Water Vole Reintroduction: Post Release Monitoring and Next Steps

Crane Catchment Water Vole Recovery

January 2026

ACKNOWLEDGEMENTS

A special thanks to the volunteers who donated their time to conduct water vole surveys during the 2026 survey season.

This project was delivered in partnership with Friends of the River Crane (FORCE), London Borough of Richmond upon Thames (LBRuT), Wild Futures, Crane Valley Partnership (CVP), and the Zoological Society of London (ZSL). We would also like to thank Marshall Wace funding the monitoring aspect of this project.

Contact: Joe Pecorelli, Programme Manager | joe.pecorelli@zsl.org

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BACKGROUND

Water vole are an endangered species in the UK, which have sadly suffered large-scale declines across London (London Mammal Group, 1998). These declines are largely due to predation by the non-native American mink, though habitat loss and degradation are also important contributing factors. Water vole are now only found in a few sites in London, with most populations being small, isolated and at risk of local extinction (ZSL, 2025).

With the roll out of the Waterlife Recovery Trust (WRT) led mink eradication programme, mink numbers within Greater London have recently been reducing (ZSL, 2025) with only two caught in 2025. Mink are still being caught near London but catches are expected to decrease as the WRT programmes matures and expands further west/ south-west. This will reduce the likelihood of mink re-invading.

With mink eradication underway, there is an opportunity to facilitate recovery of water vole populations where habitat fragmentation prevents natural recolonisation. 0

In the Crane water vole were deemed locally extinct by 2023; Crane Park Island was considered their last stronghold. Mink were likely the main cause of the population declines, thought habitat loss and degradation would have had some impact. There are currently 16 active mink traps in the catchment with the last mink caught at Yeading Brook Meadows in 2024. The catchment is currently deemed mink free but it is essential that the trapping remains active.

Significant amounts of work have been carried out by multiple partners to improve the ecological status of the river. The Crane Valley Partnership catchment plan (2025-30) sets out the next stage of the vision for the catchment. Building on the partnerships previous successes in water quality and habitat improvements, a key strategic objective for this next stage is making the Crane a “Home for water vole”. This will require catchment wide buy-in, to reconnect and improve riparian habitats, so that we can facilitate the formation of a robust, self-sustaining water vole metapopulation across the catchment.

In 2024, water vole were reintroduced back into the Crane at Crane Park Island. The following sections document the reintroduction and highlight the results of the post release monitoring. The final sections layout the amendments to the monitoring plan for 2026 and the proposed key steps towards a catchment wide water vole recovery.

AIMS OF THIS REPORT

The aims of this report are to,

- Document the work to date to restore water vole populations to the River Crane,
- Create a framework for monitoring progress
- Outline next steps to help bring new Crane valley partners into the project

REINTRODUCTION OF WATER VOLE IN THE LONDON BOROUGH OF RICHMOND

The process of restoring populations of water vole back to the Crane Catchment was initiated by London Borough of Richmond upon Thames (LBRuT) working with Wild Future and Friends of the River Crane Environment (FORCE). The Zoological Society of London (ZSL) were brought in later to monitor the planned initial release. Crane Park Island and the surrounding habitat was considered the best place for the reintroduction, as it had suitable habitat and until relatively recently, had supported water voles. Guidelines set out by DEFRA (Reintroductions and other conservation translocations: code and guidance for England, 2021) were used as a framework from which the Crane Park water vole reintroduction was planned.

Pre-release Monitoring

Prior to the planned water vole release in summer 2024, it was important to confirm if water vole were truly absent from Crane Park Island. Latrine rafts and camera trapping were used to determine if voles were present in the area. Thirty-six latrine rafts were installed across the park, along with 6 camera traps. eDNA sampling was used to identify the semi-aquatic vertebrate community within the park. No evidence of water vole was seen.

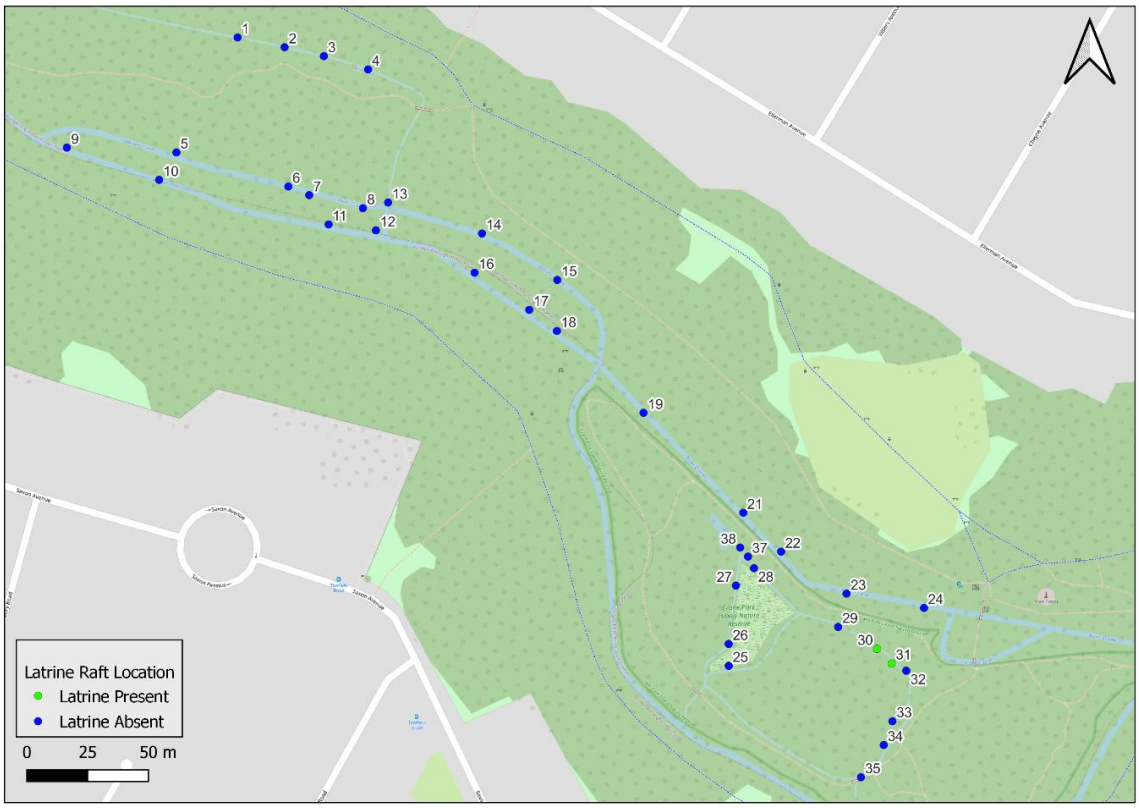

Figure 1, Latrine raft locations across Crane Park in 2022. Latrine rafts 30 & 31 had some water vole droppings, indicating water vole presence in the area in 2022.

Selecting Suitable Release Site

Reintroductions need to take place in habitat that is suitable for the reintroduced species. Water voles require well-developed bankside and emergent vegetation, year-round availability of food sources, suitable

refuge above extremities in water levels, suitable banks for burrowing, permanent open water, lack of disturbance and nest building opportunities in vegetation above the water level, all of which were present within Crane Park Island and surrounding areas. However, it was recognised that there were opportunities to improve some patches within the park to maximise the rivers potential to support water vole.

Habitat improvement

In the summer of 2023, habitat improvement work was carried out, facilitated and managed by Wild Future, building on years of voluntary efforts by FORCE and London Wildlife Trust volunteers. The work included de-silting of channels and de-shading on Crane Park Island as well as de-shading along the Mill stream within Crane Park Island (Fig 2). Additional work was carried out upstream in Little Park, which included de-shading, berm installation and planting of native species. Figure 3 showcases the improvement work carried out on Crane Park Island.

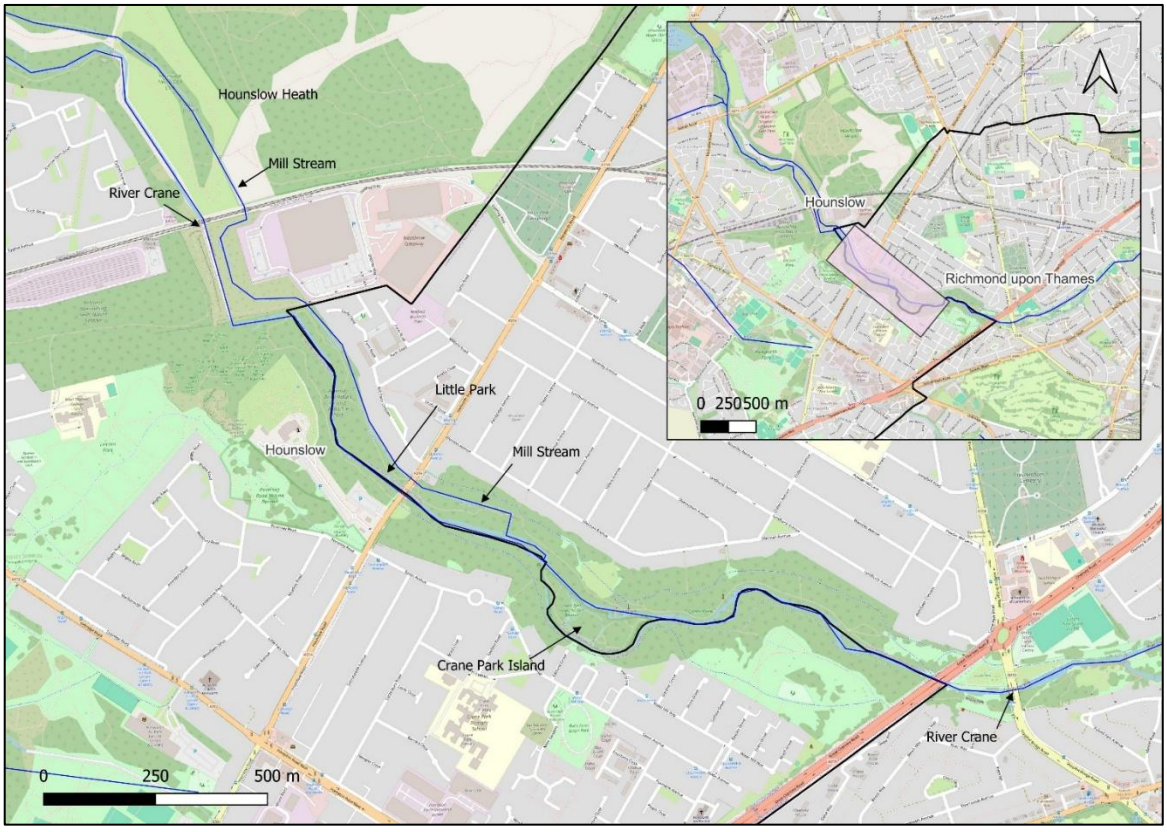

Figure 2, The river Crane as it passes through Crane Park, the location of the water vole reintroduction.

Figure 3, De-silting and de-shading carried out on Crane Park Island to improve the site for water vole, a) prior to work commencing, b) improvement work being carried out winter 2022/23, c) spring 2023 and d) summer 2023.
Photo credit – Steve Marshall

Water vole reintroduction

One hundred and thirty-seven water voles were sourced from the Derek Gow Consultancy, which arrived at Crane Park on 4th June 2024. A combination of soft and hard releases were used to reintroduce the vole into the Crane. The 34 voles that were to be hard released (Fig 4) and 49 voles soft released onto Crane Park Island, were housed indoors overnight. The 54 voles that were to be soft released into the rest of Crane Park and Little Park, were placed in the release enclosures on the day of arrival.

Two types of soft release enclosures were used to house the 103 soft release water voles; wooden pens (Fig 5) and metal pens (Fig 6). Thirty-five wooden pens were used, and consisted of a wooden frame, with wire mesh. Water voles placed in the wooden framed pens were enclosed for five days, whereupon on day five, baffles with two small holes, were added onto the side facing the water. This allowed the water voles to

Figure 4, Water voles being hard released downstream of the soft release sites.

Figure 5, Wooden release enclosures used to house water voles during the soft release phase.

come and go on their own accord, until the pens were removed on day seven. The eleven metal pens were dug into the bare earth and had open bottoms, which gave the voles the opportunity to burrow out immediately. All enclosures were provisioned with food daily until the pens were removed on day 7. The water voles that were hard released were placed in suitable habitat at intervals downstream of the main release site. Figure 7 shows the release locations, number of voles and configuration of sexes released.

Figure 6, Metal release enclosures used to house water voles during the soft release phase.

Figure 7, Locations of the soft release pens and corresponding release configuration for the water voles involved, in addition to the hard release zone.

POST RELEASE MONITORING

OBJECTIVES AND INDICATORS OF THE REINTRODUCTION

The success of a species reintroduction is never guaranteed and it is important to be able to measure and benchmark whether the reintroduction was successful and to determine which stage it is at. A reintroduction consists of several phases; establishment phase, growth phase and regulation phase (DEFRA, 2024) each of which has its own outcome measures.

Characteristics of each phase;

1) Establishment phase
    a. Initial growth rates are slow, due to population recovery from the translocation process and high mortality and dispersal rates within the reintroduced population.
2) Growth Phase
    a. Translocated population becomes established, high growth rates and range expansion, reaching towards the carrying capacity.
3) Regulation phase
    a. Population growth is density dependent, with reduced survival and recruitment.

A set of objectives has been developed, to help track the progress of the reintroduced population, and determine how successful the programme has been in establishing a viable population. The objectives were developed and adapted from the "Water Vole Release and Conservation Translocation In Britain- Good Practice Guidance" [Draft version], written by Merryl Gelling and Mike Dean (Gelling and Dean 2025). In total, there **are 13 objectives**, from year 0 (when the voles are released – 2024), to year 5 post release (2029). Each objective has several indicators, which will use specific measures from the data to determine if that year's objectives have been met.

Table 1 shows updated status of each objective for the reintroduction, including whether or not is has been achieved. A full description of the objectives, indicators and the methods used for measuring the indicator can be found in the appendix.

Table 1, A series of objectives and indicators developed to help benchmark and track the progress of the water vole reintroduction and population establishment.

Year	Phase	Objective	Code	Indicator	Indicator Achieved?	Objective achieved?
0	Establishment	Survival and settlement of released population.	Obj01	100% survival of translocated individuals during transportation	Yes	Not Achieved
			Obj02	100% survival of translocated individuals during soft release phase	No	
			Obj03	Water vole field signs located throughout the majority of the release site post release	No	
		Released cohort showing signs of breeding	Obj04	Latrines are located throughout the release zone.	Data defficient	Partially
			Obj05	Successful breeding within the release site.	Yes	
1	Establishment	Overwinter survival and establishment of release cohort	Obj06	Water voles survived the over winter period across the known yr 0 occupied habitat.	Data defficient	Data defficient
			Obj07	Surviving overwintered females attempting to breed throughout the site.	Data defficient	
			Obj08	Successful breeding of water vole within the release site.	Yes	
	Growth	Evidence of population expansion	Obj09	Evidence that occupied habitat is increasing beyond the release site	Yes	Partially
			Obj10	Increase in density of latrines/breeding females within occupied territory between yr 1 beginning and end.	Data defficient	
2	Establishment	Overwinter survival and establishment of wild born population	Obj11	Water voles survived the over winter period across the known yr 1 occupied habitat.		
			Obj12	Surviving overwintered females attempting to breed throughout the site.		
			Obj13	Successful breeding of water vole within the release site.		
	Growth	Evidence of population expansion	Obj14	Increase in the length of occupied habitat beyond the length of occupied habitat from yr 1.		
			Obj15	Increase in density of latrines/breeding females within occupied territory between yr 2 beginning and end.		
3	Establishment	Overwinter survival and establishment of wild born population	Obj16	Water voles survived the over winter period across the known yr 2 occupied habitat.		
			Obj17	Surviving overwintered females attempting to breed throughout the site.		
			Obj18	Successful breeding of water vole within the release site.		
	Growth	Evidence of continued population expansion	Obj19	At least 10% of the release site occupied at high relative density.		
			Obj20	Increase in the length of occupied habitat beyond the length of occupied habitat from yr 2		
			Obj21	Increase in density of latrines/breeding females within occupied territory between yr 3 beginning and end.		
4	Establishment	Overwinter survival and establishment of wild born population	Obj22	Water voles survived the over winter period across the known yr 3 occupied habitat.		
			Obj23	Surviving overwintered females attempting to breed throughout the site.		
			Obj24	Successful breeding of water vole within the release site.		
	Growth	Evidence of continued population expansion	Obj25	At least 20% of the release site occupied at high relative density.		
			Obj26	Increase in the length of occupied habitat beyond the length of occupied habitat from yr 3.		
			Obj27	Increase in density of latrines/breeding females within occupied territory between yr 4 beginning and end.		
5	Regulation	Wate voles reach carrying capacity within the release site	Obj28	Water voles present throughout the release site at moderate to high relative density.		
	Growth	Evidence of continued population expansion	Obj29	Water voles identified up to 2km from original release site (not including additional reintroduced water voles)		
2 - 5	Regulation	Water voles reach carrying capacity in release zone	Obj30	Density of latrines/number of estimated females no longer increasing		

YEAR 0 (2024)

Objectives	Survival and settlement of released population.			Released cohort showing signs of breeding.	
Indicators	Obj01	Obj02	Obj03	*Obj04	Obj05

Not achieved / *Data deficient / Achieved / Partially Achieved

Survey Methodology

A post release settling in period was allowed prior to any latrine rafts being deployed. Latrine rafts were subsequently deployed on 14th June, across the release site, and beyond. These were placed at intervals of approximately 100 meters up to a maximum distance from the release site of 1km. Within the main release zone, rafts were deployed at approximately 50m intervals (Fig 8).

Rafts were checked every 2 weeks, from 14th June until 26th September. A positive water vole indicator on the latrine raft was determined by the presence of latrines or feeding signs. Results were collected via Epicollect 5, a mobile data collection app used to collect field data. A pre-formed questionnaire was uploaded onto a volunteer's phone, which allowed specific data to be collected in the field. The data is subsequently uploaded to the online platform that is monitored by ZSL. The app also allowed for opportunistic fields signs to be uploaded, allowing such records to be recorded and georeferenced.

Results

Water vole survival was very high during the travel and soft/hard release phase of the reintroduction. All water voles survived the journey to the Crane (Obj01). However, during the soft release, one male was found deceased in a [**check which enclosure**] bonded pair enclosure. Unfortunately, the male wasn't taken for autopsy and the cause of death unknown. Although there was 99% survival, we should continue to aim for 100% survival of voles until the moment they are no longer in our care, and therefore we just missed achieving Obj02.

Post release, water vole field signs were identified across Crane park Island and the side channels upstream. Latrine rafts located in the upper/lower reaches of the island failed to pick up signs (Fig 8), but it is possible that water vole field signs were there and the latrine rafts simply not used – as in the case of 2025. The release zones were divided into 10m reaches, and of the 171 10m sections, 23 (13%) (Fig 9) showed signs of water voles by the end of the survey period. This suggests that Obj03 wasn't achieved, as the majority of the release zones didn't have evidence of water vole post release. Survey methodology may have hindered our ability to pick up water vole field signs (discussed later), and it is important to understand that lack of signs during this period doesn't necessarily mean voles are absent. Overall, the survival and settlement of released population objective wasn't achieved, but indicators suggest some voles had settled down and were occupying the habitat (Fig 10 - 11).

Obj04 was classified as data deficient, as although latrines were present across some of the release zone (Fig 8), there was an absence of latrines in the main channel release zone latrine rafts. Subsequent monitoring in this area in 2025, showed that the rafts weren't able to pick up water vole fields signs, and therefore it is possible that latrines existed in this area, especially considering that water voles were located across this area in 2025. Camera trap images were able to show clear evidence of a young water vole that must have been the progeny of the 2024 release cohort, indicating Obj05 was achieved (Fig 13). Overall, the *Released cohort showing signs of breeding* was partially achieved.

Figure 8, Results from the 2024 (Year 0) latrine raft monitoring, indicating where water vole occupancy was confirmed.

Figure 9, Results from the 2024 (Year 0) latrine raft monitoring, showing the release zone in 10m sections. Dark green 10m sections show where field signs were seen, accounting for 13% of the release zone.

Figure 10, Latrines left on rafts within Crane Park Island, summer 2024.

Figure 11, Fresh water vole burrowing and feeding signs within Crane Park Island, summer 2024.

Figure 12, Water voles captured on camera within Crane Park Island, summer 2024.

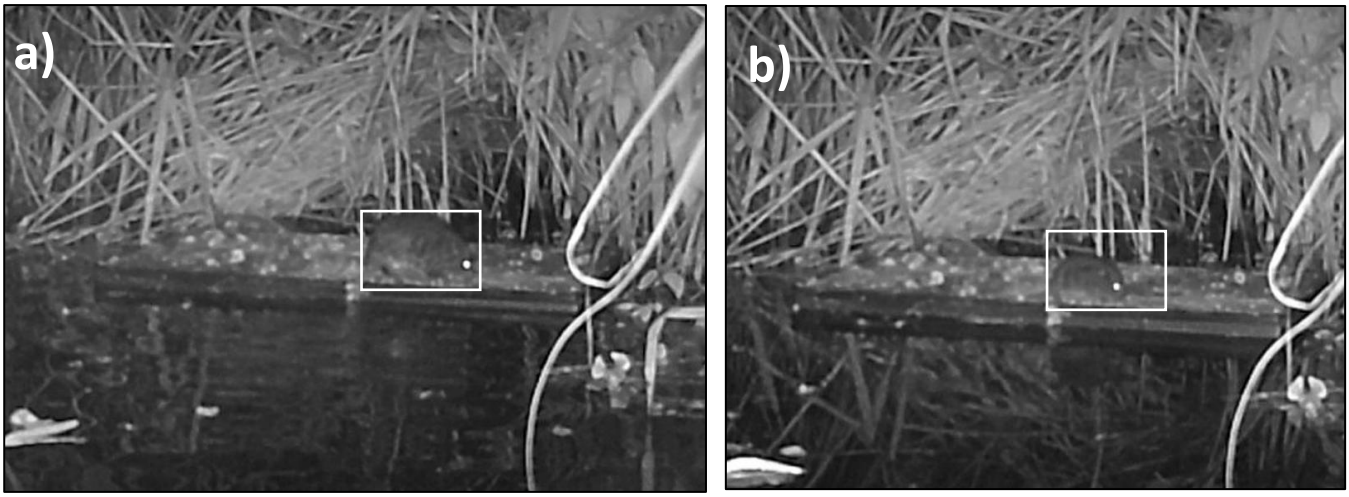

Figure 13, a) an adult (captured 22/08/24) and b) juvenile (captured 17/08/24) water vole captured in Crane Park Island, suggesting that some of the reintroduced population bred soon after release (Obj05).

YEAR 1 (2025)

Objectives	*Overwinter survival and establishment of release cohort			Evidence of population expansion	
Indicator	*Obj06	*Obj07	Obj08	Obj09	*Obj10

Not achieved / *Data deficient / Achieved / Partially Achieved

Survey Methodology

Latrines within Crane Park Island were placed in a similar configuration to that of 2024. Raft configuration differed in the rest of the upstream and downstream sections in 2025 compared to the year before. Rafts were placed in 3 clusters of three in each respective reach, for a total of 18 rafts. Rafts upstream and downstream were monitored on a fortnightly basis, by trained volunteers.

Results

For year 1, one year post release, the overwinter and establishment of the breeding females was considered data deficient (Obj06 & Obj07). This was due to the monitoring method used and lack of positive field signs throughout the spring (only 1 field sign seen in May within Crane park Island). This meant that we couldn't confirm if and where water voles had survived the over winter period, and where females were attempting to breed within the early spring period. That being said, evidence from later on in the year indicates that females had survived and were attempting to breed.

Camera traps located across Crane park island showed that there was evidence of successful water vole breeding, with one camera capturing juvenile water vole on two separate occasions – Obj08 (Fig 14).

There was evidence of population expansion beyond the release site. Obj09 was fully met; latrines (Fig 15), burrows and feeding signs were present upstream of the release zones on the main channel, with some feeding signs located downstream (Fig 16), clear evidence that water vole had expanded beyond their release zone.

Survey methodology wasn't able to pick up the changes in latrine densities during the beginning and end of the survey season (Obj10). During the 2025 survey season, latrine rafts were placed in the upstream and downstream river sections, in three clusters of three respectively. No field signs were detected throughout the survey season on these rafts, until an in-depth walkover was conducted at the end of September, when they were detected (Fig 17; Fig 18). As such, change in density is impossible to measure, and survey methodologies will be adapted for 2026 to better capture changes in latrine density.

It is evident that the released cohort has, to a degree settled into the Crane, with evidence suggesting that they have expanded in their local range and been successful in breeding. There remain gaps however within the release zone where no evidence of voles have been found. Surveys in Year 2 (2026) will be carried out to further determine if the density of voles is increasing within the occupied zone, and if the range continues to expand.

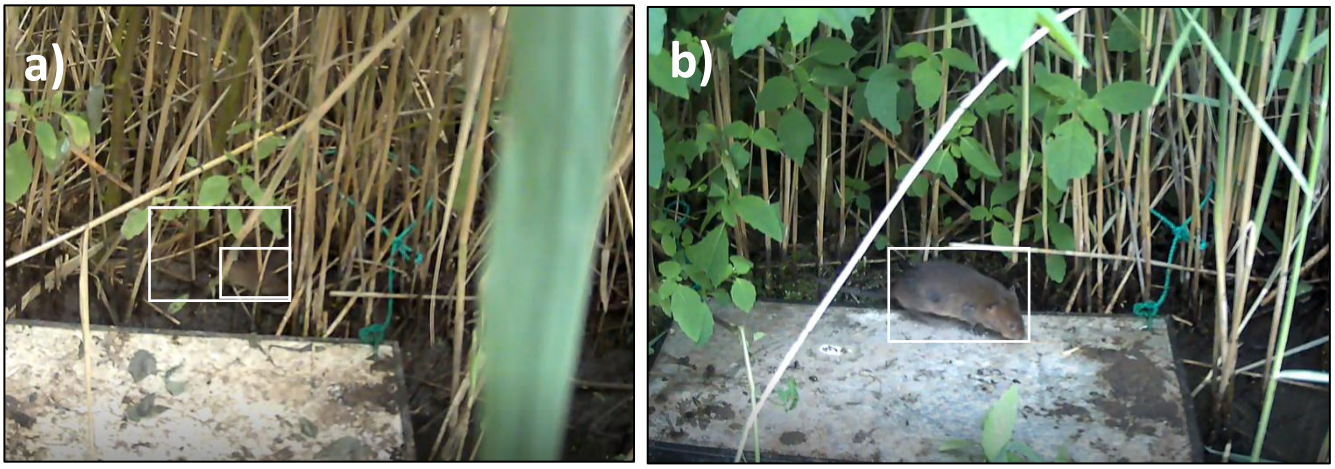

Figure 14, a) juvenile water vole captured on two separate occasions and c) comparative adult water vole captured in Crane Park Island in 2025, suggesting that some of the overwintered females were successful in breeding – Obi08.

Figure 15, Results from the 2025 (Year 1) surveys, showing the original release zone, and the river up to the furthest point up and up stream where water vole field signs were seen. Dark green 10m sections show where latrines were seen, accounting for 18% of the total extent of

Figure 16, The distribution of water vole field signs seen between March – September 25.

Figure 17, Feeding signs identified downstream (a & b) and upstream (c) during the September 2025 in-channel survey.

Figure 18, Water vole burrows in the upstream reaches during the September 2025 in-channel survey.

NEXT STEPS

METHODOLOGY FOR 2026 SURVEYS

Survey results of 2025 highlighted issues surrounding the monitoring methods used. The approach to use latrine rafts, placed in clusters of three, proved unable to determine the presence of water vole in the region. This was not due to volunteer effort, but more likely that rafts weren't well placed or were less likely to be used along a riparian bank. In depth site walk overs proved very effective in picking up field signs.

Monitoring for water vole in 2026 will shift from latrine rafts surveys to monthly, in-channel site walkovers. Monthly in-channel surveys will be conducted by trained volunteers, and surveys will start at the furthest reaches of the occupied sites from Yr1 and work towards Crane Park Island (Fig 19). In-channel surveys, carried out by two volunteers on either the upstream or downstream section, will be overseen onsite by two ZSL staff, one for each subgroup.

Surveyors will work in pairs, with one on each bank, to systematically survey the riverbank, moving around vegetation searching for burrows, latrines or feeding signs. Bank side searches to be carried out at approx. 5m intervals, to ensure high field signs detection opportunities. Location of field signs will be recorded using Epicollect.

Additional in-channel searches will be caried out by ZSL in reaches beyond the known occupied habitat. Only 3 searches will be carried across the season, May, July and September, to look for evidence of range expansion.

OBJECTIVES AND INDICATORS FOR YR 2 (2026)

Objectives	Overwinter survival and establishment of release cohort			Evidence of population expansion	
Indicator	Obj11	Obj12	Obj13	Obj14	Obj15

Objective - <u>Overwinter survival and establishment of wild born population</u>

- Obj11- Water voles survived the over winter period across the known yr 1 occupied habitat.

To determine the overwinter survival and extent of occupied habitat patches post winter, water vole field signs (feeding, burrows and latrines) collected during March/April/May will be amalgamated. The % coverage of the occupied sites from Yr 1 will be determined. A benchmark of 30% coverage of the site in Yr2 compared to Yr1, will be used to determine if the objective has been achieved.

- Obj12 - Surviving overwintered females attempting to breed throughout the site.

The same methodology will be used as used for Obj11, except that latrines will be the key metric for the indicator. Latrines are evidence of females marking territory and attempting to breed, and by assessing the extent and distribution of them early spring, post winter, we will have an indication of female's survival and breeding status before any new females born in Yr2 are breeding.

- Obj13 - Successful breeding of water vole within the release site.

From all the active burrows identified during the early surveys, a random selection from across the occupied habitat of Yr1 will have a camera trap placed at an appropriate location, to try and capture evidence of young vole being successfully reared until the dispersal stage.

Objective - Evidence of population expansion

- Obj14 - Increase in the length of occupied habitat beyond the length of occupied habitat from Yr 1.

Areas of suitable habitat, both upstream and downstream will be surveyed 3 times over the survey period, to try and capture evidence that voles are expanding in range beyond the know occupied sites. In total, three surveys will be carried out, in May, July and September, by ZSL staff, to look for water vole field signs.

- Obj15 - Increase in density of latrines/breeding females within occupied territory between yr 2 beginning and end.

Latrine counts from April will be compared with end of season latrine counts from a September survey for both the original release zone, the occupied sites from Yr1 and the total extent of occupied sites from the end of Yr2. The latrine counts will be used to estimate the number of breeding females – No. Female = No. Latrines/6 (Strachan et al., 2011). An increase of latrine density/female estimates compared to the beginning of the season results will show that Obj15 has been achieved.

Figure 19, The core survey zone to be surveyed every month, and the extended zones, where surveys will be looking for signs of range expansion.

WATER VOLE 4-YEAR RECOVERY HORIZON

Widespread, resilient and self-sustaining water vole meta-populations is the overarching goal of the Crane Valley Water Vole Recovery Programme, and a key strategic objective for the Crane Valley catchment plan.

Several streams of activity are required to deliver this outcome. The first goal is to consolidate and expand the water vole population on the lower Crane, so that water vole are present from Twickenham DNR to the M4 culvert. The second goal is to investigate the possibility of creating a second population on the Yeading Brook. This is a reach where lots of habitat improvement work has occurred, with potentially more pipeline projects on the way. At the moment, the Yeading Brook is considered disconnected for water vole due to the M4 culvert.

The following goals, objectives and key requirements are preliminary, and subject to change following a wider stakeholder discussion at the beginning of February 2026.

Goal 1 – Expansion of water vole population on the lower Crane.

Goal	Objective	Objective Completion Date	Key Requirements
Expansion of the lower Crane population, with a distribution across the Crane from Twickenham DNR to M4 culvert	Water vole distribution expanding along lower Crane and lower DNR.	2028	Map the current condition of habitat quality from the downstream reaches of CREW Phase 2 (Fig 20- Appendix) to Twickenham DNR.
			Habitat restoration – carry out necessary habitat improvements and INNS eradication to provide habitat for water vole to occupy or pass through.
			Baseline surveys – volunteers recruited and trained to carry out water vole surveys along lower DNR from 2027/28 onwards.
	High density of water voles within Crane Park	2027	Improvements made along the south bank, Hounslow managed reaches of Crane Park, to remove INNS and improve habitat quality.
			Balsam removed and native vegetation improved on the Crane Park Island side-channels.
	Habitat between Pevensey and Causeway improved to facilitate water vole movement	2026-27	Connectivity between LBRuT and Hounslow improved
			Habitat improvements carried out in the Hounslow reaches of the Crane, with an initial focus on the Pevensey section.
	Genetic variability of water vole population improved	2027	Second Crane water vole reintroduction carried out in the restored Pevensey and

			Mill Stream habitat, using water vole from Wildwood.
	Upper DNR mapped for habitat quality and water vole status determined.	2026	In-channel surveys conducted by staff.
	Water voles reintroduced to Huckerby's meadow and Cranford park	2026	Habitat assessed to determine suitability to water vole
		2027/28	Habitat improvement and INNS management carried out if/where necessary
		2027/28	Local community buy-in and engagement
		2028	Water vole reintroduced (if appropriate)

Goal 2 - Formation of new water vole population on the Yeading Brook.

Goal	Objective	Objective target Date	Key Requirements
Creation of a new water vole population on the Yeading Brook	Formation of a local stakeholder group	2026	Initiate discussions in local boroughs, friends of groups and NGO's.
	Feasibility/habitat assessment across the catchment	2026/27	Potential suitable habitats assessed against a set criteria to determine its current suitability
			Yeading Brook water vole recovery plan developed
	Delivery of habitat improvement works	2026-2028	Pipeline restoration projects incorporate water vole habitat features where possible
			Additional sites improved for water vole
	Water vole reintroduced into the Yeading Brook	2027	Suitable release site chosen.
		2028	Initial release carried out at the site.

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APPENDIX

Table 2, An extended version of the objectives and indicators developed to help benchmark and track the progress of the water vole reintroduction. Includes detailed description of each objective.

Year	Phase	Objective	Code	Indicator	Description	Indicator Achieved?	Objective achieved?
0	Establishment	Survival and settlement of released population.	Obj01	100% survival of translocated individuals during transportation	Proper animal husbandry should ensure that all voles selected for release arrive on site healthy and alive.	Yes	Not Achieved
			Obj02	100% survival of translocated individuals during soft release phase	Water voles should be well provisioned and in family groups/mated pairs to reduces stress and prevent mortality prior to release.	No	
			Obj03	Water vole field signs located throughout the majority of the release site post release	Evidence, including sightings, feeding, burrows and latrines present across the release site throughout year 0.	No	
		Released cohort showing signs of breeding	Obj04	Latrines are located throughout the release zone.	Latrines counted across the release site as evidence of potential breeding. Density of breeding females estimated based on the approximate assumption of six latrines per one female – alternatively use the equation: No. voles = 1.48 + (0.683 * No. of latrines) (handbook).	Data deficient	Partially
			Obj05	Successful breeding within the release site.	Camera trap footage showing evidence of young voles across the release site. Camera traps placed around a randomly selected number of burrows.	Yes	
1	Establishment	Overwinter survival and establishment of release cohort	Obj06	Water voles survived the over winter period across the known yr 0 occupied habitat.	Field signs (burrows, latrines, feeding stations, water vole sightings) located across at least 30% of the release site post winter in March/April/May.	Data deficient	Data deficient
			Obj07	Surviving overwintered females attempting to breed throughout the site.	Evidence that females have survived the over winter period and are attempting to breed. Latrines located across at least 30% of the known occupied sites of yr 0, during Spring.	Data deficient	
			Obj08	Successful breeding of water vole within the release site.	Camera trap footage showing evidence of young voles across the release site. Camera traps placed around a randomly selected number of burrows.	Yes	
	Growth	Evidence of population expansion	Obj09	Evidence that occupied habitat is increasing beyond the release site	Field signs identified beyond the release sites	Yes	Partially
			Obj10	Increase in density of latrines/breeding females within occupied territory between yr 1 beginning and end.	Latrines counted across the release site to determine approximate change in density of breeding females within the breeding season. A 50% increase in density is evidence of successful breeding {ref}	Data deficient	

2	Establishment	Overwinter survival and establishment of wild born population	Obj11	Water voles survived the over winter period across the known yr 1 occupied habitat.	Field signs (burrows, latrines, feeding stations, water vole sightings) located across at least 30% of the release site post winter in March/April/May.		
			Obj12	Surviving overwintered females attempting to breed throughout the site.	Evidence that females have survived the over winter period and are attempting to breed. Latrines located across at least 30% of the known occupied sites of yr 1, during Spring.		
			Obj13	Successful breeding of water vole within the release site.	Camera trap footage showing evidence of young voles across the release site. Camera traps placed around a randomly selected number of burrows.		
	Growth	Evidence of population expansion	Obj14	Increase in the length of occupied habitat beyond the length of occupied habitat from yr 1.	Field signs identified beyond the Yr1 occupied zones		
			Obj15	Increase in density of latrines/breeding females within occupied territory between yr 2 beginning and end.	Latrines counted across the release site to determine approximate change in density of breeding females within the breeding season. A 50% increase in density is evidence of successful breeding {ref}		
3	Establishment	Overwinter survival and establishment of wild born population	Obj16	Water voles survived the over winter period across the known yr 2 occupied habitat.	Field signs (burrows, latrines, feeding stations, water vole sightings) located across at least 30% of the release site post winter in March/April/May.		
			Obj17	Surviving overwintered females attempting to breed throughout the site.	Evidence that females have survived the over winter period and are attempting to breed. Latrines located across at least 30% of the known occupied sites of yr 2, during Spring.		
			Obj18	Successful breeding of water vole within the release site.	Camera trap footage showing evidence of young voles across the release site. Camera traps placed around a randomly selected number of burrows.		
	Growth	Evidence of continued population expansion	Obj19	At least 10% of the release site occupied at high relative density.	High density of latrines in the region of 14.94 latrines/100 m. Within unsuitable habitat it is estimated to be 2 latrines/100m. [9]		
			Obj20	Increase in the length of occupied habitat beyond the length of occupied habitat from yr 2	Field signs identified beyond the occupied sites of yr 2.		
			Obj21	Increase in density of latrines/breeding females within occupied territory	Latrines counted across the release site to determine approximate change in density of breeding females within the breeding season. A 50% increase		

				between yr 3 beginning and end.	in density is evidence of successful breeding {ref}		
4	Establishment	Overwinter survival and establishment of wild born population	Obj22	Water voles survived the over winter period across the known yr 3 occupied habitat.	Field signs (burrows, latrines, feeding stations, water vole sightings) located across at least 30% of the release site post winter in March/April/May.		
			Obj23	Surviving overwintered females attempting to breed throughout the site.	Evidence that females have survived the over winter period and are attempting to breed. Latrines located across at least 30% of the known occupied sites of yr 3, during Spring.		
			Obj24	Successful breeding of water vole within the release site.	Camera trap footage showing evidence of young voles across the release site. Camera traps placed around a randomly selected number of burrows.		
	Growth	Evidence of continued population expansion	Obj25	At least 20% of the release site occupied at high relative density.	High density of latrines in the region of 14.94 latrines/100 m. Within unsuitable habitat it is estimated to be 2 latrines/100m. [9]		
			Obj26	Increase in the length of occupied habitat beyond the length of occupied habitat from yr 3.	Field signs identified beyond the occupied sites of yr 3.		
			Obj27	Increase in density of latrines/breeding females within occupied territory between yr 4 beginning and end.	Latrines counted across the release site to determine approximate change in density of breeding females within the breeding season. A 50% increase in density is evidence of successful breeding {ref}		
5	Regulation	Wate voles reach carrying capacity within the release site	Obj28	Water voles present throughout the release site at moderate to high relative density.	High density of latrines in the region of 14.94 latrines/100 m. Within unsuitable habitat it is estimated to be 2 latrines/100m. [9]		
	Growth	Evidence of continued population expansion	Obj29	Water voles identified up to 2km from original release site (not including additional reintroduced water voles)	Evidence of new colonies forming well beyond the release site.		
2 - 5	Regulation	Water voles reach carrying capacity in release zone	Obj30	Density of latrines/number of estimated females no longer increasing	Levelling off of annual latrine raft counts/female desnity estimates.		

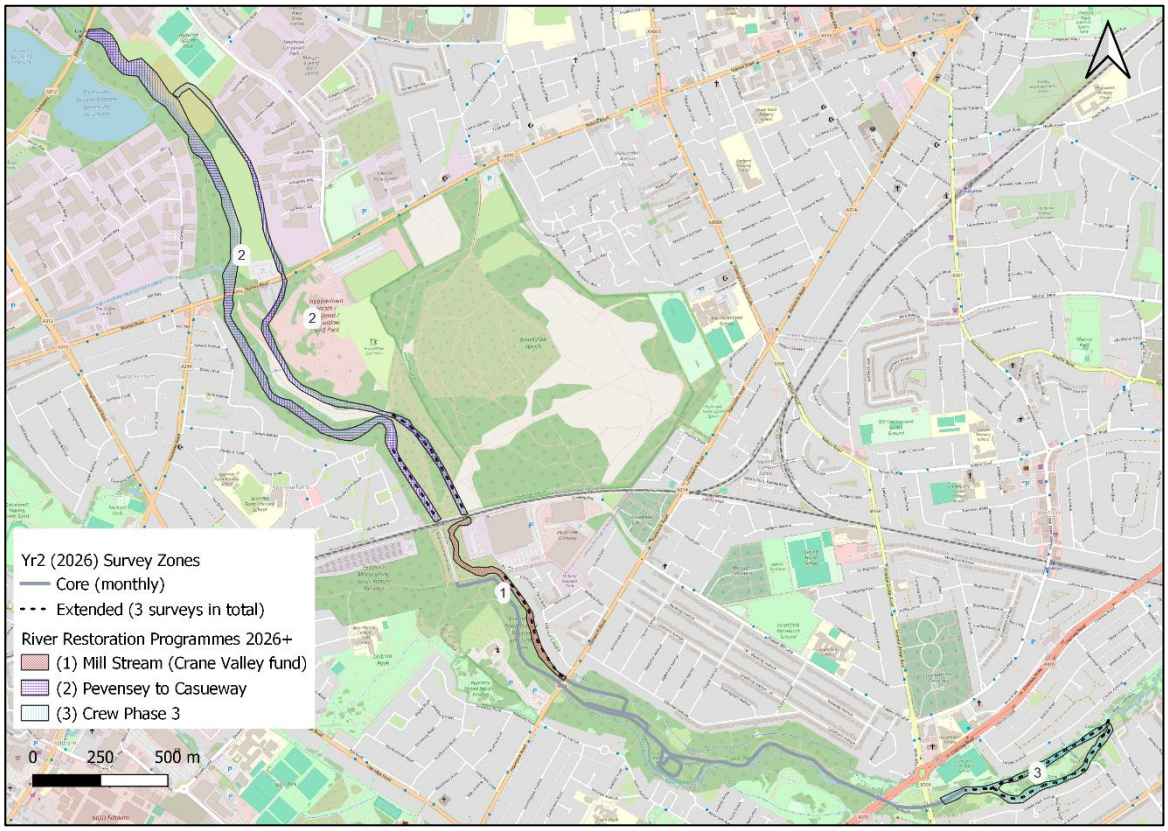

Figure 20, Areas upstream and downstream that have habitat work in the development or delivery stages in 2026.

Estuaries & Wetlands Conservation Programme
Zoological Society of London
Regent's Park, London NW1 4RY

marineandfreshwater@zsl.org | zsl.org/eels