



# Land based sources of Marine Litter

Keep Wales Tidy 2016



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## Summary

This briefing note gives an overview of marine litter from terrestrial sources and provides a summary of the supporting evidence from a wide range of international research. This paper focuses on land based sources of marine litter, as opposed to fishing and marine based industry sources, as this is where we believe that our work at Keep Wales Tidy could have the greatest impact. It also provides a summary of considerations and suggests some recommended actions for the next Government in Wales. Further information is included at the end of this document but if more information is required, please contact us.

In 2009, a U.N. joint commission estimated that 6.4 million metric tons of plastic waste currently pollutes our oceans. Marine litter is now a growing and significant threat to our aquatic and coastal environment, posing a serious risk to wildlife, human health and our economy.

Around 80% of debris found in our oceans arises from land-based sources. Therefore, in order to address marine litter, it is crucial to look at how debris from terrestrial sources enters our rivers and lakes. Whilst tackling debris from ships requires international agreements, addressing litter from land-based sources can be reduced through national and regional waste management and recycling strategies.

Innovation and effective campaigns, such as The Ocean Clean Up, alongside transnational projects such as MARLISCO and MICRO and coastal awards, encourage better management of beaches and coastal areas. However, the scale of the problem needs to be based on an approach that covers manufacturing, distribution, use and disposal.

Recycling rates vary drastically across northern Europe, ranging between around 80% - 25%. Rates in Wales are at 53% and are on target to reach zero waste by 2050. Despite upwards trends in recycling rates there is a great deal more to be done to incentivise and continue this trend - particularly around the issue of plastics. For Wales to achieve its aims of a Zero Waste nation, there will need to be a combined approach that also covers reduction and re-use. In the context of marine litter, more needs to be done to combat harmful waste at the source and a dialogue with industry is crucial. There is also a need for greater public awareness on marine litter and its impact.

The European Commission are developing a European Circular Economy Strategy which aims to 'transform Europe into a more competitive resource-efficient economy, addressing a range of economic sectors, including waste'. The Welsh Government is working with Defra to implement a UK Marine Strategy under the Marine Strategy Framework Directive (2008/56/EC) (MSFD). Many countries have taken steps at the national level and under regional organizations, such as OSPAR, to address the marine litter problem.' Theme B of OSPAR's Regional Action Plan cover actions to combat land based sources of marine litter and the majority of these centre around engaging with industry to promote extended producer responsibility.

To have an impact on what ends up in our oceans will require connecting: circular economy ambitions and zero waste targets, with further research, effective prevention, education on litter pathways and impacts, and taking action locally.

Whilst issues around our Local Environmental Quality (LEQ) have improved somewhat in recent years, litter in our marine environment continues to worsen. Keep Wales Tidy believes that greater integration of the issue should be considered in all relevant legislation so that the issue can be considered when working with land based strategies and that awareness can be raised about the impact of practices on the marine environment. Specifically, Keep Wales Tidy calls for:

- The next Welsh Government to commit to developing an integrated LEQ Action Strategy for Wales. This would bring all levels of Government, business and the third sector together and sign up to a process of reduction the extent and impact of litter on our environment, economy and well-being.
- The establishment of a National Forum for marine litter
- More research to understand the pathways of litter into the aquatic system
- A fresh approach to effective and sustainable awareness campaign and education initiatives which will lead to sustained behaviour change.

## Where are we now?

Marine litter currently poses a growing threat to the aquatic and coastal environment. Marine litter is any litter created and disposed of by humans which makes its way into our seas, oceans, lakes and rivers. A large proportion of terrestrial litter makes its way into our waterways and rivers, either through direct disposal or litter that gets transported by rain, flash flooding or sewage ways which may eventually end up in the oceans. It has been estimated that around 80% of marine debris is from land-based sources and the remaining 20% is from ocean based sources<sup>1</sup> and the U.N. estimates that over 5 million pieces of plastic enter the oceans each day from land.<sup>2</sup> In order to address marine litter, it is crucial to look at our litter and waste behaviours and to understand the pathways of litter into our aquatic environments.

Most of the land-based marine debris flows into the sea through rivers during times of flooding, so it is difficult to monitor their origin and source of generation. Some land-based marine debris is generated



through recreation at the beach and along the coast.<sup>3</sup> In one of the first projects of its kind a 2015 study, contracted by the European Commission, aimed to assess the riverine input of (marine) litter. The study identified and compared the quantities of microlitter across four rivers with varying characteristics and different sea catchment areas in Europe shown in the map (left). Plastic litter was found in all of the rivers sampled, even in rivers with low population pressure (i.e.; the Dalälven). The study proved that rivers play an important role in transporting litter and noted that '*management action is required if this input is to be decreased*'<sup>4</sup>. The report

concluded that:

*'From data that is available it is anticipated that in the absence of additional mitigation measures and improved performance of existing waste management legislation, any region with large rivers entering the sea will see inputs of large amounts of litter into the marine systems, stemming from land based sources. However, the scale of such input remains to be systematically quantified by long term monitoring.'*<sup>5</sup>

Plastic debris in our oceans poses a serious risk to wildlife as more than 1 million birds and 100,000 marine mammals die each year from becoming entangled in or ingesting marine litter.<sup>6</sup> In 2009, a U.N. joint commission estimated that 6.4 million metric tons of plastic waste currently pollutes the oceans.<sup>7</sup> In the 1990's, Captain Charles Moore from the Algalita Research Foundation found a sea of plastic debris in the Pacific Ocean and further research found that plastic debris outnumbered zooplankton

(organisms at the base of the ocean food web) by six to one. Moore revisited the same area a decade later and found that this ratio had increased six-fold.<sup>8</sup>

Microplastics, the most common marine debris found in our oceans, are far from a micro issue. Plastic does not break down entirely but gets dispersed into smaller and smaller pieces. These microplastics, absorb toxins from the water and get concentrated down the food chain in a process called bioaccumulation and can then end up on our plates through the fish we consume. In the only study of its kind to date, research looking at the North East Atlantic showed items classified as micro-plastics were identified in 94% of samples.<sup>9</sup> 100, 000 microplastic particles are found in every square kilometre of the Mediterranean.<sup>10</sup>

The abundance of these particles causes a serious threat to marine life and pose a possible risk to human health. In his book, 'Plastic Ocean', Captain Moore revealed that over a third of the most common fish that were studied had ingested microplastics. Closer to home, a study by the Norwegian Environment Agency showed that 95% of northern fulmars surveyed in the North Sea had plastic in their stomachs and that 58% contained levels above the 0.1g identified as an OSPAR Commission<sup>11</sup> environmental quality objective.<sup>12</sup> There is a wealth of research evidencing the impact of micro plastics on marine life but less has been done on the potential impact on human health due to the relative complexity of the methodology. Although a lot is known about the chronic toxicity of plastics and the result of dietary consumption (for example; *Hussain et al. 2001, Bernsten et al 2010*), more research is required for any conclusive correlations on the link to fish from both saltwater and freshwater systems.

New research has identified that clothing fibres are an important source of micro plastics. Forensic analysis of micro-plastics showed that 85% of the human-made material found on the shoreline were microfibers, and matched the types of material, such as nylon and acrylic, used in clothing.<sup>13</sup> This suggests that a large proportion of microplastic fibres found in the marine environment may be derived from sewage as a consequence of washing of clothes. Polyester, a synthetic fibre derived from oil, coal and petroleum, has doubled in production in the last 15 years as the demand for cheap clothing has increased. As with many other types of synthetic fibres, not only is polyester energy intensive to produce, the chemicals used in the process often persist in the finished product.

Marine litter can also have a significant impact on the economy and coastal and fishing communities. According to a report by the Wales Tourism Alliance, the direct contribution of the visitor economy to Wales is £2.7bn which equates to 5.8% of Wales Gross Domestic Product (GDP) (compared to 3.9% in England, 4.9% in Scotland and 2.1% in Northern Ireland). In addition, by 2020, tourism is projected to provide a total contribution of 6.9% of the Wales GDP, supporting 188,000 jobs and accounting for 13.7% of total employment.<sup>14</sup> There are a significant number of international examples which have demonstrated that experiences or perceptions of litter at destinations impact visitor choice although more research is needed to assess the extent of the deterrent. According to one evaluation model from the University of London, coastal tourism together with bathing water quality which are vulnerable to marine litter show potential costs of up to £16m per year, not including larger economic losses from beach closures or wider ecosystem services (such as the value of wildlife).<sup>15</sup> Swedish research suggests that beach litter alone reduces tourism by between 1 and 5%.<sup>16</sup> Coastal towns across the UK have already been badly affected by the advent of cheaper foreign travel since the 1970's and many are now suffering from disproportionate levels of deprivation and unemployment compared to the Wales average. Given the figures above, a 5% reduction (from the Swedish research) in the visitor economy would have a significant impact on coastal communities as tourism tends to make a disproportionately large contribution to these economies.

Although a wide range of actions and legislation already exists both nationally and internationally, littering practices from the shipping sector, as well as lack of land-based infrastructure to receive litter,

combined with a lack of awareness among main stakeholders and the general public, are major reasons that the marine litter problem appears to increase worldwide.<sup>17</sup>

The extent and scale of marine litter is a significant cause of concern and will become increasingly so if no action is taken. Clearly, it is much more effective to prevent litter reaching the aquatic environment in the first place than to try to remove it once it has entered the aquatic environment. Effectively tackling poor LEQ issues on land is crucial to addressing the waste that ends up in our seas.

## What's the current situation in the UK?

All marine litter is a result of human activity and tackling the issue in our oceans requires international legislation and co-operation. However, due to the sources of marine litter primarily coming from land, there is a great deal that can be done nationally, regionally and locally to address the problem before it reaches our seas. As much as 85% of catalogued marine litter is made up of plastic and polystyrene.<sup>18</sup> Therefore addressing the issue of litter in our aquatic environments is intrinsically linked with our national waste management and recycling strategies and initiatives to address sustainable public behavioural change. There is a great deal of innovation and effective campaigning that has been initiated in the UK and Northern Europe such as The Ocean Clean Up, transnational projects such as MARLISCO and MICRO and coastal awards (including the international Blue Flag award) all of which address marine litter from land and provide recognition for positive management of beaches and coastal areas. However, the scale of the problem is such that extraction can only be a part of the solution and terrestrial waste needs to be addressed from manufacture to distribution, to disposal.

According to Thomas Maes, Marine Scientist and spokesman for the MICRO project:<sup>19</sup>

*"...plastic pollution may gradually become less of a problem if waste is considered a valuable resource for recycling, reuse or energy-generation, and if people accept more personal responsibility for the waste they generate. This would require political commitment and investment and an integrated approach from all of us: scientists, politicians, the plastics industry, major users of plastics, retailers, user groups and the general public".*

Recycling rates across northern Europe are varied with some achieving above 85% and others struggling to reach 25%. Rates in Wales are on target under the Zero Waste Strategy (2009) which aims for to reach zero waste by 2050 and were reported last year at 53%. Other countries in the UK have not all met their targets and are in the region of 44.1%, 41% and 38% in for England, Northern Ireland and Scotland respectively.

Despite upwards trends in recycling rates in Wales, there is a great deal more to be done to incentivise and continue this trend, particularly around the issue of plastics. It is important to note that reduction and reuse, as well as recycling, will be critical for Wales to achieve its aims of a Zero Waste nation. In its 2012 report, Public Participation in Waste Recycling, Wales Audit Office argues that the Welsh Government will not reach its target of a 75 per cent reduction in the ecological footprint of waste by 2050 if Wales does not significantly reduce waste production as well as increase recycling rates.<sup>20</sup> In the context of marine litter, more needs to be done to combat harmful waste at the source and a dialogue with industry is crucial.

There is also a need for greater public awareness around marine litter. In a Europe wide survey by MARLISCO project (Marine Litter in European Seas - Social Awareness and Co-Responsibility) on the perceptions of marine litter, the key findings indicated that this was an issue of concern for the general public (particularly from respondents in the UK, Germany and Greece) but that there was not a great deal of awareness around the pathways of litter or the biggest issues. For example, survey results indicated that the public correctly perceived plastic to be the biggest litter type, but significantly underestimated the amount (45% compared with an actual 75%).<sup>21</sup> When asked about the perceived

responsibility for litter, *'respondents believed government, industry, commercial users and general public are highly responsible, but less competent and even less motivated to reduce marine litter. Independent scientists and environmental groups were perceived as least responsible, yet most competent and motivated'*.<sup>22</sup>

Scotland and Northern Ireland both have recent marine litter strategies which were published in 2013 and 2014 respectively. Both have a particular emphasis on learning and communication, attitudes and behaviours. The Scotland Strategy is linked closely to their national litter strategy which was also published in 2013.

## Impact and Considerations

Strong support for EU-level action was reported, following a stakeholder consultation in 2013 on marine litter, to extend and improve producer responsibility as a means of tackling the problem.<sup>23</sup> The European Commission suggested that packaging could be "optimised", including better design for re-use, recycling, prevention and low material demand among other things.

The European Commission are currently developing a European Circular Economy Strategy. Due for release in late 2015, the strategy aims to *'to transform Europe into a more competitive resource-efficient economy, addressing a range of economic sectors, including waste'*.<sup>24</sup> The European Parliament's Preliminary Position focuses on resource efficiency, eco-design, waste legislation and buildings and includes **a marine litter reduction target of 50% by 2025 compared to 2014 levels**.

The Welsh Government is currently working with Defra and other devolved administrations to implement a UK Marine Strategy under the Marine Strategy Framework Directive (2008/56/EC) (MSFD). The overarching aim of the MSFD is for Member States to put in place measures to achieve Good Environmental Status (GES) in their waters by 2020.

Many countries have taken steps at the national level and under regional organizations, such as OSPAR, to address the marine litter problem. Last year, OSPAR produced a Regional Action Plan for Prevention and Management of Marine Litter in the North-East Atlantic for its member signatories (including the UK). The OSPAR objective is in line with the definition of Descriptor 10 of the Marine Strategy Framework Directive, where Good Environmental Status can be seen to be achieved, when *'Properties and quantities of marine litter do not cause harm to the coastal and marine environment.'* It will also support the achievement of an EU-wide quantitative reduction headline target for marine litter, as agreed in the 7th Environment Action Programme.<sup>25</sup>

The programme sets out 4 themes for action to reach this target.

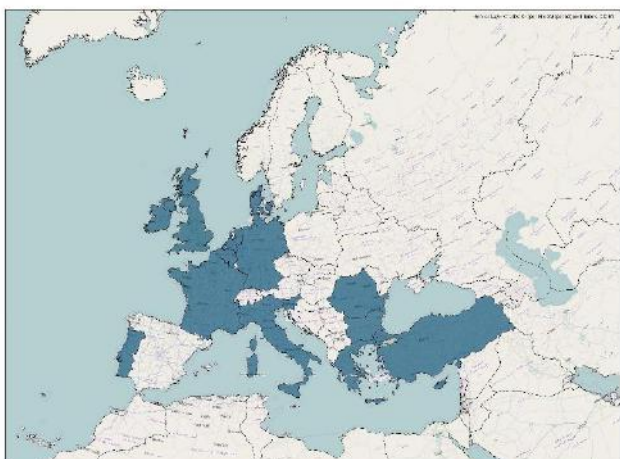
- A. Actions to combat sea-based sources of marine litter
- B. **Actions to combat land-based sources of marine litter**
- C. Removal Action
- D. Education and Outreach

Theme B of OSPAR's Regional Action Plan cover actions to combat land based sources of marine litter. The majority of these centre around industry engagement in order to promote extended producer responsibility. They include:

- Improved waste prevention and management
- Reduction of sewage and storm water related waste
- Incentives for responsible behaviour/ Disincentives for littering
- Elimination, change or adaptation of products for environmental benefits.
- Development of sustainable packaging

## Spotlight: MARISCO – Marine Litter in European Seas Social Awareness and Co-Responsibility

Project Duration: 1 June 2012 – 31 May 2015



The MARISCO project received funding from the European Union's Seventh Framework Programme for research, technological development and demonstration.

MARISCO's overarching goal was to raise public awareness, facilitate dialogue and promote co-responsibility among the different partners towards a joint vision for the sustainable management of marine litter across all European seas. Led by a consortium of 15 coastal countries, project activities took place across the 4 European regional seas: North-East Atlantic, Baltic, Mediterranean and Black Sea, by a consortium with members located in 15 coastal countries shown on the map (Right).

Over the course of the project, MARISCO members aimed to effectively engage, inform and empower audiences by developing innovative mechanisms and tools and developing best practice around sustainable marine management. Project resources included:

- A scoping study of the sources and trends regarding marine litter in each Regional Sea.
- A collection of best practices from all partner countries.
- A survey on the prevailing perceptions and attitudes of different stakeholders regarding marine litter.
- National debates in 12 partner countries.
- Diversified, tailor-made national activities including exhibitions, workshops, festivals, clean ups etc.

The project brought the issue of marine litter to a vast audience and produced insights on barriers and solutions, public perceptions and levels of awareness from a diverse section of the European community. It has identified interesting commonalities across the coastal areas in terms of issues as well as perceptions whilst recognising individual national characteristics. It has highlighted 70 best practice interventions on the issue of marine litter from grassroots to national level actions and has evaluated educational resources on the subject. All of these activities based on the principle of co-responsibility and co-production.

The project also held a contest across Europe for 7-18 year olds to create video to highlight the issue of marine litter. The UK contest winner from Furlanesend Community Primary School, 'Marine heroes' can be viewed [here](#).

### See:

MARISCO Interactive Web Documentary 'Troubled Waters': <http://www.marlisco.eu/watch-troubled-waters.en.html>

MARISCO Best Practice Guide: <http://www.marlisco.eu/best-practice-guide.en.html>

MARISCO Project Website: <http://www.marlisco.eu/index.en.html>

## Conclusion

Although many indicators suggest that the issue of terrestrial litter is improving, litter in our marine environments are reportedly on the increase and an urgent effort is needed to address this across all sectors in the UK and beyond.

By connecting circular economy ambitions and zero waste targets with effective prevention, education on litter pathways and impacts, and taking action locally, we can have a big impact on what ends up in our oceans. Whilst issues around our local environmental quality (LEQ) have improved somewhat in recent years, litter in our marine environment continues to worsen. All litter is a result of human activity and behaviour change, education, engagement and government policy can tackle this issue and reduce the extremely negative impact on our seas and wildlife.

It is recognised by all agencies working in this area that there is a great deal which can be done to tackle marine litter at the terrestrial level. The MARLISCO project highlighted that marine litter was publicly perceived to be a big problem but that there is little understanding (or significant underestimation) of the sources and pathways of litter.

There is a real and urgent need to engage in dialogue with the relevant industries to promote alternative solutions, reduce packaging and to encourage manufacturer responsibility.

Local or national policy does not currently reflect the relationship or impact of terrestrial litter on the aquatic environment. Keep Wales Tidy believes that greater integration of the issue should be considered in all relevant legislation so that the issue can be considered when working with land based strategies and that awareness can be raised about the impact of practices on the marine environment.

## Policy Links

### Wales

- [Programme for Government in Wales](#)
- [Clean Neighbourhoods & Environment Act \(2005\)](#)
- [Climate Change Strategy for Wales \(2011\)](#)
- [Towards Zero Waste Strategy \(2010\)](#)
- [Environment \(Wales\) Act \(2016\)](#)
- [Wellbeing and Future Generations Act \(2015\)](#)

### United Kingdom

- [2010-2015: UK Government Policy: Marine Environment](#)
- [Marine Strategy Framework Directive - UK Programme Measures \(Consultation 2015\)](#)
- [European / Regional Frameworks](#)
- [OSPAR Regional Action Plan \(2014\)](#)
- [Marine Strategy Framework EU Competence Centre](#)
- [EU Marine Strategy Framework Directive \(2008\)](#)



## Recommended Actions

### An integrated LEQ Strategy for Wales

Keep Wales Tidy believes that the time is now right for Wales to develop and adopt a comprehensive and integrated LEQ strategy, which focusses on prevention, reducing costs by encouraging collaboration and identifying best practice. This would have a significant impact on communities and the challenges faced by local authorities in keeping our streets and neighbourhoods clean. It is recommended that this strategy include direct references to the problem of marine litter from terrestrial sources.

### A National Forum for Marine Litter

A national forum for marine litter would seek to ensure best practice and information sharing on the subject of marine litter and could seek to take forward some of the actions in the OSPAR Action Plan including:

- Ensuring considerations related to marine litter and actions in this plan are integrated, as appropriate, into the implementation and any future revision of relevant EU Directives (e.g. Waste Framework Directive, Packaging and Packaging Waste Directive, Port Reception Facilities Directive, Landfill Directive, Water Framework Directive, Urban Wastewater Treatment Directive, Bathing Water Directive).
- Include a reference to marine litter, where applicable, in National Waste Prevention Plans and Waste Management Plans (including making links where relevant to EU legislation).

### Research pathways

Whilst there has been much research on plastics in our oceans, beach surveys and coastal litter, the pathways of debris from the source, particularly micro-plastics, is a much more complex phenomenon to study. It is recommended that more research be undertaken in this area, in cooperation with water utilities and Natural Resource Wales' area management plans around river basin catchments, storm water and sewage ways. It is recommended that a pilot be conducted in one of the catchment areas in order to scope the possibilities for further research.

Further research and evaluation is also needed in relevant industry in order to address manufacturing methods and packaging and identify alternative solutions (where applicable).

### Awareness campaign and education initiatives

Drawing on the resources from the MARLISCO project and building on successful awareness campaigns. It is evident that more education on the issue of marine litter is necessary in order to raise awareness and discourage irresponsible behaviour among the public, industry and local government. Keep Wales Tidy would support a national campaign which highlights the pathways of litter from the household to oceans via our sewers and rivers and the impact it has on our marine environment.

## Dialogue and actions with appropriate industries

Keep Wales Tidy supports the following recommendations which are part of the OSPAR Regional Action Plan on actions on land-based sources of marine litter for contracted parties:

- Entering into dialogue with the waste industry, working towards highlighting waste management practices that impact on the marine environment.
- Identifying illegal and historic coastal landfill or dumpsites, including where these might be at risk from coastal erosion, and take action if appropriate.
- Promoting Extended Producer Responsibility Strategies requiring producers, manufacturers, brand owners and first importers to be responsible for the entire life-cycle of the product with a focus on items frequently found in the marine environment.
- Encouraging the development and implementation of Sustainable Procurement Policies that contribute to the promotion of recycled products, in particular plastic, focusing on those products that impact upon the marine environment.

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