type of waste actually delivered.

The Directive is currently being reviewed in an attempt to achieve the objective of 'zero discharges at sea' from ships calling at EU ports. A new legislative proposal is planned for 2013.

Ship-source Pollution Directive (2009/123/EC)
The Ship-source Pollution Directive transposes into EU legislation the standards introduced by MARPOL 73/78 relating to the prohibition of polluting discharges into the sea and specifies the sanctions to be imposed.

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3.4.2 EU legislation dealing with waste management that indirectly may affect the control of marine litter

Waste Framework Directive (2008/98/EC)
This establishes essential conditions for waste management and concerns all waste. The Directive introduces a binding waste hierarchy, defining the order of priority for treating waste:

- *Prevention*, which offers the best outcomes for the environment, is at the top of the priority order. Prevention is carried out using less material in design and manufacture, keeping products for longer, re-use and using less hazardous materials.
- *Re-use* is represented by any operation in which products or components that are not waste are used again for the same purpose for which they were conceived. Re-use also includes use of reusable items instead of disposables ones (e.g. reusable dishes, cups etc.), or reuse of packaging materials (e.g. plastic storage boxes).
- *Recycling* represents any recovery operation by which waste materials are reprocessed into products, materials or substances useful for the original or other purposes. It includes the reprocessing of organic material but does not include energy recovery and the reprocessing into materials.
- *Disposal* means any operation which is not recovery even where the operation has, as a secondary consequence, the reclamation of substances or energy. Landfill and incineration are two possible disposal operations, to be used only as the last resort.

All Member States have to set out waste prevention programs by December 2013 containing dispositions on how to manage waste hierarchy. Moreover, Member States must set up separate collection systems by 2015 as a minimum for paper, metal, plastic and glass. Member States must prepare for re-use and recycle, by weight, at least 50 % of paper, metal, plastic and glass from households, and possibly also from other origins, as far as these waste streams are similar to waste from households and 70% of construction and demolition waste by 2020.

Packaging and Packaging Waste Directive (94/62/EC)
This Directive contains provisions for the prevention of packaging wastes as well as their recovery and recycling and emphasizes the re-use of packaging (http://ec.europa.eu/environment/waste/packaging_index.htm). The first priority is prevention of the production of packaging waste. The aim is to reduce production of packaging wastes and their impact on the environment.

Member States must develop national programs to ensure that preventive measures are implemented as well as packaging reuse systems for the reduction of the impact of packaging and packaging waste on the environment.

Packaging waste targets contained in the Directive:

- by no later than 30 June 2001, between 50% and 65% by weight of packaging waste to be recovered or incinerated at waste incineration plants with energy recovery;
- by no later than 31 December 2008, at least 60% by weight of packaging waste to be recovered or incinerated at waste incineration plants with energy recovery;
- by no later than 30 June 2001, between 25% and 45% by weight of the totality of packaging materials contained in packaging waste to be recycled (with a minimum of 15% by weight for each packaging material);
- by no later than 31 December 2008, between 55% and 80% by weight of packaging waste to be recycled.

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Moreover, Annex II of the Directive contains essential requirements on the composition and reusable and recoverable nature of packaging, including recyclable. Member States must ensure that packaging placed on the market complies with the following essential requirements:

- to limit the weight and volume of packaging to a minimum adequate amount to maintain the necessary level of safety, hygiene and acceptability for consumers;
- to design reusable or recoverable packaging;
- to reduce the content of hazardous substances and materials in the packaging material and its components.

In 2004, the Directive was reviewed to provide criteria clarifying the definition of the term 'packaging' and increase the targets for recovery and recycling of packaging waste. In 2005, the Directive was revised again to allow new Member States transitional periods for attaining the recovery and recycling targets.

Landfill Directive (99/31/EC)
This establishes technical requirements for the operation of landfills, taking into account factors such as the proximity of water bodies and coastal waters and minimisation of wind-blown materials (http://ec.europa.eu/environment/waste/landfill_index.htm). Such measures should reduce the potential dispersal of plastic packaging waste and other debris in the marine environment.
The Directive defines the different categories of waste (municipal waste, hazardous waste, non-hazardous waste and inert waste) and applies to all landfills, defined as waste disposal sites for the deposit of waste onto or into land. Landfills are divided into three classes:

- landfills for hazardous waste;
- landfills for non-hazardous waste;
- landfills for inert waste.

Integrated Pollution Prevention and Control (96/61/EC)
The IPPC is a regulatory system that promotes an integrated approach to control the environmental impacts of certain industrial activities, through a single permit process. To gain a permit operators have to demonstrate that appropriate techniques are in place. The general principles of the IPPC should be applied in cases where the Landfill Directive does not stipulate appropriate technical requirements. The IPPC is going to be subsumed under the Industrial Emissions Directive in 2013, with a revised Waste Treatment BREF (Best Available Techniques (BAT) Reference Document.

Urban Waste Water Treatment Directive (91/271/EEC)
There is a requirement, under the UWWTD, to provide secondary treatment for sewerage discharges serving cities with a population over 10000 in coastal areas and 2000 in estuarine areas. The Directive specifies requirements for monitoring. This does not include litter, but it is recognised that waste water represents a significant source of domestic and industrial debris, including sanitary waste.

The Waste Electrical and Electronic Equipment Directive (WEEE) (2002/96/EC)
This sets collection, recycling and recovery targets for all types of electrical goods, with a minimum rate of 4 kilograms per head of population per annum recovered for recycling by 2009. Many electrical goods contain significant quantities of plastics, often with relatively high levels of additives such as flame retardants. Items such as televisions and fridges have been recovered in marine litter clean-ups, or hauled up in fishing nets.

Battery Directive (2006/66/EC)
This regulates the manufacture and disposal of batteries with the aim of improving the environmental performance of batteries and accumulators, and reducing quantities entering the environment. Batteries are used extensively at sea on small vessels, and can represent an important source of marine debris.

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Bathing Water Quality Directive (2006/7/EC)
This introduces a requirement to monitor bathing waters every year and prepare a description of bathing waters and potential impacts and threats to water quality, both as information for citizens and as a management tool for the responsible authorities. Although primarily focused on bacterial status, it does provide an indication of sewerage-related pollution (e.g. sanitary waste). http://www.eea.europa.eu/themes/water/interactive/bathing/state-of-bathing-waters

End-of Life Vehicle Directive (2000/53/EC)
The objective is a reduction of waste arising from end-of-life vehicles. It sets targets for the re-use, recycling and recovery of materials, which should lead to a reduction in the entry of such materials into the environment. The dumping of unwanted vehicles on the shoreline can be a problem in remote areas with limited infrastructure for safe disposal.

Ecodesign Directive (Directive 2009/125/EC)
The aim is to reduce energy use for energy-using and energy-related products, and enforcing other environmental considerations (materials use, water use, polluting emissions, waste issues and recyclability). This should, eventually, lead to a reduction in material requiring disposal.

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4 FRAMEWORKS, GUIDELINES, AGREEMENTS AND DECLARATIONS – NON-LEGALLY BINDING INITIATIVES

4.1 Definitions

There are many examples of 'soft' mechanisms that can directly or indirectly help to reduce the introduction or impacts of litter in the marine environment. They are often used in preference to legislation as they can be easier to negotiate and get several parties with disparate views to compromise. By taking account of stakeholder interests there can be a greater feeling of 'ownership' with the result that there can be greater compliance, than if conditions are legally imposed. The disadvantage is that there is a lack of legal sanctions, although social pressure can be a powerful control. The relationships between institutions and stakeholders are represented in a conceptual model in Figure 4. Non-governmental players are given a more prominent position of influence than in the case of legislation, to reflect the importance of using knowledge and influence of these groups in developing pragmatic and acceptable solutions. The GPML is a good example of a 'soft' mechanism on a global scale, with interactions between sovereign states and other stakeholders being of equal relevance. The Berlin Message provides a similar mechanism of a smaller spatial scale.

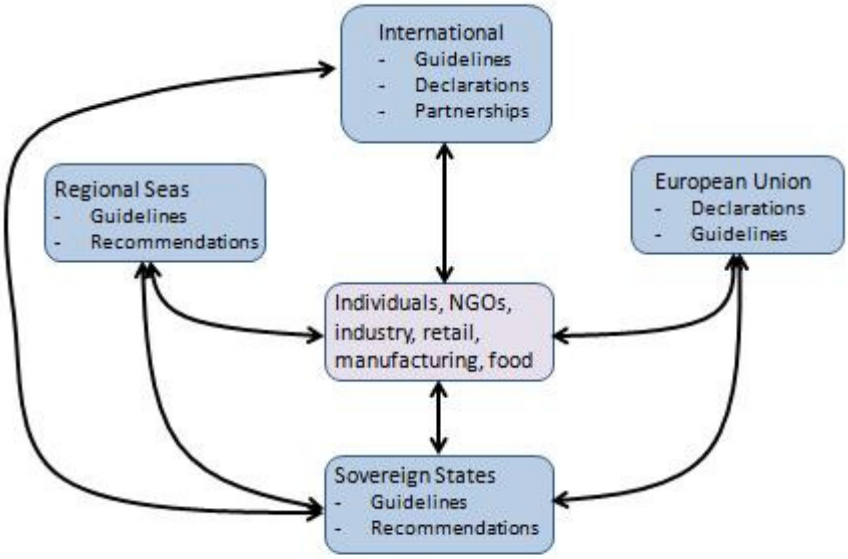

Figure 4. Relationships between international, regional, European and national institutions, responsible for introducing or proposing frameworks, declarations, guidelines and other non-legally binding mechanisms, and the individuals and groups in society at which these are directed. The GPML refers to the Global Partnership on Marine Litter.

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4.2 International Initiatives

4.2.1 Global Partnership on Marine Litter

The GPML was launched on 18 June 2012, during the Rio+20 conference in Rio de Janeiro. Under the Oceans & Seas topic of *The Future We Want* the conference adopted the following decision (A/RES/66/288 paragraph 163):

> *'We note with concern that the health of oceans and marine biodiversity are negatively affected by marine pollution, including marine debris, especially plastic, persistent organic pollutants, heavy metals and nitrogen-based compounds, from a number of marine and land-based sources, including shipping and land run-off. We commit to take action to reduce the incidence and impacts of such pollution on marine ecosystems, including through the effective implementation of relevant conventions adopted in the framework of the International Maritime Organization (IMO), and the follow-up of the relevant initiatives such as the Global Programme of Action for the Protection of the Marine Environment from Land-based Activities, as well as the adoption of coordinated strategies to this end. We further commit to take action to, by 2025, based on collected scientific data, achieve significant reductions in marine debris to prevent harm to the coastal and marine environment'*

The decision to create the GPML arose following inter-governmental discussions within the UNEP GPA (Global Programme of Action for the Protection of the Marine Environment from Land-Based Activities) during the 3rd Intergovernmental Review (Manila Declaration 2012), where marine litter was highlighted as a priority source category for 2012-2016. It takes account of, and will build on, the 2011 Honolulu Strategy, and a series of initiatives involving UNEP and other Agencies in recent years (UNEP, 2005; UNEP/MAP-WHO, 2004; Macfadyen & Cappell, 2009). The Honolulu Strategy and Commitment (UNEP & NOAA, 2011) was endorsed at the Fifth International Marine Debris Conference (5IMDC), to provide a global framework for the prevention and management of marine debris. This was a major event, jointly organized by UNEP and NOAA, with representatives of 64 nations and the EU attending. The main goals of the Honolulu Strategy are reproduced in Annex I.

UNEP will supply the Secretariat for the GPML, and provide the link to the UNEP-led Global Partnership on Waste Management, which has a marine litter component (http://www.unep.org/gpwm/). The objectives and intended outcomes of the GPML are listed below. It is intended to establish an on-line Marine Litter Network via a dedicated portal (http://www.gpa.unep.org/index.php/global-partnership-on-marine-litter).

GPML Objectives

'The Global Partnership on Marine Litter (GPML), besides being supportive of the Global Partnership on Waste Management, seeks to protect human health and the global environment by the reduction and management of marine litter as its main goal, through several specific objectives. Specific Objectives:

a. *To reduce the impacts of marine litter worldwide on economies, ecosystem and human health.*
b. *To enhance international cooperation and coordination through the promotion and implementation of the Honolulu Strategy - a global framework for the prevention and management of marine debris, as well as the Honolulu Commitment – a multi-stakeholder pledge.*
c. *To promote knowledge management, information sharing and monitoring of progress on the implementation of the Honolulu Strategy.*
d. *To promote resource efficiency and economic development through waste prevention (e.g. 4Rs (reduce, re-use, recycle and re-design) and by recovering valuable material and/or energy from waste.*
e. *Increase awareness on sources of marine litter, their fate and impacts.*

f. To assess emerging issues related to the fate and potential influence of marine litter, including (micro) plastics uptake in the food web and associated transfer of pollutants.

Expected GPML outcomes

a. Increased awareness of the impacts of marine litter at various levels – e.g. policy-makers, industry, and the general public.

b. Increased body of knowledge on communities of best practices to address marine litter by various stakeholders around the world at various levels, and how their activities contribute to the implementation of the Honolulu Strategy.

c. Identification and filling of knowledge gaps and establishing organizational knowledge processes.

d. Strengthened and coordinated global and regional networks/nodes on /for marine litter.

e. Enhanced resource efficiency by avoiding duplication of efforts, streamlining of resource utilization and information sharing across multiple activities.

f. Increased economic development and job creation opportunities in marine litter prevention and management.

g. Improved synergy among stakeholders including academia, NGOs, the private sector, governments and international organizations.

h. Enabled complementarities between the partnership and relevant Conventions and other international instruments, action plans, initiatives, and activities.

i. Systematic publication of scoping papers and global assessments on emerging issues associated with marine litter.

j. Increased mobilization of resources to address marine litter mitigation.'

4.2.2 Other initiatives

Blue Flag

The Blue Flag is a certification by the Foundation for Environmental Education (FEE) that a beach or marina meets its stringent standards (www.blueflag.org). The Blue Flag has been adopted by 60 member countries in Europe, Africa, Oceania, Asia, North America and South America and criteria include standards for water quality, safety, environmental education and information. The Blue Flag is sought for beaches and marinas as an indication of their high environmental and quality standards. Certificates, which FEE refers to as awards, are issued on an annual basis to beaches and marinas of FEE member countries. Within the requirements, Criterion 11 states:

> '*There has to be an absence of floatables such as tarry residues, wood, plastic articles, bottles, containers, glass or any other substance*.'

In the European Union, the water quality standards taken into consideration are similar to those incorporated in the EC Water Framework Directive WFD). Although, it should be noted that the WFD does not include litter as a descriptor. The Blue Flag concept began in France in 1986. The French concept of the Blue Flag was developed on European level to include other areas of environmental management, such as waste management and coastal planning and protection. The criteria have become more rigorous since the scheme began, and are applied in the same way in all participating Countries.

International Coastal Cleanup (ICC)

This initiative is organized by the Ocean Conservancy. It was initiated in Texas in 1986 and has grown to have a global reach. For example, in 2012, more than 500,000 volunteers took part from over 60 countries (http://www.oceanconservancy.org/our-work/international-coastal-cleanup/). This is one of the largest examples of voluntary engagement in cleaning-up the environment. It has an important

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educational component and undoubtedly has an influence in reducing litter volumes in those areas where the ICC operates. It is the sort of scheme that can be highlighted, within MARLISCO, when communicating the global nature of the problem to members of the public, and the local response that, taken together, can make a difference both directly (litter removal) and indirectly (by influencing behavior and public attitudes).

Clean Up the World

Clean Up the World is a community based environmental campaign that inspires and empowers communities from every corner of the globe to clean up, fix up and conserve their environment http://www.cleanuptheworld.org/en/. It is associated with the Department of Public Information of the United Nations and is supported by, and collaborates with, a range of partner organisations in various countries. Clean Up the World brings together businesses, community groups, schools and governments in a range of activities and programs that positively improve local environments. Since the first campaign in 1993, Clean Up the World has inspired more than 35 million volunteers in over 110 countries each year to take action; and activities include beach clean-ups around the world and other related projects. In 2005, European Members of Clean Up the World proposed to join forces in order to clean up, fix up and conserve the environment in the Mediterranean. ***(***http://www.cleanuptheworld.org/PDF/en/clean-up-the-mediterranean-project-overview--e--final.pdf***).*** Clean Up the World by Members in the Mediterranean region include activities such as: removal of rubbish from the natural and urban environment (streets, parks, waterways, and beaches); underwater clean ups; community recycling and water reuse projects; and environmental awareness raising and education activities.

Plastics Industry initiatives

Representatives of 47 organisations representing plastics producers have released a 'Declaration for Solutions on Marine Litter' (www.marinelittersolutions.com). The Declaration was launched at the 5IMDC conference in March 2011 and has several objectives:

- raising awareness – through public-private partnerships
- supporting research – working with the scientific community to better understand the sources and potential impacts of marine litter, and work towards solutions
- promoting best policies – promoting science-based policies and enforcement of existing measures
- spreading knowledge – to encourage more efficient waste management
- enhancing recovery – to recover plastic products for recycling or energy recovery
- preventing pellet loss – promoting better stewardship in the transshipment and use of plastic resin pellets to reduce loss into the environment (e.g. Operation Clean Sweep http://www.opcleansweep.org/)

4.3 European initiatives

4.3.1 MARLISCO Best Practices

There are a growing number of examples of 'soft' mechanisms within Europe, at a variety of scales and ambition. A representative set of examples have been identified as an integral part of the MARLISCO Project (D2.3 Analysis of the Processes and Solutions of the 72 Best Practice Examples, Loixidou et al 2013). Some have been initiated recently, in response to the increased concern about marine litter, whilst others have been in existence for many years. Some of these initiatives are very local in scale, while others may be country-wide or even trans-boundary (e.g. Fishing for Litter organised by Kimo International; http://www.kimointernational.org/FishingforLitter.aspx). Seventy-two Best Practices (BPs) were identified by national partners as representative examples that have the potential to be expanded to other regions of Europe (i.e. this does not claim to be a comprehensive list of BPs, and partners are aware of many other examples). These are summarised in a separate MARLISCO report (D2.3 Loixidou et al 2013.) and in more detail on the MARLISCO portal. In the present context, it is instructive to consider the motivation behind these initiatives. It is apparent that very few (6 out of 72) are directly related to direct

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legislation (Table 3.1). Most appear to be motivated by a simple desire to 'do something' to reduce the volume of litter, especially litter observed on shorelines, to a greater or lesser degree associated with a well-defined 'soft' mechanism.

Scale	*BP number*	*Description*
European level	BP 45/14A	The BREF = Best Available Techniques (BAT) Reference Document on waste water management in industrial sector. Document can be applied to prevent the release of plastiv pellets to the environment from industrial sites.
National Level[3]	BP 27/8A	Assessment of ML pollution on Slovenian coasts (MSFD requirement)
National Level	BP 27/12B	Indirect fee system for the collection of ship waste in Cyprus (in response to Port Reception facilities directive) with respect to Gross Tonnage of ships, regardless of whether or not the ship will actually dispose of any waste
National Level	BP 36/12C	Port State control random inspections on all ships (national and foreign) within the port areas to ensure compliance with MARPOL Annex V in Cyprus
National Level	BP 60/15O	Installation and use of port reception facilities in Portugal for ship-generated waste and cargo residues from ships calling at national ports (in response to Port Reception facilities directive)
National Level	BP 30/9B	Application of plastic bag levy in Ireland

Table 4.1 Best practices directly associated with legislation

Although the remaining **best practices** collected in the MARLISCO project have not been reported directly as linked to specific existing policies, they **necessarily influence the implementation and enforcement of national and international legislation**. They are considered a sort of "soft legislation". This is especially true if the best practices can be applied throughout the entire national territory. For this reason, if the intention is to reduce the amount of marine litter at a global, European or national level, it is important that Institutions involved are able to widely disseminate information about the BPs that are already applied.

A questionnaire was sent to the partners of the project relating to the link between BPs with 'hard' and 'soft' mechanisms. The template is shown in annex IV. Responses provide additional elements to complete this document. Above all, it has been possible to highlight the critical elements and main difficulties encountered when a specific 'best practice' is implemented.

4.3.2 Green Paper on Plastic Waste

On a more formal level the EC can issue Recommendations and Opinions to encourage Member States, organisations and individuals to adopt certain practices, but these are not legally-binding. It can also issue papers to encourage debate about particular issues. The EC has recently issued (March 2013) a Green Paper 'On a European Strategy on Plastic Waste in the Environment' (http://ec.europa.eu/environment/waste/pdf/green_paper/green_paper_en.pdf) (COM, 2013). This presents a range of policy options and issues to do with waste management, technical developments in plastics, targets and voluntary schemes and consumer behaviour. MARLISCO should be able to provide important evidence to help guide the development of the strategy during consultation and, potentially, during negotiation if the EC proceeds towards a more formal mechanism.

[3] Most BPs set at national level were initiated in response to EU Regulation

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4.3.3 Berlin Message

An international conference on *Prevention and Management of Marine Litter in European Seas* was held in Berlin from 10-12 April 2013 (http://www.marine-litter-conference-berlin.info/). A wide range of interested parties were involved, including government representatives, industry, academia, NGOs and artists. An Issue Paper had been prepared to aid discussion and the conference chairs agreed on the text of a *Message from Berlin*. This is reproduced at Annex IV. This included a description of the problem, current efforts, key principles and a list of priority actions. As part of this initiative a portal has been created to record sources of information including Best Practices (BPs), and the BPs identified as part of MARLISCO are being added (http://www.marine-litter-conference-berlin.info/tbdb.php). Many of the initiatives identified by MARLISCO partners, and many aspects of the project itself, are directly relevant for furthering the Priority Actions identified in the Berlin Message, and summarized below:

1. Fully implementing EU legislation.
2. Promoting the green economy.
3. Improving scientific understanding of sources, distribution and impacts.
4. Developing targets for reduction.
5. Raising awareness.
6. Developing regional Action plans.
7. Collaborating with global, regional and sub-regional organizations.
8. Encouraging financial support for actions.
9. Sharing expertise (Marine Litter Toolbox).
10. Participating in networks of stakeholders.

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5 CHALLENGES TO ACHIEVING EFFECTIVE LEGISLATION

5.1 Underlying challenges

There are several reasons why the present legal framework for preventing litter entering the marine environment has failed to eliminate the problem. These include: deficiencies in current legislation; a failure to recognise and address gaps in the whole waste management cycle (BIPRO, 2013); a failure by some governments to ratify international Conventions (Jeftic et al., 2009); a failure to comply with legislation; an inability to enforce legislation through lack of resources or difficulty in ascribing litter directly to a source (e.g. waste dumped from a ship in a busy shipping lane; OSPAR, 2009); an inability to prevent trans-boundary transport of litter by ocean currents and winds; and, a significant legacy of litter prior to the introduction of tighter control measures (Dixon & Dixon, 1983).

Marine litter arises from many land and ocean-based activities and solutions need to recognise the wide range of sources, the multi-disciplinary nature of the problem, the wide range of policy areas affected (e.g. energy, biodiversity, food security, habitat protection) (Mudgal et al., 2011).

Jeftic et al. (2009) conducted a comprehensive review for the United Nations Environmental Programme (UNEP) on the global challenge of monitoring, assessing and managing litter. They highlighted that while there are laws regulating the dumping of waste at sea and on shore, marine litter cannot be confined within territorial boundaries, and the complexity of identifying sources of litter makes it difficult to draft effective laws and even harder to enforce these laws. They also noted that laws do not guarantee compliance and that in addition to enforcement and penalties a sense of environmental stewardship among ocean users is essential for laws to be effective.

5.2 International scale

At the international level, there are several conventions and agreements applicable to marine litter issues (Annex I), including the United Nations Convention on the Law of the Sea, General Assembly Resolutions; the Global Programme of Action for the Protection of the Marine Environment from Land-based Activities; MARPOL 73/78 Annex V; the London Convention and the London Protocol; and the Basel Convention. However, many countries are not members of these legal regimes (Jeftic et al. 2009). There are mechanisms available to amend existing Conventions. For example, Annex V of MARPOL has been revised to tighten rules around the disposal of garbage from ships and floating platforms, ***making it illegal to dump any plastic waste and other plastic material,*** except in the event that the safety of the crew is imperilled. This came into force on 1st January 2013. Unfortunately, there remain several barriers which will limit the effectiveness of this legislation. These may relate to habitual practices by members of the crew, lack of facilities on board to store waste, financial penalties for landing garbage due to excessive port fees, or a lack of appropriate port reception facilities. In addition, only vessels over 400 t are required to carry a Garbage Record Book, subject to inspection, which excludes most fishing vessels (Chen & Liu, 2013). Vessels from 100-400 t should have a garbage management plan which the crew should follow. For vessels over 12m the requirement is to display relevant notices about the requirements of the regulations. In all cases, if crew do not follow the regulations, penalties can be applied but enforcement may be problematic.

Developing management strategies at the national level are considered to be a more practical and efficient way than amending international regulations. Management strategies can include encouraging recycling by providing adequate reception facilities at port and encouraging environmental education. Providing a reward for the garbage brought back to port may introduce undesirable consequences, such as theft of active fishing gear.

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Box 1: MARPOL Convention and Port Reception Facilities

Hereinafter some problems and possible solutions linked to application of the MARPOL Convention and the Port Reception Facilities Directive:

Fishing vessels have problems paying fees to unload their "fished" wastes in harbour facilities. In some countries the tax system is a hindrance, as communities and harbours pay a national litter tax that also applies to marine litter that is landed or collected. This is seen as unfair and does not give these stakeholders an incentive to bring waste to land or clean up. Moreover, marine litter collected along shoreline or on seafloor in some countries is considered "special wastes" by national laws.

'**Fishing For Litter initiatives could be applied at National level** if a specific regulation is built up that imposes provision to fishing vessels of dedicated containers and bags as well as assuring compliance with Port Reception Facilities of main national fishing harbours. Related costs will not include any incentive to fishermen.

Port Reception Facilities fees: introduction of a 'Indirect Fee System' which means that every ship that enters port is charged a fee that gives it the right to dispose of its waste (solid waste, sludge (from burning of fuel) and sewage), regardless of whether or not the ship will actually dispose of any waste. The charges for solid waste vary depending on ship type. The Indirect Fee System provides an incentive for ships to deliver their waste to ports rather than to dispose of them at sea.

Effective monitoring and regulation of marine litter from smaller tourist boats/vessels. This litter issue is exacerbated by the fact that these boats take trips relatively close to the shore and so any waste thrown overboard soon reaches the coast. This problem could be solved by increasing awareness and enforcing stricter waste management requirements for vessels and through regular patrol of the coast. However, grey areas exist e.g. floating kitchen waste that is released from large cruise boats and cargo ships (again this is an awareness problem since many people consider that this waste will be eaten by fish before reaching the shore). Such floating litter hotspots end up being the responsibility of no-one and cannot be collected until they reach the shore.

Enhancement of Port State control random inspections on all ships (national and foreign) within the port areas to ensure compliance with MARPOL Annex V.

5.3 Regional scale

At the regional level, there are no specific legal instruments dealing with marine litter, although litter is addressed in several regional conventions and protocols on controlling marine pollution (Annex I). Some regions (e.g. Baltic Sea, Mediterranean and Northeast Atlantic) have stated in their Regional Seas Programme review documents and/or Regional Assessment Plans that there needs to be better coordination within national governments to effectively address marine litter issues among national and local government agencies and voluntary organizations (Jeftic et al. 2009). Analysis of these documents indicated that clear lines of responsibility and authority need to be identified in order for marine litter management to be more effective. Also in many regions the implementation and enforcement of existing laws and regulations related to solid waste management is inadequate. All European Seas are shared by non-EU countries, which means that a reliance on implementing legislation and measures with the territorial limits of EU Member States will not be sufficient to prevent marine debris from entering European Seas and having a potential social, economic or ecological impact on EU Member States. Marine debris is a trans-boundary issue and there needs to be recognition of this fact when setting targets under

the MSFD and devising measures to bring about reductions. In the absence of an adequate legal framework (with the exception of international conventions such as MARPOL) more reliance will be needed on 'soft' mechanisms to gain voluntary agreement to reduce litter inputs.

5.4 European scale

5.4.1 The effectiveness of European legislation

Despite the introduction of a range of legal instruments at an EU level, marine litter continues to be a significant problem throughout European Seas. This raises several questions:

1. Are there gaps in the existing policy framework that prevent complete control of the generation of marine litter in the waste production and management cycle?
2. Can some existing legislation be adapted to include marine litter?
3. How effective is the implementation of current legislation – is it enforced throughout the EU and what is the degree of compliance?
4. How much of the litter problem in the territorial waters of EU Member States originates in international waters or the territorial waters of the third countries?
5. Can the EC encourage improved waste management practises in third countries to help reduce the quantities of litter entering the territorial waters of EU Member States?
6. Is it realistic to think that the problem of marine litter can be solved by legislation alone?

We have not been able to provide comprehensive answers to such questions, as they are outside the scope and resources of MARLISCO, but we can make some observations.

1. DGENV commissioned three related studies in the period 2011-2013 to address aspects of policy loopholes in relation to marine litter reduction (see below).
2. We noted that the Urban Waste Water treatment Directive (UWWTD), the Bathing Water *Directive* (BWD) and the Water Framework Directive (WFD) were concerned with water quality but none directly included marine litter within their scope. The modification of one or more of these directives to include litter could be examined to establish the cost-benefit and political acceptance of extending existing legislation.
3. There were several anecdotal references to a lack of consistency throughout the EU in the provision of adequate port reception facilities at reasonable cost. It appears that this may discourage ship owners and masters from using the facilities. If plastic litter is thrown overboard it is in direct contravention of the revised MARPOL Annex V. However, there is clear evidence that this practice continues, as higher quantities of shipping-related litter are observed near shipping lanes. Compliance and enforcement are difficult to achieve and it is usually not possible to trace litter back to a single vessel.
4. Inadequate landfill practices occur throughout the EU and can result in litter entering the ocean, but the overall impact of this phenomenon cannot be readily quantified. Therefore, the proper implementation of the landfill directive is crucial to the minimisation of marine litter, as are related national policy instruments that prevent fly-tipping, encourage recycling etc. Most EU Member States have implemented or are on the right track to implementing such policies. However, waste coming from landfills in countries outside the EU, e.g. the case of Saida in Lebanon (see below), causes significant pollution in the Mediterranean. Since such landfills cannot be addressed through EU policies, other ways of preventing such discharges must be identified. The review of the landfill directive needs to crack down on illegal landfill sites in Europe. Landfill sites need to be better monitored and, in the coming years, land-filling of recyclable waste needs to be phased out.
5. Marine litter is a trans-boundary problem. In a limited number of cases it is possible to point to a source outside the EU (e.g. lobster pot tags from the Bay of Maine being washed ashore on the

west coast of Ireland, Dan Minchin personnel communication; litter from the Aida landfill in Lebanon reaching the shoreline of Cyprus) but these examples are an exception. The ocean circulation will carry floating litter into EU Member States territorial waters, but more observations and model simulations are needed if this is to be quantified.

6. The Saida landfill site in Lebanon is a major source of litter to the eastern Mediterranean, with the shoreline of Cyprus receiving significant quantities. It was established in 1982 to receive rubble and building waste but started to receive municipal waste (~40%) and now contains an estimated 1,500,000 m^3, reaching over 55m high. Rehabilitation of the site is taking place, implemented by the Ministry of Environment, within a project funded through the United Nations Development Programme (UNDP)[4]. Once completed, this should significantly reduce the quantities of litter entering this region of the Mediterranean. There may be other examples where intervention by International or European bodies may provide a mutually beneficial solution to both the host country and EU Members States.
7. In the view of the authors it is clear that legislation alone will not be sufficient to bring about the desired degree of reduction of marine litter. A combination of 'carrot and stick', using legal instruments, voluntary agreements and changes in individual and group attitudes and behaviour is likely to be much more effective (see also 4.3 above).
8. More stringent penalty regimes for illegal disposal. It is necessary to foresee weak controls and enforcement of relevant existing laws, e.g. Foreshore Protection Law in Cyprus states that pollution, in any way, of the beach and sea is prohibited, making any kind of pollution a criminal offence, punishable by imprisonment and/or a fine.

5.4.2 Recent projects funded by DGENV

DGENV-funded projects commissioned in the period 2011-2013 to address policy aspects of marine litter reduction:

a) Pilot project '4 Seas': Case studies of the plastic cycle and its loophole in the four EU regional seas (ARCADIS, 2012);
b) Anti-littering instruments: Feasibility study of introducing instruments to prevent littering (RPA, 2013);
c) Plastic packaging loopholes: Loopholes in the flow of plastic packaging material (BIPRO, 2013).

The reports of these projects are available at: www.plasticmarinelitter.eu. A common chapter was produced to summarise the main conclusions of the three projects:

- Plastic is the dominant constituent of marine litter and comes mainly from land-based sources, but there are important regional differences.
- Plastic bags and bottles constitute the largest fraction of packaging waste and measures should target these areas.
- Individual behaviour, attitudes and perceptions are key factors regarding littering behaviour and measures should target these aspects.
- There is an important role for retailers, the tourism industry, local authorities and consumers themselves.
- Improvements are needed in waste management, especially with regard to plastic packaging.
- There is a role for producers through extended responsibility over a product's life cycle.

Importantly, it was recognised that measures need to take account of particular local circumstances to be cost-effective. It is anticipated that the result of the three projects will make a significant contribution to the development of marine litter policy at a European level.

[4] http://www.undp.org.lb/ProjectFactsheet/projectDetail.cfm?projectId=212

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5.4.3 MARLISCO partners' response to Advisory Panel questions

During the recent second Steering Committee (SC2) meeting (18-19 June 2013) in Brussels a number of points and questions were raised by the Advisory Panel members, as well as by MARLISCO partners. These were very pertinent to the overall aims of MARLISCO (i.e. to reduce the quantities and effects of marine litter even if they were not explicitly mentioned in the Description of Work). We took this opportunity to ask partners for their opinions and ideas for incorporation in the present report.

Advisory Panel questions:

1. Why is current legislation not effective at reducing marine litter? (Stefanie Werner)
2. What is the role of 'extended producer liability'? (Leo de Vrees)
3. Eurostat provides a 'top-down' official picture of current legislation[5], and potential policy gaps, but we need to know from the 'bottom-up'. How can we achieve this? (Leo de Vrees)
4. The Commission has produced a number of waste reviews in recent years, have we looked at these sufficiently? (Leo de Vrees)
5. How important is policy implementation in areas such as land-fill? (Leo de Vrees)
6. Can we provide examples of where legislation provides a barrier for individuals or organisations carrying out activities to reduce marine litter? This could be from the Best Practice survey or other examples[6].

Responses:

Q1 Partners noted a lack of an incentive to adopt good practice, inadequate monitoring, insufficient sanctions, trans-boundary transport and a lack of legislation in some third countries (e.g. Turkey).

Q2 It was agreed that this should play a much bigger role, and there was a need for awareness-raising amongst producers. In general it was felt that EPL was not sufficiently developed or effective.

Q3 Most respondents did not offer a solution. Informal networking with relevant individuals and organisations appears to be one solution. It seems unlikely that Member States will readily admit to failing to effectively implement existing legislation.

Q4 It was felt that such reviews should help to reduce land-based sources, but that Member States needed to be more proactive. Efforts are needed to implement solutions.

Q5 There was a consensus that the implementation of effective land-fill management was key to reducing marine litter. It was noted that there are many illegal sites within the EU, with this being a particular problem in the Mediterranean region.

Q6 The application of fees to use port reception facilities was felt to be a disincentive especially for smaller vessels such as fishing boats.

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[5] http://epp.eurostat.ec.europa.eu/portal/page/portal/product_results/search_results?mo=containsall&ms=waste&saa=&p_action=SUBMIT&l=us&co=equal&ci=,&po=equal&pi=,

[6] A couple of examples were described during the Berlin conference: a group of volunteer divers collected disused fishing nets from the seabed to prevent habitat damage and returned these to port for disposal. Under current rules the divers were charged a landing fee on the assumption that this was self-generated waste and not litter retrieved at personal cost to the divers. Users of some 'Fishing for Litter' schemes have reported difficulties in landing litter at non-home ports. In the USA, certain States have introduced laws that forbid fishing boats to transport gear that is not their own. This provides a strong disincentive for fishing boats to retrieve and bring litter to port, and results in the practice of some State organisations instructing fishers to break international law (e.g. MARPOL Annex V).

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Box 2: Extended Producer Liability

Extended Producer Liability (EPL) is a very important instrument that could minimise the improper treatment and disposal of land-based waste and therefore lead to a reduction of marine litter. Producers have not acted to any great degree to accomplish this. It allows both reduction of waste volumes (through buy-back system) as well as good management of waste produced (recycling, reuse). Producers should become more involved in raising awareness of the causes of marine litter and how to avoid marine litter in the first place. The extended producer responsibility is a crucial policy approach as it 'forces' producers to change packaging design and selection, leading to increased recyclability (higher recycling rates) and/or less packaging use. It improves recycling program efficiency, leading to less cost, which provides a benefit to society. Furthermore, it results in a fairer system of waste management in which individual consumers pay the cost of their own consumption, rather than general taxpayers. Many consumer products and packaging have a very short period in which they are are useful, cost very little and have no value after use. More products that are commonly found on beaches should be designed to be reused or refunded by the producer/distributer. Both the producer and consumer have a responsibility to "own" the garbage. This could be explored in the fast-food industry where the price of waste is included in the price of food and the returner of a bag of waste recieves a voucher for the next meal. The return bottle and can deposit system in Denmark has been very successful and reduced waste in the environment. Could this system also be implemented for marine litter items that are common in the fishing industry? The EU waste management policy needs to be better implemented at the national level making producers responsible for waste products, encouraging consumers to choose less wasteful products and packaging, promoting markets for recycled products and reduction of environmental impacts throughout a product's lifecycle.

5.5 National scale

Within the EU, national legislation is increasingly influenced by the enactment of Directives and Regulations from the EC. The methods, degree and speed of implementation of Directives into national law vary by country according to existing legal and institutional structures. An initial review of the implementation of legislation was conducted within MARLISCO. This proved to be problematic, with partners reporting difficulties in obtaining responses from those with expert knowledge about the degree to which legislation had been enacted, and the degree of compliance. It was not possible to draw meaningful conclusions. It was concluded that the sort of information we were seeking was judged to be politically sensitive. Government officials were not in a position or willing to admit any difficulties, delays or incomplete coverage in the implementation of EU Directives, for understandable reasons. Such an admission might incur infraction proceedings by the Commission[7]. The timetable for the implementation of the MSFD, with Member States currently having to set targets for Descriptor 10 (marine litter), also meant that this was an inopportune time to approach policy makers.

At the national level, few countries have specific national legislation addressing marine litter. Most countries have general legislation addressing solid waste management, public health issues, sustainable development and tourism coordinated with the conservation of natural resources and environmental quality or status targets that is directly or indirectly related to marine litter (Jeftic et al. 2009). Within the EU, Member States are obliged to implement EC Directives on waste management. Debris from flood discharges can also be an important contribution to marine litter. While the Flood Directive (2007/60/EC) aims to, *inter alia*, reduce and manage the risks that floods pose to human health and the environmentand, the Urban Waste Water Directive (91/271/EEC) governs discharges from urban sewage sources, waste from storm water drains is not specifically included. Measures need to be introduced to

[7] http://ec.europa.eu/eu_law/infringements/infringements_en.htm

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address this gap in international regulations. There is also a need to connect land and sea management and policy arrangements.

To meet European environmental requirements under the MSFD cooperation between administrations at the national and regional sea scale would be required. In addition, marine litter is an issue that requires environmental policy integration. Policy crosses several sectors (public and private) involved in marine litter sources and pathways from land and sea activities, different departments from government and multiple scales from national to local. For example, the development of a marine litter strategy in Scotland, as part of its response to MSFD, led to the recognition of the need for an integrated policy approach to engage relevant sectors addressing actions of individuals from education to enforcement (Hastings & Potts 2013).

Box 3: lack of coordination within Institutions and stakeholders

Typically a wide range of sectors and activities will be involved at different stages of the production, use and waste management of material that may enter the ocean. This can lead to a wide range of administrative arrangements and responsibilities. This may introduce a barrier to assessing the problem and ascribing responsibility and funding for introducing effective mitigation measures. For example, while the responsibility for ports is devolved in the UK, shipping and oil and gas are regulated at a UK scale. Monitoring and enforcement of shipping activity in the context of MARPOL Annex V regulation is undertaken by the Maritime Coastguard Agency, but the provision and incentives for ships to deposit waste in Ports require policy coordination between Scottish and UK ports authorities (Hastings & Potts 2013).

Often the lack of coordination between stakeholders and the lack of governance is the main challenge. Usually, no one competent authority has oversight and this can lead to gaps in legislation. Overlap of responsibilities and operational roles of the different marine litter related management authorities is a common situation. As an example, fishermen are not able to correctly dispose of their old nets due to the lack of disposal points, lack of coordination within Municipalities etc.). Central Institutions have to promote initiatives to make it applicable at a national level. The problem of a lack of coordination within stakeholder groups is particularly true in the Mediterranean Region where almost all countries have policies for the management of coastal solid waste. In fact, the problem is related to the enforcement of the policies which is in general very weak. Typically this is because of poor coordination between different national and local administrations dealing with solid waste management issues, inadequate infrastructure and understaffed services. The problem is exacerbated by an apparent lack of awareness and environmental education amongst local populations.

Box 4: Marine Litter Beach and Seafloor Clean up

To clean up the coast and seabed in a systematic manner it is important that national legislation states that it is the local authorities who have the responsibility to maintain the sea and its beaches suitable for use by the public as well as to collect litter from all public places (including the beach). This type of law could be extended and applied at a European level. At the moment the usual situation is that clean ups rely solely on NGOs that promote environmental literacy and prevent future littering. They need support from the local Municipalities.

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5.6 Legislation vs. Persuasion

To achieve a reduction in litter reaching the ocean will require a change in behaviour for organisations and individuals. Some may argue that if enough legislation is passed to cover all possible loopholes then the problem will be solved. Unfortunately, this view overlooks the idiosyncrasies of human attitudes and behaviour and that these can have group or cultural influences. If it is common practice to dispose of sanitary waste down the toilet, or leave cigarette butts and drinks bottles on the beach then additional strategies may be needed over and above existing/additional law or guidance.

There are examples showing evidence of land waste management policy influencing the occurrence of beach litter. In Taiwan litter surveys demonstrated a decreased occurrence of items that were included in land-waste management policies regarding the use, disposal and recycling of plastics (Chen and Liu 2013). This example shows that land-based litter, such as plastic bags and bottles, entering the marine environment can be greatly decreased if they can be properly reduced, reused and recycled. However, management measures to regulate waste from fishing activities using some economic instruments were not effective to ensure enforcement. This study suggests that mitigation measures should focus on source reduction, waste recycling and management, utilizing economic instruments known to be more effective, and pursuing a long-term public education campaign to raise the public awareness of this problem.

A considerable amount of legislation requires people to behave in ways that are counter to the way that they currently do not. Also, the chance of being caught litterin either at sea or on the beach, are low. Littering is still not considered a high profile crime and it is often difficult to make an explicit link from an item of litter to the individual responsible for depositing it. So the basic assumption that introducing a law will automatically lead to behaviour change may be flawed. Factors such as traditional practices, economic incentives or disincentives, cultural values and the degree of individual or collective responsibility will all be strong influences on whether laws are obeyed. McKinley & Fletcher (2012) raised the importance of marine citizenship whereby individuals are policy actors through increased responsibility, and then alter their behaviour to support the management of the marine environment and reduce the resource burden. However, the issue is finding effective ways of promoting these behaviour changes. MARLISCO is helping with its programme of raising awareness and engaging with students. These are the people who will become future producers, consumers, teachers and regulators.

Thaler and Sunstein (2008) published an influential book on 'nudge theory in 2008, arguing that small changes, for example in how health information is provided, or goods in a supermarket are presented, can achieve a significant difference in outcome; i.e. whether the health warning is followed, or whether the desirable product is purchased. The US and UK governments both set up 'nudge units' to exploit this developing field. Cass Sunstein was appointed the 'regulatory czar' in the Obama Whitehouse and has just published an account of this period, '*Simpler: the future of Government*' putting the case for the importance of including behavioural science in transforming government.

At its simplest a 'nudge' might involve a poster at a beach car park showing a child with a cut foot from broken glass on the beach, something all parents would worry about. This type of approach is evident in some of the Best Practices that were examined. But there is the potential for more subtle approaches that seek to guide people rather than instruct them. If people enter into an arrangement they have colluded with then the outcome is more likely to be mutually beneficial, and the burden on the state to enforce and prosecute will be reduced. This approach can work with individuals and with larger organisations, encouraging the spread of good practice. There will still be the need for legislation, enforcement and prosecution, but this can be targeted where it will have greatest effect. An example could be the enforcement of incentives to buy reusable materials; many daily objects are disposables determining production of huge amounts of waste. It is overall a question of willing and knowledge of the main strategies to be followed. Even the case of a plastic bag levy could fit with a connection between legislation and persuasion: reduction of distribution of free plastic bags becomes automatic if a levy is

applied through application of a dedicated national legislation. It is the case in every Country where a plastic bag levy has been built.

5.7 Taking forward the Berlin Message

The principles of the Berlin Message (Annex IV) are well aligned with the objectives of MARLISCO, and MARLISCO presents an opportunity to test the effectiveness of some of the communication mechanisms that will be needed to realize the ambitious targets that the EC has set out. Full implementation of the International, European and National Legislation by the Member States will play an important role in reducing existing marine litter as well as future input both from land-based and sea-based sources. However, it should also be appreciated that legislation alone will not provide a comprehensive and effective solution. Legislation has to be combined with a wide range of 'soft' mechanisms, working from global to local scales, in which organizations and individuals are encouraged to play their part. MARLISCO will provide another stepping stone along this route.

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6 GENERAL CONCLUSIONS

The hierarchy of legislation covers global/international, Regional Seas, EU, national and local scales, with national governments being responsible for enacting primary legislation to meet international and European obligations. The time taken from inception of a concept to the ratification and implementation of the legal instrument at a national and local scale might take years. The enforcement is usually the responsibility of national authorities, and unfortunately, the existence of a legal instrument does not guarantee that illegal practices will cease.

There are many areas of policy and legislation that may have a direct or indirect impact on the introduction of litter to the ocean. All have a common theme of being designed to improve overall waste management practices, but no one competent authority has oversight and this can lead to gaps in legislation. International, European, and national legislation concerning marine litter is mainly related to waste management on land (waste management, wastewater, landfill directives) as well as management of wastes coming from the navigation sector (Port Reception Facilities, MARPOL 73/78 Convention).

The main policy gaps could be listed as follows:

- Lack of specific National legislation on marine litter;
- Lack of full application of existing legislation in all European Countries;
- Some modifications to dispositions of existing laws to assure a more effective reduction of marine litter;
- Some modifications of Port Reception Facilities and MARPOL 73/78 Convention are reported in box 1.
- A greater coordination within subjects involved in law implementation;
- Clear individuation of the competent authority that oversees a specific framework involving marine litter;
- Lack of systematic knowledge among several stakeholders of existing rules to be applied;
- Lack of well established strategies to be followed at national and local level (selection of main measures to be adopted.

'Soft', or non-legally binding mechanisms can offer cost-effective and more flexible solutions for encouraging changes in behaviour and providing frameworks for eventual legally-binding agreements. It can represent the first step towards a treaty-making process, in which reference will be made to the principles already agreed. In the framework of marine litter, we observe that this approach is often preferable to a legally-binding one. This is particularly pertinent in the case of marine litter, where individuals and organizations often can opt whether to act within the law, or within accepted good practice as compliance is often difficult to enforce (e.g. dropping litter in the street or from the side of a ship).

Most of the Best Practices identified in MARLISCO (WP2, D1.2 Loixidou et al 2013) are aligned with 'soft' mechanisms than with the implementation of legislation. There is a growing number of examples of 'soft' mechanisms within Europe, at a variety of scales. Some have been initiated recently, in response to the increased concern about marine litter, whilst others have been in existence for many years. Some of these initiatives are very local in scale, while others may be country-wide or even trans-boundary.

Underlying challenges for achieving effective legislation include:

- deficiencies in current legislation and gaps in the whole waste management cycle (BIPRO, 2013);

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- a failure by some governments to ratify international Conventions (Jeftic et al., 2009);
- a failure to comply and enforce legislation through lack of resources or difficulty in ascribing litter directly to a source (e.g. waste dumped from a ship in a busy shipping lane; OSPAR, 2009);
- an inability to prevent trans-boundary transport of litter by ocean currents and winds;
- a significant legacy of litter prior to the introduction of tighter control measures (Dixon & Dixon, 1983).

The effectiveness of European legislation might be affected by the following:

- marine litter is not directly mentioned in some Directves (UWWTD, BWD, WFD);
- lack of port facilities, inadequate landfill practices, and lack of measure to adress the transboundary problem.

The answers provided by Marlisco partners to the questionnaires indicated some areas where options to mitigate the marine litter problem can be to considered regarding improving the systems in port reception facilities, exploring further EPL systems, improving the coordination within institutions and stakeholders, and integration of clean up activities in the national legislation.

MARLISCO has the opportunity to make a significant contribution to the development of more effective marine litter prevention policies within the EU and promote the aims of the Berlin Declaration and the Global Partnership on Marine Litter.

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ANNEXES

Annex 1 'Hard' legally-binding instruments relating to the prevention of litter entering the ocean

Conventions related to Marine Litter	Aim and Objective
UN Law of the Sea Convention (UNCLOS) - Resolution A/RES/60/30	UN Convention aimed at management of marine resources. Sets out the legal framework within which all activities in the oceans and seas must be carried out. Incentive to use port reception facilities and discourage ships from discharging marine debris at sea. Part XII of the Convention (Articles 192-237) is centred around pollution prevention and control of sea- and land-based activities, and atmospheric pollution. The General Assembly Resolution A/RES/60/30 deals with marine debris (litter).
London Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter, 1972 and 1996 Protocol	One of the first global conventions to protect the marine environment from human activities; in force since 1975. Its objective is to promote the effective control of all sources of marine pollution and to take all practicable steps to prevent pollution of the sea by dumping of wastes and other matter. Currently, 87 States are Parties to this Convention. The Protocol to the London Convention (1996) updates the Convention by adhering more strictly to the precautionary principle.
International Convention for the Prevention of Pollution from Ships (MARPOL 73/78) and Annex V	This is the main international convention for the prevention of pollution from ships and forbids dumping at sea. Annex V deals with marine litter ('garbage'), defined as "all kinds of food, domestic and operating waste, excluding fresh fish, generated during the normal operation of the vessel and liable to be disposed of continuously or periodically". Contains regulations on management of garbage produced on board a ship.
Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal (1992)	Aims to protect human health and the environment against the adverse effects of hazardous wastes. Its scope of application covers a wide range of wastes defined as "hazardous wastes" based on their origin and/or composition and their characteristics, as well as two types of waste defined as "other wastes" - household waste and incinerator ash.
Global Convention on Migratory Species - Agreement on the Conservation of Albatrosses and Petrels	The Parties shall take appropriate measures, within environmental conventions and by other means, to minimise the discharge from land-based sources and from vessels, of pollutants which may have an adverse effect on albatrosses and petrels either on land or at sea.

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Conventions related to Marine Litter	Aim and Objective
Convention of Biological Diversity	Signed by 150 government leaders at the 1992 Rio Earth Summit, the Convention on Biological Diversity is dedicated to promoting sustainable development. It requires that "by 2015, the multiple anthropogenic pressures on coral reefs and other vulnerable ecosystems impacted by climate change or ocean acidification are reduced so as to maintain their integrity".
The Jakarta Mandate on Marine and Coastal Biodiversity as part of the UN Convention on Biological Diversity (CBD).	Global consensus on the importance of marine and coastal biological diversity and part of the work to implement the CBD. The issue of marine litter is relevant for the thematic areas marine and coastal biodiversity (impacts of litter) and alien species (litter as a vector for transport of species).
OSPAR Convention	Convention for the Protection of the Marine Environment of the Northeast Atlantic. It has a long history of addressing issues related to litter. Supports direct measures of reduction of marine litter through initiative such as "Fishing for Litter".
Helsinki Commission/ HELCOM Convention	Convention on the Protection of the Marine Environment of the Baltic Sea Area (the Helsinki Commission (Helcom) Convention). Has adopted several recommendations directly or indirectly connected to marine litter. Proposed measures build on the Baltic Sea Action Plan (2007). The Baltic Sea has Special Area status under Annex V to MARPOL 73/78.
Black Sea Commission/ Bucharest Convention	Convention for the Protection of the Black Sea Against Pollution (Bucharest Convention). Contains several articles relevant to marine litter. A new "Protocol on the Protection of the Marine Environment of the Black Sea from Land-Based Sources and Activities" (2009, BSC 2009a), not yet in force, includes marine litter in the list of hazardous materials.
Barcelona Convention	Convention for the Protection of the Mediterranean Sea Against Pollution. In particular, the Protocol for the Protection of the Mediterranean Sea against Pollution from Land Based Sources recognises the importance of dealing with the problem of marine litter. The Mediterranean has Special Area status under Annex V of MARPOL 73/78. The disposal of plastics and other materials into the Mediterranean Sea has been prohibited since 2009.
Waste Framework Directive (2008/98/EC, 2006/12/EC)	Sets out essential conditions for all waste management and concerns all waste, thus influencing marine litter. Establishes waste prevention programmes by December 2013. Prohibits the abandonment, rejection and uncontrolled elimination of waste; promotes the prevention, recycling and transformation of waste; introduces a procedure for defining end-of-waste (EoW) criteria to enable a waste stream to cease being defined as waste

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Conventions related to Marine Litter	Aim and Objective
Packaging and Packaging Waste Directive (94/62/EC)	Sets out a range of requirements to reduce the impact of packaging and packaging waste on the environment. Directive contains provisions on the prevention of packaging waste, on the re-use of packaging and on the recovery and recycling of packaging waste. Requires Member States to ensure that preventative measures are implemented (e.g. by national programmes, extended producer responsibility programmes); to develop packaging re-use systems for the reduction of the impact of packaging and packaging waste on the environment; and to introduce systems for the return and/or collection of used packaging
Landfill Directive (99/31/EC)	Aims to reduce impacts of landfills on the environment, including the pollution of surface water. Establishes technical requirements for the operation of landfills, taking into account factors such as the proximity of water bodies and coastal waters and the location of landfill sites such that wind-blown materials are minimized.
The Waste Electrical and Electronic Equipment Directive (WEEE) (2002/96/EC)	Sets collection, recycling and recovery targets for all types of electrical goods, with a minimum rate of 4 kilograms per head of population per annum recovered for recycling by 2009.
Battery Directive (2006/66/EC)	Regulates the manufacture and disposal of batteries with the aim of improving the environmental performance of batteries and accumulators
Waste Incineration Directive (2000/76/EC)	Requires standards and methodologies for the practice and technology of incineration to minimise the impact of negative environmental effects on the environment and human health resulting from emissions to air, soil, surface and ground water from the incineration and co-incineration of waste.
Restriction of Hazardous Substances Directive or RoHS (2002/95/EC)	Restricts the use of six hazardous materials in the manufacture of various types of electronic and electrical equipment. It is part of a legislative initiative to solve the problem of huge amounts of toxic e-waste and is closely linked with the WEEE Directive 2002/96/EC
Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH) European Union Regulation of 18 December 2006 (1907/2006/E)	REACH aims to lower levels of pollution and increase safety levels in relation to the use of hazardous chemicals. Recycled plastics are affected as it requires recyclers to provide information on the types of chemicals included in recycled plastics. Requires producers to register chemicals in the European Chemicals Agency Database. Regulates the production and use of chemical substances (i.e. everything made of atoms), and their potential impacts on both human health and the environment
Ecodesign Directive (Directive 2009/125/EC)	To reduce energy use for energy-using and energy-related products, and enforcing other environmental considerations (materials use, water use, polluting emissions, waste issues and recyclability)

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Conventions related to Marine Litter	Aim and Objective
End-of Life Vehicle Directive (2000/53/EC)	Reduction of waste arising from end-of-life vehicles
Plastic materials and articles intended to come into contact with food directive (2002/72/EC)	Establishes a list of monomers and other substances, such as additives, that are permitted for use in the manufacture of food packaging.
Regulation on shipment of waste (EC 1013/2006)	This Regulation aims to prevent the illegal shipment of waste. Under Article 59, checks can be carried out on waste shipments or on related recovery or disposal.
List of Wastes (2000/532/EC)	Provides a framework for the collection of statistics on plastic waste streams. Distinguishing between pre-consumer and post-consumer plastic waste is important.
Urban Waste Water Treatment Directive (91/271/EEC)	Requires secondary treatment for sewerage discharges serving cities with a population over 10000 in coastal areas and 2000 in estuarine areas. Urban waste water discharge is one of the main sources of marine litter. Sewage-related debris includes sanitary towels, tampons and plastic cotton wool bud sticks. Storm water overflows may be a significant source of debris and are not included.
Assessment and management of flood risks (2007/60/EC).	The aim of this Directive is to reduce and manage the risks that floods pose to human health, the environment, cultural heritage and economic activity. Requires an assessment of all water courses and coast lines at risk from flooding and maps of areas at risk by 2013; and co-ordination with the Water Framework Directive, by co-ordinating the planning of flood risk and river basin management plans, and implementation of plans. Flood hazard maps and flood risk maps to show potential adverse consequences associated with different flood scenarios, including information on potential sources of environmental pollution as a consequence of floods.
Ship-source Pollution Directive (2009/123/EC)	Transposes into EU legislation the standards introduced by MARPOL 73/78 relating to the prohibition of polluting discharges into the sea and specifies the sanctions to be imposed.
Port Reception Facilities Directive (2000/59/EC)	The main objective is to reduce discharges of ship-generated waste and cargo residues into the sea enhancing Port Reception Facilities at European level.

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Conventions related to Marine Litter	Aim and Objective
Marine Strategy Framework Directive (MSFD, 2008/56/EC)	The MSFD is the environmental pillar of the Integrated Maritime Policy (IMP). The main aim is to achieve "Good Environmental Status" (GES) in all marine waters of the European Union by 2020. GES is defined by means of 11 qualitative descriptors. Descriptor 10 relates directly to marine litter. The overall target is to ensure that "Properties and quantities of marine litter do not cause harm to the coastal and marine environment". Member States are required to develop Marine Strategies which serve as Action Plans and which apply an ecosystem-based approach to the management of human activities, including marine litter. Monitoring programmes are to be in place by July 2014, and Marine Strategies are to be in place by 2015. The MSFD provides the overarching framework for earlier directives, including the Habitats Directive (92/43/EC), the Birds Directive (2009/147/EC), the Water Framework Directive (2000/60/EC).
Habitats Directive (92/43/EEC)	Aims to contribute towards ensuring bio-diversity through the conservation of natural habitats and of wild fauna and flora
Birds Directive (2009/147/EC)	Aims to protect all wild bird species naturally occurring in the EU and prevent declining populations due to pollution, loss of habitats and unsustainable use.
Water Framework Directive (WFD, 2000/60/EC)	Aims to protect inland surface waters, transitional waters, coastal waters and groundwater. Includes reduction and prevention of pollution of groundwater . Annex VIII - indicative list of pollutants - includes materials in suspension
Bathing Water Quality Directive (2006/7/EC)	Requirement to monitor bathing waters every year and prepare a description of bathing waters and potential impacts and threats to water quality, both as information for citizens and as a management tool for the responsible authorities.
Common Fisheries Policy	Aims to achieve a thriving and sustainable European fishing industry.

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Annex2_'Soft' non-legally binding mechanisms relating to the prevention of litter entering the ocean

Initiatives related to Marine Litter	Aim and Objective
United Nations Environment Programme (UNEP) Global Initiative on Marine Litter (2006)	Encourages cleanup, prevention and management of lost and abandoned fishing gear, harmonization of monitoring and assessment systems and establishment of reception facilities for marine garbage and waste. Main partners include Regional Seas Conventions and Action Plans, government representatives, UN agencies, donor agencies and organisations, the private sector and NGOs.
Honolulu Strategy (2011, UNEP/NOAA)	The Honolulu Strategy, published by the United Nations Environment Programme (UNEP) and the National Oceanic and Atmospheric Administration (NOAA) Marine Debris Program, is a framework for a comprehensive and global effort to reduce the ecological, human health, and economic impacts of marine debris. Main goals of Strategy are: 1) reduced amount and impact of land-based sources of marine debris introduced into the sea; 2) reduced amount and impact of sea-based sources of marine debris including abandoned, lost or otherwise discarded fishing gear (ALDFG), introduced into the sea; 3) reduced amount and impact of accumulated marine debris on shorelines, in benthic habitats, and in pelagic waters
The Global Programme of Action for the Protection of the Marine Environment from Land-based Activities (GPA, UNEP 1995)	Support and facilitate the implementation of land-based sources/activities components of the various UNEP Regional Seas Conventions and Action Programmes. Considers marine litter as one of nine 'source categories' and formulates the target 'to reduce significantly the amount of litter reaching the marine and coastal environment by the prevention or reduction of the generation of solid waste and improvements in its management, including collection and recycling of litter'.
Global Convention on Migratory Species - Agreement on the Conservation of Albatrosses and Petrels	The Parties shall take appropriate measures, within environmental conventions and by other means, to minimise the discharge from land-based sources and from vessels, of pollutants which may have an adverse effect on albatrosses and petrels either on land or at sea
Agenda 21: The UN Program of Action from Rio de Janeiro and the Johannesburg Plan of Implementation	Agenda 21 is a non-binding, voluntarily implemented action plan of the United Nations on sustainable development. It is a product of the UN Conference on Environment and Development (UNCED) held in Rio de Janeiro, Brazil, in 1992. It is an agenda of action for the UN, other multilateral organizations, and individual governments around the world; can be executed at local, national, and global levels. The "21" in Agenda 21 refers to the 21st century. It has been affirmed and modified at subsequent UN conferences
Rio +20 Earth Summit	World Leaders committed to achieving a significant reduction in marine litter by 2025. The European Commission intends to be at the forefront of this effort, working closely with Member States, Regional Sea Conventions and stakeholders to identify and develop concerted initiatives to tackle the problem

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Initiatives related to Marine Litter	Aim and Objective
UN FAO, Code of Conduct for Responsible Fisheries	United Nations Food and Agriculture Organizations' Code of Conduct for Responsible Fishing (CCRF). The Code was established in 1995 as a framework for international efforts to encourage fishing activity that is sustainable and in harmony with the environment. It provides principles and standards for the conservation, management and development of fisheries around the world. It also considers marine debris and abandoned, lost or otherwise discarded fishing gear.
GESAMP	Joint Group of Experts on the Scientific Aspects of Marine Environmental Protection (GESAMP) is an advisory body, established in 1969, that advises the United Nations (UN) system on the scientific aspects of marine environmental protection. Since 2010 they have had an expert group on marine litter
International Coastal Cleanup (ICC) - Ocean Conservancy	Global initiative from a US-based NGO, Ocean Conservancy, to remove marine litter (marine debris) and collect valuable information on the amounts and types of marine litter
Regional Seas Conventions	Four Regional Sea Conventions governing the EU's marine waters have recognised marine litter as a serious problem and have or are developing strategies to address it. EU Member States that are members of OSPAR have committed to 'continue to develop reduction measures and targets, taking into consideration an ambitious target resulting in a reduction in 2020'.
Clean Up the World (UNEP)	Initiative where cleanup activities are organized in areas such as beaches, waterways, parks, markets, roadsides and schools.
World Wildlife Fund (WWF)	The WWF's 2050 Footprint Goal aims to preserve biodiversity, such that by 2050 humanity's global footprint will stay within the planet's capacity to sustain life and natural resources will be shared equitably. The WWF works at international, national and local levels to push for measures that will minimize the impacts of development and reduce pollution. Includes initiatives to collect information in litter.
Europe 2020 Strategy	Europe 2020 is the European Union's ten-year growth strategy, addressing the shortcomings of our growth model and creating the conditions for growth which are smarter, more sustainable and more inclusive. The aim is to decouple economic growth from resource and energy use, reduce CO_2 emissions, enhance competitiveness and promote greater energy security. Also, to make Europe a resource efficient economy, through avoiding waste, using the remaining waste as a secondary resource, and contributing to reduced amounts of end-of-life material accumulating in the environment. Incorporates seven flagship initiatives, including one on resource efficiency. Actions set out in the European Commission's Roadmap to A Resource Efficient Europe include contributing to marine litter strategies in all four EU marine regions.
Green Paper on European Strategy on Plastic Waste in the Environment (COM 2013, final 7/3/2013)	Opened for public consultation. Aims to address challenges posed by plastic waste which are not yet specifically addressed in EU waste legislation.

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Initiatives related to Marine Litter	Aim and Objective
Thematic Strategy on the Prevention and Recycling of Waste	The aim of the strategy is to reduce the negative impact on the environment caused by waste throughout its lifespan. Preventing waste production and particular emphasis on biodegradable waste
List of Wastes (2000/532/EC)	Provides a framework for the collection of statistics on plastic waste streams. Distinguishing between pre-consumer and post-consumer plastic waste is important.
7th Environmental Action Programme (CEC 2012)	The Commission is considering how a 7th Environment Action Programme could best provide added value in the rapidly evolving environment policy context. The purpose of this consultation is to collect the views of all stakeholders, at EU and national level and the public at large, on the environment policy priorities up to 2020. Informed opinions are sought on the priority areas to be addressed and on the most effective tools for the EU to employ in addressing the challenges described in the consultation document
The 7th Research Framework Programme	The 7th Research Framework Programme is the most important instrument of the EU for financing research in Europe, including research on marine litter. See http://ec.europa.eu/environment/marine/good-environmental-status/descriptor-10/index_en.htm . The Framework Programme is proposed by the European Commission and adopted jointly by the Council and the European Parliament.

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Annex3_Honolulu Strategy – goals

GOAL A: REDUCED AMOUNT AND IMPACT OF LAND-BASED SOURCES OF MARINE DEBRIS INTRODUCED INTO THE SEA
Strategy A1. Conduct education and outreach on marine debris impacts and the need for improved solid waste management
Strategy A2. Employ market-based instruments to support solid waste management, in particular waste minimization
Strategy A3. Employ infrastructure and implement best practices for improving stormwater management and reducing discharge of solid waste into waterways
Strategy A4. Develop, strengthen, and enact legislation and policies to support solid waste minimization and management
Strategy A5. Improve the regulatory framework regarding stormwater, sewage systems, and debris in tributary waterways
Strategy A6. Build capacity to monitor and enforce compliance with regulations and permit conditions regarding litter, dumping, solid waste management, stormwater, and surface runoff
Strategy A7. Conduct regular cleanup efforts on coastal lands, in watersheds, and in waterways, especially at hot spots of marine debris accumulation
GOAL B: REDUCED AMOUNT AND IMPACT OF SEA-BASED SOURCES OF MARINE DEBRIS INCLUDING ABANDONED, LOST OR OTHERWISE DISCARDED FISHING GEAR (ALDFG), INTRODUCED INTO THE SEA
Strategy B1. Conduct ocean-user education and outreach on marine debris impacts, prevention, and management
Strategy B2. Develop and strengthen implementation of waste minimization and proper waste storage at sea, and of disposal at port reception facilities, in order to minimize incidents of ocean dumping
Strategy B3. Develop and strengthen implementation of industry best management practices (BMP) designed to minimize abandonment of vessels and accidental loss of cargo, solid waste, and gear at sea
Strategy B4. Develop and promote use of fishing gear modifications or alternative technologies to reduce the loss of fishing gear and/or its impacts as ALDFG
Strategy B5. Develop and strengthen implementation of legislation and policies to prevent and manage marine debris from at-sea sources, and implement requirements of MARPOL Annex V and other relevant international instruments and agreements
Strategy B6. Build capacity to monitor and enforce (1) national and local legislation, and (2) compliance with requirements of MARPOL Annex V and other relevant international instruments and agreements
GOAL C: REDUCED AMOUNT AND IMPACT OF ACCUMULATED MARINE DEBRIS ON SHORELINES, IN BENTHIC HABITATS, AND IN PELAGIC WATERS
Strategy C1. Conduct education and outreach on marine debris impacts and removal
Strategy C2. Develop and promote use of technologies and methods to effectively locate and remove marine debris accumulations
Strategy C3. Build capacity to co-manage marine debris removal response
Strategy C4. Develop or strengthen implementation of incentives for removal of ALDFG and other large accumulations of marine debris encountered at sea
Strategy C5. Establish appropriate regional, national, and local mechanisms to facilitate removal of marine debris
Strategy C6. Remove marine debris from shorelines, benthic habitats, and pelagic water

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Annex4_Berlin Message

Message from Berlin

Conclusions of the chairpersons of the International Conference on Prevention and Management of Marine Litter in European Seas, held in Berlin, Germany, 10 – 12 April 2013

The International Conference on Prevention and Management of Marine Litter in European Seas was held in Berlin, Germany, 10 – 12 April 2013. The Conference participants, which included a wide array of stakeholders, government representatives, businesses and regional organisations, analysed the issues at stake, reviewed current efforts and suggested ways forward in order to address marine litter.

Problem statement

In particular, the conference participants:

- recognised that marine litter is a growing global environmental issue, as highlighted at the Rio + 20 UN Sustainable Development Conference,
- noted with alarm the growing evidence of the harmful effects of marine litter on wildlife and habitats and on marine biodiversity and environment,
- expressed concern at the increasing threat from marine litter to human health and safety, ecosystem services, and sustainable livelihoods,
- considered the high associated costs especially for sectors such as tourism and recreational activities, shipping and fishing,
- recognised that different materials, mostly plastics which are highly persistent and remain in the environment for centuries, constitute marine litter, which stems from land- and sea-based sources,
- underlined with particular concern the problem of micro-plastics, which are ubiquitous and, whether introduced directly or due to degradation of macro litter items, reach even the most remote areas and release harmful chemical substances which may contaminate the food chain,
- recognised the need to better understand regional specificities as well as the sources, amounts, pathways, distribution trends, nature and impacts of marine litter, including microplastics.

Current efforts

The participants recognised and welcomed the many efforts currently on-going at all levels and by a wide range of actors, to address marine litter and especially:

- reaffirmed the commitment of the Rio+20 UN Sustainable Development Conference "to take action to, by 2025, based on collected scientific data, achieve significant reductions in marine debris to prevent harm to the coastal and marine environment",
- recognized the importance of international mechanisms, such as MARPOL and UNEP,
- welcomed the Honolulu Commitment and Strategy adopted by the participants attending the 5th International Marine Debris Conference held in Honolulu, Hawaii, 20-25 March 2011,
- welcomed efforts made under each of the Conventions for Europe's Regional Seas to prevent and reduce marine litter such as developing dedicated Regional Action Plans in order to contribute to the Honolulu Strategy,
- welcomed efforts made by EU Member States to address marine litter as part of their implementation of the Marine Strategy Framework Directive and to achieve or maintain good environment status in the marine environment,
- acknowledged the many initiatives developed and implemented by the different stakeholders such as environmental NGOs, local governments and communities, the private sector, consumer organizations and research institutes to tackle the problem of marine litter.

Key principles

The conference participants emphasised that a number of key principles should guide action to address marine litter, in particular:

- the precautionary principle, that measures must not be postponed in the light of scientific uncertainties, because there is already sufficient knowledge available to develop priorities, target actions and implement solutions,
- the polluter-pays principle, the principle according to which those causing pollution should bear the cost to which it gives rise,
- the prevention at source principle, as avoiding waste and preventing waste from entering the (aquatic) environment is more cost-effective and efficient than cleaning up marine litter.

Priority actions

Finally, participants considered taking a number of priority actions contributing to the Rio +20 target, to regional action, to national measures, and to the EU quantitative reduction target under development, noting these would also constitute stepping stones towards achieving the goal of reaching Good Environmental Status for Europe's regional seas, such as:

1. Fully implementing relevant EU legislation, such as the Waste legislation, the Water Framework Directive and the Marine Strategy Framework Directive and addressing the problem of plastic waste as part of the planned review of EU waste policy and legislation. This includes developing an integrated waste management infrastructure that supports waste prevention, collection, recycling and energy recovery and applying the waste hierarchy.

2. Promoting the green economy through increased resource efficiency facilitating sustainable consumption and production patterns, including improving life-cycle design, high quality recycling and sustainable packaging, encouraging extended producer responsibility and environmentally responsible fishing and maritime transport practices such as adequate port reception facilities.

3. Improving our scientific understanding of the sources, amounts, pathways, distribution, trends, nature and impacts of marine litter, including the effects of micro-plastics and their additives and absorbed substances, on marine biodiversity and public health and identifying ways to better coordinate and improve marine litter data collection, including with a view to establish an EU baseline.

4. Developing ambitious targets to reduce marine litter at all relevant levels, giving priority to sources of marine litter with the strongest impact, such as, for example, microbeads or plastic bags.

5. Contributing to raising awareness on marine litter at all levels and facilitating initiatives preventing waste from entering the (aquatic) environment while putting emphasis on addressing the complex multi-sector issues surrounding littering behaviour and building the notion of waste as a resource.

6. Initiating and further developing Regional Action Plans on marine litter for the regional seas of Europe.

7. Collaborating with global, regional and sub-regional organisations, to address the transboundary aspects of marine litter and enhance the effectiveness of multilateral initiatives aimed at preventing, reducing and managing marine litter.

8. Encouraging financial support for actions (including environmentally friendly cleaning actions) that contribute to the reduction of marine litter and its impact on the environment.

9. Sharing expertise to prevent, reduce and manage marine litter, in particular, through contributing to the conference follow up by providing further information on best practices and new initiatives collected in the Marine Litter Toolbox.

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10. Participating in networks of stakeholders committed to take action to prevent, reduce and manage marine litter in Europe's four regional seas in an environmentally sustainable manner.

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Annex5_Template linking Best Practices with 'hard' and 'soft' mechanisms

1) Title of Best Practice	
2) Code number (see annex II in draft D2.3)	
3) Brief Description (100 to 200 words). Please include the type of litter and/or sector targeted	
4) Which "hard" legally-binding instruments, if any, are directly related to this BP? (please refer also to annex I in draft D1.3)	- - - -Other instruments not included in annex I
5) Which "soft" non-legally-binding instruments, if any, are directly related to this BP? (please refer also to annex II in draft D1.3)	- - - -Other instruments not included in annex II
6) Is BP applicable to entire National territory?	Yes ☐ No ☐
7) If yes, what are the main features to be dealt with?	-Economic ☐ -Public awareness ☐ -Governance ☐ -Coordination/cooperation within stakeholders ☐ -Other ☐_____
8) Please provide details of the main features	
9) If no, please, explain why?	
10) Barriers to implementation - are there any potential conflicts with International or National Policies which restrict the introduction of the BP?	
11) Please add any further comments you may think are relevant	
Submitted by: (partner and name of person responsible for verifying the case study)	