

## Floating Plastic Litter Report for the River Crane

---

### 1. Introduction and Context

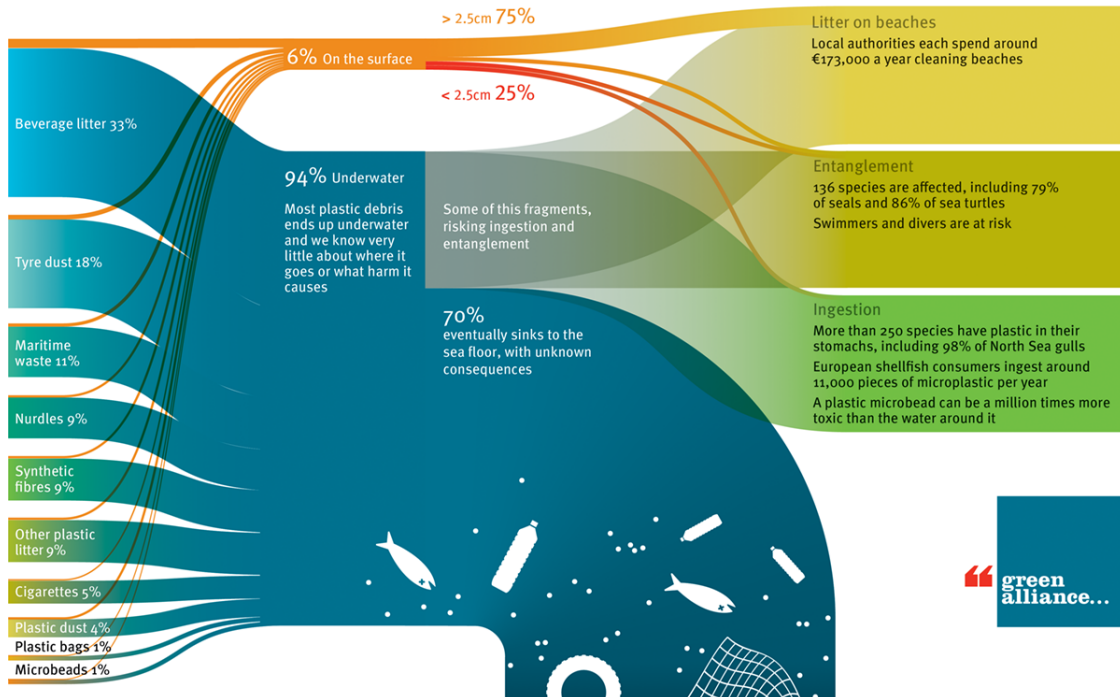
This report has been produced by Friends of the River Crane Environment (FORCE) and records observations of litter collected and seen in the lower River Crane over the period from December 2016 to July 2017, and uses these records to draw some initial conclusions. This report will be updated on a regular basis as more information becomes available.

Plastic pollution in the river and marine environments of the UK is a major concern. There are various initiatives to assess and reduce the impact of this pollution, including from ZSL, Thames21 and the European RIMMEL project. Thames21 hosted a workshop in March 2017, bringing together academics and NGO's to discuss the issue and consider strategies for managing it. FORCE attended and circulated an earlier version of this paper to key contacts.

Figure 1 below summarises the latest thinking on the sources and distribution of plastics in the marine environment of Europe.

## Floating Plastic Litter Report for the River Crane

What happens to plastic in the sea?



How to stop nearly two thirds of plastic waste getting into the sea



**Figure 1: A Green Alliance infographic showing where plastic comes from, and what happens to it when it ends up in our seas + a second figure showing how 60 per cent of it could be removed by changes to Govt policies**

## Floating Plastic Litter Report for the River Crane

---

A recent conference poster (Estimation of global plastic loads delivered by rivers into the sea: Christian Schmidt, Tobias Krauth, Phillipp Klöckner, Melina-Sophie Römer, Britta Stier, Thorsten Reemtsma and Stephan Wagner) based on research at the Helmholtz Centre for Environmental Research has proposed the following numbers for plastic pollution from rivers into the ocean:

- A total of around 4 million tonnes per annum
- Yangtse River with the highest load – at around 1.5 million tonnes per annum
- The ten most polluting rivers are all in Asia or Africa and between them contribute around 95 per cent of the total
- The Thames contributes around 18 tonnes per annum

A typical 500ml plastic bottle weighs 30 grammes – so whilst the contribution of the Thames may be only 0.0005 per cent of the world total it is still equivalent to around 500,000 plastic bottles per annum.

For comparison, Thames 21 carried out a big litter hunt at 19 locations using 200 volunteers in September 2017, collecting a total of 4100 plastic bottles. The total numbers collected in the tidal Thames since April 2016 by Thames 21 volunteers now totals 18000.

The River Crane in west London is an urban catchment draining an area of around 127km<sup>2</sup> (see Figure 2). The river is a tributary of the River Thames with some 35km of river corridor. The river flows from north to south through the London boroughs of Harrow, Hillingdon, Ealing, Hounslow and Richmond, before entering the tidal River Thames in two channels (the lower River Crane and lower Duke of Northumberland's River) in Isleworth.

## Floating Plastic Litter Report for the River Crane

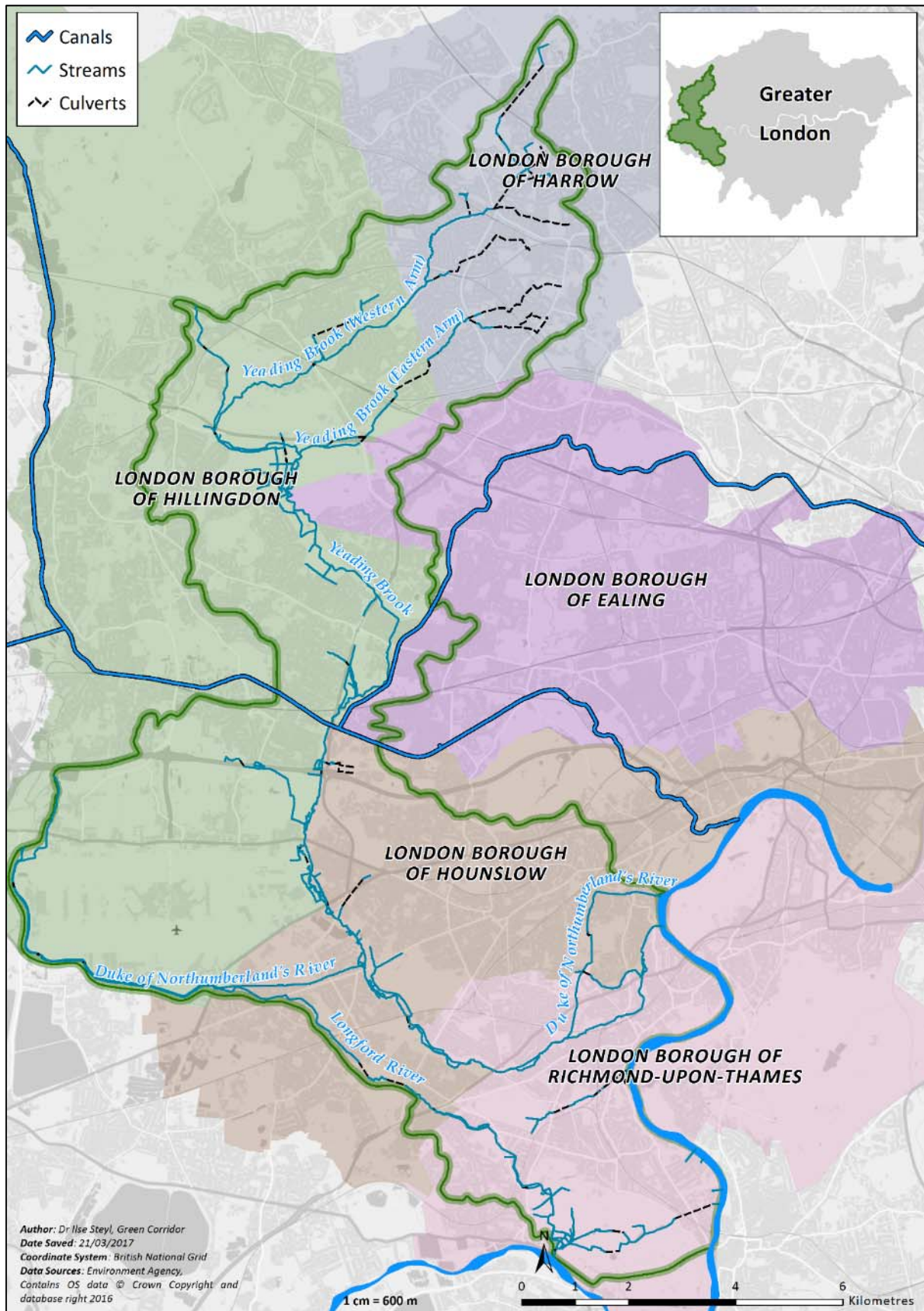


Figure 2: Crane catchment

## Floating Plastic Litter Report for the River Crane

---

FORCE is an environmental and community charity, with around 500 members, founded in 2003 [www.force.org.uk](http://www.force.org.uk) FORCE carries out regular projects, working with partners in the [Crane Valley Partnership](#), to maintain and improve the environmental and community value of the River Crane corridor. FORCE engaged with the issue of plastic pollution in response to a blog by Thames21 on plastics in the River Thames <http://www.thames21.org.uk/2016/11/2500-bottles-stranded-on-the-shore/>

FORCE has carried out regular monthly volunteer days at sites within the lower Crane corridor since 2003, undertaking eight or nine events per annum. Litter picking has always been a part of these events and (starting with the December 2016 event) FORCE has also recorded basic data on each litter pick.

FORCE has undertaken initial observations as to where litter is gathering within the river and carried out an initial survey of litter movement along the river.

These data are presented here. Preliminary conclusions are set out along with proposals for further investigation and assessment.



## Floating Plastic Litter Report for the River Crane

### 2. Litter Collection and Recording

Litter collection and recording has been carried out on seven recent FORCE volunteer days (between December 2016 and November 2017), and at a special event with Trafalgar School. The approach has also been adopted for recent TCV events in the river from June 2017. The data are set out in the ten Tables in Appendix A of this report and summarised in Table 1 below.

Date	Plastic	Cans	Glass	Recycle total (kg)	None recycle (kg)	Rubbish total (kg)
11/12/16	75	400	75	60	140	200
8/1/17	58	150	30	20	40	60
12/2/17	41	50	25	15	60	75
12/3/17	48	85	20	5	35	40
9/4/17	126	87	43	75	125	200
14/5/17	6	8	0	0.2	0.8	1
8/10/17	19	4	14	3	100	100
12/11/17	30	36	2	3	27	30
Total	397	820	209	181	528	706

**Table 1: The total amounts of litter cleared in eight FORCE volunteer days**

Around 200 plastic bottles were removed from the river by two volunteers with the Save Hounslow Heath campaign in April 2017. A further 93 plastic bottles have been collected during four TCV volunteer days recorded since June 2017. These events are also recorded in Appendix A.

Following a FORCE Facebook post about this work in August 2017 we received a posting from a member of the public who had collected a further 50 plastic bottles during a walk through Crane Park in May 2017. This type of proactive and pro-social behaviour by the local community is being actively encouraged by FORCE through Facebook and elsewhere – and the numbers of bottles collected will continue to be collated and recorded in this report. It may be that the numbers of bottles collected by pro-social activities by the general public are a significant proportion of the whole story though there is not yet sufficient evidence to know this.

The following observations have been made of litter within the river itself:

- Survey of litter floating past a set location – Meadway bridge on 15<sup>th</sup> January 2017
- Record of litter - Mill Road to Pevensey on 23<sup>rd</sup> January 2017
- Record of litter traps at Twickenham Road Bridge and the Mill Plat boom on the Lower Duke of Northumberland's River on 28<sup>th</sup> January 2017; 24<sup>th</sup> March and 3<sup>rd</sup> May 2017
- Record from litter traps in Pevensey and Brazil Mill Woods in April 2017
- *Ad hoc* observations at bridges
- Record from Mill Road site in Crane Park in June 2017

## Floating Plastic Litter Report for the River Crane

The detailed observations are set out in Appendix B and the main findings are noted below:

### 1. Survey of litter floating past a set location – Meadway bridge on 15<sup>th</sup> January 2017

This was a 90 minute survey only at the base of the river. No bottles or other debris were recorded over this time period. This is insufficient time to come to any major conclusions – though it does suggest that litter movement may occur in pulses related to high flows rather than throughout the year.

### 2. Record of litter - Mill Road to Pevensey on 23<sup>rd</sup> January 2017

A total of 50 bottles recorded over this 2km reach. On the broad assumption that these bottles were caught up during the seven days since a high rainfall event this would translate to a catchment wide contribution of around 40000 bottles per annum or 4 to 5 bottles per hour

### 3. Record of litter traps at Twickenham Road Bridge and the Mill Plat boom on the Lower Duke of Northumberland's River

The Lower Duke of Northumberland's River in Isleworth is one of two main outflow points for the Crane catchment. There is a bridge (Kendall Bridge) with a low soffit level at Twickenham Road and a boom across the river at Kidds Mill weir. Both these devices are thought to catch much or all of the floating litter that goes along this arm of the river.

Several visits have been made to these locations to record the build up of floating litter and on two occasions it has been possible to make an estimate of the rate of litter build up. These daily build up rates are noted in Table 2 below:

Date	March 2017	May 2017
Plastic bottles	3	10
Footballs	0.8	0.2
Cans	2	3.5
Glass bottles	0.5	2
Tennis balls		5
Coconuts		1.5
Polystyrene food boxes		1
Observations	Build up over 18 days. Higher flows but no flood flows over this period	Build up over 21 days. Lower flows over this period

**Table 2: Daily floating litter build up rates – based on observations from Kendall Bridge and the EA boom on the Duke's River**

Note that during periods of lower flow then (a) there may be less litter available as much of it may catch in log jams upstream however (b) a higher proportion of the available litter may come along the DNR compared to the Crane arm of the system.

In November 2017 we received notice that the EA have reduced the water level at Kidds Mill Sluice and this is intended to stop Kendall Bridge acting as a litter trap and enable the boom at Kidds Mill to operate more effectively. This amendment should be helpful in improving the effectiveness of the litter collection activity at the end of the Duke's River.

### 4. Record from litter traps in Brazil Mill Woods and Pevensey in April 2017

A single clear up day run by two members of the Save Hounslow Heath group collected over 200 plastic bottles plus six sacks of other floating material from log jams in the Brazil Mill Woods site

## Floating Plastic Litter Report for the River Crane

---

upstream of Feltham marshalling yards in April 2017. Note that the same team also collected over 100 plastic bottles and three sacks of floating debris from Pevensey in the same month – see the FORCE volunteer day record above.

These records indicate the importance of these log jam features in intercepting floating rubbish and the value in deploying teams to collect it before it is moved on by flood flows.

### 5. Observations at bridges

Observations at bridges over a number of years indicate these may be a prime source of rubbish discarded into the river.

- Bridges are a main point of intersection between the general public and the river;
- Those walking over bridges are less likely to have an emotional link to the river that would stop them discarding rubbish over it – particularly where there is no other link between the bridge and the river (e.g. a riverside path) or where the river is deemed unattractive (or maybe even unseen) at that point;
- There is a pattern where rubbish seems to accumulate in places where it can be disposed of quietly and discretely adjacent to a main thoroughfare – and dropping something over a bridge seems to fit this requirement;
- Where a bridge has a parapet there is a tendency to balance litter on it – like a shelf - where it might be picked up later by someone else. All too often it is then blown into the river;
- The river banks adjacent to urban bridges are often inaccessible by site managers and others – due in part to H&S concerns governing access. These are often hotspots for the build-up of rubbish.

There are maybe 100 bridges along the Crane Valley – one every few hundred metres. The investigation of how much litter is sourced from bridges, and what types of intervention might reduce it, would be an interesting subject for further study.

The parapet of the bridge in London Road Twickenham was observed on 29<sup>th</sup> April 2017 following the Army Navy rugby game. The records show two bottles, three drinks cans, two plastic beakers and a packet of cigarettes on just one of the four parapets at this location. Looking over the bridge there was also a significant amount of rubbish that had either been thrown or fallen into the river. This is illustrative of the problem – albeit at a high use period.

### 6. Observations at Mill Road in summer 2017

This site has become used by a group of boys and young men over the last few months since the FORCE volunteer day at the site in February 2017. In that time there has been a rapid accumulation of litter, particularly plastic soft drinks bottles. A site visit in June 2017 counted some 80 plastic bottles in the river around the weir with a further 30 bottles in the undergrowth around the site. This rate of accumulation, over 100 bottles in an area of a few hundred square metres and a length of river backwater of around 50 metres maximum in a period of four months maximum, is unprecedented in the data record to date. This is further evidence of the potential negative impact of hot spots of this nature on the overall bottle count across the catchment.

In the following two months this site was the subject of:

- An initial site clear up and graffiti removal session by the council
- Increased patrols and awareness by park guard and the local pcso's
- Posts on facebook identifying the problem



## Floating Plastic Litter Report for the River Crane

---

- Further clear up of the river by TCV on 2<sup>nd</sup> August 2017

As a result, over 100 plastic bottles were removed from the site. The early signs are that the problems with littering and anti-social behaviour have quietened down.

## Floating Plastic Litter Report for the River Crane

---

### 3.0 Initial Evaluation of the Field Data

These observations are all made in the lower part of the catchment and this has particular characteristics of being (a) the most heavily used part by the public and (b) possibly also the most actively managed (by a combination of council, volunteers and the community). It is therefore difficult to be certain of any extrapolations drawn from these data.

The possible inputs to, and routes of plastic bottles through, the catchment can be summarised as follows:

Input:

- a) Discarded into the environment local to the river e.g. park, street and other open space. From here it may be picked up and removed from the system, or be blown or washed into the river
- b) Discarded directly into the river - either thrown from the bank or from one of around 100 bridges that cross the river

Route:

- a) Float along the river to leave the catchment into the Thames – via one of the two arms of the lower catchment - the lower Crane or the Duke of Northumberland's River
- b) Caught in a litter trap – e.g. log jam, weir, backwater or low bridge such as Kendall Bridge – and subsequently removed by clean ups. Note: there are a number of other organisations doing this type of clean up (e.g. LWT, TCV and Thames 21) along the river
- c) Caught in the Duke of Northumberland's River boom and removed by the EA

The accumulation rates in open spaces in the lower Crane estimated from our volunteer day data (in bottles/ha/annum) are:

- 30 – Hanworth Road;
- 58 and 36 – Willow Way;
- 10 – Mill Road;
- 12 – Mereway;
- 24 – Butts Farm
- >2 – Pevensey
- 24 - Mereway

Assuming an average rate of 25/ha/annum would give an accumulation of around 35000/annum over the 1500 hectares of open space along the river corridor.

Two sets of observations of the river between Mill Road and Pevensey suggest an accumulation rate in the river of 30,000 and 40,000/annum. Further data sets for Crane Park from TCV suggests an in-river accumulation rate of between 3000 and 20,000 bottles per annum.

The observations in the Duke of Northumberland's River in January 2017 showed an accumulation of around 500 bottles plus a lot of other floating material at the base of the Duke of Northumberland's River. The time period is not known but it may be this is removed every few weeks – suggesting an accumulation rate for this outflow point from the river system (the other part flowing out of the tidal River Crane) in the order of 5 to 10,000 bottles per annum. Ideally these would all be removed by the EA.

## Floating Plastic Litter Report for the River Crane

---

The observations in March 2017 showed a lower accumulation rate of around 1000 per annum via the DNR – with maybe the same order of magnitude through the lower Crane. In May 2017 the record indicates around 3500 bottles per annum – with very few along the Crane due to low flows.

The initial observations of through flow of bottles and other debris at Meadway may not have been for sufficient time to be valid – however, they suggest the accumulation of bottles from the system may not be regular. Given the known number of ad hoc litter traps in the river – maybe one every km or so – then it may be expected that large movements of litter occur during high flow conditions when also much of the catchment outflow is through the Tidal River Crane rather than the Duke of Northumberland's River.

At present (late 2017) the best estimates of plastic bottle accumulation rates are 35000 per annum in the green spaces along the river with between 3000 and 15000 per annum within the river itself.

Records from specific sites – eg London Road bridge; Mill Road site and the Hanworth Road drinking area; show the massive potential influence of litter hot spots on the overall accumulation of litter in the river and the catchment.

Repeat data from the Willow Way site indicate that regular litter picks may reduce the rate of litter build up. Littering rates year on year have reduced by a factor of two at this site. As we build up further data on the rates of littering at specific sites we will be able to test and develop our understanding of the impact of litter removal.

The total number of plastic bottles collected over 15 volunteer events (including the clearance at Brazil Mill by FoHH) and one community action over a period of 12 months to November 2017, was 850. Around 500 of these bottles were removed from the river with the remainder from the surrounding land. A further 750 kg of rubbish was removed during these events, mostly from the surrounding open spaces.

Note that there are other volunteer events (plus individual pro-social actions) up and down the catchment that will be intercepting and removing more plastic bottles and other rubbish. In addition, the EA boom at the bottom end of the DNR is thought to be removing up to around 5000 bottles per annum from the river at this point.

On this basis the balance for plastic bottles in the Crane catchment may be in the order of:

- Inputs – 10000 to 30000 per annum
- Removed by FORCE and related volunteers – 850 per annum
- Removed by other volunteers and contractors etc – not known
- Removed at the Environment Agency boom – 5000 per annum?
- Percentage intercepted by actions at present – between 20 and 60 per cent
- Leaving the catchment via the Crane – maybe largely during flood flow periods – 4000 to 20000

Another way of considering these numbers is to consider the number of people living in the catchment and what their individual contribution to this litter problem might be:

- Total population of the Crane catchment is 567246 (Rural Focus CVP report, unpublished 2017)
- The total number of bottles estimated to be entering the river corridor (10,000 to 30,000) therefore represents one bottle per year for every 15 to 50 residents

## Floating Plastic Litter Report for the River Crane

---

- In practice it is likely that individual residents visiting these sites, and then littering, are doing this on a regular basis – maybe several times a year on average. Consequently it may be only 1 in 100 or so of the residents of the catchment that are responsible for this problem – in the order of 5000 in total
- This is a simplistic assessment and subject to refinement. However, it does indicate that the vast majority of local residents are not responsible for the litter problem and any approach to litter needs to consider this
- The finding of litter hot spots in time and space during the survey work to date suggests that both the numbers responsible, and the times and places the problem manifests itself, may be even more tightly defined
- The data for the Thames as whole (Heinholtz Institute 2017 – referenced in Section 1 above) indicates a total output of plastic bottles across the Thames catchment of 500,000. The population of the Thames catchment is around 18 million and therefore this number represents one bottle per year for every 36 residents
- The broadly comparable data for the Crane and for the Thames as a whole indicate the numbers being generated for the Crane catchment may be reasonable
- FORCE and associated volunteers have intercepted around 850 bottles over the first year of operation, equivalent to between 3 and 10 per cent of the estimated annual total put into the catchment. By comparison, Thames 21 have intercepted around 18000 bottles in the tidal Thames over 18 months. This is around 2 per cent of the total estimated input to the overall Thames catchment over this period

These numbers will be refined and developed as the project works continue.

## Floating Plastic Litter Report for the River Crane

---

### 4.0 Plans for the Future

1. Distribute this report for information and comment to all interested parties.
2. Continue to collect and review base data:
  - Volunteer day litter collections
  - Records of litter traps
  - Information from the EA re: the Mill Plat boom
  - River observations at Meadway (and maybe along the lower River Crane below the Mereway Road weir) – including during peak flow periods
3. Target major litter problem issues:
  - Bus stops and drinking areas – through the testing of informal signage; Facebook campaigns and liaison with the council and pcso's for example
  - Areas where public highways run along the park – particularly where the park is overgrown at this point and litter can be "lost"
  - Litter trap areas within the river – target clear ups for these areas by FORCE and others;
  - Key bridges
4. Update report at regular intervals – and in liaison with interested parties
5. Link with other interested parties – academics and other NGOs for example – who may wish to investigate these issues further using the Crane as an example catchment. To date the report has been sent to organisations with wider and national campaigns including: ZSL; Keep Britain Tidy; and Thames Estuary Partnership; as well as local interested Friends groups through South West London Environment Network.



## Floating Plastic Litter Report for the River Crane

### APPENDIX A

#### RECORDS OF LITTER FROM FORCE VOLUNTEER DAYS AND OTHER EVENTS IN THE CRANE CATCHMENT

**Table 1: December 2016 Volunteer Day**

Date	December 11 <sup>th</sup> 2016
Site name	Crane Park – Hanworth Road
Site area	1.5 hectares of Crane Park immediately downstream of Hanworth Road on the north side of the river in LB Richmond
Description	A well-used part of the park on the north bank of the main river and with a smaller mill stream running through it – an area 200m by 75m with 600m of river/stream bank within it
Litter pick	Several people for parts of the day covered most of this area – maybe 10 person hours in total
Total collected	200kg
Plastic bottles	75 plastic bottles, comprising mostly drinks or water bottles with around 10 plastic milk cartons
Cans	Around 400 drinks cans – mostly alcohol
Glass	Around 75 bottles, mostly alcohol
Recycled total	60kg
Other	140kg
Previous FORCE event at location	April 2015 – i.e. 20 months previously
Other litter picks	The council litter picks along the pathways but not generally in the wooded and more overgrown areas or by the river bank. No other formal picks
Previous FORCE work	May 2015 had been our first in this area for a number of years. In 2015 we removed more than a tonne of rubbish in three to four “tonne bags” as a major work item of our day. This time the task was much smaller, supporting our previous belief that making a place less litter strewn greatly reduces the rate at which it accumulates
Build-up of plastic bottles at the site	75 plastic bottles in 1.5 hectares in 20 months = 30 bottles/hectare/annum
Comments	The area is known to be well used by outdoor drinkers – hence the number of cans, accumulating at a rate of 5 per week. These were largely in two specific areas. Signs are one option to deter the leaving of litter here

**Table 2: January 2017 Volunteer Day**

Date	January 8 <sup>th</sup> 2017
Site name	Crane Park – Willow Way
Site area	One hectare of Crane Park between Hospital Bridge Road and Chertsey Road on the south side of the river in LB Richmond
Description	A newly opened part of the park – in 2013. It is used but not heavily - we saw around half a dozen walkers over the course of a dark and damp day. The river forms the northern boundary of the site for around 200m and the site is some 50m wide. The eastern and western boundaries are with heavily used

## Floating Plastic Litter Report for the River Crane

<b>Date</b>	<b>January 8<sup>th</sup> 2017</b>
	roads and these were the main sources of litter
Litter pick	Two people over the morning covered the entire area - around 4 person hours in total
Total collected	60kg
Plastic bottles	58 plastic bottles, comprising mostly drinks or water bottles with around 5 plastic milk cartons
Cans	Around 150 drinks cans – mostly soft drinks
Glass	Around 30 bottles
Recycled total	20kg
Other	40kg
Previous FORCE event at location	January 2016 – 12 months previously
Other litter picks	The council litter pick along the main pathway but not generally in the wooded and more overgrown areas or by the river bank. No other formal picks
Previous FORCE work	The January 2016 volunteer day removed a much larger amount of litter. There were also several tonnes of rubbish removed by the council in the build up to putting this site back into public use in 2015. This supports the idea that regular litter picks do reduce the subsequent litter accumulation
Calculations	58 plastic bottles in 1 hectare in 12 months = 58 bottles/hectare/annum
Comments	<p>There is no significant drinking issue at this site – mostly soft drinks bottles and cans.</p> <p>Around 80 per cent of the rubbish was found along the line of the two main roads, indicating it was not put there by people visiting the site but by those walking along the side of it and discarding their litter over the fence. Note that this was also the case in 2016.</p> <p>Around half the rubbish was found within throwing distance of the Willow Way bus stop on Hospital Bridge Road. This is despite there being a litter bin at this bus stop. We may request further action by transport contacts to counter this problem. Note that there is no litter bin within the Willow Way site. Update: the council has agreed to put new litter bins on the site (02/17).</p> <p>There are more plastic bottles generated by this site despite the overall rubbish loading being low – this may be due to the nature of the litter problem at this site.</p>

**Table 3: February 2017 Volunteer Day**

<b>Date</b>	<b>February 12<sup>th</sup> 2017</b>
Site name	Crane Park – Mill Road
Site area	3.5 hectares of Crane Park between Hospital Bridge Road and Mill Road on the north side of the river in LB Richmond.
Description	A well-used part of the park – a mix of woodland, meadow and short grassland with some marginal river habitat areas. The main river channel and a backwater channel.
Litter pick	Several people over much of the day in a wide ranging litter pick - 8 person hours in total

## Floating Plastic Litter Report for the River Crane

<b>Date</b>	<b>February 12<sup>th</sup> 2017</b>
Total collected	75kg
Plastic bottles	41 plastic bottles, comprising mostly drinks or water bottles, 5 directly from the river (caught behind the backwater weir).
Cans	Around 50 drinks cans
Glass	25 bottles
Recycled total	15kg
Other	60kg
Previous FORCE event at location	November 2015 – 15 months previously
Other litter picks	The council litter pick along the main pathway but not generally in the wooded and more overgrown areas or by the river bank. No other formal picks – however it is known that a number of local residents undertake informal litter picks as part of their regular walking routine.
Previous FORCE work	This area has been subject to informal litter picking for a number of years now – and as such is subject to low rates of accumulation despite (or maybe because of ) being one of the best used parts of the lower River Crane. Usage data for the Meadway entrance to Crane Park indicate usage of 500 to 1,500 people per day.
Calculations	41 plastic bottles in 3.5 hectares in 15 months = 9 bottles/hectare/annum.
Comments	The rubbish found in this site was fairly well scattered across it. The key areas were (a) a part with little public access and (b) the river itself – where the public were not able to access safely.

**Table 4: March 2017 – Trafalgar School Event**

<b>Date</b>	<b>March 10<sup>th</sup> 2017</b>
Site name	Mereway Nature Park
Site area	1.5 hectares site downstream of Kneller Gardens in the divergence between the River Crane and Duke of Northumberland's River in LB Richmond.
Description	Eleven children (around 9 years' old) and three adults in a well-used nature park comprising bramble scrub, emergent woodland and meadow including an outdoor classroom area.
Litter pick	14 in total for around half an hour covered all of the area - 7 person hours in total.
Total collected	10kg
Plastic bottles	9 plastic bottles
Cans	11 drinks cans
Glass	3 bottles
Recycled total	3kg
Other	7kg
Previous event at location	There had been a weekly Green Gym event here until October 2016.
Other litter picks	The council litter pick along the main pathway but not generally in the wooded or bramble areas. No other formal picks – however it is known that a number of local residents undertake informal litter picks as part of their regular walking routine.
Previous FORCE	This area was where FORCE started 14 years previously and is well used but

## Floating Plastic Litter Report for the River Crane

Date	March 10 <sup>th</sup> 2017
work	seems to be fairly well looked after by local people. The Richmond Green Gym kept it in very good condition and we are keen to see this re-instated. In the mean time we will be running a volunteer day on the site in May. We work regularly with Trafalgar School and they will be designing a litter awareness poster for us this spring.
Calculations	9 plastic bottles in 1.5 hectares in 6 months = 12 bottles/hectare/annum.
Comments	The rubbish found in this site was fairly well scattered across it – much of it thrown into the bramble where it would be difficult for the public to retrieve without litter pickers. Some may also have been dragged into the bramble by the resident fox population. Note: February/March is probably the best time to clear areas like this as the bramble and associated vegetation has died right back.

**Table 5: March 2017 Volunteer Day**

Date	March 12 <sup>th</sup> 2017
Site name	Butts Farm area of Crane Park
Site area	2 hectares of Crane Park between Butts farm estate and the river in LB Hounslow.
Description	This part of the park was opened up in 2011 as part of the Priority Parks project. Until this time it had been little used and had a reputation as a dumping ground for cars, motorbikes etc. It is now much better used (several hundred people per day on a nice weekend) and is an attractive part of the park with mature trees and bramble scrub and 200m of attractive river bank and water vole habitat with pathways going through it.
Litter pick	Two people for part of the day – 5 person hours in total.
Total collected	40kg
Plastic bottles	48 plastic bottles, comprising mostly drinks or water bottles, many pulled out of the path side brambles.
Cans	85 drinks cans, mostly alcohol and many found in the undergrowth in batches of five or six suggesting one or more regular park drinkers causing maybe 70 per cent of the total number.
Glass	20 bottles
Recycled total	5kg
Other	35kg: some heavy material that had been there a long time – 20 to 30 years maybe – and a lot of plastic wrappers for crisps, cigarettes, dog litter bags, sweet wrappers etc.
Previous FORCE event at location	March 2016: but probably not as focussed a litter pick.
Other litter picks	The council litter pick along the main pathway but not generally in the wooded and more overgrown areas or by the river bank.
Previous FORCE work	Annual litter pick – the amount has reduced considerably year on year.
Calculations	48 plastic bottles in 2 hectares in 12 months = 24 bottles/hectare/annum
Comments	See photo of litter collected at the site.

## Floating Plastic Litter Report for the River Crane



**Figure 3: Some of the litter collected at Butts Farm**

**Table 6: April 2017 Volunteer Day**

Date	April 9 <sup>th</sup> 2017
Site name	Pevensy Nature Reserve
Site area	10 hectare site immediately upstream of Crane Park in LB Hounslow.
Description	<p>This site had been run down for around 35 years until work started around 7 years ago to start to open it up and improve its environmental and community value. This work has continued with the formation of the Pevensy Green Gym three years ago, which meets and works there weekly. LB Hounslow rangers have also been collecting litter and rubbish from the site more regularly in recent months.</p> <p>The site is around 500 metre long, running long the southern bank of the River Crane and curling around the SW London Crematorium site. It includes, river bank, wetland, backwater ponds, woodland, wet woodland, meadow and grassland habitats. It also include Feltham Circles, a disused sewage works site used for around 3 years by graffiti artists.</p>
Litter pick	Several people for at least part of the day – maybe 12 person hours in total.
Total collected	200kg
Plastic bottles	107 plastic bottles from a log dam in the river. It has not rained significantly for around six weeks and the dam may have built up over this timescale. 19 plastic bottles from the surrounding area.
Cans	15 metal cans from the log dam. 72 metal cans – many drinks cans associated with the Feltham Circles graffiti site, from the surrounding area
Glass	27 bottles from the log dam 16 bottles from the surrounding area
Recycled total	75kg
Other	125kg Includes three bin bags of polystyrene and other floating debris from the log



## Floating Plastic Litter Report for the River Crane

Date	April 9 <sup>th</sup> 2017
	dam plus several pieces of pipe-work and one car tyre from the river
Previous FORCE event at location	April 2016
Other litter picks	There have been several other litter picks here since by the green gym and others.
Previous FORCE work	Annual litter pick – the work of Green Gym and LB Hounslow has considerably reduced the amount of litter on site. We have previously not been able to cover the whole site with many large items left. It is the first time we have cleared the river at this location.
Calculations	<p>The accumulation of bottles in the site is difficult to calculate given the amount of recent work here. A rate of 19 in 12 hectares in one year would make around 2 bottles/hectare/annum</p> <p>The accumulation in the log dam is maybe over 6 weeks. Note there is another dam around a km upstream. This would result in around <math>107 \times 52 \times 35 / 6</math> bottles per annum in the river = 30,000 bottles per annum in the river</p> <p>Now this site has been cleared it would be possible to assess the rate litter accumulates in the future</p>
Comments	See photos 4 and 5 below



Figure 4: June and Ian preparing to remove the litter from behind the log dam

## Floating Plastic Litter Report for the River Crane



Figure 5: plastic bottles and other floating debris removed from behind the log dam

Table 7: May 2017 volunteer day

Date	May 14 <sup>th</sup> 2017
Site name	Mereway Nature Park
Site area	1.5 hectares site downstream of Kneller Gardens in the divergence between the River Crane and Duke of Northumberland's River in LB Richmond.
Description	A volunteer day held at this site two months following the children's event in March 2017. There was little or no litter found in the spaces cleared by the children in March though a small amount was found in adjoining areas.
Litter pick	1 person for two hours – occasional picks later.
Total collected	1kg
Plastic bottles	6 plastic bottles
Cans	8 drinks cans
Glass	0 bottles
Recycled total	0.2 kg
Other	0.8 kg
Previous event at location	Children's event in March 2017.
Other litter picks	The council litter pick along the main pathway but not generally in the wooded or bramble areas. No other formal picks – however it is known that a number of local residents undertake informal litter picks as part of their regular walking routine.
Previous FORCE work	This area was where FORCE started 14 years previously and is well used but seems to be fairly well looked after by local people. The Richmond Green Gym kept it in very good condition and we are keen to see this re-instated.
Calculations	6 plastic bottles in 1.5 hectares in 2 months = 24 bottles/hectare/annum.
Comments	The rubbish found in this site was fairly well scattered across it – much of it



## Floating Plastic Litter Report for the River Crane

Date	May 14 <sup>th</sup> 2017
	thrown into the bramble where it would be difficult for the public to retrieve without litter pickers. Some may also have been dragged into the bramble by the resident fox population. Note: the vegetation in May is well developed and other litter may have been hidden.

**Table 8: TCV River Restoration Days**

Date	June 21 <sup>st</sup> and 22 <sup>nd</sup> 2017
Site name	Crane Park
Site area	300 metres of river where the deflectors and with two or three minor blockages within it.
Description	Restoration works as part of the community learning series of events – working on the same sites that have been done in 2016
Litter pick	Clearing floating litter from within the deflector areas and a couple of willow carr type blockages within the river over a 300 metres reach.
Total collected	20kg
Plastic bottles	44 plastic bottles over two days
Cans	100 drinks cans
Glass	Not recorded
Recycled total	3 kg
Other	17 kg
Previous event at location	Event in 2016
Other litter picks	No
Previous FORCE work	
Calculations	50 bottles in 300 metres – over a total length of 30km this would translate to 5000 bottles. It is not known how long this litter has built up over – though a maximum period of 12 months
Comments	These data are consistent with other data on the build up of plastic litter within the river

**Table 9: TCV River Restoration Days**

Date	July 5 <sup>th</sup> and July 19 <sup>th</sup> 2017
Site name	Crane Park
Site area	500 metres of river where the deflectors and with two or three minor blockages within it.
Description	Restoration works as part of the community learning series of events – working on the same sites that have been done in 2016
Litter pick	Returning to the areas covered last month and looking at a further 200 metres of river
Total collected	Not recorded
Plastic bottles	30 plastic bottles on day one – 8 from the initial 300 metres and 22 from the additional 200 metres 10 bottles on day two – covering the 500 metre reach looked at two weeks previously
Cans	Not recorded

## Floating Plastic Litter Report for the River Crane

Date	July 5 <sup>th</sup> and July 19 <sup>th</sup> 2017
Glass	Not recorded
Recycled total	
Other	
Previous event at location	22 <sup>nd</sup> June – see above
Other litter picks	No
Previous FORCE work	
Calculations	<p>Day one: 8 bottles over 300 metres in 13 days (assuming 100 per cent clear up first time around) – this translates to <math>365/13 * 100 * 8</math> or 20,000 per annum. Note however that (a) some of these may have been missed first time around and (b) there had been a flood flow in the interim fortnight which may have brought down more than an average number from upstream</p> <p>22 bottles in a further 200 metres over one year – translates to 3300 per annum.</p> <p>Day two: 10 bottles over 500 metres in 14 days – translates to <math>365/14 * 30000/500 * 10</math> or 15,000 per annum</p>
Comments	These data are consistent with other data on the build up of plastic litter within the river

**Table 10: FORCE Volunteer Day - October 2017**

Date	8 <sup>th</sup> October 2017
Site name	Twickenham Junction Rough
Site area	300 metres of river adjacent to the Brewery Wharf site
Description	Regular volunteer day – including access to the river for a litter pick
Litter pick	Clearing mainly heavy metal litter as well as a small amount of floating plastic material over a 300 metres reach
Total collected	100kg
Plastic bottles	19 plastic bottles
Cans	4 drinks cans
Glass	14 glass bottles
Recycled total	3 kg
Other	100 kg
Previous event at location	Event in 2016
Other litter picks	River clearance in October 2016
Previous FORCE work	
Calculations	<p>The build up of recycled material is not relevant as most floating material will float past this site with no places for a build up to occur.</p> <p>More relevant is the build up of other heavy metal material. An accumulation of 100 kg in one year indicates this site will need a regular clean up – at least once per annum</p>
Comments	

**Table 11: November 2017 Volunteer Day**

## Floating Plastic Litter Report for the River Crane

<b>Date</b>	<b>November 12<sup>th</sup> 2017</b>
Site name	Crane Park – Willow Way
Site area	One hectare of Crane Park between Hospital Bridge Road and Chertsey Road on the south side of the river in LB Richmond
Description	<p>A newly opened part of the park – in 2013. This site was litter picked in January 2017. This litter pick comprised an initial littler pick during a TCV event on 8<sup>th</sup> November followed by the main clear up during the FORCE day on 12<sup>th</sup> November. As a result the litter clearance was more comprehensive than in January 2017 and picked up some litter that had clearly been there for several years.</p> <p>The site is used by the public but not heavily. In January we witnessed around half a dozen people using it – whereas on this day we saw 15 to 20 people over the course of the day.</p> <p>The river forms the northern boundary of the site for around 200m and the site is some 50m wide. The eastern and western boundaries are with heavily used roads and these were the main sources of litter</p>
Litter pick	Two people over the two days covered the entire area - around 6 person hours in total
Total collected	30kg
Plastic bottles	30 plastic bottles, comprising mostly drinks or water bottles with a couple of plastic milk cartons
Cans	Around 36 drinks cans – soft drinks and alcohol
Glass	2 bottles
Recycled total	3 kg
Other	27 kg
Previous FORCE event at location	January 2017 – 10 months previously
Other litter picks	The council litter pick along the main pathway but not generally in the wooded and more overgrown areas or by the river bank. No other formal picks
Previous FORCE work	The January 2016 volunteer day removed a much larger amount of litter. The January 2017 event removed around twice this amount of litter. There were also several tonnes of rubbish removed by the council in the build up to putting this site back into public use in 2015. This supports the idea that regular litter picks do reduce the subsequent litter accumulation
Calculations	30 plastic bottles in 1 hectare in 10 months = 36 bottles/hectare/annum. This compares to 58 bottles/hectare/annum in 2016
Comments	<p>There is no significant drinking issue at this site – mostly soft drinks bottles and cans.</p> <p>Around 80 per cent of the rubbish was found along the line of the two main roads, indicating it was not put there by people visiting the site but by those walking along the side of it and discarding their litter over the fence. Note that this was also the case in 2016.</p>

### APPENDIX B



## Floating Plastic Litter Report for the River Crane

---

### RECORDS OF LITTER FROM SITE OBSERVATIONS AND THIRD PARTIES

The following observations have been made of litter within the river:

1. Survey of litter floating past a set location – Meadway bridge on 15<sup>th</sup> January 2017
2. Record of litter - Mill Road to Pevensey on 23<sup>rd</sup> January 2017
3. Record of litter traps at Kendall (Twickenham Road) Bridge and the Mill Plat boom on the Lower Duke of Northumberland's River on 28<sup>th</sup> January 2017; 24<sup>th</sup> March and 3<sup>rd</sup> May 2017
4. Record from litter traps in Pevensey and Brazil Mill Woods in April 2017
5. *Ad hoc* observations at bridges
6. Record from Mill Road site in Crane Park in June 2017

These are considered in turn below.

#### 1. Floating Litter Static Survey

Date: 15<sup>th</sup> January 2017

Location: Meadway Bridge 250m upstream of where the River Crane splits from the Lower Duke of Northumberland's River

Duration: 90 minutes between 3pm and 4:30pm

Conditions: cold and wet with rainfall over much of the previous 48 hours.

Observations: no plastic bottles or other floating litter seen – only leaves and small twigs.

Comments: this was a short length of time and firm conclusions cannot be drawn. Nevertheless, the site monitors the whole of the upstream catchment. Given there was no litter recorded throughout this period it indicates either (a) relatively low rates of debris accumulation or (b) accumulation is largely in response to episodic events not witnessed during this period. Further survey work is required to corroborate this.

#### 2. Floating Litter Survey – Mill Road to Pevensey

Date: 23<sup>rd</sup> January 2017

Location: between Mill Road and Pevensey Nature Reserve – a distance of 2km

Conditions: The weather was cold and frosty – there had been heavy rainfall the weekend of 14<sup>th</sup> January but no rainfall since. Ice movement on the river connected backwaters in Pevensey indicated water levels had fallen by 15 to 30cms over the previous week

Observations:

- Ten bottles in various locations along the river – mostly caught in overhanging branches, on the bank or river margin
- A further 10 bottles caught behind the sluice on the Mill Road backwater channel (or elsewhere local to it)
- Around 30 plastic bottles (plus several footballs, glass bottles, cans and other debris) caught behind a willow which forms a shallow height dam across the width of the river in Pevensey

Comments:

- A broad assumption would be that these bottles represent the accumulation on this length of river since the high water levels around 7 days previously
- Note that some of these bottles may have been there for longer – we may also have missed some and others may have floated past this point over the last week – so it is a broad assumption

## Floating Plastic Litter Report for the River Crane

---

- On this basis however there has been an accumulation of 50 bottles in 7 days on 7 per cent of the river (albeit towards the base of the catchment)
- This translates to 39,000 bottles per annum over the whole catchment – or 4 to 5 bottles per hour

### 3. Floating Litter Surveys at Kendall Bridge (Twickenham Road Bridge) and Mill Plat Boom

Date: 28<sup>th</sup> January 2017

Location: Kendall Bridge near the base of the Duke of Northumberland's River.

Conditions: cold and wet.

Comments:

The low soffit level on the bridge acts to skim floating debris from the river and there is often a backlog of material here. The EA has collected this in the past – though it is difficult to gain access for a vehicle onto the garage forecourt.

An EA officer has reported that the EA now seek to drop the water level at the sluice on a regular basis in order to allow this material to float downstream to the main boom (see below). The EA may also in future effect a permanent reduction in water level at the sluice sufficient that this no longer acts as a skim. The EA noted that the sluice level had been raised in the last few years and this had exacerbated the problem.

Another EA officer estimated that the boom is cleared of debris every two weeks or so

The photo below shows approximately:

- 40 footballs and three rugby balls
- 50 tennis balls
- 100 plastic bottles
- Various glass bottles, cans and other debris

FORCE also clear this site during our regular annual volunteer days on the site between 2012 and 2015. We also noted a large number of footballs here then. One explanation would be that they do not clear the soffit of the bridge even when water levels drop (allowing other debris to pass).

## Floating Plastic Litter Report for the River Crane

---



**Figure 6: Litter backed-up above Twickenham Road (Kendall Bridge)**

Questions for the EA:

- How often is the level dropped to allow this blockage to clear?
- What is the longer term plan and when might it be implemented?

Date: 28<sup>th</sup> January 2017

Location: Mill Plat boom at the base of the Duke of Northumberland's River – around 500m downstream of Kendall Bridge.

Conditions: cold and wet

Comments:

The boom is in place to stop surface litter going into the major sluice downstream and onwards into the River Thames. The EA clears the debris from this boom quite regularly. Immediately downstream of the boom is the intake for Syon House lakes.

The photo below shows approximately:

- 15 footballs
- 400 plastic bottles



## Floating Plastic Litter Report for the River Crane

---

- Various other debris including glass bottles and cans

There are a few bottles also around the Syon intake – which may indicate that some debris is either thrown into the area downstream of the boom – or maybe blows over it during high winds?

Questions for the EA:

- How often is the debris cleared from the boom? Every few weeks
- How much debris is normally cleared?
- It would be very helpful if the EA could roughly record of the dates the boom is cleared and how much debris is removed – in particular approximately how many plastic bottles are removed.



**Figure 7: Mill Plat boom: March 2017**

Date: 24<sup>th</sup> March 2017

Location: Kendall Bridge near the base of the Duke of Northumberland's River.

Conditions: cool and dry

Comments: The EA reported that the site had been cleared of all debris on 6<sup>th</sup> March 2017. When visited there was a significant build up of rubbish at the site comprising around 50 plastic bottles, 6 glass bottles, 11 footballs and one rugby ball, and 40 drinks cans. There were also a significant number of plastic bags and other debris floating at the site.

We then visited the Mill Plat boom downstream and noted that this had relatively little rubbish in place comprising 3 footballs, 10 plastic bottles, 2 glass bottles and 5 cans.

Assuming this build up had occurred over the previous 18 days then the rate of build-up has been as follows:

- Footballs – 0.8 per day

## Floating Plastic Litter Report for the River Crane

---

- Plastic bottles – 3 per day
- Cans – 2 per day
- Glass bottles – 0.5 per day

Note that the DNR is one of two outflow points for the river system. The main Crane outflow takes the bulk of the flow during high flow periods but little flow during low flow periods. A first assumption may be to expect a similar order of litter outflowing through each river and these attrition rates would therefore be doubled.

Note also that there had been some higher flows during the preceding 18 days but no major rainfall events – and therefore the system of upstream holding points (log jams etc) may have remained largely un-breached.

3<sup>rd</sup> May 2017

Location: EA boom at Mill Plat

Conditions: cool and dry

We visited the site with Paul Evans from the EA. He noted that the boom had been cleared around three weeks previously. We counted approximately:

- 200 plastic bottles
- 100 tennis balls
- 4 footballs
- 70 cans
- 40 glass bottles
- 20 polystyrene food boxes
- 30 coconuts

This indicates a build up rate of:

- plastic bottles – 10 per day
- 100 tennis balls – 5 per day
- 4 footballs – 0.2 per day
- 70 cans – 3.5 per day
- 40 glass bottles – 2 per day
- 20 polystyrene food boxes – 1 per day
- 30 coconuts – 1.5 per day

This is a faster rate of build up than recorded earlier in the year. Note however that (a) the weather has been warmer so more people would have been out and about and (b) river flows have been low so most if not all the rubbish would have come down the Duke's River.



## Floating Plastic Litter Report for the River Crane

---



Figure 8: Mill Plat boom in May 2017

### 4. Litter Surveys at Log Dams in Pevensey and Brazil Mill Wood

Date: April 2017

Location: log dam in Brazil Mill Wood.

Comments: clearance work done by volunteers with “Save Hounslow Heath”

Information: over 200 plastic bottles removed along with around half a dozen sacks of floating rubbish

Date: 9<sup>th</sup> April 2017

Location: log dam in Pevensey

Comments: clearance work done as part of FORCE volunteer day – see also above

Information: 107 plastic bottles removed along with 23 glass bottles, 15 metal cans and three sacks of floating debris.

### 5. Floating Litter Survey – Observations at Bridges

Observations at bridges over a number of years indicate these may be a prime source of rubbish discarded into the river.

- Bridges are a main point of intersection between the general public and the river
- Those walking over bridges are less likely to have an emotional link to the river that would stop them discarding rubbish over it – particularly where there is no other link between the bridge and the river (e.g. a riverside path) or where the river is deemed unattractive (or maybe even unseen) at that point
- There is a pattern where rubbish seems to accumulate in places where it can be disposed of quietly and discretely adjacent to a main thoroughfare – and dropping something over a bridge seems to fit this requirement
- Where a bridge has a parapet there is a tendency to balance litter on it – like a shelf - where it might be picked up later by someone else. All too often it is then blown into the river

## Floating Plastic Litter Report for the River Crane

---

- The river banks adjacent to urban bridges are often inaccessible by site managers and others – due in part to H&S concerns governing access. These are often hotspots for the build-up of rubbish

There are maybe 100 bridges along the Crane Valley – one every few hundred metres. The investigation of how much litter is sourced from bridges, and what types of intervention might reduce it, would be an interesting subject for further study.

The parapet of the bridge in London Road Twickenham was observed on 29<sup>th</sup> April 2017 (see Figure 9 below) following the Army Navy rugby game. This shows two bottles, three drinks cans, two plastic beakers and a packet of cigarettes on one of the four parapets at this location. Looking over the bridge there was also a significant amount of rubbish that had either been thrown or fallen into the river. This is illustrative of the problem – albeit at a high use period.



Figure 9: bridge parapet in Twickenham Road: 30<sup>th</sup> April 2017

### 6. Observations at Mill Road in summer 2017

This site has become used by a group of boys and young men over the last few months since the FORCE volunteer day at the site in February 2017. In that time there has been a rapid accumulation of litter, particularly plastic soft drinks bottles. A recent site visit counted some 80 plastic bottles in the river around the weir with a further 30 bottles in the undergrowth around the site. This rate of accumulation, over 100 bottles in an area of a few hundred square metres and a length of river backwater of around 50 metres maximum in a period of four months maximum, is unprecedented in the data record to date. This is further evidence of the potential negative impact of hot spots of this nature on the overall bottle count across the catchment.

In the following two months this site has been the subject of:

- An initial site clear up and graffiti removal session by the council
- Increased patrols and awareness by park guard and the local pcso's
- Posts on facebook identifying the problem
- Further clear up of the river by TCV on 2<sup>nd</sup> August 2017

## **Floating Plastic Litter Report for the River Crane**

---

As a result, over 100 plastic bottles were removed from the site. The early signs are that the problems with littering and anti-social behaviour have quietened down.