

Water voles as prey for grey herons in an urban environment

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In 2018 the water vole (*Arvicola amphibius*) population in the U.K. was estimated at 875,000 individuals, with the vast majority identified as riparian, an ecotype that exists along waterways with dense vegetation (McGuire & Morse, 2020). Fossorial water voles, an ecotype that lives a subterranean lifestyle in underground burrow systems and some distance away from water, were first recorded in dry grasslands in North East Glasgow, Scotland in 2008 (Stewart *et al.*, 2017; McNerny, 2021). Water voles have been recorded in 28 out of 64 U.K. cities from 2010-2018, highlighting a more established population of urban water voles than previously thought (Leivesley *et al.*, 2021). Water voles could therefore form an important component of the food web in these urban areas.

On 20th December 2018, Stuart Wilson, a Glasgow-based ornithologist, captured footage of a grey heron (*Ardea cinerea*) holding in its bill a wetland water vole (Fig. 1) at Hogganfield Loch, Glasgow (NS643672) (Wilson, 2018). On the 5th May 2021 at 10:00 GMT, a grey heron was observed by DJM and CS hunting in grassland within Cranhill Park, Glasgow (NS645655). After a failed attempt, the heron succeeded in catching a water vole which was subsequently swallowed alive. The heron continued to search other areas of the park, followed by magpies (*Pica pica*), but no further predation events were seen. Another observation of a heron capturing a water vole was filmed by KM at Avenue End Road, Glasgow (NS649667) on 12th June 2021 at 09:30 BST. Since then, local residents have also reported to DJM/CS seeing a grey heron hunting water voles within this area of Glasgow. Whilst this predatory behaviour on water voles may be infrequently seen in urban grasslands, heron predation on wetland water voles is well documented. The National Biodiversity Network (NBN) Atlas indicates that in 2019, there were 205 records of grey herons within a 5 km radius of



Fig. 1. Grey heron (*Ardea cinerea*) with water vole (*Arvicola amphibius*) near Hogganfield Loch, Glasgow, Scotland, 20th December 2018. Still from video taken by Stuart Wilson (Wilson, 2018).

Hogganfield Loch, suggesting a significant population of herons in North East Glasgow (NBN Atlas, 2022).

Water voles have previously been recorded in the diet of grey herons. In a review of the contents of grey heron pellets in U.K. studies from 1940-1979, water voles occurred in 27-60% of pellets from sites in England and Wales, and in 39% of pellets from Kincardineshire, Scotland (Hewson & Hancox, 1979). Analysis of pellets from a heronry at Lennox Castle, Stirlingshire in 1978 indicated that the water vole was the single most important prey item for herons at this location (Giles, 1981). More recently, it was found that 18% of grey heron pellets analysed from Wales contained water vole fur, more so than any other small mammals (Forman, 2005). This supports findings from across Europe, where it is well recognised that the water vole is a common prey item for grey herons (Feunteun & Marion, 1994; Peris *et al.*, 1995; Jakubas & Mioduszewska, 2005).

Red fox (*Vulpes vulpes*), common kestrel (*Falco tinnunculus*) and common buzzard (*Buteo buteo*) have been seen regularly during the course of water vole surveys (DJM, pers. obs.), and have been observed hunting them (McNerny, 2018); and domestic cats and dogs are known to predate water voles in North East Glasgow (Stewart *et al.*, 2017). Additionally, gulls (*Larus* spp.) and peregrine (*Falco peregrinus*) have been reported taking water voles in Glasgow at both wetland and grassland sites (McNerny, 2018; Shelagh MacMillan, pers. comm.). The predation events reported herein highlight the potential importance of water voles as a prey item for the grey heron and are a healthy sign of a natural food web in this urban environment.

However, the commonest predator of the water vole in the U.K. is the introduced American mink (*Neovision vision*), which is responsible for major decreases in water vole populations (Strachan, 2004; McGuire & Morse, 2020). Assessing the risk of mink to water voles and natural food webs in Glasgow is therefore a priority (Wijas *et al.*, 2019).

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