

2. Marine litter

2.1. Description and origin

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 or coastline including such materials transported into the marine environment from land by rivers, drainage or sewage systems or wind. For example marine litter consists of plastics, wood, metals, glass, rubber, clothing, paper etc, but by far the most abundant and problematic are buoyant and persistent plastics. Plastic pellets used in manufacturing and plastic fragments are widespread in the oceans.

This definition does not include semi-solid remains of for example mineral and vegetable oils, paraffin and chemicals that sometime litter sea and shores.

2.2. Impacts and significance

Marine litter is a serious and widespread problem. Impacts can be divided into three general categories: 1) ecological (mortality or sublethal impacts to plants and animals through entanglement, physical damage and ingestion including uptake of microplastics, accumulation of chemicals from plastics, facilitating the invasion of alien species, or altering the benthic community structure); 2) economic (e.g. cost to tourism, damage to vessels, fishing gear and facilities, losses to fishery operations, cleaning costs); and 3) social (reduction in aesthetic value and public safety).

Chemicals incorporated in, or attracted to plastics floating in seawater have a broad range of potentially toxic, carcinogenic and hormone disturbing effects. Around 95% of Fulmars (seabird) in the North Sea area has plastic in the stomach which unavoidably has mechanical and chemical consequences that affect their body condition with negative consequences for individual survival and capacity to reproduce. In the Mediterranean, sea turtles are seriously endangered, as a consequence of not only habitat loss and bycatch, but also through entanglement in, and ingestion of marine litter.

2.3. Monitoring

It is not possible at present to say how many types and quantities of debris are distributed within the oceans or to compare one ocean basin with another. Hydrographic features clearly play an important role in distribution of plastics. Although marine litter can be found in all sea areas, and throughout the open oceans, most of the available literature deals with beaches (which in some countries are subject to regular systematic surveys), coastal and shelf areas where quantities are greatest and impacts most apparent.

The International Pellet Watch approach to monitor POPs at a global scale have analyzed samples of polyethylene pellets that were collected at 30 beaches from 17 countries and analyzed for organochlorine compounds. PCB concentrations in the pellets were highest on US coasts, followed by western Europe and Japan, and were lower in tropical Asia, southern Africa and Australia. This spatial pattern reflected regional differences in the usage of PCBs and was positively correlated with data from Mussel Watch, another monitoring approach. DDTs showed high concentrations on the US west coast and in Vietnam. In Vietnam, DDT was predominant over its metabolites (DDE and DDD), suggesting the principal source may be current usage of the pesticide for malaria control. High concentrations of pesticide HCHs were detected in the pellets from southern Africa, suggesting current usage of the pesticides in southern Africa.

There is almost no information on marine litter and debris in the open ocean comparable to that available for coastal areas such as beaches. Only in the North Atlantic microplastic particles have been monitored in the water column using the continuous plankton recorder (CPR) which indicates an increase in abundance since the 1960s. However the CPR samples at approximately 10m depth and so will not sample floating debris.

No other regular, standardized monitoring of debris beyond the shelf has been identified. As a result, qualitative and quantitative data on marine debris in the open oceans are extremely limited. There have been occasional surveys of debris in selected open-ocean areas, especially in the area of the North Pacific central gyre where physical hydrographic conditions concentrate floating materials. There are reports of lost and discarded fishing gear, and waste from vessels, on the shores of many small islands in the Atlantic, Indian and Pacific oceans, some of which are remote and uninhabited. Island chains and archipelagos provide some of the best locations for gauging the extent of debris in the open oceans.

The Global International Waters Assessment (GIWA) of the Indian Ocean Islands revealed the serious extent of the solid waste/marine debris problems in that area.

2.4. Policies for management of marine litter

The problem of marine litter was recognized by the UN General Assembly, which in its Resolution A/60/L.22 - Oceans and the Law of the Sea - of 29 November 2005 in articles 65-70 calls for national, regional and global actions to address the problem of marine litter. In response to the GA call, UNEP (GPA and the Regional Seas Programme), through its Global Marine Litter Initiative took an active lead in addressing the challenge, among others, by assisting 11 Regional Seas around the world in organizing and implementing regional activities on marine litter.

The EU Directive on the landfill of waste (Directive 1999/31/EC) to prevent or negative effects on the environment from the landfilling of waste, including the pollution of surface water. The Directive is applicable to litter from landfills entering the seas and becoming marine litter.

The EU Directive on port reception facilities for ship-generated waste and cargo residues (Directive 2000/ 59/EC, December 2002) focuses on ship operations in Community ports and addresses in detail the legal, financial and practical responsibilities of the different operators involved in delivery of waste and residues in ports. The Dutch government uses the OSPAR Fulmar Litter EcoQO (Chapter 2.4) to monitor effects of implementation of this EU Directive.

The EU Directive on waste (Directive 2006/12/EC) that prohibit the abandonment, the rejection and the uncontrolled elimination of waste; they must promote the prevention, the recycling and the transformation of waste in order to re-use them.

2.5. Conclusions

There have been no regional, national or international assessments of marine litter/debris in the open oceans. Deposits on island shores, often in remote and uninhabited areas, provide good indicators of ocean-derived debris such as fishing gear and waste from vessels. They also show that plastics, in particular, are transported over considerable distances by ocean currents. From the extensive literature on marine debris, it is known that plastic materials and fishing gear are widespread in the oceans and can become concentrated in certain areas. Pre-production plastic pellets, and fragments of larger plastic items, are widespread in seawater, even perhaps ubiquitous. Impacts are evident but the potential for wider environmental damage warrants further investigation. Measures designed to reduce inputs have been largely ignored.