#OneLess

The River Thames: Plastic bottle pollution

2019 report

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This report has been produced by #OneLess, a collaborative project led by ZSL (Zoological Society of London) in partnership with Forum for the Future, The International Programme on the State of the Ocean, and the Thames Estuary Partnership. Since 2016, #OneLess has been working to transform London into a place where single-use plastic bottles are a thing of the past and where plastic waste is drastically reduced for the sake of the ocean.

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Data: #OneLess & Thames21. Thames foreshore bottle count data (2016 – 2019).

Plastic pollution is one of the biggest threats facing our ocean

About this report

It's no secret that plastic is polluting and threatening the future of our ocean. Still, in the UK we are using nearly 7.7 billion single-use plastic water bottles a year[1] to meet the demands of our growing throwaway society. The River Thames, London's very own haven for local wildlife, is also facing the threat of plastic pollution and was recently announced as one of the rivers most polluted with microplastic in the UK[2]. This report by #OneLess provides a snapshot of our current understanding of the extent of plastic bottle pollution in the Thames, based on evidence that has been collected in collaboration with Thames21.

Our key findings:

Between April 2016 and April 2019, nearly **70,000** single-use plastic bottles have been collected and removed from the Thames.

Water bottles make up nearly **50%** of single-use plastic bottles that have been categorised in the Thames.

Significantly more water bottles were counted during **spring** and **summer** months.

Over **95%** of all bottles found had their tops still attached[3].

[1] BRITA. 2016. Survey of water bottle usage by UK Adults, with research by OnePoll. In collaboration with the Marine Conservation Society.

[2] Bangor University and Friends of the Earth. 2019. Microplastic pollution widespread in British lakes and rivers - new study. [Press release]. [Accessed March 2019]. Available from: www.bangor.ac.uk/news/latest/microplastic-pollution-widespread-in-british-lakes-and-rivers-new-study-40043.

[3] Lesniewski, D., Morritt., D (Supervisor) and Clark., P (Supervisor). 2017. Investigating the occurrence of floating plastic debris on the shores of the River Thames, through plastic bottle sampling (thesis).

The plastic problem

Approximately eight million tonnes of the plastic the world produces is making its way into the ocean every year[4]. That's the equivalent of the weight of the London Eye in plastic, being dumped into the ocean, ten times a day, every day, annually.

Without action, by 2025 there will be one tonne of ocean plastic for every three tonnes of fish[5].

Most ocean plastic pollution comes from land – and is transported by rivers out of our towns and cities, past fields and through estuaries, into our ocean[4].

Single-use plastic is a particular problem for the ocean and our disposable society uses it in vast quantities. It's designed to be used just once, before being thrown away, despite the fact it will persist in the environment for hundreds, if not thousands of years.

Once in the ocean, plastic breaks down into increasingly smaller pieces, eventually becoming 'microplastics' releasing harmful toxins into the marine environment. Microplastics are also mistaken for food by marine life and pass into the food chain, posing a threat to wildlife and humans alike.

Sadly, every part of the ocean is now affected by plastic pollution – and this negatively impacts people, the environment, and the economy. A recent study of 50 marine animals from UK waters found microplastics in every single one[7], and in London more than a quarter of fish in the Thames Estuary have eaten plastic[8].

80% of litter in the River Thames is single-use plastic[6].

A survey of European flounder in the River Thames found that three quarters of them had plastic fibres in their digestive system[8].

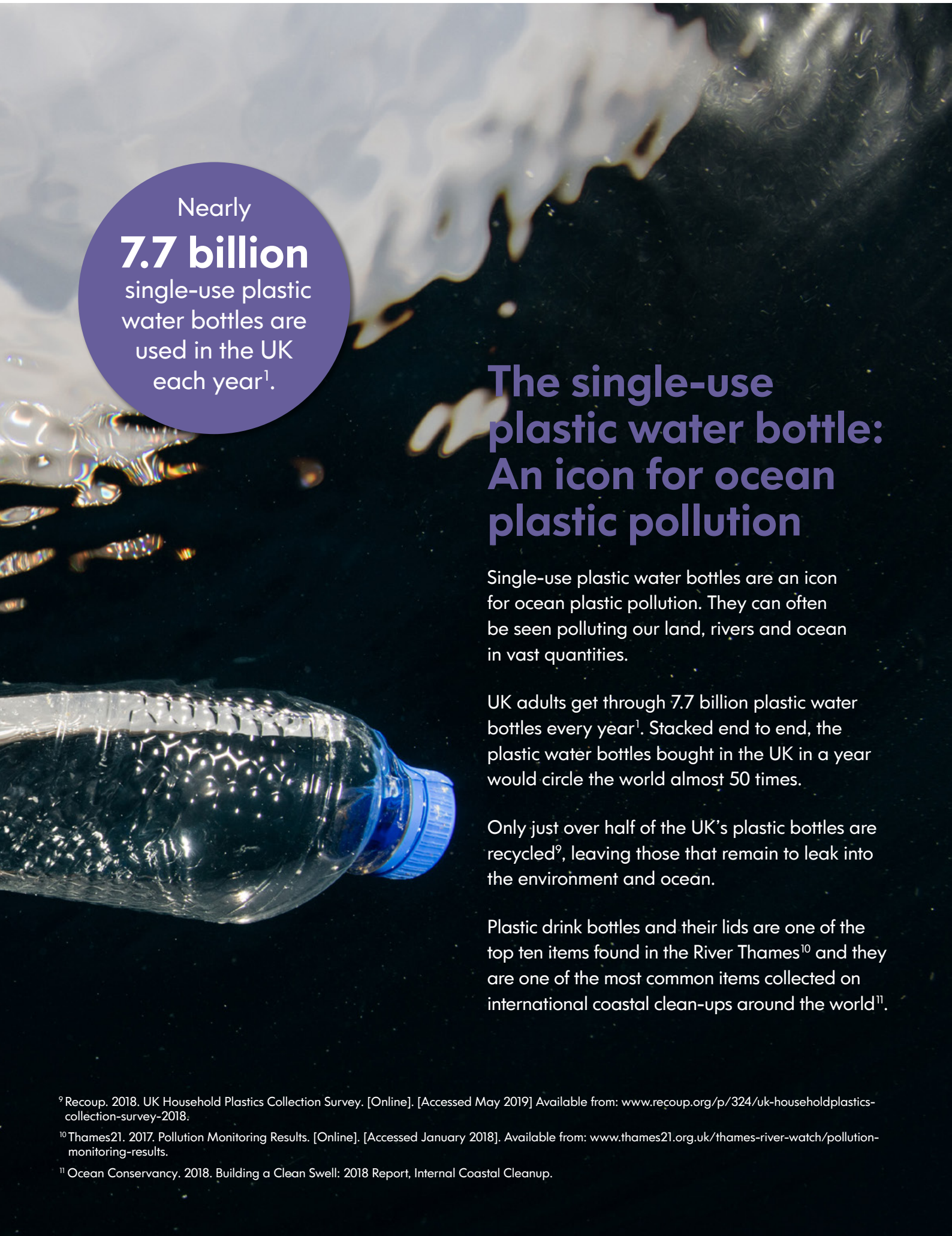
[4] Jambeck, J. R., et al. 2015. Plastic waste inputs from land into the ocean. Science 347, 768-711.

[5] World Economic Forum. 2016. The new plastics economy: Rethinking the future of plastics.

[6] Thames21. 2017. Pollution Monitoring Results. [Online]. [Accessed January 2018]. Available from: www.thames21.org.uk/thames-river-watch/pollution-monitoring-results.

[7] Nelms, S. E., et al. 2019. Microplastics in marine mammals stranded around the British coast: ubiquitous but transitory? Scientific Reports 9, 1075.

[8] McGoran, A.R., Cowie, P.R., Clark, P.F., McEvoy, J.P. and Morritt, D. 2018. Ingestion of plastic by fish: A comparison of Thames Estuary and Firth of Clyde populations. Marine Pollution Bulletin, 137, 12-23.



Nearly
7.7 billion
single-use plastic water bottles are used in the UK each year[1].

The single-use plastic water bottle: An icon for ocean plastic pollution

Single-use plastic water bottles are an icon for ocean plastic pollution. They can often be seen polluting our land, rivers and ocean in vast quantities.

UK adults get through 7.7 billion plastic water bottles every year[1]. Stacked end to end, the plastic water bottles bought in the UK in a year would circle the world almost 50 times.

Only just over half of the UK's plastic bottles are recycled[9], leaving those that remain to leak into the environment and ocean.

Plastic drink bottles and their lids are one of the top ten items found in the River Thames[10] and they are one of the most common items collected on international coastal clean-ups around the world[11].

[9] Recoup. 2018. UK Household Plastics Collection Survey. [Online]. [Accessed May 2019] Available from: www.recoup.org/p/324/uk-householdplastics-collection-survey-2018.

[10] Thames21. 2017. Pollution Monitoring Results. [Online]. [Accessed January 2018]. Available from: www.thames21.org.uk/thames-river-watch/pollution-monitoring-results.

[11] Ocean Conservancy. 2018. Building a Clean Swell: 2018 Report, Internal Coastal Cleanup.

London's #OneLess revolution

#OneLess is tackling ocean plastic pollution at source, right here in London, focusing on the iconic single-use plastic water bottle. Londoners are amongst the highest consumers of bottled water in the UK getting through 175 bottles per person per year[1]. At a city level, that amounts to over one billion bottles per year.

#OneLess is finding new ways to keep Londoners hydrated and keep plastic out of the Thames.

Over the past three years we have implemented many exciting initiatives, including teaming up with the Mayor of London to install new drinking fountains across the capital. We have also formed a network of over 50 organisations taking action to eliminate single-use water bottles, including Selfridges, King's College London, the Natural History Museum and ZSL London Zoo.

The equivalent of **155,474** 500ml bottles have been refilled at 15 fountains installed by #OneLess and the Mayor of London in under 12 months[12].

[12] #OneLess. 2019. New drinking fountains prove a success as Londoners choose to drink water sustainably. [Online]. [Accessed May 2019]. Available from: www.onelessbottle.org/portfolio/new_fountain_results/.

[13] Environment Agency Thames Region. n.d., Fish in the tidal Thames [Online]. [Accessed May 2019]. Available from: www.environmentdata.org/archive/ealit:821.

Mother Thames

London is a coastal city, directly linked to the ocean by the Thames, a perfect example of Mother Nature at its finest. Just as the Thames is the major artery which has always given life to this great city, the ocean is its heart, sending water, oxygen, clean air, fish, nutrients and weather along the river to make the city habitable and healthy.

From source to sea, the Thames is a haven for a huge diversity of wildlife. Although, you would be forgiven for not realising this – in the 1950s the river was declared biologically dead. Today, thanks to a myriad of conservation activities, life has returned and is thriving.

Beneath the river's brown surface are now over 125 species of fish[13], not to mention the kingfishers, water voles, cormorants, seals, and even dolphins who make their home along the riverbank or in the outer estuary. It's important for us too. For the countless dog walkers, cyclists and kayakers who meander its length every day, the fishermen who make a living from it, and for London as a whole.

Later this year, ZSL will publish the first report on the status of the Thames in more than 60 years.

The River Thames is now home to over **125** species of fish, including seabass, flounder and smelt[13].

Monitoring plastic bottles in the River Thames

At #OneLess we are always trying to improve our knowledge of the plastic bottle problem in London. In 2016, we teamed up with Thames21 and a Master's student from Royal Holloway University of London and the Natural History Museum to begin collecting and counting the number plastic bottles that accumulate on the banks of the Thames. This work helps us understand the scale of London's plastic bottle problem, and allows us to raise awareness and propose informed recommendations to local and national government for better protection of the environment. As members of the Thames Litter Forum, this work, along with others, helps deliver the Thames Litter Strategy and Thames Vision 2035, led by the Port of London Authority.

Thames21 is an environmental charity that has been working with local communities to clean up the River Thames for many years. Dedicated trained citizen scientists from their Thames River Watch programme have been collecting and recording data on the most common types of litter present on the Thames, including single-use plastic bottles, wet wipes, and takeaway containers.
A report which shares their findings about the wider plastic pollution problem in London is due to be published in summer 2019[14].

How it works?

Each bottle count involves: Collecting bottles from the Thames foreshore, counting them, and sorting them into four categories:

- **Water bottles**
- **Flavoured drink bottles**
- **Milk bottles**
- **Unknown,** for any bottles where it was not possible to determine type.

It was not always possible to categorise bottles by type during all surveys; these bottles have since been classified as **uncategorised**.

1
Volunteers assemble at site.

2
All plastic bottles are collected.

3
Bottles are categorised according to type.

4
Bottles are counted and then recycled.

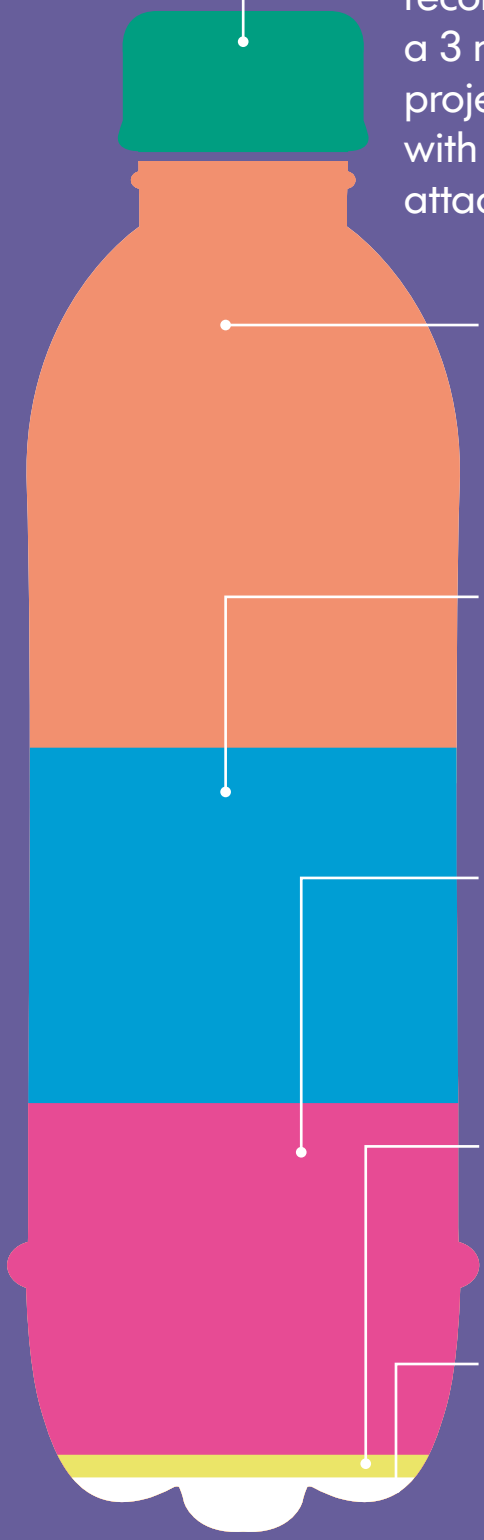
[14] Thames21. 2019, in prep. Plastic litter on the tidal Thames foreshore: Results from transect surveys 2015-2018.

The bigger picture: Between April 2016 – April 2019

67,399
Total number of single-use plastic bottles collected and removed from the River Thames.

Volunteer numbers:

More than **200** volunteers have taken part in bottle count surveys.



95%
of plastic bottles recorded during a 3 month research project were found with their lids still attached[3] (574)

47%
uncategorised (31,386)

23%
water bottles (15,188)

27%
flavoured drink bottles (18,446)

2%
unknown (1,188)

2%
milk bottles (1,191)

Five site focus: One year of fortnightly bottle counts

We began our bottle counts with Thames21 in April 2016. Initially, these counts were opportunistic – they didn't follow a regular pattern.

In April 2018, we changed our approach. In order to determine if and how the level of plastic bottle pollution in the Thames is changing, we started doing regular standardised bottle counts, focusing on five sites along the Thames. The counts are carried out fortnightly, always on a neap tide, when there is the least difference between high and low water.

The sites: Hammersmith, Fulham, Battersea, City of London and Greenwich.

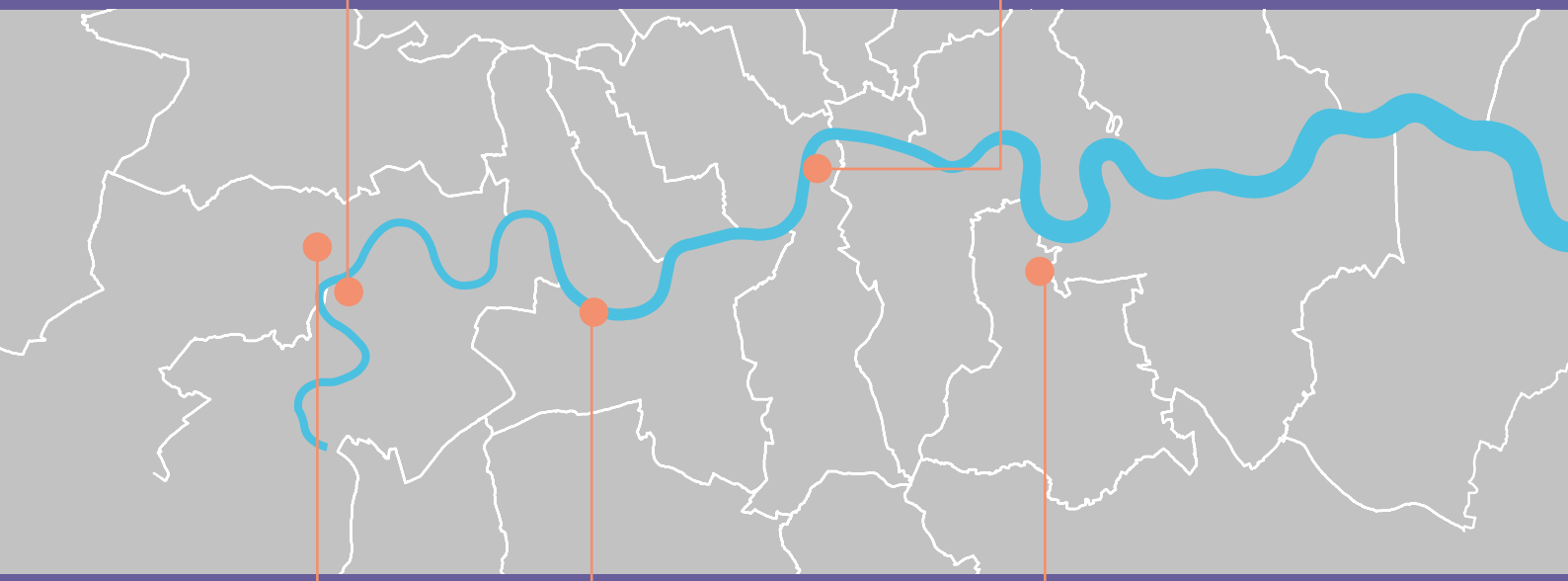
The map below details the annual number of surveys conducted at each site since April 2016.

Fulham

Number of surveys at site
April 2016 – March 2017: 17
April 2017 – March 2018: 16
April 2018 – March 2019: 23

City of London

Number of surveys at site
April 2016 – March 2017: 24
April 2017 – March 2018: 12
April 2018 – March 2019: 23



Hammersmith

Number of surveys at site
April 2016 – March 2017: 17
April 2017 – March 2018: 7
April 2018 – March 2019: 25

Battersea

Number of surveys at site
April 2016 – March 2017: 13
April 2017 – March 2018: 9
April 2018 – March 2019: 24

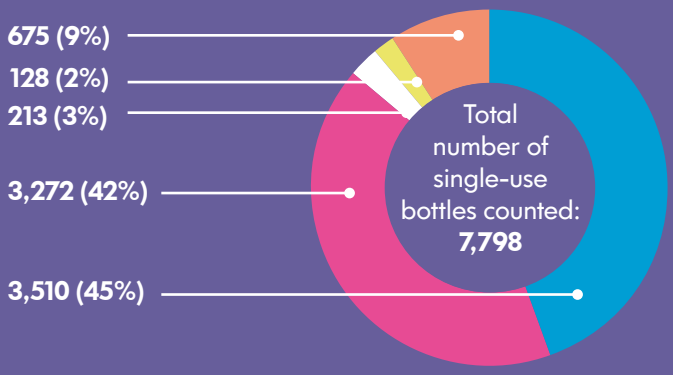
Greenwich

Number of surveys at site
April 2016 – March 2017: 20
April 2017 – March 2018: 10
April 2018 – March 2019: 23

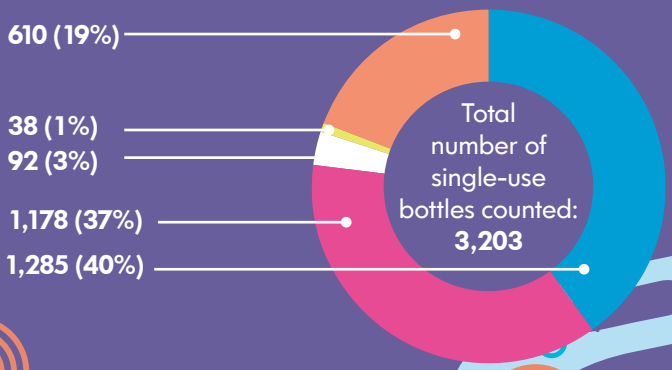
Five site focus: One year of fortnightly bottle counts

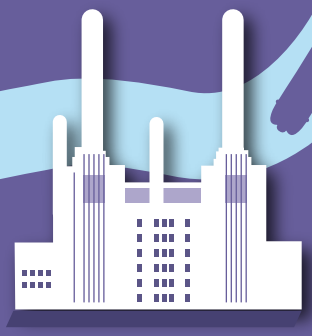
Key
- Total number of water bottles
- Total number of flavoured bottles
- Total number of milk bottles
- Total number of unknown bottles
- Total number of uncategorised bottles

The five sites



Hammersmith





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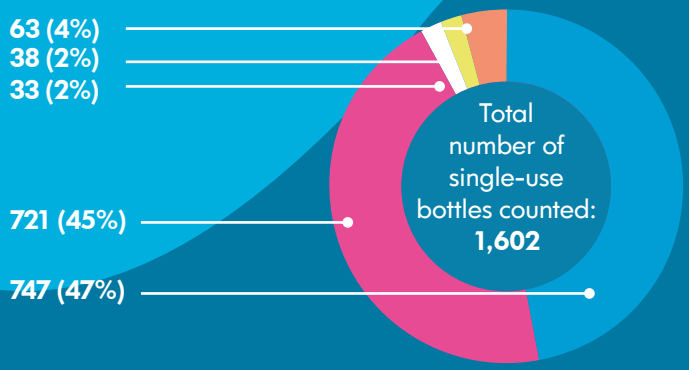
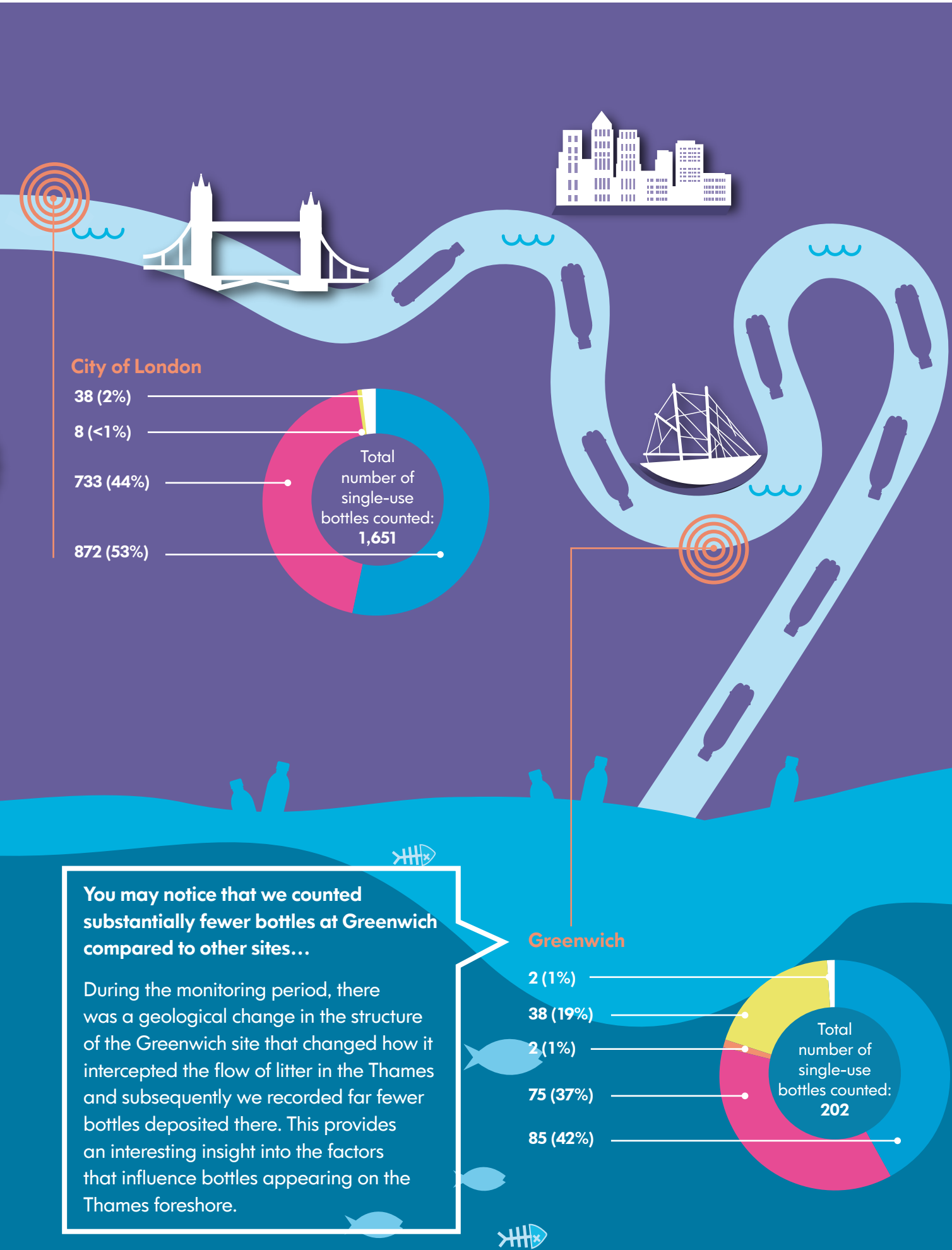


Battersea



You may notice that we counted substantially fewer bottles at Greenwich compared to other sites…

During the monitoring period, there was a geological change in the structure of the Greenwich site that changed how it intercepted the flow of litter in the Thames and subsequently we recorded far fewer bottles deposited there. This provides an interesting insight into the factors that influence bottles appearing on the Thames foreshore.

Please note in some cases the percentage total does not always equal 100% because all percentages have been rounded to the nearest whole number.

Complicating factors and knowledge gaps

It's clear the Thames has a plastic water bottle problem, with water bottles accounting for nearly 50% of all single-use bottles recorded and categorised. However, we must be mindful of the knowledge gaps and factors that add complexities to our findings before making conclusions.

There are many factors that influence the number, movement and trends of plastic bottles in the river.

Our findings are complicated by a number of factors, including:

- Changing environmental conditions.
- Undocumented plastic clean-ups.
- Changing profile of the Thames foreshore affecting bottle deposition.

More to learn
We plan to continue monitoring plastic bottle pollution in the Thames to develop a better understanding of whether things are changing for better or worse. Changes in the number of bottles we continue to find could be indicative of:

Behaviour change: the presence of initiatives such as #OneLess have increased awareness of the ocean plastic problem and increased availability of free drinking water across the city. This could be driving a reduction in the number of bottles being used and potentially littered.

Reduction of the historical plastic bottles in the Thames: the work of dedicated volunteers along the Thames could be diminishing the population of bottles that has long been residing in the Thames.

Recommendations

MORE RESEARCH is needed to help us fill in the gaps, establish trends over time and to better understand the movement of plastic bottles in the Thames.

MORE ACTION is needed across London to reduce the amount of single-use plastic bottles we use and to address the issue of litter on our streets.

We all have our part to play

Take action today by choosing not to use single-use plastic water bottles for the sake of the River Thames and the world's ocean.

Individuals: Make the #OneLess pledge! Stop using plastic bottled water and instead use a refillable water bottle, refilling from one of London's new drinking fountains.

Pledge here:
onelessbottle.org/pledge.

Businesses and brands: Join our network of pioneering businesses, attractions, councils and charities, all taking action to eliminate plastic bottled water from London.

Join here:
onelessbottle.org/network.

With special thanks to

This report would not be possible without the volunteers, partners and funders of our work.

Special thanks to the team at Thames21, in particular AJ McConville for his help and support during the project and to all the wonderful volunteers past and present that have contributed and helped us build the #OneLess and Thames21 Thames bottle monitoring database.

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We would also like to thank Professor David Morritt (Royal Holloway University), Dr Paul Clark (Natural History Museum) and Damian Lesniewski for their contribution to the Thames bottle monitoring database, the Thames Estuary Partnership including Kimberly Ferran Holt and all the #OneLess team and supporters.

Become a citizen scientist with Thames21 and get involved with collecting vital data that provides a valuable insight into London's plastic problem.

Find out more:
www.thames21.org.uk/thames-river-watch/
Email: thamesriverwatch@thames21.org.uk

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