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National
Climate Change Adaptation
Research Facility



National Climate Change Adaptation Research Plan: Terrestrial Biodiversity

Summary

A National Climate Change Adaptation Research Plan has been developed to identify the information that decision makers within government, industry and communities may need in order to effectively respond and adapt to the impacts of climate change on Australia's terrestrial biodiversity.

Increasing concentrations of greenhouse gases in the atmosphere due to human activities are driving changes in global climate. The magnitude of the recent physical changes is greater than at any time during human civilisation and, importantly, the rate of change is faster.

The Intergovernmental Panel on Climate Change has highlighted the fact that in general around the world, biodiversity is likely to be the sector most vulnerable to the impacts of climate change. This vulnerability is a consequence of the rate of change being too rapid for most species to adapt to by genetic change, and the interaction of climate change with many other existing pressures on natural systems.

While there has been some research aimed at understanding the broad impacts of climate change on the terrestrial environment, research into adaptation strategies and options is less well developed.

The National Climate Change Adaptation Research Plan for Terrestrial Biodiversity identifies research required over the next five to seven years to assist managers of the terrestrial estate to prepare for the consequences of climate change.

This document provides a summary of this Plan; the full plan is available online at www.nccarf.edu.au

Climate change impacts in Australia: priorities for Terrestrial Biodiversity

The priority questions identified in the Plan have been organised into four main sub-themes that correspond to the main ecological scales of organisation and the main scales of management: national/continental scale, regional scale, local land management, and management of key species. Critical information needs and research gaps are identified under each sub-theme.

The overall aim of the research questions is to focus research effort on how we can incorporate risk and vulnerability assessment at all levels of environmental management with future climate scenarios, to support informed decisions about the timing and cost/benefit trade-offs of adaptive management options.

Effective adaptation is needed in order to minimise negative impacts on biodiversity and realise potential opportunities. Planned adaptation will involve modifications to current management practices, including the networking of protected areas, restoration of essential habitats and in some cases, engineered strategies designed to increase the ability of species or systems to be more resilient to change.



Priority research questions for climate change and terrestrial biodiversity

National/continental-scale issues

- How will climate change affect existing conservation goals and how should changed conservation goals be promoted and achieved?
- How can the existing Australian legal, policy and institutional architecture for land management and biodiversity conservation respond to changes in conservation goals caused by climate change?
- What conceptual models and long-term observation systems are needed to support the design, analysis and assessment of active adaptive management and policy experiments at regional and national scales under climate change?

Regional issues

- What designs of landscapes in regions having different land uses confer maximum resilience for biodiversity in the face of climate change, including the uncertainty associated with future climate scenarios?
- How will climate change interact with other key stressors such as fire, invasive species, salinity, disease, changes to water availability, grazing and clearing and what are the integrated implications for ecosystem structure and functioning?
- How can large-scale carbon mitigation initiatives, such as revegetation and forest-related mitigation be designed to maximise biodiversity conservation benefits and to avoid adverse impacts on biodiversity?
- How can the major socio-economic trends occurring in many regions of Australia contribute to effective climate change biodiversity adaptation responses?

Local land management issues

- What are the costs and benefits of different climate change adaptation measures in vulnerable ecological communities and ecosystems?
- How should fire management adapt to climate change?
- How can management of local protected areas incorporate and adapt to climate change?
- How can we better integrate conservation plans and actions across landscapes, incorporating protected area management, off-reserve conservation measures and other land issues, in order to maximise biodiversity conservation benefits/outcomes under a changing climate?

Managing key species

- Which species should be the focus of investment in climate change adaptation?
- How will climate change affect current management actions for protecting priority species and what management changes will be required?
- How will climate change affect current or potential problem species and what management responses will be required?

How to get involved: key contacts

If you would like further information about the National Climate Change Adaptation Research Plan: Terrestrial Biodiversity please contact:

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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.

Published by the National Climate Change
Adaptation Research Facility
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ISBN 978-1-921609-12-1
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Adaptation Research Facility 2010
NCCARF Publication 04/11

Developing the Plan

The writing team for the National Climate Change Adaptation Research Plan for Terrestrial Biodiversity comprised Australia's leading specialists working in the area of terrestrial biodiversity and climate change adaptation research, and included Lesley Hughes, Richard Hobbs, Angus Hopkins, Jan McDonald, Mark Stafford Smith, Will Steffen and Stephen Williams.

The National Climate Change Adaptation Research Facility coordinated the development of this Plan, which was then widely disseminated in draft form. A formal period of review of the draft Plan ensured that all interested parties were able to contribute comments.

Criteria for prioritising research questions

The 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 research into terrestrial biodiversity and climate change in Australia

The implementation of the National Climate Change Adaptation Research Plan for Terrestrial Biodiversity will be supported by the Adaptation Research Network for Terrestrial Biodiversity, which is funded by the Australian Government via the National Climate Change Adaptation Research Facility. This Network is hosted by James Cook University, and co-convened by Professors Stephen Williams (JCU) and Lesley Hughes (Macquarie University).

The aim of both the Research 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 terrestrial biodiversity. 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 has made an initial investment of \$3.3m for research addressing priorities in this Plan. This funding will be made available through the Climate Adaptation Research Grants Program and funds will be allocated via an open call for expressions of interest.



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Department of Climate Change
and Energy Efficiency

