

BASELINE WASTE CHARACTERIZATION STUDY

FORESHORE, TRINIDAD AND TOBAGO
FEBRUARY 2026



ON BEHALF OF THE INSTITUTE OF MARINE AFFAIRS (IMA)



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Project Website: www.projectpromar.org

Email: IMA.Director@ima.gov.tt



Federal Ministry
for the Environment, Climate Action,
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Project Contribution to SDGs:



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1. Introduction

1.1. Background

The Prevention of Marine Litter in the Caribbean Sea (PROMAR) Project, is a regional initiative with the aim of reducing the flow of waste, mainly single use plastics and packaging from land into the Caribbean Sea, whilst accelerating and promoting the principles of a circular economy. Phase I of the project included the Dominican Republic, Costa Rica and Colombia; Phase II of the project includes the British Virgin Islands, Guyana, Suriname, St. Kitts and Nevis, and Trinidad and Tobago. **PROMAR is funded by the German Federal Ministry for the Environment, Climate Action, Nature Conservation and Nuclear Safety (BMUKN). adelphi research is the steering organisation for the project.** The Implementing Partner is the UNEP Caribbean Environment Programme/ Cartagena Convention Secretariat and the Political Partner is the Ministry of Planning, Economic Affairs and Development in Trinidad and Tobago. The Institute of Marine Affairs (IMA) is the Technical Partner for the implementation of project activities.

High plastic densities have been recorded in the nearshore waters of the Caribbean Sea, largely due to land-based sources and regional water currents. In Trinidad and Tobago, approximately 129,000 metric tons of plastics are imported annually (United Nations, 2024) and approximately 770,000 tons of municipal waste are produced annually- almost one fifth of this is plastic and Tetra Pak packaging. (SWMCOL/ KWL/Lipor, 2023). Most of this waste is disposed of in three major landfills at Beetham, Forres Park and Guanapo. Recyclable materials are co-mingled with other waste and dumped in landfills, as there is no separation of waste at the household level. Data collected during the annual Ocean Conservancy International Coastal Cleanup events shows that litter, including plastic, is present in large quantities on shorelines throughout the country. Single-use plastics, most notably, plastic beverage bottles, remain a significant concern. In 2024, 22,418 kg of ocean trash was collected including 69,615 bottles (Ocean Conservancy, 2024).

The PROMAR project aims to anchor monitoring systems in local and/or national public authorities at selected demonstration sites. Monitoring and evaluation of waste at the municipal and national levels, and conducting material flow analysis, will allow for evidence-based decision making in waste management. The project aims to implement practical circular economy solutions at selected demonstration sites, and achieve measurable reductions of plastic waste entering aquatic environments, in collaboration with local communities, informal workers, public and private actors. PROMAR supports countries by strengthening the capacities of political partners to implement Extended Producer Responsibility (EPR) systems and/or policy instruments for managing packaging waste, facilitating transnational policy dialogue as well as south-south learning and knowledge exchange. A key component of PROMAR is to enhance awareness of stakeholders on marine litter prevention which will contribute to behavioural change. This is being achieved through events such as beach-clean ups and outreach campaigns to encourage better waste practices and prevent marine litter at the source, both for the general public as well as in schools.

1.2. Overview of Activities

This Baseline Study was conducted as part of Work Package 1 of the PROMAR project, “Analysing Material Flows and Establishing Monitoring Mechanisms”. The sampling site selected for Trinidad and Tobago was the Foreshore, Port of Spain. Three plots were established at this site. Sampling was conducted once per month at each of these plots from May to July 2025. The waste collected was bagged and transported back to the IMA, where waste characterisation of the waste was performed. Sampling, waste characterisation, and the subsequent data analysis were conducted according to the protocol outlined in the PROMAR BlueBox Methodological Guide for Conducting Solid Waste Sampling on Beaches (adelphi, 2022).

The sampling team was comprised of a group of multidisciplinary staff from the IMA, including the Environmental Quality Programme (EQP), Oceanography and Coastal Processes Programme (OCP), the Geomatics Unit, the Biodiversity and Ecology Research Programme (BERP), the Fisheries and Aquaculture Research Programme, the Information Centre (IC), as

well as university students, secondary school students and a volunteer from the Fisheries Transparency Initiative (Table 1).

Table 1 Field Team Members and Affiliations

Field Team Member	Affiliation
Lester Doodnath	Project Implementation Officer and Officer-in-Charge, Human Resources- IMA
Wendy Nelson	Senior Research Officer, EQP and PROMAR Project Lead- IMA
Aleisha Dennie	Laboratory Technician, EQP- IMA
Amir Dubrie	Laboratory Technician, EQP- IMA
Joash Mohammed	Laboratory Technician, EQP- IMA
Christopher Alexis	Research Officer, OCP- IMA
Isabelle Chen	Marine Technician/ OCP- IMA
Nikia Gooding	Remote Sensing Officer, Geomatics Unit- IMA
Rayna Sookdeo	Geomatics Technician, Geomatics Unit- IMA
Anastasia Auguste	Geospatial Trainee, Geomatics Unit- IMA
Julie Mc Vorran	Geospatial Trainee, Geomatics Unit- IMA
Malissa Moses	Geospatial Trainee, Geomatics Unit- IMA
Bria De Costa	Research Officer, FARP- IMA
Jonathan Gomez	Marine Technician, BERP- IMA
Selman Andrews	Field Assistant/ Driver- IMA
Patrice Letren	Digital Content Specialist, IC- IMA
Zeke John	Intern, BERP- IMA

Table 1 Field Team Members and Affiliations (cont'd)

Field Team Member	Affiliation
Jenecia Martin	Intern, University of the West Indies
Temitayo Celestin	Intern, University of the West Indies
Maya Castellano	Intern, University of Trinidad and Tobago
Geri-Antonia De-Four	Intern, University of Trinidad and Tobago
Tershyan Russell	Intern, University of Trinidad and Tobago
Nathalia Bernard	Intern, St Francois Girls' Secondary School
Kyla Dillon	Intern, St Francois Girls' Secondary School
Mercedes Gay	Intern, St Francois Girls' Secondary School
Juwairiyah Luqman	Intern, St Francois Girls' Secondary School
Tyann Henry	Volunteer, The Fisheries Transparency Initiative

1.3. Description of the Study Area

The Foreshore is located just north-west of the Maraval River, and includes easily accessible, sandy areas of approximately 464m in length (Figure 1). The Maraval River is one of the larger rivers in north-west Trinidad. Debris exiting the Maraval River (Latitude 10.668866°, longitude -61.538031°) accumulates in areas along the northwest peninsula. On a falling tide, there would be possible impact of plastics from the Maraval (as well as Caroni, East Dry and Rivers) at the Foreshore. On a rising tide, plastics from the Diego Martin River will flow towards the Foreshore.

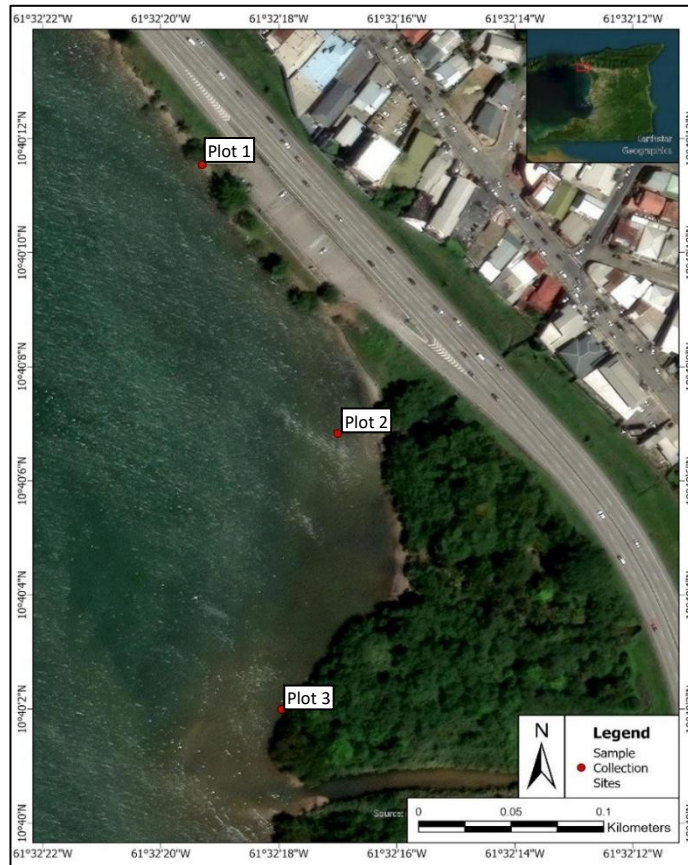


Figure 1 Location of sampling plots at the Foreshore

The Maraval River Watershed is urbanized with a high population density (approximately 23, 537 people within an area of 2,466 ha). The Maraval River Watershed spans two municipalities- the City of Port of Spain and the Diego Martin Borough Corporation (Figure 2). These municipalities produce totals of 69,013 and 26,305 tons of waste per year respectively, of which approximately 18,633 and 6,839 tons per year are potential plastics (Waste Characterisation Study, SWMCO/ KWL/Lipor, 2023). Communities upstream of the Maraval River are affected by flooding during periods of high rainfall, particularly in the rainy season, which lasts from May to December.



Figure 2 Location of the Maraval River Watershed within municipal boundaries

2. Objectives

The objectives of this study were to conduct waste sampling at repeated intervals at the Foreshore, Trinidad and Tobago, and to characterise the waste collected in terms of type, composition and quantity of waste generated. Generation of data on the predominant waste streams present on the shoreline will assist in the development of solutions for the effective management of waste and the reduction of waste flows to the marine environment.

3. Methodology

3.1. Waste Sampling

A Project Inception Meeting and Stakeholder Consultation for the Selection of a Demonstration Site was conducted at the Institute of Marine Affairs on 23 April 2025, in hybrid format. Over sixty representatives from the various government ministries as well as from non-governmental organisations, civil society, academia and the private sector attended the event. The agenda included a presentation on the Demonstration Site selection process, the proposed monitoring methodology, and the next steps to be taken under the project. Stakeholders were given the opportunity to provide feedback during an Open Discussion period.

Waste sampling was conducted using the PROMAR BlueBox Methodological Guide for Conducting Solid Waste Sampling on Beaches, that details the coordination and planning of sampling, selection and definition of sampling areas, and the recording and analyzing of data.

A reconnaissance trip was conducted, prior to the start of sampling, to select sampling sites along the shoreline at the Foreshore. Sites at which there was an accumulation of waste were prioritised. Accessibility of the sites and safety of personnel at the sites were also taken into consideration. Three representative plots each measuring 10m in width, and approximately 15 - 47m in length, extending from the beginning of the beach to the point of greatest extension of the sea at low tide, were selected for sampling. GPS co-ordinates were recorded at each plot. Cleaning of the shoreline is not regularly conducted, so there was no removal of waste between sampling events.

Sampling was conducted on 28 May, 26 June and 23 July 2025. Sampling was scheduled during periods of low tide, during which a larger area of the shoreline is exposed, to gain access to marine litter. All three plots were sampled on each occasion. A team of at least eight people were selected for each sampling event. The teams comprised staff of the IMA, On-the-Job Trainees, interns from universities and a school in Trinidad and Tobago, as well as a volunteer

from the Fisheries Transparency Initiative. People were briefed on the sampling protocol and provided with the necessary personal protective equipment and supplies.

The width and length of the plots were recorded using a measuring tape. Wooden stakes were used to demarcate the perimeter of the plot and placed at the corner of each plot during sampling. Sampling was conducted for a total of 30 minutes in each plot, where possible. All visible waste items located within the plots were collected in designated trash bags, except for bulky material; these were photographed and recorded only. Photos were also taken showing the general sampling location and shoreline, the plots before and after sampling, and the team during sample collection (Plates 1- 4). A member of the team was designated to take photos and complete a Field Record Form detailing information including date of sampling, sampling location and co-ordinates, size of area sampled, sampling start and end times, weather and tide conditions, names of participants, other observations etc. Drone footage was taken during the first sample collection event.

After sampling, the waste bags were transported to the IMA, where waste characterisation was performed.



Plate 1 Measurement and demarcation of a sampling plot at the Foreshore



Plate 2 Collection of samples at the Foreshore



Plate 3 Foreshore- Plot 3 before sampling on 23 July 2025.

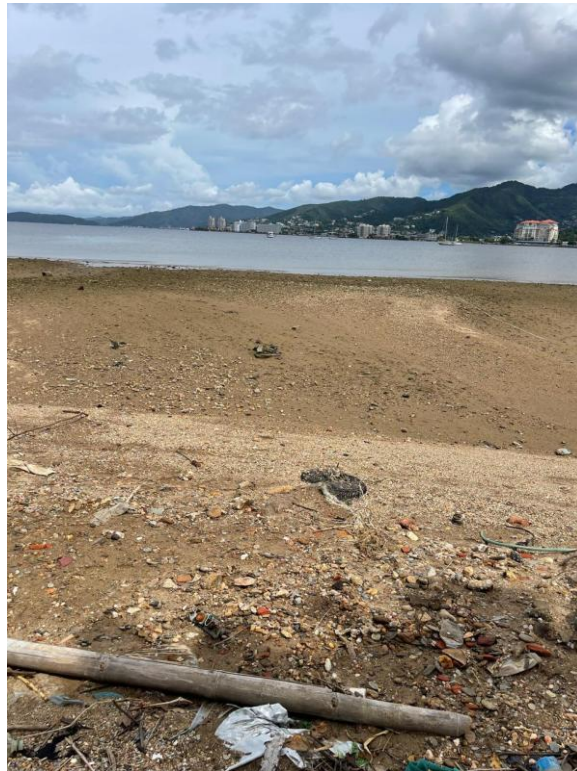


Plate 4 Foreshore- Plot 3 after sampling on 23 July 2025.

3.2. Waste Characterisation

Waste characterisation was performed at the IMA after each sampling event conducted between May and July 2025 (Plates 5- 8). Waste items collected were sorted into the following categories: plastics associated with fishing, plastics associated with consumer products, plastics associated with daily use, particulate plastics, rubber, fabric, paper/ paperboard, wood, metal, glass, ceramics, sanitary and medical waste and others. Team efforts were utilised to ensure that each waste item was placed in the correct category, and that the number of items in the individual categories were recorded, along with the associated weights. Where visible, the brand of the waste item was recorded. Data was recorded by a designated member of the sorting team and later entered the PROMAR Marine Litter Sorting Spreadsheet provided for data analysis.



Plate 5 Waste characterisation station at the IMA



Plate 6 Waste characterisation of samples collected at the Foreshore



Plate 7 Typical samples of plastics associated with consumer products



Plate 8 Weighing of samples after waste characterisation

3.3. Clean Coast Index Classification

Pollution levels at the sites were evaluated using the Clean Coast Index (CCI). The tool uses plastic debris found within a defined area to assess the cleanliness of the beach.

The index is calculated as follows:

$$CCI = \frac{\text{Total number of plastic items collected}}{\text{Sampling area}} \times K$$

Where $K = 20$ for interpretability.

There are five possible cleanliness categories, ranging from very clean to very dirty (Alkalay et al. 2007) as follows:

1. Very Clean (0 - 2): No plastic waste observed in the coastal region
2. Clean (2 – 5): No plastic waste observed in most of the coastal region
3. Moderate (5 – 10): Some plastic waste observed in the coastal region
4. Dirty (10 – 20): Plastic waste observed in most of the coastal region
5. Very Dirty (20+): Plastic waste observed covering the coastal region

4. Findings

4.1. Foreshore Sampling- May 2025

At Plot 1, 340 items weighing 14.0 kg were collected (Table 2). A considerable number of glass items/ fragments: 139 items equivalent to 40.9% of the total number of items collected, weighing 6.1 kg (43.4% of the total weight), were recorded (Figure 3). Fabric (25.1%), plastics associated with daily use (13.6%) and plastics associated with consumer products (3.6%) were the largest contributors to the total weight of waste collected at this plot.

Table 2 Items collected from Plot 1 in May 2025

Category	Number of Items	Percentage of Total Number/%	Weight of Items/ kg	Percentage of Total Weight/%
Plastics associated with fishing	1	0.3	Negligible	Negligible
Plastics associated with consumer products	48	14.1	0.5	3.6
Plastics associated with daily use	26	7.6	1.9	13.6
Particulate plastic	38	11.2	0.1	0.7
Rubber	21	6.2	0.3	2.2
Fabric	14	4.1	3.5	25.1
Metal	19	5.6	1.2	8.6
Glass	139	40.9	6.1	43.4
Ceramic	12	3.5	Negligible	Negligible
Sanitation and medical	2	0.6	Negligible	Negligible
Other	20	5.9	0.4	2.9
Total	340		14.0	

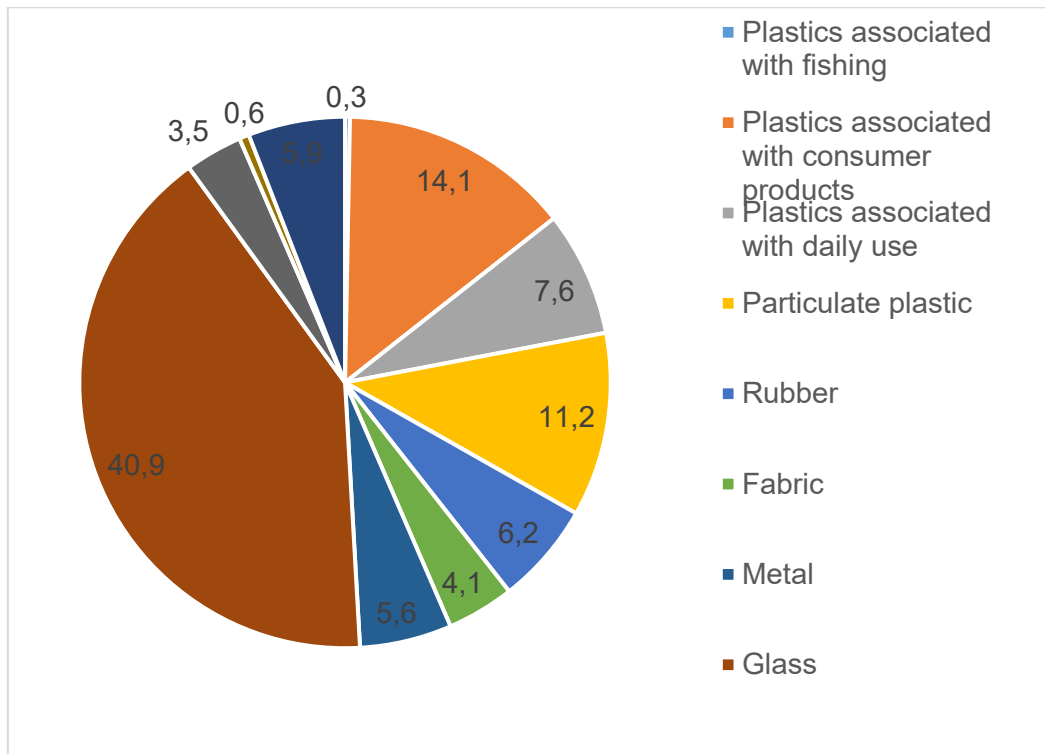


Figure 3 Percentage distribution of items collected, by number, for Plot 1 in May 2025

At Plot 2, 493 items weighing 48.7 kg were collected (Table 3). Plastics associated with consumer products and plastics associated with daily use were prevalent in this plot: 374 items (over 75% of the total number of items collected) weighing 33.65 kg, were recorded (Figure 4). The top five categories (based on weight) were plastics associated with daily use (37.5%), plastics associated with consumer products (31.7%), fabric (14.0%), other (5.3%) and glass (5.3%).

Table 3 Items collected from Plot 2 in May 2025

Category	Number of Items	Percentage of Total Number/%	Weight of Items/ kg	Percentage of Total Weight/%
Plastics associated with consumer products	249	50.5	15.4	31.7
Plastics associated with daily use	125	25.4	18.25	37.5

Rubber	21	4.3	1.4	2.9
Fabric	18	3.7	6.8	14.0
Paper and paperboard	2	0.4	Negligible	Negligible
Wood	1	0.2	0.3	0.6
Metals	12	2.4	1.85	3.8
Glass	4	0.8	2.05	4.2
Other	61	12.4	2.6	5.3
Total	493		48.7	

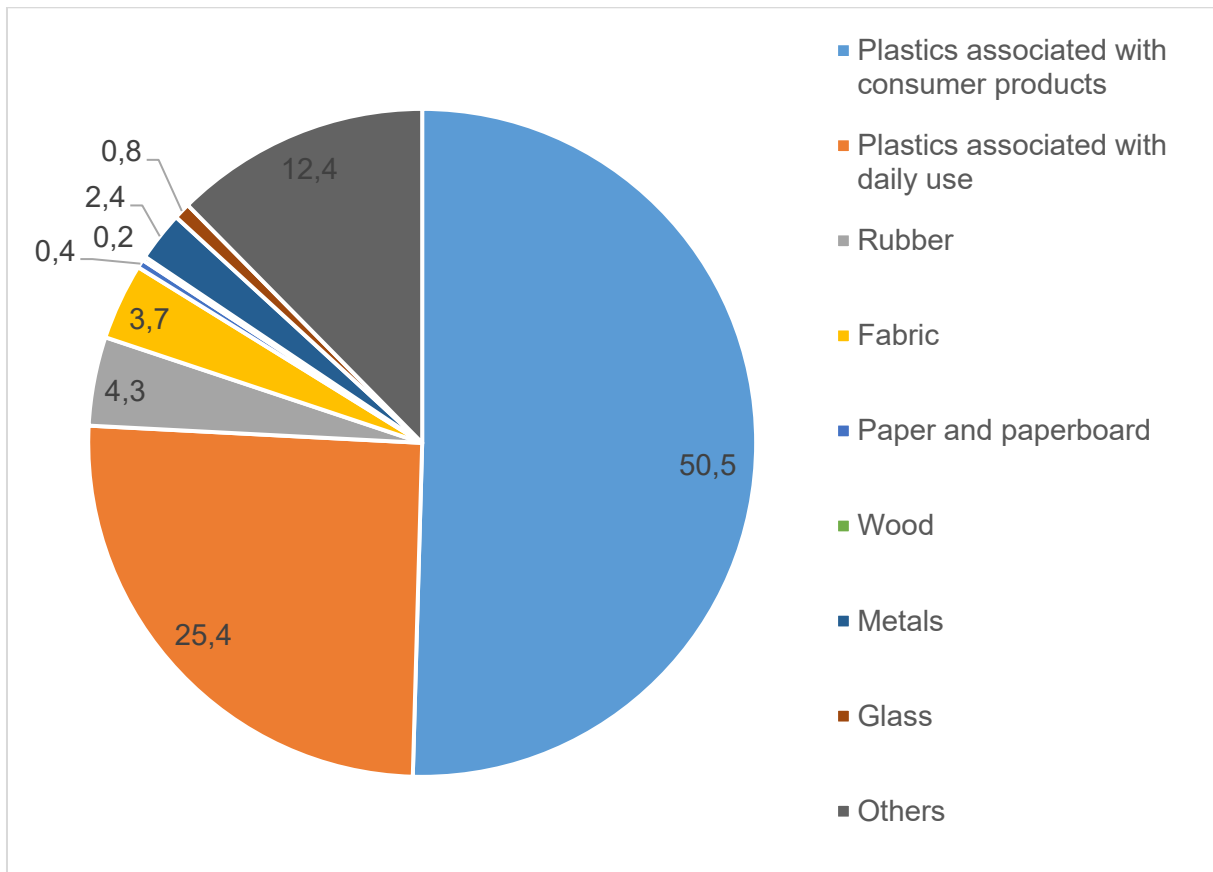


Figure 4 Percentage distribution of items collected, by number, for Plot 2 in May 2025

At Plot 3, 335 items weighing 16.0 kg were collected (Table 4). Although the combined number of items of plastics associated with daily use and plastics associated with consumer products was high (49.8% of the total number of items collected, weighing 5.4 kg, Figure 5), metals were the largest contributors to the total weight of waste collected at this plot (28.5%). Sanitary and medical waste items accounted for 16% of the total weight of waste collected.

Table 4 Items collected from Plot 3 in May 2025

Category	Number of Items	Percentage of Total Number/%	Weight of Items/ kg	Percentage of Total Weight/%
Plastics associated with consumer products	114	34.0	1.75	11.0
Plastics associated with daily use	53	15.8	3.65	22.9
Particulate plastic	8	2.4	Negligible	Negligible
Rubber	19	5.7	1.25	7.8
Fabric	14	4.2	0.8	5.0
Paper and paperboard	4	1.2	Negligible	Negligible
Metal	65	19.4	4.55	28.5
Glass	15	4.5	Negligible	Negligible
Ceramic	2	0.6	Negligible	Negligible
Sanitary and medical	2	0.6	2.55	16.0
Other	39	11.6	1.4	8.8
Total	335		16.0	

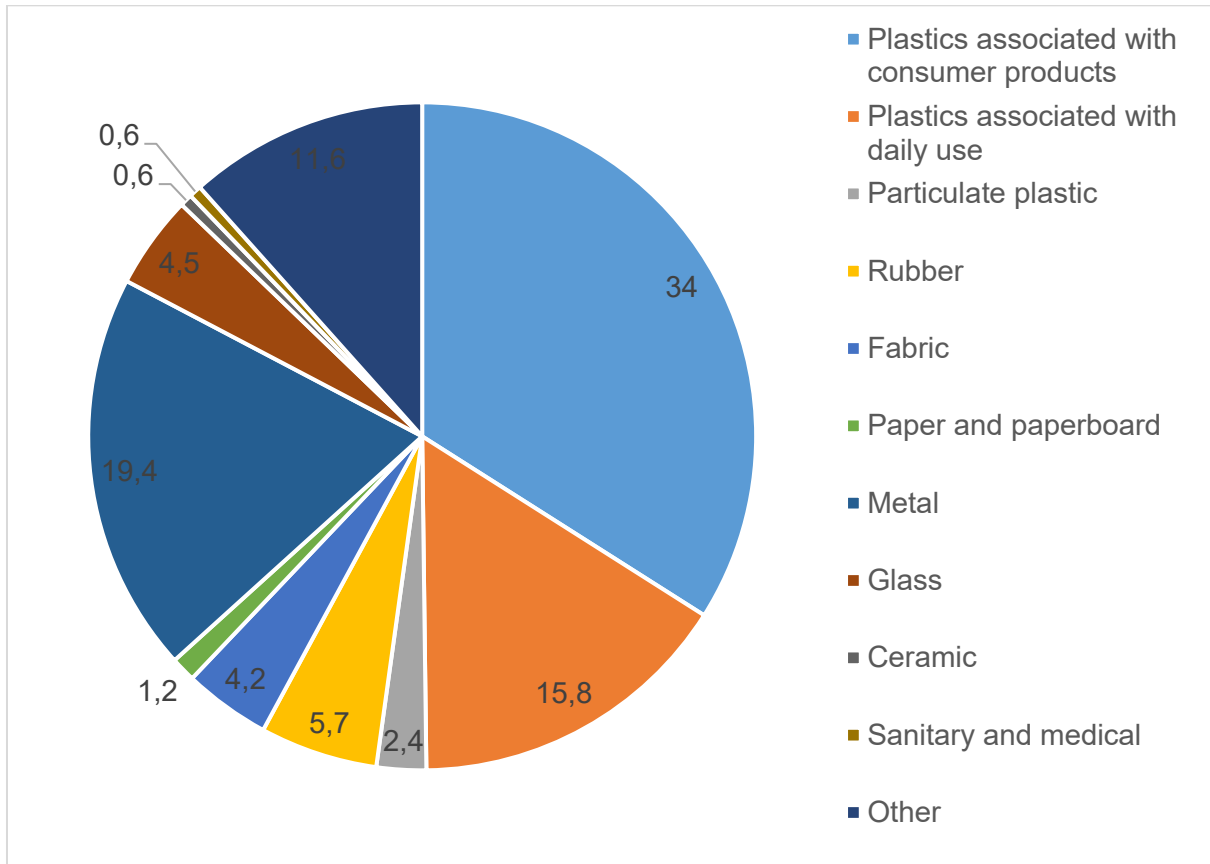


Figure 5 Percentage distribution of items collected, by number, for Plot 3 in May 2025

A total of 1168 items of litter, with a collective weight of 78.6 kg, were collected during the sampling event in May (Table 5). Of these, 615 items (over 50% of the total number of items collected) weighing 41.45 kg, were classed as plastics associated with consumer products or plastics associated with daily use. The top five categories (based on weight) were plastics associated with daily use (30.3%), plastics associated with consumer products (22.5%), fabric (14.1%), glass (10.3%) and metal (9.7%). Figures 6 and 7 show the percentage distribution of all items collected, by number and by weight, respectively, in May 2025.

Table 5 Summary of items collected from all plots in May 2025

Category	Number of Items	Percentage of Total Number/%	Weight of Items/ kg	Percentage of Total Weight/%
Plastics associated with fishing	1	0.1	Negligible	0.0

Plastics associated with consumer Products	411	35.2	17.65	22.5
Plastics associated with daily use	204	17.5	23.8	30.3
Particulate plastic	46	3.9	0.1	0.1
Rubber	61	5.2	2.95	3.8
Fabric	46	3.9	11.1	14.1
Paper and paperboard	6	0.5	Negligible	0.0
Wood	1	0.1	0.3	0.4
Metal	96	8.2	7.6	9.7
Glass	158	13.5	8.1	10.3
Ceramic	14	1.2	Negligible	0.0
Sanitation and medical	4	0.3	2.55	3.2
Other	120	10.3	4.4	5.6
Total	1168		78.55	

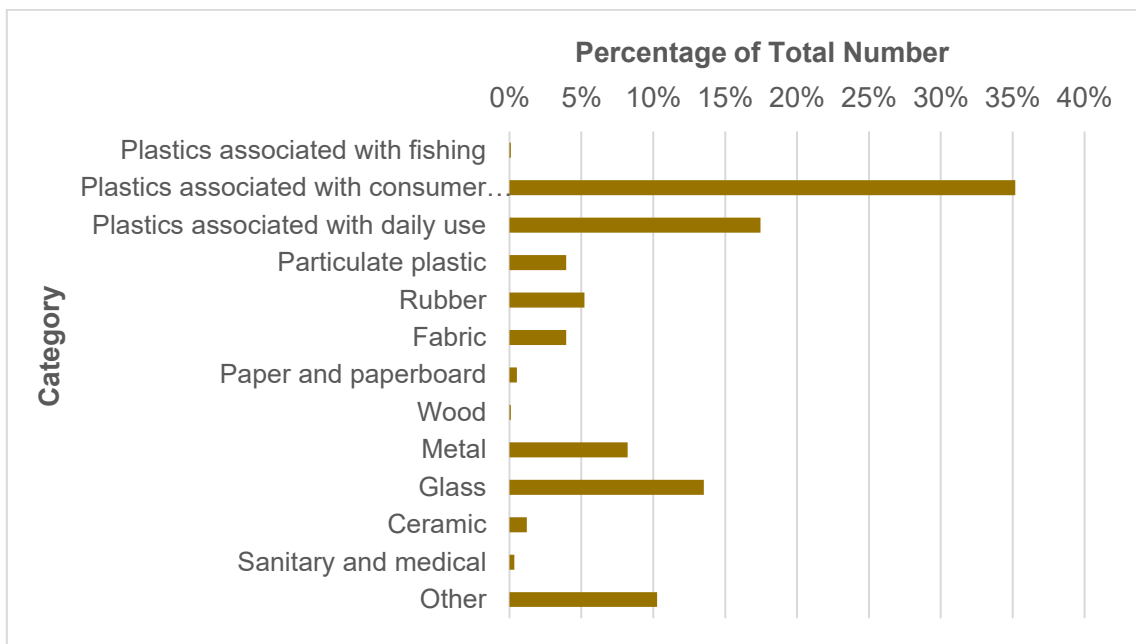


Figure 6 Percentage distribution of all items collected, by number, in May 2025

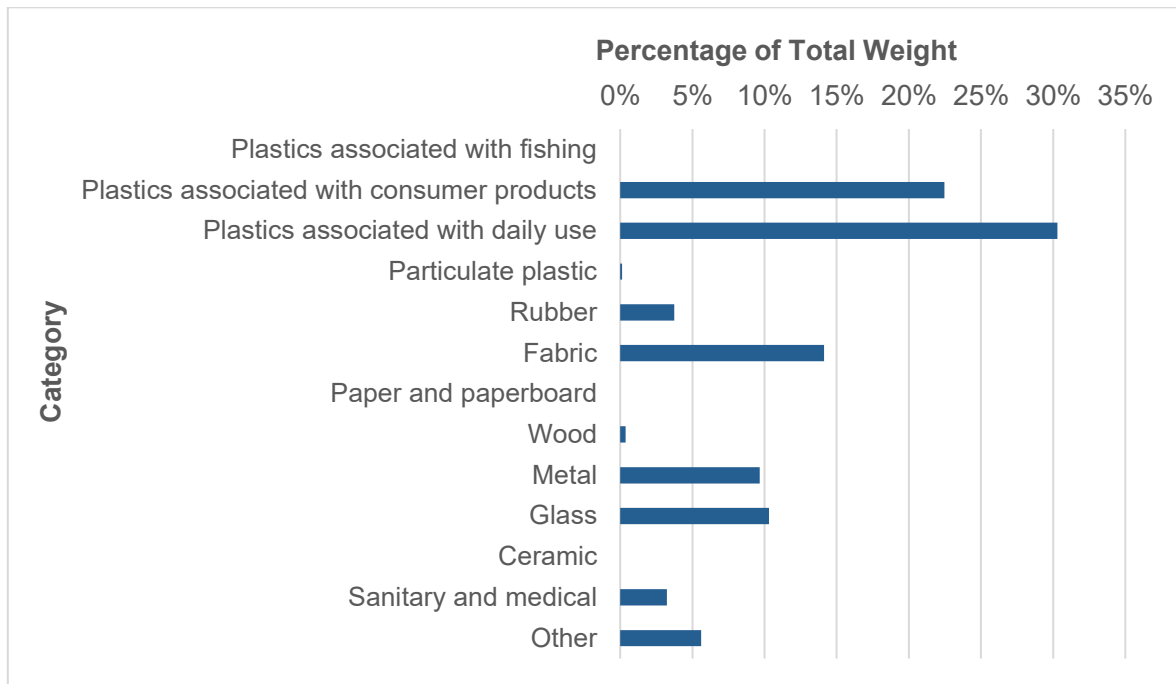


Figure 7 Percentage distribution of all items collected, by weight, in May 2025

4.2. Foreshore Sampling- June 2025

At Plot 1, 267 items weighing 3.8 kg were collected (Table 6). This weight was significantly lower than the weight of waste items recorded in the previous sampling event (May 2025).

As was the case in May 2025, a considerable number of glass items/ fragments: 156 items equivalent to 58.4% of the total number of items collected, weighing 0.5 kg (13.2% of the total weight), were recorded (Figure 8). Although the weight recorded for plastics associated with daily use was negligible, plastics associated with consumer products accounted for 46.1% of the total weight of waste collected at this plot. Other categories of waste contributing to the total weight for the plot were fabric (17.1%), sanitary and medical (13.2%) and rubber (10.5%).

Table 6 Items collected from Plot 1 in June 2025

Category	Number of Items	Percentage of Total Number/%	Weight of Items/ kg	Percentage of Total Weight/%

Plastics associated with consumer products	56	21.0	1.75	46.1
Plastics associated with daily use	21	7.9	Negligible	Negligible
Particulate plastic	3	1.10	Negligible	Negligible
Rubber	9	3.4	0.4	10.5
Fabric	5	1.9	0.65	17.1
Paper and paperboard	1	0.40	Negligible	Negligible
Metal	3	1.1	Negligible	Negligible
Glass	156	58.4	0.5	13.2
Sanitary and medical	3	1.1	0.5	13.2
Other	10	3.7	Negligible	Negligible
Total	267		3.8	

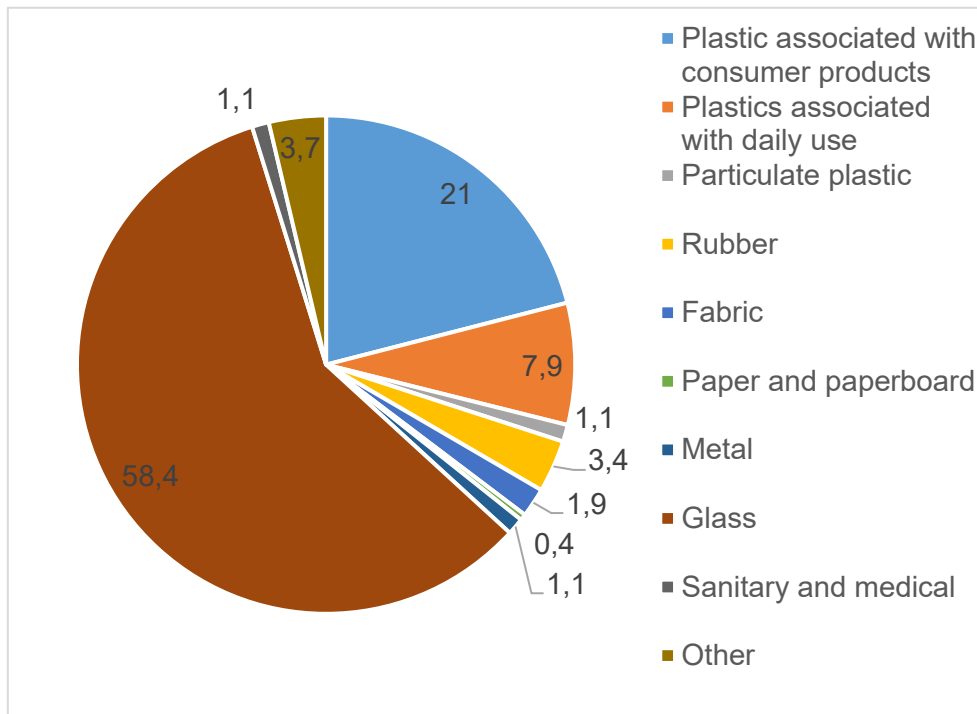


Figure 8 Percentage distribution of items collected, by number, for Plot 1 in June 2025

At Plot 2, 75 items weighing 18.7 kg were collected (Table 7). The majority of items (over 80% of the total number of items collected) weighing 14.45 kg, (Figure 9) were either plastics associated with consumer products or plastics associated with daily use. The five categories contributing to the total weight were plastics associated with daily use (56.8%), plastics associated with consumer products (20.6%), fabric (13.1%), sanitary and medical (6.2%) and other (3.2%).

Table 7 Items collected from Plot 2 in June 2025

Category	Number of Items	Percentage of Total Number/%	Weight of Items/ kg	Percentage of Total Weight/%
Plastics associated with consumer products	33	44.0	3.85	20.6
Plastics associated with daily use	29	38.7	10.6	56.8
Rubber	1	1.3	Negligible	Negligible
Fabric	2	2.7	2.45	13.1
Sanitary and medical	2	2.7	1.15	6.2
Other	8	10.70	0.6	3.2
Total	75		18.7	

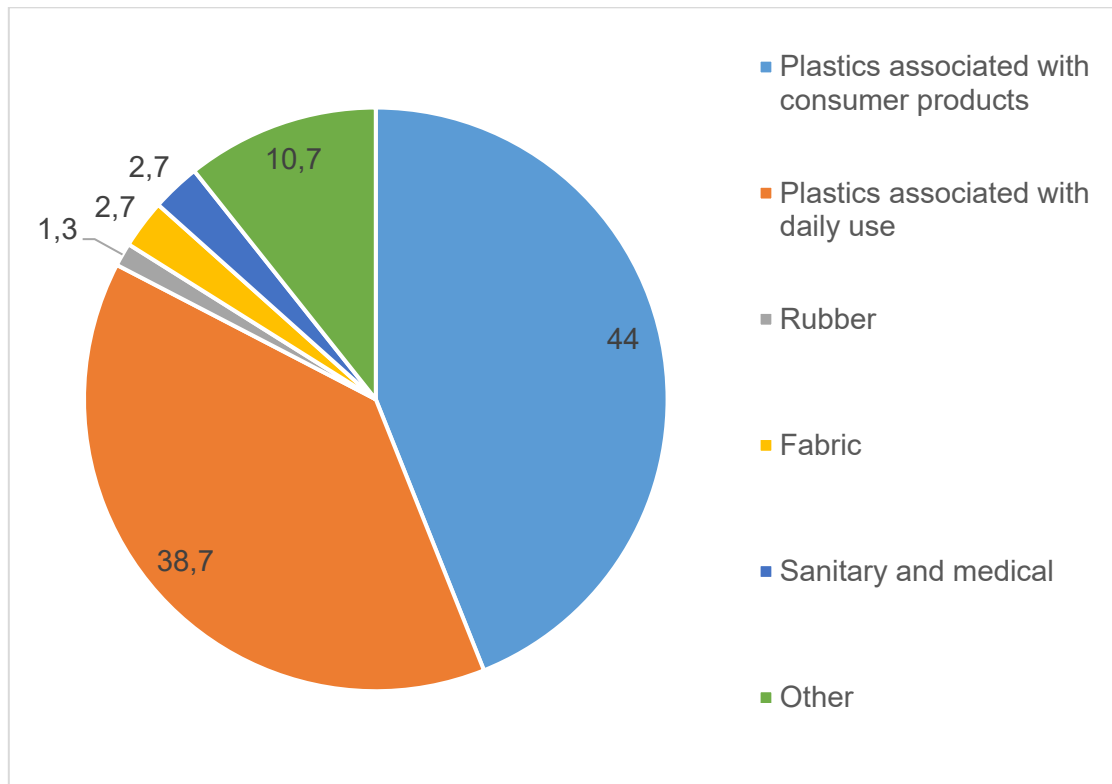


Figure 9 Percentage distribution of items collected, by number, for Plot 2 in June 2025

At Plot 3, 585 items weighing 31.7 kg were collected (Table 8). Although the combined number of items of plastics associated with daily use and plastics associated with consumer products was relatively high (45.5% of the total number of items collected, weighing 8.95 kg, Figure 10), fabric was the largest contributor to the total weight of waste collected at this plot (16.4%). Other items, metal and rubber accounted for 15.3%, 12.5% and 11.2%, respectively, of the total weight of waste collected at this plot.

Table 8 Items collected from Plot 3 in June 2025

Category	Number of Items	Percentage of Total Number/%	Weight of Items/ kg	Percentage of Total Weight/%
Plastics associated with consumer products	218	37.3	4.45	14.1
Plastics associated with daily use	48	8.2	4.5	14.2
Particulate plastic	2	0.3	0.4	1.3

Rubber	6	1.0	3.55	11.2
Fabric	7	1.4	5.2	16.4
Wood	1	0.2	0.8	2.5
Metal	112	19.1	3.95	12.5
Glass	141	24.1	2.55	8.1
Ceramic	19	3.2	1.4	4.4
Sanitary and medical	1	0.2	Negligible	Negligible
Other	30	5.1	4.85	15.3
Total	585		31.7	

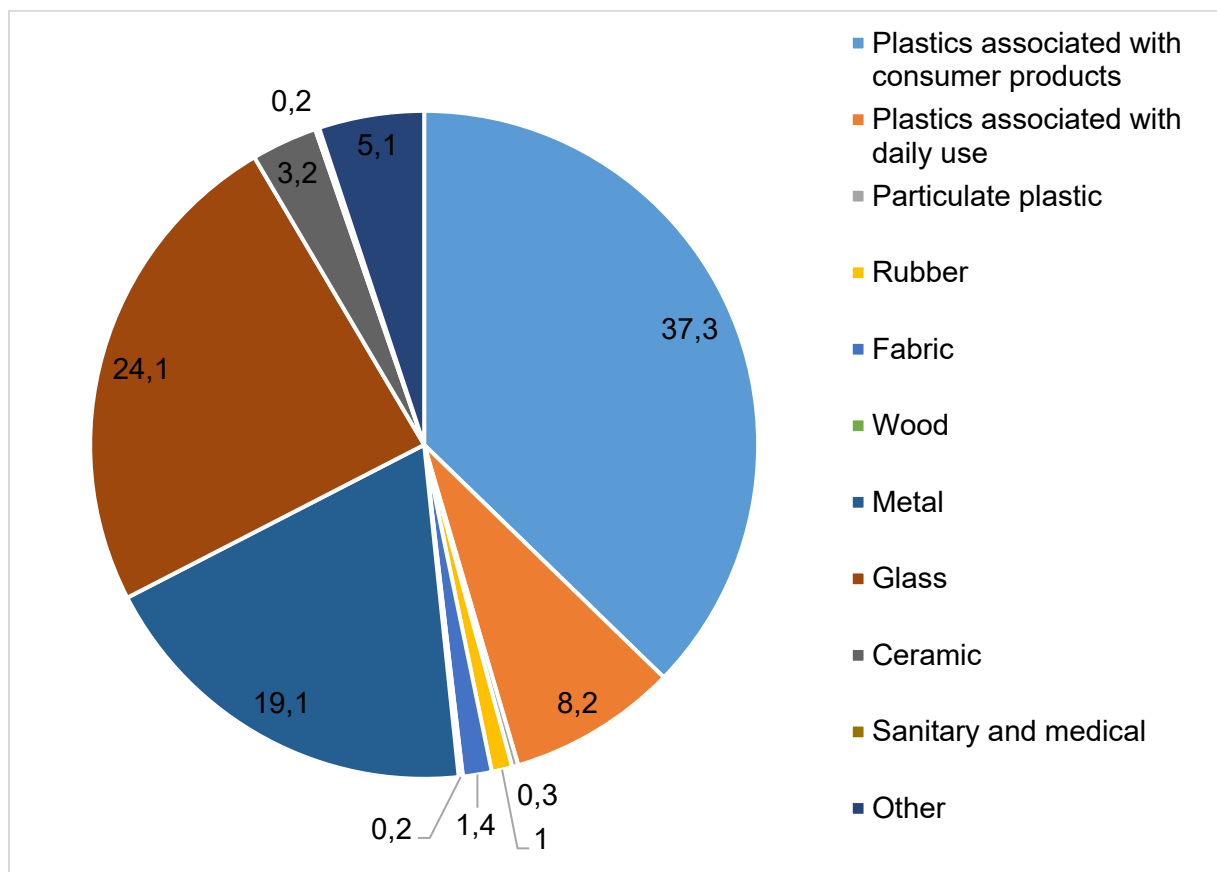


Figure 10 Percentage distribution of items collected, by number, for Plot 3 in June 2025

A total of 927 items of litter, with a collective weight of 54.1 kg, were collected during the sampling event in June (Table 9). Of these, 405 items (over 40% of the total number of items collected) weighing 25.15 kg, were classed as plastic associated with consumer products or plastics associated with daily use. A significant number of small pieces of glass and metal (297 and 115 pieces respectively) were recorded within the sampling plots. The top five categories (based on weight) were plastics associated with daily use (27.9%), plastics associated with consumer products (18.6%), fabric (15.3%) metal (7.3%) and rubber (7.3%). Figures 11 and 12 show the percentage distribution of all items collected, by number and by weight, respectively, in June 2025.

Table 9 Summary of items collected from all plots in June 2025

Category	Number of Items	Percentage of Total Number/%	Weight of Items/ kg	Percentage of Total Weight/%
Plastics associated with fishing	0	0.0	Negligible	0.0
Plastics associated with consumer products	307	33.1	10.05	18.6
Plastic associated with daily use	98	10.6	15.1	27.9
Particulate plastic	5	0.5	0.4	0.7
Rubber	16	1.7	3.95	7.3
Fabric	14	1.5	8.3	15.3
Paper and paperboard	1	0.1	Negligible	0.0
Wood	1	0.1	0.8	1.5
Metal	115	12.4	3.95	7.3
Glass	297	32.0	3.05	5.6
Ceramic	19	2.0	1.4	2.6
Sanitary and medical	6	0.6	1.65	3.0
Other	48	5.2	5.45	10.1

Total	927		54.1	
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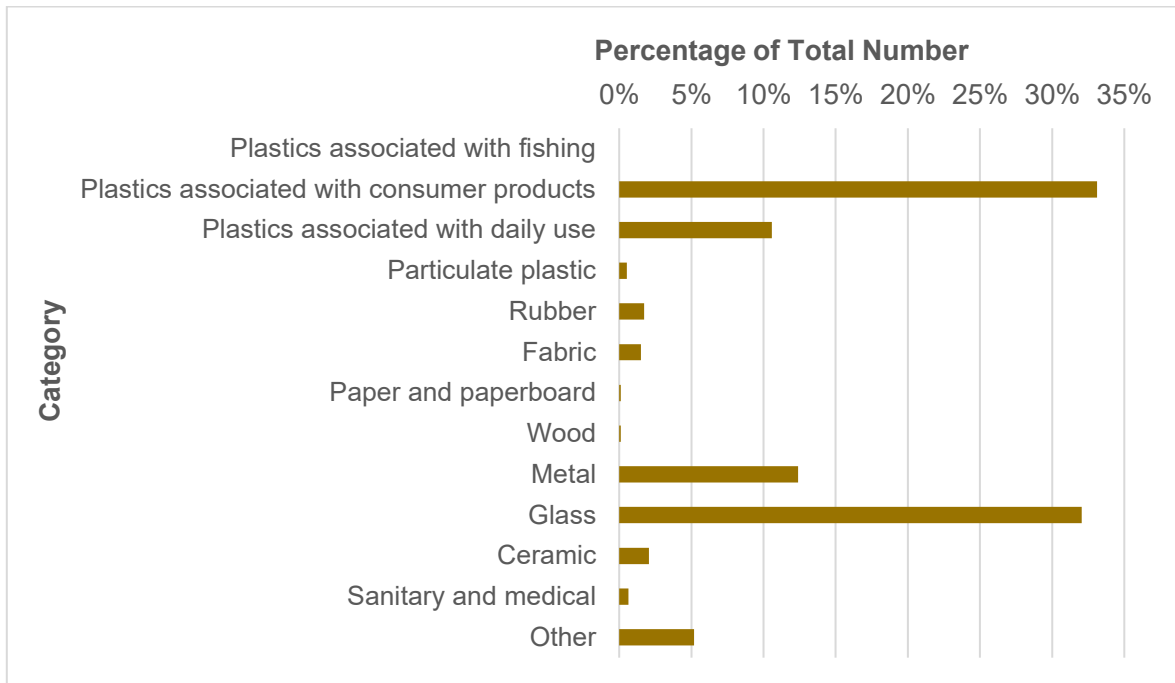


Figure 11 Percentage distribution of all items collected, by number, in June 2025

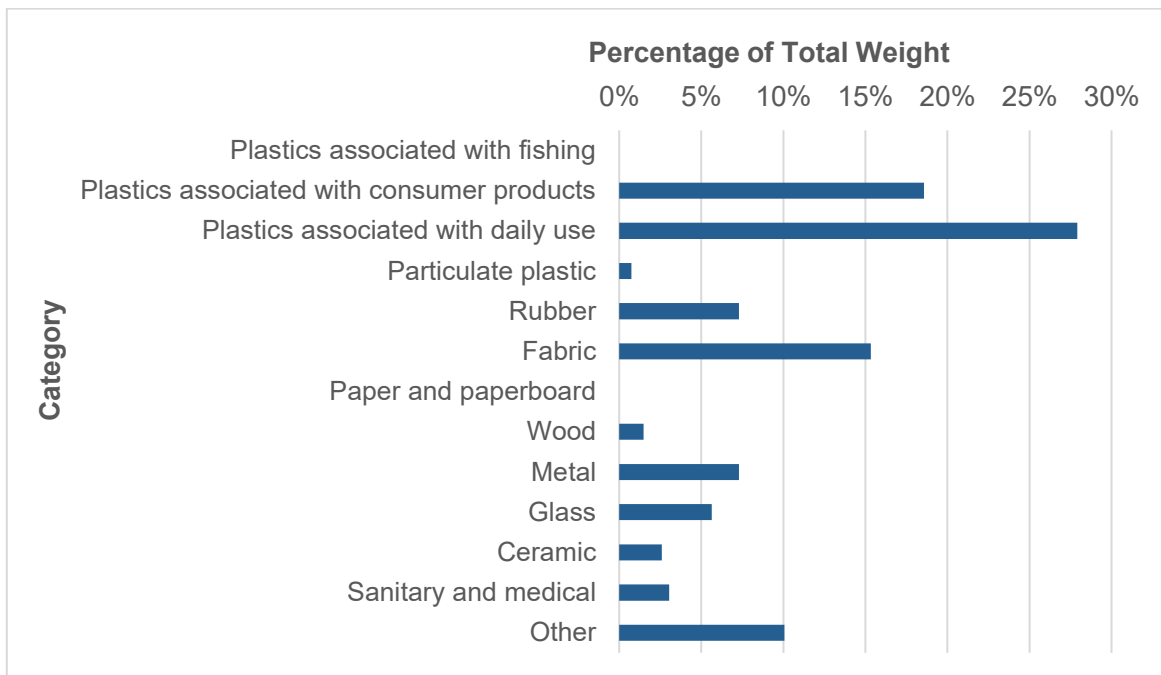


Figure 12 Percentage distribution of all items collected, by weight, in June 2025

4.3. Foreshore Sampling- July 2025

At Plot 1, 122 items weighing 2.8 kg were collected (Table 10). As, in June, this was also significantly lower than the quantities recorded in May 2025. Of the items recorded, 81 items (over 60% of the total number of items collected) weighing 0.95 kg, were classed as plastics associated with consumer products, plastics associated with daily use or particulate plastic (Figure 13). Fabric (42.9%), plastics associated with consumer products (23.2%), rubber (23.2%) and particulate plastic (10.7%) were the only contributors to the total weight of waste collected at this plot.

Table 10 Items collected from Plot 1 in July 2025

Category	Number of Items	Percentage of Total Number/%	Weight of Items/ kg	Percentage of Total Weight/%
Plastics associated with consumer products	32	26.2	0.65	23.2
Plastics associated with daily use	15	12.3	Negligible	Negligible
Particulate plastic	34	27.9	0.3	10.7
Rubber	11	9.0	0.65	23.2
Fabric	5	4.1	1.2	42.9
Metal	2	1.6	Negligible	Negligible
Glass	22	18.0	Negligible	Negligible
Sanitary and medical	1	0.8	Negligible	Negligible
Total	122		2.8	

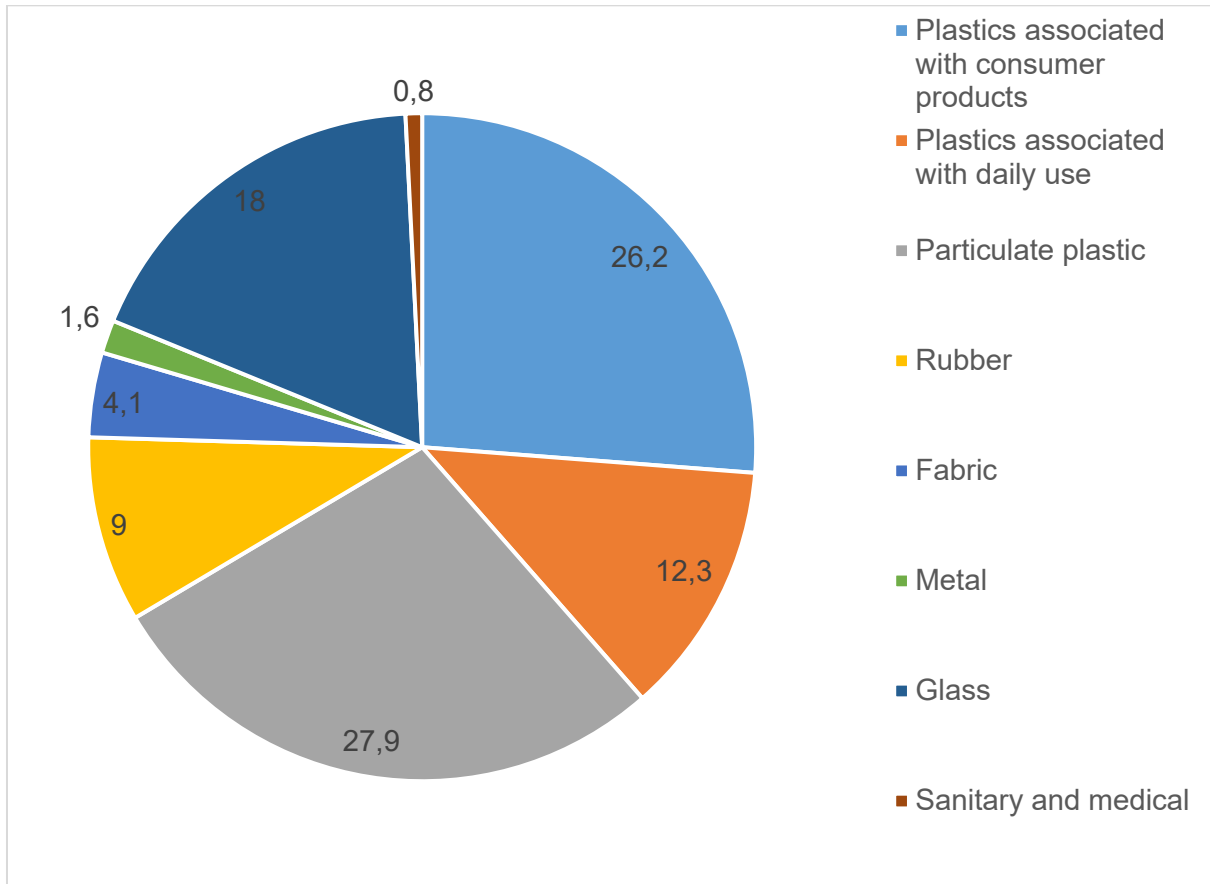


Figure 13 Percentage distribution of items collected, by number, for Plot 1 in July 2025

At Plot 2, 386 items weighing 19.5 kg were collected (Table 11). Most items (80% of the total number of items collected) weighing 12.0 kg, were plastics associated with consumer products, plastics associated with daily use or particulate plastic (Figure 14). The top five categories (based on weight) were plastics associated with consumer products (29.2%), plastics associated with daily use (26.9%), fabric (19.7%), particulate plastic (5.4%) and rubber (4.9%).

Table 11 Items collected from Plot 2 in July 2025

Category	Number of Items	Percentage of Total Number/%	Weight of Items/ kg	Percentage of Total Weight/%
Plastics associated with fishing	1	0.3	0.45	2.3
Plastics associated with consumer products	161	41.7	5.7	29.2

Plastics associated with daily use	61	15.8	5.25	26.9
Particulate plastic	87	22.5	1.05	5.4
Rubber	16	4.1	0.95	4.9
Fabric	22	5.7	3.85	19.7
Wood	1	0.3	0.7	3.6
Metal	19	4.9	0.7	3.6
Glass	3	0.8	Negligible	Negligible
Sanitary and medical	7	1.8	Negligible	Negligible
Other	8	2.1	0.85	4.4
Total	386		19.5	

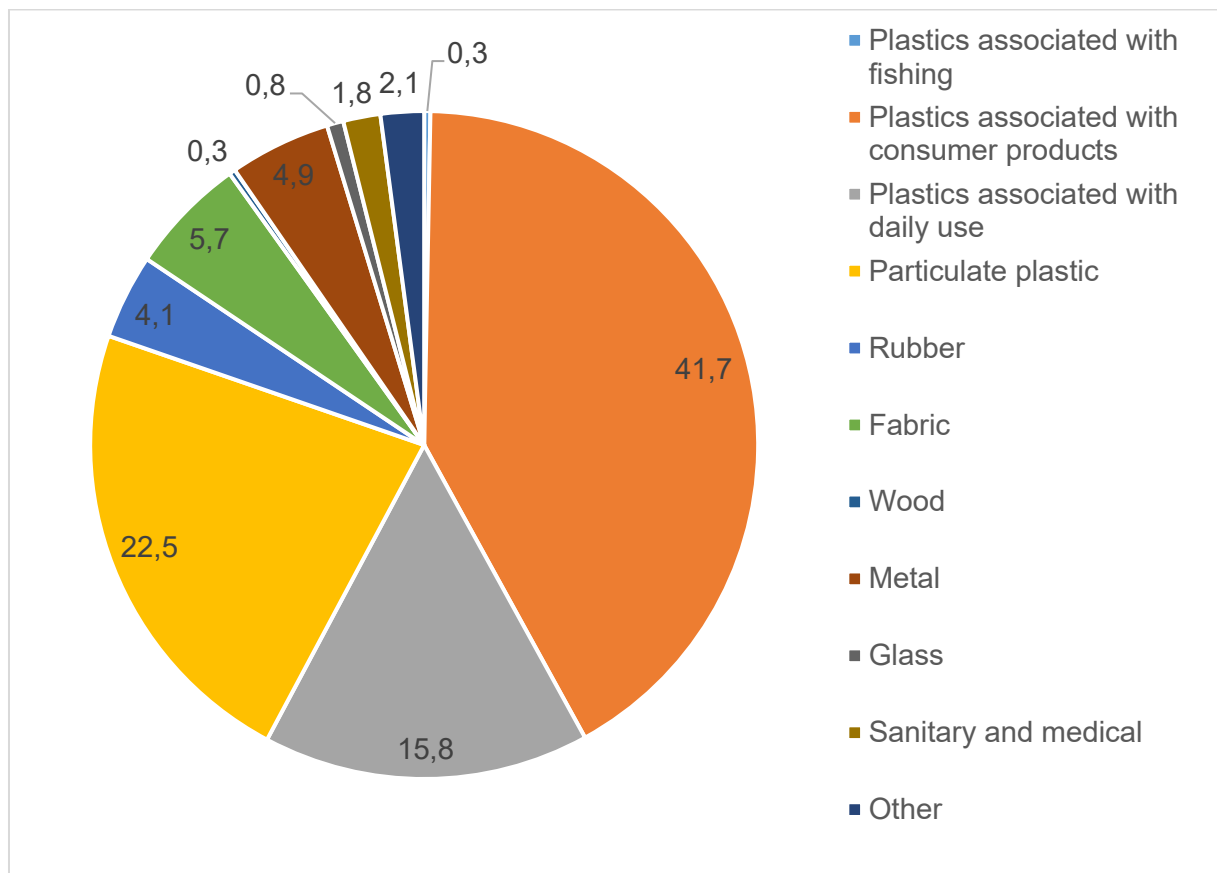


Figure 14 Percentage distribution of items collected, by number, for Plot 2 in July 2025

At Plot 3, 785 items weighing 45.0 kg were collected (Table 12). Plastics associated with consumer products were prevalent in this plot: 587 items (almost 75% of the total number of items collected) weighing 18.6 kg, were recorded, Figure 15). A considerable number of metal items (117 items weighing 4.4 kg) were also recorded. The top five categories (based on weight) were plastics associated with consumer products (41.3%), fabric (33.4%), metal (9.8%), plastics associated with daily use (6.1%) and other (4.7%).

Table 12 Items collected from Plot 3 in July 2025

Category	Number of Items	Percentage of Total Number/%	Weight of Items/ kg	Percentage of Total Weight/%
Plastics associated with consumer products	587	74.8	18.6	41.3
Plastics associated with daily use	27	3.4	2.75	6.1
Particulate plastic	25	3.2	1.6	3.6
Rubber	4	0.5	0.5	1.1
Fabric	14	1.8	15.05	33.4
Metal	117	14.9	4.4	9.8
Glass	2	0.3	Negligible	Negligible
Sanitary and medical	1	0.1	Negligible	Negligible
Other	8	1.0	2.1	4.7
Total	785		45.0	

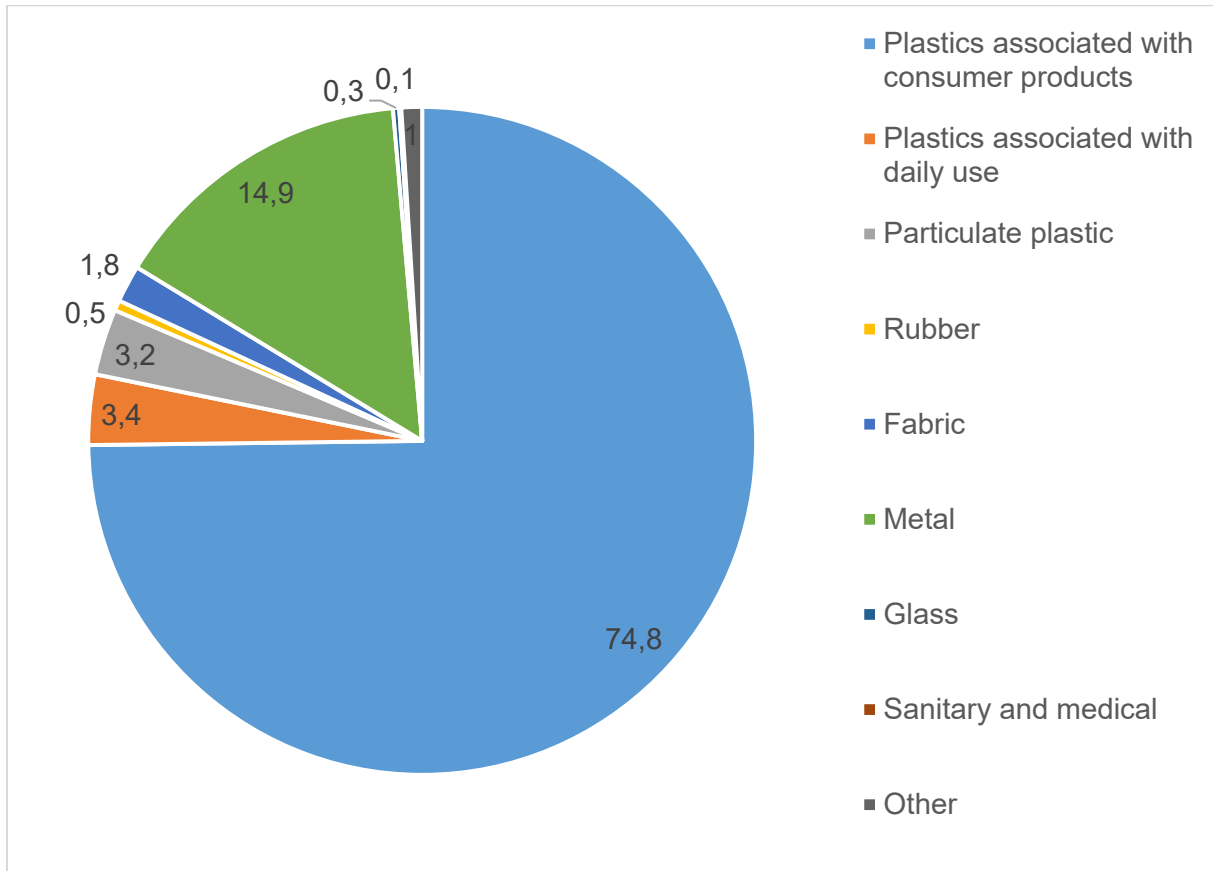


Figure 15 Percentage distribution of items collected, by number, for Plot 3 in July 2025

A total of 1293 items of litter, with a collective weight of 67.3 kg, were collected during the sampling event in July (Table 13). Of these, 883 items (over 60% of the total number of items collected) weighing 32.95 kg, were classed as plastic associated with consumer products or plastics associated with daily use. In addition, 146 items of particulate plastic (11.3% of the total number of items collected, weighing 2.95 kg were recorded in July. A considerable number of metal items were also present in July 2025. The top five categories (based on weight) were plastics associated with consumer products (37.1%), fabric (29.9%), plastics associated with daily use (11.9%) metal (7.6%); particulate plastic and other (both 4.4%). Figures 16 and 17 show the percentage distribution of all items collected, by number and by weight, respectively, in July 2025.

Table 13 Summary of items collected from all plots in July 2025

Category	Number of Items	Percentage of Total Number/%	Weight of Items/ kg	Percentage of Total Weight/%
Plastics associated with fishing	1	0.1	0.45	0.7
Plastics associated with consumer products	780	60.3	24.95	37.1
Plastics associated with daily use	103	8.0	8	11.9
Particulate plastic	146	11.3	2.95	4.4
Rubber	31	2.4	2.1	3.1
Fabric	41	3.2	20.1	29.9
Paper and paperboard	0	0.0	0	0.0
Wood	1	0.1	0.7	1.0
Metal	138	10.7	5.1	7.6
Glass	27	2.1	Negligible	0.0
Ceramic	0	0.0	0	0.0
Sanitary and medical	9	0.7	Negligible	0.0
Other	16	1.2	2.95	4.4
Total	1293		67.3	

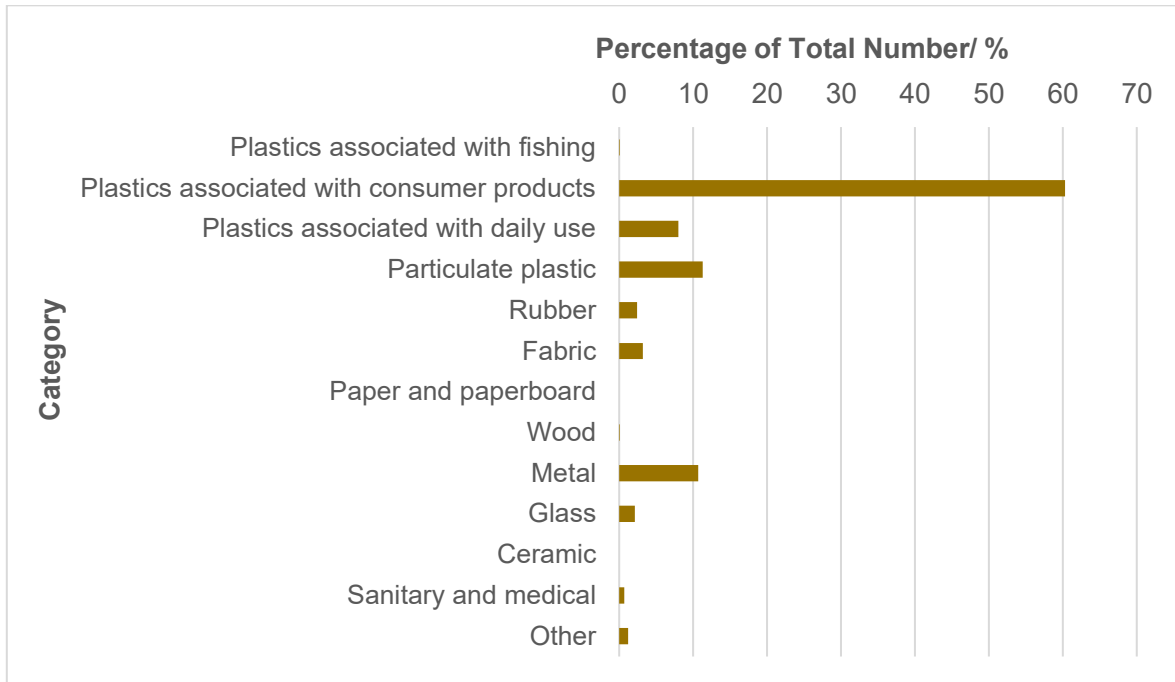


Figure 16 Percentage distribution of all items collected, by number, in July 2025

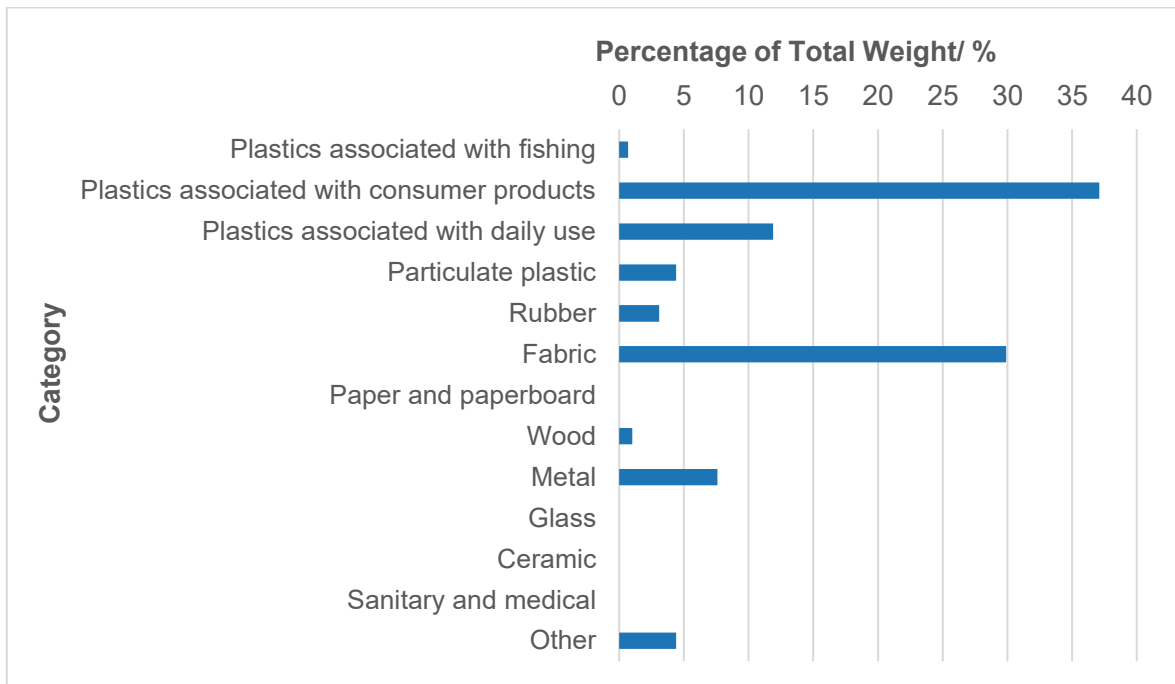


Figure 17 Percentage distribution of all items collected, by weight, in July 2025

4.4. Foreshore Sampling- Summary Data

During the sampling events conducted between May and July 2025, a total of 3388 items of litter, weighing 200.2 kg, were collected. The highest number of samples, was highest at Plot 3, followed by Plot 2, then Plot 1. This pattern was also observed with respect to weight. The mean number of samples collected at Plot 1 was 243.0 ± 111.0 items; the mean weight of samples collected at this plot was 6.9 ± 6.2 kg. The mean number of samples collected at Plot 2 was 318.0 ± 217.1 items; the mean weight of samples collected at this plot was 29.0 ± 17.1 kg. The mean number of samples collected at Plot 3 was 568.3 ± 225.5 items; the mean weight of samples collected at this plot was 30.9 ± 14.5 kg. The mean number of samples collected (all plots) was 1129.3 ± 186.0 items; the mean weight of samples collected (all plots) was 66.7 ± 12.3 kg. Figure 18 shows the number of items collected at the sampling plots between May and July 2025. Figure 19 shows the weight of items collected at the sampling plots between May and July 2025.

With respect to the brands of the waste items collected, 573 items (approximately 17%) contained labels that were visible and/or had physical characteristics that allowed for brand identification. Of these marked items, the top five most abundant brands were Blue Waters (186 items), Coca Cola (71 items), Cole Cold (47 items) Dasani Water (39 items) and Minute Maid (34 items). Figure 20 shows the distribution of brand- identified items collected between May and July 2025.

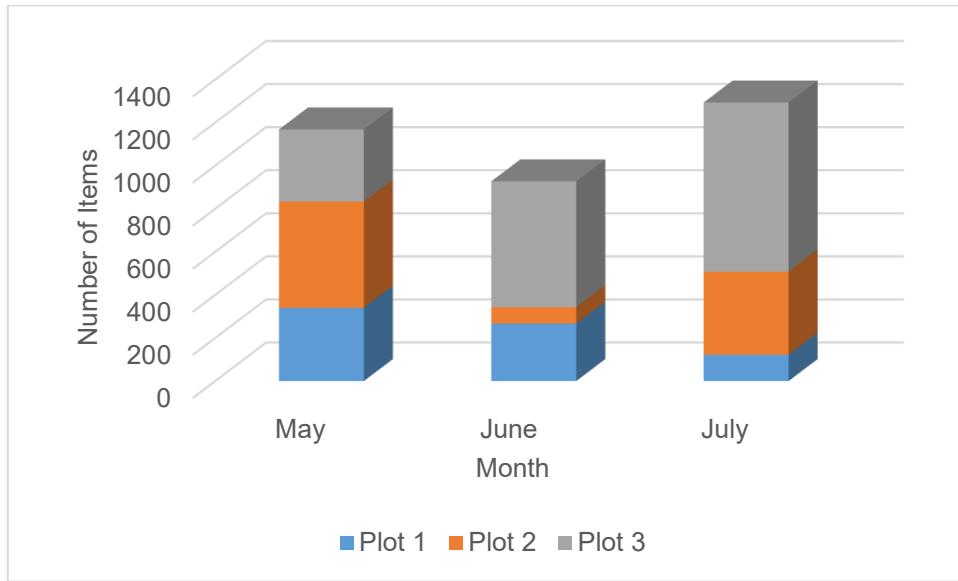


Figure 18 Number of items collected at the sampling plots between May and July 2025

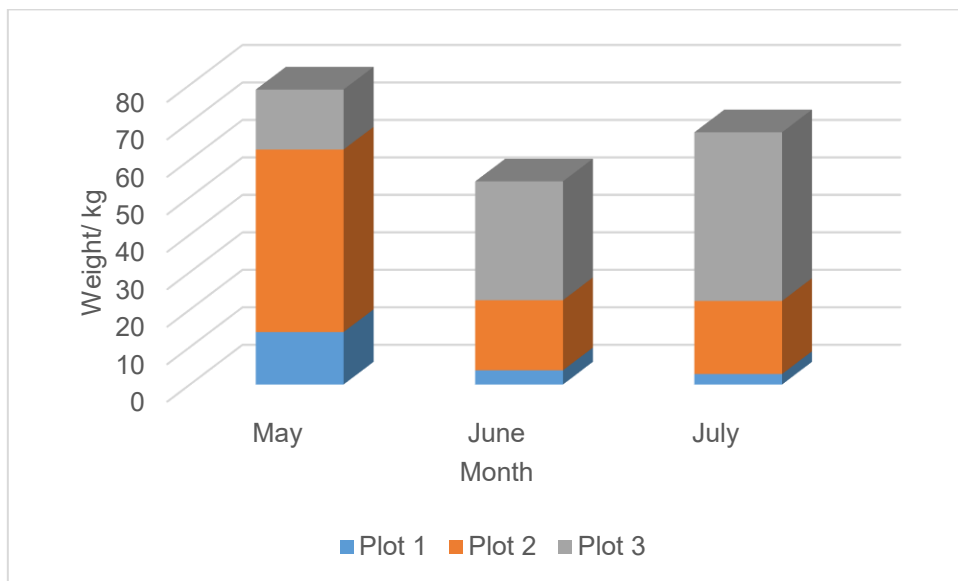


Figure 19 Weight of items collected at the sampling plots between May and July 2025

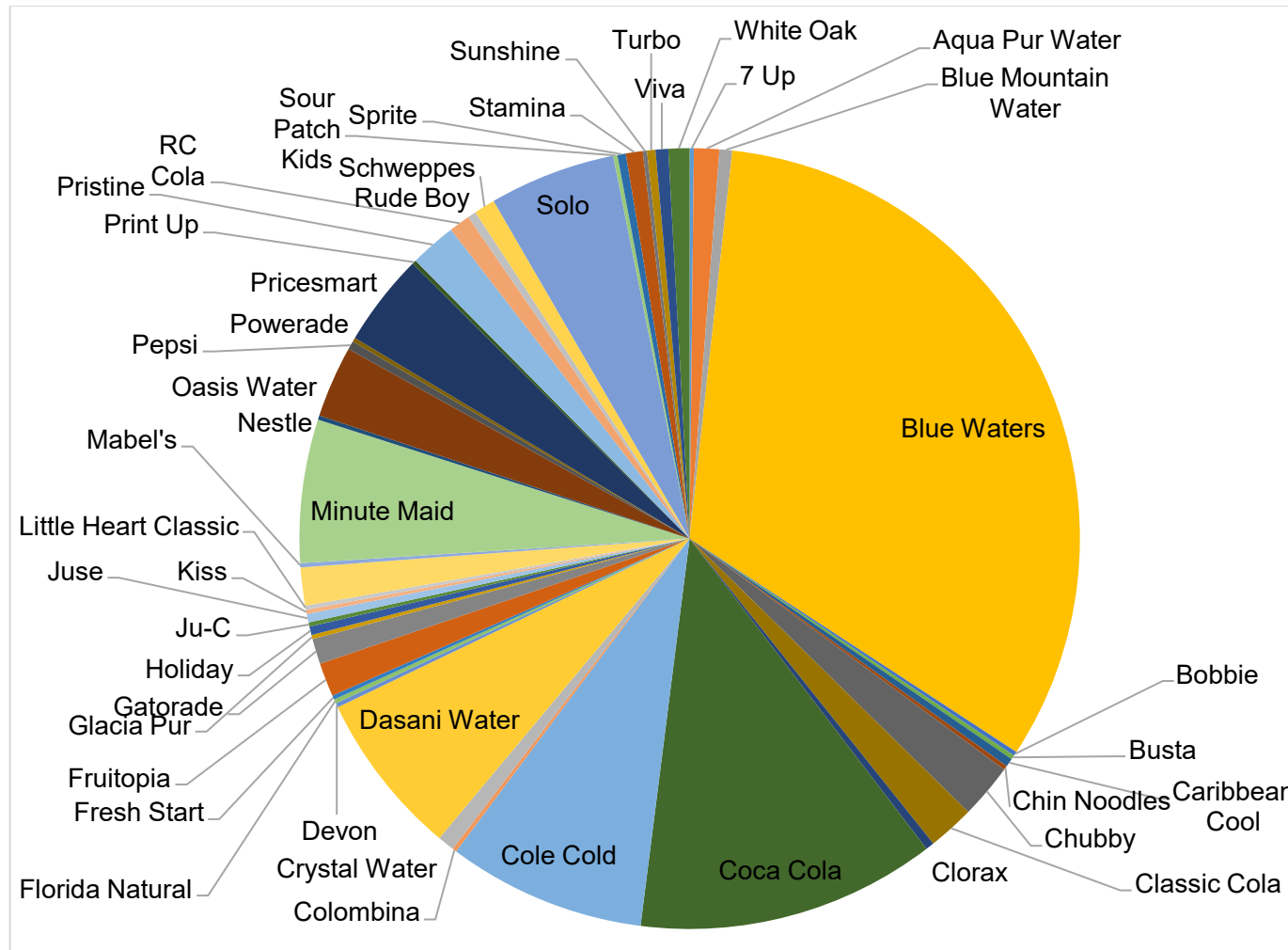


Figure 20 Distribution of brand- identified items collected between May and July 2025

4.5. Assessment of Beach Cleanliness

During the period May to July 2025, Plot 1 was classed as “Dirty”. Most plastic items were collected at Plot 1 in May 2025, during which the CCI was 14.8. The number of plastic items collected in June and July were similar and resulted in CCIs of 10.5 and 10.6 respectively. Visually, Plot 1 was the cleanest of the three plots and the removal of items in May 2025 may have contributed to the improved state of Plot 1 in June and July 2025.

During the period May to July 2025, the classification for Plot 2 ranged from “Clean” to “Dirty”. Most plastic items were collected at Plot 2 in May 2025, during which the CCI was 15.9 (“Dirty”). The number of plastic items collected in June was anomalously low, and resulted in a CCI of 2.6 (“Clean”). The removal of items in May 2025 may have contributed to the improved state of Plot 2 in June 2025. By July 2025, however, the number of plastic items at Plot 2 had increased considerably, and resulted in a CCI of 13.2 (“Dirty”).

During the period May to July 2025, the classification for Plot 3 ranged from “Moderate” to “Very dirty”. Least plastic items were collected at Plot 3 in May 2025, during which the CCI was 9.0 (“Moderate”). The number of plastic items collected, and the resulting CCI (13.9) were higher in June, resulting in a classification of “Dirty”. In July 2025, however, the number of plastic items at Plot 3 had increased considerably and resulted in a CCI of 33.0 (“Very dirty”).

Table 14 Clean Coast Index Classification of Plots at the Foreshore

Month (2025)	Plot No.	Plastics associated with fishing	Plastics associated with consumer products	Plastics associated with daily use	Particulate plastic	Total No. of plastic items	Length of plot /m	Width of plot /m	Sampling Area /m ²	CCI	Classification
May	Plot 1	1	48	26	38	113	15.3	10.0	340	14.8	Dirty
June	Plot 1	0	56	21	3	80	15.3	10.0	340	10.5	Dirty
July	Plot 1	0	32	15	34	81	15.3	10.0	340	10.6	Dirty
May	Plot 2	0	249	125	0	374	47.0	10.0	340	15.9	Dirty
June	Plot 2	0	33	29	0	62	47.0	10.0	340	2.6	Clean
July	Plot 2	1	161	61	87	310	47.0	10.0	340	13.2	Dirty
May	Plot 3	0	114	53	8	175	38.7	10.0	340	9.0	Moderate
June	Plot 3	0	218	48	2	268	38.7	10.0	340	13.9	Dirty
July	Plot 3	0	587	27	25	639	38.7	10.0	340	33.0	Very dirty

5. Conclusion

During the months of May, June and July 2025, plastics contributed significantly to marine waste collected at the Foreshore. Plastics associated with consumer products, and plastics associated with daily use, were consistently high during all three months, in terms of waste collected by number as well as by weight. Particulate plastic did not contribute significantly to the number and weight of items collected in May and June, however, a greater number of these items were recorded in July. Negligible quantities of plastics associated with fishing were recorded; these items were not a concern for this area. Fabric items contributed considerably to the total weight of items collected during all three months. Metal items were also among the top five categories recorded, based on weight, during all sampling events. Glass, rubber, particulate plastic and items classed as other, were among the top five categories recorded, based on weight, during one of the sampling events. Improvement of waste management is urgently needed to reduce the significant quantities of waste reaching the Foreshore.

6. Recommendations

The following are recommendations to assist in addressing the solid waste management challenges at the Foreshore:

- Conduct public education and awareness campaigns on the negative impacts of inadequate waste disposal on ecosystems, the need for waste segregation and the need for reducing the consumption of single-use plastics. Some aspects of this will be conducted as part of Work Package 4.
- Improve recycling schemes, including accessibility to drop off points, regular emptying of bins, and deposit refund systems. Recycling schemes will be improved under Work Package 2 and support for the implementation of a deposit refund system will be provided to relevant government stakeholders under Work Package 3.
- Upgrade fines, empower litter wardens, and improve monitoring to deter illegal dumping and littering.
- Establish infrastructure to facilitate waste separation at source, at the household level, as well as in public areas. Some aspects of this will be conducted as part of Work Package 2.
- Establish the framework for Extended Producer Responsibility (EPR) for various products including packaging, in which producers are held responsible for the entire life cycle of their products, including recycling and disposal.
- Promote circular economy solutions and encourage a shift from a linear model. Some aspects of this will be conducted as part of Work Package 2.

7. References

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