PROJECT TITLE: Do protected areas work? Tracking resilience and functional diversity change to investigate the impacts of anthropogenic stress

DTP Research Theme(s): Living World, Changing Planet

Lead Institution: University of Bristol

Lead Supervisor: Dr Christopher Clements, University of Bristol, School of Biological Sciences

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Project keywords: conservation, protected areas, biodiversity, functional diversity, resilience

Project Background

Ecosystems provide a plethora of benefits to humanity, and consequently maintaining and promoting biodiversity remains a key societal challenge. Protected areas are used as a key conservation tool to safeguard biodiversity in the face of global anthropogenic change. However, the efficacy of protected areas in maintaining the resilience and functioning of biodiversity remains unclear. This project will combine large datasets and advanced analytical tools to quantify the efficacy of protected areas in maintaining the resilience and functional diversity of ecosystems. Resilience – the ability to resist and recover from disturbance – can tell us about the capacity of natural systems to withstand the impacts of perturbations. Functional diversity – the range of roles and functions maintained by species within a community – can tell us what functions will persist following species extinctions. Understanding whether protected areas are promoting these two metrics is crucial to gauge whether protected areas are fit for purpose in our changing world.

Project Aims and Methods

This project will analyse the International Waterbird Census and Christmas Bird Count databases, supplemented with data from the Living Planet Index Database. These databases are comprised of yearly counts of animal populations, primarily birds, at tens of thousands of sites worldwide. They will be used to: (1) Assess whether populations in protected areas are more resilient than those in non-protected areas, (2) assess whether protected areas show higher levels of functional diversity change through time, and (3) use population data to predict the risk of population extinction and model how this may affect the functional diversity of sites around the world. We strongly welcome students with their own ideas and interests in this area of study, and are very happy for the student to develop their own research questions within the broad fields outline above.
Candidate requirements
The successful student will have a strong interest in conservation and biodiversity, a background in quantitative analysis methods/statistics, and a motivation for self-learning. A basic understanding of either the R programming language or some form of coding is required, and previous experience working with time series and spatial data would be helpful. We especially welcome and encourage student applications from under-represented groups: we value a diverse research environment.

Project partners
The project student will work closely (and visit regularly) all the supervisors on this project, spending time at the University of Exeter and Institute of Zoology (IoZ) at the Zoological Society of London. This will allow the student to experience and network with researchers in both academic and non-academic settings, and with those working directly on conservation issues. In addition, the student will also have the opportunity to visit supervisors at the University of Barcelona and Macquarie University, Australia.

Training
The student will spend time visiting collaborators at the ZSL, University of Exeter, and University of Barcelona, giving the student the opportunity to experience research and network in multiple international centres. The student will be provided training in: R statistical language (Clements, Wauchope, Alroy), functional trait analyses (Capdevila), time series analysis (Capdevila, Wauchope, Alroy), quantifying diversity loss and extinction risk (Alroy), global analyses (Clements, Capdevila, Wauchope, Alroy), high impact paper writing (Clements, Capdevila, Wauchope, Alroy).

Background reading and references
- Wauchope et al. Protected areas have a mixed impact on waterbirds, but management helps. (2022) Nature, 605, 103-107

Useful links
http://www.bristol.ac.uk/biology/courses/postgraduate/

Bristol NERC GW4+ DTP Prospectus:
http://www.bristol.ac.uk/study/postgraduate/2023/doctoral/phd-great-western-four-dtp/

How to apply to the University of Bristol:
http://www.bristol.ac.uk/study/postgraduate/apply/

Please note: If you wish to apply for more than one project please contact the Bristol NERC GW4+ DTP Administrator to find out the process for doing this.

The application deadline is Monday 9 January 2023 at 2359 GMT.
Interviews will take place during the period 22 February – 8 March 2023.

NERC GW4+ DTP Website:
For more information about the NERC GW4+ Doctoral Training Partnership please visit
https://www.nercgw4plus.ac.uk.

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