KEY SPECIES IN THE NATIONAL PARK

WATER VOLES

INTRODUCTION

The water vole *(Arvicola amphibious),* or 'water rat' as it is often mistakenly known, was once one of our most familiar and abundant riverside mammals. It is a semi aquatic member of the rodent family spending time in water and on land. It is very similar to the brown rat in appearance, but has a blunt nose, small ears and a hairy tail. It is the largest of the British voles and has seen a dramatic decline particularly in the latter part of the twentieth century. Most Scottish populations are now to be found in the uplands.


Water vole

© Trossachs Water Vole Project

WATER VOLE DISTRIBUTION AND ECOLOGY


Water vole habitat in uplands

© Trossachs Water Vole Project

Water voles usually live beside bodies of water, where they feed on grasses and other vegetation such as sedges and herbs. They prefer slow moving water in burns, ditches, overgrown field drains and canals. They dig their burrows in the banks and prefer steep sided muddy banks where they can create nests above the water table. They are a prey species for several mammals and birds, so prefer continuous long vegetation in which they can hide! Because of the losses of water voles in the lowlands, they are mainly restricted to smaller tributaries and headwaters of our upland rivers. Here, they are found in narrow burns and ditches and prefer gently sloping sites with a thick layer of peat. Water voles will avoid areas which are densely shaded by trees and shrubs. Water voles live in colonies and are very territorial.

Females defend a linear territory of 30–50 m, while males occupy home ranges of 60–300 m, often overlapping the territories of several females. During the breeding season (April to September) they will mark their territories with piles of droppings called latrines which have a distinct smell to keep other water voles away! Water voles have between 2-5 young per litter and can breed up to 8 times a year! More recently water voles have been discovered in Glasgow living away from water. Large populations have been recorded in the east end of the city living in long grassland in parks, road verges, gardens and derelict land. These terrestrial water voles are termed fossorial which means adapted for digging and they spend more time underground like a mole. This adaptation to living in grasslands in such high densities in an urban environment is unique in the UK.


Water vole habitat in lowlands

© Trossachs Water Vole Project

THREATS TO WATER VOLES

The total UK population of water voles was reduced by approximately 90% between 1989 and 1996. Reasons for this decline are thought to be due to two main factors:

1. LOSS OF HABITAT

Habitat that water voles favour has either been lost or broken up into fragments. This has reduced suitable areas where the water voles can live and breed. Examples of this are draining of wetlands and the introduction of hard engineering to rivers (e.g. concrete embankments and other man-made structures). Riparian vegetation (vegetation growing at the edges of water) can change due to over grazing by wild herbivores such as deer, and also domestic livestock. This reduces the abundance of vegetation for the voles to eat and enables predators to see them more easily. However, not enough grazing is equally as damaging, allowing shrubs and trees to take hold along water courses.


American Mink

© Trossachs Water Vole Project

2. PREDATORS

Predation by the non-native American mink. Water voles have many native predators, but none seem to threaten the survival of the species. Because they have evolved alongside these predators, they have well-balanced predator-prey relationships and effective defence systems. Water voles have developed evasive behaviours to minimise their chances of being caught. They maintain runway systems on the banks so they can move through the vegetation remaining relatively unseen and when threatened they will jump into the water creating a distinctive 'plop'! and seek out their burrows to hide.

However, when the non-native American Mink was introduced to the UK, they were able to exploit the gaps in our natural food webs and became a very problematic predator. American mink are very clever and opportunistic predators, they are aggressive, good swimmers and cache kill, meaning they kill more prey than they need to store for later. Most importantly, female mink can fit into water vole burrows where they can easily catch defenceless voles that are unable to escape.

PROTECTION OF WATER VOLES

The water vole receives partial protection under Schedule 5 of the Wildlife and Countryside Act 1981 (as amended). In Scotland, this legal protection is currently restricted to the water vole's places of shelter or protection and doesn't include the animal itself. Full protection, to also cover the animal, is proposed. Currently it is an offence to intentionally or recklessly:

- damage, destroy or obstruct access to any structure or place that water voles use for shelter or protection
- disturb a water vole while it is using any such place of shelter or protection.

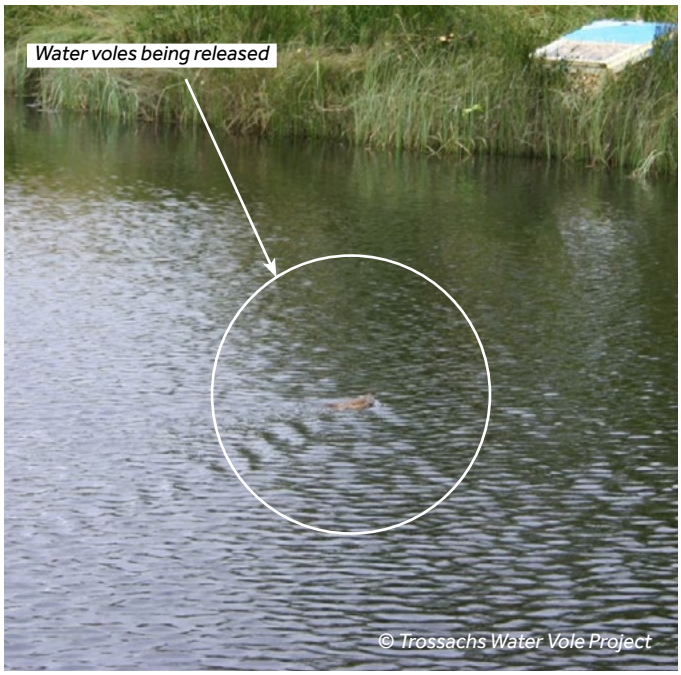
THE TROSSACHS WATER VOLE REINTRODUCTION PROJECT

The Trossachs Water Vole Reintroduction Project began in 2008 and has been an amazing success story with signs of water voles spreading fast. Surveys across Loch Lomond and The Trossachs National Park prior to this showed that water voles had been lost from most of the National Park. Forest Enterprise Scotland (Now Forestry and Land Scotland) with help from partners had carried out a lot of work to restore wetlands and created habitats which were suitable for water voles in the Trossachs area of the National Park.

This work was part of a project to improve the habitat for wildlife in the Loch Ard Forest. Ponds were dug, tree-free buffer zones were created on river edges and riparian vegetation allowed to grow, and dams were built in ditches; all of which created good habitat for the water voles and other wildlife. Mink control was also undertaken to ensure the areas were as far as possible free from this invasive species.

The nearest known surviving water vole colonies in the National Park were in isolated upland sites too far away to re-colonise this area. Meanwhile a small population of water voles needed to be relocated from a large development site in North Lanarkshire. The displaced voles were bred in captivity to increase their numbers and, between 2008 and 2011 almost a thousand were released into fifteen small areas of good quality habitat in the Loch Ard Forest. Since the releases, mink control has continued, and a buffer zone of mink monitoring activity was created and continually expanded to allow the water vole population to naturally expand.

The water vole population has been monitored every year by surveys carried out by a dedicated group of volunteers coordinated and led by a Project Officer and other staff from the project partners including Loch Lomond and The Trossachs National Park Authority.

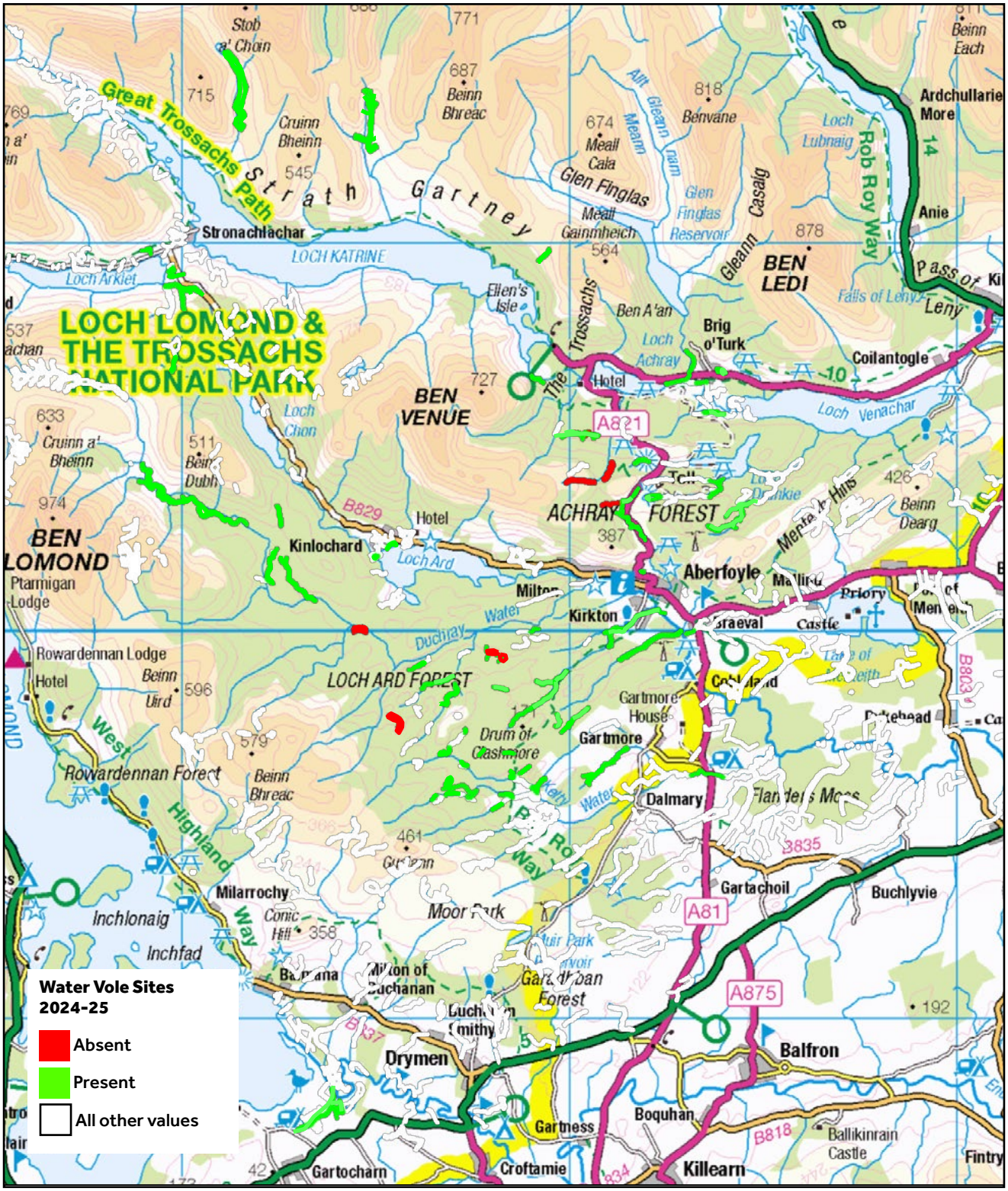


The annual surveys (see map on next page) have shown that the water vole population now occupies over 100km squares and they have travelled as far as 12 km from the original release sites.

In 2025, 10 volunteers undertook the annual training course to learn survey techniques contributing 80 volunteer hours. 9 volunteers along with 8 of our Junior Rangers volunteered to survey for water voles for a total of 176 hours. In total, more than 25 land managers are now involved in the project.

This was originally a partnership project led by Forest Enterprise Scotland with the Forth Rivers Trust, Loch Lomond & The Trossachs National Park Authority, the Royal Zoological Society of Scotland, Scottish Natural Heritage and the Derek Gow Consultancy. The steering group now comprises representatives from Forestry and Land Scotland and Loch Lomond and The Trossachs National Park.

WATER VOLE SURVEY RESULTS



OUR FUTURE NATURE PROGRAMME AND KEY PRESSURES

What is the future for nature in our National Park? We face a global biodiversity crisis and even in our most special landscapes, nature as a whole is still in real trouble. If we do not halt and reverse this decline, then our world and all of us will have a poorer and more uncertain future.

Our Future Nature programme aims to deliver a positive, exciting vision of this National Park as an exemplar where people can understand, experience and contribute towards a shared vision for restoring nature.

Future Nature

FUTURE NATURE IS CONCENTRATING ON THE FOLLOWING FOUR KEY PRESSURES:

WATER QUALITY

Negative impacts on freshwater and marine water bodies from problems such as pollution from surrounding land uses.

INVASIVE NON-NATIVE SPECIES

The spread of invasive non-native species, which displace our rich native wildlife.

HERBIVORE PRESSURE

Unsustainable levels of wild and domesticated grazing and browsing animals in some upland and woodland areas, leading to reduced tree cover and the erosion of soils, which are important carbon stores.

CLIMATE CHANGE

The impacts of climate change leading to warmer, wetter weather patterns and a subsequent increase in flood events, major landslides and rapid shifts in natural ecosystems.

Water vole

Water voles are a vital part of our freshwater ecosystem, providing a prey source for many animals and birds and creating conditions in our waterways which benefit a wide range of species. All four of these key pressures will impact the success of the continued spread of the water vole population.

KEY PRESSURES:

WATER QUALITY

Pollution from land uses including agriculture and forestry operations will affect the water habitat which will in turn impact on the plant species which can grow in areas of wetland. The condition of the water voles' habitat including trees, plants, and banks of burns or ditches will also have an impact on numbers. Many actions in the Future Nature Programme to increase water quality will benefit water voles

INVASIVE NON-NATIVE SPECIES

American mink which is a non-native species continues to be controlled across the Trossachs Water Vole Project area and areas in which it has spread. It is important this continues and more landowners, managers and volunteers become involved in monitoring mink populations to protect the water voles. Non-native invasive plants such as Himalayan balsam and Japanese knotweed will out-compete native plants which the water voles feed on. Projects in the Future Nature Programme which prevent the spread of these plants will be important in sustaining the water vole population (See Case study - Invasive non-native species).

HERBIVORE PRESSURE

Water voles eat a very wide variety of plant species and also require plants to hide in. Too much or too little grazing around sites occupied by water voles will have an impact on the quality of vegetation available to eat and the height of vegetation in which to take cover. Sustainable grazing will improve habitats for both these species.

CLIMATE CHANGE

Climate change will have an impact on the wildlife and ecosystems in the National Park including water voles. It is the single greatest threat to Scotland's habitats, some habitats will be directly affected but more often, climate change will alter the ecological balances that let plants and animals grow and thrive such as the wetland habitats where our water voles live.

MITIGATING AGAINST CLIMATE CHANGE

It is predicted that in the future typically the summers will be hotter and drier and the winters and autumns will be milder and wetter. The hotter weather in the summer will mean water levels may fall, banks may dry out affecting burrows and vegetation growth will also be affected. In the autumn and winter, water levels may rise with flooding occurring more frequently.

All these changes in the climate will affect the habitat and the ecosystem where water voles and other species have adapted to survive. We need to ensure that ecosystems in the National Park can withstand the effects that climate change is bringing to our native biodiversity and wider environment. These ecosystems can also help mitigate climate change by maintaining carbon stores, storing carbon and surface water.

The National Park's peatlands hold an estimated 20 million tonnes of carbon, and our forests hold another 2.5 million tonnes. Restoring peatlands by blocking drainage ditches and covering bare peat will not only store carbon, but will also hold onto water for longer, preventing flooding downstream in areas where there may be water voles.

Photo © RJCooper LLTNPA / Peatland ACTION

As highlighted in the beaver case study, the expanding beaver population in the National Park can help maintain and expand wetland habitat for water voles in the face of climate change

Planting trees upstream in our upland areas can also help reduce flooding, although we need to make sure woodlands are designed not to have a negative effect on water vole habitats. Many of the outcomes in our Future Nature Programme will help reduce climate change which will in turn help water voles.

FUTURE PROJECTS

The Trossachs Water Vole Project turns 20 in 2028, and we are as committed as ever to the protection of our water vole population and their habitats.

However, in the coming years the project also hopes to build on our successes and expand the breadth of our work, helping to bring about positive changes to the health of wetland and riparian habitats throughout the wider Forth catchment.

QUESTIONS AND PUPIL ENQUIRY

- What may cause species to become locally and nationally extinct?
- List two reasons for the decline of water voles across the UK
- Where did the captive water vole population come from which were reintroduced into the Trossachs?
- How may climate change affect water voles in Loch Lomond & The Trossachs National Park?

FURTHER READING

Online

- Read more about Future Nature and the four key pressures to wildlife.
- Read more about water voles and their protected status
- Read more about the Trossachs Water Vole Project
- Learn more about water voles from the Mammal Society

Video clips

Video clip of water voles on mink raft

Site visits

- Water voles are very difficult to see. Loch Ard Forest in Aberfoyle has populations of water voles. Look out for field signs such as latrines and burrows.