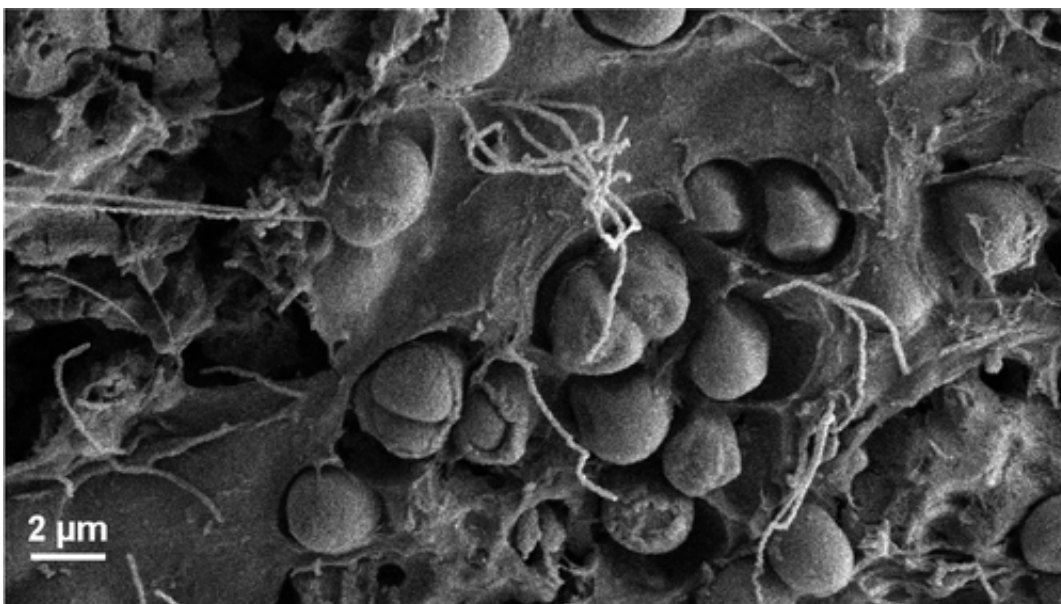


# Discovery of the 'Plastisphere': A new marine ecological community

July 10 2013

---



The masses of plastic debris that float over large areas of the world's oceans have become new ecological communities that scientists have named the "Plastisphere." Their report in the ACS journal *Environmental Science & Technology* suggests that these novel habitats in the North Atlantic Ocean may harbor potential disease-causing microbes.

Erik Zettler of the Sea Education Association, Tracy Mincer of the Woods Hole Oceanographic Institution and Linda Amaral-Zettler of the

Marine Biological Laboratory explain that plastic has become the No. 1 form of [ocean](#) debris, causing serious concerns about its impact on the health of ocean communities. The damaging effects that plastic in the oceans have on fish, birds and other seafaring animals have previously been described in detail by other researchers. But scientists had yet to explore what plastic does to some of the smallest ocean inhabitants. Zettler, Mincer and Amaral-Zettler decided to find out.

They discovered that tiny organisms from algae to bacteria thrive on [plastic debris](#), transforming it into rich "microbial reefs" that are distinct from communities in surrounding water. Though some inhabitants may be degrading the plastic, it still provides a relatively stable home for microbes. Apparently a good home for its little residents, plastic debris might pose a health risk for invertebrates, fish or possibly humans. The Plastisphere harbors a group of bacteria called *Vibrio*. Some *Vibrio* species can cause illnesses, such as cholera, when they come in contact with humans.

**More information:** "Life in the 'Plastisphere': Microbial Communities on Plastic Marine Debris" *Environ. Sci. Technol.*, 2013, 47 (13), pp 7137–7146. [DOI: 10.1021/es401288x](https://doi.org/10.1021/es401288x)

## **Abstract**

Plastics are the most abundant form of marine debris, with global production rising and documented impacts in some marine environments, but the influence of plastic on open ocean ecosystems is poorly understood, particularly for microbial communities. Plastic marine debris (PMD) collected at multiple locations in the North Atlantic was analyzed with scanning electron microscopy (SEM) and next-generation sequencing to characterize the attached microbial communities. We unveiled a diverse microbial community of heterotrophs, autotrophs, predators, and symbionts, a community we refer to as the "Plastisphere". Pits visualized in the PMD surface

conformed to bacterial shapes suggesting active hydrolysis of the hydrocarbon polymer. Small-subunit rRNA gene surveys identified several hydrocarbon-degrading bacteria, supporting the possibility that microbes play a role in degrading PMD. Some Plastisphere members may be opportunistic pathogens (the authors, unpublished data) such as specific members of the genus *Vibrio* that dominated one of our plastic samples. Plastisphere communities are distinct from surrounding surface water, implying that plastic serves as a novel ecological habitat in the open ocean. Plastic has a longer half-life than most natural floating marine substrates, and a hydrophobic surface that promotes microbial colonization and biofilm formation, differing from autochthonous substrates in the upper layers of the ocean.

Provided by American Chemical Society

Citation: Discovery of the 'Plastisphere': A new marine ecological community (2013, July 10)  
retrieved 27 April 2024 from

<https://phys.org/news/2013-07-discovery-plastisphere-marine-ecological.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.