

Confronting plastic pollution to protect environmental and public health

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Some 8,300 million metric tons of plastics have been manufactured since production exploded in the 1950s, with more than 75 percent ending up as waste and 15 million metric tons reaching oceans every

year. Plastic waste fragments into increasingly smaller but environmentally persistent "microplastics," with potentially harmful effects on the health of people, wildlife and ecosystems. A new collection, "Confronting Plastic Pollution to Protect Environmental and Public Health," is publishing on March 30th, 2021 in the open access journal *PLOS Biology* that addresses critical scientific challenges in understanding the impacts of microplastics.

The collection features three evidence-based commentaries from ecotoxicology and environmental health experts that address gaps in understanding and flag research priorities for improving methods to detect, evaluate, and mitigate threats associated with this emerging contaminant. The guest editor of the collection is Judith Enck, former EPA regional administrator, president of the nonprofit Beyond Plastics and visiting professor at Bennington College's Center for the Advancement of Public Action.

Plastic production increased from 2 million metric tons a year in 1950 to 380 million metric tons by 2015 and is expected to double by 2050. The [plastic](#) pollution crisis will worsen, experts say, as petrochemical companies shift from [fossil fuels](#) to fracking, which produces the plastic feedstock ethane.

The commentaries explores pressing challenges in three areas: the difficulty of developing health protective policies for emerging contaminants, the migration of toxic and undisclosed plastic additives into food and understanding how microplastics, a form of carbon themselves, impact carbon cycling in soils.

In the Essay, "Addressing the environmental and health impacts of microplastics requires open collaboration between diverse sectors," ecotoxicologist Scott Coffin and colleagues use California as a [case study](#) to suggest strategies to design research, policies and regulations for

a contaminant scientists are just starting to understand, drawing on parallels with a similar class of emerging contaminants (per- and polyfluoroalkyl substances).

In her Essay, "Tackling the toxics in plastics packaging," environmental toxicologist Jane Muncke focuses on a major driver of the global plastic pollution crisis: single-use food packaging. Efforts to reduce plastic waste through recycling ignore evidence that chemicals in plastic migrate into food, she argues, making harmful chemicals an unintentional part of the human diet.

In their Essay, "Microplastic effects on carbon cycling processes in soils," plant ecologist Matthias Rillig and colleagues explore how microplastics appear to be interfering with the very fabric of the soil environment itself and call for a "major concerted effort" to understand the pervasive effects of these ubiquitous particles on the function of soils and terrestrial ecosystems.

More information: Gross L, Enck J, Confronting plastic pollution to protect environmental and public health. *PLoS Biol* 19(3): e3001131. doi.org/10.1371/journal.pbio.3001131

Coffin S, Wyer H, Leapman JC. Addressing the environmental and health impacts of microplastics requires open collaboration between diverse sectors. *PloS Biol*. 2021. [DOI: 10.1371/journal.pbio.3000932](https://doi.org/10.1371/journal.pbio.3000932)

Muncke J. Tackling the toxics in plastics packaging. *PLoS Biol*. 2021. [DOI: 10.1371/journal.pbio.3000961](https://doi.org/10.1371/journal.pbio.3000961)

Rillig M, Leifheit E, Lehmann J. TK. Microplastic effects on carbon cycling processes in soils. *PLoS Biol*. 2021. [DOI: 10.1371/journal.pbio.3001130](https://doi.org/10.1371/journal.pbio.3001130)

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