Invasive Non-Native Plant Species Survey in the Crane catchment

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UK Conservation Programme

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Acknowledgements

This Invasive Non-Native Species (INNS) survey was completed as part of the Smarter Water Catchment programme, alongside the Outfall Safari which was funded by Thames Water. It was delivered in partnership with the Friends of the River Crane Environment (FORCE), the Crane Valley Partnership (CVP) with support from the Environment Agency (EA) and local authorities. It would not have been possible without the dedicated citizen scientists who helped collect the data.

Contents

1. Introduction

1.1. Background

The Smarter Water Catchment (SWC) programme is a Thames Water initiative that aims to "achieve more by taking a system-based view of the environment, collectively addressing multiple challenges and co-delivering solutions that make the most of opportunities on an even bigger scale." The programme will be delivered in partnership with stakeholders who operate within the catchment or are operating to protect and enhance the local environment over 10 years (starting from April 2021) (Thames Water & Crane Valley Partnership, 2021). It is known that there are a range of invasive non-native species (INNS) in the catchments that require management (Crane Valley Partnership, 2015). A vision to halt and reverse the spread of INNS is included as part of the SWC plan to enhance biodiversity and ecological connectivity (Thames Water & Crane Valley Partnership, 2021). The INNs survey and this report were managed by ZSL on behalf of the Citizen Crane project.

1.2. Aims

The aims of this report are to;

- evaluate the value of the outfall safari as a means of collecting INNS data and,
- make appropriate recommendations for future surveys and ongoing work needed to better understand the nature of the INNS issue in the Crane catchment.

2. Method

2.1. Invasive Non-Native Species (INNS)

Three invasive plant species, known to be present along rivers in Greater London, were chosen for this survey within the Crane catchment.

Table 1: Invasive Non-Native Species (INNS)

1. Giant Hogweed, *Heracieum mantegazzianum*	
Giant hogweed is distinguishable from the native hogweed from its height (up to 6m) and large pointed leaves. It reproduces prolifically by producing up to 50,000 viable seeds each year which can be dispersed by rivers and therefore spread quickly through catchments. Plants are commonly found in neglected areas and in urban waste grounds, where they form large, dense colonies that out compete native plants. The sap is phototoxic when it comes into contact with skin, causing burns in the presence of sunlight. (Plantlife, 2021)	
2. Japanese Knotweed, *Reynoutria japonica*	
Japanese knotweed can grow to around 2m in height with large, heart-shaped leaves. It reproduces from rhizomes, and even tiny fragments can grow into full sized plants. As a result it can spread very easily in both urban and rural environments, and can be very difficult to remove. It can grow through walls, tarmac and concrete, and forms dense colonies that out compete native plants. (Plantlife, 2021)	
3. Floating Pennywort, *Hydrocotyle ranunculoides*	
Floating pennywort is a popular garden pond plant that was only banned from sale in the UK in 2014. It has large, round leaves that form a floating mat across the water surface. It is most commonly found in south-east England, but its range is spreading. It can grow up to 20cm per day, and can regrow from a tiny fragment, making it hard to control. It can crowd out native plants in a river, deplete oxygen levels in the water and clog drainage systems. (Plantlife, 2021)	

2.2. Data collection

Forty-six citizen scientists who were taking part in the Crane Outfall Safari in 2021 were taught how to identify the invasive species listed above during the online training event on 29/04/2021. They were trained in identifying the three INNS plant species, and logging any sightings using the EpiCollect5 data collection app on their mobile phones.

Photos were uploaded with each entry so that the species could be verified. All the surveys were completed by 01/09/2021. Thirteen different surveyors uploaded entries from INNS during the survey period.

3. Results

Table 2: Summary of INNS results

Species	Records
Giant hogweed	39
Japanese knotweed	21
Floating pennywort	6
Total	66

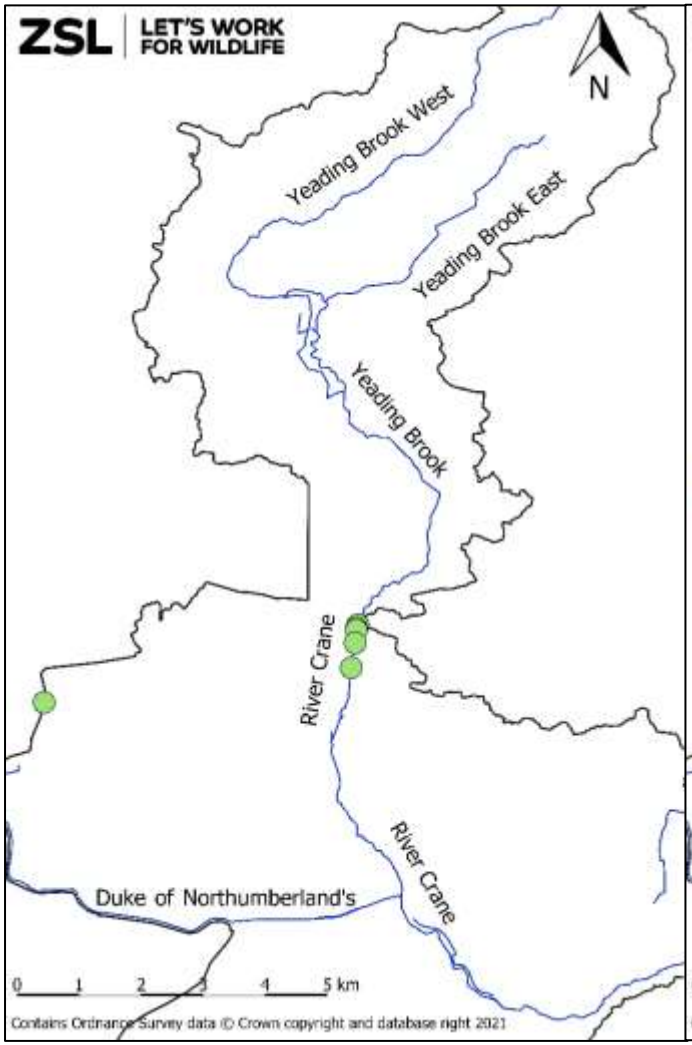

Figure 1a: Floating pennywort results

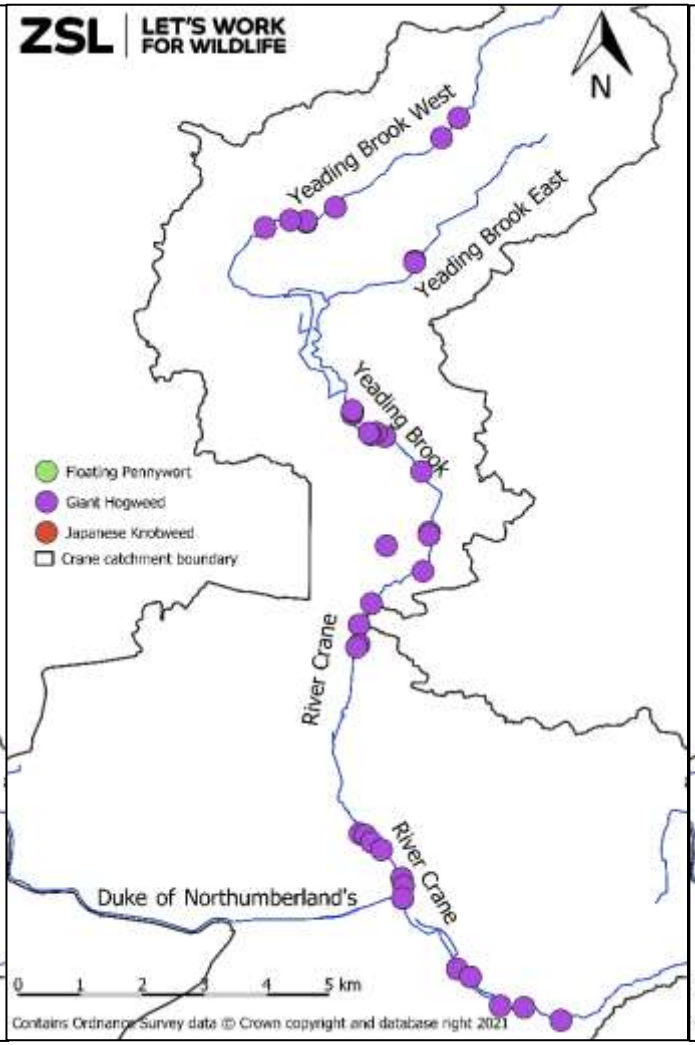

Figure 1b: Giant hogweed results

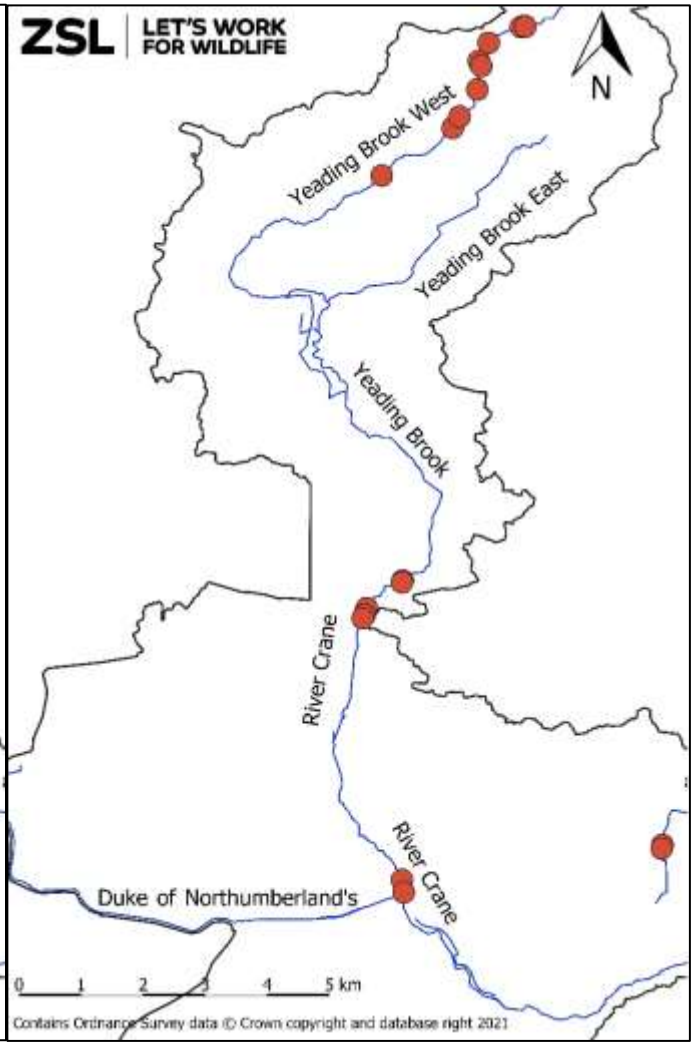

Figure 1c: Japanese knotweed results

4. Discussion

4.1. Survey method

The use of volunteers to complete walkover surveys for INNS along watercourses is well established (Wear Rivers Trust, 2017). This exercise in the Crane catchment has also demonstrated that citizen science surveys can be an effective way to gather data on the distribution of INNS. A total of 13 surveyors submitted reports of INNS, out of a total of 24 surveyors who uploaded entries via EpiCollect during the Outfall Safari.

The records collected for this project are most probably not exhaustive and it is likely that there are occurrences of the three surveyed INNS that have been missed. To encourage more systematic checking for INNS during the Outfall Safari we recommend that assessing the presence or absence of INNS be mandatory during each outfall assessment, rather than optional, as it was for this pilot. It is important to note that the surveyors only registered INNS that occurred along the river and habitat immediately alongside the river corridor, which means INNS might be present elsewhere in the catchment.

Species identification by volunteers was generally accurate. There were only two cases of giant hogweed, out of a total of 41, and two cases of Japanese knotweed, out of 23, that appear to have been misidentified (see table 4). A report of a dead stand of Japanese knotweed was also submitted by volunteers. Volunteers will be instructed to differentiate between live and dead plants in future surveys. Dead stands of INNS are important to record as they could be a potential source of new growth. In addition, guidance on plants that may be commonly mistaken for the target INNS species can be included in future trainings. For example, burdock appears to have been mistaken as giant hogweed in the two cases of misidentification.

To create a more comprehensive baseline for INNS in the catchment it will be important to review which species are included in future surveys. Species can be chosen for inclusion based on the likely severity of their ecological impact. Other factors such as, in the case of hogweed, human health and river corridor access can also be considered when drawing up a list of priority INNS for the river corridor. A full list of INNS recorded in the Crane river corridor will be produced by ZSL as part of the SWC habitats and species baseline data gathering project (data provided by GIGL).

4.2. Species distribution

This survey found a spread of INNS along the river corridor, but also showed that species are not evenly distributed within this area. 59% of the records submitted were of giant hogweed, which was identified as being on every waterbody surveyed apart from the upper Duke of Northumberland's River (DNR). Japanese knotweed made up 33% of the submitted records and has a patchier distribution, with none identified along the Yeading Brook (main channel south of confluence at Northolt) or the Yeading Brook East. There were some reports along the upper and lower DNR, but none on the Crane south of Donkey Wood. Only 9% of the records were of floating pennywort, and these were restricted to the section of the Crane between the Grand Union Canal and the M4 and a single record from the upper DNR, northwest of Heathrow airport. There are anecdotal reports of floating pennywort identified along other

stretches of the upper DNR that are within the Heathrow Airport site (pers. com. Michael Murphy, 2021) and along the lower DNR where Riverside Walk meets Woodlands Road (pers. com. Rob Gray, 2022).

46% of all records submitted were during in-channel surveys through river reaches inaccessible to the public, which is comparable with the outfall safari results where 42% of records were from in-channel surveys. 83% of floating pennywort records were from in-channel surveys, compared to 41% of giant hogweed records and 52% of Japanese knotweed records.

Giant hogweed appears to be evenly distributed along both accessible and inaccessible areas throughout the catchment, whereas Japanese knotweed and floating pennywort are more prevalent along the inaccessible areas. This information could have implications for species management. For example, improving access to rivers in an ecologically sensitive way will help stakeholders become aware of the distribution of INNS, and provide access for their removal. Improved access must take into consideration the public health risk posed by giant hogweed, and its removal should therefore be prioritised.

4.3. Current management of INNS in The Crane Valley

In 2018, DEFRA published their 25 Year Environment Plan. The plan sets out a series of goals and targets for 'Government action to help the natural world retain good health. It aims to deliver cleaner air and water in our cities and rural landscapes, protect threatened species and provide richer wildlife habitats' (HM Government, 2018). One of the stated goals is enhancing biosecurity, which includes the ambition to tackle invasive non-native species. The Environment Agency and other environmental government authorities have powers to enter into species control agreements, prioritising eradication programmes (Environment Agency, 2019). However, the Environment Agency do not have a general duty to manage INNS other than to 'protect assets, deliver watercourse duties and prevent spread to neighbouring landowners' programmes' (Environment Agency, 2019). DEFRA published changes to the Habitats Regulation 2017 in January 2021. These regulations require local authorities to maintain and restore habitats in protected areas, but it doesn't appear that local authorities have any legal obligations to actively manage and remove INNS unless it is negatively impacting the value or structure of property on neighbouring land.

Local Action Groups (LAGs) are not for profit groups including public and private organisations that represent a specific area. DEFRA offered funding to establish LAGS for the delivery of the Water Framework Directive (WFD) outcomes. LAG leads are responsible for the monitoring, controlling, and awareness-raising of INNS (Environment Agency, 2019). The LAG initiative does not appear to be active in the Crane catchment.

Volunteer activity days to manually remove INNS from sections of the Crane catchment have been organised by NGOs and community groups. For instance, Himalayan balsam bashes in some years have been coordinated between The Conservation Volunteers (TCV), the London Wildlife Trust (LWT), Thames21, Friends of the River Crane Environment (FORCE) and local authorities. TCV have recently been awarded a grant through the Green Recovery Challenge Fund to work with local project partners on a project called 'Reclaiming the Riverside'. The aim is to restore a 3km stretch of the River Crane at Cranford which includes the control of INNS and improvement in biodiversity. Lampton

Greenspace 360 have been taking a proactive approach to removing Japanese knotweed and giant hogweed along the Crane corridor in recent year on behalf of the London Borough of Hounslow, although the presence of large stands of Japanese knotweed and annual outbreaks of giant hogweed remain a problem. The London Borough of Richmond has also been actively working with contractors over many years to remove Japanese knotweed, and more recently giant hogweed, from all its sites. As a result of this, small outbreaks of Japanese knotweed and giant hogweed occur only rarely within the borough of Richmond and are dealt with by contractors when reported. Removal projects in the lower part of the catchment remain at risk of reintroduction of invasive species from INNS present upstream.

4.4. Recommended management actions

Communication and coordination by The Crane Valley Partnership (CVP) will be key in delivering an INNS management strategy for the Crane. DEFRA's Check Clean Dry message is an ongoing campaign to help stop the spread of invasive plants and animals in UK waters. This message can be highlighted to CVP stakeholders for helping to prevent the introduction of new INNS species.

The Environment Agency (2019) stated that the best approach to some INNS is to slow their spread and "for most widespread species, control is not technically feasible." Eradication or control of species already established in the Crane Valley, within a wider INNS management strategy, should be considered on a species-by-species bases. Bespoke species management action plans can be developed based on the best available data on ecological impacts. The restricted current distribution of floating pennywort means that a rapid removal response could be vital in preventing further spread through the catchment. Guidance and resources for developing a catchment-wide strategy for managing floating pennywort, and other INNS, can be found on the GB non-native species information portal (www.nonnativespecies.org).

Putting resources into eradication of INNS should not be the only consideration within an INNS strategy for the river corridor. There is a growing body of evidence that suggests INNS are often merely passengers of ecological change and other anthropogenic stressors such as habitat alteration, homogenisation (reduction in ecosystem structural complexity) and water quality issues are key factors in aiding their spread (Didham et al, 2005).

More structurally complex habitats with less pollution support a greater diversity of species and are therefore more resistant to some INNS species. This theory is referred to as the biotic resistance hypothesis. Biotic resistance could inform a future Crane INNS management strategy that sees habitat restoration and creation, as well as pollution remediation as equally important INNS control strategies alongside more traditional targeted species removal approaches for the most pernicious of species that have already established in the catchment.

5. Conclusions

- Low levels of misidentification and good engagement amongst surveyors suggests that including the INNS survey alongside the outfall safari is an effective way of monitoring the spread of these species along the river corridor.

- In future surveys it will be mandatory for volunteers to submit whether or not INNS were present when submitting an outfall record which will improve confidence of coverage throughout the catchment.
- Additional species might be included in future surveys and training will include commonly mistaken species.
- It will be useful to determine the upstream limit of the INNS being surveyed which could inform the most efficient place to begin management works.
- There are currently no legal requirements for landowners or regulatory bodies to manage and remove INNS unless they are causing a 'nuisance' or negatively affecting the value of a neighbouring property, although there are ambitions to tackle INNS included in DEFRAs 25 Year Environmental Plan.
- DEFRA might be in a position to provide funding for the formation of a LAG which is not yet in place in the Crane Catchment.
- Current action against INNS in the Crane Catchment include volunteer activity days as well as action from the London boroughs of Hounslow and Richmond to proactively remove INNS when reported.
- The lower catchment remains at risk of the reintroduction of INNS from the upper catchment.
- The continued communication and emphasis on DEFRA's Check Clean Dry message is important to prevent the spread of INNS.
- Alongside traditional management practises of removal and chemical treatment, there is strong evidence that habitat restoration and diversification could prevent the spread of INNS and diminish their dominance within that area.
- This approach, known as the biotic resistance hypothesis, is likely to me more sustainable than aiming for eradication of most INNS.
- There are relatively few instances of floating pennywort in restricted areas within the Crane catchment which might provide an opportunity to eradicate this species.

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Appendix I: Results tables

Table 3: Verified INNS results

NGR	Species	Photo 1	Photo 2
TQ 11588 80498	Giant Hogweed		
TQ 11585 80449	Giant Hogweed		
TQ 11486 79868	Giant Hogweed		
TQ 11151 79723	Japanese Knotweed		

NGR	Species	Photo 1	Photo 2
TQ 11140 79695	Japanese Knotweed		
TQ 10656 79351	Giant Hogweed		
TQ 10573 79281	Japanese Knotweed		
TQ 10540 79173	Japanese Knotweed		

NGR	Species	Photo 1	Photo 2
TQ 10506 79119	Japanese Knotweed		
TQ 10463 79012	Floating Pennywort		
TQ 10459 79004	Giant Hogweed		
TQ 10439 78960	Floating Pennywort		

NGR	Species	Photo 1	Photo 2
TQ 10437 78927	Floating Pennywort		
TQ 10417 78722	Floating Pennywort		
TQ 10461 78693	Giant Hogweed		

NGR	Species	Photo 1	Photo 2
TQ 10357 78322	Floating Pennywort		
TQ 10470 75646	Giant Hogweed		
TQ 10553 75625	Giant Hogweed		

NGR	Species	Photo 1	Photo 2
TQ 10656 75513	Giant Hogweed		
TQ 10821 75387	Giant Hogweed		
TQ 11143 74932	Giant Hogweed		
TQ 11141 74907	Japanese Knotweed		

NGR	Species	Photo 1	Photo 2
TQ 11141 74907	Giant Hogweed		
TQ 11172 74802	Giant Hogweed		
TQ 11169 74703	Japanese Knotweed		
TQ 11158 74604	Giant Hogweed		

NGR	Species	Photo 1	Photo 2
TQ 11355 84857	Giant Hogweed		
TQ 11353 84835	Giant Hogweed		
TQ 12414 88015	Japanese Knotweed		
TQ 12412 88016	Japanese Knotweed		

NGR	Species	Photo 1	Photo 2
TQ 12379 88088	Japanese Knotweed		
TQ 12537 88382	Japanese Knotweed		
TQ 05409 77761	Floating Pennywort		
TQ 10871 82033	Giant Hogweed		

NGR	Species	Photo 1	Photo 2
TQ 10734 82095	Giant Hogweed		
TQ 10651 82062	Giant Hogweed		
TQ 10614 82093	Giant Hogweed		
TQ 10350 82390	Giant Hogweed		

NGR	Species	Photo 1	Photo 2
TQ 10360 82434	Giant Hogweed		
TQ 10350 82454	Giant Hogweed		
TQ 12061 87159	Giant Hogweed		

NGR	Species	Photo 1	Photo 2
TQ 11785 86838	Giant Hogweed		
TQ 10816 86245	Japanese Knotweed		
TQ 13117 88654	Japanese Knotweed		
TQ 13056 88635	Japanese Knotweed		

NGR	Species	Photo 1	Photo 2
TQ 10079 85722	Giant Hogweed		
TQ 09610 85481	Giant Hogweed		
TQ 09609 85500	Giant Hogweed		
TQ 09351 85513	Giant Hogweed		
TQ 08947 85395	Giant Hogweed		

NGR	Species	Photo 1	Photo 2
TQ 10420 78646	Giant Hogweed		
TQ 10896 80278	Giant Hogweed		
TQ 15336 75467	Japanese Knotweed		

NGR	Species	Photo 1	Photo 2
TQ 15323 75412	Japanese Knotweed		
TQ 11465 81472	Giant Hogweed		
TQ 11957 87011	Japanese Knotweed		

NGR	Species	Photo 1	Photo 2
TQ 12068 87195	Japanese Knotweed		
TQ 12355 87631	Japanese Knotweed		
TQ 12417 88009	Japanese Knotweed		

NGR	Species	Photo 1	Photo 2
TQ 13125 88643	Japanese Knotweed		
TQ 12035 73470	Giant Hogweed		
TQ 12249 73344	Giant Hogweed		
TQ 12726 72876	Giant Hogweed		

NGR	Species	Photo 1	Photo 2
TQ 13111 72850	Giant Hogweed		
TQ 13703 72644	Giant Hogweed		
TQ 11157 74610	Giant Hogweed		

Table 4: Misidentified INNS results

NGR	Species	Photo	Notes
TQ 15323 75505	Giant Hogweed		Leaves are too rounded to be giant hogweed
TQ 15048 73491	Giant Hogweed		Leaves are too rounded to be giant hogweed
TQ 10635 74497	Japanese Knotweed		The leaves do not have the typical spade shape of Japanese knotweed
TQ 10499 74455	Japanese Knotweed		Dead plants not included