MICROPLASTICS IN THE CARIBBEAN

Estimated read time: 5 min

ON THE GREEN AGENDA

KEY TAKEAWAYS

Increasingly pervasive in the natural environment, microplastics pose a clear and present danger to animals, plants and humans.

Sources include single use plastics, tourist activities, and improper and illegal dumping of waste.

The management of microplastics is a challenge being addressed in the Caribbean, with the impacts on the environment and human health the subject of ongoing research and studies.

When plastic waste is discarded into our environment, over time, the effects of natural processes (sun, wind and water) will break these plastics down into smaller and smaller parts. These microplastics (defined as fragments smaller than five millimeters) are now pervasive in our marine and land environment.

As microplastics are present everywhere, an increasing amount of these plastic fragments is also found in the formerly pristine waters of the Caribbean, where they pose a clear and present danger to animals, plants and even humans. Small island developing states in the Caribbean are reported to have disproportionately more microplastics than would be expected based on local consumption and population size.[1]

SOURCES

Microplastics come from several sources, including synthetic textiles, dust, tyres, road markings, marine coatings, personal care products and engineered plastic pellets. For the Caribbean region, plastic waste largely derives from land-based activities, such as littering, as well as the products of improper waste disposal (dumping of unsorted plastic in planned landfills or unsanctioned garbage piles).

[1]Lachmann Florina, Almroth Bethanie C., Baumann Henrikke, et al. (2017) Marine plastic litter on Small Island Developing states (SIDS): Impacts and measures. Göteborg: Swedish Institute for the Marine Environment, University of Gothenburg, report no. 2017:4.

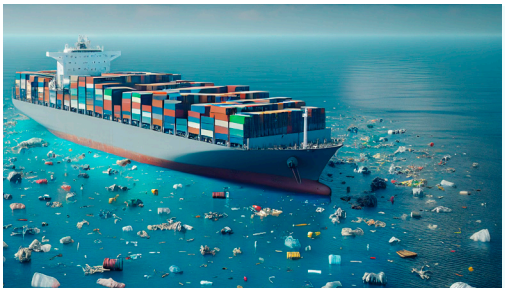
Discarded single-use bottles, cups and containers

Runoff from rivers and storm drains

Improper waste disposal (dumping of unsorted plastic in planned landfills or unsanctioned garbage piles)

Fishing gear (discarded nets, lines)

Coastal tourism contributing to plastic pollution on beaches and in the water



Illegal dumping of plastic waste from ships

Sources of microplastics in the Caribbean are outlined in Figure 1 above.

In the sea, microplastics are transported by wind and ocean currents and distributed throughout the region, such that they are present in all Caribbean ocean environments, even those that appear untouched. These microplastics can be ingested by a wide range of organisms, from plankton to fish, leading to bioaccumulation and potential harm to the food chain. If not ingested, the toxic chemicals attached to microplastics can be absorbed by animals, which means that the microplastics still enter and become part of the marine food chain, with cascading effects. Even if not ingested or absorbed, microplastics act as vectors for contaminants, transporting pollutants and pathogens throughout the marine environment, affecting Caribbean coral reefs and seagrass beds.

IMPACTS

Studies have documented the presence of microplastics in commercially important fish species, raising concerns about their potential impact on human health. For example, an analysis of queen conch confirms that microplastic pollution of the marine environment is ubiquitous in the wider Caribbean.[2] Economically, the Caribbean tourism industry is also at risk, as microplastic pollution detracts from the aesthetic appeal of beaches and negatively affects marine-based activities. More and more, animals — including humans — consume food containing

microplastics as part of their normal diets, with potentially deleterious effects on health and well-being. An act as simple as taking a sip of water has the potential to expose a person to countless particles of microplastics invisible to the naked eye. A significant percentage is also consumed through seafood.

[2]Dalila Aldana Aranda, Hazel A. Oxenford, Jairo Medina, Gabriel Delgado, Martha Enríquez Díaz, Citlali Samano, Víctor Castillo Escalante, Marion Bardet, Eve Mouret, Claude Bouchon,
Widespread microplastic pollution across the Caribbean Sea confirmed using queen conch, Marine Pollution Bulletin, Volume 178, 2022, 113582, ISSN 0025-326X,
https://doi.org/10.1016/j.marpolbul.2022.113582.
(https://www.sciencedirect.com/science/article/pii/S0025326X22002648)

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Over the long term, potential negative effects on health can include chemical contamination from toxins attached to microplastics and physical damage to internal organs through accumulation. While there is abundant evidence of contamination by microplastics, there is limited long-term research on the overall impact on regional populations. However, correlation suggests that effects of microplastics could include provoking immune and stress responses in humans.[3]

MANAGEMENT

The management of microplastics is proving to be challenging for the Caribbean, with the impacts on the environment and human health the subject of ongoing research and studies. How do we clean up this mess?

The Caribbean has not been idle, as there are ongoing efforts to mitigate and minimise plastic pollution, and thus the prevalence of microplastics. Beach cleanups and other community-based initiatives are a simple and popular way to reduce plastic waste reaching the oceans. Legislative options are also being used.

WITHIN THE CARIBBEAN, AS MANY AS 27 COUNTRIES AND TERRITORIES HAVE LEGISLATED OR PROPOSED SOME FORM OF POLICY CONTROL ON REDUCING THE USE OF PLASTICS OVER THE PAST DECADE.[4]

Locally, the Trinidad and Tobago government banned Styrofoam imports (but not local manufacture of Styrofoam) and have proposed legislation and standards around the use of plastics (Beverage Container legislation, yet to be introduced[5], a proposed TTCS 9 standard[6]).

Additional solutions that are being implemented include increased research and monitoring programmes to track microplastic levels; continued awareness campaigns to educate the public about plastic pollution; global cooperation to reduce plastic waste; and finally, improved waste management systems. As part of this effort, the existing Trinidad and Tobago Solid Waste Management Company Limited (SWMCOL) is to be repurposed to become a Waste Recycling Authority.[7]

CONCLUSION

In conclusion, while microplastics are a serious problem, all is not lost. A combination of individual and community actions around the Caribbean aimed at reducing plastics use, reusing plastic, and recycling plastics in nontraditional ways (as bricks or as plastic planking) can all help. Addressing the issue of microplastics in the long term will require a multi-faceted approach involving additional Caribbean-specific research; monitoring of microplastic levels in the environment; mitigation measures; and ongoing public engagement to protect the Caribbean's valuable flora, fauna and human resources. ■

[3]Blackburn K, Green D. The potential effects of microplastics on human health: What is known and what is unknown. Ambio. 2022 Mar;51(3):518-530. doi: 10.1007/s13280-021-01589-9. Epub 2021 Jun 29. PMID: 34185251; PMCID: PMC8800959.
[4]Economic implications of the ban on single-use plastics in the Caribbean: A case study of Trinidad and Tobago | CEPAL
[5]Le Hunte says he will deliver Beverage Container Bill - Trinidad Guardian
https://www.guardian.co.tt/news/le-hunte-says-he-will-deliver-beverage-container-bill-6.2.859670.2d0ba04d89
[6]Understanding Biodegradable Plastics | TTBS (gottbs.com)
https://gottbs.com/2023/12/01/understanding-biodegradable-plastics/
[7]National Integrated Solid Waste Policy.indd (swmcol.co.tt)
https://swmcol.co.tt/Portals/0/Waste%20Policies/National%20Integrated%20Solid%20Waste%20Policy%202024.pdf