

Mangrove forests trap floating litter

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More than 90 percent of the litter found in the survey was identified as plastic: the most common types of litter included bottles, bags, lengths of rope and food wrappings. Credit: KAUST

Mangrove forests on the coasts of Saudi Arabia act as litter traps, accumulating plastic debris from the marine environment, according to new research from KAUST. The study offers an explanation for the fate of missing marine plastic litter and highlights the threat it poses to coastal ecosystems.

"Of all the plastic discarded in the [marine environment](#) globally, only 1 percent is found floating in surface waters. That means that 99 percent of the plastic is elsewhere, but yet we don't know where exactly," says Cecilia Martin of KAUST's Red Sea Research Center. In previous work, Martin and others in Carlos Duarte's research group, found relatively low levels of plastic [litter](#) in the Red Sea. Next, to identify the location of this missing litter, the team used an unmanned aerial vehicle to scour the beaches.

Now, together with Hanan Almahasheer, Martin has surveyed litter in [mangrove forests](#) along the Red Sea and Arabian Gulf. They recorded the type and location of the litter, as well the weight of some items and various features of the sites, such as the distance to the nearest coastal city and to intense marine traffic, the density of the trees, and how far

the litter was from the shore or the sea.

They found one litter item every square meter or two, with greater density along the Arabian Gulf than the Red Sea. Plastic made up more than 90 percent of the litter: the most common were small items such as bottles, bags, lengths of rope and food wrappings. High density groves had more litter, and the aerial roots acted like a sieve, capturing large [plastic debris](#) from the water and causing mangroves to accumulate more plastic than bare beaches.



The aerial roots of mangroves act as a sieve to trap large floating debris from the water. Credit: KAUST

The team's analysis showed that the density of [debris](#) depends on the distance to major maritime traffic routes rather than land-based factors, such as the distance to the nearest city. Traffic further from the coast caused less litter accumulation, but only up to a certain distance. Unexpectedly, litter density began to increase again once the traffic was more than 15km away, which the researchers propose is due to currents transporting the litter to mangroves.

As well as harming the mangroves, debris could be ingested by other marine organisms that use the forests as a nursery. Chemicals associated with the debris, such as industrial additives or pollutants absorbed by the plastic, could also damage these

ecosystems.

The team is now checking whether microplastics are building up in [mangrove](#) sediment, which could be a major sink for plastic [marine](#) pollution and explain the fate of some of the plastic that is not accounted for.

These findings reinforce the need to reduce plastic consumption and properly deal with [plastic](#) waste in order to preserve these important ecosystems.

More information: Cecilia Martin et al. Mangrove forests as traps for marine litter, *Environmental Pollution* (2019). DOI: [10.1016/j.envpol.2019.01.067](https://doi.org/10.1016/j.envpol.2019.01.067)

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