

## Baseline Assessment of Transboundary Marine Litter along the Western Coast of Sri Lanka and a Proposed Island-wide Monitoring Framework

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Transboundary Marine Litter (TBML) refers to marine debris that crosses international borders, through ocean currents, winds, and waves. It poses significant threats to marine ecosystems, coastal livelihoods, and public health. This pilot study was carried out to establish baseline data on TBML accumulation along the Western Province coast of Sri Lanka. A systematic coastal survey was conducted across nine locations in Kalutara, Colombo, and Gampaha districts. Sites were selected based on accessibility and observed litter accumulations, with each location covering an area of 200 m × 10 m from the shoreline inland. Sampling was conducted monthly within three days of the full moon to standardize tidal influence over an eight-month period from May to December 2022. A total of 6,057 polyethylene terephthalate (PET) bottles were recorded, of which 13% (n=780) was classified as potential TBML based on identifiable labels indicating country of origin and absence characteristics typical of locally distributed products. India was the dominant contributor (66.8%), followed by China (14.6%), Malaysia (8.9%), and the United Arab Emirates (2.5%). Indian-origin items were predominantly traced to Tamil Nadu, Maharashtra, and Karnataka. Spatial variation in TBML accumulation was evident, with the highest recorded at Maggona (n = 139) and the lowest at Negombo Beach Park (n = 19). Temporal variation showed peaks in August and October, followed by a general decline towards December. These findings likely show the fluctuations of seasonal and regional oceanographic conditions. Building on these findings, a second-phase island-wide survey is proposed across 25 coastal sites representing all coastal districts of Sri Lanka to assess broader spatial and temporal patterns of TBML accumulation. This framework will incorporate a structured citizen science approach with a tier-based ranking system to enhance participation and data collection. Additionally, selected TBML items will be analysed for biofouling communities to evaluate their potential role in facilitating biological invasions. While the baseline study highlights the TBML issue and the need for regional cooperation to mitigate marine pollution, the proposed second phase provides a scalable foundation for long-term monitoring and evidence-based management across Sri Lanka.

**Keywords:** Coastal monitoring, Indian Ocean, Marine pollution, Sri Lanka, Transboundary marine litter