



17/03/2022

Crane Smarter Water Catchment, Water Quality Monitoring Plan

1. Background

This Water Quality Monitoring Plan (WQMP) has been developed by ZSL on behalf of the Citizen Crane project and funded by Thames Water as a deliverable within the Smarter Water catchment programme for the Crane.

1.1 Water Quality Summary

A recent review of water quality in Crane catchment rivers by Atkins (2022) concluded that both the Environment Agency monitoring data since 2000, and spot sample data collected by Citizen Crane, 2014 to present, show broadly similar trends, with the highest concentrations of Biological Oxygen Demand (BOD), ammonia and dissolved phosphorus observed in Yeading Brook East and West.

This conclusion reached by Atkins is supported by the evidence generated using Environmental Sensor NETWORK (ESNET) portable systems fitted with EXO multiparameter sondes by Citizen Crane (ZSL, 2021). Six months of data, generated by moving four sondes around the catchment, highlighted issues in Crane Catchment rivers typical of other urban rivers. Dissolved Oxygen (DO) and ammonium data show that the impacts of multiple diffuse sources of pollutants, such as misconnections, are chronically elevating BOD and causing impoverished oxygen regimes, particularly in the upper catchment. The data also show how the rivers react to rain, demonstrating clear 'first flush' reactions that are most acute after extended dry periods. Elevated ammonium concentrations after rain are likely linked to surcharging foul sewers. Dual manholes, as a source of foul to surface water, have been shown to be a particular problem in the upper catchment.

Environment Agency and Citizen Crane spot sample data show that the Upper Duke of Northumberland's River (UDNR) is elevating concentrations of phosphorus, dissolved phosphorus, and orthophosphate in the Crane downstream of Donkey wood, where the rivers meet. However, macroinvertebrate community health in the same stretch of river, from Donkey Wood south, is at its best in the catchment. This suggests that ammonium and DO are the principle constraints on the ecology of the rivers above donkey wood.

In addition to the chronic impact of diffuse sources of pollution in the catchment, Crane catchment rivers have also repeatedly been subjected to periodic, serious pollutions events from a variety of sources.

2. Aims of the Water Quality Monitoring Plan are to:

1. Gather water quality evidence at catchment scale to enable benchmarking for analysing trends and evaluating the impact of the SWC programme.
2. Evidence specific impacts, such as pollution events and polluted surface water outfalls to inform river management by CVP partners.
3. Evidence the impact of catchment interventions such as wetlands, to inform the design and maintenance of future interventions.
4. Focus on engaging communities, developing local stakeholder skills and building resilience into long term monitoring by local communities in partnership with professionals.
5. Address knowledge gaps in river water quality through scoping and facilitating bespoke studies.

3. Delivery of the Water Quality Monitoring Plan

- Delivery of the WQMP will be the remit of the ZSL hosted and line managed Citizen Crane Project Officer, with support and guidance from the Citizen Crane Steering Group (Friends of River Crane Environment, Frog Environmental, ZSL, Environment Agency, Thames Water and CVP).
- The Project Officer will work collaboratively with local, regional, and national organisations and experts to bring skills into the Crane Catchment. This will help build upon the volunteer teams developed through eight years of volunteer led Citizen Crane monitoring.
- Evidence generated by the WQMP will be used to inform SWC investment choices. Interventions with positive water quality impact, alongside other benefits, will be prioritised. The overall targets for water quality in the Crane remain to consistently achieve the chemical thresholds for 'Good Status' under the Water Framework Directive.
- Each SWC intervention that has projected water quality benefit will integrate monitoring and evaluation of impacts on water quality into its delivery.
- Existing monitoring by stakeholders such as the Environment Agency and Heathrow Airport Ltd. will be factored into the monitoring plan. For instance, it will be particularly important to build on significant timeseries datasets.
- The WQMP will not over stretch resources and will be mindful of legacy and sustainability of the plan beyond SWC. Building resilience into monitoring in the catchment through supporting skills and engagement is a key consideration in the plan.
- The WQMP will need to be dynamic and adapt to changing circumstance in the catchment. Opportunities to review the plan will be taken at regular Citizen Crane Steering Group meetings.
- The WQMP interfaces with other monitoring plans in the catchment, most closely with in-channel biodiversity and hydrogeomorphology. The Citizen Crane Project Officer will also be responsible for the biodiversity monitoring plan and will liaise closely with the hydrogeomorphology team.
- Citizen Crane will disseminate the evidence generated by the WQMP, and implications for catchment management, in a way that is accessible for all Crane Valley Partnership (CVP) stakeholders. Lessons learnt will be shared more widely to improve urban catchment management throughout the UK.

4. Current Water Quality Monitoring in the Crane

Citizen Crane

Citizen Crane volunteers currently conduct quarterly spot samples at two sites and monthly Riverfly Monitoring Initiative (RMI) samples at the nine locations shown in Figure 1. Citizen Crane is reliant on a core group of volunteers that have been with the project since its inception in 2014. Some sites in the upper catchment have recently lost volunteer support. RMI data have most value at sites that have been monitored for the long term, as this allows analysis of trends and for volunteers to build their skills. However, in recognition of the need to keep the scheme developing and to bring in new volunteers, in the future we will be flexible in encouraging newly trained volunteers to set up new sites rather than trying to bolster sites that have formerly been monitored but have lost their volunteer base. The RMI scheme will have more resilience if it accommodates the volunteer's fidelity to specific sites. The Citizen Crane Project Officer will however focus on addressing significant gaps in RMI monitoring, such as in the Yeading Brook East, and on engaging active volunteer groups currently working near the river but not in it, such as at Cranford Park.

All RMI sites were sampled monthly for phosphate and ammoniacal nitrogen between 2014 and 2019. From 2020 onwards this was reduced to quarterly spot samples taken from two sites in the catchment: Cranford Park and Kneller Gardens. Both Cranford Park and Kneller Gardens are close to Environment Agency gauging stations so the spot sample concentration data, from analysis of samples at Thames Water’s laboratories, can robustly be converted to loading. Phosphate and ammoniacal nitrogen loading in the river over time will be a useful means by which we can evaluate the impact of SWC interventions to reduce nutrient pollution at catchment scale.

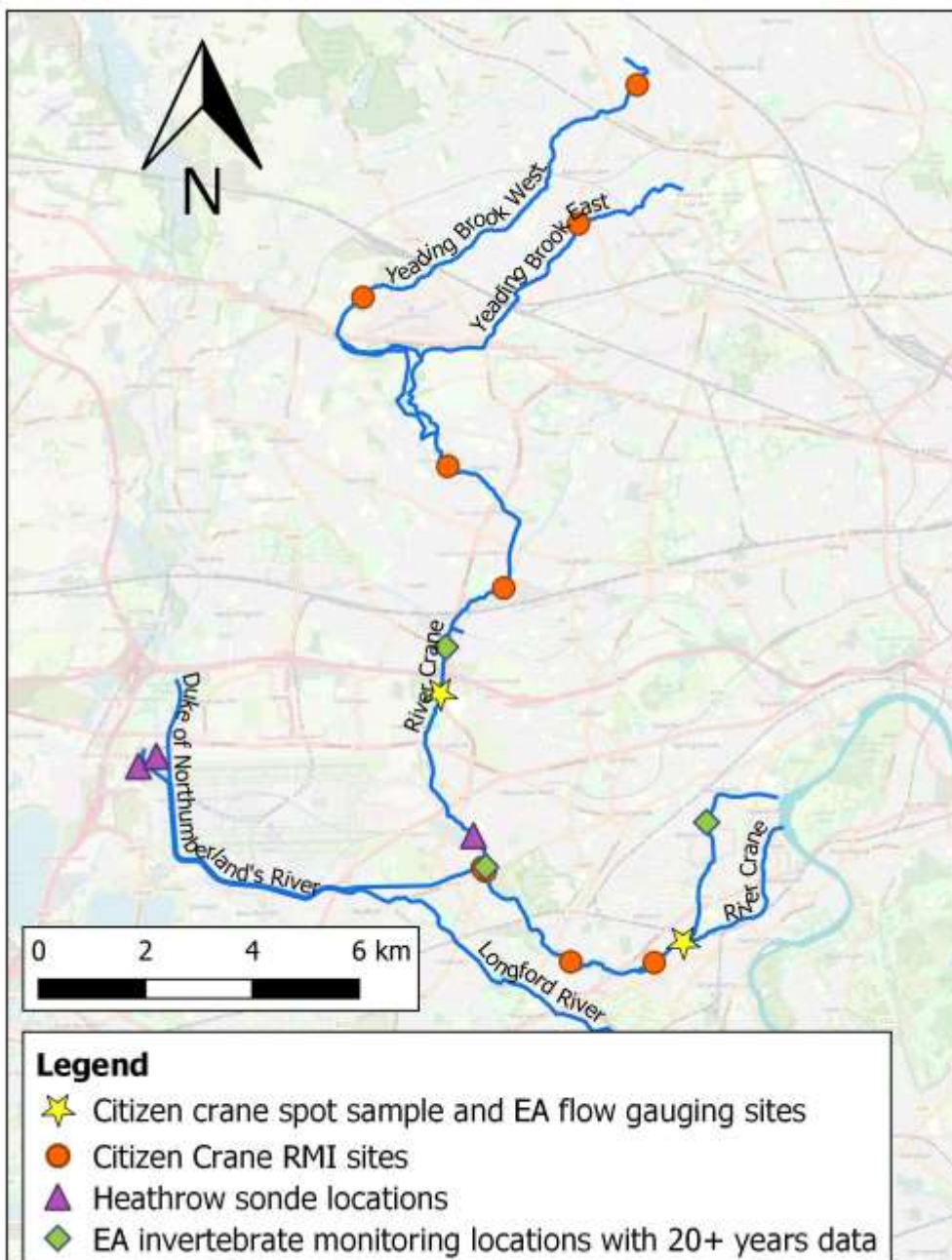


Figure 1: Locations of key monitoring sites in the Crane Catchment. Map created using QGIS©

Environment Agency

Future Environment Agency monitoring is not entirely straightforward to predict over the SWC period as monitoring resources are dependent on annual spending reviews and shifting Environment Agency priorities.

In February 2022, Environment Agency staff confirmed details of chemical water quality and biological water quality (macroinvertebrates) sampling plans for the 2022/23 financial year. Macroinvertebrate sites are listed in Table 1 and chemical water quality samples in Table 2.

Table 1, Environment Agency macroinvertebrate monitoring sites in 2022.

River	Site	EA reference	Grid Ref	EA rationale
CRANE	AT CRANE PARK, HANWORTH	GB106039023030	TQ1324372850	Local water resource monitoring sites
CRANE	DS Mereway Road Weir	GB106039023030	TQ1507673314	"
DNR	DS of Railway Bridge	GB106039023030	TQ1508073430	"
DNR	Worton Road	GB106039023030	TQ1530075500	"
LDNR	AT KNELLER GARDENS TWICKENHAM	GB106039023030	TQ1480073250	"
CRANE	AT PARK LANE, CRANFORD PARK.	GB106039023030	TQ1004077160	Heathrow Investigation
CRANE	U/S BALANCING POND (HEATHROW)	GB106039023030	TQ1084375345	Heathrow Investigation
CRANE	D/S BALANCING POND (HEATHROW)	GB106039023030	TQ1097975205	Heathrow Investigation
YEADING BROOK WEST	RSN0706 - YEADING BROOK AT HEADSTONE MANOR	GB106039023051	TQ1397189682	

There are three Environment Agency macroinvertebrate monitoring sites that date back to the 1990s (shown in Figure 1) in the catchment. The fact that they have been monitored continuously for over 20 years, giving us a critical long-term view of trends in the river, makes these key datasets very valuable. We would like to see the Environment Agency protect these three important sites from funding cuts and have listed them as an activity in the WQMP.

Table 2, Environment Agency chemical water quality monitoring plans in 2022

SiteCor	SiteName	#		SuiteName
PCRR0006	CRANE AT NORTHCOTE ROAD, ISLEWORTH	NATDEF21-HNL	Monthly Standard	OSLO/PARIS COMMISSION-OSPAR RIVERINE SAM
PCRR0006	CRANE AT NORTHCOTE ROAD, ISLEWORTH	HNL-1006	Monthly Standard	WFD RIVERS BASIC PHYSICO CHEM PARAMETERS
PCRR0006	CRANE AT NORTHCOTE ROAD, ISLEWORTH	HNL-1016	Monthly Standard	WFD RIVERS BASIC PHYSICO CHEM PARAMETERS
PCRR0008	CRANE AT THE CAUSEWAY, HOUNSLOW	HNL-1003	Monthly Standard	EQSD PHS (Fresh) PFOS
PCRR0008	CRANE AT THE CAUSEWAY, HOUNSLOW	HNL-1003	Monthly Standard	Ad hoc: Glycols Special Survey.
PCRR0008	CRANE AT THE CAUSEWAY, HOUNSLOW	HNL-1003	Monthly Standard	WFD RIVERS BASIC PHYSICO CHEM PARAMETERS
PCRR0008	CRANE AT THE CAUSEWAY, HOUNSLOW	HNL-1003	Monthly Standard	BOD
PCRR0014	CRANE BELOW EASTERN BALANCING RESERVOIR	HNL-1003	Monthly Standard	BOD
PCRR0014	CRANE BELOW EASTERN BALANCING RESERVOIR	HNL-1003	Monthly Standard	Ad hoc: Glycols Special Survey.
PCRR0014	CRANE BELOW EASTERN BALANCING RESERVOIR	HNL-1003	Monthly Standard	WFD RIVERS BASIC PHYSICO CHEM PARAMETERS
PCRR0014	CRANE BELOW EASTERN BALANCING RESERVOIR	HNL-1003	Monthly Standard	EQSD PHS (Fresh) PFOS
PCRR0020	CRANE ABOVE DUKE OF NORTHUMBERLANDS RIVE	HNL-1003	Monthly Standard	WFD RIVERS BASIC PHYSICO CHEM PARAMETERS
PCRR0020	CRANE ABOVE DUKE OF NORTHUMBERLANDS RIVE	HNL-1003	Monthly Standard	EQSD PHS (Fresh) PFOS
PCRR0020	CRANE ABOVE DUKE OF NORTHUMBERLANDS RIVE	HNL-1003	Monthly Standard	BOD
PCRR0020	CRANE ABOVE DUKE OF NORTHUMBERLANDS RIVE	HNL-1003	Monthly Standard	Ad hoc: Glycols Special Survey.
PCRR0063	YEADING BROOK EAST ABOVE PRIORS FARM, RU	HNL-1003	Monthly Standard	WFD RIVERS BASIC PHYSICO CHEM PARAMETERS
PCRR0063	YEADING BROOK EAST ABOVE PRIORS FARM, RU	HNL-1003	Monthly Standard	EQSD PHS (Fresh) PFOS
PCRR0063	YEADING BROOK EAST ABOVE PRIORS FARM, RU	HNL-1006	Monthly Standard	WFD RIVERS BASIC PHYSICO CHEM PARAMETERS
PCRR0063	YEADING BROOK EAST ABOVE PRIORS FARM	HNL-1017	Monthly Standard	WFD RIVERS BASIC PHYSICO CHEM PARAMETERS
PCRR0067	YEADING BROOK WEST AT THE WESTERN AVENUE	HNL-1003	Monthly Standard	WFD RIVERS BASIC PHYSICO CHEM PARAMETERS
PCRR0067	YEADING BROOK WEST AT THE WESTERN AVENUE	HNL-1003	Monthly Standard	EQSD PHS (Fresh) PFOS
PCRR0067	YEADING BROOK WEST AT THE WESTERN AVENUE	HNL-1006	Monthly Standard	WFD RIVERS BASIC PHYSICO CHEM PARAMETERS
PCRR0084	YEADING BROOK AT NORTH HYDE ROAD, HAYES	HNL-1003	Monthly Standard	EQSD PHS (Fresh) PFOS
PCRR0084	YEADING BROOK AT NORTH HYDE ROAD, HAYES	HNL-1003	Monthly Standard	WFD RIVERS BASIC PHYSICO CHEM PARAMETERS
PCRR0084	YEADING BROOK AT NORTH HYDE ROAD, HAYES	HNL-1006	Monthly Standard	WFD RIVERS BASIC PHYSICO CHEM PARAMETERS
PCRR0084	YEADING BROOK AT NORTH HYDE ROAD, HAYES	HNL-1016	Monthly Standard	WFD RIVERS BASIC PHYSICO CHEM PARAMETERS
PCRR0111	CRANE ABOVE EASTERN BALANCING RESERVOIR OUTLET	HNL-1003	Monthly Standard	WFD RIVERS BASIC PHYSICO CHEM PARAMETERS
PCRR0111	CRANE ABOVE EASTERN BALANCING RESERVOIR OUTLET	HNL-1003	Monthly Standard	Ad hoc: Glycols Special Survey.
PCRR0111	CRANE ABOVE EASTERN BALANCING RESERVOIR OUTLET	HNL-1003	Monthly Standard	BOD
PCRR0111	CRANE ABOVE EASTERN BALANCING RESERVOIR OUTLET	HNL-1003	Monthly Standard	EQSD PHS (Fresh) PFOS
RSN0706	RSN0706 YEADING BROOK AT HEADSTONE MANOR	NATDEF18-HNL	RSN Panel 7 - WQ Monthly Year 1	Field Insitu Determinands
RSN0706	RSN0706 YEADING BROOK AT HEADSTONE MANOR	NATDEF18-HNL	RSN Panel 7 - WQ Monthly Year 1	Rivers Surveillance Nutri Standard Extra
RSN0706	RSN0706 YEADING BROOK AT HEADSTONE MANOR	NATDEF18-HNL	RSN Panel 7 - WQ Monthly Year 1	Chemicals Surveillance A
RSN0706	RSN0706 YEADING BROOK AT HEADSTONE MANOR	NATDEF18-HNL	RSN Panel 7 - WQ Monthly Year 1	Chemicals Surveillance A Extra
RSN0706	RSN0706 YEADING BROOK AT HEADSTONE MANOR	NATDEF18-HNL	RSN Panel 7 - WQ Monthly Year 1	Chemicals Surveillance B
RSN0706	RSN0706 YEADING BROOK AT HEADSTONE MANOR	NATDEF18-HNL	RSN Panel 7 - WQ Monthly Year 1	Chemicals Surveillance B Extra
RSN0706	RSN0706 YEADING BROOK AT HEADSTONE MANOR	NATDEF18-HNL	RSN Panel 7 - WQ Monthly Year 1	Rivers Surveillance Nutrients Standard

Appendix 1 includes information on Environment Agency current river monitoring plans.

Heathrow Airport Limited

As a condition of their licence to discharge, Heathrow Airport Limited have sondes at three locations (shown in Figure 1):

- The River Crane upstream of the Eastern Balancing Reservoir discharge
- The upper Duke of Northumberland's River
- The Longford River

In May 2021, Heathrow sonde data were shared with ZSL, to be used as supplementary evidence in the Citizen Crane 'Real Time Water Quality Project'. At this point, it was noted that Heathrow's sondes were not showing accurate data. Two out of the three sondes (Crane and DNR) have subsequently stopped transmitting data. The sondes are managed by the Environment Agency on behalf of Heathrow Airport Ltd. It is essential that the sondes are reinstated as soon as possible. Without them the Environment Agency lacks a means of monitoring discharge from the Eastern treatment ponds and evaluating the impact of the airport run-off treatment system. In addition, the sondes provide an important data source for management of the catchment and as such are a key activity listed in the WQMP.

At the time of writing, Heathrow's discharge permit from the Eastern Balancing Reservoir is still under review by the national Environment Agency permitting team, and CVP partners have yet to be consulted on the conditions it may contain.

We suggest, once the WQMP has been formally adopted by SWC, the Citizen Crane team and CVP, Heathrow and Environment Agency staff meet to review the location of the sondes and progress the permit.

Thames Water

There is no routine sampling by Thames Water in the catchment, only reactive sampling to pollution events. The Surface Water Outfall Programme (SWOP) team routinely take spot samples from outfall discharges or directly from a manhole from the upstream network where the outfall is inaccessible. This is done as part of investigations following incident reports, in response to Outfall Safari data and as part of the Environment Agency agreed process to sign off outfalls that have been remediated by the SWOP team.

Listed in Table 3, is the intention to work with Thames Water to improve reporting of 'network issues' such as blockages, cross-connections and asset failure. Achieving this will require a more joined-up approach between internal Thames Water departments to standardise reporting of problems to Citizen Crane in a timely fashion. This process will cross over with effective delivery of the newly developed Drainage and Wastewater Management Plans (DWMPs).

5. Activities within the WQMP

Monitoring for benchmarking and pollution detection

Table 3, Water quality and linked ecological health parameters and how they will be monitored.

What do we need to monitor	How	Who	Why	Where	Frequency
Biological elements					
Macroinvertebrates	Riverfly Monitoring Initiative (RMI)	Citizen Crane	Long term trends, detection of pollution events, community engagement	Multiple sites	Monthly
Macroinvertebrates	Walley, Hawkes, Paisley & Trigg (WHPT)	EA	Long term trends at three sites with 20 + years of continuous monitoring	EA site references 34166, 34254 and 34253	Minimum once every 3 years
Phys-chemical					
Multiple parameters including dissolved oxygen and ammonium	Sondes	Heathrow Airport Ltd	Trends/ wet weather response	Donkey Wood DNR Longford	Continuous
Total ammonium nitrogen and phosphate concentration	Spot samples analysed at TW labs	Citizen Crane	Long term concentration and load (by calculation with flow data)	Cranford and Kneller Gardens	Quarterly
Chemicals of emerging concern/watch list					
PFAS/ “forever chemicals”	Join a SWC research project on emerging chemical threats	Imperial Dr. Leon Barron	Support research with national impact	Multiple sites	Initial study in 2022/23
Neonicotinoid insecticides	“”				
Pharmaceuticals	“”				

Monitoring known impacts

Table 4, Known impacts on the river and how they will be monitored.

Impact	How will it be monitored	Frequency
All reported pollution incidents – frequency and severity	Environment Agency National Incident Recording System (NIRS) database Thames Water reporting system	Annual reports collated and analysed from the EA and TW
Polluted Surface Water Outfalls	Outfall Safari (see notes below)	Every two years
Misconnections, cross-connections, and other forms of pollution entering via the surface water network	Thames Water and Citizen Crane to work together to define data needs and reporting processes on network issues	TBC
CSO discharges	Event Duration Monitoring by Thames Water	Continuous
Inappropriate bankside activities and land drainage that cause silt contamination during wet weather – e.g. bank poaching	Modular River Survey (MORPH)	TBC
Use of herbicide and pesticide near river e.g. poor amenity grassland management	Imperial study on Emerging Chemical Threats	Initial study in 2022/23
Airport de-icing	RMI upstream and downstream of Heathrow outfall	Monthly
Road runoff	No plans for more evidence gathering – hotspots have been identified Future evidence gathering will be linked to remediation projects	

Outfall Safari

The Outfall Safari Comparison 2016 to 2021 report (ZSL, 2022) makes the following recommendations to improve safaris in the Crane through the SWC programme delivery.

- Thames Water to assign each of their outfalls a unique identifier to allow for a more straightforward comparison of outfalls from one survey to the next and for improved analysis of the impact of the SWOP.
- ZSL can improve comparability of data from one Outfall Safari to the next by providing volunteers with photographs and reference numbers of outfalls from previous surveys and set protocols for photographing outfalls that allow better direct comparison with previous survey photos and impact scores.
- The SWC programme provides an opportunity to increase the frequency of the Outfall Safari to every two years in the Crane catchment. The rationale for doing so includes an opportunity to better understand which outfalls might be polluting intermittently and to track the impact of the progressing AMP 7 SWOP works.
- Add a research project to the 2023 Outfall Safaris to understand if outfalls that show no visual evidence of pollution, and therefore have a low impact score, are discharging ammonium into the river. This could be

achieved using a handheld YSI to test for ammonium and dissolved oxygen, on a sub-sample of outfalls, during staff led in-channel surveys.

- Further analysis of OS outputs – as per the 2016 and 2021 review.
- Ongoing monitoring of specific outfalls to understand their background nature and variations – as per the Crane Park outfall study.
- Addition of further elements to the OS – as per the INNS observations in the 2021 survey.

Monitoring interventions and field trials

A variety of interventions will be needed on the journey to restore rivers in the Crane catchment, including:

- Removal of pollution at source i.e., SWOP and road runoff source control measures
- River morphology restoration such as re-establishing meanders
- Reconnection to the floodplain and riparian zone for example through embankment removal (or setback)
- Creation of backwater and pond features to improve floodplain habitats
- Culvert removal/daylighting of rivers
- Wetland creation and other sustainable urban drainage systems (SUDS)

Each intervention will have a bespoke monitoring plan to evaluate its impacts on water quality. Water quality plans will be designed to capture before and after data and, where possible, data from a control site. The Citizen Crane Project Officer will be the interface between the project deliverers and the community-based monitoring teams. Table 3 shows the example of the water quality monitoring planned for the new wetlands in Harrow.

Table 5, Harrow Wetland Water Quality Monitoring Plan.

What do we need to monitor	How	Who	Why	Where
Ammonium concentration	Spot sample/autosamplers during dry and wet weather conditions	Citizen Crane	Calculate nutrient removal efficiency of wetlands	Headstone/ Newton Park
Phosphate concentration	“	Citizen Crane	“	“
Hydrocarbons/PAHs concentration in water	Wet weather samples	Citizen Crane	Evaluate impact of wetlands on chemicals associated with road/urban runoff	“
Metals concentration in water	Wet weather samples	Citizen Crane	“	“

Research and development plans

1. RAF Northolt: identification of outfalls and scoping of opportunities to routinely monitor upstream and downstream on both Yeading Brook West and Yeading Brook East locally using RMI or simple systematic visual checks.
2. The use of cameras: trial the use of cameras to keep in view pollution issues that have been reported to the Environment Agency National Incident Reporting System and Thames Water and are the subject of active investigation. Questions include what kit to use and who reviews and communicates the data.
3. Continuous monitoring of DO: investigation of the most cost effective and accurate means of using continuous monitoring to systematically evidence diurnal DO concentrations and trends at multiple sites in the catchment. Questions include what kit to use, which sites to monitor and at what frequency. There could be great benefit here in teaming up to develop protocols across the three SWCs.
4. Working with universities: The use of MSc and PhD students to develop the scope of research opportunities with key partners.
5. Sediment: There is an identified need to better understand how sediment (sources, quantity, quality and instream dynamics) may be impacting the ecology of the rivers. We are interested to hear news of how the piloting of Mudspotter, a new citizen science method for identifying sources of sediment, goes on the Chess SWC. There is also an ambition to better understand how gully pots and their maintenance impact the quantity and quality of sediment entering the river.

Citizen Crane will continue to work with other SWCs to identify program overlaps and areas where there will be mutual benefit in teaming up. In an initial meeting on 10th March 2022, to compare WQMPs across the three SWCs we identified a common interest in sediment sources and low cost, real-time DO monitoring with the Chess.

6. Reporting and communications

Data will be collated, analysed, and presented in a concise report annually by the Citizen Crane Project Officer with support from the Citizen Crane Steering Group.

Water quality reviews will continue to take place at the annual Citizen Crane forum. Reports and other updates will be made available on the CVP website and integrated into the catchment StoryMap.

7. Assumptions

- Thames Water will continue to fund the collection and analysis of Citizen Crane spot samples.
- CVP stakeholders such as the Environment Agency will provide NIRS and other data to feed into the annual Water Quality Report for the catchment.
- Heathrow Airport Limited will continue to share sonde data with Citizen Crane under the existing data sharing agreement with ZSL.

8.Risks

Description of risk	Chance of risk (high, medium, or low)	Impact of risk (high, medium or low)	Planned action to manage or mitigate the risk
Lack of volunteer capacity to deliver sufficient monitoring activities	High	High	SWC Project Officer needed to recruit and better support volunteers, particularly in the catchment above Donkey Wood.
Heathrow/Environment Agency do not reinstate sondes	Medium	Low	Citizen Crane/CVP to formally approach both to highlight the significance of the sonde data.
No resource for any Environment Agency monitoring	High	Medium	Citizen Crane/CVP to formally approach the EA to highlight the significance of the three long term sites.

Appendix 1: Environment Agency, Herts and North London river monitoring priorities in 2022

National programmes

River Surveillance Network (RSN) – a new long-term programme of randomly chosen sites which will be monitored on a rolling programme. There will be 100 sites (total for all areas) which are fixed and monitored every year and a further 400 sites (total for all areas) that are sampled on a rotating basis of every three years. There are 11 RSN sites in HNL, and the majority of those are not in the London rivers. These sites are monitored for: invertebrates, macrophytes, chemical water quality and river habitat surveys.

Natural Capital Ecosystems Assessment (NCEA) – a new long term programme coming on line but no details as yet.

Drought – two sites monitored for drought annually for invertebrates, neither are situated within London.

Water Resources (WR) – we have a WR programme in HNL and the data is used for things like abstraction work. These sites are long term monitoring sites with invertebrates taken annually. Most of these sites sit within the chalk streams.

Water Framework Directive (WFD) – WFD monitoring stopped some time ago and has not been replaced in any of our local programmes.

Local Programmes

Local water resources – This is primarily the local chalk stream project in partnership programme with Affinity Water.

Local area drought - A couple of years ago we set up our own local drought monitoring programme, so these are long term sites we aim to keep, providing we can find the funding for them each year, but again these sites are all above the line of the London rivers.

WFD deteriorations – With each round of WFD classification The Environment Agency check for deteriorations which are investigated, with additional monitoring if required. However, a lack of resource has meant these investigations are still on going from the last classification round.

Local investigation work – This is mostly where the HNL team focus on the issues with London rivers. There are currently a few specific projects including a Heathrow investigation and Mereway flow investigation.