

Using Expertise to Combat Marine Litter

For a number of years now, researchers at the AWI have been investigating the effects of plastic litter on our oceans. Their expertise is not just of interest to the scientific community and the media; their advice is increasingly sought after among governmental authorities and political decision-makers. As such, they now serve as consultants in Germany and throughout Europe - and have also begun giving talks at schools to sensitise the next generation to global litter problems.

The extent of litter pollution in our oceans is alarming, especially since we still know so little about its effects on marine organisms and habitats. Fortunately, government authorities and political decision-makers across Europe appear to take the problem seriously. Various bodies and committees currently discuss the risks and explore potential solutions. In this regard, AWI experts' latest findings on marine litter are in high demand.

For example Dr Gunnar Gerdts, a microbiologist at the AWI's Helgoland facilities, is currently active as an expert on microplastic for the Federal Ministry of Education and Research (BMBF) and other major authorities - not just in Germany, but also at the European level. In 2012 the BMBF decided to make the pollution of European waters caused by microplastic a subject of intensive research, and introduced this topic into the European Joint Programming Initiative (JPI). JPI provides a forum in which EU member states can define common research objectives and launch scientific collaborations to address essential societal topics such as demographic transition or Alzheimer research. Ten member states agreed to promote research on the pollution of EU waters by microplastics in form of a dedicated JPI: JPI-Oceans.

Heading an EU project

Gunnar Gerdts leads one of the four joint projects selected, BASEMAN. The goal of BASEMAN is to develop standardised methods for measuring microplastic pollution in the ocean. A major problem is that different working groups currently use a broad range of methods to detect microplastics in sediment and water samples, making reliable and mutually comparable statements on the actual scale of pollution practically impossible. "For many years, it was primarily Belgian, British and Dutch researchers who were investigating microplastic in Europe. JPI-Oceans is the first viable opportunity to approach the subject comprehensively and collaboratively," says Gunnar Gerdts.

Since Germany's federal government put marine litter on the agenda of the 2015 G7 Summit at Schloss Elmau, Bavaria, Gerdts was also invited to contribute to a G7 workshop. As Gerdts recalls, "It was a truly different and international level, since we had the chance to discuss the problem directly with a number of delegates from the G7 countries."

AWI-experts in marine litter



Dr Gunnar Gerdts (Photo: Jens Quaster)



Dr Lars Gutow (Photo: Sina Löschke)

Consultant for the wastewater management sector



Überführen auf Filter Nummer zwei (Photo: Svenja Mintenig, Ivo Int-Veen)

For some time now, Gunnar Gerdts has worked together with experts from regional authorities, municipal water treatment and wastewater treatment plants. The reason: the works of Gerdts

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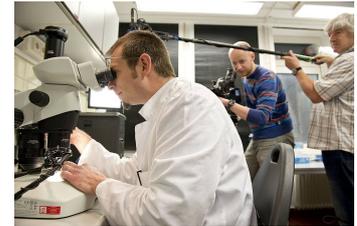
and other researchers show that wastewater and sewage sludge from treatment facilities contain large amounts of microplastics. "We still don't have guidelines or threshold values for microplastics in wastewater, but it's conceivable that in the future, filtering microplastics out of wastewater will become mandatory," says Gerdts.

The discussion concerning microplastic coincides with the debate about a fourth filtration step for treatment plants: for some time now, there have been discussions about introducing additional filtering technologies to remove antibiotics, pharmaceutical residues and other substances from wastewater, as this cannot be achieved with conventional systems. "This offers a good opportunity to not only filter out the pharmaceutical substances, but also plastics," explains Gerdts. "Nevertheless, the currently available data are hardly sufficient. We need a cross-cutting system analysis of the problem, which isn't limited to the filtering processes used at treatment plants. Moreover, we still know far too little about the amounts of microplastic in rivers."

Working on a programme of measures for the EU

Gerdts' AWI colleague Dr Lars Gutow, a biologist whose work currently focuses on the distribution of marine plastic, is also increasingly being approached to share his expertise. According to Gutow, the fact that this topic is attracting more and more attention is partly due to its inclusion in the EU's Marine Strategy Framework Directive (MSFD). By establishing the MSFD, the EU member states have made it their declared goal to better safeguard European waters in the future. According to the Directive, a "good marine environmental status" must be achieved - also with regard to marine litter. "But it's extremely difficult to define that status," explains Gutow. "Ideally, no litter would end up in the oceans at all. But in a highly industrialised and densely populated region like Europe, that's actually not feasible. What we need to do, then, is to define target levels and threshold values that are both realistic and offer political decision-makers a basis for planning concrete protective measures."

Germany's Federal Environment Agency delegated Gutow to join a specialist working group whose goal is to prepare a programme of measures. The working group includes researchers, representatives of government authorities, and environmental organisations. "We heard a number of talks and discussed how a good marine environmental status could be defined with regard to plastics - and created the programme of measures on that basis," says Gutow. The programme will subsequently be submitted to those EU committees responsible for the implementation of the MSFD.



Films shooting in the microplastic laboratory
(Photo: Uwe Nettelmann)

Researchers as influencers

With research stations on the islands Helgoland and Sylt, AWI researchers are also experts on the North Sea. Accordingly, the AWI has established some time ago the North Sea Office, which acts as an intermediary between research on North Sea topics on the one hand and the public, political decision-makers and environmental protection organisations on the other side, thus transferring theory into practice. "As North Sea Office we are regularly invited to evening talks, or to events at schools," relates Gutow, adding, "I'm glad that we scientists can also be influencers. The only way we're going to get the litter problem under control is if we change our behaviour - which makes it all the more important to inform young people about alternatives to simply tossing out their litter."



Publications that gain notice

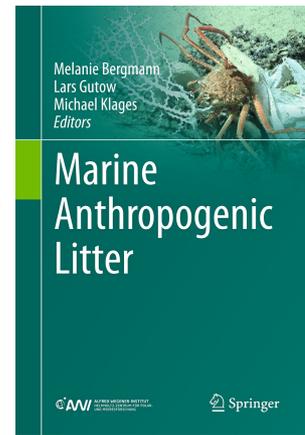


BMBF-Presskonferenz zum JPI Oceans Call Microplastics (Photo: Robby Große / BMBF)

In turn, AWI biologist Dr Melanie Bergmann sparked increased awareness of the marine litter problem with her publications on the pollution of the deep sea and waters of the Arctic. Further, in the spring of 2015 she and Lars Gutow released a new edited book on marine litter. The deep-sea expert is part of the HAUSGARTEN consortium and is currently working to add a pollution observatory component to the infrastructure programme FRAM. . Amongst other tools, we will deploy an instrument that will filter microplastics from the depths of the Arctic Ocean year-round - and provide valuable data on how the plastic load changes over time.

Melanie Bergmann has since been invited to participate in numerous panel discussions, e.g. one with the Federal Minister of Education and Research, Professor Johanna Wanka, whose staff regularly consult Bergmann as an expert on marine litter. Most recently, the industrial sector also responded to one of Bergmann's articles: she and her colleagues are now in contact with a chemical manufacturer interested in promoting the development of truly biodegradable plastics. Further, they are engaged in collaborations with other research institutes, the focus being on the development of alternative materials. Though the exact roles of the AWI researchers have yet to be finalised, it is safe to assume the projects will at least achieve some small steps ahead in our attempts to reduce marine litter.

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