

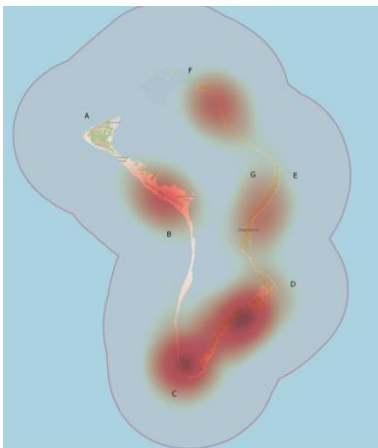
Plastic impacts on remote and protected turtle nesting beaches, Chagos Archipelago

Overview

The Chagos Archipelago and surrounding seas have been a no-take Marine Protected Area since 2010, totalling 640,000km². It is an important nesting ground for green and hawksbill turtles.



The atoll of Diego Garcia, Chagos Archipelago showing relative hotspots in red of beach plastic litter (left) and turtle nesting activity (right)



Plastic litter density



Turtle nesting activity

Mortimer J and Esteban N, Guzman, A, Hays, G (2020) <https://doi.org/10.1017/s0030605319001108>

Local solutions

Linking local benefits to charismatic local wildlife to plastic reduction campaigns and to encourage beach cleans.

Testing effects of different polymers of microplastic on **turtle nest temperatures**.

Tracking upstream contributions to plastic waste by using data from water bottles collected on standardised surveys.

Single use plastic reduction campaign: 'Hello DG, Goodbye Ocean Plastic'.

Incentivising **beach cleans** and targeting beaches in time and space most used for turtle nesting and most impacted by plastic (left).

Key successes

Revealing the close correlation between turtle nesting beaches and those with the most plastic (left).

Multi-year data set of turtle nesting attempts impeded by plastic.

Targeted beach cleans focus on turtle nesting beaches and seasons.

Data collected across the archipelago reveals sources upstream of plastic pollution.

Sales of 500ml plastic bottles reduced by 40%.

Recommendations for the Plastics Treaty

1. Downstream data can be used to identify upstream polluters very specifically - Extended producer responsibility is key.
2. Legacy plastic on beaches is an issue now and will be for decades into the future – solutions cannot only be upstream.
3. Solutions that can tackle waste plastic in situ are required in ways that are useful to the local community – turning waste into a resource.
4. Financial support for developing and distributing island-scale tech solutions is important – islands need special considerations.

Local impact of plastic pollution

Small island communities have disproportionately more coastline and are vulnerable to plastic pollution not of their making. They have few resources and limited infrastructure with which to tackle ocean borne plastic.

In the Chagos Archipelago MPA very little plastic pollution is produced locally. Analysing beach waste shows most common items are drinks bottles, mostly water 76.8% (right). Data collected from these bottles reveals the brands, corporations and nations upstream that are contributing most of the pollution of the Indian Oceans' largest MPA.

- **Species** – critically endangered hawksbill turtle's nest in large numbers on Chagos beaches
- **Habitats** – plastic is becoming incorporated into beaches sediments which pushes microplastics deep into the sand column where they affect sand temperature around turtle nests

Future project ambitions

Contribute data on plastic origin in efforts to hold producers and multinational corporations accountable, for harm caused downstream.

Consider new tech that deals with mixed plastic waste of variable quality locally – creating products and processes that are useful locally.

Scale up new tech solutions in number while keeping infrastructure requirements low – making them 'island scale'.

Experimentally explore the relationship between the abundance and characteristics of sea surface microplastics with a) the composition of beached macroplastics and with b) the human population gradient.

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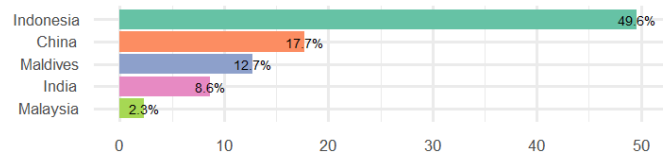
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Scan for
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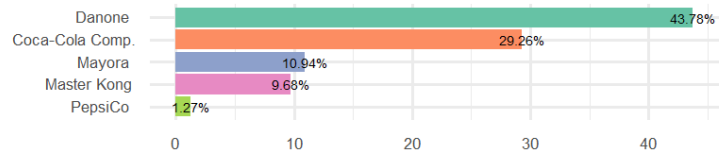


Percentage of bottles/lids by:

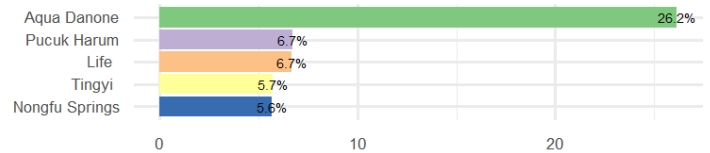
a) Country (n = 1,185 ID'd items)



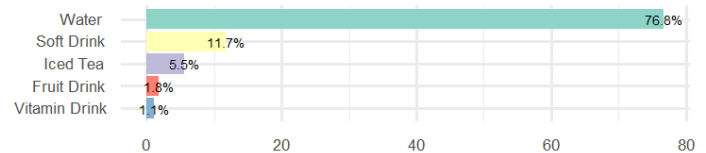
b) Parent Company (n = 868 ID'd items)



c) Brand (n = 1,383 ID'd items)



d) Drink (n = 1,976 ID'd items)



Percentage of identified bottles
Savage et al., *in preparation*

Lessons learnt

Key learning:

- The plastic bottles and lids found on the beaches all arrive from elsewhere, including neighbouring countries and Indian Ocean basin wide producers.
- A large proportion of the plastic bottles and lids are thought to originate from vessels (shipping and fishing) around the Marine Protected Area.
- This highlights the transboundary origin of plastic pollution and a need for international legally binding regulations around disposal of waste, on land and at sea.
- The prevalence of water bottles points towards part of the solution to reduce plastic bottle use: access to clean and safe drinking water.

Challenges:

- Plastic waste continuously arrives in large quantities, making it difficult to keep beaches clean without repeated beach clean efforts.
- On islands there is often no other solution to dispose of the cleared plastic than incineration.
- If the larger plastic debris are not cleared, they will break down into microplastics which will be impossible to remove, causing harm to species and habitats.
- Plastic needs to be recycled reused or otherwise processed locally in island communities – off island treatments are rarely economically viable.