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# Environmental Health Assessments of Beaches using Beach Quality Indexes

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## Abstract

Marine litter represents a significant issue along the northern coast of Sri Lanka, where it substantially impacts marine biodiversity and the local ecosystem. Therefore, assessing and managing beach quality is crucial for the protection of marine biodiversity and the sustainability of the local ecosystem. The present study provides the first assessment of marine debris and beach quality using five Beach Quality Indexes (BQI), such as the Plastic Abundance Index (PAI), Clean Coast Index (CCI), General Index (GI), Pellet Pollution Index (PPI), and Hazardous Items Index (HII), along the northern shore of Sri Lanka. The marine litter survey was conducted at Kankesanthurai (KKS), Myliddy, and Akkarai beaches from February to July 2023, following the protocols set by NOAA and OSPAR. A 50 cm × 50 cm wooden quadrate was placed with a 20 m interval along the 100 m transect at each beach. The samples were collected at a depth of 1 cm and any debris larger than 2.5 cm in size on its longest dimension was included in the analysis. The study at the three beaches recorded 538 marine debris items and classified them into five distinct material groups: plastic, metal, glass, paper, and wood. The highest number of marine debris was recorded at KKS (187 items), followed by Myliddy (176 items) and Akkarai Beach (175 items). The average litter density was 1.19±0.05 items/m². Plastics constituted the highest percentage, amounting to 85.69% (289 items), while metal (1.12%, 6 items) was the least common. The beach quality index scores obtained in this study indicate that the studied beaches are 'extremely dirty' based on the average GI (23.73) and CCI values (104.89), and as 'very low' by the PPI value of 0.02. The PAI value (69.89), highlights that all beaches had a ‘high abundance’ and the HII value (0.55) indicates 'little to no litter'. The studied beaches are at low risk based on plastic pellets and hazardous litter items, but with a high risk as indicated by the GI, CCI, and PAI values. These findings underscore the need for a comprehensive marine litter management framework on the northern coast of Jaffna and provide valuable baseline data for future research and conservation efforts.

***Keywords**:* Beach Quality Index, Marine litter, Northern coast, Plastics