

THE ECONOMIC IMPACT OF MARINE PLASTIC IN SOUTH AFRICA: SUMMARY OF RESULTS

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KEY FINDINGS

The total economic impact associated with the plastic reaching SA’s marine environment each year ranges between R3.5 billion and R34.9 billion per year (0.05 to 0.5% of annual GDP), with a mid-range estimate of R14.1 billion per year (0.2% of GDP). The cost per tonne of plastic (per year) ranges between R70 635 and R698 186 (mid-range estimate of R282 028 per tonne). The lifetime cost per tonne of marine plastic, in terms of its impacts on ecosystem services over its lifetime, ranges between R3.4 million and R33.8 million per tonne (mid-range estimate = R13.5 million per tonne). The plastic entering SA’s marine environment each year imposes a total cost of between R169 billion and R1.69 trillion (mid-range estimate = R677 billion) in terms of impacts on ecosystem services over its lifetime.

INTRODUCTION

Leakage of plastic waste into the environment is an issue of increasing global concern. In South Africa, an estimated 40 000 tonnes of mismanaged plastic waste enters the marine environment each year from land-based sources (Verster and Bouwman, 2020); with another 10 000 tonnes per year arising from episodic flooding and marine sources (estimated in this study).

Marine plastic debris has a negative impact on marine biota and ecosystems; as well as on economic sectors that rely on marine ecosystem services, such as fisheries, shipping and tourism. Quantifying the impacts of marine plastic debris on the economy can provide critical evidence to inform an appropriate policy response.

Marine plastic impacts on the economy in three ways:

1. **Impacts on marine ecosystem services**
2. **Direct damage to industry** (e.g. **fisheries, shipping** (marine transport), and marine & coastal **tourism**)
3. **Costs associated with clearing** of plastic debris

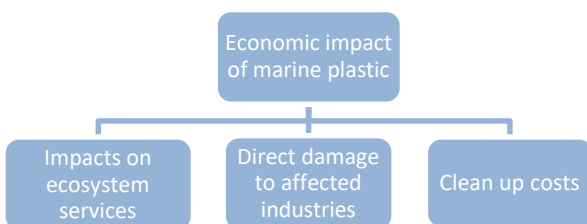


Figure 1. Components of the total economic impact of marine plastic

This study provides a preliminary estimate of the costs associated with each of these three components (see Figure 1); as well as an overall estimate of the economic impact of marine plastic debris in South Africa.

METHODOLOGY

Given the lack of local data and knowledge regarding the impacts of marine plastic on ecosystem services and on industry in South Africa, the study applied the ‘benefits transfer’ method in order to quantify the costs associated with each of the three components in Figure 1.

This involved adapting the best available global estimates of the impacts of marine plastic (in relevant units) to the SA context, based on relevant local variables. Specifically, it involved the identification of relevant ‘unit impact values’ from global studies; i.e. estimates that are framed in units (e.g. impacts per tonne, or in % terms) allowing them to be adapted to a new context based on relevant local variables.

It also involved consultation with relevant local experts and stakeholders to help adapt and refine the unit impact values from the international studies to the SA context. An online expert/stakeholder consultation workshop was conducted on 7 December 2022; with 40 participants from government, industry, civil society and academia. The refined unit impact values were then applied to the SA context to derive the total economic impacts of marine plastic in SA.

RESULTS

In terms of impacts on annual ecosystem service delivery, the **plastic entering South Africa's marine environment each year** (estimated at 50 000 tonnes per annum) imposes a cost of **R3.4 billion to R34.1 billion per annum (mid-range estimate = R13.6 billion)**. This is equivalent to **R68 142 to R681 423 per tonne of plastic (mid-range estimate = R272 569 per tonne), per annum** (see first row of Table 1).

Table 1. Total economic impact of marine plastic in SA per year (based on 50 000 tonnes of plastic entering the marine environment annually); and costs per tonne

	Annual costs due to plastic entering SA's marine environment each year (R millions)			Annual costs per tonne of plastic entering the marine environment each year (Rands per tonne)		
	Low	Mid-range	High	Low	Mid-range	High
Impacts on ecosystem services (/year)	3 407	13 628	34 071	68 142	272 569	681 423
Direct damage to industry	64	269	475	1 272	5 390	9 507
Clean-up costs	61	203	363	1 221	4 069	7 256
Total	3 532	14 101	34 909	70 635	282 028	698 186

Direct damage to industry, in terms of **reductions in revenue or GDP in the fisheries, shipping and tourism sectors**, ranges from **R64 million to R475 million per annum (mid-range estimate = R269 million)**. This is equivalent to **R1272 to R9507 per tonne of plastic (mid-range estimate = R5390 per tonne)**.

Clean-up costs for marine plastic (row 3 in Table 1) are estimated at **R61 million to R363 million per annum (mid-range estimate = R203 million per annum)**.

The total annual economic impact associated with the plastic reaching the marine environment each year ranges from **R3.5 billion to R34.9 billion per year (0.05% to 0.5% of SA's annual GDP, or 4.7% to 46% of the plastics industry's direct contribution to GDP)**. The **mid-range estimate is R14.1 billion per year (0.2% of GDP, or 18.6% of the plastics industry's direct contribution to GDP)**. The **cost per tonne of plastic (per year)** ranges from **R70 635 to R698 186 (mid-range estimate = R282 028 per tonne)**.

Impacts on ecosystem services make up the bulk of the costs associated with marine plastic. Based on the mid-range estimate of annual impacts (R14.1 billion per annum), **impacts on ecosystem services account for 97% of the total**, with direct damage to industry (2%) and clean-up costs (1%) making up a much smaller proportion (Figure 2).

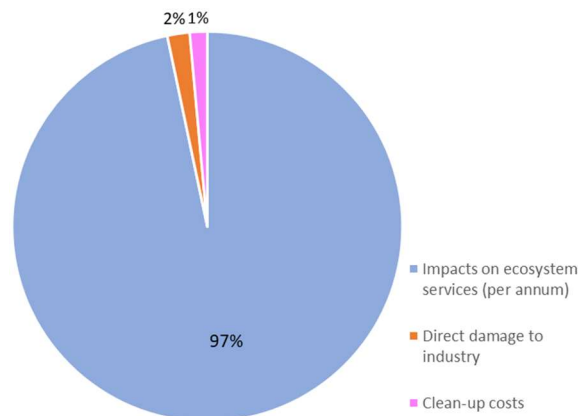


Figure 2. Percentage contribution of each component to the total economic impact

Furthermore, plastic entering the marine environment takes hundreds to thousands of years to break down, and will continue to impose negative impacts on ecosystem services throughout its lifetime. The **lifetime cost per tonne of marine plastic**, in terms of impacts on ecosystem services, **ranges between R3.4 million and R33.8 million (mid-range estimate = R13.5 million)**. This implies a total cost of **R169 billion – R1.69 trillion per year (2.5% to 25.5% of SA's annual GDP); with a mid-range estimate of R677 billion (10.2% of annual GDP)**, in terms of **impacts on ecosystem services over the lifetime of the plastic entering the marine environment each year**.

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