National Water Vole Database and Mapping Project

PART 1: PROJECT REPORT for period 2008 – 2017

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Protecting wildlife for the future

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INTRODUCTION

The National Water Vole Database and Mapping Project (NWVDMP) is the only project of its kind in the UK. It brings together and maps water vole and mink data, and therefore can inform conservation efforts for water voles. Information about the project, including an interactive map, is held here: https://www.wildlifetrusts.org/national-water-vole-database-mapping-project.

The NWVDMP began in 2008, following revisions to the Biodiversity Action Plan (BAP) targets for water voles which sought to create a shared vision for conservation across the devolved nations. The targets were: firstly, to maintain the range of water voles, (at that time 730 occupied 10km grid squares), and secondly, to increase the range by 105 additional occupied 10km grid squares by 2015.

A standardised method for storing and managing water vole and American mink data was devised, including setting out which data would be necessary to identify trends in distribution, and providing a standard method for analysing and mapping this data.

The project has two primary aims:

1. To assess the national status and trends of water vole distribution, and,
2. To use a geographic information system, or GIS, to enable strategic water vole conservation at the local, regional and national level.

Update to the 2017 Report

This report presents an update to the detailed report dated December 2017. That report covered data up to the end of 2015 and sought to understand progress against the UK BAP targets. This report covers data from 2008-2017. In the intervening time, the project findings have been widely publicised and were presented at a national conference on water vole conservation in 2018. As a result, there was a surge in support for the project with 22,312 new records submitted to the project, bringing the total to 135,656 records. A number of new data suppliers also came on board, helping to fill gaps in our knowledge of water vole presence. Funding to update the distribution and alert maps and create this report was provided by The Wildlife Trusts.

METHODOLOGY

Data Collation and Formatting

Each year, data requests for water vole and mink presence and absence data are made to Local Environmental Records Centres (LERCs), PTES, individual Wildlife Trusts and other suppliers in England and Wales. A limited update comprising data from the PTES water vole monitoring programme is used to update data for Scotland. The data is quality checked, cleaned, and formatted in Excel, ready for import and analysis in GIS.

Key Area Data Analysis and Mapping

The data is used to generate three tiers of map which are explained in Fig. 1.

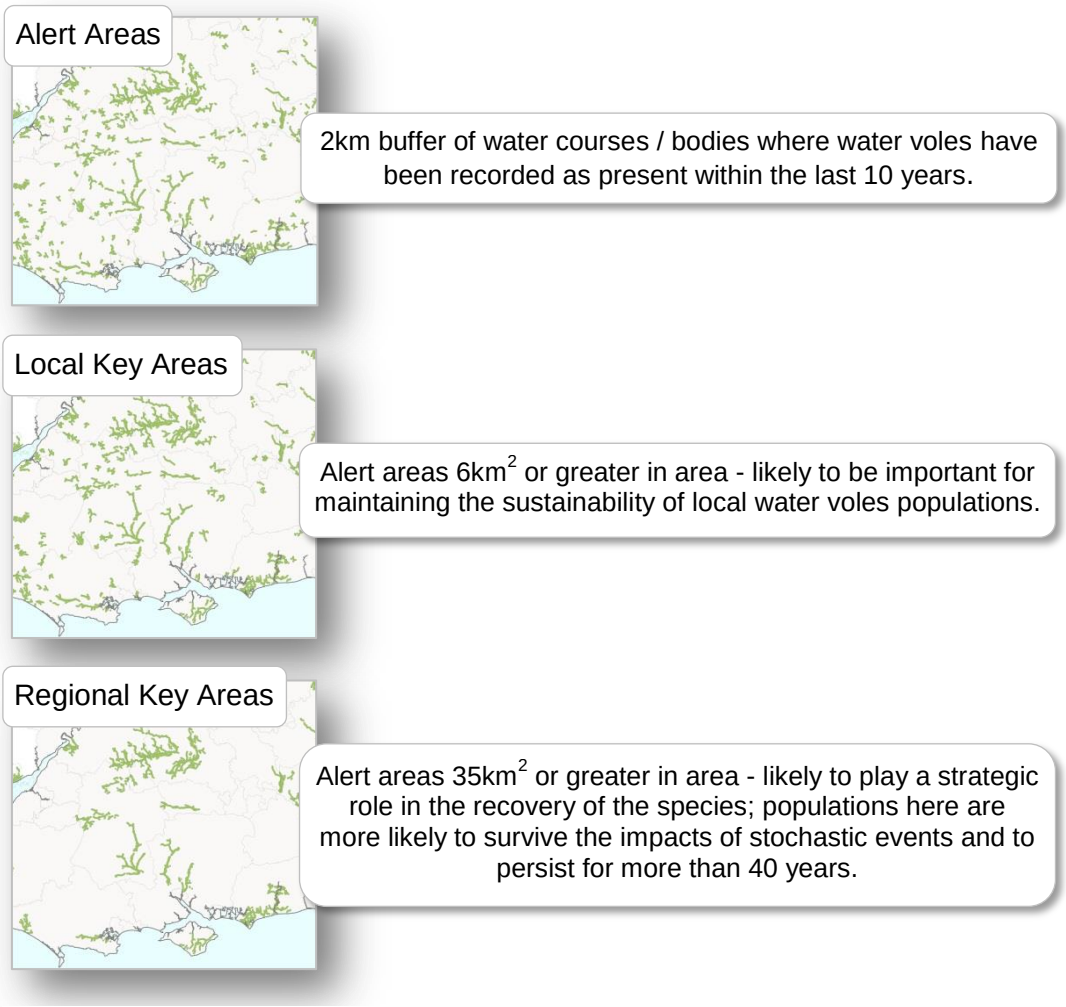


Fig. 1: The three tiers of map produced by the project

The aim of the alert and key areas maps is to identify the areas known to support water vole populations and areas where some of the more robust populations may be found. Data covering a 10-year period is analysed in order to avoid the skew caused by differences in availability of data each year and to ensure alert areas are not lost due to changes in surveying capacity over time.

The methodology for producing the alert and key areas mapping is based on work undertaken originally by the Berkshire, Buckinghamshire and Oxfordshire Wildlife Trust, which is summarised in the second edition of the Water Vole Conservation Handbook (Strachan and Moorhouse, 2006). Mapping is produced by buffering water vole records to capture some of the potential surrounding habitat and areas within average water vole dispersal distance. A figure of 0.5km (measured from occupied watercourses) has been used to capture some of the surrounding habitat and a figure of 2km, as measured from water vole records, has been used to capture dispersal distance.

The three tiers of mapping (alert, local and regional key areas, **Fig. 1**) have been produced for the 11 English River Basin Districts, for Wales, and for Scotland (12 sets of maps in total). A further map has been produced to display the Regional Key Areas across the UK. In this latest update, in response to feedback from users of the maps, an additional set of maps has been produced, displaying the current alert areas alongside alert areas based on historic data from 1958-2007 (see **NEW MAPPING** section). The maps are available in Part 2 of the report.

The methodology used to derive the alert maps is explained further in the 2017 project report published by Hampshire & the Isle of Wight Wildlife Trust and The Wildlife Trusts (McGuire & Whitfield, 2017): https://www.wildlifetrusts.org/sites/default/files/2018-05/water_vole_report_2006-2015_final.pdf.

Limitations

Data accuracy

Data received for this project has been through a process of verification resulting in a good quality dataset. It is further cleaned and formatted and only those records with a minimum 6 figure grid reference are included in the analysis. However, there may still be errors in the original data such as transposed numbers placing records in a different, incorrect location. Spot checks are carried out but due to the volume of records in the database it is not possible to check each one for accuracy.

Recorder effort

Recorder effort is an important factor to consider when comparing distribution over time; and budgets for conducting water vole surveys have reduced over recent years. However, by comparing averages between five-year periods, variations in effort over time are reduced. Variations in spatial recorder effort are further reduced by analysing distribution by 10km grid squares.

Population versus distribution

It is important to note that the outputs do not show population sizes, but rather the distribution of the species. Users of the maps should also be aware that one record in a square turns it positive, i.e. a record from even a single 1 hectare site within the grid square would create the same output on the distribution map as records from multiple (or even all) 1 hectare sites within that 10km grid square.

Areas of known water vole absence

In some parts of the UK it is known that water voles are functionally extinct. Due to the 10-year coverage in this report, some of these locations will feature alert areas despite only absences being recorded within these areas in recent years. This means that very recent localised distribution changes will not be shown. However, the fact that these areas have, within the last 10 years, supported water vole populations to a greater or lesser extent suggests there is potential for re-establishment of water vole populations, given appropriate management. It is hoped that the alert areas will continue to inform these conservation efforts such that robust water vole populations may be restored in the future.

Project scope

The updated distribution and alert maps cover England and Wales only. A limited update to data for Scotland has again been produced this year and includes historic records originally supplied by Scottish Local Environmental Records Centres, supplemented by new data arising from the PTES National Water Vole Monitoring Programme. The distribution and alert maps for Scotland should therefore be treated with caution as they cannot represent a complete picture with the data available.

RESULTS

Distribution

Key findings

- There has been an estimated overall 26% decline in water vole distribution across England and Wales between January 2006 and December 2017.
- Distribution may be slowly starting to increase, with 76 grid squares newly occupied, or reoccupied, between January 2013 and December 2017.

Data for England and Wales was analysed against the 2006 UK Biodiversity Action Plan targets:

- Target 1: Maintain the current range (730 occupied 10km squares) of water vole in UK.
- Target 2: Achieve an increase in range by 50 new occupied 10km squares in the UK by 2010. Achieve a further increase in range by 55 new occupied 10km squares by 2015.

Following the release of the last update to the project (the 2017 report), alongside efforts to disseminate the findings more widely, over 22,000 new records have been added to the database. Despite the increase in records, including from areas previously under-represented, the overall pattern of decline in distribution since 2006 remains unchanged from that found in the last report (McGuire & Whitfield, 2017).

Data has been analysed in five-year blocks to avoid the skew caused by fluctuations in recording effort. Fig. 2 illustrates the decline in distribution since 2006, with the most recent figures still falling slightly short of the baseline of 730 occupied 10km squares, and substantially below the 2015 target of 835 occupied 10km squares.

However, whilst a marked decline is apparent between 2006 and 2013, since 2014 there has been a small but promising increase in distribution from the lowest point in 2013 (627 occupied 10km grid squares), increasing to 703 occupied grid squares by 2016. A slight decline appears again by 2017 (falling to 684 occupied grid squares) but without further data it is not possible to know whether this is the start of a period of further decline or if the growth in water vole distribution has plateaued at present.

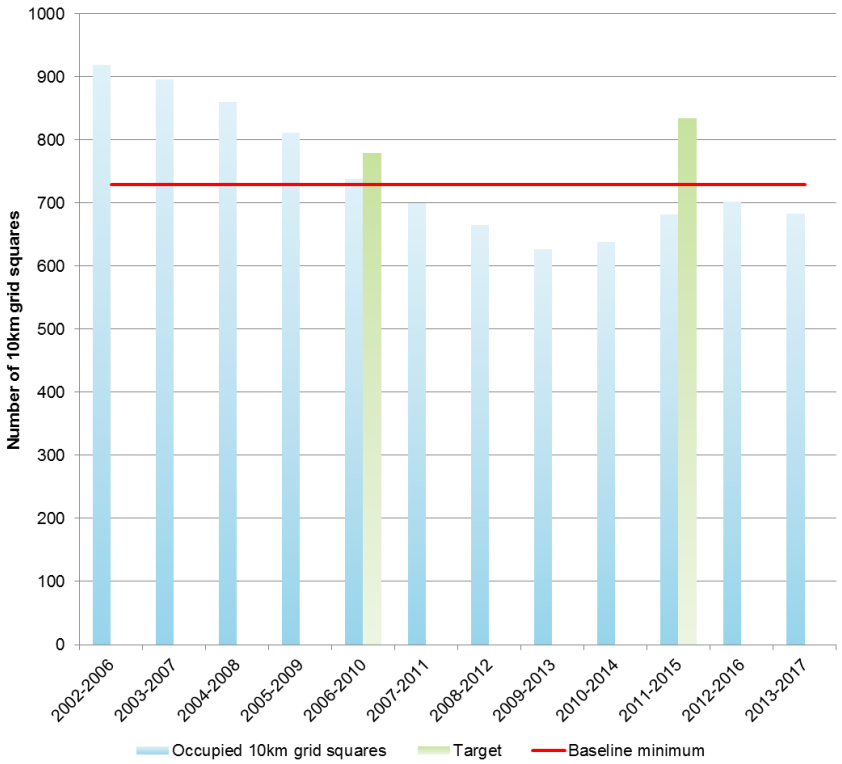


Fig. 2: Occupancy of 10km grid squares by five- year reporting period in England & Wales against UK BAP targets

The targets to maintain the UK BAP baseline of 730 occupied 10km squares, and to increase the range by 105 new occupied 10km squares in the UK by 2015, remain unattained.

Extent of Dataset

Table 1 shows the cumulative number of presence and absence records for water vole and mink held in the database. The figures in each column represent the total number of *records held* in the database up to the end of the year stated in that column. The total number of positive water vole records held to date is 94,474.

It is important to note that the figures in the table represent the cumulative data held in the database for both presence and absence records used to analyse the spatial distribution of water voles, and do not suggest an increase in population size of either species.

Table 1: Total cumulative number of records held in the national database by year

	2009	2010	2011	2012	2013	2014	2015	2016/17
Water vole presence	36,898	42,006	50,717	62,080	67,161	71,922	75,063	94,474
Water vole absence	10,288	10,463	11,734	12,512	12,661	12,913	13,541	16,089
American mink presence	7,883	8,582	9,146	12,730	15,460	16,109	16,377	18,456
American mink absence	4,213	4,213	5,136	5,282	5,451	5,645	5,790	6,637
Otter presence	-	1,874	-	-	-	-	-	-

Some of the datasets collated by the project are extensive and include records dating back to the turn of the 18th Century. The earliest water vole and American mink records are dated 1700. The majority of data, however, are from the mid-1990s to the present day. As refinements are made to databases held by Local Environmental Records Centres and additional past records are validated and digitised or removed due to ambiguity, revised datasets are occasionally supplied to replace some existing records in the project database.

Records by data supplier

Data for the current update was received from 53 different data suppliers across England and Wales with historic records included from 18 further data suppliers in England and Wales, as well as historic records from 19 data suppliers in Scotland. The full list of current and historic data suppliers is included in Appendix 1.

THE MAPS IN ACTION

October 2018 saw a national gathering of water vole conservation professionals at the Restoring Ratty Conference in Hexham. Hosted by Northumberland Wildlife Trust, the conference was motivated by the stark results published in the last update to the National Water Vole Database and Mapping Project. The two day conference comprised a series of presentations on Day 1, followed by workshops and a field trip to the Restoring Ratty locations around Kielder Water on Day 2.

Presentations were delivered by experts from Wildlife Trusts, private consultancy, Government bodies and others (Fig. 3), and each talk focussed a critical eye on the chosen topic. The overall aim of the conference was to recognise the enormous efforts to maintain and enhance water vole populations but to also take an honest and critical appraisal of what has worked, what hasn't worked so well and, crucially, what it will take to improve the situation.

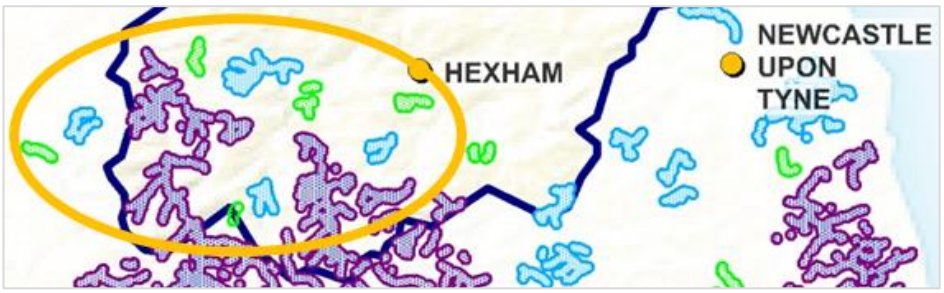
Fig. 3: The Restoring Ratty Conference speakers.

Photo credit: Katy Barke, Northumberland Wildlife Trust.

L-R: Derek Gow (Derek Gow Consultancy), Helen Donald (Zoological Society of London), Katy Anderson (FC Scotland), William Morgan (University of Aberdeen), Jonathan Spencer (FC), Graham Holyoak (Restoring Ratty, NWT), Elaina-Whittaker-Slark (South Downs NPA), Darren Tansley (Essex WT), Mike Pratt (NWT), Catherine McGuire (National Water Vole Database & Mapping Project, Hampshire & Isle of Wight WT).

The conference was a great opportunity to share the concerns raised in the last report as well as to demonstrate the potential uses of the National Water Vole Database and Mapping Project maps. Our presentation illustrated the way the maps can be used to identify the potential for projects to connect isolated alert and local key areas to larger regional key areas (Fig. 4), and to demonstrate the importance of sharing species records with Local Environment Records Centres (Fig. 5).

Fig. 4: Extract from NWVDMP presentation: identifying opportunities for connecting alert and local key areas to regional key areas in Northumberland



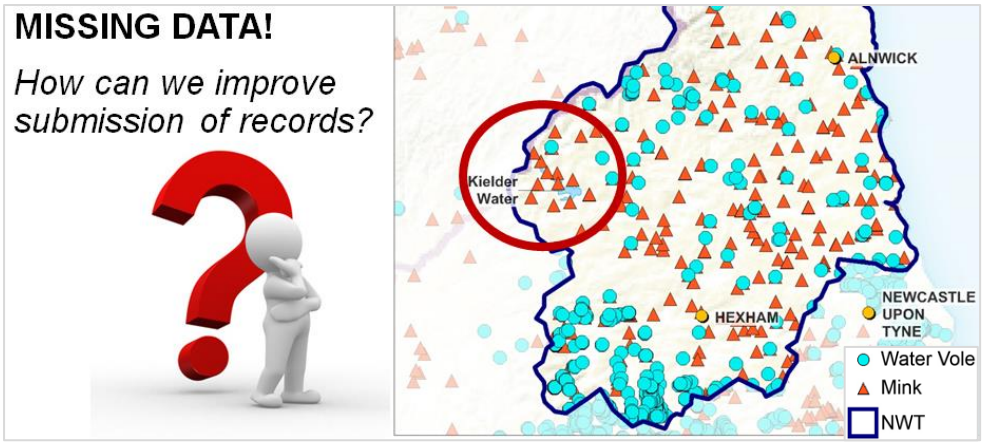


Fig. 5: Extract from NWVDMP presentation: discussing the issue of missing data submissions to LERCs

Despite the concerns raised about the status of water voles in the UK and the difficulties in conserving this species, some very positive messages came through, with projects such as Restoring Ratty and the Meon Valley Partnership demonstrating the conservation gains arising from concerted efforts to control mink and reintroduce water voles.

Overall the conference had a real galvanising effect with delegates commenting in post-event feedback that they could take away a number of new ideas and inspiration, and a greater understanding of how the national mapping of water voles can aid the delivery of both practical and policy conservation measures. (Fig. 6)

Fig. 6: Restoring Ratty delegates at Kielder Water.

Photo credit: Katy Barke, Northumberland Wildlife Trust.

NEW MAPPING

The Restoring Ratty Conference was an excellent opportunity to meet users of the project maps and to understand what would enhance the value of the outputs for existing and potential users. The water vole alert, local and regional key area maps are derived from data over the most recent 10-year period. Feedback following the conference highlighted a need to better understand where water voles have been recorded as present in the years preceding the alert map analysis period. To that end, a series of alert maps comparing the current dataset with an alert layer comprising data for the preceding 50 years, January 1958 – December 2007, has been included in this update (Fig. 7).

These maps will provide a useful aid in planning habitat restoration and reintroductions by highlighting locations that have been optimal for water vole population success in the past. They will also help with survey planning by identifying gaps in recent data that could be updated with focused survey effort.

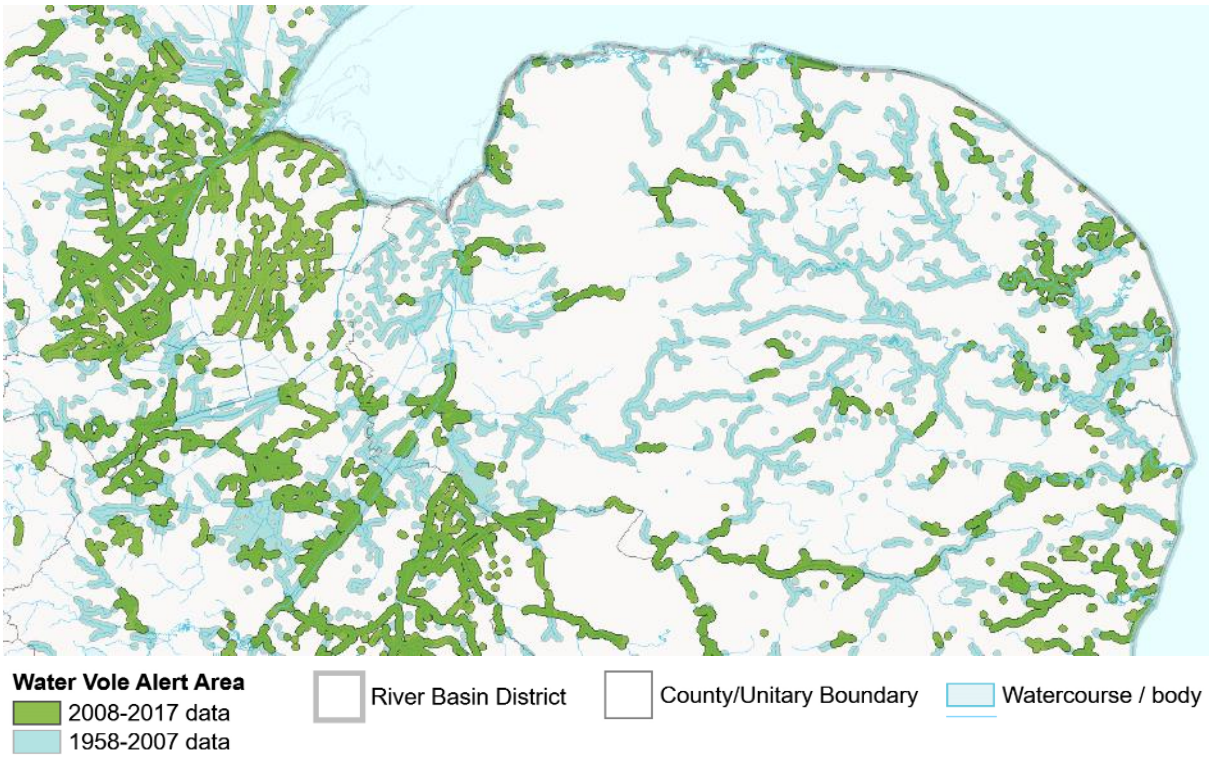


Fig. 7: Extract from the new map series showing current and historic alert areas in Anglian River Basin District

SUGGESTED USES OF THE MAPS

The maps from the National Water Vole Database & Mapping Project could be used in numerous ways to further water vole conservation. The following list highlights some potential uses:

- **Habitat connection and expansion:**
  - Use maps showing local and regional key areas within your area of influence/interest to identify opportunities to expand key areas, or to connect smaller local key areas to create a larger regional key area.
  - Identify opportunities for partnership working between neighbouring landowners, local authorities and conservation organisations by looking at where local and regional key areas cross administrative boundaries.
- **Focus survey effort:**
  - Use historic alert areas to target survey effort to gather more up-to-date information on the status of water voles in those areas.
  - Plan investigations into whether there is scope for reintroduction (if the habitat is still favourable), whether mink control is required or whether habitat restoration work is required in areas where water voles are no longer present.
- **Evidence for funding:**
  - Include the maps as supporting evidence in funding bids for targeted conservation work.
  - Use local and regional key area maps to inform the development of agri environment scheme applications.
- **Site protection:** Present local key area maps as evidence to inform the designation of statutory and non-statutory sites.
- **Existing population protection:** Share alert maps with organisations that undertake regular maintenance tasks, and so need to be aware of the potential presence of water voles.

WATER VOLE REINTRODUCTIONS

The map of water vole reintroductions has been updated to the end of December 2018 (Fig. 8), with data supplied by a number of Wildlife Trusts and Derek Gow Consultancy.

Key to numbered sites:

ID	Location
1	Llangors
2	River Dore
3	Queen Elizabeth Forest Park - Aberfoyle
4	Brandon Marsh, Kirkby in Ashfield
5	Netheridge Nature Reserve
6	Arundel
7	Barn Elms Reservoir
8	River Colne
9	Dartford Park
10	West Malling
11	Rainham Marsh
12	Pagham Harbour
13	Upper Thames
14	River Tale
15	River Axe
16	Ruxley Gravel Pits
17	Alver Valley
18	Foxglove Covert
19	Rutland Water
20	Ayreshire - Darley Burn, Troon
21	Ayreshire - Slaphouse Burn, Ayr
22	Moors Valley
23	Portbury Docks
24	Alston, Cumbria
25	Bedfont Lakes
26a	R Meon, Hants: Upper Titchfield Haven
26b	R Meon, Hants: Abbey Meadows, Titchfield
26c	R Meon, Hants: Fontley
26d	R Meon, Hants: Warnford
26e	R Meon, Hants: Mayles Lane, Wickham
26f	R Meon, Hants: Kingsmead
26g	R Meon, Hants: Mislingford, Kingsmead
26h	R Meon, Hants: Holywell
26i	R Meon, Hants: St Clairs, Soberton

ID	Location
26j	R Meon, Hants: Brockwood House Meadow
26k	R Meon, Hants: Exton
26l	R Meon, Hants: Midlington
26m	River Meon: East Meon
26n	River Meon: Frogmore
26o	River Meon Meon: Drayton
26p	River Meon Meon: Meonstoke
26q	River Meon: West Meon
27	Bude
28	Magor Marsh
29	Ffrwd Farm Mire, Pembrey
30	Carmarthen
31	Thurlestone
32	Thorley Wash
33	Cosmeston Country Park, Penarth
34a	Ouse 1
34b	Ouse 2
35b	Lower Windrush 2
35a	Lower Windrush 1
36a	Thame 1
36b	Thame 2
37	Swere
38	Evenlode
39a	Glyme 1
39b	Glyme 2
40	Kirkby in Ashfield
41	Kingsnorth
42	Malham Tarn
43	Kielder Water and Forest Park
44	Sevenoaks Wildlife Reserve
45	Sandford Mire, Warcop
46	Warcop Training Area
47	Holnicote
48	Seaton Marshes

Fig. 8: Water vole reintroduction map, updated to the end of 2018.

CONCLUSION

A more joined-up approach to conservation is needed in order to establish robust populations of water voles over healthy landscapes. The Wildlife Trusts propose a Nature Recovery Network which puts space for nature at the heart of our farming and planning systems and brings nature into the places where most people live their daily lives. Building a Nature Recovery Network requires detailed information: where wildlife is abundant or scarce; where it should be in future; which places are most important; and where there is opportunity for positive change. This project's alert, local and regional key areas maps, including the new suite of maps detailing current and historic alert areas, can help with this.

Readers are encouraged to use the maps to identify areas to target for improving habitat connectivity, and to create strategic partnerships between neighbouring landowners, local authorities and conservation organisations to achieve this.

The findings remain of significant conservation concern but the evidence suggests there is reason to be hopeful for the potential recovery of water voles. Understanding our success in this will only be possible through continued recording of field signs and sightings of this elusive mammal, and assessment through the National Water Vole Database and Mapping Project.

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Acknowledgements

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Updating the project would not be possible without the time and dedication of the Local Environmental Records Centres, Wildlife Trusts, and other organisations who freely contribute their records to the project each year. Special thanks goes to the many volunteers involved in surveying and collating data, as well as the countless members of the public who continue to send their water vole and mink sightings to LERCs, Wildlife Trusts, PTES and other dedicated water vole recording schemes. All play an integral part in the project by providing the evidence we need to assess the state of the British water vole population.

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APPENDIX

Appendix 1:

List of Project Data Suppliers

Suppliers of water vole and / or mink data for England, Scotland and Wales, 2008 onwards.

Suppliers of water vole and American mink data from 2008 onwards	
ENGLAND	
Bedfordshire and Luton Biodiversity Recording and Monitoring Centre (Beds & Luton records)	Leicestershire & Rutland Wildlife Trust
Bedfordshire, Cambridgeshire & Northamptonshire, Wildlife Trust for (Cambs records)	Leicestershire and Rutland Environmental Records Centre (LRERC)
Berkshire, Buckinghamshire & Oxfordshire Wildlife Trust	Lincolnshire Environmental Records Centre (Greater Lincolnshire Nature Partnership)
Bristol Regional Environmental Records Centre	Merseyside BioBank
Buckinghamshire and Milton Keynes Environmental Records Centre (BMERC)	Norfolk Biodiversity Information Service
Cambridgeshire and Peterborough Environmental Records Centre (CPERC)	North and East Yorkshire Ecological Data Centre
Cornwall and the Isles of Scilly, Environmental Records Centre for	North York Moors National Park Authority
Cumbria Biodiversity Data Centre	Northamptonshire Biodiversity Records Centre
Derbyshire Biological Records Centre (DBRC) c/o Derbyshire Wildlife Trust	Northumberland Wildlife Trust
Devon Biodiversity Records Centre	Nottinghamshire Biological and Geological Record Centre
Doncaster Local Records Centre	Nottinghamshire Wildlife Trust
Dorset Environmental Records Centre	RECORD LRC for The Cheshire Region
Dorset Wildlife Trust	Sheffield & Barnsley BRCs (Sheffield City Ecology Unit)
EcoRecord (Birmingham)	Shropshire Mammal Group c/o Shropshire Wildlife Trust
Environmental Records Information Centre North East	Somerset Environmental Records Centre
Essex Wildlife Trust	Staffordshire Ecological Record
Essex Wildlife Trust Biological Records Centre	Suffolk Biodiversity Information Service
Gloucestershire Centre for Environmental Records	Suffolk Wildlife Trust
Greater Manchester Local Record Centre (GMLRC)	Surrey Biodiversity Information Centre
Greenspace Information for Greater London	Sussex Biodiversity Record Centre
Hampshire & Isle of Wight Wildlife Trust	Tees Valley Wildlife Trust (data provided by ERIC NE)
Hampshire Biodiversity Information Centre	Thames Valley Environmental Records Centre
Herefordshire Biological Records Centre	Warwickshire Biological Records Centre
Hertfordshire & Middlesex Wildlife Trust	Warwickshire Wildlife Trust
Herts Environmental Records Centre c/o Herts & Middlesex Wildlife Trust	West Yorkshire Ecology Service
Isle of Wight Local Records Centre	Wiltshire and Swindon Biological Records Centre
Kent and Medway Biological Records Centre	Worcestershire Biological Records Centre
Lancashire Environment Record Network	Yorkshire Wildlife Trust

SCOTLAND	**WALES**
Alan Ross	Biodiversity Information Service for Powys and Brecon Beacons National Park
Cairngorms Water Vole Conservation Project	Brecon Beacons National Park Authority
Caithness Biodiversity Information Group	Cofnod (North Wales)
Forestry Commission Scotland	Gwent Wildlife Trust
Glasgow Museums Biological Records Centre	Natural Resources Wales
Highland Biological Recording Group	Radnorshire Wildlife Trust
International Otter Survival Fund	South East Wales Biodiversity Records Centre
John Muir Trust	West Wales Biodiversity Information Centre
North East Scotland Biological Records Centre	South & West Wales, Wildlife Trust of
Perth Museum & Art Gallery	
Scottish Borders Biological Record Centre	**NATIONAL**
Scottish Mink Initiative	People's Trust for Endangered Species
Scottish Natural Heritage	
South West Scotland Environmental Information Centre	
The McManus: Dundee's Art Gallery and Museum	
Wildlife Information Centre for Lothian and the Borders	