

# Monthly E-Bulletin of the Project “Zero Waste Strategy for Good Environmental Status-BSB257”

E-Bulletin No:4

## Common borders. Common solutions

This project is funded by the 1<sup>st</sup> Call for Proposal of the Joint Operational Programme “BLACK SEA BASIN 2014-2020”

### Marine pollution and ZEWSGES Projects

#### Definition of Marine Pollution

The United Nations Convention on the Law of the Sea defined pollution as the introduction by man, directly or indirectly, of substances or energy into the marine environment, including estuaries, which results or is likely to result in such deleterious effects as harm to living resources and marine life, hazards to human health, hindrance to marine activities, including fishing and other legitimate uses of the sea, impairment of quality for use of the sea water and reduction of amenities’.

#### Why is cross-border cooperation needed to achieve the ZEWSGES project objectives and results?

The history of aquatic environmental pollution goes back to the very beginning of the history of human civilization. However, aquatic pollution did not receive much attention until a threshold level was reached with adverse consequences on the ecosystems and organisms. Aquatic pollution has become a global concern, but even so, most developing nations are still producing huge pollution loads and the trends are expected to increase. Industrialised human society generates vast quantities of materials, many of which, lacking recovery infrastructure, end up as waste. The nature of this waste has changed dramatically over the last 30 to 40 years due to the introduction of synthetic materials such as plastics. Human garbage, including synthetics and plastics, have inevitably found their way into the world’s seas. This rubbish, which is present in the seas and on beaches, is called marine debris. Astoundingly, it is now evident that marine debris is one of the world’s most pervasive pollution problems affecting the seas. (Derraik, J.G:B, [Marine Pollution Bulletin 44 \(2002\) 842–852](#)).

Besides this, large concentrations of floating waste were found in the central part of the Black Sea. Marine waste on the beaches has become common place. But the middle of the sea, which is far from the seacoast and settlements, is clean and free from waste, since it has almost no sources of pollution. There fore, high concentrations of floating waste on the high seas, recorded during research, became a surprise. The high concentration of sea litter in the center of the sea can be explained by the fact that the system of currents in the Black Sea moves waste to the open sea. But there is an encouraging trend in this - garbage compactly concentrates, creating "trash islands", it will probably be easier to take measures to remove it from the marine ecosystem. In general, waste entering the sea is a threat to all sea inhabitants. The greatest damage to the sea is caused by micro-particles, most of which consists of microplasma, which, along with water and food, enter the living organisms and poison them.

#### The Black Sea oxygen layer decreases

It is well known that the Black Sea has a surface-rich oxygen layer, under which a deep, oxygen-free layer is saturated with dissolved hydrogen sulfide. The oxygen-free zone is located at a depth below 90-160 m and occupies about 87% of the sea. Over the past 20 years, the hydrogen sulfide layer has risen by 20-25 m. This negative trend has been confirmed by research in 2016.



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In addition, the thickness of the upper oxygen layer is inhomogeneous throughout the sea. There are a number of currents flowing along the continental slope, the western and eastern cyclone cycles in the high seas. In the center of these cycles, an increase in the lower boundary of the oxygen layer was found to 54 m. This is also confirmed by the large number of anaerobic bacteria found in samples from these depths.

**The significance of the problem:** The main marine inhabitants live in the upper layer, saturated with oxygen. If it decreases-space for their existence decreases. It is believed to be this the negative phenomenon is directly related to climate change and global warming. This should make society think again about how to mitigate climate change.

Therefore, the problem of marine litter is steadily gaining importance in the last decade at the global, regional and national levels. It poses a complex and multi-dimensional challenge with significant implications for the marine and coastal environment and human activities all over the world. In this regard, partnering countries of the action sharing a marine region or sub-region in Black Sea shall draw up awareness programmes and clean-up campaigns in the interest of coherence and coordination, endeavour to ensure that: (a) activities envisaged are consistent across the marine region or sub-region so far as to facilitate comparability of monitoring results; (b) relevant trans boundary impacts and trans boundary features are taken into account. “Coordinated coherent prevention and reduction effort will be practically and financially.

### What is the ZEWSGES project approach in addressing common challenges?

Control of aquatic pollution has been identified as an immediate need for sustained management and conservation of the existing fisheries and aquatic resources. An understanding of the dynamics of floating litter is fundamental to developing appropriate strategies in order to manage marine litter in both a global and local context. There is notable temporal, particularly seasonal, variation with a tendency for accumulation along coastal areas where debris can enter the seas directly in the case of waste from fishing activities, shipping, fixed installations (e.g. oil rigs) or the sewage system. Solid materials, typically waste, that has found its way to the marine environment is known to be the cause of injuries and deaths of numerous marine animals and birds. Countless marine animals have been killed or harmed by marine debris primarily because they either become entangled in it, or, they mistake plastic debris for food and ingest it. A review of entanglement and ingestion of marine debris by marine organisms showed that these phenomena had been known to affect individuals of at least 267 species world-wide. This included 86% of all sea turtles, 44% of all seabird species, 43% of all marine mammal species and numerous fish and crustacean species.

In this respect, the action will go beyond a product-by-product approach to reducing debris' impacts in the sea. With this knowledge comes the responsibility to seek the most effective solutions to stop the flow of solid wastes into our seas. These solutions must range from changing our own behaviour as consumers to local efforts such as coastal clean-up sand product specific policy to transformative ways to manage waste at the global scale. In this respect: (1) Littering caused by beachgoers becomes marine debris including items such as food packaging and beverage containers, cigarette



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butts and plastic beach toys. The action will fight against this by beach clean-ups bringing people together – school children, and teachers, as well as members of environmental, cultural and civic organizations. (2) The geographical distribution of litter on the sea floor (i.e. seafloor litter) is strongly influenced by hydrodynamics, geomorphology and human factors. Under the weight of fouling by a wide variety of organisms, most litter will eventually sink to the bottom. Currents will enable transportation of litter to areas of accumulation, such as the seafloor and for most of the species concerned, significant numbers of individuals are affected. This will be addressed by the action through mobilisation of local fishermen in 'Fishing for Litter' campaigns involving collection of derelict fishing gear abandoned by them on the sea floor, and for this reason, these species will be benefiting from the action asco-habitants of the same ecosystem with humans, as well ([http://www.greenpeace.org/austria/Global/austria/dokumente/Studien/meere\\_Plastic\\_Debris\\_Study\\_2006.pdf](http://www.greenpeace.org/austria/Global/austria/dokumente/Studien/meere_Plastic_Debris_Study_2006.pdf); Derraik, J.G:B, Marine Pollution Bulletin 44 (2002) 842–852)

### What are the common territorial challenges that will be tackled by the ZEWSGES project?

Recently, it was estimated that a staggering 6.4 million tons of garbage reach the marine environment every year. Estimates suggesting that there are currently over 13,000 pieces of plastic litter floating on every square kilometre of seas have been reported by UNEP (United Nations Environment Program) (UNEP 2005). Whilst another UNEP study reporting estimates of 46,000 pieces per square mile (18,000 per square kilometre) has also been produced (UNEP 2006). The significant marine litter reduction at global level was the only new target agreed at the Rio+20 summit in 2012. In the mean time, the assessment of the status of marine litter in the Mediterranean prepared by MAP partners in 2008 in the framework of UNEP/MAP MED POL Programme found that, (1) most of marine litter come from land based sources; (2) inadequate solid waste management is a major driver to generate marine litter in the region; (3) data gaps and inconsistency exists at national, sub regional and regional levels; (4) monitoring of marine litter needs substantive improvement; and (5) there is high potential to implement recycling and prevention measures in the region. Therefore, knowledge of the pollution sources and impacts on ecosystems is important not only for a better understanding on the ecosystem responses to pollutants but also to formulate prevention measures. Many of the sources of aquatic pollutions are generally well known and huge effort has been devoted to the issue. However, new concepts and ideas on environmental pollution are emerging (e.g., biological pollution) with a corresponding need for an update of the knowledge. Because the pollution problem is characterized by interconnectedness, complicated interactions, uncertainty, conflicts and constraints, this makes it difficult to control the problem. Moreover, because scientific knowledge on marine pollution is patchy, knowledge gaps have been identified as one of the major problems in introducing effective management strategies for its control. Disposal into waterways is a very ancient practice of dealing with wastes and the open waterways have been used by people for dumping all kinds of waste produced. Consequently, most of the aquatic environments are now polluted to some extent; situations are even critical near intensive human settlements. Human activities are responsible for a major decline of the world's biological diversity, and the problem is so critical that combined human impacts could have accelerated present extinction rates to 1000–10,000 times the natural rate. Within this context, major litter types causing problems are as follows: (1) Litter on the coastline (i.e. beach litter) is one of the most obvious signs of marine litter



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pollution. Major land-based sources include tourism, recreation, illegal dumping, waste disposal sites, input from rivers, sewage and storm water outflows. (2) Major sea-based sources are commercial shipping, fisheries activities, pleasure crafts and off-shore installations (<https://news.un.org/en/story/2014/06/471492-plastic-waste-causes-13-billion-annual-damage-marine-ecosystems-says-un-agency;file:///C:/Users/Admin/Downloads/Marine%20Litter%20An%20Analytical%20Overview%20UNEP%20GPA.pdf>; Derraik, J.G:B, Marine Pollution Bulletin 44 (2002) 842–852).

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