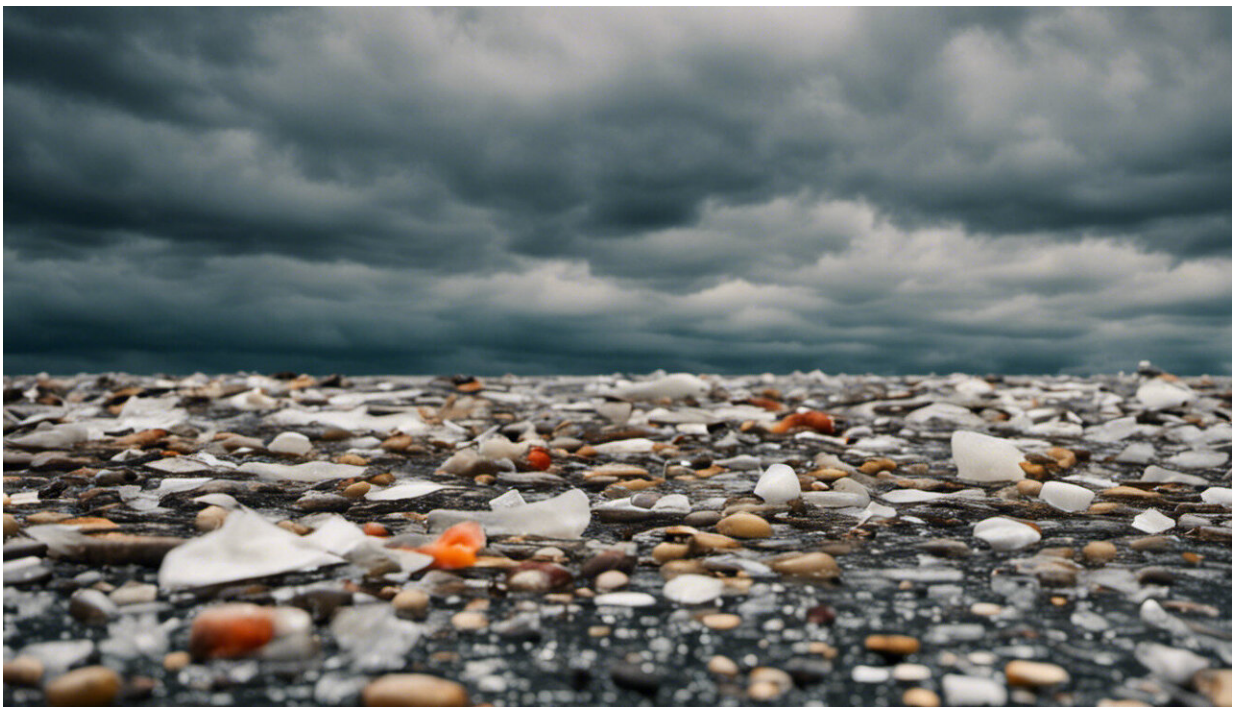


77% more microplastics found in River Thames during lockdown may be due to discarded face masks and PPE, research shows

April 13 2023, by Ria Devereux



Credit: AI-generated image ([disclaimer](#))

At a first glance the COVID-19 pandemic seemed to have a positive impact on the environment, with significant decreases in greenhouse gas

emissions, and transport-related noise, air and light pollution.

However, [our research](#) found discarded [face coverings](#) and other [personal protective equipment](#) (PPE) are likely to be the cause of a rise in microplastics entering the environment.

Microplastics are particles [less than 5 millimeters long](#) that break off from larger plastics, often consumer products or industrial waste. A few years back, my colleagues and I began investigating how many of these particles were making their way into London's River Thames. We continued sampling the river every month between May 2019 and May 2021, right through the various lockdowns. We obviously didn't start the project with COVID in mind, but our work became a useful way to track one environmental impact of the pandemic.

One key finding from [our research](#) is that, although there was a 34% decrease in microplastics from pre-COVID levels in the river during lockdown one, levels rose by 77% during the second national lockdown in late 2020 compared to lockdown one.

We suspect this pattern will have been repeated elsewhere, since many of the world's major rivers pass through rural areas to enter major cities before flowing into the sea. The River Thames can, therefore, be a [case study](#) for similar rivers especially within the rest of Europe.

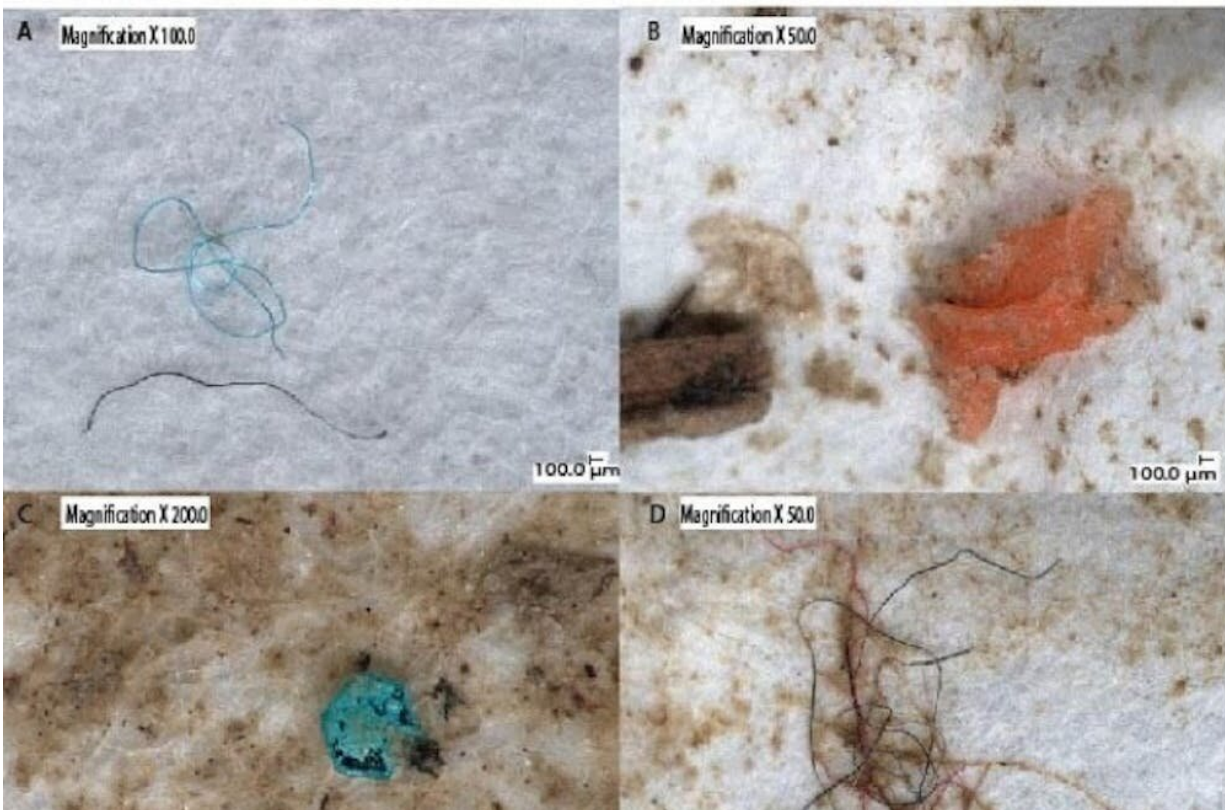
Measuring microplastics

We took three one-liter samples each month at high tide at five points along the Thames in and around London. Our sample sites were Teddington Lock, in an upstream suburb, St Katharine Docks and Limehouse, both in built-up urban areas, and Tilbury and Southend-on-Sea, both downstream of the city.

We then filtered the water and scanned it with a [microscope](#) to measure the levels of tiny plastic particles. In all, across the two years, five sites and 354 liters, we found a total of 4,480 microplastics.

That works out to an average of 17.6 pieces per liter. The highest levels were during lockdown two when there were 27.1 pieces per liter.

Microfibers made up 82% of the microplastics overall, and almost all of those we found during lockdown two. These are the most common form of microplastics and usually come from clothing like socks, T-shirts and jumpers made of polyethylene.



Examples of microplastics the author found in the Thames. A) Blue and black fibres found at Teddington Lock June 2019. B) Red fragment found at Southend-on-Sea March 2021, C) Blue fragment found at Tilbury Fort February 2021. D)

Fibres found at Tower Bridge January 2021, E) Red fragment and black fibres found at Limehouse, November 2020. F) Red fragment found at Southend-on-Sea January 2020. Credit: [Ria Devereux et al](#)

Rise caused by face masks

We believe the spike was therefore caused by PPE, especially disposable face masks which are made of a mixture of [polyethylene and polypropylene](#) and other types of plastics.

One study found these masks release at least [24,300 microplastic fibers per wash](#), and if everyone in the UK used one [face mask](#) daily for a year, it would produce [66,000 tons](#) of unrecyclable and contaminated plastic waste.

This wouldn't have been such a problem—at least in terms of [microplastic](#) pollution—if the masks had been disposed of properly in bins. But unfortunately face masks littered on pavements or left abandoned on [public transport](#) became a common sight, while people often accidentally washed their single-use masks. Even reusable masks, which may also be made from plastics, were supposed to be worn and then washed daily according to [government guidelines](#).

Tire particles decreased consistently over the first two lockdowns as only key workers were permitted to work and travel, and therefore car journeys came down. However, by lockdown three they had risen once again coinciding with hotels, pubs and restaurants reopening.

During the first lockdown, we recorded higher levels of microplastics in Limehouse even as they decreased elsewhere, perhaps as the area is close to a marina with residential and leisure moorings. Teddington recorded

high levels of microplastics in between lockdowns, as people were swimming and using boats in the river, which led to authorities [barricading the area and its beach](#).

By the third lockdown overall microplastic levels had reduced to 5.5 pieces found per liter. However, specific microplastics such as polypropylene, the material recommended in face coverings and PPE, were higher during lockdown three and the post-COVID sample and may be attributed to existing microplastic pollution continuing to breakdown in the water.

Blue fibers increased the most

The most common colors we found throughout this study were blue, black, red and transparent, which is consistent with the microplastics I found when assessing pollution caused by [New Year fireworks in London](#) or the particles found in the [stomachs of fish in the Thames](#). However, the sorts of blue fibers released by [face masks](#) generally increased throughout the two years of our study. For example, blue fibers increased from 2% of those found in Southend pre-COVID to 30% in lockdown two.

We may not see the full impact of the pandemic on plastic pollution for some years as masks and gloves are continuing to degrade and release particles into the environment. But the good news is that our work has shown that changing public behavior really can help the environment. It's an extreme example, but just look at how microplastics decreased in [lockdown one](#).

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