

# Coastal wildlife more vulnerable to microplastics than expected

September 29 2016

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Fluorescent microplastics in the intestinal tract of the copepod *Calanus helgolandicus*. Credit: University of Exeter

Coastal dwelling marine wildlife, including crabs, lobsters and shellfish, which play a crucial role in the food chain, are more vulnerable to harmful plastic pollution than previously expected, a new study has found.

The research, conducted by world-leading experts from the University of Exeter and Plymouth Marine Laboratory, determined that the overlap between marine microplastic debris and oceanic life is most prevalent along urbanised coastlines.

Coastal cities represent a major source of plastic pollution. The authors conclude that animals living in waters near densely-populated coastlines

will be more at risk of coming into direct contact with microplastic.

Animals can readily ingest microplastics, causing potential harm not just to those animals, but also larger species further up the [food chain](#). The paper highlighted evidence that in consuming microplastics, small, free-floating animals called zooplankton may be instrumental in moving plastics from the ocean surface to the seafloor.

Dr Matt Cole, co-lead author and Natural Environment Research Council (NERC) Associate Research Fellow at the University of Exeter, said: "This vital research highlights that plastics and marine animals are mostly likely to interact in coastal areas. Microscopic plastics are readily consumed by zooplankton; plastics trapped within animals' faeces will sink towards the seafloor, removing the plastic from the [ocean surface](#)."

The research comes after Environment Secretary Andrea Leadsom announced plans to ban the sale and manufacture of cosmetics and personal care products containing tiny pieces of plastic, commonly known as 'microbeads'.

Now, the research team are calling on more work to be done to tackle plastic pollution around these [coastal areas](#), and not just in the open ocean. Professor Tamara Galloway, one of the world's foremost experts on microplastics and one of the co-authors of the paper, has been a leading voice in calling for a ban on microbeads in cosmetics, speaking to the United Nations and the Environmental Audit Committee at the Houses of Parliament. The Professor of Ecotoxicology at the University of Exeter said: "Our research is building a better understanding of how microplastics behave in the environment. Now we urgently need to understand what implications this will have for ecosystem health and food security."

The new study, published in the journal *Frontiers in Ecology and the*

*Environment*, examined existing literature alongside laboratory, field and modelling studies to provide an overview of the current understanding of what happens to microplastics after they enter the ocean, and how they come into contact with [marine wildlife](#)

Experts compared data collected about where plastic pollution has been found to date, with where marine life is most likely to live.

Dr James Clark, co-lead author and Marine Ecosystem Modeller at PML, said: "At present there are many unknowns regarding the impact of microplastics in the marine environment which hinders decision making. Within the UK and elsewhere, the technical expertise exists for a world leading, interdisciplinary consortium to be formed which would help fill these knowledge gaps. Such a research effort could provide meaningful advice to policy makers, businesses and members of the general public on how best to manage existing debris levels and to deal with plastic end of use moving into the future."

Marine plastic debris is a major environmental and economic concern. It is estimated that approximately 269,000 tonnes of plastic float at or near the surface of the ocean, posing a risk to marine life, industry and food security.

Microplastics are plastic particles smaller than 5 mm in size, and include microbeads used in exfoliating cosmetics, or form following the breakdown of larger plastic pieces. They enter the ocean as a result of maritime activities or via beaches, rivers and sewage outflows.

Microplastics have been detected across the globe, including the open ocean, polar icecaps, deep-sea sediments and remote mid-oceanic islands far from sources of plastic pollution. Collecting data on the impact of this [plastic pollution](#) is challenging, and there is limited knowledge and scientific certainty regarding their impact on the marine environment

and society.

**More information:** James R Clark et al. Marine microplastic debris: a targeted plan for understanding and quantifying interactions with marine life, *Frontiers in Ecology and the Environment* (2016). [DOI: 10.1002/fee.1297](https://doi.org/10.1002/fee.1297)

Provided by University of Exeter

Citation: Coastal wildlife more vulnerable to microplastics than expected (2016, September 29) retrieved 13 March 2024 from <https://phys.org/news/2016-09-coastal-wildlife-vulnerable-microplastics.html>

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