Climate Change Adaptation Research Grants Program
- Terrestrial Biodiversity Projects

Project title:
Adaptation strategies for Australian birds.

Principal investigators: Stephen Garnett
Lead organisation: Charles Darwin University

Objectives:
Identify adaptation strategies for Australian birds based on modelling, building on a current review of Australian bird status

Project design and methods:
New analytical tools and methods, utilizing and building upon well-established methods, will be used to assess current and future changes in the spatial patterns of distribution and abundance of the Australian bird fauna. Projecting models of the 'current' distribution of species onto future climate scenarios presents the potential changes in distribution and abundance.

Making use of high performance computing facilities of Queensland Cyber Infrastructure Foundation (QCIF) hosted at James Cook University (JCU) & University of Queensland (UQ), we will model the spatial patterns of distribution and abundance of individual species (now and future) using Maxent (common species distribution modelling algorithm). Novel analytical methods (e.g., modelling spatial patterns of abundance and definitions, e.g., definitions of distribution) will be developed and applied here. The models will align shifts in the suitability of overall habitat and current climate refugia for each taxon with threat and tenure maps to determine the implications for each taxon. This will identify the taxa most likely to be threatened by shifts in climate space. These models will identify priority species and the spatial context of relative vulnerability, potential refugia, the uncertainty involved based on different climate futures and the potential timing and sequencing of adaptation actions under various mitigation scenarios.

While there have been some analyses of the interaction between species and protected areas in Africa, this level of assessment has never been undertaken at this scale for all species and will represent a truly global benchmark for assessments of climate change vulnerability. The modelling will then be combined with the three dimensions of susceptibility - sensitivity, adaptive capacity and exposure - using protocols developed by *BirdLife International* to develop adaptation species specific strategies.

The recommendations will be guided by the decision framework developed by the NCCARF Terrestrial Biodiversity Network (TBN) for management actions focused on ameliorating impacts of climate change on biodiversity. Similarly the principles developed for genetic adaptation and managed relocation generated by other NCCARF TBN workshops will be used to guide adaptation recommendations in the final plan. The cost of actions will also be estimated based on the threatened bird database so that an overall estimate can be made of conserving Australia's birds in the face of climate change. This will be the first time such a costing has been made for an entire faunal group for a continental avifauna.