

Science for Environment Policy

Citizen science could address impact of global change on biodiversity

Citizen science holds the potential to address some of the biggest concerns facing biodiversity researchers, according to a new study. The study found that volunteers already save biodiversity research huge sums of money, but that their contributions are underused.

The impact of global change on [biodiversity](#) is difficult to monitor because change is occurring at a global scale over long periods of time. The resources needed to track and analyse in detail the effects of [climate change](#), pollution, invasive species, [land use](#) change and overexploitation are vast. However, citizen science approaches may help scientists to tackle the problem in a way that is not prohibitively expensive.

The authors carried out the largest ever quantitative study of biodiversity-focused citizen science projects. They set out to understand how citizen scientists already contribute to biodiversity research and how they could contribute in future. In particular, they wanted to analyse the extent and economic worth of volunteer involvement in biodiversity research, how it contributes to peer-reviewed biodiversity research, and whether it has the potential to address the effects of global change on biodiversity.

They started by building a database of 388 biodiversity-focused citizen science projects. To qualify as citizen science, projects had to involve unpaid volunteers collecting or processing data to help address a specific issue or question as part of scientific research.

They collected information on several aspects of the projects, including scale, goals and methods, and sent surveys to the projects' organisers, receiving 125 responses. At the same time, they surveyed 423 biodiversity scientists about their awareness and perceptions of volunteer involvement in biodiversity research.

The results suggest that for the projects surveyed, which only represent the most widely publicised projects reported in English, between 1.36–2.28 million people volunteer each year, giving up around three working days of their time. According to the authors, this equates to \$0.7–2.5 billion (€0.6–2.2 billion) of in-kind contributions.

On average, projects lasted for 11 years. Dividing them into three groups by geographical scale, they found that most (67%) operated at the largest scale, between 100–100,000 km, while 22% operated at between 10–100 km and only 10% at a local scale of 10 km or less. The vast majority (97%) focused on monitoring species diversity, with a bias towards land-based species and vertebrates — mammals and birds, for example, as opposed to insects or plants.

It was not clear how often data from citizen science were published in peer-reviewed journals. Online research (including on project websites and through research databases) suggests that only 12% of the projects provided data to peer-reviewed articles. However, 60% of project organisers said the data from their projects had been used in 'scientific publication in the peer-reviewed science journal literature'.

Nonetheless, larger spatial scale, longer-running projects that provided training in species identification were more likely to have published peer-reviewed papers. In total, 87% of all projects, and 100% of projects that publish in the peer-reviewed literature, published some or all of their results online.

The researchers conclude that citizen science provides a valuable, but underused, resource for global change research, which holds potential for gathering data at a global scale via local volunteering efforts. In this way, scientists and non-scientists could work together to solve large-scale environmental problems.

However, the researchers say that this potential will not be realised unless citizen science is better integrated into established scientific research. One solution could be for citizen science networks, such as the [Citizen Science Association](#), to help match professional scientists with projects that could provide data for their research.



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