Saving our Upland Water Voles

2024 - 2025

CYMRU WYLLT WILD CYMRU

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Report Authors

Richard Bluck, Eliza Chapman, Rob Parry and Vaughn Matthews (March 2026)

Executive Summary

Water Voles have witnessed one of the most dramatic population crashes of any mammal species in Wales. It is likely that if we do not act to save the Water Vole, then this once common neighbour of ours is facing almost certain extinction from these shores. Upland habitats such as bogs, mires and moorland offer a unique opportunity for Water Vole conservation in Wales. Although upland habitats are often sub-optimal in quality, their relative safety from American Mink, coupled with their extent and connectivity, make these regions of Wales crucial in the fight to save Water Voles from extinction. In our project area of the Glamorgan uplands the Wild Cymru team, along with local volunteers and students have been able to survey over 70 sites for Water Voles and recorded their presence in 26 of them. This level of positive sites scattered over such a large area means that the Glamorgan uplands are now considered one of the most significant landscapes for Water Voles in Wales. Despite the good news, the project has also found that Water Voles face a barrage of new and existing threats whilst in these upland landscapes, most notably the increasing presence and occupation of American Mink. Community conservation is key to saving Water Voles in the Glamorgan uplands and across the uplands of Wales.

Wild Cymru

Science Centre
c/o National Botanic Garden of Wales
Llanarthne
Carmarthenshire
SA32 8HG
Charity Number 1180113

07821 397625

info@wild.cymru

www.wild.cymru

Front Cover: Water Vole *Arvicola amphibius*. *Photo: Sorcha Lewis*

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1. Introduction

1.1. About Wild Cymru

1.1.1. Wild Cymru (formerly the Initiative for Nature Conservation Cymru (INCC)) was founded in 2018 as a charitable organisation (charity number: 1180113). Our vision is of 'a Wales with more wildlife in more places, created by a society that intrinsically values the natural world'.

1.1.2. Wild Cymru was formed in response to the growing need for an independent nature conservation organisation for Wales. An organisation that was able to speak out and challenge environmental decision makers to do more for wildlife and nature conservation in Wales. To help achieve this, Wild Cymru undertakes a wide variety of nature conservation activities, including:

- Targeted species and habitat conservation projects
- Research, surveys and monitoring
- Practical habitat management and landowner advisory
- Community engagement and education
- Advocacy, campaigns and litigation

1.2. Rationale

1.2.1. Wild Cymru's Saving our Upland Water Voles project responds to the urgent conservation issues facing Water Voles *Arvicola amphibius* across the upland landscapes of Wales, and those particularly in Glamorgan. Water Voles have suffered one of the most severe population declines of any British mammal, with national losses estimated at around 90% since the mid-20th century (Macdonald & Harrington, 2003; Strachan et al., 2011; Strachan & Moorhouse-Gann, 2006). The catastrophic decline has been driven by habitat loss and fragmentation, wetland drainage, urbanisation, and predation by the non-native American Mink *Neogale vison* (Macdonald & Harrington, 2003). As a result, the Water Vole is listed as a species of principal importance for maintaining and enhancing biodiversity in Wales, under Section 7 of the Environment (Wales) Act 2016.

1.2.2. The project therefore is driven by clear ecological need and a significant historical evidence gap. Upland landscapes in Glamorgan were long overlooked for Water Voles due to assumptions that they represented unsuitable or marginal habitat. This assumption, coupled with the difficulty of surveying upland habitats, resulted in minimal survey effort in the uplands, despite a period (1995 - 2015) of intense survey action for the species. The intense survey action was in direct response to the widespread collapses of Water Vole populations across lowland South Wales

catchments following post-war agricultural intensification and increased American Mink pressure. Consequently, few lowland strongholds now remain in Wales.

1.2.3. Emerging evidence, including early (2014) records from sites such as Llyn Fach and more recent survey work, demonstrates that the uplands of Glamorgan support extensive networks of blanket bog, wet heath, flushes, moorland streams and wet grasslands. These habitats form interconnected wetland systems that can act as refuges from American Mink predation (Aars et al., 2001).

1.2.4. The project seeks to address a critical knowledge gap by identifying, surveying and safeguarding these overlooked upland populations, while developing a landscape-scale understanding of upland Water Vole ecology.

1.2.5. The project is delivered with the support from local landowners, academic institutions, conservation bodies and stakeholders, and is driven by a community-led conservation approach. By combining ecological research, habitat restoration and community engagement, the project represents an essential step towards the recovery and long-term resilience of Water Vole populations in South Wales's uplands.

1.3. Project Aims and Objectives

- Prevent the local extinction of Water Vole populations in and around the upland landscape of Pen y Cymoedd, one of the largest on-shore windfarms in Europe. This will be achieved by undertaking detailed habitat surveys, innovative research, community engagement, advocacy, and provide guidance for land managers.

- Engage with local communities, groups, schools, and individuals**.**

- Create a Wales-wide approach to upland Water Vole conservation, based on the scientific evidence and information gained through the project.

1.4. Outcomes

- Water Voles within the project area will be better understood and better protected in the long-term.
- Local people from different communities will be inspired by their landscape and the wildlife it supports.
- The area will become known throughout Wales and the UK as a destination for upland wildlife and wild landscapes.
- The safeguarding of upland Water Voles across Wales and the prevention further localised extinctions.

1.5. Study Area

1.5.1. The project focuses on approximately 25,000 hectares of upland landscape within the upper catchments of the Rhondda Fach, Rhondda Fawr, Cynon, Afan and Neath valleys (**Figure 1** and **Figure 2**), typically between 300 and 600 metres above sea level. The project area is split into three blocks: East, Central and West (**Figure 3**).

1.5.2. The habitats and land use within the study area varies considerably across the landscape, ranging from dense conifer forest plantation, roads and industry to peatlands, Purple Moor-grass *Molinia caerulea*-dominated marshy grassland, and mire. Those habitats thought to be more beneficial to Water Voles in upland landscapes include peatland, mire, lake/reservoir edge, ponds, marshy grassland, upland streams and drainage ditches.

1.5.3. Habitat protection and restoration across the Glamorgan uplands is being delivered in parallel by Natural Resources Wales (NRW) and the Lost Peatlands Project. Across the wider project area, peatlands that were historically drained or afforested are being restored through ditch blocking, re-wetting. These measures raise water tables, improve bog condition and create wetter, more structurally diverse habitats that benefit Water Voles and other upland species.

Figure 1: Map of Wales showing location of project area.

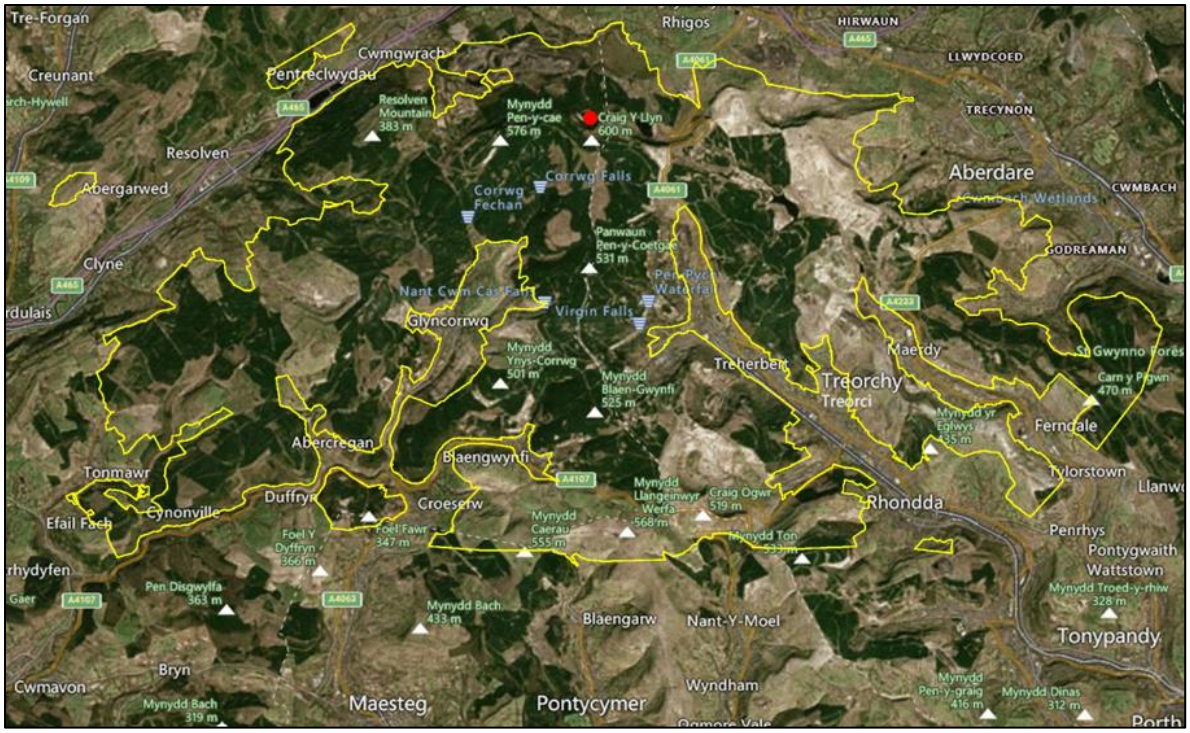

Figure 2: Project area covering the Neath, Afan, Rhondda and Cynon valleys with Llyn Fach Nature Reserve shown (red dot - records of Water Voles found in 2014).

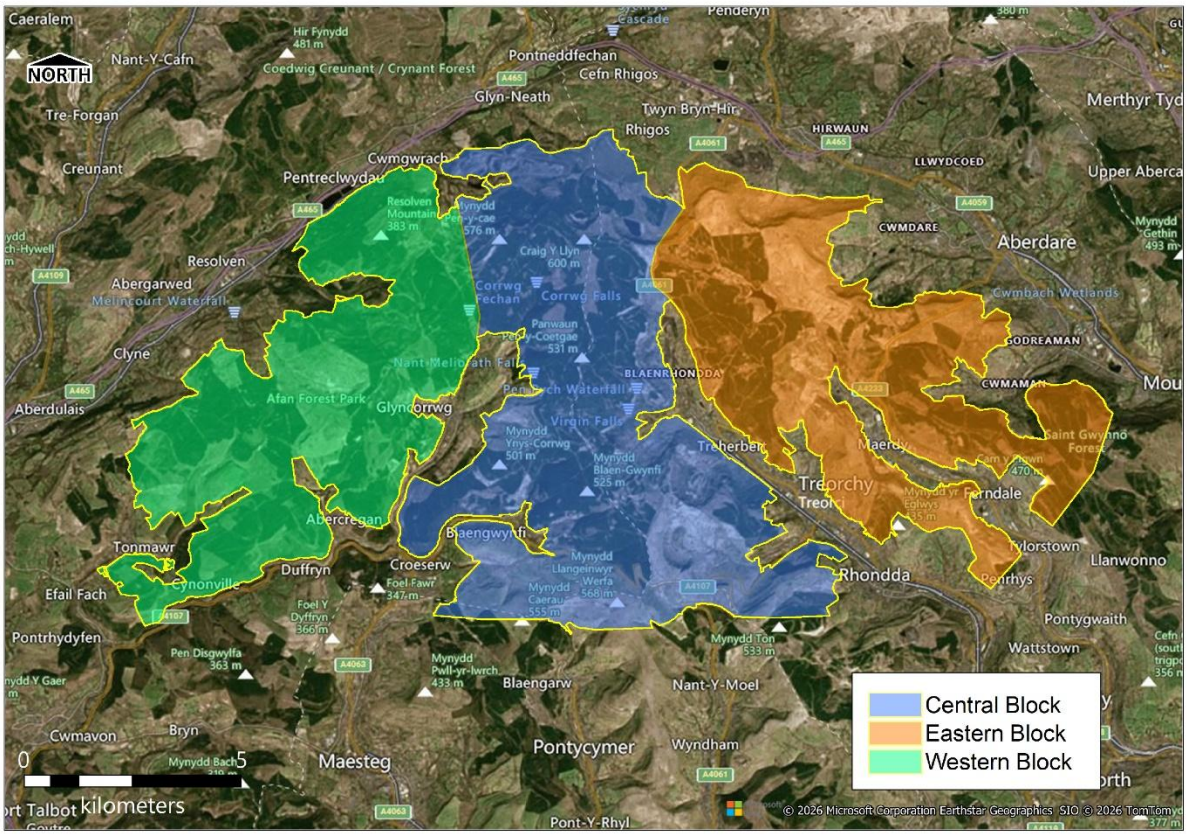

Figure 3: Project area broken up into three distinct blocks.

2. Water Vole Ecology

2.1. Habitat

2.1.1. In the uplands, Water Voles occupy a range of wetland habitats including flushes, peatland edges, small ditches and slow-moving streams (Strachan et al., 2011; Neyland, 2011). Unlike lowland populations that rely heavily on burrows within riverbanks, upland Water Voles rely more on nests constructed from grasses and rushes, reflecting the shallow soils, high water tables and peat-dominated substrates in upland habitats (Strachan, 2004; Lawton & Woodroffe, 1991).

2.1.2. Upland Water Voles primarily feed on rushes, sedges, grasses and other wetland plants (Neyland, 2011). Their territories tend to be larger and more dispersed than those in lowland river systems, reflecting the patchy distribution of suitable habitat within the uplands (Rushton et al., 2000). These ecological adaptations allow populations to persist in areas that may experience reduced predation pressure, particularly where American Mink are absent or occur at lower densities (Barreto et al., 1998; Brzeziński et al., 2018).

2.1.3. Upland conditions also present significant challenges. Harsh weather, including low temperatures and prolonged rainfall can reduce foraging opportunities and damage burrows, leading to increased mortality (Strachan et al., 2011). These environmental pressures can increase the effects of habitat fragmentation and predation, making upland populations vulnerable to decline.

2.2. Breeding Ecology

2.2.1. Water Voles have a relatively high reproductive rate, which allows populations to recover rapidly following disturbance (Strachan, 2006). In upland environments the breeding season typically extends from April to September, although it is influenced by altitude and temperature (Neyland, 2011). Females may produce two to four litters per year, with an average litter size of four to six young and juveniles reaching sexual maturity within a few months (Strachan et al., 2011). In the uplands reproductive success is often constrained by shorter growing seasons and reduced food availability, resulting in lower population densities than those recorded in lowland habitats. (Rushton et al., 2000; Neyland, 2011).

2.3. Population Dynamics and Connectivity

2.3.1. Upland Water Vole populations are typically small, fragmented, and widely dispersed, reflecting the patchy distribution of suitable wetland habitats in upland landscapes. Unlike lowland river systems, which allow populations to expand along continuous corridors, uplands function as a network of semi-isolated habitat patches,

with colonies separated by unsuitable terrain (Capreolus Wildlife Consultancy, 2005). Maintaining connectivity between these patches is therefore crucial for sustaining genetic diversity and reducing the risk of local extinction. In the uplands, population survival depends not only on the condition of individual habitat patches, but also on the integrity of the wider network that enables dispersal and recolonisation (Lawton & Woodroffe 1991; Aars et al. 2001).

2.3.2. Compared to larger populations, small and isolated colonies are far more vulnerable to extinction as they are less resilient and highly susceptible to fluctuations in colony size (Lawton et al 1991). Small populations are also at greater risk of inbreeding, resulting in reduced genetic diversity and increased susceptibility to disease. These pressures are compounded by environmental factors such as limited food availability, predation, and extreme weather events, including drought and flooding, which occur with high frequency in upland systems. Nevertheless, provided that the rate of dispersal and recolonisation exceeds that of localised extinctions, Water Vole populations may persist at a regional scale, maintaining their overall distribution even if individual colonies are lost or shift location over time. When a regional population consists of a group of multiple sub-populations spatially separated from one another and maintained by frequent dispersal and interaction, we call this a 'metapopulation'. It has been shown that regional populations of Water Voles in the Scottish Highlands function as metapopulations (Strachan et al., 2011).

2.3.3. Wild Cymru has documented how rapidly upland Water Vole populations can be lost. During the 2024 survey season, an exceptionally active wetland site was recorded, showing numerous signs of Water Vole activity, including feeding stations, latrines, burrows, and well-used runs, indicating a thriving population. However, when the site was resurveyed in 2025, no evidence of Water Voles was recorded. A habitat that had supported a healthy population just a year earlier had become completely unoccupied.

2.3.4. This rapid loss highlights the extreme vulnerability of upland Water Voles to predation and habitat disruption. Such sudden disappearances are typical of American Mink, which can destroy entire colonies in a short period. Studies in lowland systems have shown that American Mink presence is strongly linked to Water Vole absence and is often the primary factor determining current distribution (Barreto et al. 1998). Long-term observations further indicate that in areas invaded by American Mink, Water Vole numbers decline as American Mink populations increase, sometimes resulting in the complete local extinction of colonies (Aars et al. 2001).

2.4. Habitat Loss and Fragmentation in the Uplands

2.4.1. Afforestation in the Rhondda uplands has negatively affected Water Voles mainly through the peatland drainage required for forestry trees to establish successfully. Drainage lowers water tables and dries bogs, flushes and streams, reducing the wet areas and dense vegetation that Water Voles need for feeding and burrowing. As plantations mature, increased water uptake by trees and canopy shading further dry the peat and shift plant communities away from sedges and rushes toward species typical of drier habitats. Large forestry blocks also fragment open upland habitats and disrupt hydrological connectivity, limiting Water Vole movement. These combined effects lead to habitat loss and reduced suitability for Water Voles, although peatland restoration and drain-blocking schemes are beginning to reverse these impacts by restoring wetter conditions (The Lost Peatlands Project, 2025).

2.4.2. Fragmentation in upland habitats can reduce population connectivity, limit genetic diversity, and prevent recolonisation of areas where populations have declined (Melis et al., 2013). It can also force Water Voles to traverse exposed dangerous terrain, increasing their vulnerability to predation. Parts of the Glamorgan uplands suffer greatly from habitat fragmentation in the form of afforestation, natural regeneration, farming and more recently through industry, particularly onshore wind power (**Figure 4)**. Regeneration ('regen') in the uplands arises from naturally occurring succession in native broadleaf species, such as Willow *Salix spp.* but also from planted, non-native conifers, mostly Sitka Spruce *Picea sitchensis.* Both processes lead to increasing tree cover, negatively impacting Water Vole habitat by shading out wetland vegetation. The Sitka, however, are adapted to grow significantly faster compared to Britain's native trees (hence the use in the forestry industry), leading to habitat loss and fragmentation over a far shorter period. Conifer trees have dense leaves (needles) which shade out vegetation far more than species such as Willow. (Non-Native Species Secretariat, 2022).

2.4.3. Infrastructure such as roads, buildings, substations and foundations all have the potential to directly result in habitat loss and fragmentation. The road and turbine foundation network, when coupled with existing forestry access tracks can be significant in terms of habitat loss. While the full long-term impacts are not yet fully understood, these infrastructures have the potential to reduce breeding success and threaten the long-term viability of Water Vole populations in upland landscapes (Rushton et al., 2000; & Brzeziński et al., 2018).

Figure 4: Habitat fragmentation caused by renewable energy infrastructure**.**

2.5. American Mink

2.5.1. The number one factor driving the decline of Water Vole populations is predation by American Mink. Research on Water Vole reintroductions consistently identifies American Mink predation as a major cause of failure, demonstrating that effective American Mink control is critical for establishing and sustaining populations (Mace, 2025). In upland landscapes, Water Voles may persist within a metapopulation structure, where long-term survival depends on the balance between local extinctions and recolonisation from nearby sites (Aars et al. 2001). This makes populations highly sensitive to habitat loss and fragmentation but also highlights the potential for targeted habitat restoration and improved connectivity to deliver conservation plans. Within the project area, collaboration with NRW, the Lost Peatlands Project, and local farms is essential to coordinate habitat management and support recolonisation and long-term population resilience in the uplands.

2.5.2. Predation by American Mink remains the principal factor limiting Water Vole population stability. Recent sightings within the project area, with four Mink recorded to date (2026), have heightened concerns regarding population vulnerability and potential local losses. Although American Mink generally favour lowland environments due to higher prey availability and more favourable conditions, they are known to occur at higher elevations and pose a significant threat to upland colonies. Female Mink are particularly damaging, as their small size allows them to enter Water Vole burrows and rapidly eliminate entire colonies by hunting along linear watercourses and systematically exploiting burrow systems.

2.5.3. Where American Mink are absent or effectively controlled, upland Water Vole populations show greater resilience despite challenging environmental conditions (Barreto et al. 1998). However, upland-specific data on American Mink behaviour, dispersal, and seasonal impacts remain limited compared to lowland systems, highlighting the need for further research to inform effective management. American Mink were introduced to Britain following escapes from fur farms during the 20th century and hunt efficiently along rivers and connected ditch networks. Studies indicate that Water Vole populations occupying linear habitats are particularly vulnerable to predation, whereas those associated with more complex wetland mosaics tend to exhibit greater resilience (Macdonald & Harrington, 2003; Macdonald et al., 2007).

2.6. Changes in Understanding of Upland Habitat

2.6.1. Understanding of upland habitat use by Water Voles in South Wales has changed significantly over the past two decades. Uplands were once considered marginal or unsuitable, so survey effort and conservation resources were focused almost entirely on lowland rivers and wetlands, where Water Voles were expected to occur (Lawton & Woodroffe, 1991; Aars et al., 2001). However, more recent surveys have shown that Water Voles can occupy a range of upland habitats, highlighting the need to consider these areas in conservation planning (Aars et al., 2001).

2.6.2. Across Wales, upland landscapes (land above 300m elevation)—including mountains, moorland, and heath cover approximately 401,500 hectares, or about 19.3 % of the total land area (NRW, 2021) (**Figure 5**). These upland habitats consist of semi-natural ecosystems such as blanket bog, heath, wet flushes, and upland grasslands. These habitat types are particularly important in upland areas of South Wales, providing refuges and potential connectivity for Water Vole populations that were previously overlooked (Barreto et al., 1998; Aars et al., 2001).

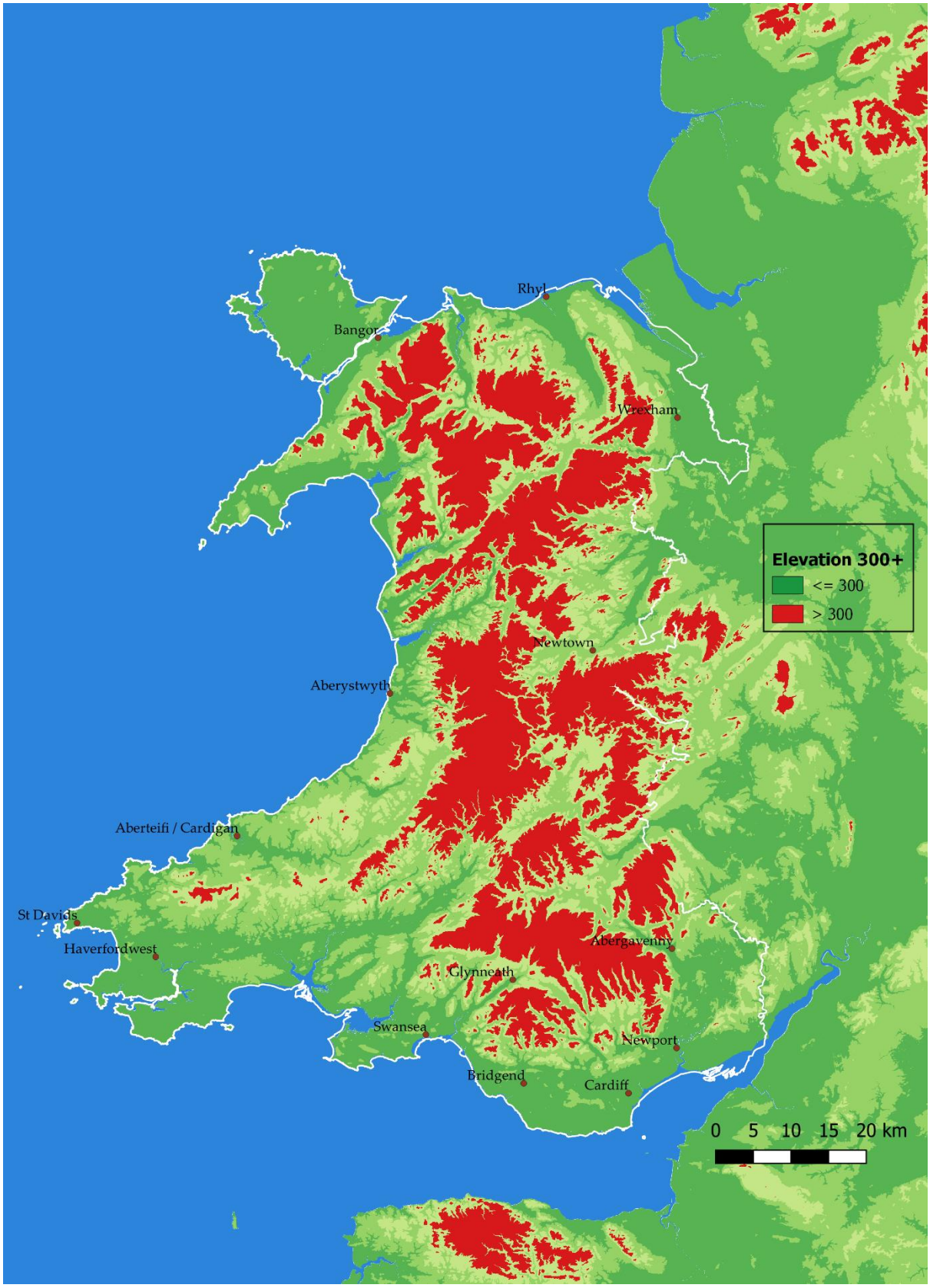

Figure 5: Upland (>300 m) land cover in Wales, including mountains, moorland and heath habitat

2.7. South Wales Decline

2.7.1. Declines in Water Vole populations in South Wales (**Figure 6** and **Figure 6**) have also been caused by the non-native American Mink as with much of the UK. In addition to American Mink predation, Water Vole declines are linked to agricultural intensification following the Second World War. National food security policies resulted in the widespread drainage of wetlands and floodplains, leading to extensive habitat loss. A clear example of this process can be seen along the Dyfi floodplain in Mid Wales, which historically supported strong Water Vole populations (**Plate 1**). However, large-scale drainage and agricultural improvement removed much of the connected wetland habitat, leading to habitat fragmentation and loss of Water Voles from many former sites.

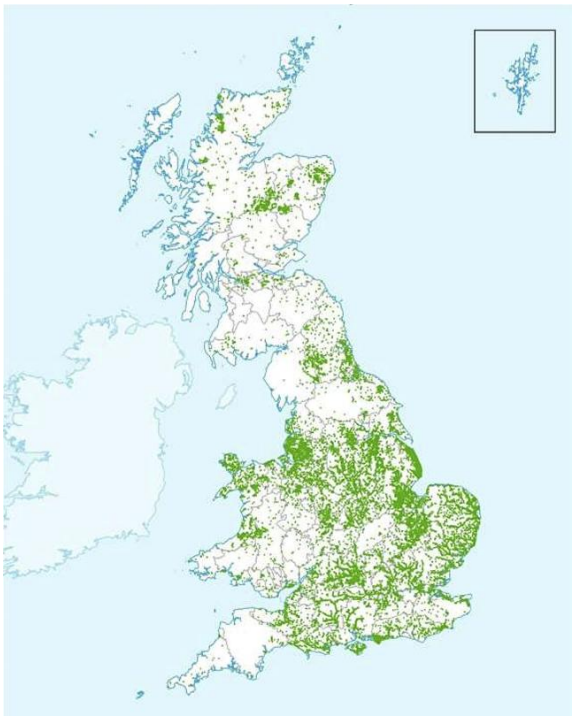

Figure 6: Water Vole distribution in England, Wales and Scotland 1861 – 2012. Copyright National Water Vole Database Project (Glossop 2024).

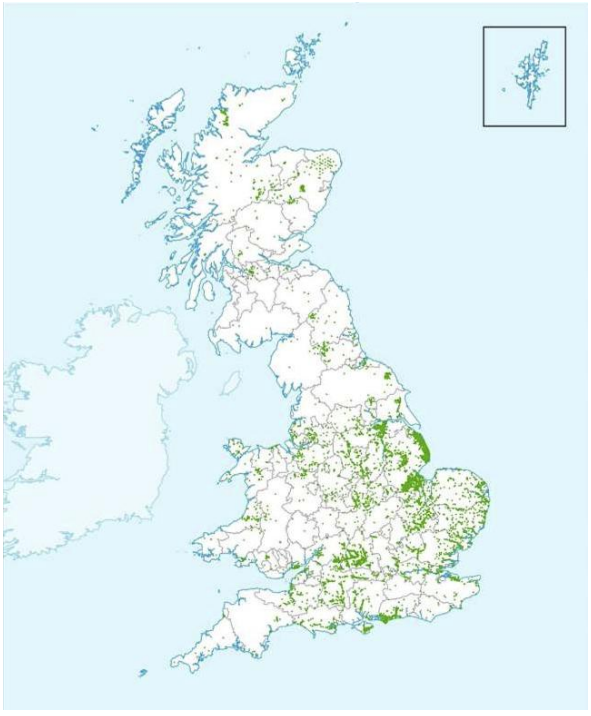

Figure 7: Water Vole distribution in England, Scotland and Wales 2008 – 2012. Copyright National Water Vole Database Project (Glossop 2024).

Plate 1: Dyfi floodplain showing a large area of drained wetland now grazed by sheep alongside a relatively narrow drainage ditch, offering Water Voles the only remaining suitable habitat.

2.7.2. In contrast, upland landscapes such as those in Glamorgan have been less intensively modified for agriculture and now represent important refuge areas. This pattern is closely linked to the area's industrial history. From the early 19th century, coal mining was a major industry across Glamorgan, limiting agricultural drainage in upland areas (Williams, 1996). Although mining caused localised hydrological disruption, drainage, and wetland fragmentation at the time, these habitats now support Water Vole populations within structurally diverse wetland mosaics.

3. Methodology

3.1. Water Vole Surveys

3.1.1. The presence of Water Voles was ascertained through the identification of key Water Vole field signs, including:

- **Droppings (Plate 2)**: Cylindrical in shape, measuring 8 – 12mm in length and 4 – 5mm in width. They are odourless and vary in colour between green, brown, black and purple, depending on diet. Droppings can be found scattered throughout a territory but are normally deposited in discrete latrines.

Plate 2: Water Vole droppings (top 3 – green colouration, bottom 3 – brown colouration)

- **Latrines (Plate 3):** Found scattered throughout the territory on raised muddy platforms near the water's edge, along runs and outside burrows. They often appear flattened, caused by scent marking where the Water Voles drum marks the latrine, leaving scent from the lateral flank glands.

Plate 3: Water Vole latrine – note trampled droppings due to scent marking

- **Food piles (Plate 4):** These are neat, often parallel piles of vegetation, typically larger than 10-15cm in length (often found with incisor marks at a 45° angle), found on banks and along runs.

Plate 4: Water Vole feeding station (food pile)

- **Burrows (Plate 5)**: Entrances are typically wider than high, with a diameter of 4-8cm, and can be found above and below the water level.

Plate 5: Water Vole burrow in upland habitat.

- **Runways in Vegetation**: Distinct pathways formed by the Water Voles when they move through their territory which lead to feeding stations, latrines or burrow entrances.

3.1.2. Due to the potential confusion of many Water Vole field signs with other small mammal species, only latrines and droppings were used to confirm current occupancy of Water Voles during surveys. Water Vole burrows were recorded but additional evidence such as latrines and droppings were necessary to confirm presence.

3.1.3. Sturdy sticks were used by all surveyors to part vegetation to expose the ground beneath to check for field signs. Water Voles use the vegetation for cover from predators; consequently, a large proportion of latrines and food piles were hidden from view compared to signs left in exposed areas, for example on a raised platform of mud within a channel.

3.1.4. Surveying was avoided for at least 1-2 days following heavy rainfall due to the potential of flooding temporarily removing field signs (latrines, droppings and feeding remains). Likewise, waterways in spate were not surveyed until conditions became more settled and water height and flow stabilised.

3.1.5. Water Vole field signs were recorded using a Geographical Positioning System (GPS) (**Plate 6**). Field sign grid references were entered into a Geographical Information System (GIS) so that colony distribution data could be displayed within the project area. Other information collected during the survey and entered into a spreadsheet include date of survey, starting grid reference, surveyors, elevation, weather conditions and dominant vegetation type.

Plate 6: Recording 10-figure grid reference and elevation

3.2. Site selection

3.2.1. Water Vole surveys were conducted throughout the project area between May – October of 2024 and 2025. Surveys were carried out by Wild Cymru's Conservation Officers and trained volunteers. Survey sites were selected on the basis of; (i) habitat suitability, (ii) accessibility, access constraints and safety (informed by NRW mapping based on data from 2018 and 2019), and (iii) a minimum elevation of 300 m above sea level (ASL), which is defined as 'uplands'.

Habitat considered 'potential' was surveyed. Potential habitat had to meet 2 basic criteria, (i) Presence of water, and (ii) not within closed canopy forestry. Sites were determined using GIS and in-person assessment. Potential habitat included ditches, ponds, streams, rivers, reservoirs, flushes, bogs and lakes (**Plate 7**). Surveys of ditches, streams and rivers were undertaken from within the waterway (if possible) and up to 5m adjacent to the bank. Non-linear habitats, e.g., bogs, were surveyed using a line-pattern method in order to cover as much of the survey area as possible and ensure adequate survey effort. Due to the variable and often extreme weather conditions, working near water and on unstable peat bogs, all surveying adhered to a strict no lone working policy.

Plate 7: Llyn Fach Nature Reserve showing suitable habitat around lake edge

3.3. Trail Camera Monitoring

3.3.1. In addition to more traditional Water Vole surveying, artificial burrows ('burrow cams') (**Plate 8**), housing bait and trail cameras, were deployed in various locations across the project area to capture activity. This method both supplemented and complemented Water Vole survey effort.

3.3.2. Camera trapping has also been used to monitor the presence of American Mink. Burrow cams have been employed as an effective alert for Mink presence, as well as an additional surveying technique for Water Voles and have provided important records to help inform potential locations to deploy Mink traps.

3.3.3. The burrow cam is approximately 0.8 – 1 metre in length and mimics a real Water Vole burrow. There is an entrance hole at one end, approximately the size of an actual Water Vole burrow entrance, and a removable lid at the other end, where a trail camera can be inserted. The trail camera was fitted with a 3.5 magnification lens to focus captured species more clearly. Burrow cams were baited with pieces of apple and carrot, a known favourite of captive-bred Water Voles. Footage from the cameras was reviewed every 7-10 days to check what species were captured.

Plate 8: Burrow camera with solar panel charger in the field

3.4. Relatedness Analysis

3.4.1. Finding out how closely related one Water Vole colony is to the others will indicate the degree of interaction and genetic exchange between all the sub-populations identified during surveying. Additionally, it will show the degree of recolonisation, which is extremely important for the Water Vole's long-term survival.

3.4.2. The genetic relatedness results will determine if Water Vole sub-populations in the uplands of Glamorgan function in the same and/or similar way. Ultimately, it will give an insight into how well-connected Water Voles from different colonies are, which will

lead to a better understanding of the dynamics of colony distribution within the project area. Conclusions from the research will inform future conservation efforts, including improving habitat corridors for connectivity, and will allow Wild Cymru to develop a habitat guidance plan for the species, tailored to an upland landscape.

3.5. Sample Collection

3.5.1. Sites were surveyed for Water Voles, with emphasis on finding territory-marking latrines. 1-3 droppings were taken from identified latrines and collected in separate sample tubes (**Plate 9**). The process was repeated for each latrine found on a site. Sample tubes were labelled with a code, relating to the site number (first digit), latrine number (second digit) and dropping number taken from the latrine (third digit). The code 2.5.1, for example, indicates Site 2, latrine number 5, dropping number 1 (**Plate 10**). A 10-figure grid reference was recorded for each latrine collected from.

3.5.2. Droppings were collected using a knife, preventing contamination from handling. Droppings were stored in 70% ethanol in sample tubes; this, combined with freezer storage, is the optimum method for preserving the DNA stored in the droppings for later analysis. Droppings have been sent to our project partners at Aberystwyth University where the relatedness analysis is being undertaken.

Plate 9: Dropping collection

Plate 10: Sample code on vial

4. Results

4.1. Water Vole Surveys

4.1.1. A total of 40 surveys were conducted during 2024, with a total of 17 positive sites for Water Voles (**Figure 8**). 32 surveys were carried out during 2025 with a focus on dropping collection for genetic relatedness analysis of which 16 sites were positive (**Figure 8**). Nine new occupied sites were found in 2025. When added to the 17 sites found in 2024 a total of 26 positive sites has been found and recorded across the project area. However, resurveys in 2025 found that 6 of the original 2024 surveys which were positive for Water Vole were no longer occupied, meaning that there was only a total of 20 positively occupied sites for Water Vole at the end of 2025.

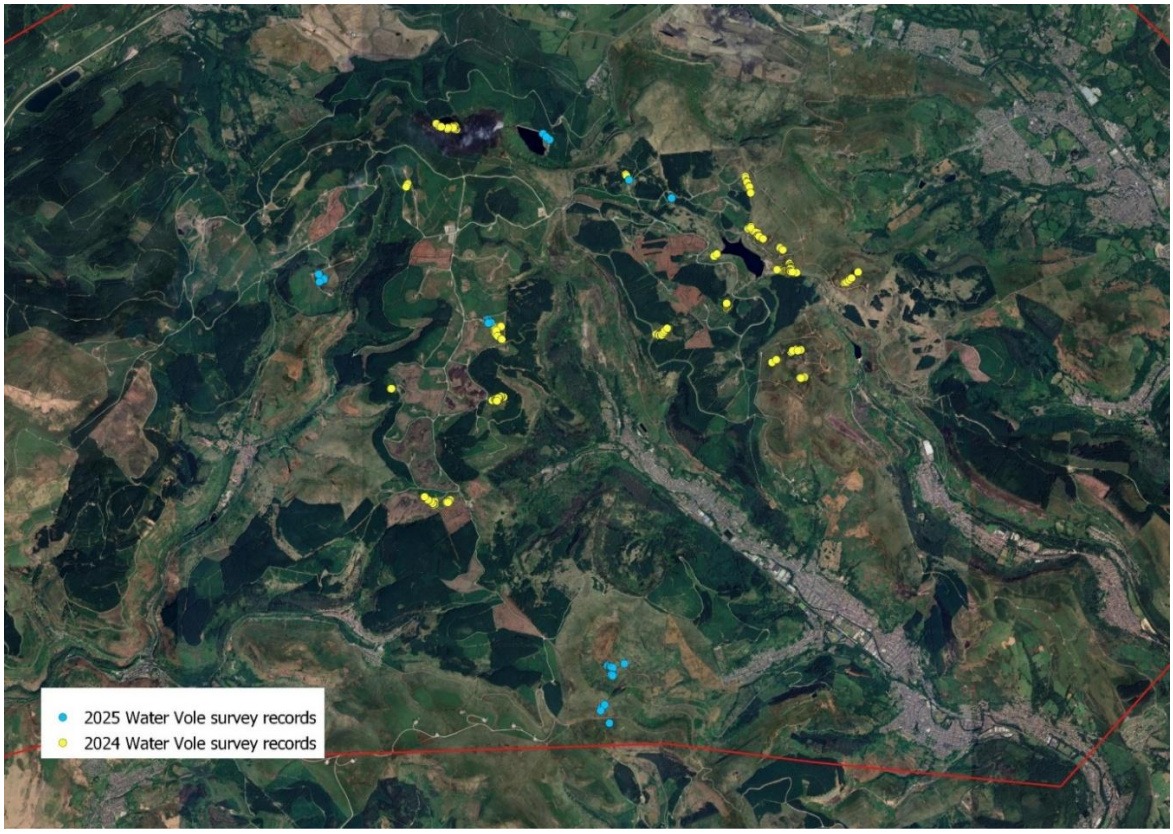

Figure 8: Water Vole records 2024 and 2025

4.2. Trail Camera Monitoring

4.2.1. Species captured on the trail camera include Water Vole (**Plate 11**), Field Vole *Microtus agrestis*, Common Shrew *Sorex araneus*, Wood Mouse *Apodemus sylvaticus*, Common Lizard *Zootoca vivipara*, Weasel *Mustela nivalis*, Stoat *Mustela erminea* and American Mink (**Plate 13**).

Plate 11: Water Vole feeding on apple captured on burrow cam

4.2.2 Burrow cam footage complemented surveying data, for example, an initial survey of a site in 2024, containing good habitat (wet ditch surrounded by marshy grassland), was found to contain no evidence of Water Voles; by utilising the burrow cam, footage was captured of two Water Voles within the burrow at the same time later that year. This prompted a follow-up survey, which resulted in finding 3 Water Vole latrines.

4.2.3. Four sightings of American Mink have been recorded within the project area. Sighting one was captured in December 2024 on the Rhondda River (just north of Blaenrhondda), the headwaters of which connect to the Central Block of the project area and was reported to us by a member of the public. The footage, captured on a free-standing trail camera, showed the animal near a large pile of stones, suggesting that it could be a female who has set up a den.

4.2.4. The second Mink was detected on a site adjacent to 'Black Bog' (SS 9060998440) in March 2025 using a burrow cam. The 'Black Bog' site, which contains areas of good quality habitat and where 7 latrines were found in 2024, was negative when resurveyed in 2025.

4.2.5. Mink sightings 3 and 4 came in quick succession, appearing on burrow cams in August and September of 2025 (**Plate 12**).

Plate 12: American Mink captured on burrow camera

4.3. Relatedness Analysis

4.3.1. Genetic relatedness analysis work continues at Aberystwyth University and Results are pending – to be confirmed in spring 2026.

4.3.2. Droppings from latrines were collected from 17 sites, with 4 sites in the south falling just beyond the project area boundary.

5. Conclusion and Observations

5.1. Water Vole surveys

5.1.1. 7 sites which were positive for Water Voles in 2024, showed a decline in 2025. 6 out of the 7 colonies were negative in 2025 with no droppings, latrines or feeding stations found (**Table 1**). Site 9, informally named 'Gold Mine', showed a concerning decline in activity (based on latrine count) but remains occupied. This decline, however, is potentially attributed to the aforementioned American Mink sighting.

Site	Grid ref	Latrine Count 2024	Latrine Count 2025	Note
9	SN 9446501031	24	7	Mink record Aug 2025. Habitat remains good.
14	SS 9024698382	7	0	Mink record March 2025. Habitat remains good.
15	SS 9060998440	7	0	Mink record March 2025. Habitat remains good.
17	SS 9023398340	5	0	Mink record March 2025. Ditch has become dry.
31	SN 9343100697	13	0	Habitat remains suitable.
37	SN 9118800807	18	0	Habitat remains suitable.
40	SS 9109399788	19	0	Habitat remains suitable.

Table 1: Water Vole site latrine counts 2024 vs 2025

5.1.2. A total of 13 sites were found to contain signs of Water Voles in the East Block (**Figure 3**) of the project area during 2024 and 2025. During the same period, 7 occupied sites were identified in the central block and to date only occupied 1 site has been found in the West Block (**Figure 3**). Most Water Vole survey signs were recorded in Rhondda Cynon Taff (RCT), with several positive sites occurring just within Neath Port Talbot (NPT) (**Figure 9**). In addition, a small number of positive signs were recorded just outside the project area towards the north of Bridgend County Borough Council.

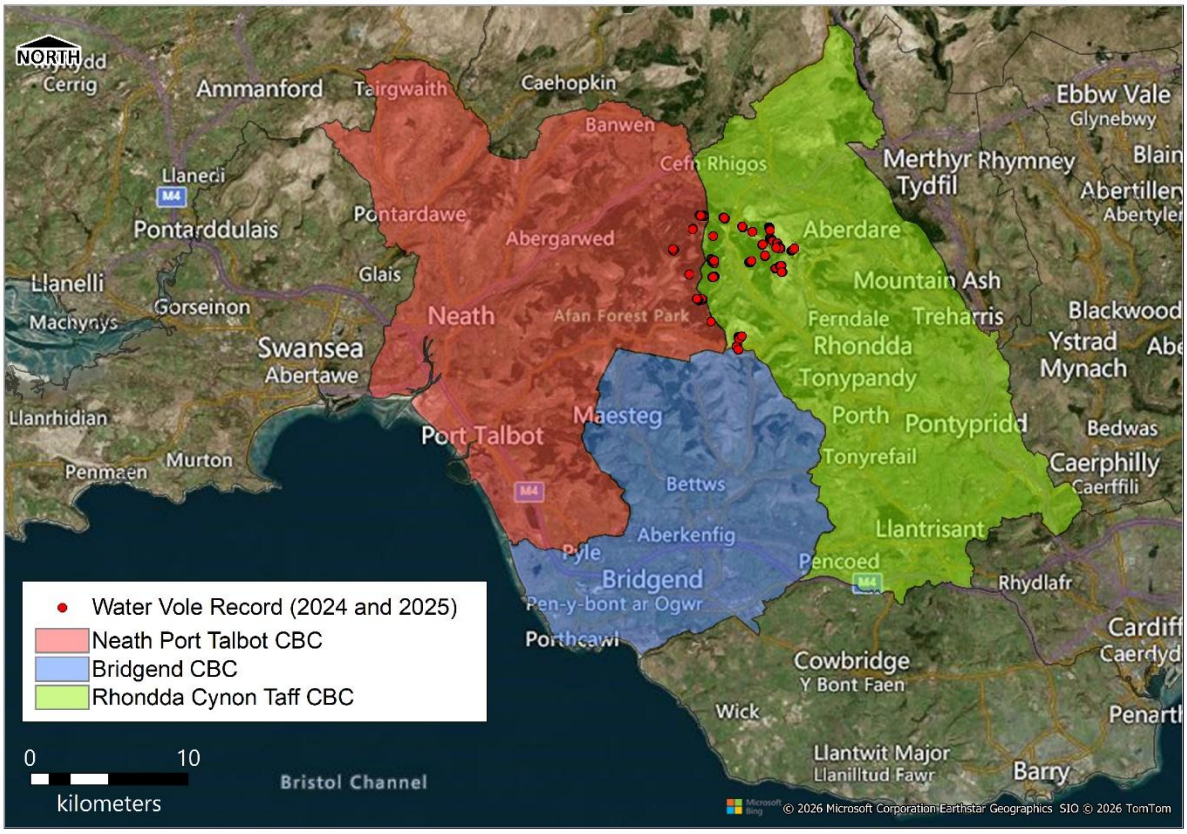

Figure 9: Water Vole distribution within the three local authorities within the project area.

5.1.3. A total of 4 occupied sites were found outside the project boundary, including 2 sites in Cwmparc (an area of peat bog containing localised pools and marshy grassland), and 2 sites on the Bwlch Mountain (one either side of the A4107). This brings the total number of sites to 26. However, when considering the 6 colonies which have been lost when resurveyed in 2025, this brings the total to 20 extant colonies.

5.1.4. Survey results from 2024 and 2025 show that 8 sites supporting favourable Water Vole habitat were not occupied by Water Voles. Examples of this include surveys 3 and 6 which were conducted on the same site. The site is located in the headwaters of the river Rhondda and contains favourable Water Vole habitat for an upland landscape (**Plate 13**). The bank supports an abundance of riparian vegetation, providing plenty of food and cover; its substrate is peaty, which is suitable for burrowing, and the channel features intermittent deep pools which act as refuges from terrestrial predators. This combination of features provides some of the best habitat available in this environment, however no signs of Water Voles were found. In contrast, 3 sites with less favourable habitat were occupied by Water Voles, including a relatively fast flowing channel (often avoided by Water Voles due to them being poor swimmers), where droppings were found on a rocky ledge (SN 89982 02904).

Plate 13: Headwaters of River Rhondda (favourable habitat) – Negative for Water Voles in 2024 and 2025.

5.1.5. Survey results for the habitat types shown in (**Table 2**) should not be used to draw any firm conclusions due to the limited data set, however, it can be noted that habitat associated with wet peat bogs ('Open bog' and 'Open bog w/ditch network') have been 100% positive for Water Voles when surveyed. 'Open marshy grassland w/ditch' also showed high occupancy when surveyed (73%). 'Open river/stream' and 'Open wet ditch' both had approximately 40% occupancy. For every habitat where conifer regeneration ('regen') encroachment was noted, % occupancy was nearly always zero apart from 'Wet ditch (regen)', where 1 site out of 6 was positive for Water Voles. Of the 7 'Dry ditch' habitats surveyed, all were negative for Water Voles suggesting water being present could be considered necessary for occupancy.

Habitat	Survey total 2024+2025	+ve	-ve	% +ve
Open river/stream	5	2	3	40
River/stream (regen)	1	0	1	0
Open pond	2	0	2	0
Pond (regen)	2	0	2	0
Open wet ditch	12	5	7	42
Wet ditch (regen)	6	1	5	17

Dry ditch	7	0	7	0
Open marshy grassland	0	0	0	0
Marshy grassland (regen)	2	0	2	0
Open marshy grassland w/ditch	11	8	3	73
Marshy grassland w/ditch (regen)	1	0	1	0
Open bog	3	3	0	100
Bog (regen)	0	0	0	0
Open bog w/ditch network	5	5	0	100
Bog w/ditch network (regen)	0	0	0	0

Note: (regen) – conifer encroachment noted on site

Table 2: Incidence of Water Vole occupancy in surveyed habitats

5.1.6. Of the 62 sites surveyed, 33 (53%) were negative for Water Vole field signs (droppings and latrines), 10 (16%) contained 1-5 latrines, 11 (18%) contained 6-15 latrines, and 8 (13%) contained more than 15 latrines (**Table 3**).

Latrine count	**Number of sites**
0 latrines	33
1-5 latrines	10
6-15 latrines	11
>15 latrines	8
Total	**62**

Table 3: Site latrine counts for 2024 and 2025 surveys.

5.1.7. According to Dean (2021), lowland survey latrine counts can be used as a proxy for Water Vole population size. Therefore, it is fair to assume that the higher the number of latrines found at survey sites would equate to larger populations of Water Voles.

5.1.8. In relation to diet, it was observed that Water Vole feeding stations found during surveying show a preference for rush *Juncus* sp., including, Soft Rush *Juncus effusus* and Heath Rush *Juncus squarrosus,* where this vegetation is available. Where Rush persists, alongside such common upland species as Purple Moor-Grass *Molinia caerulea*, sedges such as Cotton Grass *Eriophorum* sp., Bilberry *Vaccinium myrtillus*, Bog Asphodel *Narthecium ossifragum*, it was noted that the majority of food piles were exclusively made up of rush remains (Bluck. *pers. obs*.).

5.1.9. A deceased Water Vole was found during surveying at Llyn Fach Nature Reserve. Coincidently, our surveys revealed this site to have one of the highest latrine counts (30). There were no clear indications of how the Water Vole died.

6. Research

6.1. Territory Size

6.1.1. As part of the project, research is being undertaken to understand the territory size of colonies and populations in the uplands. Wild Cymru are working closely with Cardiff University School of Biosciences to help with research and volunteer elements of the project.

6.1.2. A novel non-invasive method for measuring Water Vole territory size has been trialled. The technique is based upon existing bait marking methods used to collect data on European Badger *Meles meles* territories, where bait is combined with coloured plastic pellets which are recovered from latrines during surveying. It is understood that Badger latrines mark the limits of their territories, therefore finding latrines containing pellets during surveying can be used to find the extent of a badger's territory.

6.1.3. Based on this, edible, biodegradable glitter of various colours was added to slices of apple and fed to captive Water Voles (**Plate 14**) at NRW's rearing facility to test if the glitter survived passing through the gastrointestinal tract. **Plate 15** shows that the glitter (in this case green) survived the digestion process and appeared in the collected droppings.

6.1.5. The technique was trialled by Cardiff University MSc students on a wild population of Water Voles at Cosmeston Lakes Country Park in the Vale of Glamorgan. No glitter was recorded in latrines found during surveying; therefore, the technique requires further research before it is trialled in the uplands, which practically will be considerably more challenging.

Plate 14: Captive reared Water Vole feeding on apple with added edible, biodegradable glitter

Plate 15: Green glitter visible in Water Vole droppings

6.2. Tracking dispersal

6.2.1. Studying how juvenile Water Voles disperse will develop a further understanding into whether the Water Voles actively avoid physical barriers such as forestry blocks and renewable energy infrastructure, which can be used to inform habitat management. The research will also show if Water Voles are using the main channels and/or the smaller ditches to move around or perhaps travelling directly across open habitats.

6.2.2. Results will expand on the genetic relatedness analysis as it will contribute to an understanding into the dispersal of Water Voles across the landscape and how they reach other colonies.

6.2.3. Tracking techniques, for example GPS collars, are one method used to track the movement of mammals in the wild but are invasive. The process would involve trapping the Water Vole and handling the animal to fit the collars, leading to disturbance and stress. Use of such techniques also requires a license from NRW and a Home Office: Animals (Scientific Procedures) Act 1986 license.

6.2.4. Due to ethical reasons and to avoid inflicting any undue stress to the Water Voles, this research is unlikely to be undertaken as part of this project. Currently, a method has not been identified which will allow the tracking of Water Voles without impacting their welfare.

7. American Mink Control

7.1. Project Officer

7.1.1. Wild Cymru, in partnership with the South Wales American Mink Partnership (SWAMP) and the Waterlife Recovery Trust (WRT), established the first dedicated Mink Officer role in South Wales to address the threat posed by invasive American Mink and to protect vulnerable Water Vole populations. Recent detection of American Mink across the project area highlighted the urgent need for action to prevent further Water Vole losses due to predation. The dedicated project officer has already recorded success in trapping and removing American Mink across the Vale of Glamorgan, Neath Port Talbot, Merthyr Tydfil, Powys, and Cardiff. To date, 70 traps have been deployed across these areas, resulting in the capture and humane dispatch of 18 American Mink as of March 2026. The ambition is to deploy over 100 traps across Glamorgan over the coming months. Having a dedicated officer allows for coordinated Mink control across multiple regions in the project area, preventing American Mink from dispersing into upland landscapes and threatening key Water Vole colonies.

7.2. South Wales American Mink Partnership (SWAMP)

7.2.1. The American Mink control work delivered through this project contributes directly to the wider SWAMP approach, which focuses on collaborative, landscape-scale invasive species management. By working across catchments and administrative boundaries, the project supports early detection, rapid response, and long-term reduction of Mink populations.

7.3. Waterlife Recovery Trust

7.3.1. Farmers, gamekeepers and conservation organisations have been controlling Mink for several decades. Although there have been some successes, if the control is not carried out methodically and at scale, then Mink will continue to breed, disperse and recolonise catchments previously cleared. However, recent landscape-scale Mink eradication trials in eastern England have shown that eradication is now possible. The charity, Waterlife Recovery Trust, supported and guided by conservation NGOs, the farming community, internal drainage boards, Government agencies and over 1,000 volunteers, cleared over 11,000 sq km (8.5% of England) of Mink within 5 years (Martin & Baker, *in review*). Better still, Water Voles started to recover in both numbers and geographical range even before the last Mink had been eradicated (Bonet et al., *in review*). Small, remnant populations of Water Voles had managed to cling on, perhaps in places like reedbeds where they can hide from Mink, and rapidly expanded as soon as Mink ceased to be a threat. It must be highly likely that other Mink prey species (e.g. ground nesting birds) are similarly recovering.

8. Community Conservation

8.1. Community Engagement

8.1.1. Community engagement has been a central element of the Saving our Upland Water Voles Project. The project is working closely with communities in the Rhondda, Cynon, Afan and Neath valleys to raise awareness of upland Water Voles and involve local people in their conservation.

8.1.2. At the start of the project, fundraising took place at a local community food festival, where Water Vole–themed cupcakes were sold. This provided an early opportunity to engage with local people and introduce the project. Volunteers from the Treherbert Men's Shed were also involved, helping to improve artificial Water Vole burrows and giving the local community a practical, hands-on role in the project.

8.1.3. In spring 2024, a project leaflet was produced and distributed around community centres, shops and libraries. This outreach helped lead to a community-led survey day on site. Over the summer months, three volunteer sessions were held, allowing participants to connect directly with the upland landscape on their doorstep. Pop-up events at venues such as Dare Valley Country Park and Coleg y Cymoedd further increased awareness of the project.

8.1.4. Throughout the project, Wild Cymru supported local businesses and community hubs in Treorchy and Neath, including working with High Street Media to produce project leaflets and hosting meetings in local venues. Wild Cymru has also maintained a presence within the Rhondda Cynon Taff and Neath Port Talbot Nature Partnerships. Further funding is currently being sought to create a wildlife mural on Treorchy High Street which will feature Water Voles and other upland species.

8. 2. Student Placements

8.2.1. During summer 2025, Wild Cymru employed two students from Bridgend College, Freya Smith and Laura Griffiths, to support Water Vole surveys across the project area (**Plate 16**). During their placement they assisted with surveys, sample collection for genetic relatedness analysis, community engagement through pop-up events, and the identification of new Water Vole sites, while working alongside Wild Cymru staff.

Plate 16: Placement students Freya Smith and Laura Griffiths collecting Water Vole droppings for DNA analysis.

8.3. Training

8.3.1. Targeted training days were delivered for local community volunteers, Swansea City Council staff (**Plate 17**) and freelance ecologists who had experience of lowland Water Vole surveying but limited exposure to upland survey methods.

8.3.2. The project has also supported two students from Cardiff University through practical field experience and mentoring. In addition, public talks and guided upland walks were delivered for Black Mountains College and Welcome to Our Woods in Treherbert, providing further learning opportunities linked to upland conservation.

Plate 17: Wild Cymru staff undertaking training for Swansea City Council in survey skills for upland Water Voles.

8.4. Animation

8.4.1. Wild Cymru has developed a short, animated film (Help Save our Upland Water Voles) telling the story of a Water Vole's life in the uplands (**Figure 10**). The short film depicts a day in the life of a Water Vole and the daily trials and threats they face. The film is designed to tell the Water Vole's story through a different media and to engage with local people who may not be able or willing to undertake actual surveys in the uplands. There are plans for this animation to be shown in local theatres across the project area to help engage wider audiences.

Figure 10: Still of a Water Vole from Wild Cymru's short film.

8.5. Outreach

8.5.1. Water Vole conservation work undertaken through the project received national media coverage on the BBC, raising the profile of Wild Cymru as a charity and increasing awareness of upland Water Vole conservation in Wales.

8.5.2. An educational Water Vole story book is currently in development (**Figure 11**), with plans for it to be used in schools and distributed to local libraries and community groups, further extending the project's outreach and legacy.

Figure 11: Illustration of Water Vole featured in story book

9. Future Work

9.1. Habitat Assessment

9.1.1. In 2026, Wild Cymru plans to undertake a comprehensive habitat assessment of the uplands in the project area. By evaluating both the quality and distribution of suitable habitats it will be possible to identify areas where populations are thriving, where habitats are degraded, and where habitat restoration and creation efforts can be suggested to landowners for Water Vole conservation.

9.2. All-Wales Upland Water Vole Guidance

9.2.1. A major element of the project is to produce guidance on Water Vole survey techniques and conservation in the uplands from an all-Wales perspective. The guidance, due to be produced in 2027, will highlight the importance of upland habitats for Water Voles, along with the threats they face, and what can be done to safeguard these vital populations. Once published, the guidance can be used by land managers and statutory agencies to increase the fortunes of upland Water Voles in the project area and across Wales.

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