

Climate Change Adaptation Research Grants Program

- Marine Biodiversity and Resources Projects

Project title:

Identification of climate-driven species shifts and adaptation options for recreational fishers: learning general lessons from a data rich case

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Lead organisation: CSIRO

Objectives:

1. Determine changes in distributions of rocky reef fish in eastern Australia over the past four decades, and establish correlation of these changes to climate induced environmental change (e.g. temperature).
2. Determine perceptions of the test group regarding climate-induced changes to fish distributions and abundance and identify adaptation options.
3. Develop and test a “process model” for engagement and development of climate change adaptation options suitable for deployment to other fishing sectors and user groups, including commercial fishers

Methods:

Overview

Representative clubs have been selected and consulted along the south-eastern Australian seaboard: Tasmania (1), Victoria (several clubs, now held by 1), New South Wales (3), and south-eastern Queensland (1). Data extend from 1970s to the present and include numbers and weights of target species caught during competitions. Data will be collated, digitised and analysed to assess shifts in species ranges over decadal timeframes. Where possible, any changes will be assessed against relevant environmental variables (e.g. temperature, currents) to establish correlation of shifts with climate change. Results will be assessed in conjunction with voluntary changes previously undertaken by the test group to determine future adaptation options. A transferable ‘process’ model (Fig. 1, attached) will be developed to facilitate engagement of other fishery sectors in identifying future adaptation options.

PHASE I

1. INITIAL WORKSHOP

A workshop will be held at the start of the project to determine: detailed project tasks and timeframes; schedule of club engagement; identify roles and responsibilities of team members; and to prepare a publication plan for manuscripts and the final report.

2. CLUB OUTREACH I

Two project team members attend a meeting at participating clubs (~5) to:

- a) Explain the project rationale and objectives,
- b) Educate on climate change, associated environmental changes, the observed and likely impacts of these changes, the need for data to inform on these impacts, and the importance of fishing sectors being better prepared to adapt to these changes in the future, and
- c) Establish a relationship with club members to ensure support for the engagement and adaptation process, and for the use of club data. A data agreement, signed by both parties, will help allay any potential mistrust regarding use of the data. Incentives will be offered to the clubs, including the return of hard copy datasheets and data in electronic form (spreadsheets), industry supported club training and development, and promotional materials.

3. INITIAL SOCIAL SURVEY

A social survey will be developed and implemented at the beginning of the project. This will determine the perceptions of the representative group to climate change, their level of concern over

how it may impact on their activities, and their attitude to adaptation (Objective 2). This will target spearfishers from participating clubs and will be undertaken by a social scientist from James Cook University.

PHASE II

1. DATA COLLATION

Existing data will be collated and assessed for their utility (e.g. breadth of coverage, temporal duration and continuity, and completeness). These opportunistically collected data may have limitations due for example to changes in competition rules or fishing practices. Significant interaction with members is required to document such changes, and will increase the level of collaboration and ownership of the process and potential adaptation options.

2. DATA ANALYSIS

Data will be entered into a project database (e.g. Access), and an assessment will be made of the most suitable analyses. These will initially focus on geographic shifts in distribution of rocky reef fishes (Objective 1). Correlations between known climate change effects (e.g. changes in ocean currents and increased minimal sea surface temperatures) will be investigated. All data entry and analyses will occur at CSIRO in Hobart. There are likely to be synergies between this project and other NARP projects being undertaken by Edgar (Adaptive management of temperate reefs to minimise effects of climate change) and Bax (Pre-adapting a Tasmanian coastal ecosystem to ongoing climate change through reintroduction of a locally extinct species). Investigators in these projects and, for example, the marine ecosystem model Atlantis, will be consulted to identify such commonalities and to pose potential futures that may have alternative adaptation implications.

PHASE III

This will occur in the final six months of the project.

1. FINAL WORKSHOP

The project team will assemble to discuss project results and adaptation options, refine the “process” model, plan for final extension activities and obligations, and discuss reporting of results to the wider community.

2. CLUB OUTREACH II

Presentations of the results will be made to participating clubs to: report changes in species distributions; implications for spearfishers; and their roles as custodians and users. Members will be consulted to determine any need for, and potential effectiveness of, adaptation options. Clubs will be encouraged to be proactive in developing the adaptation process to ensure ownership of adaptation solutions. All original data, along with electronic copies, will be returned to clubs.

Adaptation options for spearfishers (Objective 3) are likely to be club/locality specific, and may include:

3. FOLLOW-UP SOCIAL SURVEY

A follow-up social survey will re-assess attitudes toward climate change and its perceived impacts (Objective 2). It will also assess the perceived effectiveness of, and support for, any adopted adaptation plans, and to the research process undertaken (Objective 3).

4. DEVELOP ENGAGEMENT MODEL

The engagement model will be further developed and evaluated based on the extensive literature on public participation and engagement in natural resources management (e.g. Dalton 2005, Reed 2008). The suitability of the model will be assessed for transfer to other recreational and commercial sectors (Objective 3). For example, aspects may be readily transferrable to game fishers, other line fishers, and also charter operators, for example to reduce pressure on particular species considered to be of highest concern following analysis, and for charter operators to educate customers as to why they return particular species to the water.

PHASE IV

1. REPORTING AND OUTPUTS

Participating clubs will receive fact sheets summarising results and adaptation options for their region. Articles will be submitted to relevant magazines and newsletters (e.g. Spearfishing Downunder, Fish, Marine Adaptation Bulletin) to inform the fishing community of project findings. The final report will be provided to the funding body, participating clubs and stakeholders. Results will be published in peer reviewed scientific journals in two manuscripts detailing results of the analyses, and the adaptation model and its suitability for deployment to other sectors.