Swedish Agency
for Marine and
Water Management

Swedish efforts to reduce marine litter pollution

SUSTAINABLE DEVELOPMENT GOALS, TARGET 14.1:

By 2025, prevent and significantly reduce marine pollution of all kinds, in particular from land-based activities, including marine debris and nutrient pollution.

Executive summary

- Marine litter is a growing global problem, causing negative effects on the marine environment and socio-economic costs to our society as a whole.
- Litter enters the ocean from both land- and sea-based sources. Rivers can act as important routes for carrying litter to the ocean, even from sources far from the coast. In addition, currents and winds can transport buoyant litter, such as plastics, long distances.
- Plastic items make up the largest fraction of marine litter. Plastics can be very durable in the marine environment. They can therefore remain for centuries and accumulate if not cleaned up. Plastic items may also break down into tiny pieces, so-called microplastics.
- The loss of waste and material, especially plastic, is a loss in resources. Efficient use of material and waste is both economically and environmentally beneficial.
- Marine litter needs to be treated as a cross-sectoral and transboundary issue, where strong measures need to be implemented from the local to the global level. Success factors for reducing marine litter pollution include strong political will and a robust regulatory framework. It also includes changed production and consumption patterns, public awareness and changes in behaviour, adequate waste management both on land and at sea, as well as appropriate wastewater and storm water systems.
- Systematic monitoring is an essential foundation for efficient marine pollution management.
- There are several knowledge gaps, but we know enough about the effects on our environment and society in order to take precaution and act.
- Via regional cooperation, we can coordinate and share costs of monitoring, analysis, research and mitigation of marine litter pollution.
- Most of the sustainable development goals (SDGs) are interlinked with one another. SDG 12, Responsible consumption and production, plays an especially vital role in fulfilling SDG 14.

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This report is based on the report from 2017 and has been updated by the Swedish Institute for the Marine environment together with researchers and experts from universities, organisations and agencies including the Swedish Agency for Marine and Water Management.

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Introduction

Marine litter is a global environmental problem that is growing, causing negative effects on marine life and the provision of ecosystem services as well as on socio-economic costs to our society as a whole. Marine litter originates from a variety of sources and enters the ocean from activities both on land and at sea, such as from commercial and recreational shipping. In addition, rivers can act as important routes for carrying litter from sources that are far from the coast. In Sweden, marine litter is an environmental problem, especially along the northern parts of the Swedish west coast where prevailing currents and winds drive up to 8,000 cubic metres of litter annually onto the shore. This situation makes the area one of the most polluted areas of marine litter in Europe.

Awareness of marine litter has increased. Several policy instruments and legislations are in place for handling the main sources of marine litter, both at national and international levels. However, the problem is still growing globally. This indicates that current policy instruments might be inefficient or need to be complemented. Marine litter is a cross-sectoral problem, and tackling it requires changes in behaviour and production and consumption patterns, technical solutions and innovations, adequate waste management both on land and at sea, and appropriate wastewater and storm water systems. Marine litter is also a transboundary problem that stresses the need of working across different scales, from the local to the global level.

Plastics make up the largest fraction of marine litter. The production and use of plastic material has drastically increased since the 1950s. The fact that plastic is often lightweight and durable makes it useful to society, but it is a significant threat to the marine environment. It is estimated that several million tons of plastic ends up in the oceans every year. Since the majority of plastic materials takes a very long time to degrade (from decades to even centuries), plastic litter in the marine environment is very persistent and accumulates unless cleaned up.

Plastic items can drift large distances and end up far away from their original source. The fact that marine animals can ingest plastic litter and become entangled in it – with starvation and drowning as a consequence – is one of the main environmental issues of marine litter. Plastic items will eventually break down into smaller pieces, so-called microplastics which are particles smaller than 5 mm. As these particles are impossible to clean up, it is expected that their concentrations will increase in the future. Microplastics are found in basically all studied marine environments and are ingested by a broad range of marine organisms. Experiments indicate that microplastics may have adverse effects, at least when ingested in high concentrations. Nanoplastics, breakdown products of larger plastics, can cross biological barriers (like gut lining) and be taken up into organisms, thereafter causing harm, but we know almost nothing about their presence or prevalence in the marine environment.

Marine litter originates from a variety of sources and enters the ocean from activities both on land and at sea.

Since plastic materials sometimes contain toxic substances or even accumulate hazardous substances from the marine environment, another issue is the risk of toxic substances entering the food web through this source. While this exposure route is thought to be of limited importance compared to uptake of toxic chemicals via e.g. the food web and trophic transfer, the extensive use of plastic materials and associated chemicals adds to the ubiquitous

Since 2009 the municipali-ties along the northern part of the Swedish west coast has worked together in different projects to make their cleaning efforts more effective as well as to highlight the special situation of high amounts of marine litter floating ashore on their coast line.

presence of these substances in the environment. Plastics may also act as vectors for movement of invasive species, carrying invertebrate animals, eggs, and microbes into new areas. Plastic-specific biofilms can form, and may be enriched with several species of pathogenic bacteria, including Vibrio sp.

Marine litter is now recognised as a serious environmental issue, and our ambition should be working toward close-to-zero litter in the marine environment. Work to establish realistic baselines and threshold values has been ongoing, and will need to be specific for different fractions of litter, environmental niches, and species. Despite the knowledge gaps, we know enough about the effects on our environment and society in order to take precaution and act to prevent deterioration of the marine environment.

National efforts

Awareness of marine litter has increased in the past thirty years, both in Sweden and worldwide. The Swedish foundations Keep Sweden Tidy and the West Coast Foundation together organized the Year of Clean Beaches in 1987–88. Keep Sweden Tidy works nationally and internationally with public information and active cleaning efforts. In 2017, Keep Sweden Tidy established the network Keep the Oceans Tidy, which is a proactive and voluntary network to combat man-made litter. The membership network is open to all actors in trade, industry, academic, civil society and public sectors. The West Coast Foundation continued for several years to coordinate the municipalities' cleaning efforts along the coast. Since 2009, municipalities along the northern part of Sweden's west coast have worked together in various projects to make their cleaning efforts more effective, and to highlight the serious amount of marine litter floating ashore on their coastline. Furthermore, Keep Sweden Tidy helps mobilize volunteers across the Nordic region to clean beaches on the Nordic Coastal Cleanup day every year. The Swedish Agency for Marine and Water Management (SwAM) supports several such projects with the aim of reducing and preventing marine litter, including educational programs aimed to increase Ocean Literacy. SwAM is currently evaluating demands on reducing negative impacts of fishing gear in the marine environment. To combat ghost fishing and marine litter in the Nordics, the network Clean Nordic Oceans was established to exchange knowledge and experience of methods and measures that can reduce the risk of ghost fishing and marine. All Nordic countries have participated in the network and SwAM partook as one of three project partners.

Sweden's waste management is based on high levels of recycling and reuse, with incineration as the final step rather than landfill. This form of energy recycling is considered in waste hierarchy and reduces the risk of large quantities of litter being lost to water and air. The private sector has increased plastic material recycling capacities in Sweden, in line with Europe's focus on a circular economy. Economic incentives are used to encourage use of more readily recyclable materials, reducing reliance on new production of raw plastic.

Strict requirements for sewage treatment result in improved litter removal. For example, Europe's largest disk filter installation, in Gothenburg, Sweden, removes particles as small as ~0.3 mm, although removal at source would be even better. New investments will reduce the release of microplastics into the marine environment via storm water.

In Sweden, several policy instruments and legislations are in place for handling the main sources of marine litter. Nevertheless, the problem is growing globally. This affects Sweden and indicates that current national policy instruments need to be complemented with international efforts. Sweden therefore prioritises efforts against marine litter within two of the Regional Sea Conventions – OSPAR for the North-East Atlantic and HELCOM for the Baltic Sea – as well as within the EU's Marine Strategy Framework Directive (MSFD). The MSFD was incorporated into Swedish law in 2010, which means that Sweden now partially has a monitoring program for marine litter (which includes litter on the beach and seabed but excludes microlitter monitoring) and a program of measure (PoM) for marine litter. The PoM includes five measures directed

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toward the reduction of abounded, lost, and discarded fishing gear; public awareness campaigns; coastal beach cleaning in particularly affected areas; and the inclusion of marine litter into national and local plans on waste prevention and management.

Ministry of the Environment and Energy proposed national measures for restricting the occurrence of micro-plastics in cosmetic products. The Swedish Chemicals Agency investigated the feasibility of this proposed a new regulation banning all such products on the market that contain plastic particles for cleansing, scrubbing, and polishing, and are intended to be removed or spat out after having been used in hair or on skin, mucous membranes, or teeth, which would in effect reduce the discharge of plastic particles in wastewater. In line with an EU directive, Sweden has decided to reduce the use of plastic bags from a maximum of 90 bags per person per year by 2020 down to 40 before 2026. Fees are already collected by many retailers, and a tax on bags (0.3 SEK/bag) will be implemented to further reduce usage.

Regional efforts

At the EU level, a wide range of policies and directives addresses the source and impact of marine litter. This includes legislation on waste management, urban wastewater, and pollution from ships. The MSFD is the dedicated binding legal instrument for assessing, monitoring, and setting targets to reach good environmental status with regard to marine litter. The MSFD is implemented nationally and coordinated regionally. The EU itself is a signatory to the Regional Sea Conventions and recognises them as the plat¬form for regional coordination. Thus, strong synergies exist between the MSFD and the Regional Action Plans on Marine Litter, mentioned below. In addition, the EU Plastic Strategy may play an important role in preventing marine litter. In addition, the Single Use Plastic (SUP) directive was decided as a part of the EU Plastics Strategy in May 2019.

The SUP directive aims to tackle marine litter by phasing out single-use plastic items that are most frequently found on beaches, as well as lost and abandoned fishing gear. Furthermore, the SUP directive establishes economic incentives to reduce consumption and transition to reusable systems, high collection rates and extended producer responsibility schemes (EPR). The SUP Directive also addresses the need for information to consumers, which is imposed on both producers and the nations. Sweden makes extensive use of HELCOM and OSPAR to drive work and share management costs. The conventions work through a process of assessing pressures and impacts through thematic assessments and using recommendations, action plans, and agreements to develop and ensure best practices. One example is the OSPAR recommendation on “fishing for litter” initiatives. Yet another is the HELCOM recommendation on the no-special-fee system for ship-generated waste and marine litter caught in fishing nets. OSPAR and HELCOM developed, in 2014 and 2015 respectively, Regional Action Plans on Marine Litter (RAP ML) with member countries sharing responsibility for actions, and mitigation work often being completed by nationally funded NGOs. The action plans address both land- and sea-based sources and are divided into regional and voluntarily national actions. The regional actions address problems requiring cross-scale reinforcement and collective action by contracting parties, with focus on fisheries related actions, ship generated waste, land based waste management, education and outreach, cleaning activities and behavioural actions, and more sustainable use and design of products and packaging. The voluntary national actions primarily address problems of national concern. The RAP ML also provide a platform to address issues of regional relevance that have not yet been included in EU legislation, and even help contracting parties to approach global actors where the EU is not represented.

Sweden is co-lead and supports several regional actions within the RAP ML. These include actions to prevent and reduce marine litter within the fishing sector, to prevent

Large amounts of marine litter, including lost fishing equipment, acts as disturbance on ecosystems and their services. Thus our ambition should be working towards close-to-zero litter in the environment.

and reducing litter, including microlitter, from entering the marine environment via wastewater and storm water, to coordinate action regarding ship generated waste, and phase out microplastics in personal care products. In line with our regional work, Sweden has supported two EU projects: MARELITT Baltic (2016-2018) aimed to reduce the impact of derelict fishing gear in the Baltic Sea, and BLASTIC (2016-2018) aimed to reduce plastic waste and, consequentially, the inflow of hazardous substances into the Baltic Sea by mapping and monitoring the amounts of litter in the aquatic environment. In 2019, Keep Sweden Tidy was funded by the Swedish Environmental Protection Agency to digitize the tool that was developed in BLASTIC. At the same time, the tool was adapted for Swedish conditions to become more relevant to Swedish municipalities. Marine litter issues exist on the agendas of many actors, and various processes of relevance for OSPAR's and HELCOM's Regional Action Plans on Marine Litter are ongoing. OSPAR and HELCOM have working groups committed to developing monitoring programs and indicators for marine litter. To their help, they have a dedicated subgroup at the EU level working on these issues in order to support member states in reaching good environmental status for marine litter. In addition, the EU platform JPI Oceans ran four research projects investigating the impact of plastic particles on the marine environment, and continues to support cutting-edge research on the identification and monitoring of micro- and nanoplastics. JPI Oceans is supported by Sweden and nine other countries. Sweden is also active within the Arctic Council which recently decided to more actively engage in the issue of marine litter.

INTERACTION AND LINKS TO OTHER ANALYSIS AREAS

Large amounts of marine litter, as well as microparticles and litter ingested by marine animals, act as a disturbance on the ecosystem and can have a negative impact on ecosystem services like food web dynamics, maintenance of biodiversity, habitats, and resilience. Use of plastics (from production to use to waste disposal) is also intricately connected to pollution and climate change. Awareness of marine litter as an environmental problem works as a driving force toward better waste management and resource efficiency. This, in turn, could have a positive impact on our climate. It also draws more attention to the need of adequate wastewater and storm water treatment which links to the reduction of other marine pollutants such as nutrients and hazardous substances. Classical nutrient re-tention approaches, in the form of water retention measures, reduce the risk of untreated sewage overflow by delaying the run-off from land and reducing the maximum flow. These measures also reduce flows of litter and hazardous substances to the marine environment.

Challenges and Gaps

- Marine litter is a cross-sectoral and transboundary problem in which the resolution of the problem requires the involvement of a variety of actors from the local level all the way to the global scale.
- The amount and composition of marine litter varies greatly from one region to another and depends on a number of factors. Thus, even if much is to be won by sharing experiences and knowledge between different regions, one must adapt the measures to fit one's own context.
- Marine litter is recognised as a serious environmental issue and our ambition should be working toward close-to-zero litter in the marine environment. Even so, there is a need to launch realistic baselines and threshold values.
- Knowledge gaps exist. For example, the environmental effect of microplastics has just begun to be studied and our picture of where marine litter accumulates in the marine environment is fragmentary. Monitoring is there-fore essential, even though it does not give us the whole picture. Despite the knowledge gaps, we do know enough about the effects of marine litter on our environment and society in order to take precaution and act.
- As the new SUP Directive is to be implemented nationally, it will be crucial to find effective implementation strategies, relevant targets and baselines and ensuring enforcement and monitoring programs to assess the impact of those measures. In addition, it is important that all awareness raising actions is implemented as long-term and recurring measures to have an effect long term.
- Bioplastics (plastic particles that are either bio-based, biodegradable, or both) are sometimes proposed as a way to mitigate marine plastic litter. However, the term 'biodegradable' does not imply that bioplastic materials are easily degradable in the marine environment. Misleading communication regarding plastics that is termed as biodegradable could result in a more relaxed attitude towards littering. Current scientific studies show that degradation of bioplastics does not occur to a great extend in the marine environment and the potential harmful effects on organisms are understudied. More studies are needed before advocating bioplastics or biodegradable plastics as a solution to marine litter, and considerable attention must focus on end-of-life management of these products. It is important that we continue to focus on minimising the use of single-use plastics and plastic bags, and decreasing marine litter regardless of origin.
- Microlitter derives from a variety of sources implying that we need to think in new terms when technical solutions, materials, and infrastructure are developed.
- Microfibers from synthetic materials are found ubiquitously in the marine environment, but study of their fate and impacts is in its infancy, and the relative importance of these contaminants compared to fibres of natural materials is unknown.
- Another emerging class of marine litter is engineered nanoparticles which are used in a wide array of products, from cosmetics and biomedicine to agriculture. Laboratory studies indicate that nanoparticles can cross biological barriers to enter into organisms, and have harmful effects in microalgae, invertebrates and fish. More research on the effects on humans as well as the environment is needed, and precautions should be used when applying nanopar¬ticles in applications from which they might be spread to the environment.

Compilations made by SwAM for SDG 14, Life below water

This document represents one out of nine compilations made by the Swedish Agency for Marine and Water Management (SwAM) to highlight Sweden's key efforts and initiatives for Sustainable Development Goal 14 of the 2030 Agenda for Sustainable Development. This report has been developed as a part of Sweden's work in support of The Ocean Conference in Lisbon 2020. It is based on the report developed for The Oceans Conference in New York 2017 and has been updated by the Swedish Institute for the Marine environment together with researchers and experts from universities, organisations and agencies including the Swedish Agency for Marine and Water Management.

The documentation focuses on a situation assessment and does not constitute a complete picture of Sweden's initiatives being carried out in order to achieve the goal and targets. A starting point for the content is operational areas within national authorities, but the content has also been expanded to include other significant aspects based upon existing contacts and knowledge.

Swedish Agency for Marine and Water Management

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