

Science for Environment Policy

Quality of urban waterways found to affect bat populations and biodiversity

Urban waterways can provide foraging opportunities for a range of bat species. However researchers have found that bats in the UK are negatively affected by high levels of invasive plant species and urban development near waterways. The researchers highlight the value these often disregarded urban spaces can have for ecosystems, and suggest ways to improve the biodiversity of waterways.

Urbanisation splits and fragments natural habitats, and can therefore limit breeding and foraging opportunities for species. [Waterways](#) which often run the length of [urban environments](#) — help to overcome this problem by acting as effective wildlife corridors, provided that their banks and surrounding lands are well vegetated.

Bats are listed as an [indicator species](#) by the [Department for Environment, Food and Rural Affairs](#) (DEFRA) in the UK, which means their presence indicates the broader environmental quality of an area. Although some bat species can adapt to some extent to urbanisation — such as learning to gather insects from artificial light sources — most are negatively affected. Urban waterways provide a suitable refuge for bats in towns and cities, as they provide a drinking source and high concentrations of insect prey. This is the first large-scale study to assess how populations of bats are affected by landscape changes surrounding urban waterways.

The researchers selected segments from 30 UK waterways that are at least 8 km long and have a third of their length surrounded by an urban environment, using information from Ordnance Survey (OS) maps. The area up to 3 km around the waterways was surveyed and labelled as green space (gardens, parkland and farmland), grey space (buildings and roads), inland water or woodlands. Sixteen locations along the waterways were selected as monitoring points and navigated to by kayak, and the surrounding vegetation and bank profile surveyed. For the bat counts, the researchers recorded the bats' echolocation calls on dry evenings 30 minutes after sunset. These recordings were then analysed with software called AnalookW to determine the number of individuals and the species or genera.

In total, 19 689 bat passes were recorded. The highest proportion was of the Common pipistrelle (*Pipistrellus pipistrellus*) and the Soprano pipistrelle (*Pipistrellus pygmaeus*), which together made up 74% of all recordings. Although the Common pipistrelle is generally thought to be a good urban adaptor, the researchers found it to be significantly negatively affected in areas with higher local urban development.

The genus known as mouse-eared bats (*Myotis* sp.) — which accounted for 20% of all calls — were found to be the most sensitive to urbanisation of all bats recorded. When there was a 10% proportion of urban space within a 3 km radius, there was a 68% chance of recording *Myotis* sp. This dropped to a 32% chance when 80% of the surroundings were urban space. *Myotis* sp. activity also negatively correlated with an increase in invasive plant species, and was greater in waterways with very steep and high banksides.

Urban waterways are usually considered in terms of human benefits (such as water supplies, flood mitigation and waste disposal) and may be removed once they are no longer required. This research helps to reframe these areas as potential hotspots for animal biodiversity, provided they are well maintained. However, highly urbanised waterways may be as much of a barrier to wildlife as some roads. The authors suggest ways to improve biodiversity, including lowering pollution, keeping immediate surroundings well vegetated with native plants and creating links to other green spaces.

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(continued)

The authors caution that with the rate of urbanisation growing year on year, more large-scale, integrated river rehabilitation schemes are needed as part of the [EU Water Framework Directive](#). These should be developed with an evidence-based understanding of relevant species' requirements. On the local scale, enhancing and maintaining vegetation on the banks of waterways will benefit a wide variety of bat species, whilst reducing the levels of invasive plant species. This will directly benefit urban residents too, as clean, attractive waterways also have a wide range of socio-economic benefits.



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