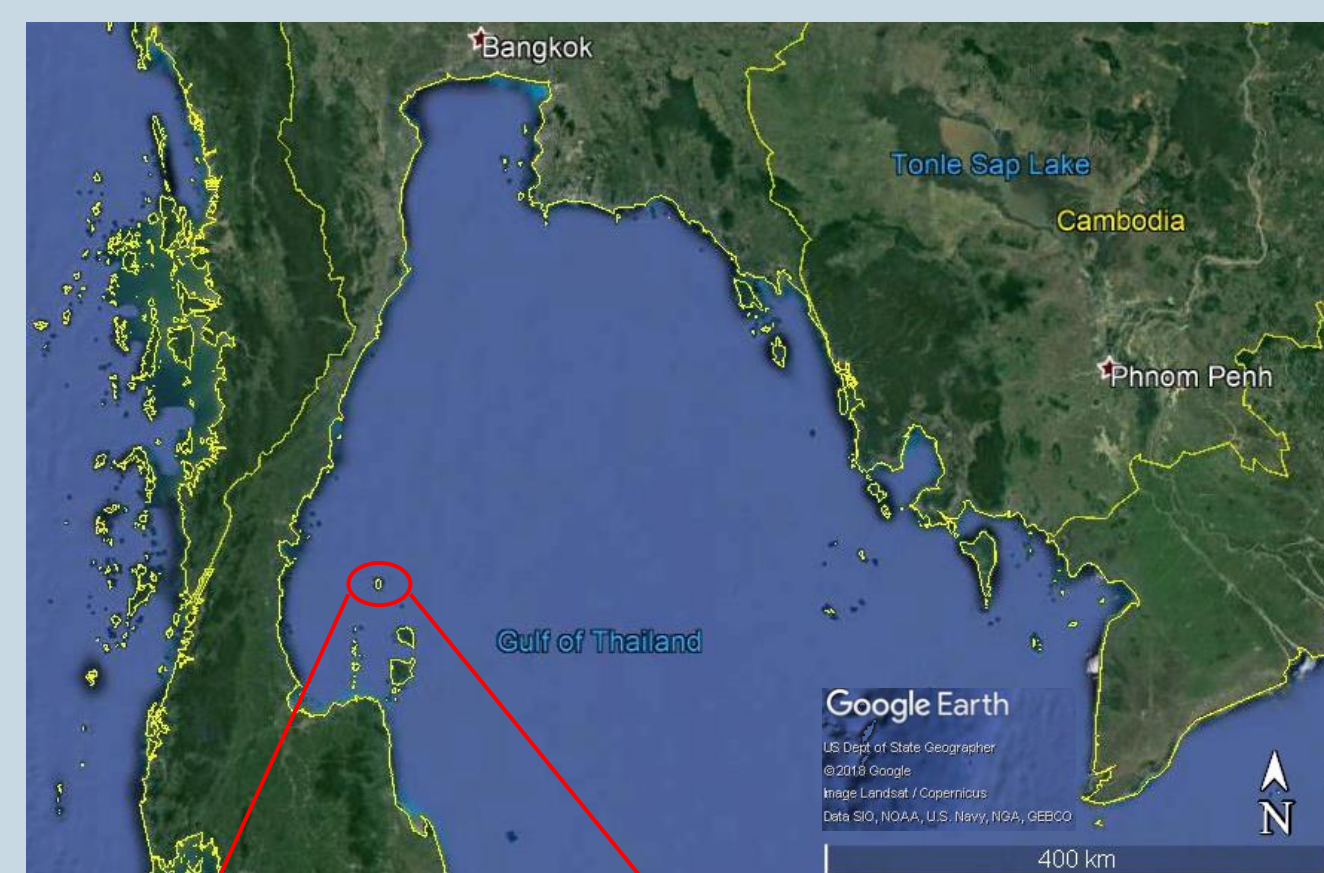
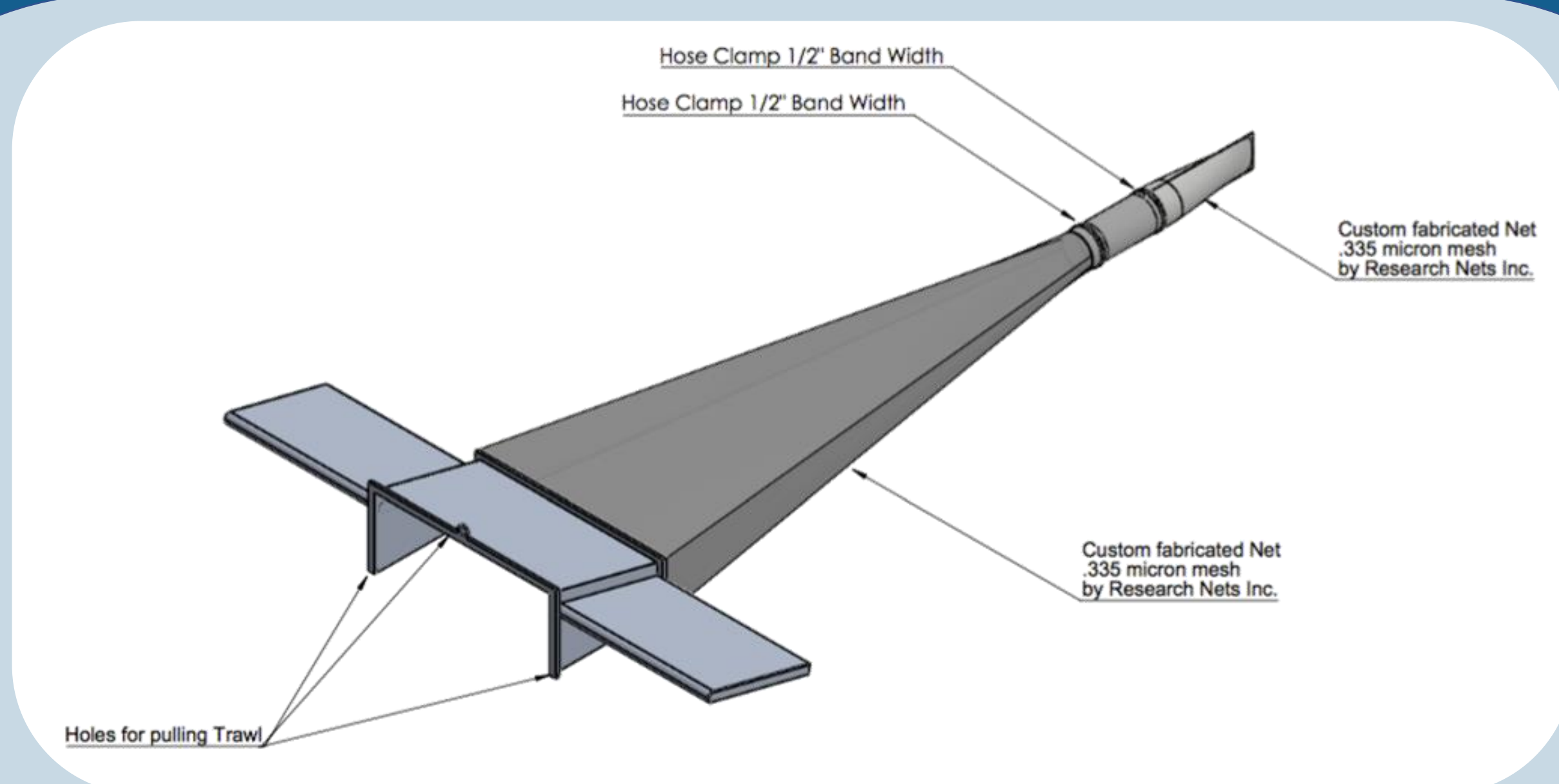


## Introduction

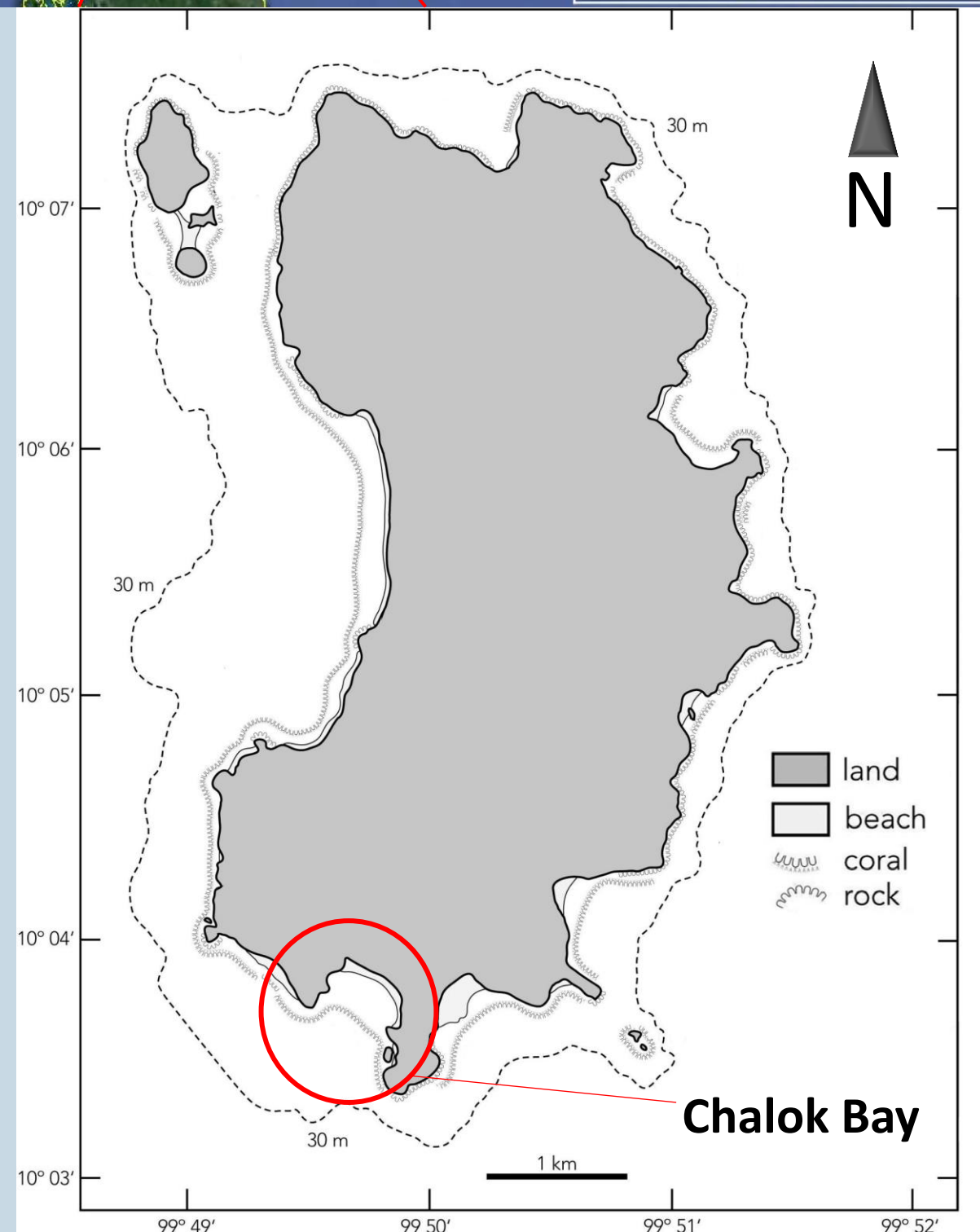
The island of Koh Tao in the Gulf of Thailand is a popular tourist destination for SCUBA diving and other marine recreation. Its popularity has led to an estimated 30 tons of waste being produced per day on the 19km<sup>2</sup> island. Koh Tao has historically had a proactive marine conservation presence with regular cleanup activities being carried out along beaches and sub-tidally, however, terrestrial development and growth of the local tourist industry has also rapidly resulted in added strain on local terrestrial waste management infrastructure. Over the past 10 years, annual tourist numbers have been estimated to grow by 500% from 141,000 in 2006 to 700,000 in 2016<sup>[1]</sup>. While efforts have been made to assess the direct impacts of tourism on the marine habitats, only limited data is available on the abundance of plastics and other debris being exposed to the marine environment at Koh Tao<sup>[2]</sup>.

## Methodology



Beach surveys: 27 Beach cleanups in Chalok bay from June to September 2017. Surveys counted and weighed all items, then separated them into the 10 most abundant items on the beach.

Water samples: 23 surface trawls performed around the island with a Manta Trawl, between March and April 2018. Trawls followed the protocol as stated by the 5 Gyres Institute, involving counting and identifying plastics larger and smaller than a maximum diameter of 5mm, quantified and classified arbitrarily into 'foam', 'pellet', 'films', 'lines' and 'fragments'.



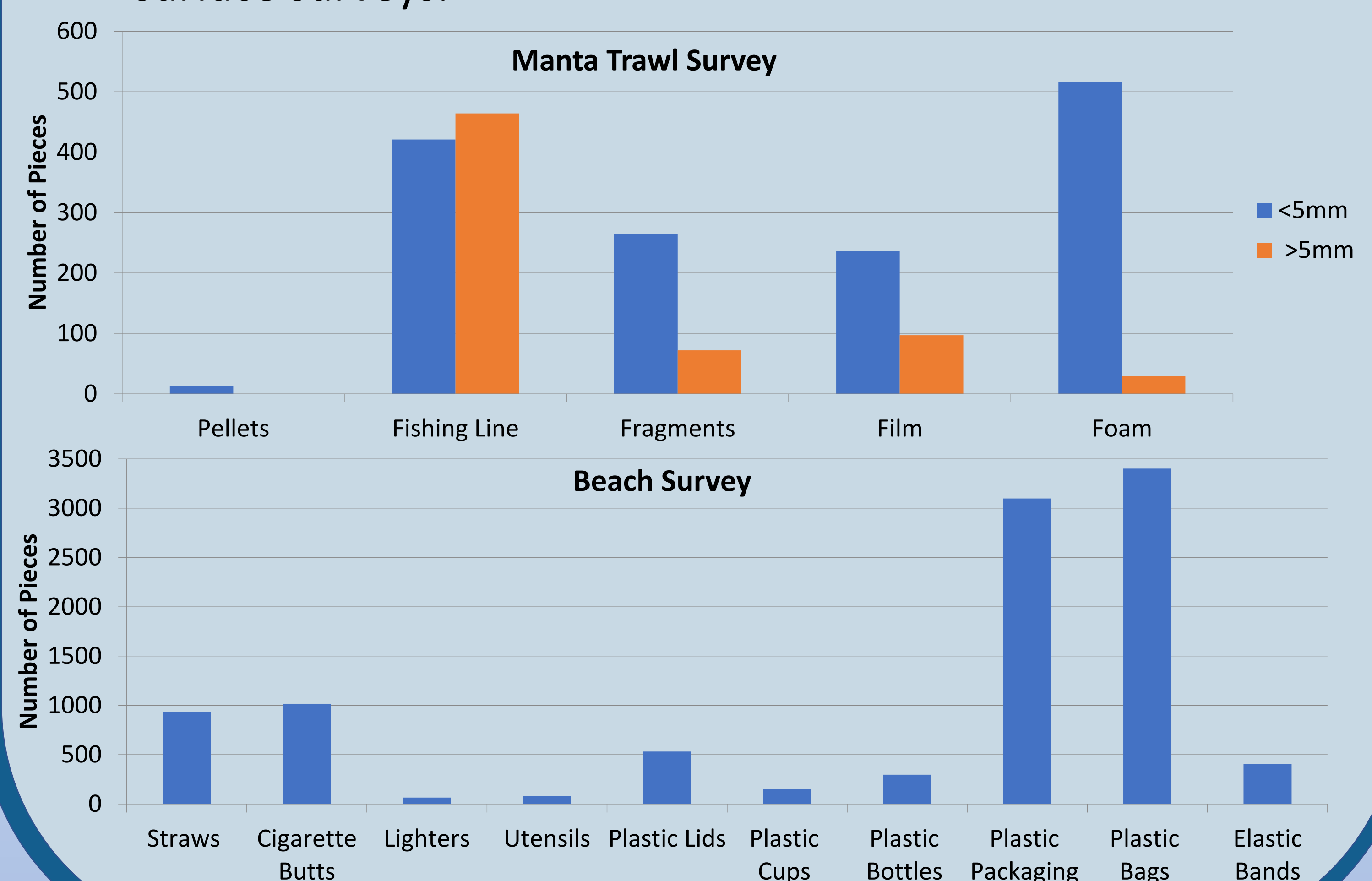
## Acknowledgments

The authors would like to thank the entire team and the numerous volunteers of New Heaven Reef Conservation Program and New Heaven Dive school for helping, supporting and providing the necessary equipment during the project. We would also like to warmly thank the 5 Gyres Institute for being part of this research effort and sharing their expertise and to all the donors who provided financial support for the initiative.

## Results



- Manta Trawl surveys were carried out over 169.05km of coastline, trawling approximately 4100 cubic litres. 1453 items of plastic smaller than 5mm and 659 items larger than 5mm were recorded in total.
- Beach surveys yielded 314kg of waste collected in approximately 94 cumulative hours. Daily spatial coverage varied from 8000m<sup>2</sup> to 16,000m<sup>2</sup> based on tidal height. In total, 9974 items of debris were collected.
- This equates to approximately 219.17 items per km<sup>2</sup> for sea surface surveys.



## Conclusions

- The present findings are among the lowest densities of plastic per km<sup>2</sup> recorded by the 5 gyres global surveys.
- For context, mean values presently indicate 708.17 and 1880.42 items of plastic per km<sup>2</sup> for the Southern Pacific Ocean and Belize respectively.
- High abundance of microplastics were found in floating *Sargassum*, which are ecologically important habitats including for juvenile turtles<sup>[3]</sup>. Survey bycatch findings highlight risk of Manta trawls in use for cleanup.
- Data on plastic and microplastic abundance around Thailand and South-East Asia is severely lacking.
- Continued pressure from increasing tourism and worsening climate change may yet challenge the effectiveness of localised clean-up efforts.

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