

Science for Environment Policy

Cities shown to shelter threatened wildlife – but good urban planning is key

Although cities are typically low in biodiversity, they can provide important refuges for native species, new research shows. Urban planning making use of green infrastructure can enhance city habitats and may help reduce the loss of biodiversity that follows urban expansion, the researchers say.

Cities currently cover around 3% of the Earth's surface and harbour around 70% of its human population. Urban populations are expanding faster than the rate of global population growth as, increasingly, people are moving from rural to urban areas. Urban sprawl can have severe effects on local wildlife by degrading habitats and disrupting migration routes.

Cities share structural characteristics, creating similar habitats across the globe. Combined with a higher risk of introduction of non-native species than in rural areas, it is thought some urban species have become ubiquitous, so-called 'cosmopolitan species'. Invasions of cosmopolitan species and reductions in local biodiversity are thought to lead to global similarity of urban **biodiversity**.

Previous research has focused on the effects of urbanisation over individual regions or for particular cities. However, the present study investigates how urbanisation affects biodiversity on a global scale, and identifies human activities that drive biodiversity loss.

The researchers analysed data on plants in 110 cities and data on birds in 54 cities around the world to determine the diversity of native and non-native plant and bird species in each city. They also analysed the data for patterns and predictors (both human and natural) of urban species diversity, such as the percentage of natural vegetation or urban land cover within a 15 km radius of the city centre, city age, annual average temperature and latitude. The results for each city were also compared to estimates of biodiversity in nearby undeveloped areas.

Cities contained, on average, only 8% of the native bird and 25% of the native plant species found in nearby undeveloped areas. Despite this, a total of 36 bird and 65 plant species of conservation concern were supported in cities. Threatened plants were found in 8% of cities and 30% of cities were home to threatened bird species. Four 'cosmopolitan' bird species were found in more than 80% of cities, such as the rock pigeon (*Columba livia*) in 51 cities, and 11 'cosmopolitan' plants were found in more than 90% of cities, such as the annual meadow grass (*Poa annua*) in 105 cities.

For both plants and birds, species diversity in cities was best explained by anthropogenic features of the city, such as city age, rather than natural factors, such as average temperature. The diversity of bird species was most negatively affected by urban land cover, indicating that vegetation is an important factor for bird conservation. Plant species were positively affected by city age and, unsurprisingly, higher percentages of intact vegetation were found to preserve plant species.

Taken together, the findings indicate that although urbanisation has significant, negative effects on biodiversity, cities are able to provide a refuge for some threatened species. Improved urban planning and conservation efforts within cities, such as preserving and restoring native vegetation and establishing sufficient **green spaces**, could reduce the biodiversity declines associated with urban expansion, the researchers conclude.



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