



NCCARF

National
Climate Change Adaptation
Research Facility



National Climate Change Adaptation Research Plan: Marine Biodiversity and Resources

Summary

A National Climate Change Adaptation Research Plan for Marine Biodiversity and Resources has been developed to identify research required over the next 5–7 years to inform policy development and to help managers of coastal ecosystems and the marine environment and associated industries and communities prepare for the consequences of climate change.

Climate change is very likely to affect marine biodiversity and resources, mainly through changes induced in the physical and chemical features of the marine environment such as ocean warming, changes in ocean currents, and changes in ocean chemistry. It is also likely to have significant effects on important coastal habitats, including wetland, mangrove, saltmarsh and seagrass ecosystems. Some of these changes have already been observed. The magnitude of recent physical changes is greater than at any time during human civilization and, importantly, the rate of change is faster.

The effects of climate change may have serious implications for the communities and industries that depend on the resources and services provided by marine ecosystems. Appropriate adaptation to these changes will require that, where possible, the social, economic and environmental consequences are anticipated, impacts minimised, and opportunities realised.

The National Climate Change Adaptation Research Plan for Marine Biodiversity and Resources provides a framework to guide research funding decisions and key research directions for Australia's marine research community.

The Plan focuses on research to inform strategies addressing climate change impacts on:

- Marine-dependent species and ecosystems, including those in the ocean, estuaries and coastal saline wetlands and beaches, including production at the base of marine food webs
- Physical features of habitats for the above species, including processes such as increased inundation of wetlands, coastal erosion, nutrient distributions, and warming-and pH-related changes in the ocean as they affect the dependent species
- Physical conditions in the marine environment (e.g., weather and wave climates) that directly affect people's access to marine resources
- Social conditions in marine-dependent or associated communities
- The economic viability of activities or communities that depend on marine biodiversity and resources
- The options for governance and management of the marine environment and regulation of its uses.

Key stakeholders and sectors

The Plan groups key stakeholders into three broad categories, with a focus on those most likely to be directly affected by climate change impacts:

- Policy-makers and regulatory decision makers
- Direct and dependent users of marine biodiversity and resources
- Representatives of interests in marine biodiversity and resources.

The Plan then groups stakeholders around the sectoral activities or interests that they have in Australia's marine biodiversity and resources. The following sectors are addressed in this Plan:

- Marine aquaculture
- Commercial and recreational fishing
- Conservation management
- Tourism and non-extractive recreational uses.

The Plan also recognises the high importance of systems-based cross-sectoral research.

The Plan identifies a number of critical information needs and research gaps for each sector, and these are listed on the following page.



Images: Top L-R: Australian Fisheries Management Authority/Rick Allison; Fernando Alvarez; James Dunn. Bottom: Jan-Olaf Meynecke; Jan-Olaf Meynecke; Ned Pankhurst.

Climate change and marine biodiversity and resources: priority research questions

Aquaculture

- Which farmed species in which locations are most likely to be impacted by climate change?
- What options are there for businesses to adapt to climate change effects either by minimising adverse impacts or taking advantage of opportunities? What are the barriers to implementing such changes and how might they be overcome?

Commercial and recreational fishing

- Which fishery stocks, in which locations, are most likely to change as a result of climate change? What will those changes be (e.g., in distribution, productivity), and when are they likely to appear under alternative climate change scenarios?
- What options or opportunities are there for commercial fishers in identified impacted fisheries to adapt to climate change effects through changing target species, capture methods and management regime, industry diversification, relocation or disinvestment?

Conservation management

- Which ecosystems and species of conservation priority most require adaptation management and supporting research, based on their status, value, vulnerability to climate change and the feasibility of adaptive responses?
- How should conservation managers and planners adapt their practices to ameliorate climate change risks and enhance adaptation options? What intervention strategies will increase system resilience and improve the time within which biological systems can adjust to a future climate?

Tourism and recreational uses

- What are the predicted regional impacts of climate change for marine tourism assets (e.g., which tourism sites will be most vulnerable to change and to what degree)?
- What is the adaptive capacity of the marine tourism industry and how can it be enhanced to cope with climate change impacts?

Cross-cutting issues

- What are the key interactions across sectors, cumulative impacts and cross-jurisdictional issues that will affect the development of adaptation strategies in each sector and how can these cross- and multi-sectoral issues best be addressed?

Developing the Plan

The writing team for the National Climate Change Adaptation Research Plan for Marine Biodiversity and Resources was led by Dr Bruce Mapstone. The team comprised Australia's leading specialists working in the area of marine biodiversity and resources and climate change adaptation, and included Peter Appleford, Kathleen Broderick, Rod Connolly, John Higgins, Alistair Hobday, Terry Hughes, Jan McDonald, Paul Marshall and Marie Waschka.

The National Climate Change Adaptation Research Facility coordinated the development of this Plan, and the writing team consulted broadly with stakeholders and researchers with an interest in marine climate impacts and adaptation including science, policy, management and industry groups, and government agencies.

A formal period of review of the draft Plan provided an opportunity for all interested parties to provide input into the development of the Plan.

Criteria for prioritising research questions

Identified research questions were evaluated and prioritised using the following criteria:

- Severity of impact/degree of benefit
- Immediacy of required intervention/response
- Need to change current intervention/practicality of intervention
- Potential for co-benefit
- Potential to address multiple, including cross-sectoral, issues.

A coordinated national approach to climate change and marine biodiversity and resources research in Australia

The implementation of the National Climate Change Adaptation Research Plan for Marine Biodiversity and Resources will be supported by the Adaptation Research Network for Marine Biodiversity and Resources, which is funded by the Australian Government via the National Climate Change Adaptation Research Facility. This Network is hosted by the University of Tasmania, and convened by Associate Professor Neil Holbrook.

The aim of both the Plan and the Network is to facilitate a coordinated research effort to address the information needs of decision-makers with respect to adaptation to climate change in the area of marine biodiversity and resources. This effort will include the identification of sources of research funding and the communication of research outcomes to inform decision making by government, industry and communities.

The Australian Government Department of Climate Change and Energy Efficiency and the Fisheries Research and Development Corporation (FRDC) have made an initial investment of \$5.5m for research addressing priorities in this Plan. This funding will be made available through the Climate Change Marine Adaptation Research Program and administered by the FRDC.

Published by the National Climate Change
Adaptation Research Facility
Email nccarf@griffith.edu.au
Website www.nccarf.edu.au

Disclaimer: The views expressed herein are not necessarily the views of the Commonwealth, and the Commonwealth does not accept responsibility for any information or advice contained within.

NCCARF expresses its appreciation to the writing team and to the many individuals and organisations who contributed their time and expertise to the development of this Plan.

ISBN 978-1-921609-06-0
© Copyright National Climate Change
Adaptation Research Facility 2010
NCCARF Publication 04/10



How to get involved: key contacts

If you would like further information about the National Climate Change Adaptation Research Plan for Marine Biodiversity and Resources please contact:

National Climate Change Adaptation Research Facility
Telephone + 61 7 5552 9333
nccarf@griffith.edu.au
www.nccarf.edu.au

If you would like to be involved in the Adaptation Research Network for Marine Biodiversity and Resources please contact:

Associate Professor Neil Holbrook (Network Convenor)
School of Geography and Environmental Studies
University of Tasmania
Telephone +61 3 6226 2027
neil.holbrook@utas.edu.au

