

# ECOLOGY AND CONSERVATION



## THE WATER VOLE *Arvicola terrestris amphibius*

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# Ecology and Conservation of the Water Vole *Arvicola terrestris amphibius*

## Introduction

The water vole *Arvicola terrestris amphibius* is well adapted to riparian ecosystems and can be found inhabiting banks of rivers, streams, canals, dykes, lakes and ponds throughout Britain. Water voles occur along waterways, with a preference for slow flowing or still waters. Steep banks are also important habitat features, allowing a choice of burrows at different levels above the water, especially where flooding is likely. The species' decline has been very rapid over the past 30 years and its prolonged survival is now in doubt.

## Current Status

A recent population estimate, published by the Mammal Society in 2004, suggested a total pre-breeding population in Britain of 875,000 individuals. The water vole, once common and widespread in lowland Britain, has suffered a significant decline in numbers and distribution in recent years.



*Water vole eating grass*

Water voles are found throughout Britain but are absent from Ireland and are only seen infrequently in Scotland. Recent work has shown that they are much more numerous in upland and peatland habitats than previously thought<sup>1</sup>.

A National Survey carried out from 1996-98 found that the water vole had been lost from over 90% of the sites occupied in a previous survey between 1989 and 1990. This has been noted as the most catastrophic decline of any British mammal in the 20th century. Water voles have declined from whole catchments in north Yorkshire, Oxfordshire and northeast

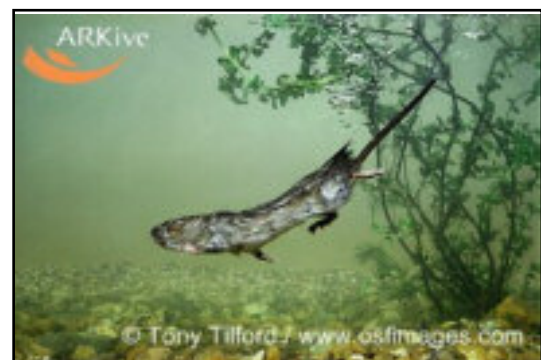
Scotland<sup>1</sup>. Distribution is discontinuous because some sites have inadequate habitat or are too remote from existing populations<sup>2</sup>.

## Legal Status

The water vole did not gain legal protection until 1998, under Schedule 5 of the Wildlife and Countryside Act 1981. It is covered in Section 9, which only protects its place of shelter and not the water vole itself. Statutory Nature Conservation Organisations (Natural England, Scottish Natural Heritage and Countryside Council for Wales) can issue licences for reasons of conservation, education and scientific research, to allow otherwise prohibited actions.



*Water vole pair*



*Water vole swimming*

Water voles are also found on the IUCN Red List of Threatened Species, but when they were assessed in 1996 were seen to be a species of least concern. They are a UK Biodiversity Action Plan Priority Species and a Local Priority Species in over a hundred counties in Britain, including Kent. Action Plan objectives involve maintaining the current distribution and abundance in order to arrest the decline of the species in Britain, as well as restoring water voles to their former widespread distribution.



## Reasons for Decline

Although the water vole may still remain locally common, the overall trend for the species is one of decline.



*Introduced American Mink*

### Predation by North American Mink

This is seen as the greatest threat to water vole populations. Although rarely witnessed as mink are a predominantly nocturnal species, evidence collected from radio tracking studies suggests that mink have a severe impact on water vole populations. Mink are an introduced species, native to North America, and are now well established throughout England and Wales. Where large numbers of mink occur, water vole populations are non-existent. Surveys have shown that mink have not only eliminated water voles from suitable areas, but in doing so have caused isolation and fragmentation of their populations<sup>1</sup>. Female mink can enter water vole burrows and remove entire populations when feeding their young.

Dense cover in riparian habitats reduces the effect of predation by mink.

### Habitat Loss

Riverbank management, drainage of ditches to prevent flooding and heavy grazing pressure from domestic livestock have led to habitat loss and degradation. Dredging further removes food and cover that are vital for survival<sup>1</sup>. Diverse waterside vegetation is essential for water vole survival and has been drastically reduced through inappropriate management. Large scale flood defence engineering causes water levels in rivers to rise dramatically during the winter months, flooding burrows. As a direct consequence of this, water voles either drown or have to abandon their burrows, leaving them open to predation.

Population fragmentation through habitat loss and predation causes local extinctions or isolated habitats that may accelerate the rate of local decline<sup>3</sup>. This in turn can reduce the reproductive potential, further increasing fragmentation of the population.

### Water Pollution

The effects on water voles remain unknown. Contaminants include organochlorine insecticides, heavy metals and organic pollutants<sup>3</sup>.

## General Ecology

The water vole is the largest British vole, males weighing on average 246-386g and females slightly less at 225-310g. Their body length is around 20cm plus a tail length of 13cm. Water voles are often mistaken for brown rats, especially when swimming. Young are born between April and September, with a short gestation period of 20-22 days. Breeding nests are usually underground and consist of finely shredded grass or reeds<sup>1</sup>. They can have up to three or four litters of young per year. Young water voles are weaned at two weeks and are actively scent marking at three weeks. Water voles scent mark by scratching the scent glands on their flanks using their hindfeet, at latrines and during aggressive or defensive social interaction or sexual encounters<sup>1</sup>.

In captivity water voles have a life span of up to three years but in the wild they only live for about five months, mainly due to predation. They can be recognised by a blunt nose, short rounded ears, chestnut brown fur and a long hair covered tail. Black water voles are commonly seen in Scotland. Introduced American mink are not the only predator faced by water voles; weasels, stoats, otters, foxes, cats, owls, herons and pike will all take water voles. Water voles are not particularly well adapted to water, although they do swim and dive well. Unlike otters they do not have webbed feet, their fur becomes water-logged if they remain submerged for prolonged periods of time and they do not use their tail as a rudder.



*Distinctive features*

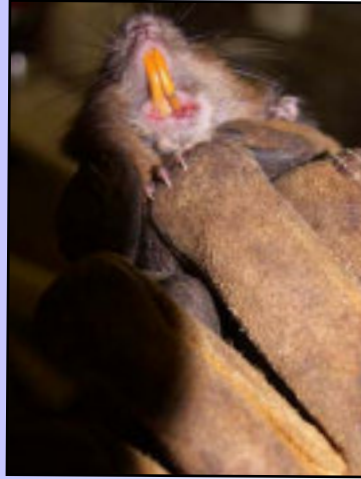


## Diet

Water voles are predominantly herbivores, eating virtually any vegetation they can find and consuming about 80% of their body weight daily<sup>1</sup>. Grasses, sedges and reeds comprise the largest portion of their daily diet. Water voles do not hibernate over winter and collect food to store in their burrows in the autumn.

In the wild a water vole's diet has a marked change during the winter months and the breeding season.

A total of 227 different plant species were identified from food remains found at feeding stations in the wild<sup>1</sup>. This serves to illustrate the vast array of food that water voles will feed on.



*Overgrown teeth can prevent feeding*

table<sup>3</sup>. Sites excessively shaded by shrubs or trees are less favoured.



*Suitable upland vole habitat*

## Monitoring

Water vole sites are monitored to follow the stability of the population. Monitoring can be done through direct trapping or through observing field signs, including latrines, feeding stations, burrows and footprints.



*Water vole trapping*

## Suitable Habitat

Previous WildCRU (Wildlife Conservation Research Unit) research has shown that the density of water vole populations is extremely sensitive to the amount of vegetation present at a site, since vegetation provides both food and shelter.



*Good water vole habitat*

Water meadows and expanses of wetland also offer habitat for water voles, provided they have tussocks of grass, rush, sedge or reed in which to create a dry nest above the water

The capture-mark-recapture technique is used to estimate population size. The weights of individuals and the breeding condition of females are all noted.

## References

1. Woodroffe, G. (2000) *The Water Vole*, The Mammal Society
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3. Strachan, R. and Moorhouse, T. (2006) *Water Vole Conservation Handbook*, 2nd ed., Wildlife Conservation Research Unit, Oxford

