

Citizen Crane: Year Ten Report

September 2024

Working in partnership



Report title		
Author(s)	FORCE/ZSL/FE	
Project	River Crane Smarter Water Catchments Project	
Theme & milestone	Water Quality	

Authorisation and assurance record			
	Name & organisation Date & signature		
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This document has been created for the purposes of Thames Water's Smarter Water Catchments initiative. Although Thames Water remain the primary client, this document will be made available to all partners associated with the project, in line with the true partnership ethos of the project. The work detailed in this report is based on the information available at the time. Any findings and/or recommendations will inform future phases of the project.

Executive Summary

General

- 1. This report sets out the findings of Year 10 of the Citizen Crane programme. Initially the programme focused on collecting and analysing monthly water quality and ecological data sets collected by citizen scientists and using these to better understand the river ecosystem and target interventions that might improve it.
- This work has continued over the last ten years and has also expanded to encompass a wider array of citizen science based data collection and engagement – particularly as part of the Smarter Water Catchments programme that started in April 2020.
- 3. The Citizen Crane volunteers have continued to provide high quality data for the programme and have extended their range of activities to include geomorphology, wetland monitoring, water vole and mink monitoring, as well as a third Outfall Safari.

Findings

- 4. For many years the Citizen Crane reports recorded variations in river condition but without seeing any significant or sustained improvements. This was despite the removal of hundreds of misconnections as part of the Thames Water (TW) Surface Water Outfall Programme (SWOP). This changed in Year 9 (2022-23) with significant improvement in Riverfly Monitoring Initiative (RMI) and water quality scores, combined with a positive shift in the river's Water Framework Directive classifications. These improvements appear to have been sustained and developed during Year 10.
- The Year 10 RMI data provide further encouragement that the river's ecosystem is slowly improving with many of the invertebrate monitoring sites at or near the ten year RMI highs and three sites setting new high mean annual scores.
- 6. The report also presents Environment Agency (EA) water quality data. These largely support the findings of the Citizen Crane programme and provide some further evidence of improvement.
- 7. The third Crane outfall safari was completed in 2024. The full analysis has not been completed. Preliminary findings are that, whilst the number of highly polluted outfalls has fallen, there has been an increase in the number of moderately polluted outfalls. These results indicate that new misconnections are continuing to be added to the surface water drainage network.
- 8. There are two large combined sewer outfalls in the catchment. Both have been active over the last year. We do not know the significance of these outflows; however, they do not appear to be the source of many of the regular ammonia peaks seen in the sonde data, which are more likely to be caused by other cross connections between the sewer system and surface water drainage.

- 9. The Surface Water Outfall Programme (SWOP) data indicate that large numbers of misconnected properties remain across the catchment, with 259 identified over the last four years. However, this compares to 470 in the previous five years, and the number of properties per drainage catchment surveyed has reduced from 12 to 10, both indicating that the SWOP may be starting to get to grips with the problem. Another encouraging development is that the SWOP team are now also targeting local network issues. They have identified at least 41 properties with these issues over the last four years.
- 10. There is further evidence that the treatment system at Heathrow is being effective in removing glycol from the river ecosystem, albeit last winter was one of the warmer ones in the recent record.
- 11. There are encouraging findings at a local level about the beneficial impacts of enhancement schemes being delivered through the Smarter Water Catchments programme and other related programmes both from wetland data at Headstone Manor Park and river-based data at various intervention sites. There are also many more interventions planned and in development that will hopefully be delivered over the next few years.
- 12. The lack of progress with road run-off is one of the frustrations to date. The project team remain hopeful that, as improvements are delivered elsewhere, this may lead to progress with some of the more chronic road pollution sources.
- 13. Public engagement has continued to expand. This has helped to grow and sustain the volunteering efforts as well as engaging a wide audience about the Crane Valley itself and all the ways in which the public can help to make it better. For example, several pollution incidents that have been reported by Citizen Crane volunteers and/or members of the public and have resulted in the pollution problems being stopped in hours and days rather than weeks and months.
- 14. One of the major changes over the last ten years has been the increase in partnership based working across the catchment to identify and resolve issues as well as delivering projects. Representatives of the various groups EA, TW, Local Authorities, community-based partners and others are familiar with each other, leading to a good level of trust and understanding being developed. This has been incredibly helpful when resolving issues or putting together project proposals and opportunities.
- 15. Overall, there are further encouraging signs that the river ecosystem is improving and moving towards Good Ecological Status. The system is very complex and we consider the recent improvements are due to a combination of actions by all our partners to identify and remove pollution sources as well as improve the ecological functioning of the river.
- 16. This is only the second year of significant improvements, and the benefits may also be a function of mild winters and lack of drought over the last couple of years, which could subsequently change. Nevertheless, it is noticeable that these improvements have coincided with the growth of the Smarter Water Catchments programme and the increase in partnership-based project delivery and this could be the crucial factor that has tipped the balance in favour of river improvements.

The Future

- 17. The Citizen Crane project currently sits within the TW Smarter Water Catchments (SWC) programme. The first five years of this programme ends in March 2025. TW and all the project team would very much like to continue Citizen Crane, as well as the wider SWC programme, for a further five years. At present, though, this is not guaranteed, not least due to wider water industry issues that are outside the control of this project.
- 18. The Citizen Crane team is working alongside the wider SWC programme partners to help identify future funding for the wider programme through TW and/or other funding streams. We will also be talking to TW about making Citizen Crane a TW core partner delivery programme if SWC funding is not available. There is otherwise a risk that much of the progress achieved over the last ten years will be dissipated.
- 19. The intention from all partners is for the core Citizen Crane monitoring to continue, subject to securing funding and continued volunteer engagement. The team has been delighted how volunteers have also engaged with a wider range of citizen science activities and we are keen to continue and expand this. The opportunity for formal training and qualifications delivered through these programmes has already helped to broaden the volunteer base and we would like to embed and expand this approach.
- 20. The SWOP is expected to continue for a further five years. This provides an opportunity to further focus efforts on the key pollution problem areas at the top of the catchment, as well as expanding the work to identify and deal with associated network issues.
- 21. If SWC goes ahead for a further five years then this provides a golden opportunity to deliver river improvements at scale across the catchment using the Citizen Crane volunteers to monitor (and help to optimise) their effectiveness.
- 22. The public engagement work would also expand, subject to appropriate funding, both to grow our volunteer network and engage the wider population on the key issues and where they can make a difference.
- 23. We have seen very encouraging progress over the last ten years. If these proposed activities can be delivered and learned from over the next five years, then our long-term target of "Good Ecological Status" or, as we have previously defined it:

"An urban river corridor teeming with wildlife and unconstrained by pollution, serving as a vital community resource where people can connect with nature and improve their wellbeing."

can be achieved by the end of the next five-year cycle in 2030.

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1 INTRODUCTION

This report sets out the findings of Year Ten of the Citizen Crane programme, including a review of citizen science data for the period from April 2023 to March 2024. This programme started in the Crane Valley catchment in west London in 2014, following major pollution incidents in 2011 and 2013. A project team of three organisations: Friends of the River Crane Environment (FORCE), Frog Environmental and Zoological Society of London (ZSL) came together to set up the programme. The team is supported by a steering group including Thames Water (TW), The Environment Agency (EA) and Crane Valley Partnership (CVP). Teams of volunteers were recruited to collect monthly water quality and ecological data from up to 16 sites across the Crane Valley catchment.

Annual Citizen Crane reports have been produced since 2015 - apart from Year 7 when investigations were severely curtailed due to COVID-19 lockdown restrictions. This Year 10 report, in common with most of the others, provides an overview of the entire project and detailed findings from the previous year of investigations. The main exception is the Year 6 Report, which provides more detail on the findings over the first six years of the project and sets a baseline condition assessment for the start of the Smarter Water Catchment (SWC) programme, in April 2020. A more detailed update report is anticipated at the end of Year 11 (April 2024 to March 2025), which will conclude the first five years of the SWC Programme. All the Citizen Crane reports can be found in the CVP Project Library: https://www.cranevalley.org.uk/project-archive-library/.

The scope of Citizen Crane has evolved over the last three years in response to the SWC programme. The work has broadened to include other citizen science components and is being co-ordinated by a Citizen Crane Officer, appointed by ZSL in 2021. This Year 10 Citizen Crane report presents:

- Core Citizen Crane data collected between April 2023 and March 2024.
- An outline of other work undertaken by the Citizen Crane team and our partners.
- Conclusions from a review of these data sets.

This is a summary report and further information can be found in the other SWC reports referenced, many of which are also held in the CVP Project Library.

1 CITIZEN CRANE CORE INVESTIGATIONS

1.1 River Monitoring Initiative

The River Monitoring Initiative (RMI) is a national methodology for detecting and reporting pollution events and assessing the ecological value of a river system through a proxy of up to eight classes of invertebrates, measured and scored using a logarithmic scale, and collected by three one-minute kick samples. Trends in RMI scores can be used as a proxy for changes in water quality, although they are affected by habitat quality/suitability for different species and other impacts such as silt and flow.

The Citizen Crane volunteer teams have been carrying out RMI assessments at up to 16 sites every month over the ten-year period from April 2014. The main catchment map, including the key monitoring locations, is shown on Figure 2.1. This section of the report reviews the findings from last year (April 2023 to March 2024) and presents these, alongside a summary of the long-term data set, to identify any emerging trends. The data for 2023-24 for ten long-term monitoring points, and three new data points (sites 1b to 1d) along the Yeading Brook, are set out in Table 2.1 below. Note: trigger levels for pollution incident reporting were set with the agreement of the Environment Agency at the start of the project.

Site	Site number	No. of samples	Mean	Median	Trigger level
Headstone Manor Park	1	12	2	2	3
Yeading Walk	1b	10	3.1	3	2
Streamside Open Space	1c	2	4.5	4.5	N/A
Roxbourne Park	1d	6	4.6	4.5	N/A
Spider Park	2	8	2.9	3	3
Ickenham Marsh	3	5	5	5	3
Newton Park West	4	11	2.5	3	3
Yeading Brook Meadows	6	8	3.9	3.5	4
Minet Country Park	7	6	2.7	2.5	3
Cranford Country Park *	8	N/A	N/A	N/A	N/A
Donkey Wood - Crane	9	12	7.1	7	3
Donkey Wood - DNR	10	11	8.2	8	7
Crane Park Island	11	9	11.3	11	8
Mill Road Weir	12	12	7.6	7	7

Table 2.1: Summary of core RMI data 2023 – 2024, *Cranford Country Park is not currently being monitored.



Figure 2.1: Catchment map with Riverfly Monitoring Initiative (RMI) monitoring locations and Environment Agency water sampling locations.

The main findings from these data are as follows:

- The general trend follows that of previous years, with the lowest RMI scores at the top of both upstream sub-catchments, quite poor scores in the middle, and the river condition improving significantly towards the base of the catchment.
- The Riverfly Partnership state that RMI scores of 4 and below are indicative of a river system that is heavily adversely impacted. ZSL 2021 analysis of RMI data from 42 regularly monitored sites in London show mean site scores range between 1 to 10 with a mean from all sites of 5.2.
- Trigger levels were breached regularly at both Newton Park West and Minet Country Park. This is in line
 with findings from previous years. These breaches are so regular that they are no longer reported to the
 EA. The causes are considered further in Section 2.3 below.
- Trigger levels were also breached regularly at Headstone Manor Park this year. This was considered to be due to a major pollution source, which was investigated by Citizen Crane volunteers, and is reported in Section 3 below.

Figure 2.2 below shows the summary annual data sets for each of the ten years from 2014.



Figure 2.2: Catchment map with Riverfly Monitoring Initiative (RMI) monitoring locations, corresponding Riverfly scores and RMI trigger levels where available.

The main findings from these data are as follows:

- Only one of the long-term sites (Headstone Manor Park) reports annual mean RMI data for Year 10 that are below the long-term average. This is considered likely to be linked to the pollution issue identified by the Citizen Crane team and discussed further in section 2.3 below.
- Six of the long-term sites record Year 10 annual mean RMI data that are at or above the long-term average.
- Three of the long-term sites (Newton Park West, Ickenham Marsh and Crane Park Island) record annual mean RMI data for Year 10 that are higher than previously recorded at these sites. In the case of Crane Park Island, the annual mean average score of 11 is the highest we have seen at any site over the tenyear monitoring period.
- The weather conditions over the year were moderate throughout with a mild winter and no extended drought periods – and these conditions could partly explain the high values recorded. Nevertheless, these results build on the encouraging findings from the previous year (see Year 9 report) and indicate that there may also be underlying improvements in river condition.

There is further consideration of specific data sets in the next two sections.

1.2 Analysis of RMI Data in Relation to Activities at Heathrow

Heathrow Airport uses de-icer to treat the runways and aircrafts during periods when the temperature is near or below freezing. Drainage from the eastern part of the airport complex goes through the Eastern Balancing Reservoir and discharges into the River Crane just upstream of RMI Monitoring Site 9 in Donkey Wood. Information collated by the Citizen Crane teams in previous years has shown a close correlation between extended periods of cold weather, outbreaks of sewage fungus in the river bed, and a reduction in the RMI scores in the three downstream monitoring points (Donkey Wood, Crane Park Island and Mill Road).

In 2018, Heathrow constructed and commissioned a new treatment system, specifically designed to remove glycol from the airport run-off before it is discharged into the river. Over the last six years we have been assessing whether there have been any changes in the impact of discharges from Heathrow on the river ecosystem downstream.

Table 2.2 below presents weather data from the Heathrow meteorological station, and notes the severity of the weather in terms of (a) total number of days per month below freezing, and (b) periods per month experiencing 5+ days and 10+ days with the temperature recorded below freezing. Those winters highlighted are considered to have been more severe – with a combination of both 20+ below zero days total and one or more periods of 10+ days per month with the temperature below zero.

Winter	Days below 0°C	Period (months)	5+ days/month	10+ days/month
2015-16	15	4	2	0
<mark>2016-17</mark>	<mark>26</mark>	4	2	1
<mark>2017-18</mark>	22	4	2	1
2018-19	16	5	1	0
2019-20	13	6	0	0
2020-21	<mark>34</mark>	6	3	1
2021-22	21	6	1	0
<mark>2022-23</mark>	<mark>28</mark>	4	3	2
2023-24	16	3	1	0

Table 2.2: Heathrow cold weather data.

Figures 2.2 to 2.4 below plot the monthly RMI data over the full ten year period for the three sites downstream of Heathrow as follows:

- Site 9 (Donkey Wood) is a few hundred metres downstream of the outfall from Heathrow's Eastern Balancing Reservoir.
- Site 11 (Crane Park Island) is around 2km downstream of the outfall.
- Site 12 (Mill Road) is around 3.5km downstream of the outfall.



Figure 2.3: Monthly Riverfly Monitoring Initiative (RMI) data for Site 11.





Figure 2.4: monthly Riverfly Monitoring Initiative (RMI) data for Site 12.

The following notes are made from these data:

- A seasonal variation can be seen in all the RMI scores, with lower scores in the winter when there are less invertebrates naturally present.
- The cold winter periods of 2016-17 and 2017-18 correlate closely with significantly reduced RMI scores at all three sites downstream. Sewage fungus was also noted as coating the river bed at Site 9; and being present alongside a greenish water tinge, at Sites 11 and 12 during this period.
- Scores reduced below the incident trigger levels at each of the three sites during these two winters and the RMI scores at the Donkey Wood site were 1 or 2 for an extended period – compared to a winter average of 4 or 5.
- The new treatment system was 50 percent operational in winter 2018-19. This was a warmer winter, and the following winters were also either warmer and/or impacted by the COVID-19 lockdown, such that the amount of glycol being used at Heathrow would have been significantly lower than normal.
- Winter 2022-23 was the first time that there was both an extended cold period and both the airport and the treatment works were fully operational. It was therefore the first proper test of the effectiveness of the treatment system.
- We did receive one report of sewage fungus in the river that winter. However, this was not supported by further reports or any visual evidence from the volunteer teams.
- The RMI plots for 2022-23 show little or no evidence of an impact on the ecosystem, over and above normal winter reductions.
- Winter 2023-24 was relatively mild and glycol use is unlikely to have tested the treatment system as much as in the previous year. Nevertheless, it is encouraging to see that winter scores at all three monitoring sites appear unaffected.

• Note that reduced RMI scores at Site 12 in recent winters may be due to the cumulative effects of increased over-shading of this site by encroaching saplings and ivy. This issue is addressed further in section 2.3 below.

This review suggests that the treatment system is being effective in reducing the impact of glycol discharges on the ecosystem, compared to previous years with no treatment. The Citizen Crane teams will continue to monitor the river to assess any effects in future winters.

1.3 RMI Data from Individual Sites

The following findings are drawn from a review of the data from individual sites:

- Site 1: Headstone Manor Park. Reduced scores at this site (and an average of only 2 over the year) helped to guide the local Citizen Crane volunteers to undertake further investigations of the upstream water quality, leading to the identification of significant pollution sources that have subsequently been resolved.
- Sites 1b to 1d: Yeading Walk to Roxbourne Park. These three sites have been added to the roster as part of the Yeading Brook Unbound project, with the enthusiastic engagement of local volunteer groups. This project is at the planning stage and aims to enhance the habitat quality of several kilometres of this upper tributary of the Crane.
- Site 2: Spider Park. The scores at this site remained at around the 3 to 4 level for another year. The geomorphology of this site is currently well below optimal. A scheme is currently under development to enhance the form and function of the river through this site and these RMI scores are a valuable baseline with which to help assess the changes delivered by this work.
- Site 4: Newton Park West. The score of 3, whilst still being low, is the highest annual mean score recorded over the eight years of data gathering at this site. This result may be indicative of cumulative improvements being delivered by large scale investigations and improvement works in the upstream system (as set out in section 3.5 below), combined with the benefits derived from the local wetlands systems which have been in place over the last 6 years.
- Site 5: Ickenham Marsh. The score of 5 is the highest annual median RMI score over the ten years of data gathering at this site. This score reflects other higher scores along this western branch of the Yeading Brook and provides evidence that the pollution impacting the reduced scores at Headstone Manor Park may be more local compared to the wider scale benefits being delivered by the ongoing Surface Water Outfall Programme (SWOP) and other measures as also discussed in 2.6 below.
- Site 6: Yeading Brook Meadows. The score of 4 has stayed fairly consistent over the ten years of monitoring. The site is known to be impacted by road run-off (and associated sediment) in particular and this may be having the effect of dampening the habitat at this site.

- Site 7: Minet Country Park. The RMI score at this site has been low throughout the ten years of monitoring and last year was its joint highest at 3. The low scores may be caused in part by the poor geomorphology within and local to the site, although there is also thought to be ground contamination locally which may be adding to the ecological issues.
- Site 8: Cranford Park. This site has not been monitored for several years. We remain hopeful that a monitoring team will be set up here and/or the adjacent Avenue Park in the near future.
- Site 9: Donkey Wood River Crane. The scores at this site increased to between 7 and 8 over the last four years with another 7 scored last year. As noted above, this increase is believed to be primarily a result of the new glycol treatment plant at the Heathrow Eastern Balancing Reservoir and a consequent increase in winter RMI scores.
- Site 10: Donkey Wood Upper Duke of Northumberland's River. Last year's RMI score of 8 was the joint highest over the last ten years. The Upper Duke of Northumberland's had suffered from low flows in recent years. Last year, the summer flows returned to normal, following work around the upstream offtake from the River Colne. These high scores reflect the high value contribution of this inflow to the river downstream.
- Site 11: Crane Park Island. Last year's score of 11 is the highest at this site and the highest annual RMI score at any site in the Crane Valley. Comparison with other rivers across London (see the data from the Citizen Crane Year 9 report last year) indicate it may be at least equivalent to the highest anywhere else in Greater London. Scores have been improving over the last few years and this may be at least in part due to the glycol treatment works at Heathrow referenced above as well as the improved inflows from the Upper Duke's River. There have also been, over the last two years, improvements to the ecological value of around 500 metres of river channel through Little Park and Pevensey Nature Reserve several hundred metres upstream of this site (as discussed in Section 3.8 below) which may also have contributed to the improvements seen here.
- Site 12: Mill Road. Last year's RMI score of 8 was around the average for this site. The team at this site suspect that the score is being compromised by an increased level of shading from ivy clad trees and associated vegetation, particularly on the south bank of the river. As a result, there is no in-stream vegetation at this site, whereas there is plenty in unshaded reaches immediately upstream. There are plans to remove some of this shading in the coming winter and it will be interesting to see if this benefits the RMI scores at this site.

The RMI methodology has also been applied at other sites across the catchment in order to provide an ecological baseline in advance of prospective improvement works. These data will be reported as part of specific development projects in due course and may then be incorporated into the Citizen Crane roster for future years.

1.4 Water Quality Data

For the first six years of the Citizen Crane programme, volunteers collected monthly water samples and measured the flow rate at each of the RMI sites. The samples were analysed in Thames Water laboratories for ammonia and phosphate concentrations and these data were used to build up a picture of the organic pollution concentrations and loadings across the main catchment.

A plot was produced that showed concentrations and loadings with distance down the catchment for each of the first six years of the project. The main findings were:

- The highest concentrations of ammonia and phosphate were in the two upper tributaries of the catchment and the concentrations reduced significantly with distance downstream.
- The loadings of both ammonia and phosphate varied with distance downstream and there were significant reaches towards the base of the catchment where loading reduced with distance. This indicated the ability of these parts of the ecosystem to remove organic pollutants.
- There was a significant input of phosphate from the Upper Duke of Northumberland's River due to the loading from sewage works in the River Colne upstream of the Duke of Northumberland's River offtake.

No samples were taken in Year 7 due to COVID-19 restrictions; a decision was then made to discontinue the sampling and rely on the Environment Agency water quality datasets, which had been enhanced over this period. This approach has continued over the last few years – and this year we have also undertaken some comparative analysis of the EA data sets.

Figures 2.5 and 2.6 below show a plot of (a) the median loading data for phosphate and ammonia over the first six years of Citizen Crane (the blue line) and (b) spot loading median annual data for years 7 to 10. These latter data have been produced using the Environment Agency water quality data from two sites in combination with flow data from the EA gauging stations in the middle and lower catchment.



Figure 2.5: Phosphate loading data for the ten year Citizen Crane period.



Figure 2.6: Ammonia loading data for the ten year Citizen Crane period.

The following points are made from the phosphate data:

- The phosphate loadings over the last four years are of the same order as each other and around 20 percent higher than the median curve for the previous six years. This may either be a real change or a function of the different dataset and methodology.
- The loading data for Year 10 are at the lower end of the last four years.

• The impact of the inputs from the Upper Duke of Northumberland's River continues to be evident – with the phosphate load being doubled over this reach of the river.

The following points are made from the ammonia data:

- The ammonia loadings over the last four years are comparable with the median curve for the previous 6 years.
- The loading data for Year 10 are at the lower end of the last four years and significantly lower than the median for the previous six years.
- The data continue to reveal the ability of the lower reaches of the river to remove ammonia from the ecosystem.

We have also done some further analysis of the EA dataset for the last year (April 2023 to March 2024). Figures 2.7 and 2.8 below show the entire datasets for phosphate and ammonia respectively:



Figure 2.7: full dataset of phosphate concentrations.



Figure 2.8: full dataset of ammonia concentrations

The main points from these data are as follows:

- The phosphate concentration data are remarkably consistent between sites and across the 12 month period. The mean concentration across the sites is around 0.15 mg/l and there is little variation around this mean value.
- This suggests that the phosphate inputs are reasonably distributed across the catchment.
- The ammonia concentration data show more variation. Most data points are in the 0.05 to 0.2 mg/l range but five (or about seven percent) of the data points are 0.4 mg/l or above and two (around three percent) of the data points are 1 mg/l or above. These peaks are from two different sites and five different months.
- This suggests that, although most of the ammonia inputs are reasonably distributed across the catchment, there remain sporadic much higher inputs.

Figures 2.9 and 2.10 show the plot of median annual concentrations of phosphate and ammonia respectively compared against the median data for year one to six from the Citizen Crane dataset:



Figure 2.9: Comparison of Environment Agency phosphate data for Year 10 with Citizen Crane data for years 1 to 6.



Figure 2.10: Comparison of Environment Agency ammonia data for Year 10 with Citizen Crane data for years 1 to 6.

The key points from these two plots are as follows:

- Both datasets show broadly similar curves for the Citizen Crane data for years 1 to 6 and the EA data for Year 10.
- The phosphate data are generally indicative of slightly higher concentrations in the lower reaches of the catchment over the last year at slightly above 0.2 mg/l.
- The ammonia data are generally indicative of slightly lower concentrations in the middle catchment and comparable levels in the lower catchment at or below 0.1 mg/l.

In broad terms these data indicate that the water quality with respect to these two key indicators of organic pollution is largely unchanged over the ten year period. One point to note is that the EA data do not have any data points for the upstream tributaties of the catchment where potentially the most improvement work has been achieved – as indicated by the RMI datasets.

1.5 Outfall Safaris

'Outfall Safaris' are a volunteer supported means of evaluating the polluting potential of surface water outfalls across a river catchment. The first outfall safari in the UK was carried out in the Crane Valley catchment in 2016 by the Citizen Crane team and reported in the Citizen Crane Year 3 report. A total of 230 surface water outfalls were surveyed and the data was used to investigate specific pollution problems as well as prioritising the investigations as part of Thames Water's Surface Water Outfall Programme (SWOP).

A second outfall safari was undertaken in 2021 and the findings were summarised in the Year 8 report. The main conclusion was that, although the level of pollution identified was slightly lower, it was of the same order as identified in 2016. The SWOP had resolved the pollution inputs from 689 polluting properties over the 6-year period from 2015 to 2021. This finding therefore indicated that there may have been something approaching the same number of new misconnections (say 50 to 100 per year) being added to the network over the same period.

A smaller outfall safari was carried out in the Yeading Brook East in 2023. This safari was targeted at identifying the key problem areas in this sub-catchment, which is recognised as being the most highly polluted in the Crane Valley and has been subject to a detailed series of investigations over the last couple of years (as discussed in Section 3.5 below). This outfall safari trialled the use of a new unique numbering system for each outfall, as well as deploying handheld ammonia meters to complement the baseline data set. Both approaches were rolled out in the next full outfall safari in 2024.

The third full catchment outfall safari for the Crane was held in the summer of 2024. The safari was delayed due to heavy rainfall during the first few months of the year and the data are still being collated and analysed as this report was finalised (September 2024).

A total of 22 volunteers took part over two outfall safari trainings on 06/03/24 and 12/03/24. Surveys were conducted between 19/03/24 and 24/06/24. Two days of in-channel surveys were required and were completed.

An initial comparison of the data from the three main safaris is provided in Table 2.3 below:

	2016	2021	2024
River length surveyed (km)	34	45	25
No: volunteers	15	46	22
Outfalls evaluated	221	223	146
Impact Score*			
0	162	172	115
1 to 4	26	24	1
5 to 9	24	19	27
10+	9	8	3

Table 2.3: Outfall Safari comparison of data from 2016, 2021 and 2024. *Impact score is based on visual pollution indicators using the methodology developed by Thames Water for all outfalls.

In total, 56 km of waterways were identified to be surveyed. These included areas of the Crane River, Yeading Brook, Frogs Ditch and Duke of Northumberland's River. Of these, approximately 25 km of the river channels were surveyed. The reduced survey length was in part due to the delays caused high river flows over the first couple of months of the survey period. Sections were then left un-surveyed due to the river sections having no access, being too deep, culverted, or thick with vegetation and fallen trees.

146 outfalls were surveyed during the 2024 Outfall Safari. 30 outfalls scored ≥6; three outfalls were scored ≥10 and were reported to Thames Water for inclusion in the SWOP (Table 2.3).

A full comparison with the data from previous surveys has not been carried out to date and will be included in the full 2024 Outfall Safari report. The information to date indicates that the number of highly polluted outfalls (with scores of 10+) has reduced significantly, even when accounting for the reduced number of outfalls surveyed. However, the number of moderately polluted outfalls (5 to 9) has increased. This may be due to (a) the removal of many of the highly polluted outfalls over the previous 10 years of the SWOP and (b) more outfalls becoming moderately polluted as more new misconnections are added to the drainage system.

Handheld recorders have been used for the first time during this year's safari. These data are still being analysed. However, initial commentary from the monitoring teams indicated that some outfalls with a low "impact score" were nevertheless emitting high concentrations of ammonia. This outcome, which may be simply a reflection of the difference between the impact score (as a proxy for long term cumulative effects) and the hand held recorder (as effectively a single point spot sample), is still being evaluated.

A site location methodology has also been applied successfully for the first time during this recent survey. This allows the simple comparison of data from the same outfalls and will be very useful in creating a more detailed understanding of the evolution in the condition of individual surface water outfalls over time. The Outfall Safari concept was first trialled in the Crane catchment by the Citizen Crane team in 2016 and has subsequently been applied to rivers across the country. This latest safari illustrates how innovations in the Crane catchment can continue to spearhead the development of this citizen science methodology.

1.6 Pollution Reporting

This section sets out the information received on various pollution events that we have been informed about over the last year. We have encouraged our volunteers and the wider public to report all pollution incidents that they see using the Environment Agency and Thames Water contact numbers. Four significant incidents are listed below. Note: the Environment Agency National Incident Recording System (NIRS) recorded 24 incidents in the catchment over the 12 month period to the end of March 2024 (see section 3.4 below):

- Headstone Manor Park: 2024. We do not have any details about this pollution issue as yet. It was reported by the Citizen Crane team as inflowing from one of the small tributaries between the wetlands and the sampling point. The team have been investigating this problem over several months and informed both Thames Water and the London Borough of Harrow. It has been reported recently that a significant misconnection issue has been identified and resolved.
- Yeading Brook at Northumberland Road September 2023 and June 2024. A sewage pollution issue was reported by the local Citizen Crane team in September 2023 and again in June 2024. Thames Water investigated and it is understood to have been resolved.
- Huckerby's Meadow June 2024. Sewage flooding of this nature reserve site was reported by London Wildlife Trust (LWT) in June. It subsequently emerged that this was the fifth time that this nature reserve had been subject to sewage flooding in the memory of LWT staff. The Citizen Crane team asked TW to investigate the causes of the flooding and how this might be resolved on a long-term basis. TW reported that they have (a) implemented a repair to the problem in August 2024 and (b) included a proposal in their AMP8 plan for a longer-term solution from 2025.
- Lyndhurst Avenue May 2024. Two sewer failures were reported in Lyndhurst Avenue in Twickenham several weeks apart in the summer of 2024. Both failures resulted in sewage outflowing to the River Crane in Crane Park and this was reported by local people.

It is noteworthy that most or all of these failures appear to be repeat events. We have raised this with Thames Water and asked for more information to understand why these network failures are being repeated – and what else can be done by TW and local people to make the system more robust.

1.7 Other Citizen Science Investigations

The Citizen Crane team has continued to expand the range and nature of activities being delivered by citizen science volunteers. These are summarised below:

- Wetlands monitoring: this work started with the development of a methodology for evaluating the ecological value of the Headstone Manor Park wetland at the top of the catchment in the London Borough of Harrow. Local volunteers are at the forefront of testing and delivering this approach. The first year of monitoring was in the very hot and dry summer of 2022. The wetland became de-oxygenated during this period and was no longer able to support invertebrates or fish. There were concerns at the time that this may happen every year. Thankfully however, the wetland has continued to function as a healthy and aerobic system throughout the summers of 2023 and 2024. ZSL are currently working on a community science methodology for monitoring the performance of constructed wetlands built as nature-based solutions. This was piloted at Headstone Manor Park in 2022 and will be rolled out to Newton Park wetlands at the top of Yeading Brook East in 2024 as well as other wetlands in Greater London.
- Geomorphology: the Modular River Physical (MoRPh) system is being used with volunteers to evaluate the geomorphological changes being delivered across the catchment. MoRPh surveys are being carried out as part of river restoration works (proposed or planned) at Little Park and Pevensey; Spider Park and at Yeading Brook West.

The SWC programme is also funding the development of a national MoRPh user guide for citizen scientists.

- Invasive Non-Native Species (INNS): the SWC programme is funding a pilot study to investigate the distribution of several key INNS across the catchment and trial the removal of these using various approaches. The 2024 Outfall Safari, largely undertaken by citizen scientist volunteers, included a section for recording INNS along the riverbank. These data are being used to help map INNS distribution as part of this pilot study.
- Water vole and mink monitoring: 137 water voles were released into the lower Crane catchment in the summer of 2024. Citizen science volunteers have been monitoring the distribution of water voles within and around the release sites, complementing a volunteer supported programme to operate mink trapping at key potential entrance points across the catchment.

The project team has been very encouraged by the enthusiasm of volunteers to engage and expand their involvement through the growing network of programmes and opportunities. Further consideration of this approach is set out in Section 4 below.

2 INFORMATION FROM OTHERS

2.1 Data from Sondes

In 2021 the SWC programme deployed sondes across the catchment and these helped to build a more detailed understanding of the water quality issues in time and space. The findings are summarised in the Citizen Crane Year 8 report and more details can be found in the Water Quality report (available from ZSL on request). Two key findings were:

- Dissolved oxygen (DO) levels varied significantly, both from day to night and across the seasons, at many of the monitoring sites. Oxygen sags, with low DO levels at night and in response to low flows and high temperatures, were particularly common in the upper reaches where there are higher concentrations of organic contaminants. This is likely to be a limiting factor to the ecological value of parts of the river - through a combination of poor water quality, high organic sediment loads and reduced oxygen levels
- There were regular pulses of high ammonia concentration, 5 to 10 times the background level, lasting from a few hours to a couple of days and occurring every few weeks. These are believed to have been due to the input of sewage into the river system and were recorded at all monitoring locations. Sometimes these coincided with high rainfall events and at other times not. Likely causes include: the triggering of Combined Sewer Overflows during storm events and the discharge of pollution through surface water outfalls following sewer blockages and collapses. Ammonia is poisonous to a wide variety of invertebrate fauna at the levels (typically peaking at around 10 mg/l) recorded and these pulses are likely to be having a significant limiting effect on the ecological value of the ecosystem.

There is ongoing data collection from sondes deployed by Heathrow in the middle reaches of the Crane. In addition, the EA are deploying sondes in relation to specific pollution issues. For example, the EA has recently been using sondes as part of the wide-ranging investigation of pollution issues in Yeading Brook East, as discussed in Section 3.6 below.

2.2 Combined Sewer Overflows (CSO's)

The spill data for combined sewer overflows are recorded by Thames Water and the records for 2023 and 2024 (to the end of July) are set out in Tables 3.1 and 3.2 below.

Location Name	Number of spills (12-24h count method)	Total duration (hours) all spills prior to processing through 12- 24h count method
Field End Road (East)	N/A	N/A
Field End Road Storm (Harrow)	1	2.5
Pavilion in Roxbourne Park	N/A	N/A
SSO, Jn Crane Valley/Bath Road	3	3.25

Table 3.1: Crane Catchment CSO data for 2023 (April 2023 to March 2024).

Table 3.2: Crane Catchment CSO data for 2024 (April to August)

Location Name	Number of spills	Total duration (hours)
Field End Road (East)	0	N/A
Field End Rd Storm (Harrow)	2	2
Pavilion in Roxbourne Park	0	N/A
SSO, Jn Crane Valley/Bath Road	0	N/A

The following points are made from a review of the base data:

- There were a total of three spills from the Field End Road CSO over the last 19 months (in October 2023, January and July 2024) totaling 4.5 hours.
- There were a total of three spills from the Bath Road CSO over the last 19 months (all between 12th and 16th January 2023) totaling 3.25 hours.
- There were no spills from the Roxbourne Park CSO over this period.
- Both the Field End Road and Bath Road CSOs are large structures capable of discharging huge volumes of raw sewage into the river. As a result, any spill from these CSO's is a cause for concern.
- The total number of spills over the 16-month period was six with a total time of spillage as 7.75 hours. It is outside of the scope of this project to carry out a detailed assessment of these spills, but it would be interesting to investigate whether, for example, they coincided with high rainfall events. Note however that the Environment Agency NIRS data (see section 3.4 below) records a Category 2 incident on 11th July 2023 at the Bath Road CSO that was not flagged by these data.

At this stage, we conclude that the spills are a cause for concern – particularly as the sewer capacity at these sites is very large and we do not know the volumes that were discharged. However, we can also conclude that CSO's are unlikely to be the sole or major cause (and may not be a significant contributor) to the sewage peaks that have been recorded by sondes over the last few years – as these are much more frequent and distributed across the catchment.

2.3 Surface Water Outfall Programme

The Surface Water Outfall Programme (or SWOP) is managed by Thames Water and targets misconnected properties that result in pollution going into the surface water drainage system (and thereby into the river) instead of the sewerage system. The SWOP first started in Asset Management Plan (AMP) period 3 (2000 to 2005) and has been increased in each subsequent cycle, as the scale of the misconnections problem has been revealed.

TW data on the SWOP for the Crane catchment (to the end of August 2024) are provided in Table 3.3 below:

Table 3.3:	Thames Water Surface Water Outfa	I Programme Data for	Asset Management Pla	n 6 and Asset Manageme	nt
Plan 7.					

	Outfalls	Misconnected Properties Identified	Misconnected Appliances	Misconnected Properties Rectified	Outstanding Misconnected Properties
AMP7 SWOP – Live projects	10	97	642	51	46
AMP7 SWOP – Signed off by EA	14	139	320	109	30
Waiting List	7	-	-	-	-
Total	31	236	962	160	76
AMP6 SWOP – Signed off by EA	39	470	1278	455	15

The following points are made from these data:

- 39 outfalls were signed off in AMP6.
- Initial progress in AMP7 was slowed by the COVID-19 pandemic. With eight months to the end of the cycle, the SWOP team are on target to sign off a broadly comparable number of outfalls (31) over the full five-year period.

- The number of appliances per misconnection has remained reasonably consistent at around four. The average number of misconnected properties per outfall has reduced slightly (from 12 to 10).
- It is likely that around 1000 misconnected appliances will have been removed from the surface water network by the end of this five year AMP cycle.

The SWOP continues to be effective in stopping large numbers of misconnected properties from polluting the river system.

Around eight percent of misconnections are not being rectified and these are sent to the Local Authority Environmental Health Offices (EHO) for resolution. The Citizen Crane team has several times raised the issue of EHO resources to resolve these outstanding misconnections and this remains a concern. One example in particular is a large misconnected block of flats in the London Borough of Hillingdon which (as of August 2024) remained as a pollution source to the river despite the best efforts of the TW team to engage with the freeholder over the previous year.

The TW SWOP Team are also increasingly identifying and removing other sewer system issues that cause pollution to enter the river. Records have been provided of 41 system defects identified over the AMP7 SWOP period (as set out in Table 3.4 below) and this is believed to be a partial record.

Defect	Number
Blockage	24
Gully divider	3
Poor housekeeping	7
Private defect	5
Missing surface water cap	2
Total	41

Table 3.4: Sewer defects identified by the Surface Water Outfall Programme team - partial dataset.

This partial dataset indicates the type and distribution of the defects being identified. Note that "private defect" is a catch-all phrase for defects on a private drainage system that are not a blockage, surface water cap, gully divider or housekeeping issue. The scope of these issues is highly varied and there could be a variety of potential pollution sources (e.g. cracks in a pipe, tree root infiltration, missing /broken brickwork, soil stack issues etc.).

It is very encouraging to note that the SWOP scope is expanding to identify and resolve these broader issues, particularly given the large numbers of properties that have these issues.

2.4 Environment Agency Pollution Data

The Environment Agency National Incidents Reporting System (NIRS) recorded 24 incidents in the Crane and Yeading Brook catchments over the 12 month period to 31st March 2024. This compares to 37 over the previous 12 months. These are all the water pollution incidents that were logged by the Environment Agency – either called in by the public or identified by the EA or other parties.

The 24 incidents were classified as follows:

- Category 2: classified as significant 2 incidents
- Category 3: 10 incidents
- Category 4: classified as minor or insignificant 12 incidents

There were no Category 1 incidents.

One of the Category 2 incidents was from the CSO on the Bath Road on the 11th July 2023. The other was reported on Hounslow Heath but no further information was logged. There were five further sewer failures or overflows reported among the incidents. There were three outflows from surface water outfalls and two related to building products. Many of the incidents were not identified further.

2.5 Water Framework Directive (WFD) Classifications

The Water Framework Directive (WFD) regulations introduced a rigorous method of evaluating the ecosystem value of catchments across the UK. The Crane Valley is divided into three catchments:

- Main Crane,
- Yeading Brook upstream parts of the river,
- Portlane Brook minor catchment to the west of the Crane Valley.

The Year 9 report (April 2022 to March 2023) included encouraging news about improvements to WFD Classifications in the Crane Valley. There were improvements across many Classes on the main Crane with most parameters moving to Good or High status, two parameters (fish and phyto-benthos – algae and diatoms) remaining as Moderate status and one parameter (phosphate) remaining as Poor. There were only partial reports for the other two WFD catchments but these also revealed some improvements in WFD Class.

There have been no new WFD datasets released this year and the next major review is due in 2025. The results from last year have, however, helped to focus efforts on the remaining Moderate and Poor Classes, in line with a longer term goal to achieve Good Ecological Status for the Crane Valley.

This would be a remarkable achievement for an urban river catchment if delivered; only 14 percent of rivers nationally are currently of Good Ecological Status overall.

2.6 Yeading Brook East Investigations

One of the initial shocking findings of the Citizen Crane investigations was the poor quality of the water inflowing to the top of the catchment in Yeading Brook West (Headstone Manor Park) and Yeading Brook East (Newton Park West). The data from Yeading Brook East have continued to reveal major problems including:

- Significant inputs of sewage as revealed by the outfall safaris and sonde investigations.
- Hydrocarbon inputs via the Roxbourne tributary as revealed by a build-up of oil in Newton Park West wetlands as well as complaints by local people about noxious levels of hydrocarbon fumes in their homes.

These findings have led to detailed joint investigations by the EA, TW, London Borough of Harrow and local community volunteers Harrow Nature Conservation Forum (HNCF) which have included:

- Detailed SWOP investigations of many of the upstream surface water drainage catchments by TW. Note that one of the challenges in this area is the extensive networks of underground covered culverts containing the upstream drainage system.
- Investigations of the nature of the hydrocarbon pollution in the downstream wetlands in Newton Park
 West led by HNCF with support from the British Geological Survey and the EA.
- Investigation of industrial site operations and potentially contaminated ground in the upstream areas led by the EA with support from the London Borough of Harrow.

These investigations are ongoing and are due to report later in 2024 as part of the Smarter Water Catchments programme. The informal reports to date are encouraging – with many misconnections and sewer faults identified, and some rectified, alongside several examples of poor pollution management practice within industrial sites that have been identified and resolved.

The RMI data for Newton Park West provide reason for hope that things may be improving (see section 2 above) whilst the addition of the Newton Park West wetland to the urban wetland monitoring pilot will hopefully provide insight into the issues and how they are being resolved.

2.7 Sustainable Drainage Schemes (SuDS)

Sustainable Drainage Schemes (SuDS) have been identified as a key means of reducing the pressure on the downstream drainage and/or sewerage system and thereby reducing the risk of (a) flooding and (b) sewer surcharges, with consequent impacts on the river system.

Thames Water has supported the installation of nine SuDS projects in the London Borough of Hounslow. Three of these projects have been completed to date, three are in progress and three others (comprising a total of 11 rain gardens) are due to start construction in October 2024. These schemes are outside the current scope of the Citizen Crane programme. However, we are investigating the potential for using volunteers as part of a monitoring scheme to assess the longer term effectiveness of these schemes.

The SWC programme helped to deliver several SuDS schemes in the Pinkwell Green area of the London Borough of Hillingdon in 2022. Unfortunately, despite several attempts to engage with this programme, we have been unable to learn anything further about how these schemes have been performing in practice. There are several other SuDS schemes proposed in the London Boroughs of Hillingdon and Richmond and the team will continue to evaluate if and how these might be linked to the Citizen Crane programme.

Thames Water have also identified the presence of a number of large and historic storage chambers in their sewer network. These were identified as a potential source of the large influx of gravels that blocked the screens and led to a major pollution incident at Mogden Sewage Treatment Works in January 2023. These tanks may also be of significant benefit to the active storage in the sewer network, if they can be rehabilitated and their operation optimised.

The London Surface Water Strategy was published in July 2024 by the Greater London Authority (GLA). This identified ambitious targets for SuDS development across Greater London. We are hopeful that the Crane Valley may be able to provide pilot sites to assess the value of these systems and how they might be optimised for the provision of environmental and social as well as flood management benefits. This will be investigated further over the next year of the Citizen Crane programme.

2.8 Road Run-Off

Previous Citizen Crane reports have recognised road run-off as a chronic source of polluted sediment and hydrocarbons as well as representing an ongoing risk from both small and larger pollution events. This year, as well as in previous years, occasional hydrocarbon pollution events lasting several hours to several days have been reported at various locations in the river system. These are likely caused by leaks, or the deliberate disposal, of oils to the surface water drainage system – though they are notoriously difficult to track to any particular source. The Citizen Crane team have made several attempts to engage with Highways England to investigate the major road pollution inputs to the river system – including notably those from the M4 in to the river at Cranford Park. These attempts have not been successful to date, though we

understand that a scheme to create a new wetland at the site of one of these M4 inputs may be moving forwards.

2.9 Other Relevant Schemes

The Citizen Crane team is engaged with many other schemes that are in development or delivery across the Crane catchment including:

- Little Park/Pevensey Road Nature Reserve: restoration of a 500 metre length of the river and two hectares of associated wet woodland. Phase One of the scheme was completed in 2024 and has enhanced the river condition and extended the wet woodland area. River deflectors have led to the development of more varied river habitats and flushed a deep layer of sediment from the river, revealing the gravel river bed. Volunteers have played a key part in the delivery of this project, supporting the planting as well as completing MoRPh surveys and litter removal counts. Improvements to the ecological value of this part of the river may help to explain the improved RMI scores at the Crane Park Island site (Site 11) which recorded a maximum both for the site and the catchment as a whole last year. Little Park was also part of the water vole release in summer 2024, with 137 water voles released over a kilometre of river corridor. There are plans to extend the river and wetland enhancement works at and around the site in 2025.
- Lower Crane restoration: this project is seeking to enhance the ecological value of a 2500 metre length of concrete lined channel immediately below the Mereway Road weir in the London Borough of Richmond. A pilot restoration site was delivered in 2022 at Twickenham Rifle Club, creating a new backwater and around 30 metres of enhanced river corridor. The project team continues to monitor the ecological value of this site using RMI and other survey techniques. A new major fish pass was opened in June 2024, providing fish passage between the lower Crane and the main part of the river for the first time in hundreds of years. Further restoration schemes are planned for 2024 and 2025 and are currently awaiting consent from the EA.
- Northcote Nature Reserve: this project, near the confluence of the Crane with the tidal Thames, was formally opened in June 2024. It includes a new tidal creek alongside around 30 metres of improved river corridor in a much enhanced one hectare site. Initial monitoring was carried out by volunteers prior to the site development and further monitoring (including fish and RMI surveys) is planned for later in 2024.
- Cranford Park Sewage Treatment Works: a new package sewage works has been proposed as part of the Cranford Park Heritage Lottery Funded scheme. The Citizen Crane project team opposed the plans, not least because there are currently no sewage works discharging into the catchment, alongside concerns about the environmental impact of the scheme. The original surface water discharge scheme was refused by the EA. Subsequently, a revised scheme was put forwards that discharges treated effluent to groundwater rather than the river. This scheme is still under review by the EA.

- Spider Park: this scheme is at the detailed design stage and includes the restoration and enhancement of several hundred metres of the river corridor through the site. Baseline RMI and MoRPh surveys have been carried out as part of the project.
- Brazil Mill and Donkey Woods (known as the "Take Me to the River" project): this major project is seeking to deliver environmental and community enhancements to this 2000 metre reach of the river in the London Borough of Hounslow. Plans have not been finalised as yet.
- Gutteridge Woods and surrounding area: London Wildlife Trust (LWT) are producing a feasibility study for a major wetland and river restoration project at the confluence between the eastern and western tributaries of the Crane Valley in the London Boroughs of Ealing and Hillingdon. This scheme has the potential to create large areas of new high value habitat as well as improve the water quality for the main river system downstream of the confluence.
- Yeading Brook Unbound: this major scheme is planning to enhance the habitat on 3500 metres of river corridor on the western arm of the Yeading Brook in the London Borough of Harrow. Baseline monitoring has included the setting up of several new RMI sites and MoRPh surveys.
- Yeading Brook Meadows: this project has been developed by one of our Citizen Crane volunteer teams. The scheme is to create new and enhanced backwater habitat adjacent to the RMI site.
- **Biofilms PhD**: the Citizen Crane team has a long-standing relationship with Cranfield University and has worked with several MSc students on their theses and supported a PhD research project investigating the links between Heathrow glycol and biofilms in the river. A new PhD project is due to start later in 2024 and will investigate the value and limitations of biofilms as a proxy for river condition.
- Other research: the Citizen Crane team has contributed to a research projects list that has been developed by the Crane Valley Partnership for sharing with research partners and others.

The locations of these schemes are shown on Figure 2.1.

The works are all designed to help protect and enhance the ecological value of the Crane Valley river corridor. At present, we are seeing ecological improvements local to the few schemes that have been delivered. Plans are currently being developed to deliver enhancements at a much larger scale and it is hoped that these will also see benefits at a wider scale and cumulatively lead to catchment level improvements.

3 COMMUNICATIONS AND ENGAGEMENT

3.1 Communication with Citizen Crane Volunteers

The volunteers are the backbone of the Citizen Crane programme and it is remarkable how many of them have continued monitoring the river on a monthly basis over the last ten years. The project team engages with volunteers via a monthly newsletter, which currently has over 60 subscribers. The newsletter also encourages feedback and discussions around findings of interest, project opportunities, safety concerns and other matters. Many of the volunteers also attend our annual Citizen Crane Forum which provides an opportunity to share findings and discuss future plans.

There are regular training sessions for both new and established volunteers. Sessions are added as and when new areas of interest are developed, such as the MoRPh surveys and urban wetland survey work. The team has also been working with Let's Go Outside and Learn (LGOAL) to reach out across diverse communities, particularly in the central parts of the Crane Valley. Tailored training sessions have been delivered and linked to the development of a new AQA Qualification for environmental work.

A new portal is being developed for use with the Citizen Crane volunteers. This will be based on the portal developed for the River Chess volunteer team and is intended to be in place by the end of 2024.

3.2 Social Media Engagement

The project team has been working with Crane Valley Partnership (CVP), Friends of the River Crane Environment (FORCE), Zoological Society of London (ZSL), Let's Go Outside and Learn (LGOAL) and Habitats and Heritage (H&H) to engage the wider public on key messages around the Citizen Crane programme. These include:

- The existence of the Crane Valley.
- The value of the river as an ecological asset.
- The opportunities for volunteering and engagement.
- The misconnections problem.
- Issues with the disposal of wet wipes and cooking fats to the sewerage system.
- Issues with the disposal of liquid pollutants to road drains.
- Publicity around pollution events and information on how to report a pollution problem (using EA and TW reporting tools).
- River restoration projects plans and progress.

The platforms used include Facebook, X (formerly Twitter), Instagram, Youtube, Threads, LinkedIn and TiKToK. The engagement includes photos, short stories and video clips.

The engagement from local people includes:

- High numbers of views typically several thousand across all platforms with some stories reaching 50 to 100,000+ people.
- Positive comments and responses from the majority of people.
- Information and support in the form of pollution information and reports, sharing key messages across other forums and new volunteers for activities.

These data indicate that we are regularly reaching around one per cent of the population and some messages may reach up to 20 per cent of the 650,000 people who live in the catchment through these media. We are hopeful that some of these people will also be having conversations with others across the catchment and slowly disseminating some of our key messages more widely.

3.3 Environment Agency and Thames Water Interest Groups

The Environment Agency and Thames Water have been part of the steering group for Citizen Crane since its inception in 2014 and their role is essential in bringing Citizen Crane in to their regulatory and operational frameworks. Initiatives such as the Outfall Safari, data sharing with the TW SWOP programme and the development of the Yeading Brook East investigations have all been partly derived from these links.

In 2022, the organisations set up the Crane Valley Interest Group (TW) and Crane Valley Working Group (EA) to align all their internal departments with interests in the Crane Valley. These groups have been meeting regularly over the last couple of years and sharing ideas and information. The two groups also held a joint meeting for the first time in 2023, and a further joint meeting is planned for October 2024 immediately prior to the annual Citizen Crane Forum.

3.4 Wider Engagement

The project team has engaged at a regional and national level about the Citizen Crane programme including:

- Presentations and site visits with decision makers and interest groups.
- Representation on the board of the national DEFRA funded CastCo project, investigating the opportunities for citizen science to engage more directly with decision making and programme development etc.
- Representation on the regional Connect Right group investigating misconnections and crossconnections.
- Linkage to the "DEFRA Policy Challenge" being delivered as part of the Silk Stream project in the adjacent Brent catchment by the London Borough of Harrow and others.

These linkages have helped to raise an awareness of the Crane Valley and the Citizen Crane programme as well as seeding the wider adoption of citizen science activities that have been trialed through this programme. Outfall Safari, for example, is now being delivered across most of the Thames catchment as well as being trialed nationally.

4 SUMMARY AND CONCLUSIONS

4.1 General

- 1. This report sets out the findings of Year 10 of the Citizen Crane programme. Initially, the programme focused on collecting and analysing monthly water quality and ecological data sets collected by citizen scientists and using these to better understand the river ecosystem and target interventions that might improve it.
- This work has continued over the last ten years and has also expanded to encompass a wider array of citizen science-based data collection and engagement – particularly as part of the Smarter Water Catchments programme that started in April 2020.
- 3. The Citizen Crane volunteers have continued to provide high quality data for the programme and have extended their range of activities to include geomorphology, wetland monitoring, water vole and mink monitoring, as well as a third Outfall Safari.

4.2 Findings

- 4. For many years the Citizen Crane reports recorded variations in river condition but without seeing any significant or sustained improvements. This was despite the removal of hundreds of misconnections as part of the TW Surface Water Outfall Programme (SWOP). This changed in Year 9 (2022-23) with significant improvement in RMI and water quality scores, combined with a positive shift in the river's Water Framework Directive classifications. These improvements appear to have been sustained and developed during Year 10.
- The Year 10 RMI data provides further encouragement that the river's ecosystem is slowly improving with many of the invertebrate monitoring sites at or near the ten year RMI highs and three sites setting new high mean annual scores.
- 6. The report also presents EA water quality data. These largely support the findings of the Citizen Crane programme and provide some further evidence of improvement.
- 7. The third outfall safari was completed in 2024. The full analysis has not been completed. Preliminary findings are that, whilst the number of highly polluted outfalls has fallen, there has been an increase in the number of moderately polluted outfalls. These results indicates that new misconnections are continuing to be added to the surface water drainage network.
- 8. There are two large combined sewer outfalls in the catchment. Both have been active over the last year. We do not know the significance of these outflows – however, they do not appear to be the source of many of the regular ammonia peaks seen in the sonde data, which are more likely to be caused by other cross connections between the sewer system and surface water drainage.

- 9. The Surface Water Outfall Programme (SWOP) data indicate that large numbers of misconnected properties remain across the catchment with 259 identified over the last four years. However, this compares to 470 in the previous five years, and the number of properties per drainage catchment surveyed has reduced from 12 to 10, both indicating that the SWOP may be starting to get to grips with the problem. Another encouraging development is that the SWOP team are now also targeting local network issues. They have identified at least 41 properties with these issues over the last four years.
- 10. There is further evidence that the treatment system at Heathrow is being effective in removing glycol from the river ecosystem, albeit last winter was one of the warmer ones in the recent record.
- 11. There are encouraging findings at a local level about the beneficial impacts of enhancement schemes being delivered through the Smarter Water Catchments programme and other related programmes both from wetland data at Headstone Manor Park and river-based data at various intervention sites. There are also many more interventions planned and in development that will hopefully be delivered over the next few years.
- 12. The lack of progress with road run-off is a consistent frustration. The project team remains hopeful that, as improvements are delivered elsewhere, this may lead to progress with some of the more chronic road pollution sources.
- 13. Public engagement has continued to expand. This has helped to grow and sustain the volunteering efforts as well as engaging a wide audience with the Crane Valley itself and teaching them about how they can help improve the catchment. For example, we have noted several pollution incidents that have been reported by Citizen Crane volunteers and/or members of the public and have resulted in the pollution problems being attended to in hours and days rather than weeks and months.
- 14. One of the major changes over the last ten years has been the increase in partnership-based working across the catchment to identify and resolve issues as well as delivering projects. Representatives of the various groups EA, TW, Local Authorities, community-based partners and others are familiar with each other, leading to a good level of trust and understanding being developed, and this has been incredibly helpful when resolving issues or putting together project proposals and opportunities.
- 15. Overall, there are further encouraging signs that the river ecosystem is improving and moving towards Good Ecological Status. The system is very complex, and we believe the recent improvements are due to a combination of actions by all our partners to identify and remove pollution sources as well as improve the ecological functioning of the river.
- 16. This is only the second year of significant improvements, and the benefits may also be a function of mild winters and lack of drought over the last couple of years, which could easily change over the next year or two. Nevertheless, it is noticeable that these improvements have coincided with the growth of the Smarter Water Catchments programme and the increase in partnership-based project delivery and this could be the crucial factor that has tipped the balance in favour of river improvements.

4.3 The Future

- 17. The Citizen Crane project currently sits within the TW Smarter Water Catchment (SWC) programme. The first five years of this programme end in March 2025. TW and all the project team would very much like to continue Citizen Crane, as well as the wider SWC programme, for a further five years. At present, this is not guaranteed, not least due to wider water industry issues that are outside the control of this project.
- 18. The Citizen Crane team is working alongside the wider SWC programme partners to help identify future funding for the wider programme through TW and/or other funding streams. We will also be talking to TW about making Citizen Crane a TW core partner delivery programme if SWC funding is not available. There is otherwise a risk that much of the progress achieved over the last ten years will be dissipated.
- 19. The intention from all partners is for the core Citizen Crane monitoring to continue, subject to securing funding and continued volunteer engagement. The team has been delighted how volunteers have also engaged with a wider range of citizen science activities and we are keen to continue and expand this. The opportunity for formal training and qualifications delivered through these programmes has already helped to broaden the volunteer base and we would like to embed and expand this approach.
- 20. The SWOP is expected to continue for a further five years. This provides an opportunity to further focus efforts on the key pollution problem areas at the top of the catchment, as well as expanding the work to identify and deal with associated network issues.
- 21. If SWC goes ahead for a further five years then this provides a golden opportunity to deliver river improvements at scale across the catchment – using the Citizen Crane volunteers to monitor (and help to optimise) their effectiveness.
- 22. The public engagement work would also expand, subject to appropriate funding, both to grow our volunteer network and engage the wider population on the key issues and where they can make a difference.
- 24. We have seen very encouraging progress over the last ten years. If these proposed activities can be delivered and learned from over the next five years, then our long-term target of "Good Ecological Status" or, as we have previously defined it:

"An urban river corridor teeming with wildlife and unconstrained by pollution, serving as a vital community resource where people can connect with nature and improve their wellbeing."

can be achieved by the end of the next five-year cycle in 2030.

