Marine Pollution Bulletin 167 (2021) 112258

Contents lists available at ScienceDirect

Marine Pollution Bulletin

journal homepage: www.elsevier.com/locate/marpolbul

Review

Marine debris in Malaysia: A review on the pollution intensity and mitigating measures

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ARTICLE INFO

Keywords:
Marine debris
Coastal pollution
Polyethylene
Polypropylene
Ocean
Plastics

ABSTRACT

The launch of Roadmap towards Zero Single-use Plastics in 2018 demands baseline data on the management of marine debris in Malaysia. In 2021, Malaysia is placed 28th top plastic polluter in the world with plastic consumption at 56 kg/capita/year, therefore data on mismanaged plastic is imperative. This paper reviews the abundance and distribution of marine debris in selected Malaysian beaches over the last decade (2010–2020) and discusses issue on its management. Plastic debris on beaches in Malaysia, was reported to range from 64 items/m^2, to as high as 1930 items/m^2, contributing 30–45% of total waste collected. Plastics film was the most dominant, mainly originated from packaging materials. Therefore, appropriate action including improved marine waste management system is crucial to tackle the problem, together with effective governance mechanisms. Various suggestions were proposed based on the statistical-environmental data to reduce the occurrence of marine debris in the country.

1. Introduction

The human pattern of resource consumption has changed dramatically since the industrial revolution of the 1760s (Horn et al., 2010). The demand for materials had doubled and tripled with the improved standard of living where goods were obtained for luxurious needs rather than necessity (Millward-Hopkins et al., 2020). This trend worsened in countries with high material consumption leading to the generation of massive amounts of waste. Improper waste disposal has been acknowledged as one of the major contributing areas that results in environmental deterioration, particularly among developing nations (Lestari and Trihadiningrum, 2019; Ghayebzadeh et al., 2020; Gopinath et al., 2020). Waste management has been established as a priority area on national and international agendas since this sector has tremendous impacts on climate change and loss of biodiversity (Gopinath et al., 2020). This is because improper waste disposal can cause water, air, and land pollution.

In relation to marine pollution, marine debris or marine litter has been identified as the culprit that can deteriorate marine health and impact biodiversity negatively. As a result, MARPOL 73/78 was introduced to tackle marine pollution originating from ships. Unfortunately, there are other sources of marine pollution including marine debris, besides those generated on board ships, which have been threatening the marine environment. Marine debris is defined as persistent polluting materials that intrude water bodies including freshwater and marine environment. The National Oceanic and Atmospheric Agency (NOAA) (2018) defines marine debris as “any persistent solid material that is manufactured or processed and directly or indirectly, intentionally or unintentionally, disposed of or abandoned into the marine environment or the Great Lakes”. Issues pertaining to marine debris have been debated for several decades but have only reached a highpoint in the past 10 years or so.

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https://doi.org/10.1016/j.marpolbul.2021.112258
Received 4 November 2020; Received in revised form 5 March 2021; Accepted 8 March 2021
Available online 8 April 2021