



Marine litter: 'continents' of rubbish

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Marine litter comes from many sources including waste discarded from ships, sanitary products from sewerage outflows and litter left on beaches.

Some of the most problematic marine litter is made of plastic as it has a very slow rate of decomposition, leading to a gradual build up in the environment. A plastic bottle can remain intact for up to 450 years. A large amount of plastic is accumulating in large areas of the sea. These areas have been dubbed 'great garbage patches' or 'plastic continents'.

Marine litter is a major environmental issue with significant implications for the marine environment and coastal communities. It leads to large economic losses. The long term environmental impacts of marine plastic pollution are unknown. There are concerns that it may lead to chemical contaminants entering the food chain, although more research is required.

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1 Marine litter

Marine litter is comprised of many types of waste including organic waste discarded from ship galleys, sanitary products from sewerage outflows and litter left on beaches. Some of the most problematic marine litter is made of plastic as it has a very slow rate of decomposition, leading to a gradual build up in the environment—plastic and polystyrene accounts for around 75 per cent of marine litter.¹ A plastic bottle can remain intact for up to 450 years.²

The UN Environment Programme (UNEP) recently published a report on this issue. It stated that marine litter was a major environmental issue “with significant implications for the marine and coastal environment and human activities all over the world”. It concluded that “every year, marine litter results in tremendous economic costs and losses to individuals and communities around the world” and that it “can spoil, foul and destroy the beauty of the ocean and the coastal zone”.³

2 Where does marine litter come from?

A large proportion of marine litter in the north east Atlantic region, including the seas around the UK, comes from land rather than from ships or rigs, but it can be hard to identify the sources of litter:

This is demonstrated in the Beachwatch survey, in the UK, where the largest category is non-sourced items at 42 percent of the total, with recreation beach users at 35 percent and fishing at 14 percent

...

[A]nalysis of the data for the whole of the OSPAR region [north east Atlantic] showed a consistent picture with no trends in shore-based sources such as tourism or sanitary wastes. There was also no trend for the sea-based sources of galley waste and shipping, although fishing sources did show an increase from 2001 to 2006.⁴

The UNEP report also noted that lost or abandoned fishing gear was “a significant and very persistent form of marine litter. It poses a threat to the marine environment, as well as human life and activities”. The report explained the impact of lost and discarded nets:

Even when the lost nets sink from the weight of their 'catch', the persistent nature of the synthetic materials from which they are made means that they can continue to damage the seabed and affect commercially important shellfish species for many years. An estimated... £127 million in marketable lobster is lost every year due to 'ghost' fishing (<http://marine-litter.gpa.unep.org/facts/facts.htm>).⁵

3 How much litter is in the sea?

In the seas around the UK and in the north east Atlantic, litter levels appear to be steady, but high. A 2004 study estimated that some 20,000 tonnes of litter was deposited each year into

¹ *Marine Litter*, OSPAR Commission and UNEP, on 1 July 2010

² *Reduce marine litter: Save the North Sea project results*, Save the North Sea, on 1 July 2010

³ *Marine Litter: A Global Challenge*, United Nations Environment Programme, April 2009

⁴ *Marine Litter: A Global Challenge*, United Nations Environment Programme, April 2009

⁵ *ibid*

the North Sea—70% of sinks to the bottom, 15% floats on the surface and 15% was washed up on beaches.⁶

Levels of litter floating in the sea or found on the seabed have remained relatively constant:

Amounts of marine litter at sea have also remained consistent, but show varied spatial distribution with litter on the seabed varying significantly from 0 to 101,000 pieces of litter per km² due to topological and tidal differences. The Greater North Sea background study into the Ecological Quality Objective (EcoQO) on plastic particles in fulmars stomachs showed that there was a reduction in the amount of litter at sea during the late 1990s, with the average amount of plastic per bird falling from 0.5g to 0.3g, however, this has now levelled off and there has been no reduction in recent years.⁷

The 2009 Beachwatch survey showed a reduction in litter on UK beaches from 2008.⁸ The 2009 results are still 77% higher than the results of the 1994 survey.⁹ Across the north east Atlantic region litter generally remains “consistently high and... not decreasing, despite recent efforts”:

[In a 2007 study] an average 542 items of marine litter of varying sizes were found per 100m survey on the reference beaches... The highest levels recorded... were in the Greater North Sea Region with 600-1400 items per 100 m of beach surveyed in the Northern North Sea and 200-600 items per 100 m in the Southern North Sea. In the Celtic Seas, levels were also high with 600-800 items per 100 m; however in this case levels were higher in the south, as shown by the MCS Beachwatch Survey 2007, where 3,230 items per km were monitored in the southwest of England compared to 1,057 items per km in Northern Ireland.¹⁰

4 ‘Continents’ of litter floating in the sea

Globally, marine litter appears to be worsening, and it is likely to worsen for years to come without effective action being taken.¹¹ News reports have highlighted the existence of ‘plastic continents’ or ‘great garbage patches’ in vast areas of ocean where currents and winds lead to the accumulation of large amounts of marine litter.¹² The term garbage patch or continent is rather misleading, as the accumulation is more like a soup of small plastic particles spread throughout the upper water column.

A large area in the northern Pacific, the ‘Pacific Garbage Patch’ is said to have accumulated a very large amount of marine litter. Estimates of the amount of litter present vary as do estimates of its size. Some have estimated that it covers an area twice the size of France.¹³ In February 2010 a ‘garbage patch’ was first described in the north Atlantic.¹⁴

⁶ [Reduce marine litter: Save the North Sea project results](#), Save the North Sea, on 1 July

⁷ *ibid*

⁸ [Marine Conservation Society Beachwatch Big Weekend 2009 - Executive Summary](#), Marine Conservation Society, on 1 July 2010

⁹ *ibid*

¹⁰ *ibid*

¹¹ [Marine Litter: A Global Challenge](#), United Nations Environment Programme, April 2009

¹² Richard Grant, “Drowning in plastic: The Great Pacific Garbage Patch is twice the size of France”, *The Telegraph*, 24 April 2009

¹³ Richard Grant, “Drowning in plastic: The Great Pacific Garbage Patch is twice the size of France”, *The Telegraph*, 24 April 2009

¹⁴ [Plastic rubbish blights ocean](#), BBC News, 24 February 2010

5 Wildlife impacts

While it is impossible to say with certainty what proportion of marine animals are killed or harmed by marine litter, as we do not know how many animals die at sea, evidence suggests that a large proportion of some species are adversely affected. One estimate stated that “more than one million birds and 100,000 marine mammals and sea turtles die each year throughout the world after either becoming entangled in or eating plastic materials found in the sea”.¹⁵

In a study 12 per cent of all gannet corpses on German and Dutch beaches on the North Sea were found entangled in plastic and another study found that ninety-four per cent of the seabirds in the North Sea had ingested small plastic particles from floating litter, “with 55 per cent of birds having more than 0.1 gram of plastic in their stomachs”.¹⁶ A 1999 study found that “90% of the 30,000 gannet nests on Grassholm Island (in the Bristol Channel) now contain plastic”, indicating “the extent of plastic pollution in surrounding waters as gannets collect almost all their nest material at sea”. It went on that “young gannets’ feet can often become entangled, resulting in serious injuries”.¹⁷

There is also growing concern about microscopic plastic particles, which can be ingested by microorganisms at the bottom of the food-chain. They are formed by the steady breakdown of larger plastic pieces and can be found at concentrations of 150 to 2400 particles per m³.¹⁸ A study conducted by researchers at Newcastle University on 3 beaches in Northumberland found some sand samples contained more than 10,000 microscopic plastic fibres per litre of sand.¹⁹

The effects of microscopic plastic pollution are unknown. There are concerns that the particles may lead to chemical contaminants entering the food chain, although more research is required:

Studies into the impact on microscopic plastic particles on the marine environment are at the forefront of recent research into marine litter. Global plastic production is now estimated at 225 million tons per year (Plastic-Europe, 2006). Plastic debris is accumulating in terrestrial and aquatic habitats worldwide and it is progressively fragmenting into small pieces and as it does so the potential for ingestion by animals increases.

...the impacts of microscopic (<1mm) plastic debris are still poorly understood. Plastics can be mistaken as food by numerous animals, including birds, fish, turtles, marine mammals, and marine vertebrates. Given the high capacity of the plastics to absorb phenanthrene, plastics may be an important vehicle for transporting contaminants to organisms.²⁰

6 Economic and social impacts

Some of the economic and social impacts listed by the UNEP and other organisations included:

¹⁵ [Reduce marine litter: Save the North Sea project results](#), Save the North Sea, on 1 July

¹⁶ [Marine Litter](#), OSPAR Commission and UNEP, on 1 July 2010

¹⁷ [The Impacts of Marine Litter](#), Marine Pollution Monitoring Management Group: Report of the Marine Litter Task Team, May 2002

¹⁸ [Marine Litter](#), OSPAR Commission and UNEP, on 1 July 2010

¹⁹ [The Impacts of Marine Litter](#), Marine Pollution Monitoring Management Group: Report of the Marine Litter Task Team, May 2002

²⁰ [Marine Litter: A Global Challenge](#), United Nations Environment Programme, April 2009

- Loss of economically important wildlife through entanglement and ingestion;
- Smothering and/or mechanical scouring of the sea bed and the economically important wildlife found there;
- Damage to fisheries, fishing boats and gear. North Sea fishermen spend an average 1-2 hours each week cleaning their nets of marine litter. Total costs to fishing boats in some regions around the UK could be £6000 to £30,000 per year;²¹
- Damage to boats from propeller fouling, blocked engine intake pipes and damaged drive shafts, which also create safety risks that may require emergency service intervention. In 1998, the Royal National Lifeboat Institution (RNLI) attended over 200 incidents to vessels with fouled propellers. The total cost to undertake these rescues was on average £900,000 each year.²²
- Contamination of beaches, harbours and marinas so that they require cleaning;
- Serious injury or disease to those coming into contact with the sea, such as when scuba diving or swimming;
- Blocking and damage to water intakes in power stations and desalination plants. The UN said “the amount of debris removed from [power station] screens varies between 100-10,000 tonnes depending on location each year...[costing] up to £50,000 to remove the debris with additional costs for pump maintenance”;
- Contamination of coastal grazing land, causing injury to livestock; and,
- Damage to tourism as litter in the water is perceived (sometimes correctly) to reflect microbial pollution and poor water quality. Tourism can be “strongly negatively affected by the presence of litter”.²³

7 What can be done?

The UNEP report concluded that “there is an increasingly urgent need to attack this issue through more efficient and effective enforcement of laws and regulations, coordinated and expanded outreach and educational campaigns, and the employment of strong economic instruments and incentives for prevention and abatement”. It pointed out that marine litter comes from both land and marine sources so that tackling the problem will take engagement by society as a whole.²⁴

The UNEP found that prevention was “generally more effective and efficient than remedial action”. It highlighted the following measures to reduce the volume of waste being deposited in the sea:

- measures to decrease or eliminate the discharge of ship-generated waste;
- stop the discharge of solid wastes from land-based sources;

²¹ [Reduce marine litter: Save the North Sea project results](#), Save the North Sea, on 1 July

²² [Marine Litter: A Global Challenge](#), United Nations Environment Programme, April 2009

²³ [MARINE STRATEGY FRAMEWORK DIRECTIVE: Task Group 10 Report Marine litter](#), JRC Scientific and Technical Reports, April 2010

²⁴ [Marine Litter: A Global Challenge](#), United Nations Environment Programme, April 2009

- protect rivers from pollution; and,
- reduce the loss of fishing gear from fishing vessels.²⁵

However, it pointed out that often commitments to these measures are already in place, and that the focus should be on ensuring that “regional and international instruments are made effective through improved legislation, regulations, enforcement and compliance at the national level”.²⁶ Some specific measures to tackle the problem include:

- ‘Fishing for litter’. This project involves asking fishermen to return all litter caught in their nets to shore, where the waste is disposed of appropriately. This has been operating in Scotland (where some 120 tonnes of litter was collected over three years) and was recently launched in south west England.²⁷ UNEP said that the “projects demonstrate that fishermen are willing to take part in returning litter to shore, if provided with an incentive and educational resources”. See: www.fishingforlitter.org/
- On land, encouraging the responsible disposal of waste, the recycling of materials and discouraging the consumption of packaging. The UNEP said “for example, in Germany plastic bottles all have a deposit giving them a value after they have been used encouraging recycling. This measure could also be expanded to cover larger plastic containers that are used commercially. In Ireland the introduction of a tax on plastic bags has reduced the number of bags entering the environment”.
- Charging vessels for waste at harbours whether they deposit it or not, rather than on the amount of waste disposed of (a ‘no-special-fee’ system). This may help to discourage vessels from dumping overboard.
- The collection of lost fishing gear. Norway recovered some 500 nets per year (although many more per year are thought to be lost). An EU-funded project called Deepclean looked at the effect of lost nets in deepwater fisheries off the coast of the UK, and included a net retrieval exercise.

The UNEP report concluded that “there was a lack of a coordinated approach to marine litter in the region” and that “progress has still been slow on developing and implementing the wide range of programmes and measures that are required to reduce the input of marine litter from its many sources or to introduce mechanisms for the remediation of existing litter”.²⁸

8 Campaign for a marine litter strategy

A number of marine conservation groups have called on the UK Government to introduce a marine litter strategy to set out a response to the problem. The Marine Conservation Society called for:

Governments to:

- Formulate a coherent marine litter strategy.

²⁵ *Marine Litter: A Global Challenge*, United Nations Environment Programme, April 2009

²⁶ *ibid*

²⁷ *Fishing for litter in Cornish waters*, BBC News, 6 April 2010

²⁸ *Marine Litter: A Global Challenge*, United Nations Environment Programme, April 2009

- Appoint a lead body to implement this strategy.
- Work with signatory countries to ensure the statutory enforcement of waste reduction measures under the OSPAR and MARPOL Conventions.
- Invest in enforcement of domestic legislation covering the proper disposal and clearance of litter from land and aquatic environments.
- Extend existing Port Waste Reception Facilities to include fishing vessels.
- Properly enforce current legislation for the protection and progressive improvement of the aquatic environment, and ensure polluters pay costs that truly reflect the damage they cause.

Industry to:

- Improve water treatment storage capacity and combined sewer overflows to reduce the discharge of untreated sewage and sewage related litter to rivers and the sea during heavy rainfall.
- Appropriately label all bathroom and sanitary products, particularly those that contain plastic, as nonflushable.
- Tighten packing, transport and shipping procedures to reduce the loss of plastic pellets to the marine environment.

The public to:

- Reduce their use of plastic packaging, and reuse and recycle wherever possible. First steps can be as simple as avoiding plastic shopping bags, bottled drinking water and over packaged goods.
- Take responsibility for safe disposal of all litter items whether at home, work or on holiday, using bins provided, and not flushing plastic products.
- Support clean up schemes to remove litter from the environment before it reaches the sea.²⁹

9 What is the Government doing?

In addition to encouraging appropriate waste management, the previous Government supported a ‘Fishing for Litter’ scheme in south west England. It was also involved in the creation of the European Marine Strategy Framework Directive (MSFD), although it was accused by some of trying to water down the proposals.³⁰

The MSFD was adopted in July 2008. The Directive requires EU member states to put in place measures to achieve “good environmental status” (GES) in their marine waters by 2020. This may include targets related to marine litter and will involve countries working together to tackle the problem.³¹ It is possible that an objective on marine litter will lead to “a measurable and significant decrease in the total amount of litter in the environment by

²⁹ *Beachwatch 2008*, Marine Conservation Society, 2009

³⁰ *Parliament adopts marine protection strategy amid NGO criticism*, Euractiv.com, 12 December 2007

³¹ *PROPOSING METHODOLOGICAL STANDARDS FOR MONITORING MARINE LITTER*, JRC poster, on 1 July 2010

2020”.³² However the degree to which marine litter will be tackled and how the MSFD will be transposed in the UK are still being determined.³³

The Coalition Government stated that it would “work towards a ‘zero waste’ economy, encourage councils to pay people to recycle, and work to reduce littering”.³⁴ Such measures will help to reduce marine litter.

Prior to the election, both the Conservatives and Liberal Democrats recognised the importance of tackling marine litter and stated that the parties would draw up a strategy for dealing with the problem:

Richard Benyon MP, Shadow Minister for Environment, Fisheries and Wildlife has stated “Marine litter is a massive issue in both our inshore waters and beyond. A Conservative Government will require DEFRA to draw up a cohesive strategy for dealing with this problem. This will include input from other Departments and will set out clear deliverable objectives. The new Marine Management Organisation will take the lead in implementing the Strategy.”

Andrew George from the Liberal Democrats said “We agree that a Marine Litter Strategy is needed to determine what new actions are needed to tackle this growing problem.”³⁵

³² *ibid*

³³ *Consultation on the Marine Strategy Framework Directive: Putting in place the legal framework for implementation*, Defra website, on 1 July 2010

³⁴ *The Coalition: our programme for government*, May 2010

³⁵ *Strandline*, The Marine Conservation Society, Winter 2010