
Is soft-sediments ecosystem service delivery compromised due to microplastic pollution?

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Abstract

Soft-sediment ecosystem processes and provides enormous ecosystem services, including nutrient cycling, primary production, climate regulation, food production, coastal protection and many more. Microbial communities of the soft-sediment commonly known as ‘microphytobenthos’ are the base of this complex ecological network and interactions which underpin the delivery of vital ecosystem services. These microbial communities influence the flow and cycling of nutrients, the productivity of the marine food webs, stabilizing sediments through biofilm formation, and affect water quality and the benthopelagic coupling of nutrients. Therefore, any negative impact on these microbial communities is most likely to pull back the delivery of ecosystem services in the extensive soft-sediment ecosystems. However, the sediment trapping characteristics of the soft-sediments also made them endpoints and hotspots of microplastic pollution. These microplastics may alter microbial community diversity, microbial carbon and nitrogen processing, basal respiration and enzyme activities, which are central to soft-sediment ecosystem services like climate regulation and primary production. Though microplastic has gained widespread attention as a pollutant, enough clarification is yet to be made about its effects on soft-sediment microbial communities and the consequent delivery of ecosystem services. This theoretical overview seeks to draw attention to the researchers for holistic research to clarify the impact of microplastics on life-sustaining ecosystem services. Eventually, we should not take for granted the integral and disproportional role of soft-sediment ecosystems. The ecosystem service delivery is already distressed dreadfully, with over 60% loss over the past 50 years. The newly introduced human-made microplastics in the soft-sediment may compromise the long-term delivery of various ecosystem services.

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