

National Environmental Science Program

National Assessment of Climate-Driven Species Redistribution using Citizen Science Data

Project 1.30

Project Summary

This project will develop a report card assessing Australian marine species to determine species that have undergone recent changes in distribution, either shifting into each State, or into new areas within States. This report card will draw upon citizen science databases and use a robust decision tree analysis to outline which species are shifting, and with what degree of certainty. This project will: 1) draw upon citizen scientists to identify climate-driven changes within the Australian marine estate; and 2) communicate to and engage with the public on issues of climate change and biodiversity using their own citizen science information.

Problem

Recent climate-driven shifts in marine species distributions are widespread around Australia, however due to the rate at which they are occurring there are large gaps in available species occurrence data hindering our ability to document species range shifts. Citizen science initiatives like Redmap (redmap.org.au) are valuable sources of species occurrence data that could allow for the assessment shifts in species distributions around Australia. However, there has not yet been an Australia-wide systematic analysis to harness the potential of citizen science for this purpose.

How Research Addresses the Problem

This project will use species occurrence data from citizen science initiatives (Redmap, Reef Life Survey, iNaturalist) in a rigorous analysis to determine which species are undergoing shifts in distribution beyond their historical geographic range limits, and with what certainty. The resulting assessment will inform researchers, resource managers, stakeholders and the general public of which marine species are undergoing redistributions in each region of Australia.

General Project Information

The project will build upon a report card for Tasmania only, which was developed via a robust peer-reviewed analysis, to formally assess shifting statuses of species and provide a degree of confidence of each range shift (Robinson et al. 2015).

Briefly, this analysis combines an assessment of the certainty of historical estimates of each species' range, and the strength of evidence provided by citizen science data of a shift in distribution beyond historical range limits. This methodology will be updated through an expert workshop process.

Citizen science records of marine species occurrences nationwide will be sourced from multiple databases (Redmap, iNaturalist, and Reef Life Survey) and assessed by experts, and then will be analysed with the updated methodology applied nationwide. The results of the analysis will be developed into a 'Report Card' of species undergoing shifts in distribution in each region of Australia (see www.redmap.org.au/article/the-redmaptasmania-report-card/ as an example) in collaboration with stakeholders, state-based resource managers, and citizen scientists themselves.

The report card will be disseminated through social media, the Redmap website, newsletters, and to government and community group stakeholders.



ABOVE: The baldchin groper (Choerodon rubescens), a species endemic to Western Australia, is potentially undergoing a redistribution south. A recent review identified at least 198 species that are similarly on the move, despite large geographical and taxonomic gaps in available species occurrence data. Photo credit: Jemina Stuart-Smith. **OPPOSITE PAGE**: Out-of-range species sightings collected by citizen scientists, like this tiger shark (Galeocerdo cuvier) spotted by anglers off the coast of Tasmania, are an invaluable source of information on species distributions. This project will harness citizen science data collected while fishing, diving, boating or beachcombing to assess which marine species are moving around Australia. Photo credit: James Boag

Project Leads

Prof. Gretta Pecl E: gretta.pecl@utas.edu.au P: 0408 626 792

Dr. Barrett Wolfe E: <u>barrett.wolfe@utas.edu.au</u> P: 0413083690







Department of Primary Industries and Regional Development

