Submission 077
Received 17/12/11

Private Bag 49 Hobart
Tasmania 7001 Australia
Phone +61 3 6227 7277
Fax: +61 3 6227 8035
www.imas.utas.edu.au

IMAS
INSTITUTE FOR MARINE AND ANTARCTIC STUDIES

UTAS

The Secretary of the Committee
House of Representatives Standing Committee on
Climate Change, Environment and the Arts
PO Box 6021
Parliament House
CANBERRA ACT 2600
AUSTRALIA

15-December 2011

The Institute for Marine and Antarctic Studies (IMAS) hosts a wide range of projects and associated expertise examining various aspects of marine biodiversity that would be relevant to the Parliamentary inquiry on biodiversity and climate change. However, as discussed with the Secretary of the Committee, this submission focuses specifically on the Redmap (Range Extension Database & Mapping) project based at IMAS. Redmap is well-placed to comment on biodiversity in a changing climate given the project promotes education and awareness of marine issues, has been successful in engaging vast community participation across broad backgrounds and interests, and represents a cost-effective way to monitor the impacts of climate change in the marine environment. Redmap is currently restricted to Tasmania; however, we are in the process of expanding the initiative across most of Australia with the collaboration of a range of institutes across the country. Redmap Australia will be launched in October 2012.

Our submission comprises a short section on the background of the project and specific comments which address the Terms of Reference of this inquiry.

BACKGROUND

Redmap (Range Extension Database & Mapping project) is a multi-award winning project initiated at IMAS at the University of Tasmania in 2009 (receiving the 2010 Whitley Award for Excellence for an Interactive Resource, the University of Tasmania's Vice Chancellor's Award for Outstanding Community Engagement in 2011, and an external nomination for NCCARF's 2010 'Climate Adaptation Champion'). Redmap is a volunteer research program inviting community members to report observations of marine species from outside their known distributions – species that are unusual in a particular region. This valuable data will, over time, show which marine species are shifting range as our waters warm.

Redmap provides a cost-effective approach for facilitating broad scale marine species observational data collection and display in a time and cost effective manner; and allows a system for marine monitoring over large scales. The Redmap project increases our marine observational data collection capacity, promotes climate change awareness and education, and significantly improves the likelihood of detecting important range shifting species across a range of scales. This will allow management to respond positively to climate change and to promote education of the impacts and to identify specific adaptive strategy initiatives. Redmap has the ability to act as an early warning system for changes occurring in the marine environment, and has the potential to play a pivotal role in directing management decisions and actions. The project also promotes data sharing and collaborative options for scientists, managers, and community members on a large scale, helping to promote cross-collaborations between marine users. In doing, Redmap will facilitate the transfer of knowledge and integrated approaches to monitoring climate change impacts.

INQUIRY INTO BIODIVERSITY AND CLIMATE CHANGE

Terrestrial, marine and freshwater biodiversity in Australia and its territories

Redmap represents a large-scale cost-effective marine monitoring tool with the ability to engage 'citizen scientists' in collecting data on marine species (fishes and invertebrates) that are undergoing distribution range changes in the face of climate change. To date, in Tasmania alone over the past 2 years, the Redmap project has received 350+ sightings of marine species which have been recorded outside their known distribution range. This comprises 70 species recorded, with some recorded as much as 470km south of their 'known' distributional range. Although initiated in Tasmania, the Redmap project is currently undergoing a significant expansion to become active in all Australian states and territories, and recently held its first national workshop to establish a national steering committee and associated operating guidelines. The website and database for Redmap Australia is funded by the Australian National Data Service, however, they are not funding the project per se. The project is being developed using in-kind funding from participating institutes around Australia with the aim of applying for funding to support the program as funding options become available.

Strategies to enhance climate change adaptation, including promoting resilience in ecosystems and human communities

Redmap is able to enhance education and awareness of climate change adaptation, and the promotion of ecosystem resilience through community engagement and effective communication via the website (www.redmap.org.au). It provides an early warning system for species distribution changes so that research can then be directed to these areas. It generates awareness of the impact that present (and future) changes are likely to have on fishing, diving; and creates awareness and promotion of the reduction of other marine pressures (pollution, habitat degradation etc.) to increase ecosystem resilience against the impacts of climate change.

For efficient management of changes in the marine environment, not only is there a need for data to be collected at large scales, but also it is crucial to have the data readily available – the Redmap website provides current and publicly available data to achieve this. Additionally, data collected are promoted through a regular community newsletter and promotion through a range of partnership groups.

Mechanisms to enhance community engagement

Redmap has been highly successful in engaging a broad audience in marine monitoring, biodiversity, climate change and other issues across Australia. This project is able to identify areas of species change with the marine environment and identify marine species on the move. Furthermore, the projects achievements include:

- Education and awareness of climate change issues
- 27,500+ discrete website hits or visits
- 105,000+ website pages downloaded (approx. 4700 per month)
- Web viewers from 156 countries
- 680+ people subscribe to the quarterly Redmap newsletter (from 20 countries)
- The most downloaded web pages include: "Species of interest", "Tasmanian sightings" and "What is climate change?" suggesting Redmap is engaging the community with climate change and marine science

Redmap recently held its first national workshop to form a national steering committee with representatives from four states, and numerous groups including recreational and commercial fisheries, SCUBA diving community, community groups (e.g. OceanWatch) and state representatives. Redmap also engages with school groups and local events to further promote marine issue awareness and the need to identify and implement climate change adaptive capacity mechanisms. The project is supported by project partners including Fishcare, Reef Life Survey, OceanWatch, TARFish, and the Tasmanian Seafood Industry Council.

The Redmap project allows a link between science and the fishing industry which is otherwise often difficult to bridge – knowledge gaps are addressed in a true partnership and two-way knowledge exchange between fishers and scientists. Studies show traditional scientific messages are not getting through to large segments of

the population. For example, many commercial fishers do not believe global warming is an issue for their industry. Redmap lets Tasmanians discover for themselves how the seas are changing by collecting their own 'data'; and over time will show marine industries - on a map – which species are on the move. Redmap is science created 'by the people for the people' with the potential to directly engage Australia's 3.5 million fishers and divers directly, and much of our broader community indirectly.

The scope of the committee's inquiry shall include some case studies of 'nationally important ecosystems', as defined by submissions to the inquiry.

Case study 1: SE Australia

We suggest that southeastern Australia should be considered as a priority case study as a **'nationally important ecosystem'** region. South-eastern Australian waters represent a hotspot for marine climate change – where ocean warming is occurring at 3-4 times the global average. Recent research has demonstrated that shifts in species distribution are greatest where warming is greatest (Chen et al 2011). It is not surprising then that several dozen species from a range of taxa have exhibited major climate related distributional shifts in recent decades in south-east Australia (e.g. Ling et al 2009a,b; Last et al 2011), and there have been significant climate-related changes in key fisheries (Johnson et al 2011; Pecl et al 2010). Waters in south-eastern Australia are responsible for 50% of Australia's fisheries production, host a high level of endemic species and offer no land mass further south for species that find themselves in unable to cope with increasing water temperature.

Redmap observations, submitted by the SCUBA divers, recreational fishers and commercial fishers of Tasmania, have included some 350+ sightings of 70 marine species observed outside their expected distributions in Tasmanian waters, some species as far as 470km south of their 'known' distribution. Sightings are often submitted with a photograph which Redmap subsequently gets verified in terms of the species ID by a qualified expert. Redmap data is thus robust and consequently has been used to date in three international journal publications (Booth et al 2011; Johnson et al 2011; Last et al 2011).

We are happy to provide additional information and address any issues arising from our submission. Should you require any further detail please contact us.

Prof M F Coffin
Executive Director
Institute for Marine and Antarctic Studies
University of Tasmania

W www.imas.utas.edu.au

CC:

Dr Gretta Pecl (Redmap Australia Chair)
Fulbright Fellow and Senior Research Fellow
Institute for Marine and Antarctic Studies
University of Tasmania

References cited:

Booth, DJ, Bond, N & Macreadie, P. (2011). Detecting range shifts among Australian fishes in response to climate change Marine and Freshwater Research. 62: 1027–1042

Chen, I-C, Hill, JK, Ohlemüller, R, Roy, DB, Thomas, CD (2011). Rapid Range Shifts of Species Associated with High Levels of Climate Warming. Science 333: 1024-1026.

Johnson, C.R., S.C. Banks, N.S. Barrett, F. Cazassus, P.K. Dunstan, G.J. Edgar, S.D. Frusher, C. Gardner, M. Haddon, F. Helidoniotis, K.L. Hill, N.J. Holbrook, G.W. Hosie, P.R. Last, S.D. Ling, J. Melbourne-Thomas, K. Miller, G.T. Pecl, A.J. Richardson, K.R. Ridgway, S.R. Rintoul, D.A. Ritz, D.J. Ross, J.C. Sanderson, S.A. Shepherd, A. Slotwinski, K.M. Swadling and N. Taw (2011). Climate change cascades: shifts in oceanography, species' ranges and subtidal marine community dynamics in eastern Tasmania. Journal of Experimental Marine Biology and Ecology, 400: 17–32

Last, P.R., White, W.T., Gledhill, D.C., Hobday, A.J., Brown, R., Edgar, G.J., and Pecl, G (2011). Long-term shifts in abundance and distribution of a temperate fish fauna: a response to climate change and fishing practices. Global Ecology and Biogeography, 20: 58-72.

Ling, S. D., C. R. Johnson, S. D. Frusher, and K. R. Ridgway. (2009a). Overfishing reduces resilience of kelp beds to climate-driven catastrophic phase shift. Proceedings of the National Academy of Sciences of the United States of America, 106:22341-22345.

Ling, S. D., C. R. Johnson, K. Ridgway, A. J. Hobday, and M. Haddon. (2009b). Climate-driven range extension of a sea urchin: inferring future trends by analysis of recent population dynamics. Global Change Biology, 15:719-731.

Pecl G, Frusher S, Gardner C, Haward M, Hobday A, Jennings S, Nursey-Bray M, Punt A, Revill H, van Putten I (2009). The east coast Tasmanian rock lobster fishery – vulnerability to climate change impacts and adaptation response options (Executive summary). Report to the Department of Climate Change, Australia.