TANGAROA BLUE FOUNDATION

CHRISTMAS ISLAND

Marine Debris Initiative Public Report

2023 - 2025

Australian Government
Parks Australia

Australian Marine Parks

tangaroablue.org

Tangaroa Blue Foundation acknowledges the First Nations people as Traditional Owners and Custodians of Country across Australia, including the Land and Sea Country on which we live and work.

We pay our respects to their Elders past and present, and acknowledge their continuous relationship to this land and the ongoing cultures of Aboriginal and Torres Strait Islander peoples across Australia.

Image: *Christmas Island Credit Edges of Earth Adam Moore.*

Table of Contents

EXECUTIVE SUMMARY

HEIDI TAIT
CEO and Founder
Tangaroa Blue® Foundation

The three-year Christmas Island Marine Debris Initiative (August 2023 – September 2025), delivered by the Tangaroa Blue® Foundation in partnership with the Christmas Island community and Australian Marine Parks (AMP), has successfully established the most comprehensive, locally-informed picture to date of marine debris pressures impacting Christmas Island's vital coastal and marine environments.

The Challenge

Located only 350 km from Indonesia, Christmas Island sits directly in the path of regional ocean currents, resulting in the relentless accumulation of large volumes of plastic debris from across the Indo-Pacific. Despite the island's globally significant ecosystems, floating debris persists, particularly on its limited accessible beaches. The island's challenging, steep cliffs and rugged terrain have historically restricted effective clean-up operations, making a coordinated monitoring and community-focused approach essential.

Key Achievements

The initiative successfully delivered on the AMP's objectives of protecting and conserving biodiversity and natural values within the newly established Australian Marine Park Network. By working closely with the local community, partner agencies, and AMP, Tangaroa Blue Foundation built a robust, locally-supported program encompassing:

Comprehensive Data Generation
Generated a high-value dataset from continuous monitoring, targeted clean-ups, and microplastic surveys. This data significantly improves the understanding of marine park pressures and will support evidence-based, long-term management strategies.

Enhanced Local Stewardship
Substantially strengthened local capacity through training, employment, and direct, hands-on involvement in coastal conservation. The program has successfully empowered the community to take ownership of their marine environment.

Measurable Environmental Improvement
Improved the condition of priority coastal sites through repeated removal of marine debris.

PROJECT OUTCOMES

Increased Knowledge	Elevated local knowledge and scientific evidence to inform Indian Ocean Territories marine management.
Empowered Community	Enhanced the capacity of Indian Ocean Territories community groups for ongoing monitoring and marine park stewardship.
Strong Engagement	Achieved strong engagement of community members in protecting the island's coastal and marine environments.
Improved Sites	Improved the condition of priority coastal sites through repeated clean-ups and debris removal.
Increased Awareness	Increased awareness and appreciation of environmental values across the local community, project participants, island visitors, and social media audiences.
New Opportunities	Created new employment and skills development opportunities connected to environmental management.

Acknowledgments

Community science programs thrive on local passion. We owe immense gratitude to the dedicated community members of Christmas Island—whose ingenuity was instrumental in identifying innovative, yet safe, methods for removing hundreds of bags of debris from remote and inaccessible beaches.

This remarkable effort prevented further harm to wildlife and mitigated impacts on the island's tourism experience. We also sincerely thank our key collaborators: AUSMAP, Island Care Christmas Island, Christmas Island District High School, Keep Australia Beautiful Council (KABC) WA, and the Shire of Christmas Island. This vital work was made possible through the support of the Indian Ocean Territories Marine Park Grants, administered by Australian Marine Parks.

CHRISTMAS ISLAND
SITE MAP

KEY

Community Marine Debris Clean-up Site

Quarterly Marine Debris Monitoring Site

METHODOLOGY

Beach debris accumulation is a dynamic process with many factors (e.g. wind speed and direction) playing an important role. Determining which factors drive debris accumulation at a given location is essential to understanding localised or seasonal hazards for shipping or wildlife, anticipating potential impacts debris may have on local communities and tourism, and ensuring debris removal and other conservation efforts are appropriately timed.

To understand debris accumulation patterns on beaches, monitoring is essential. Monitoring involves conducting debris surveys at consistent, regular intervals to build reliable long-term datasets. Monitoring sites were set-up around Christmas Island: Dolly Beach, Flying Fish Cove, Greta Beach and Merrial Beach, with monitoring conducted quarterly from September 2023 to September 2025. Micro-debris (1–5 mm) is also sampled biannually at each site using AUSMAP methodology. The Australian Marine Debris Initiative (AMDI) monitoring methodology uses four fixed transects, with all items within these transects being meticulously counted and categorised.

Regular Monitoring Is Essential

1. It establishes high-quality, long-term datasets that support scientific research.
2. Improves understanding of debris trends within each management area.
3. Provides evidence to set prevention and mitigation targets and to evaluate the effectiveness of interventions and source-reduction measures.
4. Helps determine how debris moves through the litter pathway, including quantities, sources, accumulation points, and changes over time.
5. Generates robust data to inform local and global action on marine debris.

Community clean-ups are also regularly conducted at these and other sites around the island to remove as much debris as possible. See page 24 for more information.

Image: *Volunteers looking for microplastic marine debris.*

2023-2025 HIGHLIGHTS

23-25 IOT MARINE DEBRIS INITIATIVE

45
COMMUNITY CLEAN-UPS

35
MONITORING SURVEYS

781
VOLUNTEERS

6200
WEIGHT REMOVED

122.2
KILOMETRES COVERED

1903
VOLUNTEER HOURS

62,933
VOLUME (L) MARINE DEBRIS REMOVED

550,910
MARINE DEBRIS ITEMS REMOVED

MARINE DEBRIS MONITORING

During the monitoring events between September 2023 and September 2025, a total of **189,537 items** weighing **788.7 kg** were removed and recorded in the AMDI Database (Table 2). The most common 'problematic' debris items were consistent across sites and years, with the two most frequently encountered items being hard plastic remnants (i.e., fragments of larger unknown items) and foam insulation and packaging (Table 2).

Image: *Greta Beach (Sept 2025) showing the debris levels in transects before and after sampling.*

Table 1: Item count and weight (kg) of macro-debris items (>5 mm) removed and entered into the AMDI Database during monitoring at each of the five beaches on Christmas Island (September 2023-2025). The top three most commonly encountered items are also reported.

	2023-2025		Most common items (top 3)		
Beach	**Item Count**	**Weight (kg)**	**1st**	**2nd**	**3rd**
Greta	164554	551.6	Hard plastic remnants	Foam insulation & packaging	Plastic lids and bottle caps
Dolly*	17555	87.44	Hard plastic remnants	Foam insulation & packaging	Plastic lids and bottle caps
Flying Fish Cove	848	29.96	Hard plastic remnants	Foam insulation & packaging	Soft plastic film remnants
Merrial	6579	2.22	Foam insulation & packaging	Rubber remnants	Hard plastic remnants
TOTAL	**189536**	**671.22**	**Hard plastic remnants**	**Foam insulation & packaging**	**Plastic lids and bottle caps**

*Dolly Beach was not accessible for monitoring in September 2025 as the track was closed for maintenance by Parks Australia.

MONITORING TRENDS

Christmas Island has two distinct seasons during which monitoring studies were conducted. Dry-season sampling occurred in June and September, while wet-season sampling occurred in December and March.

Figure 1 highlights the noticeable difference in the total average number of items collected from transect studies. During the wet season, the average number of items collected shows only a minor increase. In contrast, the average weight of debris removed (Figure 2) remains relatively stable during the wet season, suggesting a shift in debris composition, with fewer larger items present. However, during the dry season, transect studies reveal a consistent upward trend in both average debris weight and item counts over time, strongly indicating that the majority of debris originates from long-range transport rather than local sources.

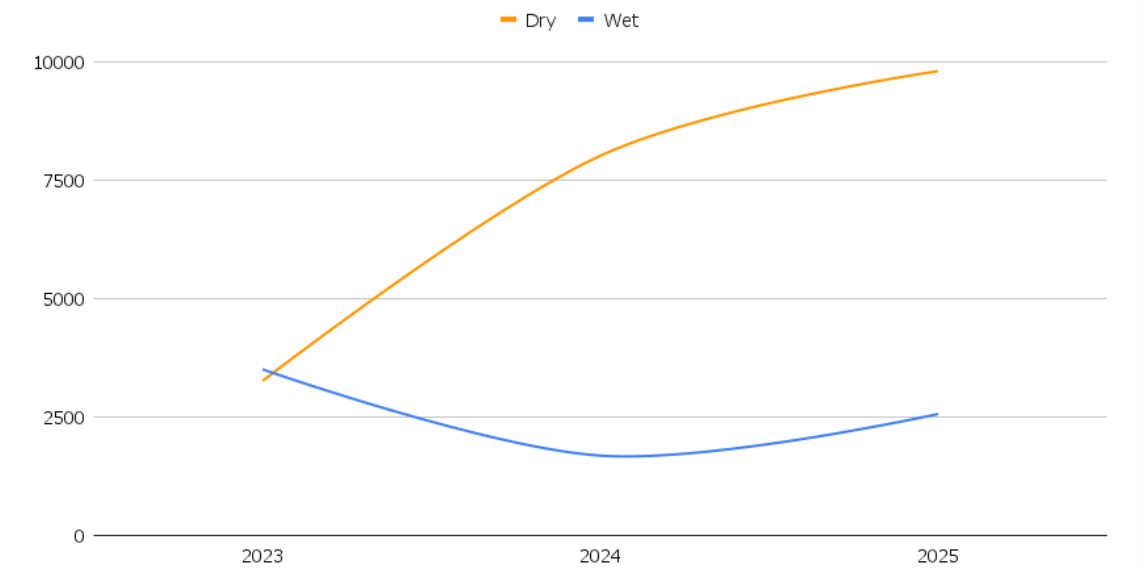


Figure 1: Averaged item counts from monitoring site sampling.

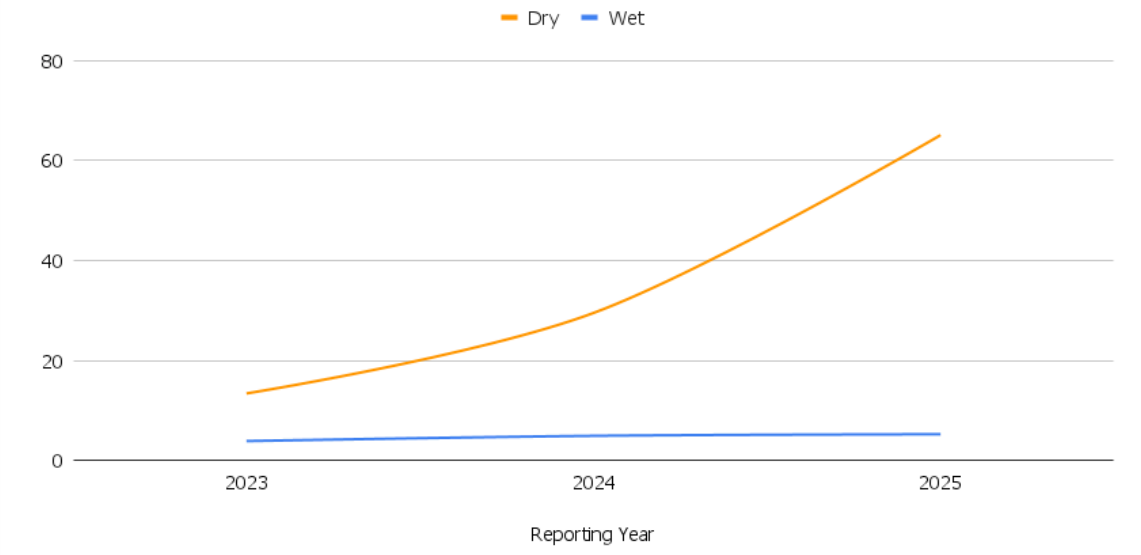


Figure 2: Average Kg of debris from monitoring site sampling.

Debris Density

The average density in items/m2 indicates that the size range of the debris items has changed over time, with a spike in 2024 largely due to Greta Beach being heavily impacted by over 33,000 hard plastic remnant items. The transect sample area in the wet season has shown a slight upward trend, also indicating the shift in item composition size.

The pronounced seasonal differences in debris deposition are largely driven by prevailing easterly winds and the westward-flowing South Equatorial Current (SEC) across the Indian Ocean, which transports marine debris from distant regions, including Southeast Asia and the broader Indo-Pacific.

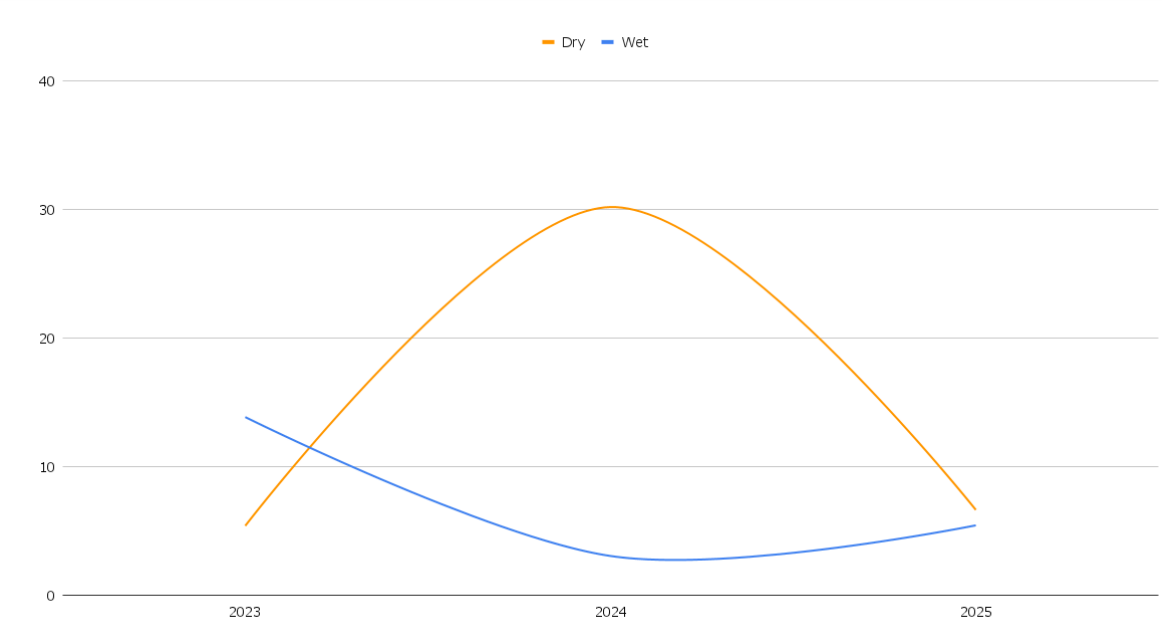


Figure 3: Average debris density per m2.

Image: *The local community came together for a community clean-up on Greta Beach.*

MATERIAL TYPES
ON CHRISTMAS ISLAND

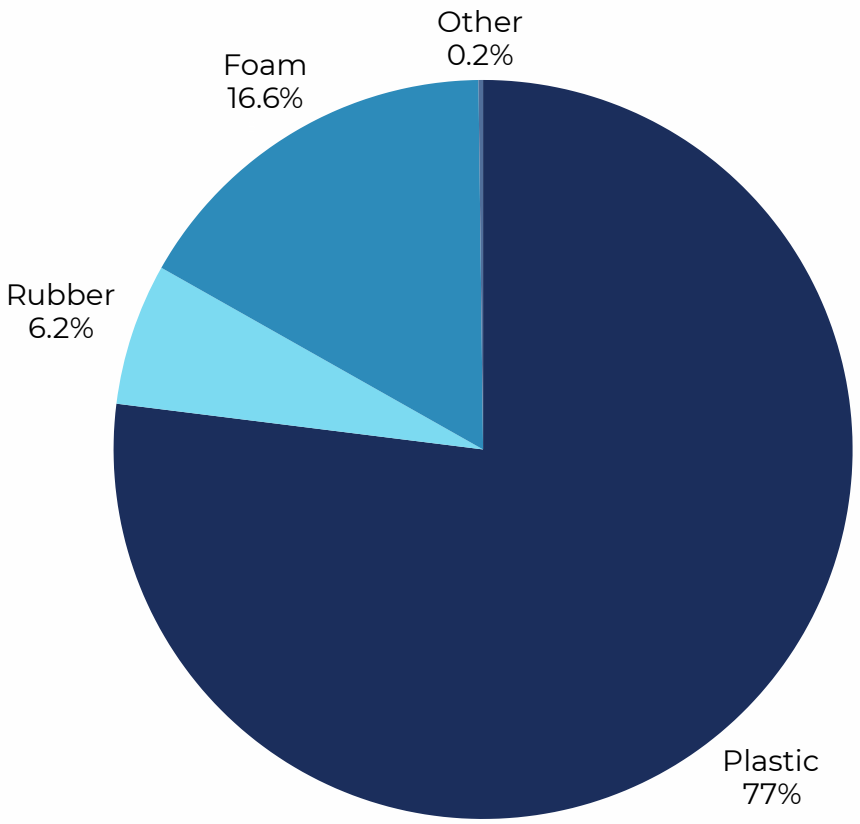


Figure 4: Material breakdown summary for monitoring sites at Christmas Island 2023-2025.

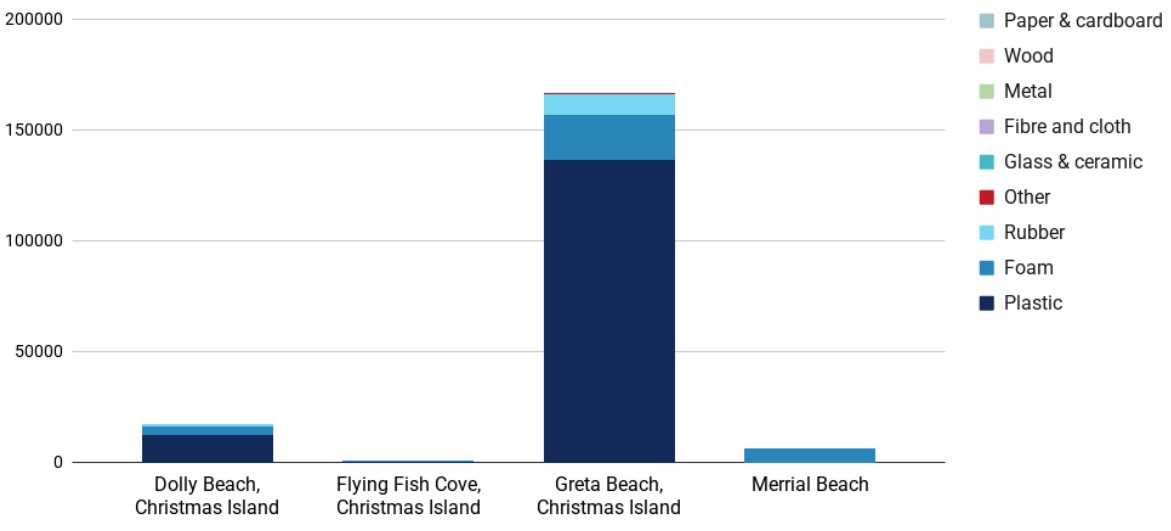


Figure 5: Material breakdown per site for monitoring sites at Christmas Island 2023-2025.

Project Summary

Greta Beach

Images: *Staff member Renee with a seahorse shaped toy found on at Greta Beach (right), marine debris on Greta Beach (below).*

Table 2: Summary statistics per year at Greta Beach.

Reporting Year	Total Weight (Kg)	Volume (L)	Total Event Days
2023	**70.75**	**636.16**	**2**
2024	**220.27**	**2031.12**	**4**
2025	**360.55**	**2560.9**	**3**
Grand Total	**651.57**	**5288.2**	**9**

Table 3: Top 10 items found per year at Greta Beach.

Marine Debris Items	2023	2024	2025
Hard plastic remnants	11054	33154	55725
Foam insulation & packaging (whole and remnants)	1271	14651	4142
Plastic lids and bottle caps, pump spray, flow restrictor & similar	2077	5561	4404
Rubber remnants	421	5494	2804
Plastic straws, confection sticks, cups, plates & cutlery	1844	3037	2795
Soft plastic film remnants	500	1656	2724
Plastic packaging food (wrap, packets, containers)	436	628	1761
Burnt plastic remnants	79	927	1325
Personal care & pharmaceutical packaging	188	658	401
Rubber footwear & thongs	78	404	350

Project Summary

Greta Beach

Seasonal Analysis

At Greta Beach, seasonal patterns reveal clear differences in debris trends between 2023 and 2025. During the wet season (October-April), average debris density, weight, and volume remained relatively consistent across all three years (Figures 6-8). In contrast, the dry season (May-September) shows an upward trajectory in both debris weight and volume, which increased steadily from 2023 to 2025. Debris density/m2 peaked sharply in 2024. This spike suggests a higher proportion of smaller debris items entering the site that year. Table 3 supports this interpretation, with foam insulation fragments increasing more than 11.5x between 2023 and 2024 before dropping 3.5x in 2025. Similar increases in plastic lids, rubber remnants, and plastic straws were also recorded in 2024.

Figure 6: Average density/m2 of debris per year at Greta Beach.

Figure 7: Average weight (kg) of debris per year at Greta Beach.

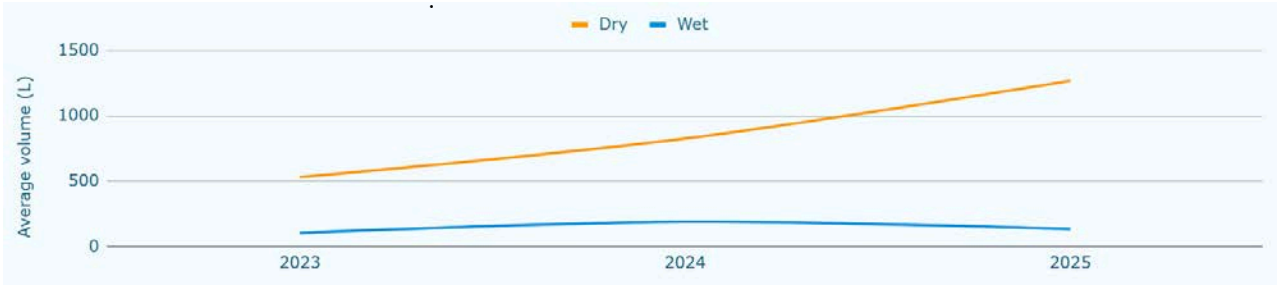


Figure 8: Average volume (L) of debris per year at Greta Beach.

Project Summary
Dolly Beach

Images: *Rope found on Dolly Beach (right), marine debris at Dolly Beach (bottom).*

Table 4: Summary statistics per year at Dolly Beach.

Reporting Year	Total Weight (Kg)	Volume (L)	Total Event Days
2023	**8.37**	**95.2**	**2**
2024	**37.5**	**366.8**	**4**
2025	**41.57**	**392**	**2**
Grand Total	**87.44**	**854**	**8**

Table 5: Top 10 items found per year at Dolly Beach.

Marine Debris Items	2023	2024	2025
Hard plastic remnants	1168	4709	2495
Foam insulation & packaging (whole and remnants)	420	1866	1534
Plastic lids and bottle caps, pump spray, flow restrictor & similar	258	635	714
Plastic straws, confection sticks, cups, plates & cutlery	210	480	421
Rubber remnants	121	378	392
Soft plastic film remnants	46	198	137
Burnt plastic remnants	42	124	79
Personal care & pharmaceutical packaging	12	106	93
Rubber footwear & thongs	8	61	56
Plastic packaging food (wrap, packets, containers)	24	54	42

Project Summary

Dolly Beach

Seasonal Analysis

At Dolly Beach, seasonal patterns reveal similar trends across all three recorded metrics (density/m2, weight (kg), and volume (L)). Similarly to Greta Beach, Dolly Beach observed significantly higher debris loads in the dry season (May-September) compared to the wet season (October-April, Figures 9-11). Debris loads increased progressively from 2023 to 2025, and while item counts for the top two items peaked in 2024 (Table 5), this fluctuation did not alter the broader upward trajectory.

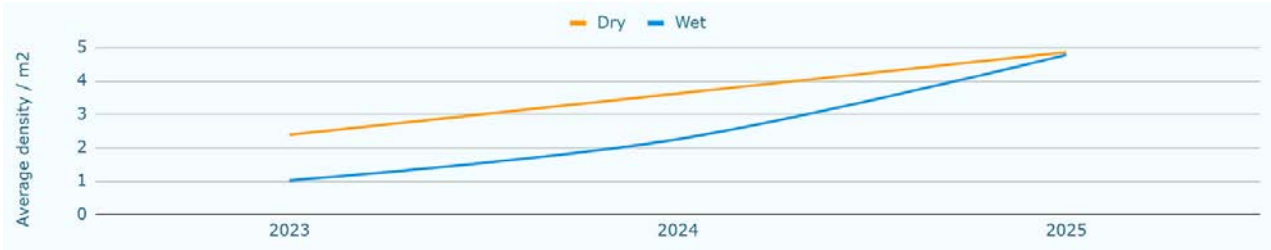


Figure 9: Average density/m2 of debris per year at Dolly Beach.

Figure 10: Average weight (kg) of debris per year at Dolly Beach.

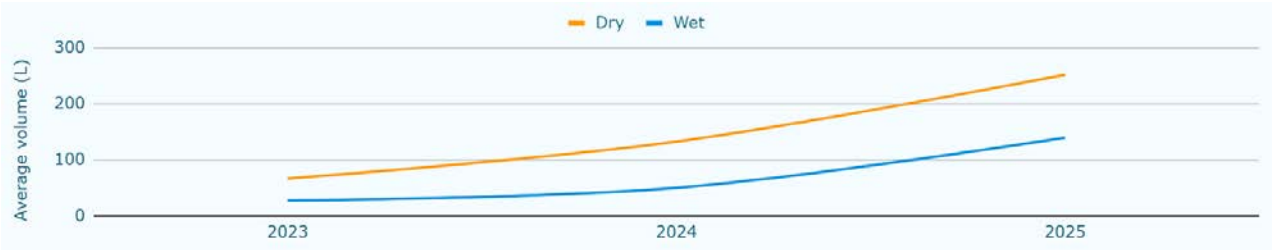


Figure 11: Average volume (L) of debris per year at Dolly Beach.

Project Summary
Flying Fish Cove

Images: *Tangaroa Blue staff and volunteers tackling marine debris at Flying Fish Cove. Below: Flying Fish Cove.*

Table 8: Summary statistics per year at Flying Fish Cove.

Reporting Year	Total Weight (Kg)	Volume (L)	Total Event Days
2023	0.19	4.48	2
2024	2.5	41.50	4
2025	27.3	415.22	3
Grand Total	30	461.5	9

Table 9: Top 10 items found per year at Flying Fish Cove.

Marine Debris Items	2023	2024	2025
Hard plastic remnants	11	122	186
Foam insulation & packaging (whole and remnants)	3	57	51
Soft plastic film remnants	31	64	14
Plastic lids and bottle caps, pump spray, flow restrictor & similar	4	30	11
Plastic straws, confection sticks, cups, plates & cutlery	4	20	19
Plastic packaging food (wrap, packets, containers)	6	7	20
Rubber remnants	6	16	8
Plastic electrical cable, connectors & fittings	13	8	5
Burnt plastic remnants	3	2	10
Synthetic rope & net scraps remnants less than 1 metre	1	6	6

Project Summary
Flying Fish Cove

Seasonal Analysis

At Flying Fish Cove, seasonal trends mirrored those at Greta Beach , with higher debris loads in the dry season, and a peak in average debris density/m2 in 2024 (Figures 15-17). However, because this site is located on the island's western side (unlike Greta Beach, Dolly Beach, and on the eastern coast), it receives substantially lower overall debris.

Debris weight and volume were minimal in both 2023 and 2024, but notably, both metrics increased approximately tenfold between 2024 and 2025, indicating a recent rise in the accumulation of debris at this otherwise low-impact site.

Figure 15: Average density/m2 of debris per year at Flying Fish Cove.

Figure 16: Average weight (kg) of debris per year at Flying Fish Cove.

Figure 17: Average volume (L) of debris per year at Flying Fish Cove.

Project Summary
Merrial Beach

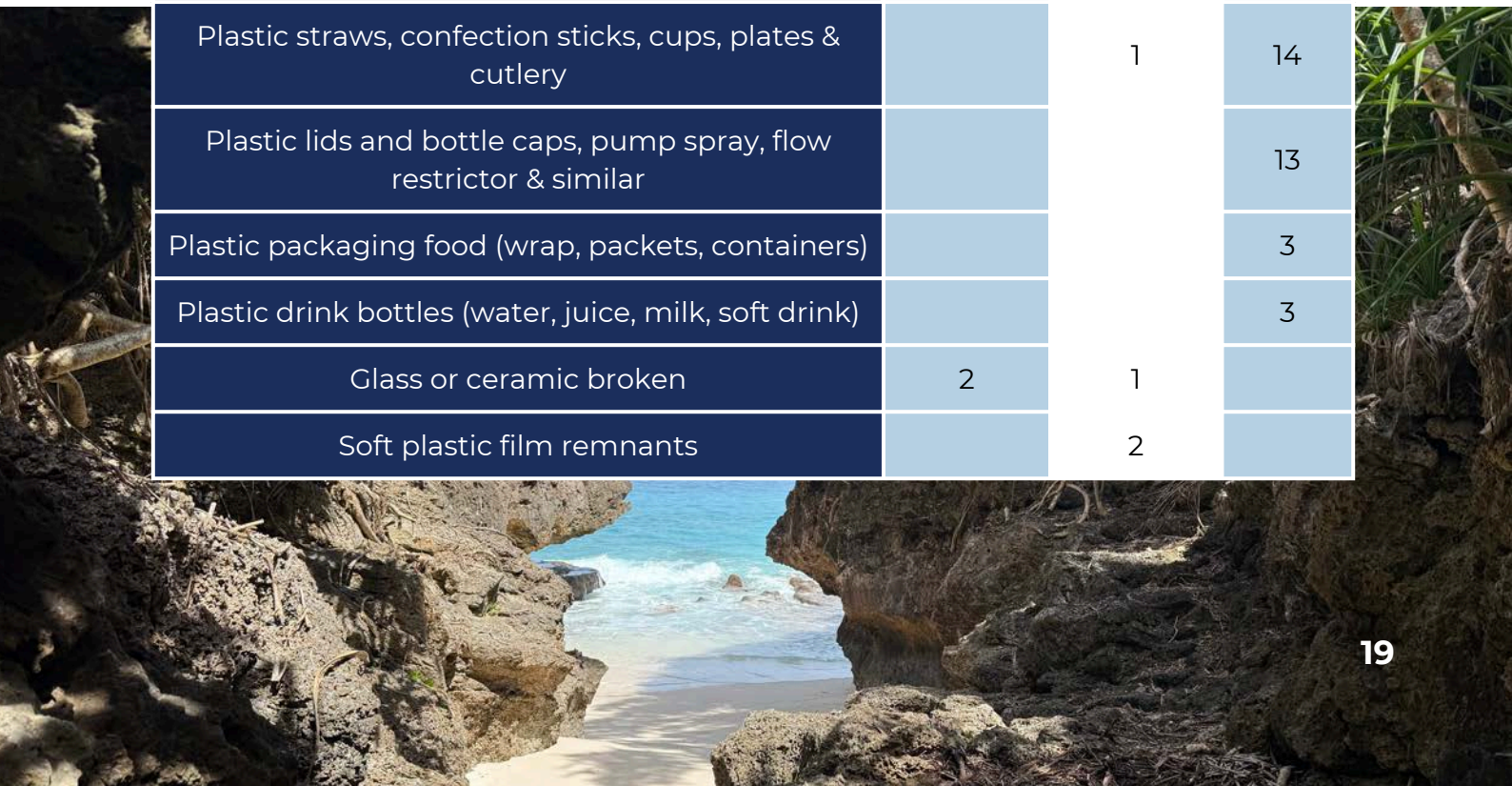
Images: *Marine debris found at Merrial Beach (right), Merrial Beach (below).*

Table 10: Summary statistics per year at Merrial Beach.

Reporting Year	Total Weight (Kg)	Volume (L)	Total Event Days
2023	0.08	1.68	3
2024	0.26	1.23	4
2025	1.88	34.16	3
Grand Total	2.2	37.07	10

Table 11: Top 10 items found per year at Merrial Beach.

Marine Debris Items	2023	2024	2025
Foam insulation & packaging (whole and remnants)	5787	427	179
Rubber remnants	4	17	50
Hard plastic remnants		3	42
Rubber footwear & thongs		3	14
Plastic straws, confection sticks, cups, plates & cutlery		1	14
Plastic lids and bottle caps, pump spray, flow restrictor & similar			13
Plastic packaging food (wrap, packets, containers)			3
Plastic drink bottles (water, juice, milk, soft drink)			3
Glass or ceramic broken	2	1	
Soft plastic film remnants		2	



Project Summary
Merrial Beach

Seasonal Analysis

Merrial Beach, located on the far western side of Christmas Island, received the lowest debris loads of all five monitoring sites, with most items consisting of foam insulation and packaging materials (Table 11). As observed at Flying Fish Cove, debris weight and volume were minimal in 2023 and 2024. However, both increased sharply in 2025, with weight rising sevenfold and volume increasing by a factor of 27. As with the other sites, the dry season carried more debris to Christmas Island compared to the wet season, though unusually, the average debris density/m2 was higher in the wet season in 2023 (Figure 18).

Figure 18: Average density/m2 of debris per year at Merrial Beach.

Figure 19: Average weight (kg) of debris per year at Merrial Beach.

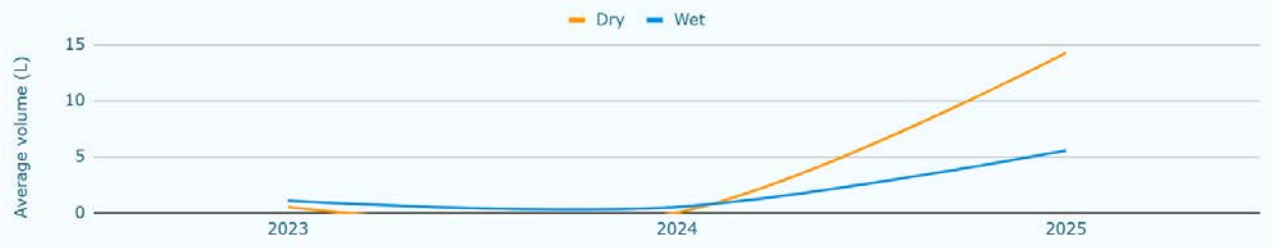


Figure 20: Average volume (L) of debris per year at Merrial Beach.

WHITE PAPER:

Wind Speed and Direction Influence Beach Plastic Accumulation Patterns on Remote Christmas Island

In October 2025, a new research article authored by the Tangaroa Blue Foundation team was published in the international journal *Marine Pollution Bulletin*.

Using three years of data (2023-2025) from the Christmas Island Marine Debris Initiative, this paper highlights the value of strategic and structured monitoring programs that encompass multiple sites and years.

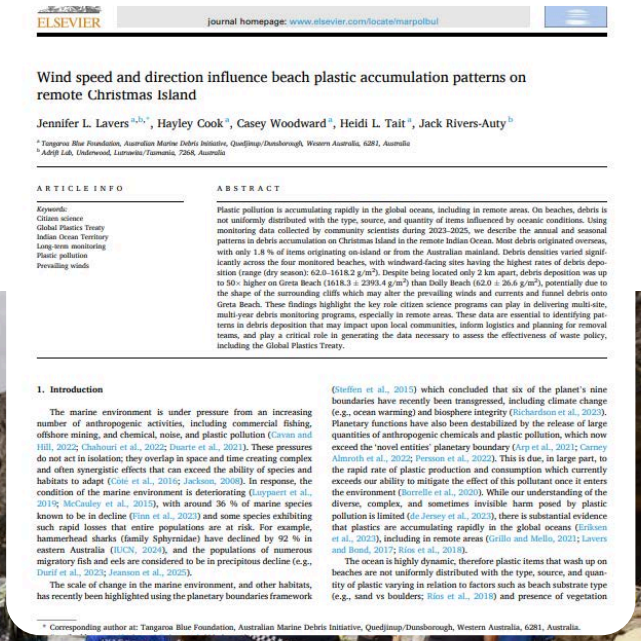
Data (quarterly monitoring) from four out of five of the monitoring beaches on Christmas Island was analysed for the paper. Distinct patterns were identified, even over small distances, with Greta Beach experiencing roughly 25 times the level of debris compared with Dolly Beach, despite these locations being only 2 km apart.

Images: *Volunteers and students from Christmas Island District High School piling driftwood on Greta Beach so that debris can be accessed.*

Wind (speed, direction) was also found to be an important factor influencing when and where debris washes up, with south-easterly facing beaches exposed to the prevailing winds. Overall, debris loads on beaches were substantially higher during the dry (winter) season, and this has important implications for budgeting and logistics (e.g., planning debris removal events such as those featured in this report).

The majority of debris originated in South-East Asia, with <2% of items likely to have originated locally.

This information is critical to mitigation planning, as it suggests global policy and legislation is required to address the marine debris problem on Christmas Island, such as the Global Plastics Treaty.



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Wind speed and direction influence beach plastic accumulation patterns on remote Christmas Island

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ABSTRACT

Plastic pollution is accumulating rapidly in the global oceans, including in remote areas. On beaches, debris is not uniformly distributed with the type, source, and quantity of items influenced by oceanic conditions. Using monitoring data collected by community scientists during 2023–2025, we describe the annual and seasonal patterns in debris accumulation on Christmas Island in the remote Indian Ocean. Most debris originated overseas, with only 1.8 % of items originating on-island or from the Australian mainland. Debris densities varied significantly across the four monitored beaches, with windward-facing sites having the highest rates of debris deposition (range (dry season): 62.0–1618.2 g/m²). Despite being located only 2 km apart, debris deposition was up to 50× higher on Greta Beach (1618.3 ± 2393.4 g/m²) than Dolly Beach (62.0 ± 26.6 g/m²), potentially due to the shape of the surrounding cliffs which may alter the prevailing winds and currents and funnel debris onto Greta Beach. These findings highlight the key role citizen science programs can play in delivering multi-site, multi-year debris monitoring programs, especially in remote areas. These data are essential to identifying patterns in debris deposition that may impact upon local communities, inform logistics and planning for removal teams, and play a critical role in generating the data necessary to assess the effectiveness of waste policy, including the Global Plastics Treaty.

1. Introduction

The marine environment is under pressure from an increasing number of anthropogenic activities, including commercial fishing, offshore mining, and chemical, noise, and plastic pollution (Cavan and Hill, 2022; Chahouri et al., 2022; Duarte et al., 2021). These pressures do not act in isolation; they overlap in space and time creating complex and often synergistic effects that can exceed the ability of species and habitats to adapt (Côté et al., 2016; Jackson, 2008). In response, the condition of the marine environment is deteriorating (Luypaert et al., 2019; McCauley et al., 2015), with around 36 % of marine species known to be in decline (Finn et al., 2023) and some species exhibiting such rapid losses that entire populations are at risk. For example, hammerhead sharks (family Sphyrnidae) have declined by 92 % in eastern Australia (IUCN, 2024), and the populations of numerous migratory fish and eels are considered to be in precipitous decline (e.g., Durif et al., 2023; Jeanson et al., 2025).

The scale of change in the marine environment, and other habitats, has recently been highlighted using the planetary boundaries framework (Steffen et al., 2015) which concluded that six of the planet's nine boundaries have recently been transgressed, including climate change (e.g., ocean warming) and biosphere integrity (Richardson et al., 2023). Planetary functions have also been destabilized by the release of large quantities of anthropogenic chemicals and plastic pollution, which now exceed the 'novel entities' planetary boundary (Arp et al., 2021; Carney Almroth et al., 2022; Persson et al., 2022). This is due, in large part, to the rapid rate of plastic production and consumption which currently exceeds our ability to mitigate the effect of this pollutant once it enters the environment (Borrelle et al., 2020). While our understanding of the diverse, complex, and sometimes invisible harm posed by plastic pollution is limited (de Jersey et al., 2023), there is substantial evidence that plastics are accumulating rapidly in the global oceans (Eriksen et al., 2023), including in remote areas (Grillo and Mello, 2021; Lavers and Bond, 2017; Ríos et al., 2018).

The ocean is highly dynamic, therefore plastic items that wash up on beaches are not uniformly distributed with the type, source, and quantity of plastic varying in relation to factors such as beach substrate type (e.g., sand vs boulders; Ríos et al., 2018) and presence of vegetation

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MICROPLASTICS
AUSMAP ASSESSMENT

The Australian Microplastic Assessment Project (AUSMAP) is a program which uses citizen science to document microplastic pollution.

Microplastic loads varied across sites, seasons, and years. Based on 2023-2025 averages, the most heavily polluted sites were Greta Beach (764 mp/m²) and Dolly Beach (631 mp/m²), both exposed open-facing sites likely acting as catchments for debris transported via prevailing currents. In contrast, Merrial Beach and Flying Fish Cove recorded the lowest average pollution, with 71 mp/m² and 33 mp/m² respectively. Wet season averages were typically higher than dry season results, suggesting storm-driven deposition. Polystyrene foam fragments were the dominant plastic type found across the island, comprising 42-100% of mean site averages of microplastics collected. Hard plastic fragments also contributed significantly to overall microplastic loads at most sites, typically accounting for 9-28% of plastics recorded.

Overall, the level of microplastic contamination (i.e., density in mp/m2) detected on Christmas Island was concerning, with two of the beaches (Greta Beach and Dolly Beach) recording microplastic densities that fall within the “High Hotspot” range based on AUSMAP’s criteria (i.e., 251-1000 mp/m2; Table 12).

Monitoring Site	Season	2023		2024		2025		Seasonal Average	Overall Average
Flying Fish Cove	Wet	-	-	Mar	12	Mar	0	6	33
	Dry	Aug	116	Sep	4	-	-	60	
Greta Beach	Wet	-	-	Mar	1140	Mar	769	955	764
	Dry	Aug	825	Jun	321	-	-	573	
Dolly Beach	Wet	-	-	Mar	312	Mar	1531	922	631
	Dry	Aug	187	Sep	495	-	-	341	
Merrial Beach	Wet	-	-	-	-	Mar	0	0	71
	Dry	Sep	177	Sep	37	-	-	107	

Table 12: Microplastic (1 - 5 mm) density (mp/m2) estimates for five beaches on Christmas Island during 2023-2025. Using the AUSMAP method which requires three quadrats (Q) to be sampled at each site. Data adapted from AUSMAP (2025). Colour Grading: 0-10 mp/m2 Good (Green), 11-50 mp/m2 Low (Yellow). 51-250 mp/m2 Moderate (Orange), 251-1000 mp/m2 High (Red).

MICROPLASTICS
AUSMAP ASSESSMENT

The Australian Microplastic Assessment Project (AUSMAP) is a program which uses citizen science to document microplastic pollution.

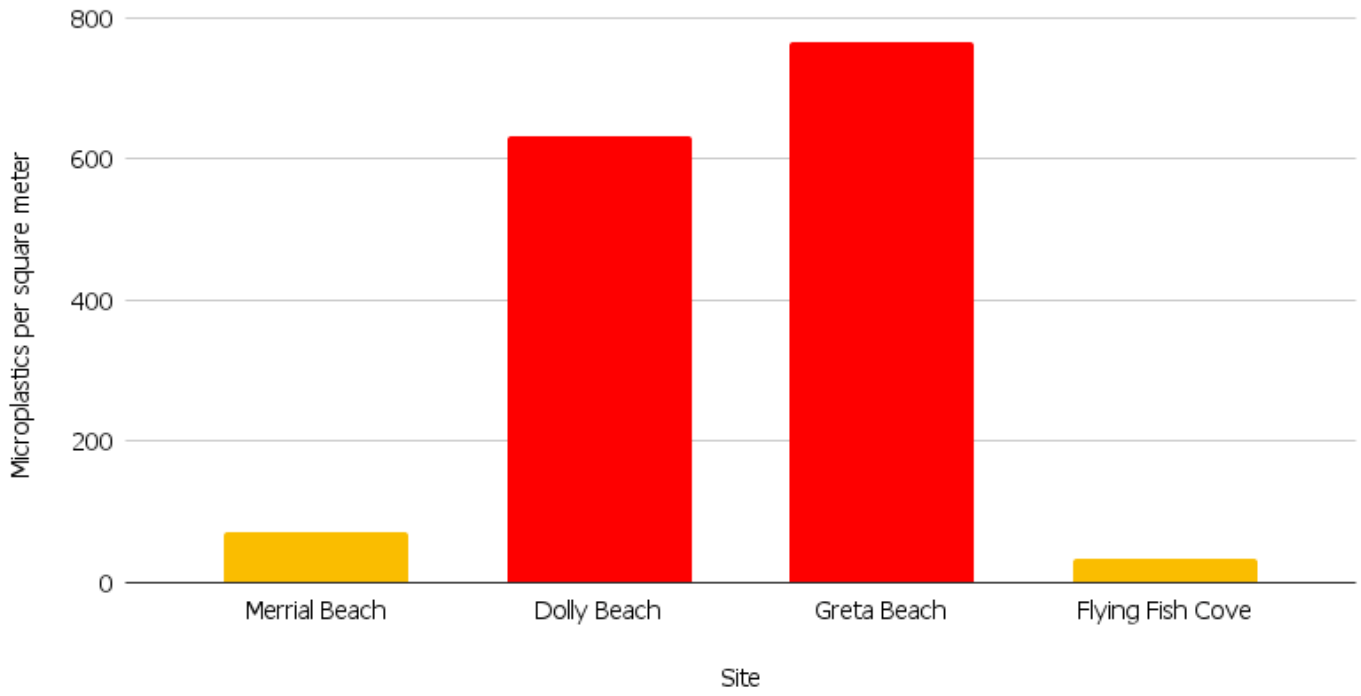


Figure 21: Microplastic loads for five beaches on Christmas Island (average across 2023-2025, including both wet and dry seasons). Colours reflect AUSMAP's microplastic debris load categories: orange is 51-250 items per m2 (Moderate) and red is 251-1000 items per m2 (High). Data adapted from AUSMAP (2025).

Image: *Tangaroa Blue Project Coordinator Hayley and volunteers conducting microplastic sampling.*

COMMUNITY CLEAN-UPS

Beyond the formal monitoring, the project significantly amplified its community engagement and debris removal efforts. This included facilitating local community clean-up events outside the main monitoring transects, and coordinating three major annual clean-up voyages (August 2023, June 2024, and June 2025) which strategically targeted critical, high-priority zones.

Image: *Volunteers at a community beach clean-up.*

This extensive collaborative work mobilised 545 volunteers who dedicated 1393 total hours. Their effort led to the manual removal of 5200.45 tonnes (53m3) of marine debris, often requiring the hand-transport of substantial loads across challenging terrain.

Image: *Tangaroa Blue Coordinator Ian cleaning-up flip-flops off the beach.*

Participants in the Christmas Island voyages collaborated closely with KABC WA, Christmas Island District High School students, Parks Junior Rangers, Federal Police, Parks Australia, and other community members. These engagements fostered valuable connections, allowing volunteers to learn about island life and residents to gain insight into the Tangaroa Blue Foundation's work across Australia. The voyages also provided a tangible economic boost to the island through the utilisation of local accommodation, venues, car hire, and catering services. Volunteer feedback on both the major voyages and the community clean-ups was overwhelmingly positive, underscoring the success of these collaborative, networking opportunities.

COMMUNITY CLEAN-UPS

Data and Impact

All clean-up data has been entered into the Australian Marine Debris Initiative (AMDI) Database, strengthening community reporting and supporting targeted source-reduction planning. This information also contributes to broader policy discussions focused on addressing marine debris at its source.

Reporting Year	Total Weight (Kg)	Total Length (m)	Volume (L)	Total Volunteers	Volunteers * Duration	Count of clean-up activities
2023	1303.2	2445.24	13189	168	341	14
2024	1684.88	7296.48	17752	190	459.5	12
2025	2136.12	1184.6	21504	188	592.5	10
Grand Total	5124.2	10926.32	52445	546	1393	36

Table 13: Summary statistics for community clean-ups per year.

Images: *Volunteers at community beach clean-ups sorting marine debris at Flying Fish Cove (above). Volunteers in front of marine debris they have collected from Greta Beach in 2024 (below).*

VOLUNTEER VOYAGES

Across the project, three large-scale volunteer clean-up voyages were delivered annually during the peak debris season from May to August. These voyages brought off-island volunteers to Christmas Island to work alongside the local community in major clean-up operations, focusing on removing as much debris as possible from priority marine debris hotspots.

Image: *The 2025 voyage team poses with marine debris collected from Flip Flop Beach.*

June 2025 Voyage

The 2025 Christmas Island large-scale volunteer clean-up voyage was held from 21–28 June 2025, led by Christmas Island Project Coordinator Hayley Cook, with support from off-island Tangaroa Blue coordinators Ian Anderson and Renee Mouritz and a team of 8 volunteers who had made their way to the island for an experience to remember.

Tangaroa Blue Foundation partnered with Keep Australia Beautiful WA and Christmas Island District High School to conduct a clean-up at Greta Beach, while Flip-Flop Beach and Ethel Beach clean-ups were open to the general public. A Tangaroa Blue-led community clean-up was held at Flying Fish Cove with Year 7 students and teachers, and general collections took place at Dolly Beach with the voyage volunteer team.

Image: *The 2025 voyage team walking down to clean-up Greta Beach.*

Additional activities included volunteers staffing a stall at the Tangaroa Blue Foundation-sponsored screening of Women & The Wind at the local cinema and rescuing a Red-Footed Booby, “Floof,” which was delivered to the Seabird Rehabilitation Centre at the Christmas Island Parks Australia head office, and has since successfully fledged.

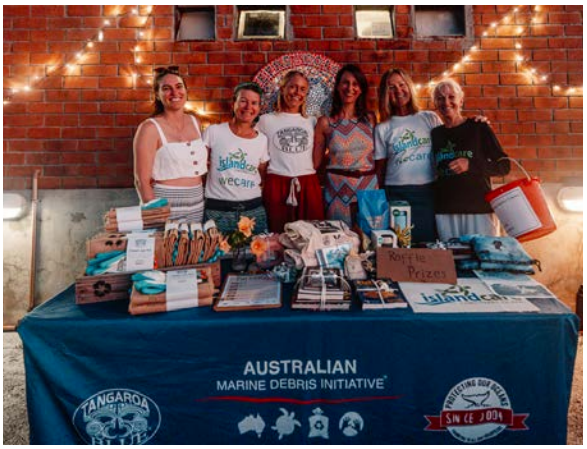
The voyage removed 5124.2kg of marine debris (estimated to be more than 27,500 items) and engaged 118 participants.

COMMUNITY EDUCATION AND AWARENESS

Through this project, community members (including students), volunteers, and tourists also received training in data collection and reporting and 31 engagement activities were held on the island, including community presentations and workshops. A marine educational brochure, designed by a local graphic artist, was also created as part of this project along with two videos that celebrate the role of volunteers in protecting the marine environment from plastic debris.

Activity Type	Total Activities Delivered
Stakeholder group meetings	17
Community presentations	6
Marine debris and AMDI training workshops	6
Source reduction plan workshops	2

Table 14: Activity types and number of activities delivered across project lifespan.



Ocean Film Festival

The Tangaroa Blue Foundation presented the Ocean Film Festival to Christmas Island residents on 22nd March 2025 at the Christmas Island Outdoor Cinema, with 108 attendees. A Tangaroa Blue Foundation stall was also present at the event, with lots of interaction with the community (pictured on left).

Women and The Wind

A free film screening of 'Women & The Wind' was delivered for the Christmas Island community on 21st June 2025 during the volunteer voyage, with 52 attendees. The film documents three young women's epic journey across the North Atlantic on a 50-year-old wooden catamaran.

COMMUNITY EDUCATION AND AWARENESS

Community Presentations

Throughout the project, community presentations have played a crucial role in engaging and educating local community members on marine debris issues and data collection methodologies. These presentations provided valuable insights into the impacts of marine debris and fostered a sense of custodianship among community members. Presentation topics included:

- **Project ReCon** - a world-first program that uses retrieved and repurposed satellite technology to track and remove deadly and destructive ghost gear.
- Impacts of marine debris on seabirds in the Houtman Abrolhos National Park - a presentation by Alanah Campbell from the Northern Agricultural Catchments Council.
- **AUSMAP** - a presentation about the impact of microplastics on our marine environment and a workshop on how to accurately collect microplastic samples.
- Marine Debris Rope Shade Workshop - a presentation by Tangaroa Blue Ambassador Bernadette Davis. Participants learned to create their own marine debris lampshades using ropes found during clean-ups.
- Seabird rehabilitation training day with Dr Felicity Bradshaw - an opportunity to share knowledge about seabird husbandry with the volunteers who care for our sick and injured seabirds brought into the rehabilitation facility on Christmas Island.

Images: *Top: Tangaroa Blue Coordinator, Hayley Cook, during the Seabird Rehabilitation training day. Middle: Alanah Campbell presenting on impacts of marine debris on seabirds in the Houtman Abrolhos. Bottom: AUSMAP training day.*

SOURCE REDUCTION PLANS

A Tangaroa Blue SRP (Source Reduction Plan) is an initiative designed to prevent marine debris by reducing waste at its source. These programs engage communities, schools, and businesses in practical strategies to minimise single-use plastics and other litter before it reaches the environment, supporting our broader mission of marine debris prevention. **During this project three SRPs were developed for implementation on Christmas Island.**

Project ReCon

Project ReCon aims to repurpose “smart buoys” that aren't able to be recovered from the ocean by the fishing companies who use them. Through partnering with international technology company, Satlink, satellite technology is used to tag and track ghost nets (abandoned, lost, or discarded fishing nets/gear) while retrieval teams (including TBF staff) are mobilised to remove them. An information poster developed by TBF to describe the process of repurposing ReCon buoys is provided below.

In 2025, the Project ReCon program on Christmas Island was in the early stages of development and implementation. As a result, activities largely focused on hosting meetings/workshops that aimed at introducing the project to stakeholders and community members. As a result of these activities, the Christmas Island community is now aware of what a FAD and buoy look like and how to report it via AMDI. If one is found, we will work with the community and Satlink to see if it can be repurposed (i.e., whether it is still functional) with the aim to use it to track ghost gear, or for local conservation projects.

Image: *Informational poster on Project ReCon.*

SOURCE REDUCTION PLANS

The Esky Library Initiative

The Indian Ocean Territories face a major waste challenge from single-use expanded polystyrene (EPS) eskies used for freighted fresh food. Each year, around 216 cubic metres of discarded EPS (equivalent to 901 wheelie bins) fills local landfill sites, and EPS is consistently one of the most common items found during local coastal clean-ups. To help address this, a new circular, reusable alternative has been launched - the Esky Library SRP.

What is the Esky Library?

The Esky Library is a shared, community-based lending system for reusable KoolPak eskies, designed to replace disposable EPS boxes. Customers and businesses borrow a KoolPak for food freight, return it empty, and the esky is then reused for the next delivery. This approach aims to dramatically cut waste and reduce pollution.

Images: *Esky Trial participants with their food deliveries.*

Why KoolPak Eskies?

TomKat KoolPaks are a durable, traceable, and fully recyclable alternative to single-use polystyrene. Each esky has been market-tested to withstand multiple reuses compared to EPS boxes that are used once and discarded. Integrated near field communication (NFC) and temperature-logging tags allow simple mobile-phone scanning, supporting transparent tracking, supply-chain monitoring, and recycling at end of life. The units are also 90%+ post-consumer recycled content, and the producer provides a cash refund for each esky recycled.

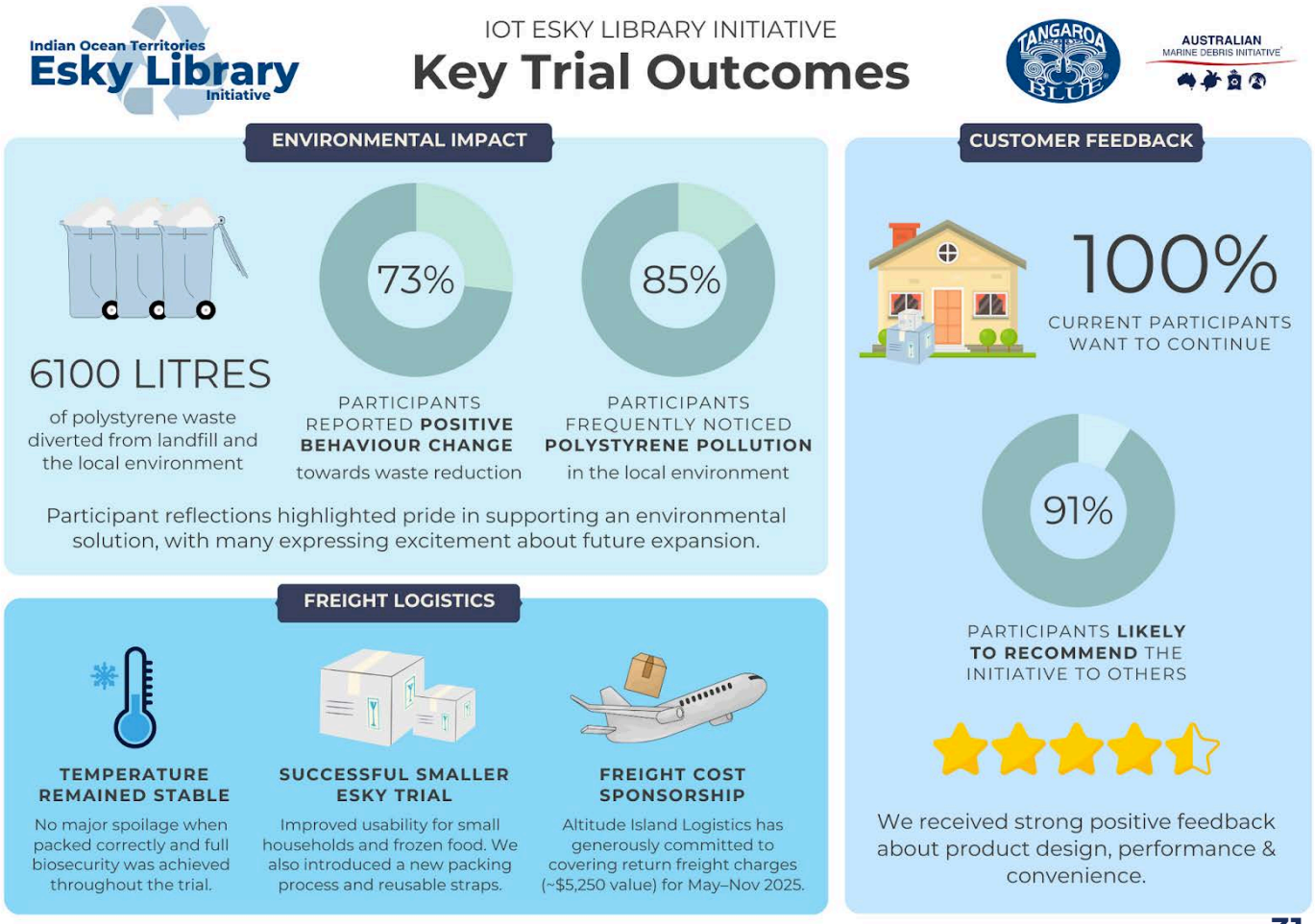
The Esky Library Project Phases

The Esky Library is being rolled out in three stages:

Phase 1 (Febuary – April 2025)
A small-scale pilot on Christmas Island that trialled the reusable esky system with 23 participants, achieving six successful rotations, 135 reusable eskies in circulation, and 6,187 L of EPS waste prevented from coming to the island. Feedback was also gathered on design, operations, and technology needs, with multiple stakeholders involved, including Hambleys IGA, FreightShop, Altitude Island Logistics, TomKat, and PRL Group.

Phase 2 (transition April - December 2025)
The small- scale pilot continued while a new airline tendered for the contract to operate from the mainland to the Indian Ocean Territories. During this time services need to be re-contracted and timings for deliveries are still being confirmed.

Phase 3 (ongoing)
A self-sustaining, community-run model continuing long-term and scaling to allow all community members to participate.



SOURCE REDUCTION PLANS

Rig Recycle

In 2024, the Christmas Island Shorefire Tackle shop installed a Rig Recycle collection station. Rig Recycle is an Australian-first program that collects selected recreational fishing and packaging items, diverting them from landfill through an innovative repair, reuse, and recycle framework. This pioneering project brings together fishers, retailers, suppliers, and community partners in a holistic, truly circular solution that addresses a current recycling gap within the industry. By changing recycling behaviours among consumers and retailers, Rig Recycle aims to prevent fishing gear and its packaging from ending up as litter or in landfill. Items collected at this station were audited by Tangaroa Blue Foundation with the contents delivered to Perth for recycling.

Images:
A) One of the Rig Recycle promotional materials (posters) used on Christmas Island. B) An item made from recycled fishing rope and line collected during the program. C) Raw materials collected from the Rig Recycle station. D) Installing a collection station at Shorefire Tackle shop on a Christmas Island.

Rig Recycle Items Collected

Sixteen items were collected within 30 days of the Rig Recycle station being installed, with a total of 128 items collected (and recycled) during September 2024 to September 2025; the most common item was plastic spools (Table 16). In total, 268 liters (15 kg) of fishing related waste were diverted from landfill (or the oceans).

Fishing line equated to 10,923m of the Rig Recycle collection. This demonstrates the substantial amount of waste that can be recycled, and wildlife entanglement hazard avoided, through the collection of individual items.

Item type	Count	Length (m)
Fishing line (recreational)	72	10,923
Metal fishing items (sinkers, lures, hooks, traps, pots)	1	N/A
Plastic packaging labels	3	N/A
Recreational fishing items (lures, floats, rods, reels, spool)	49	N/A

Table 15: Rig Recycle items collected.

Image: *The Christmas Island Red Crab, an example of one of the many coastal species which can be impacted by recreational fishing waste in the environment. Credit: Edges of Earth, Adam Moore.*

This work was made possible through the Australian Government's Indian Ocean Territories Marine Parks Grant program.

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TANGAROA BLUE

AUSTRALIAN MARINE DEBRIS INITIATIVE

We would like to thank the Christmas Island community and all our partner organisations for helping to protect the coastline from the impacts of marine debris.

Image: *Christmas Island District High School students sorting marine debris for the Australian Marine Debris Initiative (AMDI) Database.*