Efficiency of beach clean-ups and deposit refund schemes (DRS) to avoid damages from plastic pollution on the tourism sector

in Cape Town, South Africa

Authors: Jain, A., Raes, L., Manyara, P.
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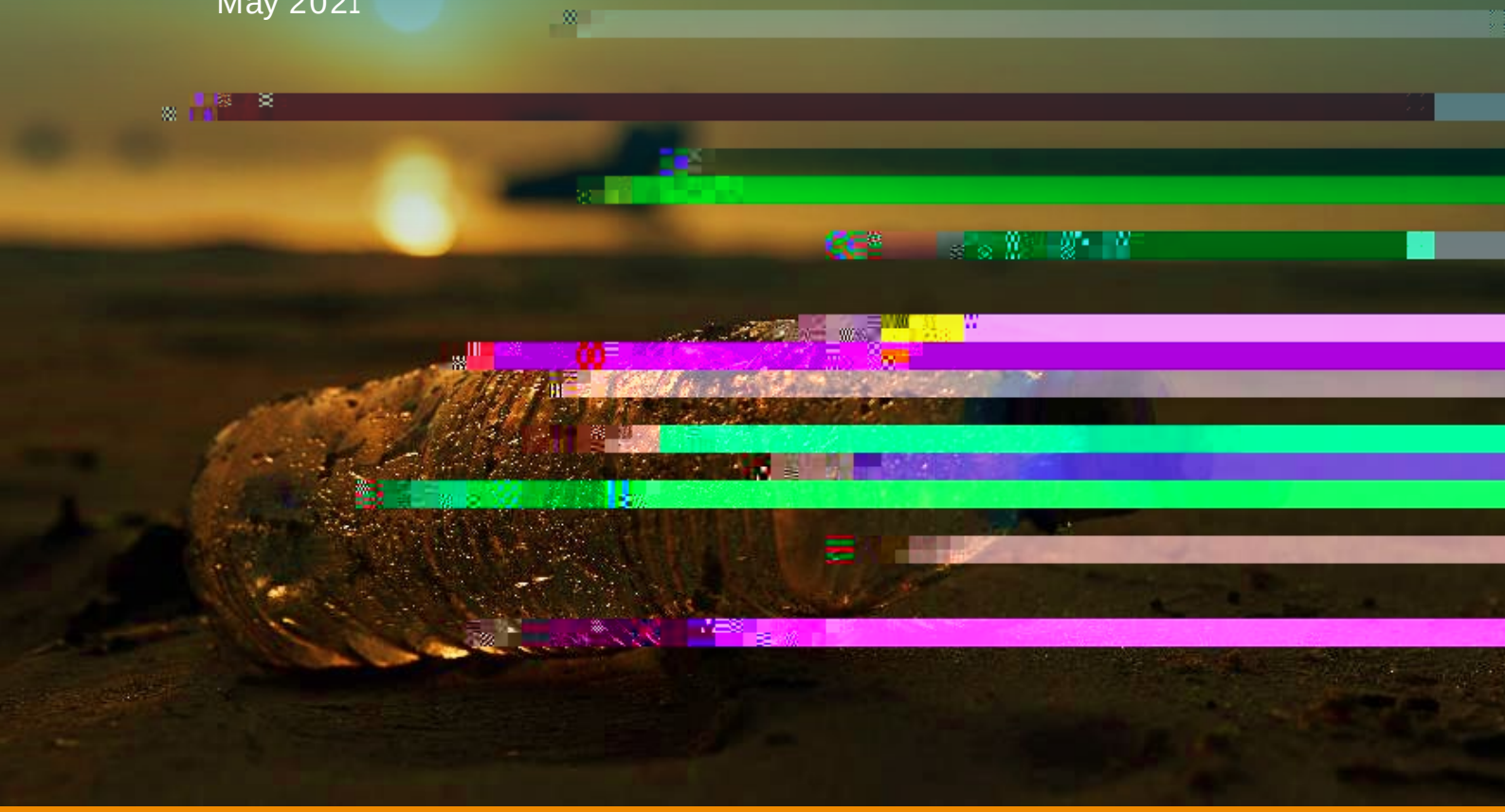

GLOBAL MARINE AND POLAR PROGRAMME

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This policy brief is the summary of the Master's thesis for University of Nantes, 2019-2020. The thesis was completed at IUCN, Switzerland as part of the Marine Plastics and Coastal Communities (MARPLASTICs) project. The following report is an analysis of the costs and benefits of current beach clean-ups in Cape Town, and it aims to estimate the cost efficiency of implementing a Deposit Refund Scheme (DRS) in conjunction with beach clean-ups. (Full Thesis).

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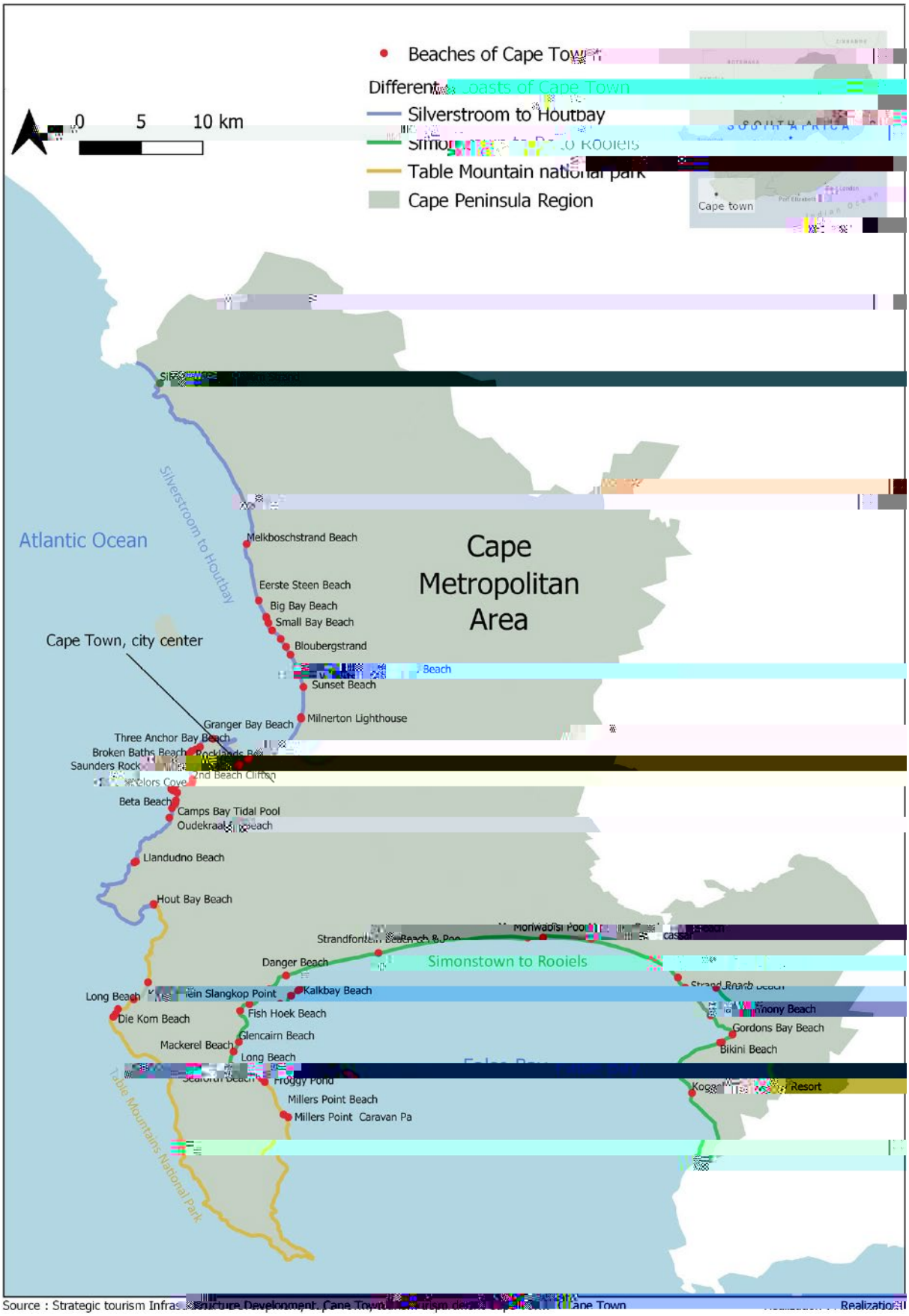
Total cos

beaches (Figure 1). However, a rapidly growing economy, touristic pressures, and waste streams associated with development and population growth pose an increasing threat to Cape Town's valuable beaches by increasing the number of pollutants and litter on the coastline (Newman, 2019). Plastic accounts for 94-98% of all the litter on Cape Town beaches (Takunda, 2019). **Continued degradation of beaches could significantly impact Cape Town's economy. According to a study on Cape Town, foreign tourists stated that a drop in cleanliness standards could influence the choice of beaches frequented; up to 97% of tourists would not be willing to come to beaches with more than ten large items of debris per metre. This reduced expenditure on travel to beaches would correspond to a considerable decrease in the total recreational value of beaches and a reduction in the regional economy (Ballance, 1996).**

To target this problem, **Cape Town has implemented a variety of beach clean-up programs, organised at three different levels.** First are those organised by the government, which comprise a majority (90%) of all clean-ups. The Department of Environment, Forestry and Fisheries (DEEF) of South Africa has launched various projects to ensure a clean South African coastline, such as 'Work for the Coast (WFTC)' and 'International Coastal Clean-up (ICC)'. Second, the City of Cape Town Metropolitan Municipality also takes care of regular cleaning of the coastline and residential areas through its waste management department. Third, select NGOs are engaged in beach cleaning through the NGOs are sponsors' Metadata (https://tinyurl.com/MCthsTbunt)19.yenti.un few other local NGOs and individual volunteers are also engaged in conducting clean-ups.

1 When purchasing a product, an individual will pay a deposit for the packing, which is reimbursed when the packaging is returned. This encourages return and reuse by consumers, and therefore reduces the number of such items ending up as litter (Numata, 2005).

2 74% is considered as the defining threshold; below this return rate, the deposit rate will go below R 0.1, which is practically impossible to achieve. The return rates (86%, 94% and 100%) were randomly selected to analyse what happens when the return rate is increased by 10%.



Source : Strategic tourism Infrastructure Development, Cape Town

Figure 1: Map of beaches in Cape Town City, South Africa

Results

Impacts on tourism revenue

Approximately R 7.8 billion could potentially be lost if international tourists are unwilling to visit Cape Town's beaches, and R 591 million in the case of domestic tourists.[3] Overall, if there is plastic litter on the beaches, Cape Town could lose up to R 8.5 billion in total coastal tourism revenue, representing 91% of total coastal tourism revenue and 67% of overall tourism revenue. An estimated 1.5% of the GDP of Cape Town could be impacted by the presence of plastic litter that is not cleaned up (City of Cape Town, 2019).

Impact on tourism employment

The revenue which could have been lost in the absence of beach clean-ups could employ approximately 29,258 people in the tourism sector. According to the calculation in this study, 67.8% of total employment in the total tourism sector and 91% of total employment in coastal tourism in Cape Town would lose their job due to the plastic litter on beaches.

3 R = South African Rand currency sign.

Table 2: Total costs to clean beaches through beach clean-ups and DRS

Scenarios	Cost of cleaning beaches with DRS (ZAR)	Cost of beach clean-ups (ZAR)	Total cost to clean beaches with both interventions (ZAR)
Without DRS		13,029,387	13,029,387
DRS 74%	51,571	11,367,299	11,315,728
DRS 87%	54,439	11,054,352	10,999,913
DRS 94%	55,855	10,885,713	10,829,858
DRS 100%	57,141	10,741,238	10,684,097

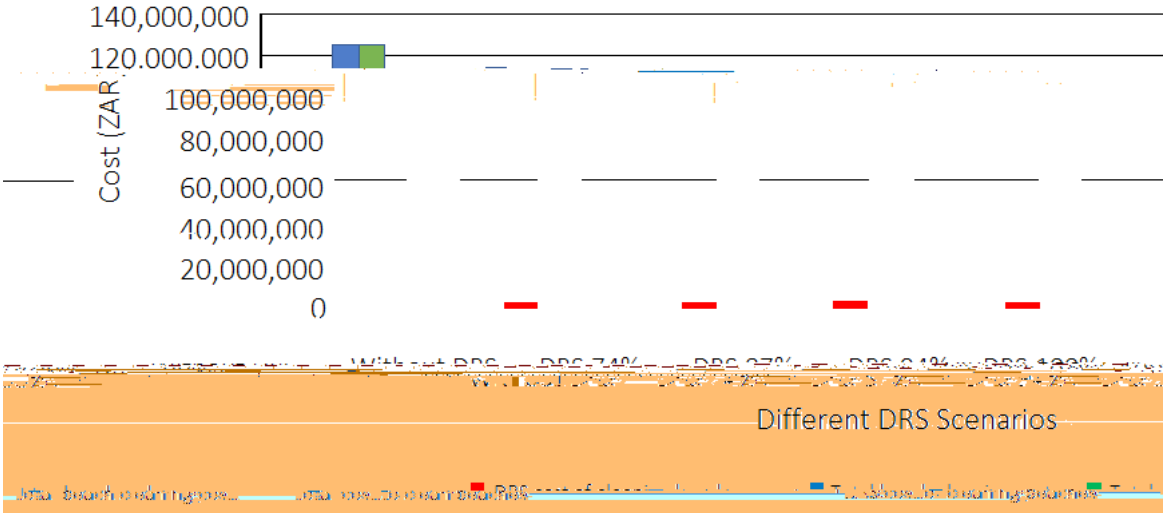


Figure 2: Different DRS scenarios

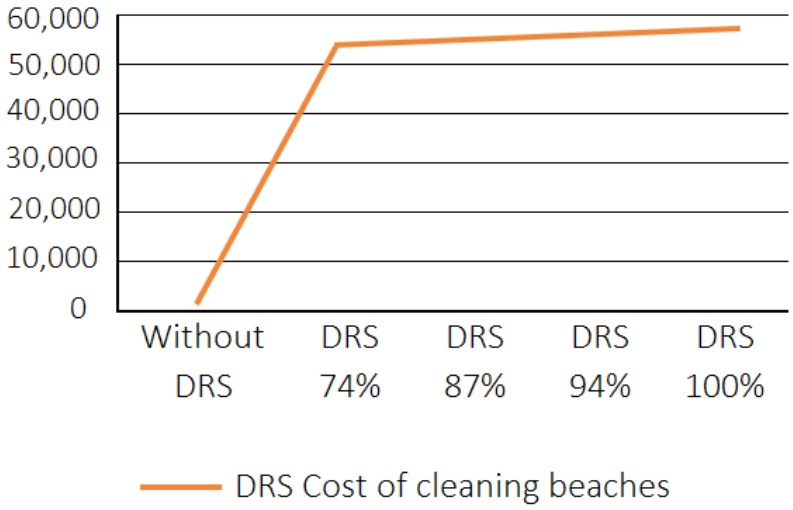


Figure 3: DRS related costs to clean-up the bottles from the beaches

Cost efficiency of clean beaches

Table 3 shows the efficiency of combining the different systems, with the efficiency being calculated as 'benefits/costs' or 'avoided loss for the tourism sector/costs of the system'. The

even under these scenarios, the beach cleaning solutions are still efficient, as the avoided losses are higher than every rand spent on reducing the number of plastic bottles on beaches.

In summary, to clean beaches, beach clean-ups are more efficient if implemented along with a DRS. The cost efficiency increases as the DRS return rates increase. At the same time, the efficiency will decrease as fewer tourists are affected by beach litter and as the tourists' sensitivity decreases.

Table 4: Total Cost Efficiency of beach clean-ups and DRS with varied tourists' sensitivity

	Change in tourists' sensitivity towards beach litter (%)									
DRS Scenario	**90%**	**80%**	**70%**	**60%**	**50%**	**40%**	**30%**	**20%**	**10%**	**0%**
	Total Cost Efficiency									
Without DRS	654	575	503	431	359	287	215	144	72	0
DRS74%	749	659	576	494	412	329	247	165	82	0
DRS87%	770	677	593	508	423	339	254	169	85	0
DRS94%	782	688	602	516	430	344	258	172	86	0
DRS100%	793	697	610	523	436	348	261	174	87	0

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