



## Enhancing public awareness and promoting co-responsibility for marine litter in Europe: The challenge of MARLISCO



Joana M. Veiga<sup>a,\*</sup>, Thomais Vlachogianni<sup>b</sup>, Sabine Pahl<sup>c</sup>, Richard C. Thompson<sup>d</sup>, Kathrin Kopke<sup>e</sup>, Thomas K. Doyle<sup>e,f</sup>, Bonny L. Hartley<sup>c</sup>, Thomas Maes<sup>g</sup>, Demetra L. Orthodoxou<sup>h</sup>, Xenia I. Loizidou<sup>h</sup>, Iro Alampei<sup>b</sup>

<sup>a</sup> Coastal & Marine Union (EUCC), P.O. Box 11232, 2301 EE Leiden, The Netherlands

<sup>b</sup> Mediterranean Information Office for Environment, Culture and Sustainable Development (MIO-ECSDE), 12, Kyristou Str., 105 56 Athens, Greece

<sup>c</sup> School of Psychology, Plymouth University, Drake Circus, Plymouth PL4 8AA, United Kingdom

<sup>d</sup> School of Marine Science and Engineering, Plymouth University, Drake Circus, Plymouth PL4 8AA, United Kingdom

<sup>e</sup> MaREI Centre, Environmental Research Institute, Beaufort Building, University College Cork, Haulbowline Road, Ringaskiddy, Co. Cork, Ireland

<sup>f</sup> School of Natural Sciences (Zoology), Martin Ryan Institute, National University of Ireland Galway, University Road, Galway, Ireland

<sup>g</sup> Centre for Environment, Fisheries & Aquaculture Science (Cefas), Pakefield Road, NR33 0HT Lowestoft, United Kingdom

<sup>h</sup> ISOTECH Ltd Environmental Research and Consultancy, 1 Kallipolis Str. & Larnakos Ave., Apt. 401, 2102 Aglantzia, Nicosia, Cyprus

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### ABSTRACT

Marine litter is a pervasive and complex societal problem but has no simple solution. Inadequate practices at all levels of production–use–disposal contribute to accumulation of waste on land and at sea. Enhanced societal awareness but also co-responsibility across different sectors and improved interactions between stakeholders are necessary.

MARLISCO was a European initiative, which developed and implemented activities across 15 countries. It worked towards raising societal awareness and engagement on marine litter, through a combination of approaches: public exhibitions in over 80 locations; a video competition involving 2100 students; and a legacy of educational and decision-supporting tools. 12 national participatory events designed to facilitate dialogue on solutions brought together 1500 stakeholders and revealed support for cross-cutting, preventive measures. Evaluation during implementation shows that these activities are effective in improving individuals' perceptions about the problem but also commitment in being part of the solution. This paper summarises MARLISCO's approach and highlights a selection of outcomes.

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### 1. Introduction

Marine litter is defined as any manufactured item or material deliberately discarded or unintentionally lost into the sea or coastline, including those transported into the marine environment from land by rivers, drainage or sewage systems and wind (Galgani et al., 2010). While it corresponds to a very wide range of items with different origin, usage and composition, plastic items consistently rank as the most abundant types of marine debris on a global scale (STAP, 2011; Galgani et al., 2015). European Regional Sea Conventions reports show that plastics account for 50–80% of litter items found on beaches (OSPAR, 2007; HELCOM, 2009; UNEP/MAP MEDPOL, 2008).

\* Corresponding author.

E-mail addresses: [j.veiga@eucc.net](mailto:j.veiga@eucc.net) (J.M. Veiga), [vlachogianni@mio-ecsde.org](mailto:vlachogianni@mio-ecsde.org) (T. Vlachogianni), [sabine.pahl@plymouth.ac.uk](mailto:sabine.pahl@plymouth.ac.uk) (S. Pahl), [r.c.thompson@plymouth.ac.uk](mailto:r.c.thompson@plymouth.ac.uk) (R.C. Thompson), [k.kopke@ucc.ie](mailto:k.kopke@ucc.ie) (K. Kopke), [tom.doyle@nuigalway.ie](mailto:tom.doyle@nuigalway.ie) (T.K. Doyle), [bonny.hartley@gmail.com](mailto:bonny.hartley@gmail.com) (B.L. Hartley), [thomas.maes@cefas.co.uk](mailto:thomas.maes@cefas.co.uk) (T. Maes), [project@isotech.com.cy](mailto:project@isotech.com.cy) (D.L. Orthodoxou), [xenia@isotech.com.cy](mailto:xenia@isotech.com.cy) (X.I. Loizidou), [alampei@mio-ecsde.org](mailto:alampei@mio-ecsde.org) (I. Alampei).

Marine litter is a growing cross-sectoral global challenge that does not recognise geographic or political boundaries. Its negative ecological and socio-economic impacts pose severe threats to the marine and coastal environment and human livelihoods, affecting habitats, species and ecosystems services; human health and safety; and vital economic sectors such as fisheries, tourism and navigation (Kershaw et al., 2011; Mouat et al., 2010; CBD, 2012; STAP, 2011; Thompson et al., 2009; UNEP, 2009). Particularly after the RIO + 20 Summit (UN, 2012), marine litter is recognised as one of the major pollution problems worldwide. Apart from the primary/direct impacts of marine litter on marine wildlife resulting from entanglement and ingestion, there is concern about secondary impacts such as bio-accumulation and bio-magnification of toxic substances either released from plastic items (e.g. PBDEs, phthalates, Bisphenol A) or adsorbed and accumulated on plastic particles (e.g. POPs, PAHs) (Oehlmann et al., 2009; Rochman and Browne, 2013; Teuten et al., 2009).

The production of plastics has increased substantially over the last 60 years from less than 0.5 million tonnes in 1950 to over 300 billion tonnes in 2014 and in Europe alone the plastics industry

has a turnover of 350 billion euros (PlasticsEurope, 2015). Plastics are not only ubiquitous in our daily lives but they are now found throughout the marine and coastal environment, from the poles to the Equator, from shorelines and the sea surface to the sea floor (Galgani et al., 2015; Thompson et al., 2009; Eriksen et al., 2014). Inadequate solid waste management, inappropriate waste disposal by consumers at large and discharge of inappropriately treated/untreated waste water, can all lead to litter entering the sea but there are also direct inputs from maritime activities, coastal tourism and recreation (STAP, 2011; Barnes et al., 2009).

From a life-cycle perspective, the linear use of resources from production to a short-lived single-use stage to disposal is a central underlying cause of the accumulation of waste on land and at sea (Barnes et al., 2009; Thompson et al., 2009). Recognition that marine litter is not merely a waste management issue is fundamental to addressing the underlying causes of this problem. As such, addressing it through a complete life-cycle approach is one of the potential testing grounds for the green economy and the circular economy (Braungart and McDonough, 2002; European Commission, 2014). The STAP solution-based framework (STAP, 2011) indicates the need for relevant stakeholder dialogue and linkages between industry, society and policy in order to achieve solutions. Furthermore, the combination of strategies outlined includes the 3 Rs — *reduce*, *reuse*, and *recycle* which are widely advocated to reduce the quantities of waste and introduce two more: — *redesign* and *recover* (STAP, 2011).

In recent years, marine litter has received major attention from the European Commission and the EU Member States, as it represents one of the 11 descriptors within the Marine Strategy Framework Directive (MSFD — European Directive 2008/56/EC), in relation to which monitoring programmes and a set of measures need to be implemented to reach or maintain “Good Environmental Status” by 2020. Furthermore, considerable work is ongoing at the European Regional Seas Conventions with regard to the development and/or implementation of Regional Action Plans on Marine Litter. Several other funding schemes have been made available to improve the understanding of associated processes and implications of marine litter and also to promote and facilitate the coordination of efforts of the countries towards harmonized monitoring approaches (Galgani et al., 2013) and effective solutions.

MARLISCO — *Marine Litter in Europe's Seas: Social Awareness and Co-responsibility* was a European project (2012–2015) assembling a multidisciplinary group of 20 partners, which joined forces to tackle the issue of marine litter at the science–society interface, by implementing engagement activities in 15 coastal countries, in the four European Regional Seas. This paper aims at showcasing the mechanisms set-up and the tools developed within this project, while providing indications of their effectiveness in increasing awareness and empowering the targeted audiences. Some key outcomes, challenges and lessons learned will be highlighted and discussed, demonstrating the importance and the continuous need for these consistent and collective efforts, with regard to addressing such a transversal challenge as marine litter.

## 2. The challenge and strategic approach of MARLISCO

At present, problems associated with marine litter are exacerbated by a combination of: lack of awareness within society on the extent of the problem the potential solutions; and lack of communication and articulation mechanisms between the different stakeholders. MARLISCO aimed to raise public awareness, trigger a sense of co-responsibility within different sectors and facilitate dialogue between the various actors on both the problems and the potential solutions related to marine litter. The project focused on the development, implementation and evaluation of mechanisms to: i) communicate a complex problem in its environmental and social dimensions, encouraging society to gain a deepened understanding of the issue of marine litter, ii) address the

disconnection between the problem and the responsibility of individual behaviour and sectorial practices and iii) bring together and actively engage key stakeholders to define a more sustainable collective vision, constructively identify viable solutions and eventually pave the way for concerted actions to address this complex issue.

MARLISCO incorporated a set of activities including a scoping study on the characteristics of marine litter and related policies in each European Regional Sea; a collection of best practices from all partner countries; an assessment of the prevailing perceptions and attitudes of different stakeholders regarding marine litter; national fora in 12 partner countries (Fig. 1), involving key stakeholders and the wider public; a European video contest for school students; a wealth of awareness raising and educational activities and innovative tools designed for the younger generation; and an exhibition replicated in different national languages.

A key aspect of MARLISCO was the wide geographic spread and also the sectorial coverage of its partnership — the consortium was composed of a diverse range of entities, from regional and local authorities, research institutes and academia, environmental associations, industries and multimedia companies. 15 of these organisations were responsible for implementing a set of national activities in their countries and in this way MARLISCO covered 14 EU Member States and Turkey, with representation in each of the four European Regional Seas: North-East Atlantic, Baltic, Mediterranean and Black Sea. As with many multifaceted societal problems, effective solutions require the joint action of the general public, industry and decision-makers. The project benefited from the inclusion of three plastics industry associations, representing plastic producers, converters and recyclers throughout Europe.

## 3. Main lines of action and results

### 3.1. Formulating clear messages based on sound scientific evidence and findings

There are still uncertainties and crucial knowledge gaps related to marine litter, specifically on amounts, their fate in the marine environment and their toxicological impacts (e.g. Browne et al., 2015). In such a context, there is a potential for misconceptions to arise, within media and society. It is therefore imperative to base messages on clear, evidence-based information when informing, engaging and empowering stakeholders and the general public.

With this in mind, one of the initial activities of MARLISCO was to set a clear picture regarding what is known on the topic in each of the European regional seas. This included a scoping study on amounts, sources, distribution and impacts of marine litter (Kershaw et al., 2013a), and an overview of the legislative frameworks at international and regional levels, e.g. Europe and Regional Sea Conventions, that directly or indirectly deal with litter found at sea and on the coast (Kershaw et al., 2013b). Furthermore, Kershaw et al. (2013a) address basic ‘Facts & Figures’ and clarify popular misconceptions on the issue, namely the so-called “islands of trash” in the Pacific or biodegradable plastics as a panacea for plastic pollution (see also GESAMP, 2015). Apart from synthesizing and consolidating existing knowledge to underpin MARLISCO's activities, this task contributed to the project's general aim of a better understanding of the science–society nexus and the conditions for translating research-based knowledge into action, thus special emphasis was given to the identification of key actors, specificities and/or priorities within each of the countries involved.

### 3.2. Perceptions, attitudes and commitment within European society

It is essential to understand how people perceive the problem of marine litter when attempting to facilitate changes in attitudes and behaviour, yet surprisingly little is known about this. Two specific objectives of MARLISCO were to: i) assess societal perceptions about marine litter and ii) evaluate the impact of the project's educational and

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