

FREQUENTLY ASKED QUESTIONS

Date: 08. April 2013



marine litter / pollution of oceans with plastic

What is marine litter?

“Marine litter is any persistent, manufactured or processed solid material discarded, disposed of or abandoned in the marine and coastal environment ... Marine Litter consists of items that have been made or used by people and deliberately discarded or unintentionally lost into the sea and on beaches, including such materials transported into the marine environment from land by rivers, draining or sewage systems or winds. For example, marine litter consists of plastics, wood, metals, glass, rubber, clothing or paper etc. This definition does not include semi-solids remains of for example mineral and vegetable oils, paraffin and chemicals that sometimes litter sea and shores”.

How much human-created waste is in the oceans?

Estimates claim there is now between 100 and 142 million tonnes of human-created waste in the world's oceans. Up to ten million additional tonnes are added every year. Some 70 per cent of the waste is thought to sink to the ocean floor, whereas one half of the remaining 30 per cent is washed up on beaches and the other half is suspended at the surface and the water column. The UNEP believes that about 13,000 pieces of plastic litter are floating on every square kilometre of ocean surface. Other estimates claim that 250 million pieces of debris are circulating in the Mediterranean Sea. Currents and wind spread the litter worldwide throughout the oceans, where it accumulates in certain regions.

What is the ecological impact of marine litter on the marine environment?

Whereas the pollution problem in holiday areas is no more than an aesthetic annoyance for the Central European, it poses a serious threat to the health, and sometimes survival, of the affected marine organisms. The ingestion or swallowing of litter has been observed in 43% of all cetaceans, 36% of marine bird species and various species of fish. The proven consequences include partial or complete blockage of the gastrointestinal tract accompanied by a drastic reduction in the production of digestive enzymes, significantly increased expenditure of energy by the animals, all of which can affect reproduction or even lead to death by starvation.

There are 136 marine species that regularly become entangled or strangled by marine litter, including six of the seven species of sea turtles, 51 of the 312 known species of marine birds and 32 species of marine mammals. One-tenth of the litter in the world's oceans consists of ownerless fishing equipment which is either lost or actively discarded in the marine environment, for example when cargo capacities have been reached. In particular, this concerns cheap fishing equipment such as set gillnets: these nylon nets can continue to fish at will for up to 600 years. The cumulative impact of the large numbers of drifting nets is a threat to marine biodiversity. See **Factsheet 1** for more detailed information about the impact of marine litter.

What is known about pollution of Germany's seas?

Germany's sea areas are much used by industry. The volume of litter on the seabed of the North Sea alone is estimated to be 600,000 m³. An average of 236 litter particles per 100 metres of shoreline can be found in the southern North Sea, and a total of about 600,000 cubic metres of debris is thought to be lying on the seabed. Plastics have been present in 95 per cent of all the northern fulmars found dead along Germany's North Sea coast, each with an average of 30 pieces. Data about the coastlines of Germany's Baltic Sea reveal strong variance of litter volumes, ranging from 2 to 328 kilogrammes, or 4 to 181 pieces for every 500 metres of coastline. The amount of waste at the surface in both seas correlates to the density of shipping traffic and traffic separation schemes. More information is available in the national reports on the implementation of the Marine Strategy Framework Directive: <http://www.meeresschutz.info>.

Where does marine litter come from?

This varies greatly depending on region. In general, 80 per cent of discharges originate onshore, that is from rivers or large landfills in coastal areas of the Mediterranean, for example. An additional source of input is tourism along the coast, which is one of the main sources at the German Baltic Sea. On the other hand most of the litter in the southern North Sea comes from the shipping and fishing industries. Usually only a fraction of the litter is actually from the local region. During a beach cleanup on the island of Texel in April 2005, only 42% of the waste found could be traced by its barcode to the Netherlands, whereas the remainder originated in other littoral states such as Germany or Great Britain but also included China, Russia and Spain. See **Factsheets 2 and 3** for more information on land-based and marine sources of litter.

How long have plastics been around?

Plastics have only been manufactured on an industrial scale since 1907. It is precisely their unique properties of durability and low-cost manufacture which also make their disposal problematic. The annual production rate is 245 million tonnes, of which 60 million tonnes are produced in Europe. The EU 27 incurred a volume of plastic waste of around 25 million tonnes (mt) in 2008. Of that volume 12.1 mt (48.7%) was disposed to landfills, 12.8 mt (51.3%) was used for energy recovery and only 5.3 mt (21.3%) was recycled.

What is the share of plastic in ocean debris?

About three-quarters of the litter found in oceans is made of plastic, and even exceeds 80 percent along the coasts of the Mediterranean.

Doesn't plastic biodegrade at all or is it a very slow process?

It takes up to 450 years for a plastic bottle or disposable nappy to decompose. It is believed that microorganisms cannot completely biodegrade plastics. Plastic is biologically inert and are hardly susceptible to mineralization, which means that microplastic particles gradually become smaller and more numerous but are not completely degraded. An accumulation of plastics has been observed worldwide along beaches, in whirlpools and sediments.

HOW LONG DOES IT TAKE RUBBISH TO BREAK DOWN IN THE SEA?



© German Federal Environment Agency

What are microplastics?

Microplastics are plastic particles smaller than 5mm in size and therefore hard to see with the naked eye. There are two types of microplastics: so-called primary microplastics that include nurdles, which is the base material used to manufacture plastic; granulates in cosmetics and hygiene products such as peelings, toothpaste, hand soaps; microscopic particles that are used in blast cleaning in shipyards, in medicine as a vector for active ingredients and in fibres. Up to 2,000 synthetic fibres from a piece of fleece clothing, made mostly of polyester or polyacrylic, are released per washing cycle to the marine environment through watercourses since they cannot be captured by wastewater treatment plants. If a cargo container with industrial plastic pellets intended for later manufacture is lost at sea, 50 billion pellets are released into the ocean and can then hardly be distinguished from grains of sand on the beach. Moreover, microplastics are also formed as a result of physical, biological and chemical degradation of macroplastic particles, the so-called secondary microplastics.

Are microplastics a problem?

Common plastics such as polyethylene are notable for their low density and thus float at the ocean surface. Microplastics are therefore widely available to plankton but also to commercially fished species in the larval stage. The ratio of microplastics particle to zooplankton in the northwestern Mediterranean is 1:2. As they degrade, plastics may emit toxic and endocrine disruptive additives such as plasticisers, flame retardants and UV filters to the marine environment or organisms which takes them up. In addition, persistent organic pollutants (POPs - pesticides such as DDT or polychlorinated biphenyl (PCB)) from the surrounding water can bond in high concentrations to microplastic particles and enter the food web (as Trojan horses) through the marine fauna which take up the plastic while feeding. Additives and contaminants that have carcinogenic potential or mutagenic and other effects can accumulate in body tissues. These properties can lead to an accumulation of pollutants in the food chain which might also be relevant for human consumption of fish and shellfish.

What are promising approaches to solving the problem of marine litter?

Remedial collection of litter in the sea and along shorelines is time-consuming, costly and only captures a small proportion of overall debris. Preventative and other measures at the sources should be enacted with more determination. Recycling and reuse schemes should be further strengthened, and the environmentally friendly design of plastic products (eco-design) should be promoted. Plastics should become established as recyclable materials in order to prevent their careless disposal. Producer responsibility should also play a greater role. Product sales by highly developed economies often occur in regions where there is no adequate waste management system in place. There is also a need for the development of a coherent, regionally coordinated monitoring programme to improve the database. Gaps in knowledge should be closed in close collaboration with research. See **Factsheets 2 and 3** for examples of how to handle land- and ocean-based sources of marine litter.

What is the Marine Strategy Framework Directive?

The Marine Strategy Framework Directive (2008/56/EU) has established a pan-European framework for comprehensive protection of the European Seas since 2008. As the environmental pillar of the integrated maritime EU policy (IMP) this directive is a key element of European activities to combat marine litter. The Directive determines marine litter to be one of the qualitative descriptors for achieving good environmental status of marine waters by 2020. Descriptor 10 requires that the "properties and quantities of marine litter do not cause harm to the coastal and marine environment." In a Decision dated 1 September 2010, the Commission laid down the criteria by which the Member States can evaluate the environmental status of their marine water within the framework of the Marine Strategy Framework Directive (MSFD). A number of the indicators are relevant to marine litter.

What are Germany's environmental objectives under the MSFD?

To achieve good environmental status the Marine Strategy Framework Directive (MSFD) requires for the German parts of the Baltic and North Sea a significant reduction of litter input to these sea areas. The visionary national goal on marine litter for Germany's North and Baltic Sea regions is "seas without marine litter pollution". This objective is to be achieved by pursuing three operational goals: (1) gradually reduced discharges and a reduction of existing waste volumes will result in a significant reduction of wastes with harmful effects for the marine environment along shorelines, on marine water surfaces, in the water column, and on the seabed; (2) proven harmful debris in marine organisms (especially microplastics) will be virtually zero; (3) further adverse ecological

effects (entanglement and strangulation in litter) are reduced to a minimum (see also <http://www.meeresschutz.info>). As a first step, EU Member States could agree on a reduction goal for inputs of litter to the marine environment in the order of 50 %. Furthermore, in analogy to the generation goal for hazardous substances (“phasing out”) EU members could establish a goal for a reduction of litter inputs to the marine environment against zero within one generation. The UBA has commissioned research and development projects to generate proposals for the efficient and sound monitoring of the MSFD D10 targets which include a statistically based system of assessment and monitoring of trends. As a next step, a pilot monitoring project of all relevant measurement parameters and biological effects is to be tested, thereby ensuring a detailed categorisation of input and drifting paths, accumulation regions and further identification of causative anthropogenic activities.

What is the objective of the upcoming conference on the topic?

Its primary objective is the initiation or further development of concrete regional action plans to reduce and prevent further inputs of waste into Europe's oceans and seas (North East Atlantic, Baltic Sea, Mediterranean Sea and Black Sea) in close cooperation with the regional conventions on protection of the marine environment (OSPAR, HELCOM, UNEP/MAP, Barcelona and Bucharest Convention). This will also represent Europe's contribution to the implementation of the Honolulu strategy as a global action plan to combat marine litter. Successful implementation of the MSFD depends on important steps of the implementation phase, which are scheduled for 2015 and 2016. By 2015, EU Member States must draw up an adequate programme of appropriate measures to curb marine litter pollution of the marine environment which then have to be implemented by 2016. The Conference seeks to support the Member States in identifying appropriate measures by presenting and collecting good environmental practice examples and new initiatives and establishing the respective points of contact.

IMPRINT

Published by: German Federal Environment Agency (UBA)
Wörlitzer Platz 1
D-06844 Dessau-Roßlau
Germany

E-Mail: pressestelle@uba.de

Internet: www.umweltbundesamt.de

Press office: Stephan Gabriel Haufe

Section II 2.3: Stefanie Werner
„Protection of the Marine Environment“

Dessau-Roßlau, 8th April 2013