FEBRUARY 2020

EXTENT OF SINGLE-USE LITTER IN THE UK

A report by PLASTIC PATROL

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EXECUTIVE SUMMARY

This report is the first of a five-year series by Plastic Patrol to monitor and inform progress towards eliminating single-use plastics from nature by 2025, in line with UK Government's target to 'work towards all plastic packaging placed on the market being recyclable, reusable or compostable' by 2025, outlined in the Waste and Resources Strategy published in 2018 (1). The report presents the initial findings from analysis of data on litter recorded in the Plastic Patrol app by volunteers over a nine-month period from 5th April 2019 to 31st December 2019. Items of litter were recorded in 80 countries; 70% of the data was collected in the UK which is the focus of this study.

64,913 pieces of litter were categorised by type and brand in the UK from 5th April 2019 to 31st December 2019, including 1065 identified brands. 83% of litter, in terms of number of items, was plastic and the top ten most frequently found types of litter were:

1. Plastic packaging (21%)
2. Plastic fragments larger than 2.5cm (10%)
3. Cigarette butts (9%)
4. Plastic bottles (9%)
5. Drinks cans (7%)
6. Polystyrene / Styrofoam (6%)
7. Plastic bags (6%)
8. Fishing net, rope and pieces (5%)
9. Plastic bottle lids (5%)
10. Glass bottles (4%)

The top five brands recorded were:

1. Coca-Cola
2. Cadbury
3. Walkers
4. Mars
5. Tesco

When brands were mapped to parent companies (companies with a controlling interest of the brand), the top five parent companies were:

1. Coca-Cola Company
2. PepsiCo
3. Mondelez International
4. Mars
5. Suntory

To reduce waste and accelerate the transition to a circular economy, Plastic Patrol recommends:

- **A reformed waste producer responsibility system coupled with a transparent regulatory framework.**
- **An 'all-in' Deposit-Return Scheme (DRS) that goes beyond drinks containers to include all single-use material and container types and sizes.**
- **A nationwide ban on plastic bags.**

A full breakdown of the methodology and wider results are found in the report.

1. House of Commons Library (2020), Plastic Waste Briefing Paper, https://researchbriefings.parliament.uk/ResearchBriefing/Summary/CBP-8515#fullreport

CONTENTS

1.0 BACKGROUND

1.1 About Plastic Patrol

Plastic Patrol is an international movement sitting at the intersection of wellbeing and environment. Plastic Patrol's mission is to ignite and lead behavioural change around polluting litter through community action and citizen science whilst driving industry and political action that serves to protect our planet and wildlife from the harmful effects of single-use litter.

15,000 + volunteers have joined Plastic Patrol and data has been recorded across 80 countries worldwide

Plastic Patrol mobilises volunteers globally to either join coordinated clean ups or do them independently. Clean ups are combined with wellbeing activities like paddleboarding, canoeing, kayaking, yoga and plogging (jogging whilst picking up litter), encouraging people to look after the planet whilst simultaneously looking after themselves. To date, more than 15,000 volunteers have taken part and data has been recorded across 80 countries worldwide.

All volunteers are required to collect and record the litter found invading nature during clean ups via the Plastic Patrol mobile app. The app is available to use anytime, anywhere, by anyone, allowing Plastic Patrol to take an 'always on' approach to data collection. Inviting the general population to volunteer increases the amount of litter recorded, not only providing detailed data worldwide but also increasing awareness of the problem publicly.

Plastic Patrol's target for 2020 is to collect and record one million pieces of single-use litter through the Plastic Patrol app. Data are licenced and accessible for free when used for research or non-profit purposes and Plastic Patrol welcomes proposals. Plastic Patrol's citizen science programme is supported by researchers at the University of Glasgow and University of Nottingham. Data collected by the public are reviewed and analysed to better understand the problem, to inform, accelerate and monitor the transition to a circular economy.

Target for 2020 is to collect and record one million pieces of single use litter

1.2 The Single-Use Crisis

Globally, the use of plastics is expected to double in the next 20 years

Plastics and metals are durable and functional materials, but their current application in single-use products, such as plastic bottles or aluminium cans, is unsustainable:

- Globally, the use of plastics is expected to double in the next 20 years (2).
- In the UK, it is estimated that by 2030, 5.2 million tonnes of plastic waste will be generated, a 20% increase from 2018 (3).
- 7.7 billion metal drinks cans and 14.4 billion plastic bottles were used in 2018 (4).
- After a first use, it's estimated that 95% of plastic packaging material value is lost to the global economy, equivalent to £62 -117 billion per year (2).

Beyond the economic impact, plastic pollution causes serious environmental damage with unknown effects on human health. For example, plastic pollution is responsible for the deaths of over one million sea birds and 100,000 marine mammals and turtles every year (5).

Government and brands have made commitments to transition towards a circular economy – a system based on creating economic value by eliminating waste and reliance on finite resources in favour of the continued use of materials and resources in the existing system:

- The EU adopted the Circular Economy Package in 2018.
- In the UK, 79 businesses, responsible for over 80% of plastic packaging products sold in UK supermarkets, are members of the UK Plastics Pact with the ambition that all plastic packaging is reusable, recyclable, or compostable, ie 'circular' (6).
- By 2025, UK Government's target is to 'work towards all plastic packaging placed on the market being recyclable, reusable or compostable' (1).
- The UK Government's new Environment Bill (7), announced in the December 2019 Queen's Speech, is expected to set out aims to extend producer responsibility, introduce deposit return schemes, and introduce charges for specified single use items in 2020 to make 'progress towards resource efficiency and a circular economy' (8).

Crowdsourced data on polluting materials will be essential to monitor progress towards a circular economy, allowing citizens to 'police' the system and help develop a set of ambitious targets to eliminate single use materials in nature.

Even with a circular roadmap in place, we know that the EU has projected that marine plastic pollution will increase to 150 million tonnes by 2025 (9). Something isn't working.

To make a lasting change and develop an effective roadmap towards a truly circular economy, we must first understand and measure the extent of the problem. At the time Plastic Patrol launched in 2016 we were not able to find a reliable, impartial and statistically robust tool to gather evidence about litter and waste disposal behaviours globally, so we built our own: the Plastic Patrol app. Crowdsourced data on polluting materials will be essential to monitor progress towards a circular economy, allowing citizens to 'police' the system and help develop a set of ambitious targets to eliminate single use materials in nature.

Definition of single-use: designed to be used once before being thrown away or recycled

2. World Economic Forum, Ellen MacArthur Foundation and McKinsey & Company, The New Plastics Economy — Rethinking the future of plastics (2016, http://www.ellenmacarthurfoundation.org/publications)
3. A Plastic Future, Plastics Consumption and Waste Management in the UK. Plastics Consumption and Waste Management Final Report, Report for WWF prepared by Eunomia Research and Consulting Ltd (2018) https://www.wwf.org.uk/sites/default/files/2018-03/WWF_Plastics_Consumption_Report_Final.pdf
4. WRAP, 2019, Banbury, Drinks Recycling On-the-Go, Prepared by Valpak and Recoup
5. The Ocean Conference, United Nations (2017), Factsheet: Marine pollution, https://sustainabledevelopment.un.org/content/documents/Ocean_Factsheet_Pollution.pdf
6. WRAP, The UK Plastics Pact (2018) A Roadmap to 2025
1.ibid
7. Department for Environment, Food & Rural affairs, (2019), Environment Bill policy statement, https://www.gov.uk/government/publications/environment-bill-2019/environment-bill-policy-statement#a-new-direction-for-resources-and-waste-management
8. HM Government, Queen's Speech December 2019: background briefing notes, 19 December 2019, p112
9. Government Office for Science (2018), Foresight Future of the Sea. https://www.gov.uk/government/publications/ future-of-the-sea--2

2.0 METHODOLOGY

2.1 Method

Data collected on litter were recorded by volunteers in the Plastic Patrol app. The app has been developed over time, increasing the functionality and scope of data collection, outlined briefly below.

158,724 pieces of waste were recorded between 19th April 2017 and 31st December 2019 in the UK. 48,110 pieces were recorded using the first version of the app from 19th April 2017 to 5th April 2019 in which users uploaded geo-tagged photos to the app along with the number of pieces of litter in the photo. From 5th April 2019, version two of the app was released, with increased functionality for the user to categorise litter items by 'type' and brand as well as uploading information about the quantity, location and a photograph of the waste. Between 5th April 2019 and 31st December 2019 in the UK, 110,614 pieces of litter were recorded, 64,913 of which were categorised by type and brand.

These 64,913 items of litter from the UK categorised by type and brand, collected between 5th April 2019 and 31st December 2019 are the focus of this report.

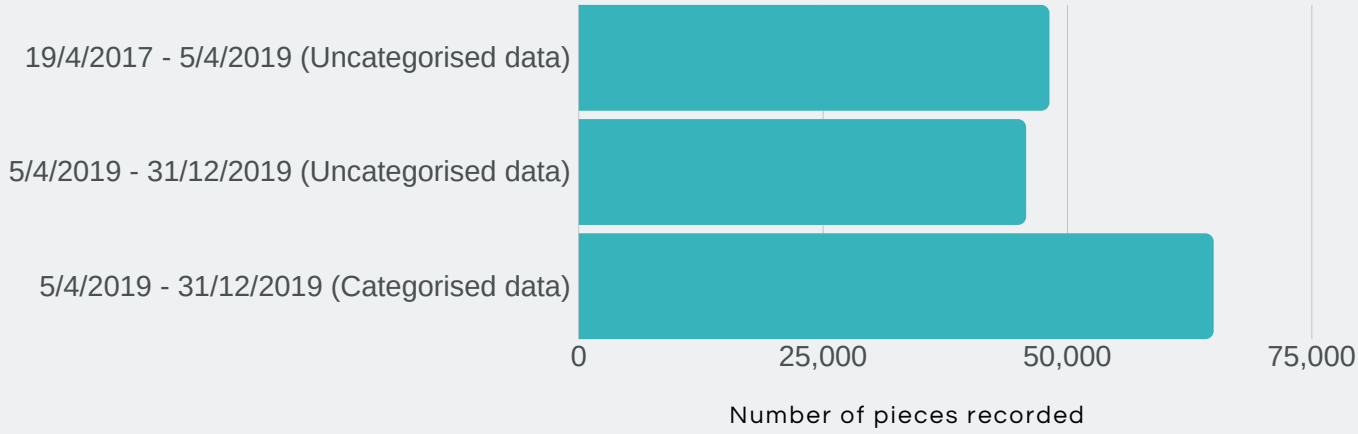

Figure 1: Quantity of categorised and uncategorised data collected in the Plastic Patrol app between 19th April 2017 and 31st December 2019 in the UK

How the app works

Volunteers use the mobile app to photograph litter found. Photographs uploaded are geo-tagged, providing the exact location the photograph was taken providing geographical and behavioural insight outlined in section 2.3. Data on the quantities, types and brands of litter are inputted by a manual process.

Figure 2: Infographic detailing the basic steps to use the Plastic Patrol app

2.2 Analysis

The main stages of analysis are as follows:

1. Remove data points for which there was no categorisation of the type or brand of the item by the user.
2. Review spellings of brands manually typed by users, ensuring there was one consistent spelling for each brand.
3. Map recorded brands to parent companies.
4. Filter data points for UK locations.
5. Calculate the total number of items for each type and brand of waste recorded.

Cleaning of data are done manually, as there are many different spellings of brands and cross-checking is required to ensure the 'type' of litter matches the recorded brand. Mapping of brands to parent companies is done by a manual process, with the 'ultimate' parent brand being recorded. If a brand is owned by different companies in different countries, the UK owner is selected.

Once the data are cleaned, data are filtered for the UK and transferred to a separate database. Data points are then grouped by types, brands and sorted.

Analyses are undertaken to determine the material composition of litter items, 'types' of waste, brands and parent companies of litter recorded. For the top types of litter, the brands and parent company composition of that litter type is investigated.

2.3 Distribution

The Plastic Patrol app is used to gather data on litter polluting the natural environment. All images are geo-tagged and each user is individually verified, offering insight into the most engaged communities and the most disengaged. Plastic Patrol uses this insight to target specific communities in clean up efforts.

Figure 3 shows a map of the UK, with circles representing the number of photos which have been uploaded to the Plastic Patrol app in that area. Table 1 summarises information displayed in Figure 3, presenting the most engaged cities and disengaged cities based exclusively on insight gathered by Plastic Patrol app users.

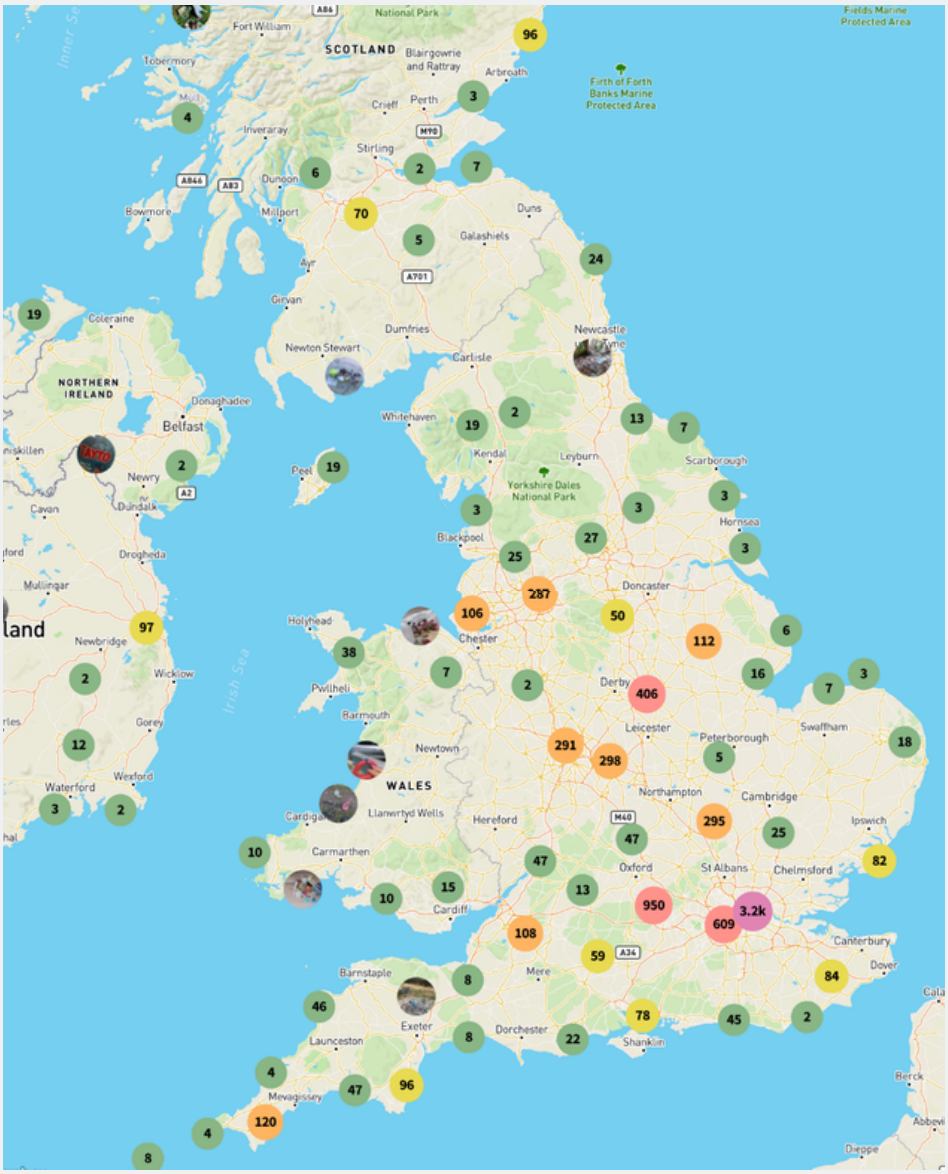

Figure 3: Map showing the distribution of uploads to the Plastic Patrol app in the UK. Each circle represents the number of photos uploaded to the app in that area. Image taken from the Plastic Patrol interactive map on 10th January 2019, https://plasticpatrol.co.uk/plastic-map/

Table 1: Most engaged locations and least engaged locations, determined by the number of uploads to the Plastic Patrol app.

Most engaged locations	Least engaged locations
London	Hereford
Reading	Newcastle
Oxford	Doncaster
Nottingham	Ely
Walsall	Carlisle
Bedford	Peterborough
Falmouth	Edinburgh
Rochdale	Stoke-On-Trent
Coventry	Cardiff
Lincoln	Exeter

3.0 KEY FINDINGS

3.1 Material Types

64,913 items recorded were categorised by material type. Plastic made up the majority of items categorised (83%), followed by metal (8%) and glass (4%).

Table 2: Material types recorded in the Plastic Patrol app between 5th April 2019 - 31st December 2019 in the UK

Material type	Count	Percentage of total*
Plastic	54081	83.3%**
Metal	5405	8.3%
Glass	2804	4.3%
Fabric	1567	2.4%
Rubber	368	0.6%
Ceramic	362	0.6%
Wood	221	0.3%
Cork	105	0.2%

**Percentages given to one decimal place*
***The percentage of plastic recorded is higher than found in several previous studies. There is the potential for an unconscious bias towards recording plastic items, for example as they are easier to pick up and identify, or this could reflect a concentration of user effort in urban locations, where littering of 'on-the-go' items is common.*

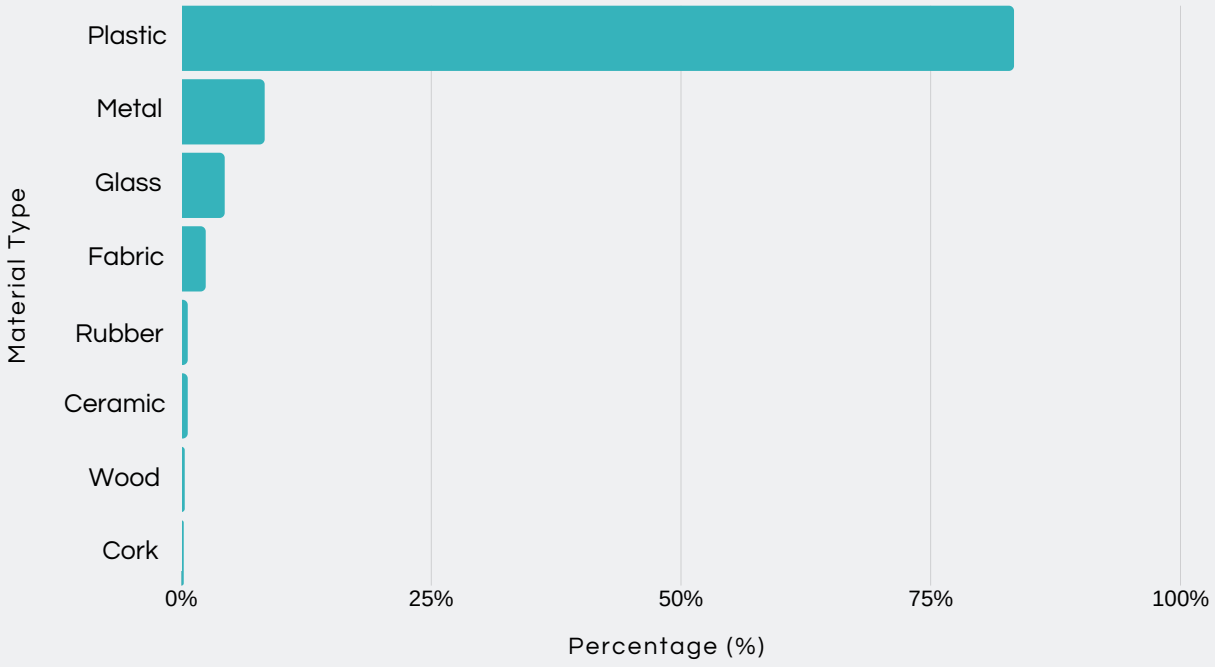

Figure 4: Material types as a percentage of the total litter recorded in the Plastic Patrol app between 5th April 2019 - 31st December 2019 in the UK

3.2 Top Litter Types

64,913 items recorded were categorised by type. Items were categorised in 56 different categories (see Appendix 1).

The 'Other Plastic' category, for unidentifiable items or items that did not fit into a given category (such as mobile phone cases, road signs) was removed as the type is not well-defined, leaving 51,725 items. Of these items, 10 types accounted for over 80% of litter recorded.

Plastic packaging was the most commonly recorded litter type (21%), followed by plastic fragments larger than 2.5cm (10%), cigarette butts (9%), plastic bottles (9%), drinks cans (7%), polystyrene / Styrofoam (6%), plastic bags (6%), fishing net/rope/pieces (5%), plastic bottle lid/cap (5%) and glass bottles (4%).

Table 3: Top 10 litter types recorded in the Plastic Patrol app between 5th April 2019 - 31st December 2019 in the UK

Litter type	Count	Percentage of total*
Plastic packaging**	10990	21.3%
Plastic fragment (>2.5 cm)	5166	10.0%
Cigarette butt	4713	9.1%
Plastic bottle	4469	8.6%
Drinks can	3630	7.0%
Polystyrene / Styrofoam	3164	6.1%
Plastic bag	2952	5.7%
Fishing net, rope and pieces	2788	5.4%
Plastic bottle lid / cap	2603	5.0%
Glass bottle	2138	4.1%

**Percentages given to one decimal place*
*** Plastic packaging is here defined as any item used to hold, protect, handle, deliver and present goods, excluding bottles, bottle lids, bags, cups, Styrofoam, which are separate categories. The majority of packaging recorded was from the food industry, such as sweet and chocolate wrappers, crisp packets etc.*

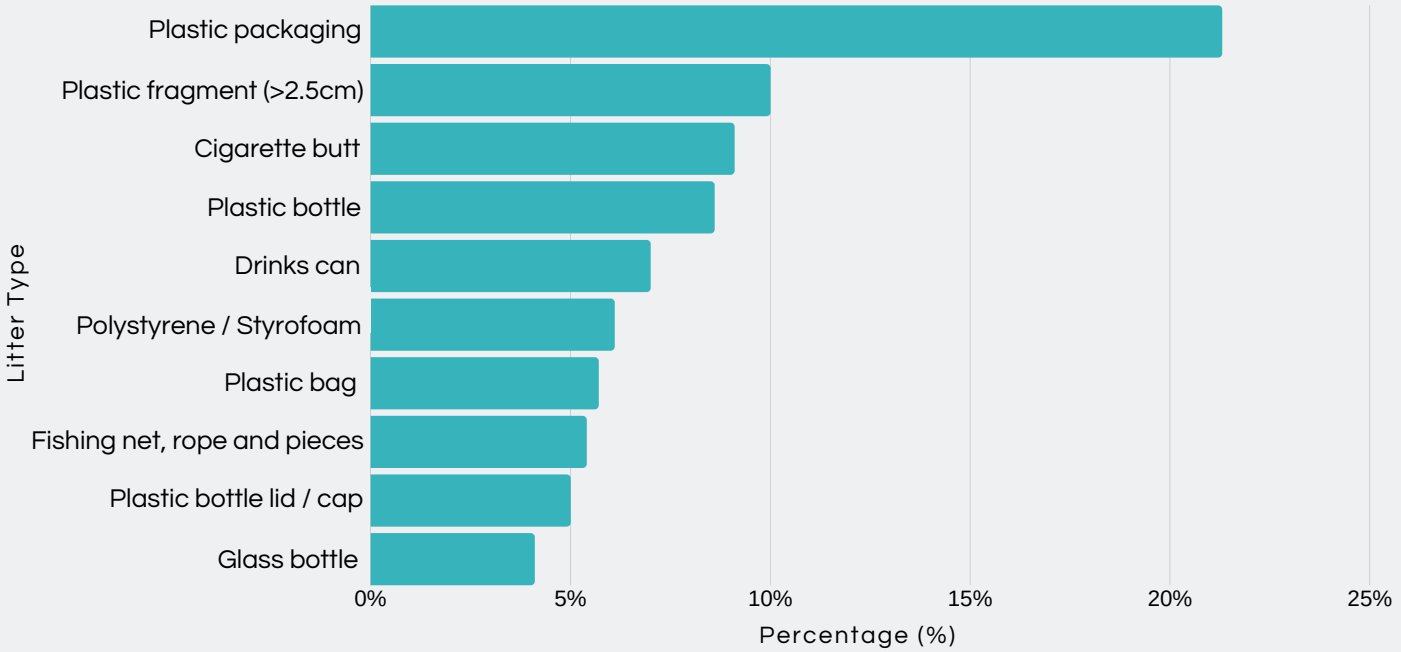

Figure 5: Top 10 litter types as a percentage of the total categorised items recorded in the Plastic Patrol app between 5th April 2019 - 31st December 2019 in the UK.

For the top types recorded, the brands and parent companies were further analysed. A parent company is here defined as a company that has a controlling interest in another company, giving it control over its operations. For cigarette butts, plastic fragments and polystyrene / Styrofoam categories the brands were in the vast majority unknown or unbranded. Therefore, the brand breakdown for these types is not included in this document.

3.2.1 Plastic Packaging

10,990 items of plastic packaging were recorded. The plastic packaging was composed of products from 432 brands, which mapped to 237 parent brands

The brand of 6,826 packaging items was 'unknown' (unidentifiable, not visible, unbranded) - these items were excluded from the analysis.

The top 10 brands accounted for 56% of plastic packaging. When mapped to parent companies, the top 10 companies accounted for 70% of plastic packaging.

Plastic Packaging Brands:

Table 4: Top 10 brands of plastic packaging recorded in the Plastic Patrol app between 5th April 2019 - 31st December 2019 in the UK

Brand	Count	Percentage of total*
Cadbury	590	14.2%
Walkers	566	13.6%
Mars	385	9.3%
Nestle	154	3.7%
Haribo	132	3.2%
Coca-Cola	115	2.8%
Tesco	112	2.7%
Kinder	103	2.5%
Maoam	96	2.3%
McDonald's	72	1.7%

**Percentages given to one decimal place*

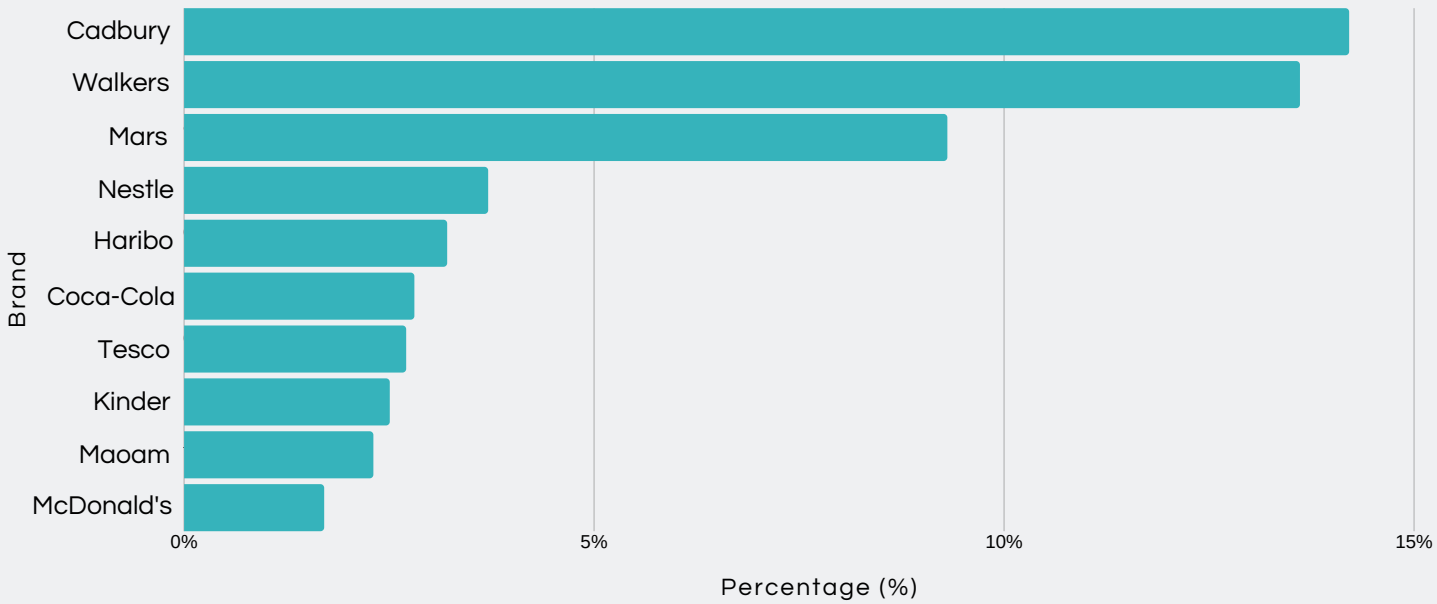

Figure 6: Plastic packaging from each of the top 10 brands as a percentage of the total branded plastic packaging recorded in the Plastic Patrol app between 5th April 2019 - 31st December 2019 in the UK

Plastic Packaging Parent Companies:

Table 5: Top 10 parent companies for plastic packaging recorded in the Plastic Patrol app between 5th April 2019 - 31st December 2019 in the UK

Parent company	Count	Percentage of total*
PepsiCo	672	16.5%
Mondelez International	602	14.8%
Mars	443	10.9%
Nestle	230	5.6%
Haribo	224	5.6%
Intersnack	190	4.7%
Coca-Cola Company	146	3.6%
Tesco	113	2.8%
Ferrero	111	2.7%
Lotus Bakeries	101	2.5%

**Percentages given to one decimal place*

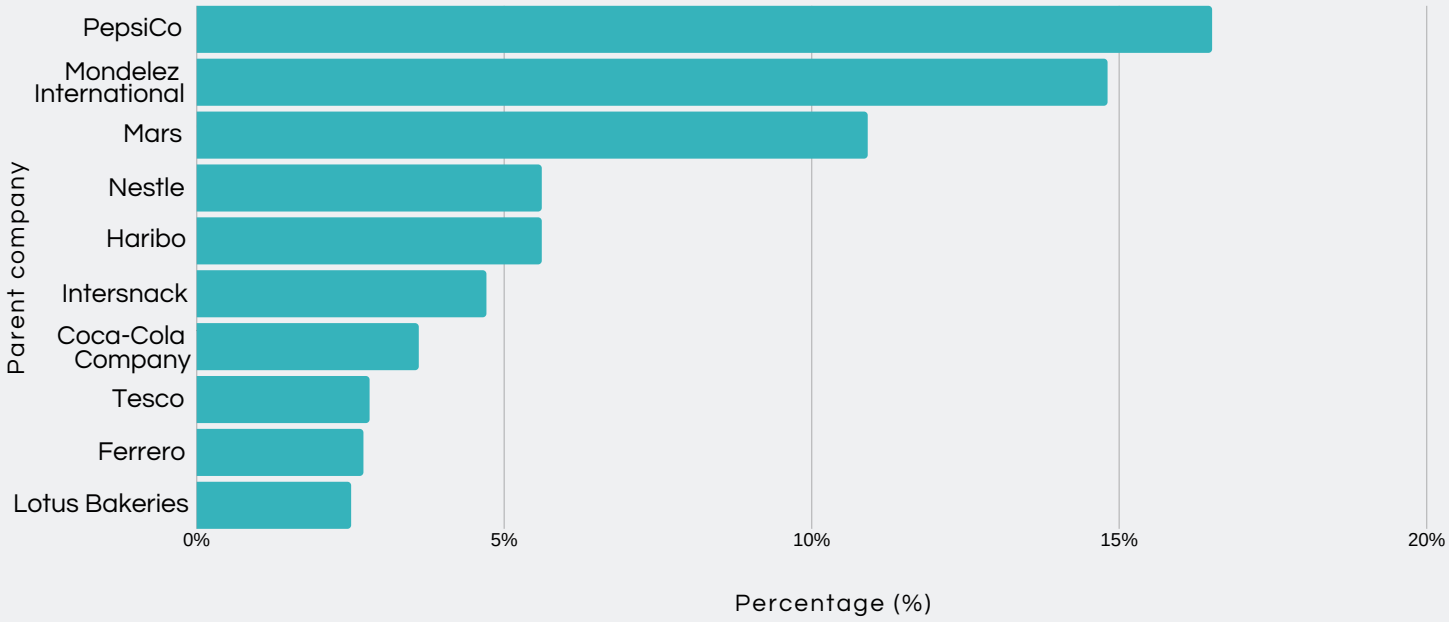

Figure 7: Plastic packaging from each of the top 10 parent companies as a percentage of the total branded plastic packaging recorded in the Plastic Patrol app between 5th April 2019 - 31st December 2019 in the UK

3.2.2 Plastic Bottles

4469 plastic bottles were recorded from 260 different brands, which mapped to 163 parent companies. The brand of 1965 bottles was 'unknown' (unidentifiable, not visible, unbranded) and these items were excluded from the analysis.

The top 10 brands (before mapping to parent companies) accounted for 59% of plastic bottles. When mapped to parent companies, 4 companies dominated, accounting for over 50% of plastic bottles: Coca-Cola Company, Suntory, Danone and Boost Drinks.

Plastic Bottle Brands:

Table 6: Top 10 brands of plastic bottles recorded in the Plastic Patrol app between 5th April 2019 - 31st December 2019 in the UK

Brand	Count	Percentage of total*
Coca-Cola	348	13.9%
Lucozade	323	12.9%
Boost Energy	227	9.1%
Evian	138	5.5%
Pepsi	81	3.2%
Volvic	79	3.2%
Oasis	75	3.0%
Fanta	70	2.8%
Highland Spring	69	2.8%
Buxton	61	2.4%

*Percentages given to one decimal place

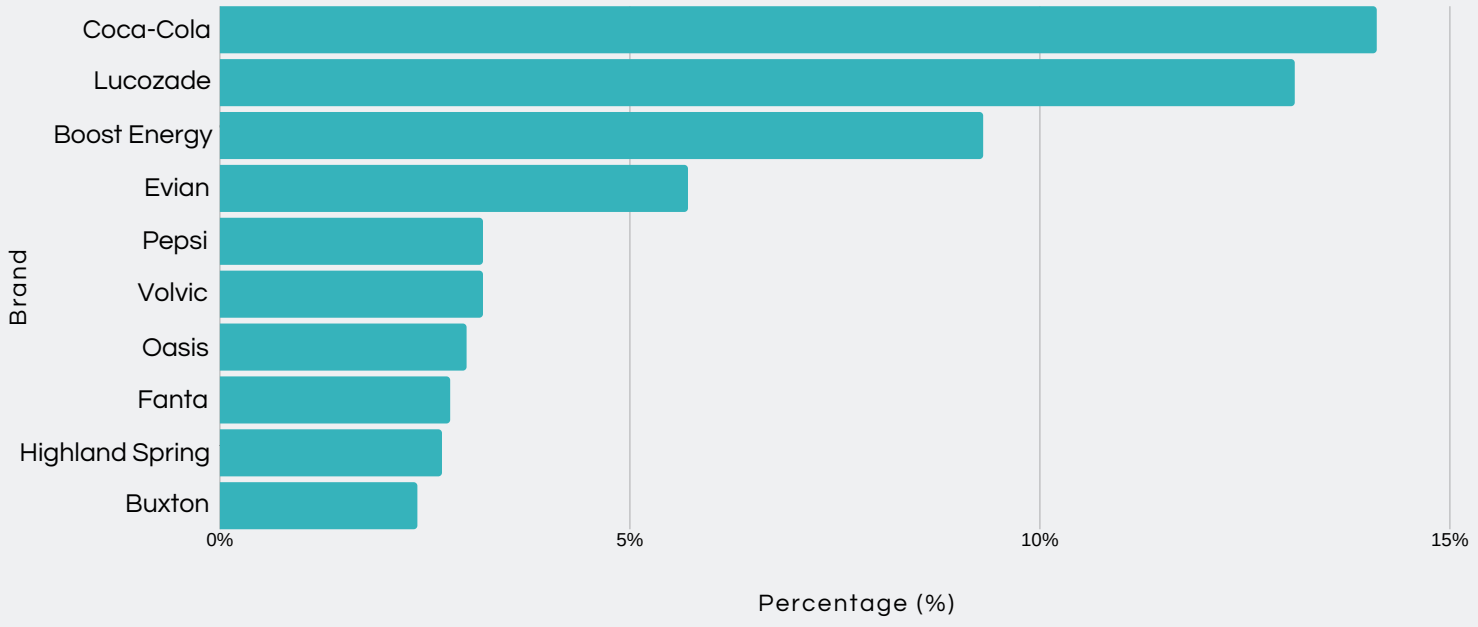

Figure 8: Plastic bottles from each of the top 10 brands as a percentage of the total branded plastic bottles recorded in the Plastic Patrol app between 5th April 2019 - 31st December 2019 in the UK

Plastic Bottle Parent Companies

Table 7: Top 10 parent companies for plastic bottles recorded in the Plastic Patrol app between 5th April 2019 - 31st December 2019 in the UK

Parent company	Count	Percentage of total*
Coca-Cola Company	604	24.4%
Suntory	384	15.5%
Danone	229	9.2%
Boost Drinks	227	9.2%
PepsiCo	148	6.0%
Nestle	96	3.9%
Highland Spring Group	69	2.8%
Britvic	49	2.0%
Nichols plc	46	1.9%
Keurig Dr Pepper	42	1.7%

**Percentages given to one decimal place*

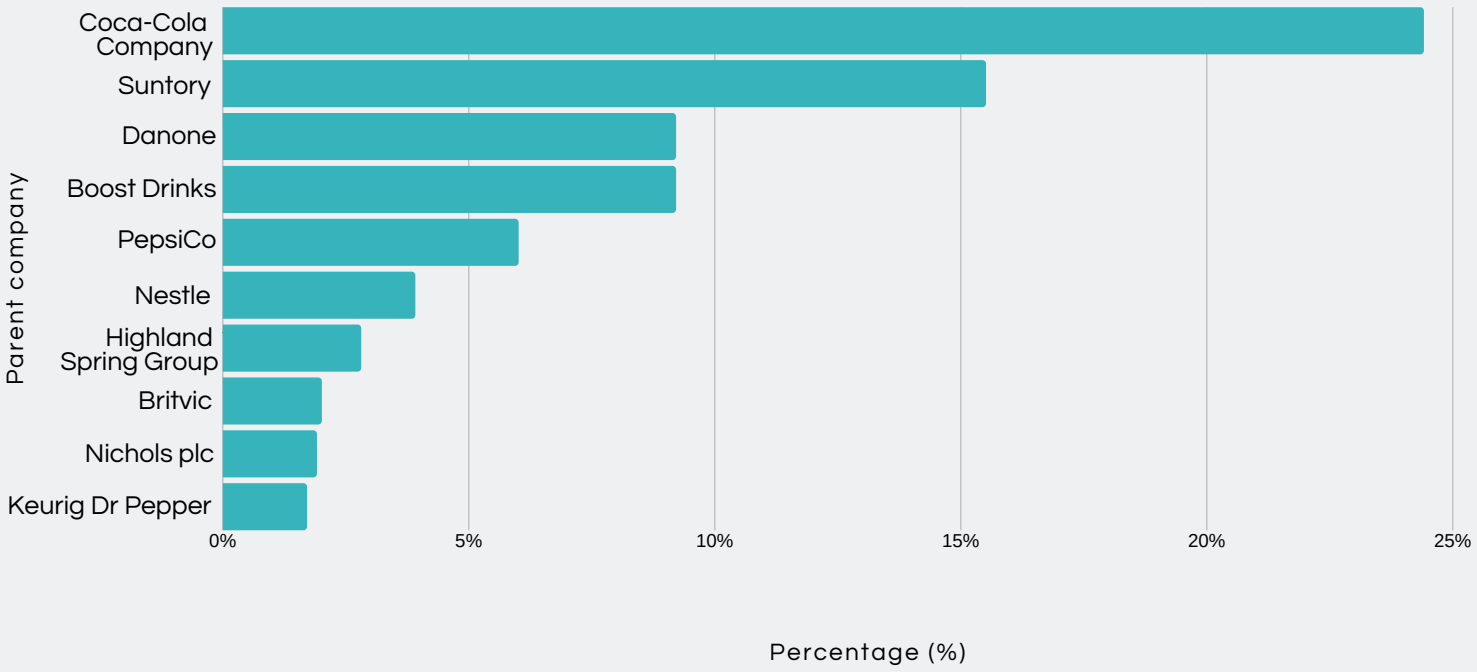

Figure 9: Plastic bottles from each of the top 10 parent companies as a percentage of the total branded plastic bottles recorded in the Plastic Patrol app between 5th April 2019 - 31st December 2019 in the UK

3.2.3 Drinks Cans

3630 metal drinks cans were recorded from 192 different brands, which mapped to 107 parent companies. The brand of 1181 items were 'unknown' (unidentifiable, not visible, unbranded) and these items were excluded from the analysis.

The top 10 brands (before mapping to parent companies) accounted for 53% of the drinks cans. When mapped to their parent companies, 5 companies accounted for over 50% of drinks cans: Coca-Cola Company, Heineken International, Anheuser-Busch, Carlsberg Group and Red Bull GmbH.

Drinks Can Brands:

Table 8: Top 10 brands for drinks cans recorded in the Plastic Patrol app between 5th April 2019 - 31st December 2019 in the UK

Brand	Count	Percentage of total*
Coca-Cola	302	12.3%
Stella Artois	203	8.3%
Red Bull	172	7.0%
Foster's	133	5.4%
Pepsi	116	4.7%
Strongbow	108	4.4%
Carling	72	2.9%
Boost Energy	72	2.9%
Euro Shopper	65	2.7%
Kronenbourg	58	2.4%

*Percentages given to one decimal place

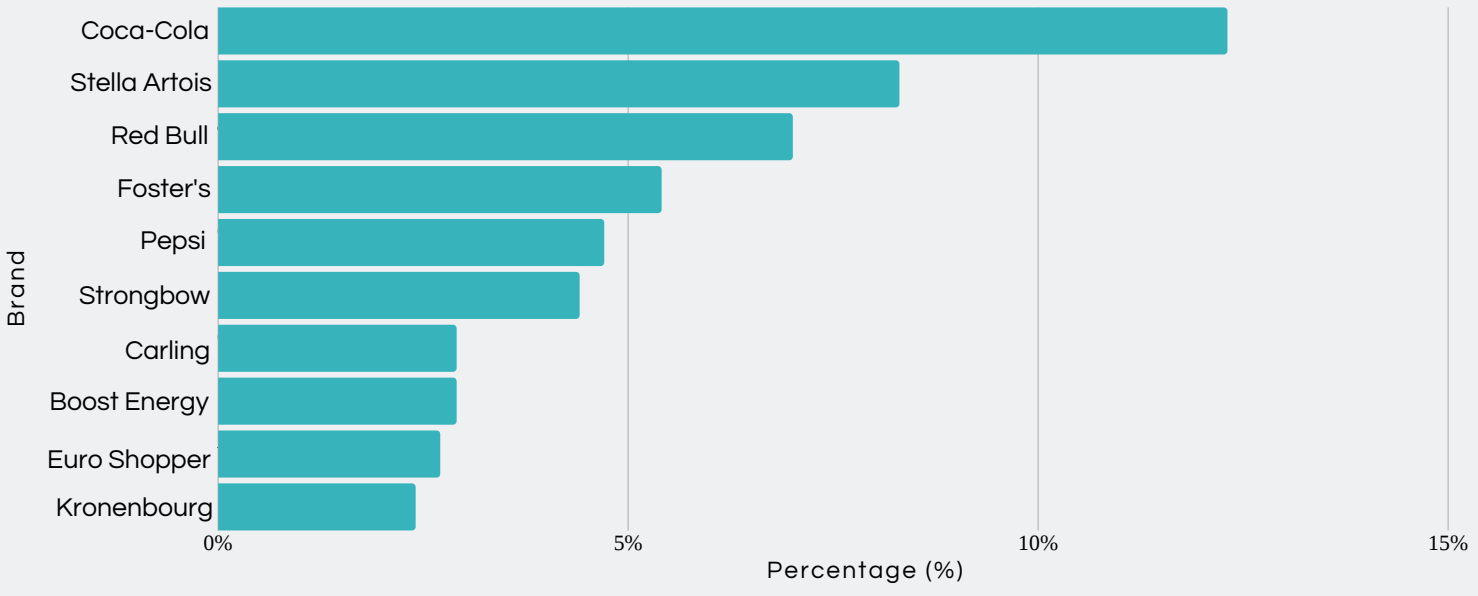

Figure 10: Drinks cans from each of the top 10 brands as a percentage of the total branded drinks cans recorded in the Plastic Patrol app between 5th April 2019 - 31st December 2019 in the UK

Drinks Can Parent Companies

Table 9: Top 10 parent companies for drinks cans recorded in the Plastic Patrol app between 5th April 2019 - 31st December 2019 in the UK

Parent company	Count	Percentage of total*
Coca-Cola Company	389	16.2%
Heineken International	286	11.9%
Anheuser-Busch	270	11.2%
Carlsberg Group	204	8.5%
Red Bull GmbH	172	7.2%
PepsiCo	157	6.5%
Molson Coors Brewing Company	72	3.0%
Boost Drinks	72	3.0%
Asahi Breweries	66	2.7%
Diageo	65	2.7%

**Percentages given to one decimal place*

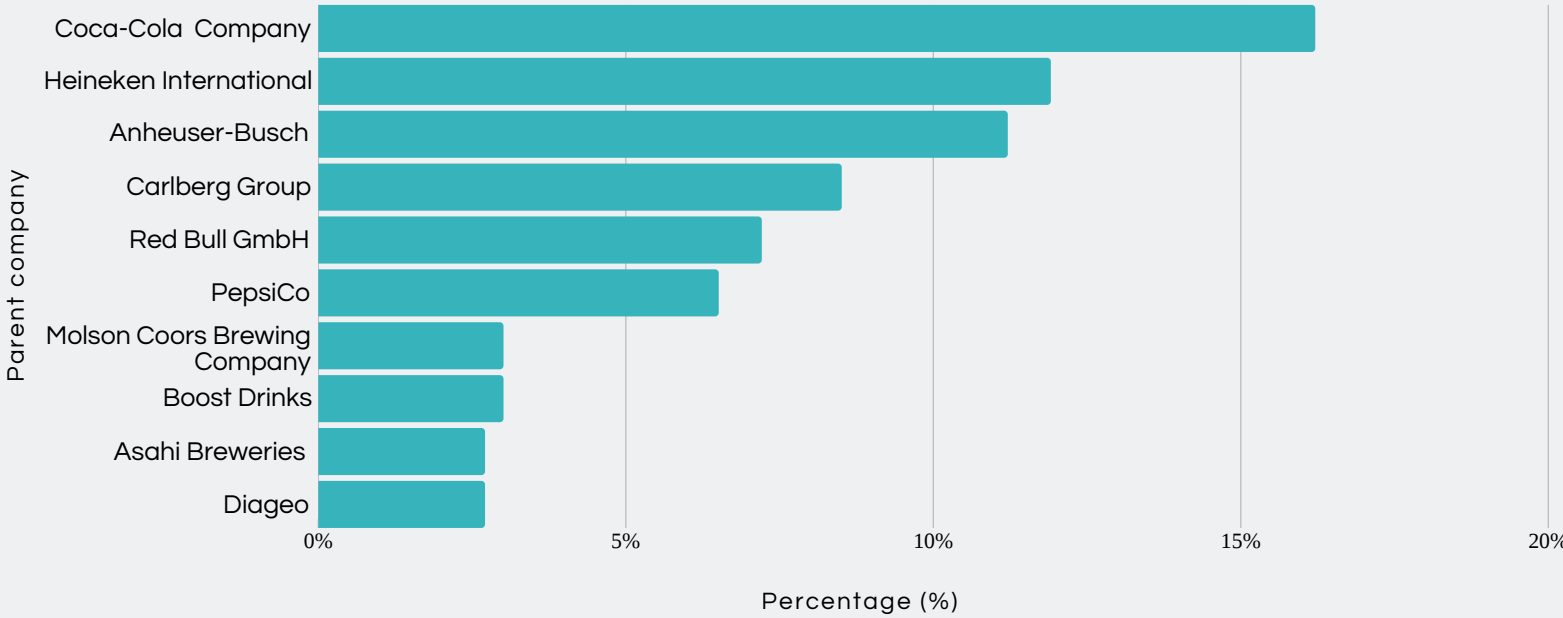

Figure 11: Drinks cans from each of the top 10 parent companies as a percentage of the total branded drinks cans recorded in the Plastic Patrol app between 5th April 2019 - 31st December 2019 in the UK

3.2.4 Plastic Bags

2952 plastic bags were recorded from 76 brands. The vast majority of plastic bags (85.4%) were 'unbranded' (no brand visible), such as those provided by smaller retailers or grocery stores.

Table 10: Brands of plastic bags recorded in the Plastic Patrol app between 5th April 2019 - 31st December 2019 in the UK

Brand	Count	Percentage of total*
No brand	2520	85.4%
Tesco	106	3.6%
Asda	64	2.2%
Sainsbury's	39	1.3%
Morrison's	18	0.6%
Other	205	6.9%

**Percentages given to one decimal place*

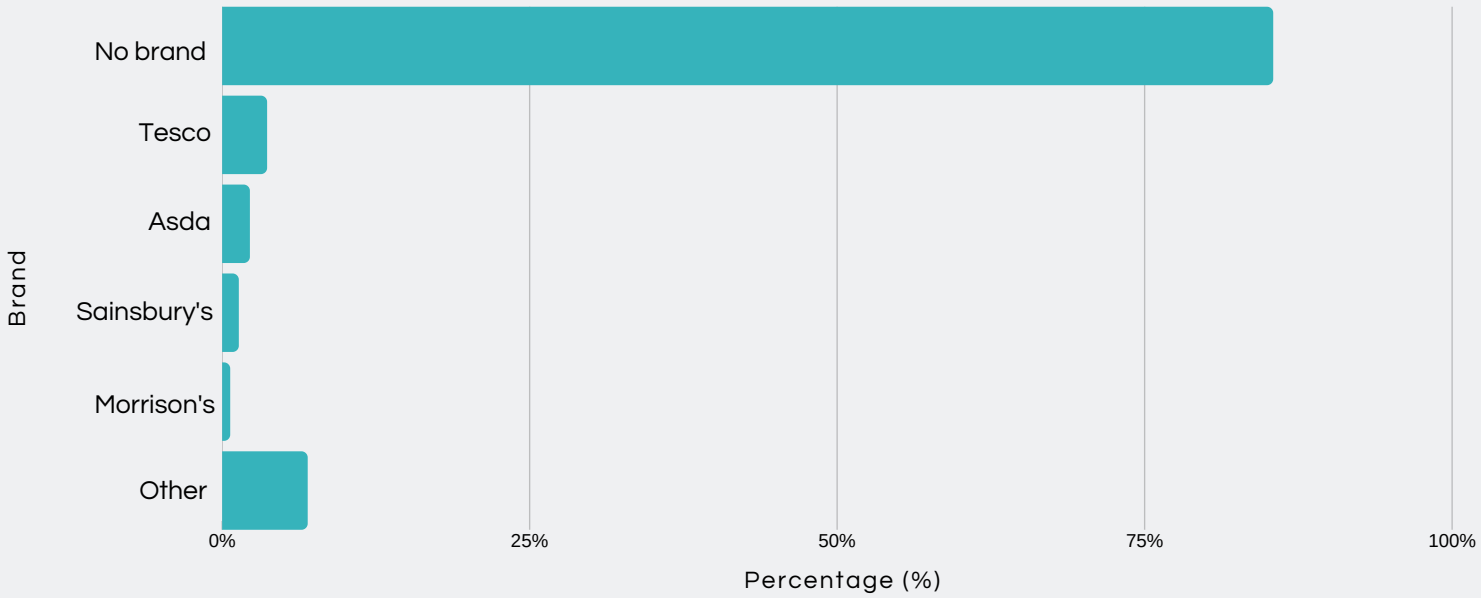

Figure 12: Plastic bags brands as a percentage of the total branded plastic bags recorded in the Plastic Patrol app between 5th April 2019 - 31st December 2019 in the UK

3.3 Top Litter Brands and Parent Companies

Of the 64,913 items recorded, 52,749 pieces had unknown brands (brand not visible, unidentifiable) which may be partly due to differences in app user effort or the state of the item. These items were excluded from the analysis. 1065 brands were recorded which mapped to 604 parent companies.

The top 10 brands accounted for 35.4% of items recorded. The majority of brands had less than three items recorded (767 brands). From the 604 parent companies, the top 10 parent companies accounted for 49.1% of branded waste.

Brands:

Table 11: Top 10 brands recorded in the Plastic Patrol app between 5th April 2019 - 31st December 2019 in the UK

Brand	Count	Percentage of total*	Commitments
Coca-Cola	896	7.4%	• All packaging 100% recyclable by 2025 • Collect and recycle a bottle or can for each one sold by 2030 • Support a well-designed Deposit-Return Scheme in UK (10)
Cadbury	617	5.0%	• All packaging 100% recyclable by 2025 • Recycling information for consumers on all products by 2025 (11)
Walkers	566	4.7%	• All packaging 100% recyclable by 2025 • Partnered with TerraCycle to recycle crisp packets (12)
Mars	392	3.2%	• All packaging 100% reusable, recyclable or compostable by 2025 • Use, on average, 30% recycled content in plastic packaging by 2025 • Reduce virgin plastic use by 25% by 2025 (13)
Tesco	385	3.2%	• All packaging 100% recyclable by 2025 • Halve packaging weight for own brand products by 2025 • Trialling removal of packaged fruit and vegetables in 2 UK stores • Trialling reverse vending machines in UK where customers get money back for returning plastic bottles (14)
Lucozade	360	3.0%	• All drinks containers are recyclable • Use 50% 'sustainable' plastic packaging by 2025, 100% by 2030 (15)
Boost Energy	310	2.6%	Unable to find sustainability plan - a strategic plan will be released in 2020
Pepsi	272	2.2%	• All packaging 100% recyclable, compostable or biodegradable by 2025 • Use 25% recycled content in plastic packaging by 2025 • Reduce virgin plastic use 30% across beverages by 2025 (16)
Stella Artois	259	2.1%	100% of product in packaging returnable or made from majority recycled content by 2025 (17)
McDonald's	254	2.1%	• Source 100% of guest packaging from renewable, recycled or certified sources by 2025 • Recycle guest packaging in 100% of restaurants by 2025 • 'Zero waste to landfill' target by 2020 (18)

**Percentages given to one decimal place*

10. Coca-Cola European Partners (2019) Action on packaging, Making our packaging more sustainable, https://www.cocacolaep.com/sustainability/this-is-forward/action-on-packaging/
11. Mondelez International, Packaging Innovation, Sustainable Snacking, https://www.mondelezinternational.com/Snacking-Made-Right/Sustainable-Snacking/Packaging-Innovation
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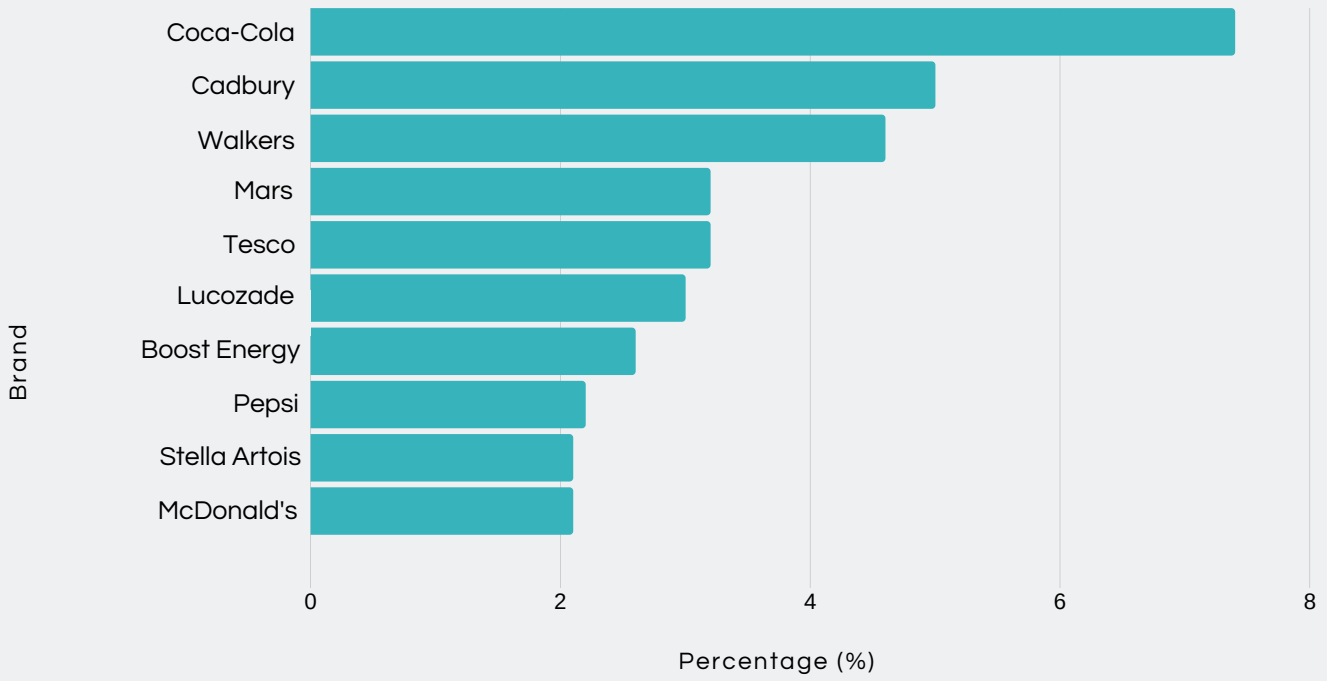

Figure 13: Top 10 brands as a percentage of the total branded litter recorded in the Plastic Patrol app between 5th April 2019 - 31st December 2019 in the UK

Parent Companies

Table 12: Top 10 parent companies recorded in the Plastic Patrol app between 5th April 2019 - 31st December 2019 in the UK

Parent company	Count	Percentage of total*
Coca-Cola Company	1425	12.0%
PepsiCo	1030	8.7%
Mondelez International	629	5.3%
Mars	457	3.8%
Suntory	431	3.6%
Anheuser-Busch	405	3.4%
Heineken International	403	3.4%
Tesco	389	3.3%
Nestle	352	3.0%
Boost Drinks	310	2.6%

**Percentages given to one decimal place*

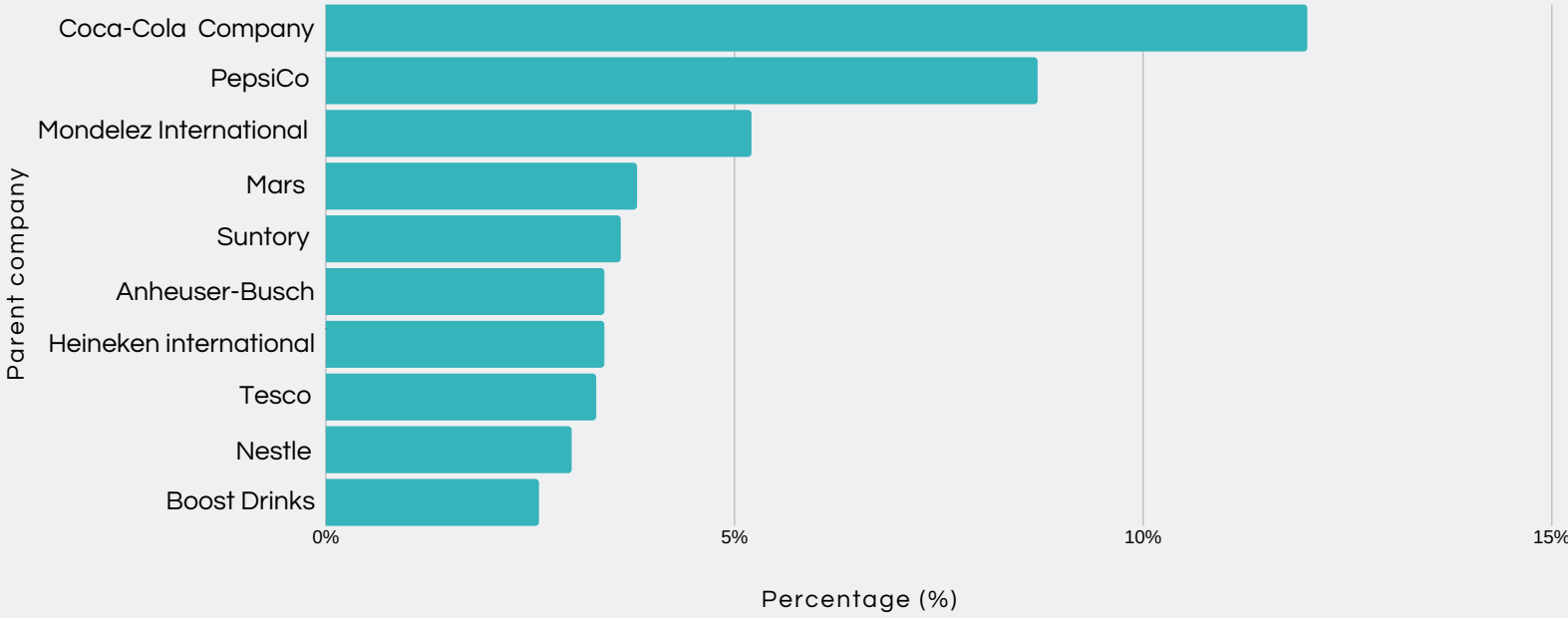

Figure 14: Top 10 parent companies as a percentage of the total branded litter recorded in the Plastic Patrol app between 5th April 2019 - 31st December 2019 in the UK

4.0 LIMITATIONS & CONSIDERATIONS

Data were crowdsourced manually through the Plastic Patrol app, leaving room for human error. As the data are collected through mobile technology, users' ability in using technology varies. Anomalous entries were identified and removed, and data cleaning removed inconsistencies in categorisation and brand naming.

For manually inputted data there were spelling errors, which occasionally made it difficult to recognise the relevant brand associated. Users may also have categorised the same items differently from the drop-down list due to semantics around how a particular item would be described, e.g. bottle cap and bottle lid. This is expected to be the case for fragmented pieces of litter, the source of which is difficult to trace. Biases are expected, such as a bias towards recording larger items or better-known brands. Users were identified by clean up leaders as being uncomfortable collecting and recording specific items such as sanitary products or condoms, so results may not show a true reflection of the extent of pollution by such items.

It should be considered that data were collected by volunteers at organised clean-ups and by individuals in their local area. Data recording was not done in a designed study where survey locations would be determined through a rigorous statistical sampling scheme in space and time. Hence sampling locations are rather a reflection of areas which Plastic Patrol has engaged in the movement rather than a reflection of the distribution of plastic pollution and litter in space.

5.0 DISCUSSION & RECOMMENDATIONS

5.1 Extended Producer Responsibility

The UK Government's Resource and Waste Strategy outlines plans to invoke the 'polluter pays' principle and extend producer responsibility for packaging. Extended Producer Responsibility (EPR) is a policy approach which extends a producer's responsibility for a product to the post-use stage beyond point of purchase (19). Under the current packaging producer responsibility system, which has not been updated in over 20 years, it is estimated that producers pay only 10% of recycling costs, and therefore much lower than 20% of all waste management costs (20).

In a consultation on reforming the packaging producer responsibility system in 2019, Defra outlined plans for obligated businesses to pay full net costs for managing packaging waste, including collection, recycling, disposal and clean up of litter. Following the consultation, Government stated they 'intend to progress our policy proposals and introduce an EPR scheme for packaging in 2023' (21). We recommend that the EPR system goes beyond packaging to include all single-use items, including disposable cups and sandwich bags amongst others which were initially excluded from Governments proposals. We also support the call for EPR to include full net costs of management and clean up of waste, incentivising innovation in packaging design and waste management infrastructure that support a circular economy.

Plastic Patrol recommends that the EPR system goes beyond packaging to include all single-use items and support the call for EPR to include full net costs of management and clean up of waste

The brand of 81% of items recorded in this study was 'unknown' (brand not visible, unidentifiable etc) which may be partly due to differences in app user effort, but also highlights the difficulties in tracing a product's history back to the producer. The nature and prevalence of such unbranded items, such as plastic fragments, should be considered in relation to an EPR scheme where producers take responsibility for pollution caused.

To ensure the EPR scheme is effective, Plastic Patrol recommends the EPR be supported by a transparent and data-driven regulatory and monitoring framework to ensure costs are fairly distributed between producers, including a mechanism to accurately track materials throughout the system, including leakage into the environment. Crowdsourced data on polluting materials will be essential to monitor progress and calculate costs associated with polluting items. A platform such as the Plastic Patrol app, which allows citizens to 'police' the system, provides an opportunity to support such a regulatory and monitoring framework. Disclosure of data from businesses as to the quantity of packaging and material produced and handled, not currently accessible, would assist with investigations into whether brands share of polluting items, recorded in studies such as this, is in line with levels of use.

Crowdsourced data on polluting materials will be essential to monitor progress and calculate costs associated with polluting items. A platform such as the Plastic Patrol app, which allows citizens to 'police' the system, provides an opportunity to support such a regulatory and monitoring framework.

19. HM Government, Our Waste, Our Resources: A Strategy for England, 2018
20. Housing, Communities and Local Government Committee, Waste Strategy: Implications for local authorities, 2019
21. Department for Environment, Food & Rural Affairs, Consultation on reforming the UK packaging producer responsibility system, Summary of consultation and next steps, July 2019

5.2 Deposit Return Scheme

In this report, 'on-the-go' items featured heavily in the top types of litter recorded, including: plastic packaging, plastic bottles, drinks cans, plastic bottle lids, Styrofoam and glass bottles. The top ten brands recorded were also producers of single use, 'on-the-go' products. Such items consumed and disposed of outside the home have limited options for responsible disposal. Authorities operate very few 'on-the-go' or street bin recycling schemes and the quality of such material collected by these schemes is very low due to contamination (22). Containers made of plastics, metal and glass have a high inherent value as recyclable material resources which is lost to the economy once disposed of incorrectly and littered.

In February 2019, Defra launched a consultation on introducing a Deposit Return Scheme (DRS) for drink containers, with the aim of a DRS to reduce the amount of littering, boost recycling and offer enhanced possibility to collect high quality materials in greater quantities (23). Following the consultation, the Government are 'minded' to introduce a DRS for drinks containers in England and Wales by 2023, the details of which materials and drinks to be included will be developed following a further consultation in 2020 (24).

Plastic Patrol recommends that the Government implements an 'all-in' DRS to increase collection of high-quality material for recycling and reduce the flow of materials into the environment

Plastic Patrol recommends that the Government implements an 'all-in' DRS to increase collection of high-quality material for recycling and reduce the flow of materials into the environment. In a DRS, consumers pay an upfront deposit on an item at point of purchase, redeemed upon return of the container. DRS systems have been effective at increasing collection and recycling of 'on-the-go' items, for example Germany, Norway and the Netherlands have some of the highest rates of plastic drinks bottle collection/recycling in Europe at 98%, 95% ad 95% respectively, all of which have a DRS and kerbside or household recycling collections (22). A DRS would also save local authorities an estimated net saving of £35 million per annum (25).

An 'all-in' DRS should go beyond the drinks containers outlined in the consultation outcome, to not only include plastic drinks bottles, drinks cans and glass bottles but all material types and sizes, which would include items like bottle lids, coffee cups and other single use and recyclable plastic packaging such as wrappers and sachets, identified as contributing to a high proportion of litter recorded in this study.

22. Voluntary & Economics Incentives Working Group Report, Voluntary and economic incentives to reduce littering of drinks containers and promote recycling, 2018
23. Department for Environment, Food & Rural Affairs, Introducing a Deposit Return Scheme (DRS) in England, Wales and Northern Ireland, February 2019
24. Department for Environment, Food & Rural Affairs, Consultation Outcome: Introducing a Deposit Return Scheme (DRS) in England, Wales and Northern Ireland: Executive summary and next steps, August 2019
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5.3 Plastic Bag Charge & Ban

A single use carrier bag charge has been in effect in England since October 2015, requiring enterprises employing more than 250 full time staff to charge 5p for the sale of single use carrier bags of 70 microns thick or less. The charge does not apply to 'Bags for Life' and a variety of other bag types (for information on which bags are exempt visit: https://www.gov.uk/guidance/carrier-bag-charges-retailers-responsibilities) and small-to-medium sized enterprises (SMEs employing less than 250 full time staff) are exempt, although able to participate on a voluntary basis (26). In December 2018, the Government launched a consultation on the charge in England, proposing extending the charge to include all retailers, increasing the charge to 10p and requiring producers of single use carrier bags to report how much they sell (27). At the time of writing, the response to the consultation had not been published.

It's estimated that SMEs hand out over 3.6 billion single-use plastic bags annually. In this study, 85% of bags recorded had no brand or the brand was unidentifiable, characteristic of plastic bags handed out from SMEs such as independent grocery retailers

The charge has been credited with the success of decreasing the usage of single use carrier bags. Government studies showed that compared to 2014, there has been a decrease of more than 90% (over 7.1 billion bags less) in 2018 to 2019 (28). These data only include those from obligated larger enterprises and to the single use bags of 70 microns thick or less and excludes that of exempt bags and SMEs. It's estimated that SMEs hand out over 3.6 billion single-use plastic bags annually (29). A survey from the Environment Investigation Agency revealed a large increase in the sale of 'Bags for Life', which contain more plastic by weight: in 2018 eight major companies (representing 75.3% of the market share) reported usage of 960 million bags for life and in 2019 this figure increased to 1.24 billion (30). The aim of the single use carrier bag charge in 2015 was to reduce the number of bags given out, increase re-use and reduce litter.

In this study, findings showed plastic bags as the seventh most commonly recorded litter item, of which 85% had no brand or the brand was unidentifiable, characteristic of plastic bags handed out from SMEs such as independent grocery retailers. These data highlight continued pollution of plastic bags in the environment despite the charge. In the Government's 25 Year Environment Plan, published in January 2018, a commitment was included to extend the single use carrier bag charge to all retailers on a mandatory basis if voluntary approaches were deemed ineffective (31).

Research has shown a large increase in the sales of 'Bags for Life', from 960 million in 2018 to 1.24 billion in 2019 in 8 of the UK's largest supermarkets

We argue that these findings, combined with data on plastic carrier bag usage by SMEs, demonstrate ineffectiveness and that all retailers should be obligated. The current policy is inadequate.

Plastic Patrol believes charges alone are not enough.

Government should increase ambition and introduce a ban to end sales of plastic bags. Plastic bag bans are operational in 32 countries globally and a number of other states and regions, with proven success when implemented effectively. Further investigation using ongoing data collection, results and models internationally will determine the best approach, which Plastic Patrol is exploring.

26. Department for Environment, Food & Rural Affairs, Policy paper: Carrier bags: why there's a charge (Updated Jan 2018, https://www.gov.uk/government/publications/single-use-plastic-carrier-bags-why-were-introducing-the-charge/carrier-bags-why-theres-a 5p-charge)
27. Department for Environment, Food and Rural Affairs, Single use carrier bags: extending and increasing the charge, 27 December 2018
28. Department for Environment, Food & Rural Affairs, Carrier Bag Charge: summary of data in England, 31 July 2019
29. Department for Environment, Food & Rural Affairs, Consultation on the proposal to extend single-use carrier bag charge to all retailers and to increase the minimum charge to 10p, December 2018
30. Environment Investigation Agency, Greenpeace, Checking Out on Plastic II: Breakthroughs and backtracking from supermarkets, 2019, https://eia-international.org/wp-content/uploads/Checking-Out-on-Plastics-2-report.pdf
31. HM Government, A Green Future: Our 25 Year Environment Plan to Improve the Environment, 2018

5.4 Summary

To reduce waste and accelerate the transition to a circular economy, Plastic Patrol recommends:

- **A reformed waste producer responsibility system coupled with a transparent regulatory framework.**
- **An 'all-in' Deposit Return Scheme that goes beyond drinks containers to include all single-use material and container types and sizes.**
- **A nationwide ban on plastic bags.**

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31. HM Government, A Green Future: Our 25 Year Environment Plan to Improve the Environment, 2018

7.0 APPENDIX

Appendix 1: Categories of Litter

During data collection, users of the Plastic Patrol app can categorise items of litter in the following categories.

Table 13: Categories of litter in the Plastic Patrol app

Litter type		
4/6 Pack Rings	Glasses (Facial)	Plastic Lid / Bottle Cap
Aerosol Can	Household Battery	Plastic Rope
Animal Poo (not in bag)	Industrial Packaging/Sheeting	Plastic Straw
Balloon	Inhaler	Polystyrene / Styrofoam
BBQs / Grill (Disposable)	Light Bulb / Neon Tube	Poo Bag
Bottle Cork	Mesh Bag (e.g. fruit / veg)	Pottery / Ceramic
Car Part	Metal Bottle Cap	Rubber
Cigarette Butt	Metal Fragment	Sacking
Cigarette Lighter	Metal Tin	Sanitary Item
Clothing	Metal Wire / Mesh	Syringe
Comb / Hair Brush	Nappy	Tobacco Pouch
Condom	Packaging	Toy
Cotton Bud	Pallet / Crate	Traffic Cone
Disposable Cup Lid	Plaster	Tyre (Car or Bike)
Disposable Plastic Cup	Plastic Bag	Wet Wipe
Drinks Can	Plastic Bottle	Wood Pieces (manufactured)
Fishing Net, Rope and Pieces	Plastic Cutlery / Utensil	Wooden Pallet / Crate
Glass Bottle	Plastic Fragment (>2.5 cm)	
Glass Fragment	Plastic Glove	

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