



# Water Vole

*Arvicola amphibious*

## Species Action Plan

### 1. Introduction

The water vole is one of the UK's fastest declining mammals. It was listed as a priority UK BAP species and subsequently in Section 41 of the Natural Environment and Rural Communities (NERC) Act 2006. Formerly common throughout Britain, studies have shown a considerable decline in numbers in recent times, a trend reflected in Worcestershire.

### 2. Current Status

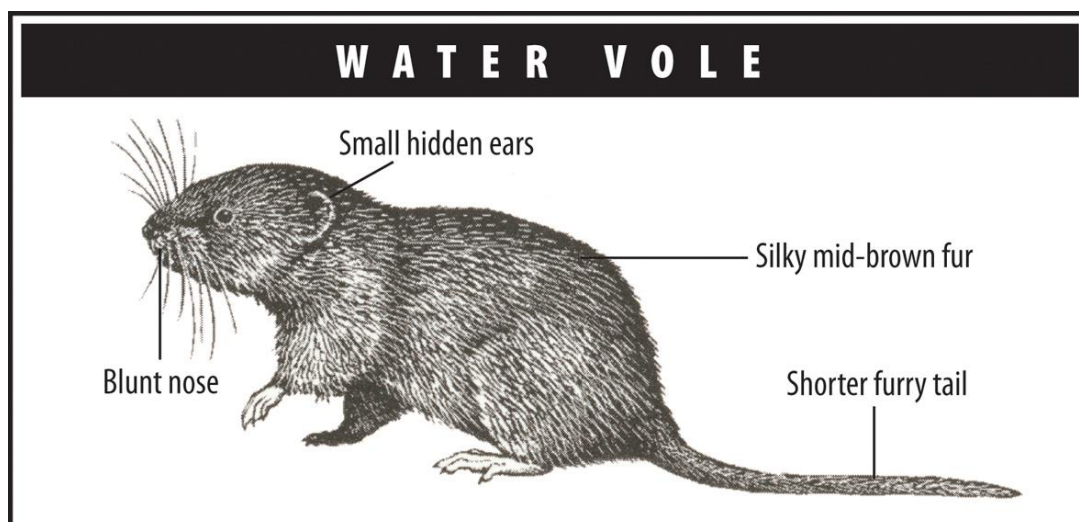
#### 2.1 Ecology and Habitat Requirements

Key Habitats:

- The fringe of densely vegetated rivers, streams, canals and ditches
- Ponds, lakes and marshes

Water voles are riparian/aquatic mammals that inhabit the banks of rivers, canals, ditches, pools and marshes. They live in colonies within a network of burrows, having territories along the water's edge marked by the presence of latrines. Water voles feed on bankside and marginal vegetation including grasses, sedges, rushes and reeds and these plants also provide cover from predators such as American mink (*Neovison vison*), heron (*Ardea cinerea*), stoat (*Mustela ermine*) and domestic cats. Depth of riparian habitat from the riverbank is important in the resilience of colonies to predation. Breeding occurs from April to August with up to five litters produced, each containing three to four young.

Fossorial water voles, which exhibit a more subterranean lifestyle away from water, are common in continental Europe (Berthier *et al*, 2014) and populations have been identified in localised areas of Glasgow and on some Scottish islands (Telfer *et al*, 2003; Stewart *et al*, 2017). However, these are currently considered to be a small proportion of the total British population.

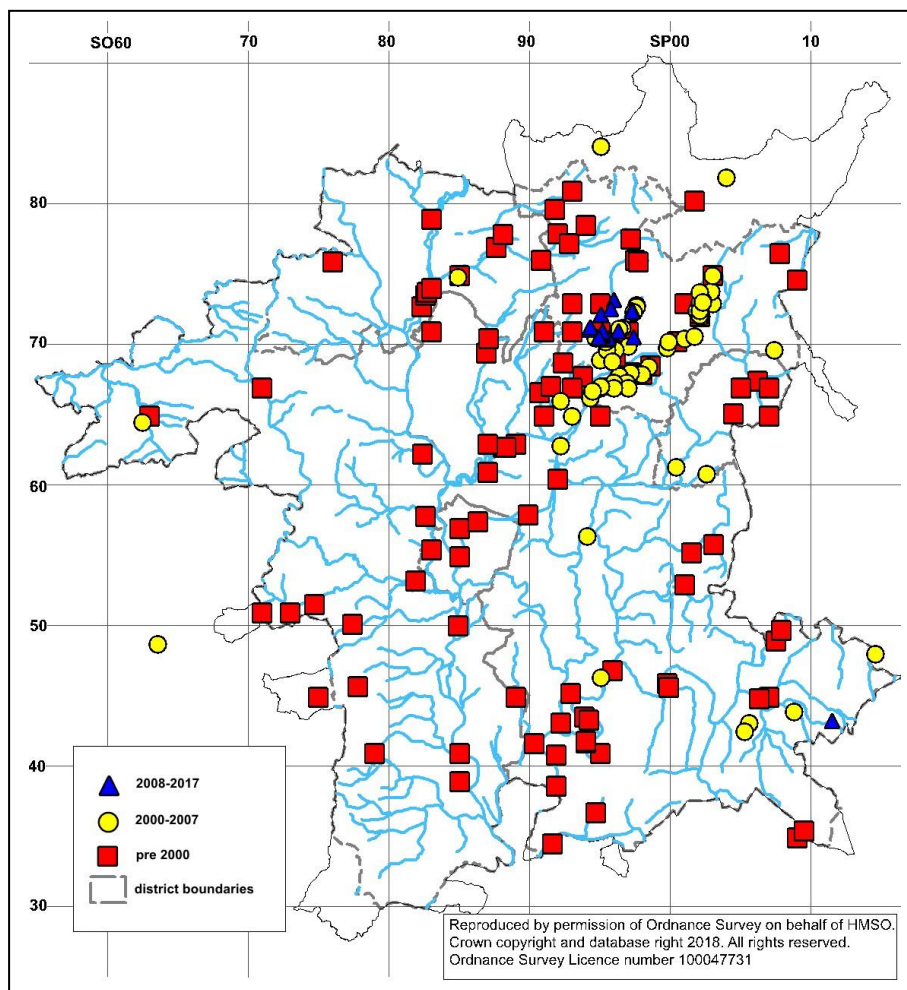


**Figure 1. Key features distinguishing the water vole from brown rat (*Rattus norvegicus*), for which it is often mistaken.**

## 2.2 Population and Distribution

Water voles are found throughout mainland Britain and on some offshore islands. They are absent from Ireland. They are found mainly in lowland areas but are increasingly being sighted in upland sites, urban areas and isolated pools. This change in behaviour and the occupation of sites at the extreme of their habitat requirements is thought to be attributable to predation by the American mink.

The Vincent Wildlife Trust carried out national water vole surveys in 1989-90 and 1996-98. These surveys show a long-term decline in water vole numbers since 1900, with a dramatic decline through the 1990's: locally, water vole numbers declined by 90% between 1990 and 1998. The National Water Vole Database and Mapping Project was established in January 2008 and in a report published in 2017 describes an estimated 30% decline in water vole distribution across England and Wales between 2006 and 2015. The most recent five-year reporting period (2011-2015) shows a slight increase in distribution from the previous reporting period (2010-2014). The report analysis shows that water vole populations are struggling to maintain densities and expand their ranges linked to habitat change and loss and predation.



**Figure 2. Records of water vole in Worcestershire. Data supplied and map prepared by Worcestershire Biological Records Centre.**

In Worcestershire the population shows a similar trend. Figure 2 shows all water vole records currently held for the county but the majority are historical and no longer believed to be current: a countywide survey carried out by Worcestershire Wildlife Trust in 2000 found water voles only in Bromsgrove District, and these were believed at the time to be the last populations of water voles in Worcestershire. In 2002 Worcestershire Wildlife Trust surveyed thirty-two sites in Bromsgrove of which eleven sites (approx. 34%) showed positive signs of water vole activity: in 2018 this was believed to have decreased to only three sites.

In 2018 records of water vole were received from two locations to the south of Kidderminster in close proximity to the River Stour, the Staffordshire and Worcestershire Canal and Wilden Marsh SSSI. The size and extent of this possible population is unknown and needs further investigation.

### **2.3 Legislation**

The water vole is listed in schedule 5 of the Wildlife and Countryside Act 1981 (and amends). It is listed within Section 41 of the Natural Environment and Rural Communities (NERC) Act 2006.

Lawful and essential operations affecting water vole habitat must take full account of this protected status and avoidance of damage/adequate mitigation must be undertaken.

Under the Water Act 1989 (and amends), it is an offence to cause or knowingly permit a discharge of poisonous, noxious or polluting matter to enter any controlled waters without proper authority.

### **2.4 Summary of important sites**

Water bodies in and around Bromsgrove in the north east of the county are collectively the most important confirmed sites for water voles in Worcestershire.

## **3. Current Factors Affecting the Species**

The main three reasons for decline are:

- **Predation by American mink:**

UK water voles are approximately 20% bigger than continental water voles and for this reason American mink are able to enter their burrows. A female mink with young is able to exterminate a water vole population within one or two years.

- **Habitat loss:**

In the last hundred years we have lost the majority of our wetlands through draining and development, and many of our rivers have become inhospitable for wildlife through human modifications and insensitive bankside and channel management. Though increased awareness among the main riparian owners has led to improvements in some places, several types of habitat loss are still threatening water voles. These include:

- Development on river floodplains leading to containment of river channels and loss of riparian habitat.
- Intensive engineering, bank protection and maintenance work to rivers and canals often damages bankside habitat.

- Intensive grazing by livestock causes poaching of banks and the destruction of burrows and bankside vegetation.
  - Inappropriate, intensive mowing of the bank and vegetation clearance results in water voles being increasingly vulnerable to predators.
  - Lack of management can lead to degradation of the waterside habitat through siltation, drying out or invasion by scrub.
  - Loss of ponds and other wetland areas and the degrading of associated habitat through development and farming practices.
- **Population fragmentation:**  
Fragmentation of the population from habitat loss and degradation may accelerate the rate of local population decline. Isolated groups are more vulnerable to environmental change and extinction, and survival is enhanced if colonies are connected.

Other important threats are:

- Excessive fluctuations in water levels due to land drainage or flooding can damage riverbanks and burrows.
- Drought conditions can expose burrows making the water vole more vulnerable to predators.
- Poisoning by the use of rodenticides is a major threat in urban situations.

## 4. Current Action

### 4.1 Local protection

The Spadesbourne Brook and the Battlefield Brook are both listed as Local Wildlife Sites (LWS), which gives some measure of protection in planning policy.

### 4.2 Site Management and Programmes of Action

- Establishment of the UK Water Vole Steering Group and the development of mink control strategies, such as the Scottish Mink Initiative, part-funded by the Scottish Natural Heritage Species Action Framework.
- The third edition of the Water Vole Conservation Handbook was published in 2011 and in 2016 The Mammal Society published the Water Vole Mitigation Handbook. The latter is aimed at promoting best practice in undertaking surveys and designing and implementing water vole mitigation measures. Guidance is provided relating to development projects and other construction activities, including flood defence works. It supersedes the Water Vole Conservation Handbook in all aspects relating to development.
- The Wildlife Trusts and many other individuals and groups have carried out river restoration and reintroductions of water voles across the UK. The National Water Vole Database and Mapping Project (2017) mapped around 40 water vole reintroductions carried out up to 2015. Examples include an introduction on the River Coln in Essex where more than 100 mink were removed and then from 2010 to 2012 approximately 600 water voles were released; and in 2017, 700 water voles were released across Kielder Forest. At a local level, reintroductions seem successful; however, these successes do not appear to be enough to reverse the national distribution trends.

- Worcestershire Wildlife Trust developed a Water Vole Conservation Strategy for Bromsgrove District Council in 2005. Approx. 70% of the recommended actions and activities were carried out between 2005 and 2015 through a combination of specific site management, planning developments and/or advice to landowners. In some cases this has led to permanent habitat improvements and the removal or reduction of significant barriers to population movement such as at Artrix/NEW College, Market Hall/Waitrose and sites in Sanders Park. Other recommendations such as bank and tree management activities were carried out initially and are now integrated into routine site management objectives and repeated as required.
- The Environment Agency and Lead Local Flood Authority takes the requirements of water voles into account in its capital and maintenance works and when carrying out its regulatory function of issuing consents. The promotion of soft bank engineering techniques is particularly beneficial to water voles.
- Similarly, the Canal and River Trust takes the ecology and habitat requirements of water voles into account in canal maintenance works and actively pursue the use of soft bank engineering where appropriate.
- There are currently two boreholes in operation on the Battlefield Brook that aim to maintain and supplement baseflow. These boreholes are operated by Severn Trent Water and the Environment Agency, who hope that their use will help to maintain and expand existing water vole colonies.
- In 2015 Worcestershire Wildlife Trust launched the Love Your River Bromsgrove project, working with local schools and communities to carry out habitat improvement works, provide training to spot and monitor levels of pollution and check for and solve household drain misconnections.
- In 2017 Severn Trent Water and the Environment Agency began work on the restoration of the Battlefield Brook where it flows through Sanders Park in Bromsgrove. The work will remove the concrete channelling that currently contains the brook and re-landscape the bed and banks to a more natural profile.

#### **4.3 Survey, research and monitoring**

- The National Water Vole Monitoring Programme is a new national survey launched in 2015 and hosted by People's Trust for Endangered Species. Trained volunteer surveyors conduct annual surveys of 500m of river bank. It is hoped that the number of sites being surveyed will expand until a complete national survey is undertaken every year.
- The National Water Vole Database and Mapping Project was set-up in order to provide a focus for water vole conservation and to identify areas of continued decline the UK. This project has now been mapping both water vole and mink distribution since its inception in 2008.

- In 2002 Worcestershire Wildlife Trust carried out a water vole survey within Bromsgrove town, which informed the production of Bromsgrove District Council's Water Vole Conservation Strategy.
- Recent developments in survey methodology include the use of eDNA and camera trapping techniques.

## 5. Associated Plans

Rivers and Streams, Ponds and Lakes, Wet Woodland, Canals, Fen and Marsh, Otter.

## 6. Conservation Aim

Losses of existing water vole habitat have been avoided and all opportunities have been taken to de-fragment and re-connect suitable habitat.

## 7. Conservation Objectives

- Formation of an effective and well-coordinated county Water Vole Group
- Completion of the Battlefield Brook restoration works in Sanders Park
- Identify potential Ark sites for water voles within the county and establish a formal strategy for use of Ark sites in line with known threats and opportunities
- Carry out survey work to confirm the current population distribution
- Improve accuracy of recording by the public with an awareness raising campaign

## References and further information

Aars, J., Lambin, X., Denny, R and Griffin, A. C (2001). *Water vole in the Scottish uplands: distribution patterns of disturbed and pristine populations ahead and behind the American mink invasion front.* **Animal Conservation**, 4(3), 187-194.

Dean, M., Strachan, R., Gow, D and Andrews, R. M (2016). *The Water Vole Mitigation Handbook.* Mammal Society.

Gow, D (2007). *Water vole reintroduction projects, the lessons and success factors.* **ECOS**: 28(1).

Barreto, G. R and Macdonald, D. W (2000). *The decline and local extinction of a population of water voles, Arvicola terrestris, in southern England.* **Zeitschrift Fur Säugetierkunde-International Journal of Mammalian Biology**, 65(2), 110-120.

Barreto, G. R., Macdonald, D. W and Strachan, R (1998a). *The tightrope hypothesis: an explanation for plummeting water vole numbers in the Thames catchment.* In: Sherwood, B and Bailey, R. (eds.) *United Kingdom Floodplains.*

Barreto, G. R., Rushton, S. P., Strachan, R and Macdonald, D. W (1998b). *The role of habitat and mink predation in determining the status and distribution of water voles in England*. **Animal Conservation**, 1(2), 129-137.

Capreolus Wildlife Consultancy (2005). *The ecology and conservation of water voles in upland habitats: Scottish Natural Heritage Commissioned Report 9*. Scottish Natural Heritage, Edinburgh.

Macpherson, J. L and Bright, P. W (2010). *A preliminary investigation into whether grazing marsh is an effective refuge for water voles from predation*. **Lutra**, 53(1), 21-28.

Macpherson, J. L and Bright, P. W (2011). *Metapopulation dynamics and a landscape approach to conservation of lowland water voles (*Arvicola amphibius*)*. **Landscape Ecology**, 26(10), 1395-1404.

Mathews, F., Kubasiewicz, L. M., Gurnell, J., Harrower, C. A., McDonald, R. A and Shore, R. F (2018). *A Review of the Population and Conservation Status of British Mammals: Technical Summary*. A report by the Mammal Society under contract to Natural England, Natural Resources Wales and Scottish Natural Heritage. Natural England, Peterborough.

<http://publications.naturalengland.org.uk/publication/5636785878597632>

McGuire, C and Whitfield, D (2017). *National Water Vole Database and Mapping Project PART 1: PROJECT REPORT 2006-2015*.

Mutch, F and Scottish Natural Heritage (2000). *The influence of dredging on water vole populations in small ditches*. Scottish Natural Heritage Commissioned Report F99LF13.

Rushton, S. P., Barreto, G. W., Cormack, R. M., Macdonald, D. W and Fuller, R (2000). *Modelling the effects of mink and habitat fragmentation on the water vole*. **Journal of Applied Ecology**, 37(3), 475-490.

Strachan, R., Moorhouse, T and Gelling, M. (2011). *Water Vole Conservation Handbook*. Wildlife Conservation and Research Unit, Oxford University.

Strachan, R and Moorhouse, T (2006). *The Water Vole Conservation Handbook Second Edition*. Wildlife Conservation and Research Unit, Oxford University.

Strachan, R and Holmes-ling, P (2003). *Restoring water Voles and Other Biodiversity to the Wider Countryside*. Wildlife Conservation and Research Unit, Oxford University.

Strachan, C., Strachan, R and Jeffries, D. J (2000). *Preliminary report on the changes in the water vole population of Britain as shown by the national surveys of 1989-90 and 1996-98*. The Vincent Wildlife Trust, London.

Strachan, R and Jeffries, D. J (1993). *The water vole (*Arvicola terrestris*) in Britain 1989-90: its distribution and changing status*. The Vincent Wildlife Trust, London.

Stewart, R. A., Clark, T. J., Shelton, J., Stringfellow, M., Scott, C., White, S. A and McCafferty, D. J (2017). *Urban grasslands support threatened water voles*. **Journal of Urban Ecology**, 3(1), 1-7.

Telfer, S., Dallas, J. F., Aars, J., Piertney, S. B., Stewart, W and Lambin, X (2003). *Demographic and genetic structure of fossorial water voles (*Arvicola terrestris*) on Scottish islands*. **Journal of Zoology**, 259(1), 23-29.