Australian Government

Director of National Parks

BARRIERS TO EFFECTIVE CLIMATE CHANGE ADAPTATION

SUBMISSION BY
THE DIRECTOR OF NATIONAL PARKS
TO AN INQUIRY BY THE
PRODUCTIVITY COMMISSION

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INTRODUCTION

The Director of National Parks

The Director of National Parks is a corporation sole established under Division 5 of Part 19 of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and is the statutory agency responsible for the Australian Government's protected area estate, both terrestrial and marine. The Director is assisted by Parks Australia, a division of the Australian Government Department of Sustainability, Environment, Water, Population and Communities, in carrying out the Director's responsibilities. In this submission, reference to Parks Australia means the Director of National Parks and Parks Australia staff members.

Overview of Activities

The Director, supported by Parks Australia, provides a national leadership role in the understanding, management and appreciation of the natural and cultural values of Australia's conservation estate, through the management of Commonwealth reserves and the administration of complementary protected area programs and initiatives. A brief overview of the Director's activities follows, with detailed information available in the Director's annual report: http://www.environment.gov.au/parks/publications/annual/10-11/index.html.

Management of Commonwealth terrestrial and marine reserves. Terrestrial reserves managed by Parks Australia on behalf of the Director include Booderee, Kakadu and Uluru-Kata Tjuṯu national parks, each jointly managed with their Indigenous owners via statutory boards of management; and Christmas Island, Norfolk Island and Pulu Keeling national parks located in Australia's external territories. The Director is also responsible for the Australian National Botanic Gardens, a major national scientific, educational and recreational resource located in Canberra.

Under a long-standing agreement between the Director and the CSIRO, the Australian National Botanic Gardens and the CSIRO participate in the Centre for Australian National Biodiversity Research, the aims of which include to be a national centre of research excellence in the fields of systematics and conservation biology, as a basis for conservation and sustainable management and use of Australian ecosystems.

Under delegation from the Director, the department's Marine Division and Australian Antarctic Division manage a network of 26 Commonwealth marine reserves which currently cover nearly 50 million hectares of Australia's large and diverse maritime estate. The Australian Government is currently conducting a marine bioregional planning process throughout Commonwealth waters which includes identification of substantial areas of further Commonwealth marine reserves, in accordance with international and national commitments to establish a National Representative System of Marine Protected Areas by 2012.

Complementary protected area initiatives. The Director is engaged in a partnership with Tourism Australia to identify and promote world-class and distinctively Australian natural- and cultural-based tourism experiences at a regional scale through the National Landscape Program. Currently eleven National Landscapes are recognised including the Australian Alps, the Flinders Ranges and the Kimberley. Enhancing and promoting the role of protected areas in the social and economic well-being of regional Australia is a major focus of the program.

The Director has been delegated functions and powers by the Minister and the Secretary of the department for programs that complement the Director's Commonwealth reserve responsibilities. These include the National Reserve System Program and the Indigenous Protected Areas Program, both significant components of the Australian Government's Caring for our Country initiative.

The National Reserve System is Australia's network of protected areas and represents the collective effort of government and non-government organisations, the business sector and Indigenous landholders to formally protect biodiversity in perpetuity. The National Reserve System Program supports the acquisition and covenanting of properties to be managed for nature conservation, targeting under-represented and vulnerable areas. The Indigenous Protected Areas element of Caring for our Country supports Indigenous communities to manage their land for conservation and protection for all Australians. More than 50 Indigenous Protected Areas have been declared to date, covering some 26 million hectares and representing about one quarter of the National Reserve System which now covers nearly 14 per cent of Australia's landmass.

In working towards the establishment of a comprehensive, adequate and representative protected area estate, a key priority for investment through the National Reserve System component of Caring for our Country has been the target of building up to 10 per cent representation in each of 85 bioregions across the country.

PROTECTED AREAS AND CLIMATE CHANGE

The nation's conservation estate is accepted as the backbone of Australia's efforts to conserve our native biodiversity (DSEWPaC 2011). Nevertheless protected areas in their various forms can only cover a relatively small sample of Australia's remaining natural areas and conservation of biodiversity is dependent on actions taken across the entire landscape, meaning the protected area estate is a 'necessary but not sufficient' biodiversity conservation strategy. Effective conservation of biodiversity within the protected area estate thus requires amelioration of many of the same threats that are present outside protected areas.

Habitat loss, degradation and fragmentation, impacts of invasive species, unsustainable use of natural resources, changes to the aquatic environment and inappropriate fire regimes are among the most important factors that threaten biodiversity. Some are the result of legacy issues that continue to operate long after the original activity took place (past land clearing is an example). Climate change further threatens biodiversity, both in its own right through direct impacts such as increased temperature and altered rainfall patterns and more importantly as a magnifier of the impacts of existing threats (NRMMC 2010).

That natural areas have been subject to dramatic changes in climatic regimes in the past is well-established - the biodiversity which characterises Australia's environment is the evolutionary product of past environmental change, including to the prevailing climate. Anthropogenic climate change currently underway and anticipated, however, poses two key challenges not previously experienced by natural areas, at least not to the same degree:

- climate change is projected to occur at rates well beyond the capacity of species and species assemblages to adapt through on-going evolutionary processes

- pressures on natural areas due to existing threatening processes will reduce the options available to species to respond to climate change (impediments to distributional change arising from habitat fragmentation and reductions in the genetic diversity of threatened species due to low population size are two obvious examples).

Climate change also has major implications for management of the protected area estate beyond anticipated (and unknown) impacts on biodiversity. For example, as important places for recreation and commercial tourism and as sites with high cultural values (particularly for Indigenous people) managers of protected areas can be increasingly expected to deal with more extreme climate events which impact negatively on visitor access, comfort and safety, damage cultural sites and pose an increased threat to park buildings, assets and infrastructure. While the significance of those impacts should not be downplayed, there is arguably the greater prospect of wider socio-economic and technological solutions becoming available which can be deployed to ameliorate them, compared to the likelihood of available measures for conservation of natural attributes (such as biodiversity) including traditional food resources.

What Parks Australia Is Doing

A comprehensive discussion paper commissioned in 2007 provides a detailed analysis of the implications of climate change for the Australian Government's terrestrial and marine protected area estate[1] (Hyder Consulting 2008). This report identifies projected impacts on the natural, cultural and recreational values and their attendant management implications for each Commonwealth terrestrial and marine reserve, under a range of climate change scenarios. A review of those impacts and implications is not repeated in this submission but two issues in particular serve as exemplars of the management issues beginning to be experienced:

- increasing temperatures and number of extreme fire danger days at Booderee National Park means there are narrowing and declining opportunities for prescribed burning, with implications for conservation of the park's biodiversity as well as for the safety of park visitors and neighbouring communities
- saltwater intrusion to the floodplains of Kakadu National Park from storm surges and anticipated sea-level rise is altering the structure of existing freshwater communities, with resultant impacts on the availability of traditional food sources for the park's Indigenous owners, in addition to biodiversity and tourism impacts.

A more recent study on the vulnerability of Kakadu to climate change impacts (BTM WBM 2010) has modelled expected impacts on the park's key environmental, cultural and economic values. A range of adaptation options and potential barriers to implementation were identified and evaluated. A review of the park's policy, planning and management regimes concluded that its regulatory and policy environment is well developed and the current management regime is effectively managing current challenges. The highest priority action identified in the study, the development of a digital elevation model for the park to enable more rigorous analysis and forecasting of potential impacts of sea level rise, is being implemented.

[1] This study did not include the Great Barrier Reef Marine Park which is the responsibility of a separate Australian Government agency, the Great Barrier Reef Marine Park Authority

An overarching climate strategy, *Parks Australia Climate Change Strategic Overview 2009-2014*, identifies the principles and objectives that will guide response to managing the consequences of climate change in Parks Australia's terrestrial reserves (DNP 2009). The strategic overview incorporates the following five objectives:

i. to understand the implications of climate change
ii. to implement adaptation measures to maximise the resilience of our reserves
iii. to reduce the carbon footprint of our reserves
iv. to work with communities, industries and stakeholders to mitigate and adapt to climate change
v. to communicate the implications of, and our management response to, climate change.

Park-specific five-year climate change strategies, progressively prepared since 2010, support the overall strategy and identify particular management actions. Detail of these strategies is available at: http://www.environment.gov.au/parks/climate.html.

In terms of climate change and protected areas nationally, in 2008 the CSIRO undertook a preliminary assessment of the implications of climate change for the National Reserve System (NRS) (Dunlop and Brown 2008) and an update for 2011 is currently being finalised to reflect the findings of the most recent climate change research. The recommendations of these reports have been taken into account in developing priorities for investment and strategies for implementation of the NRS component of Caring for our Country.

Parks Australia's Approach to Climate Change

As climate change proceeds, it is inevitable that some changes to natural areas, including those within Commonwealth reserves, will be irreversible while others will merit issue-specific solutions to ensure the continuation of attributes of particular natural or cultural heritage significance. The uncertainty surrounding the specific impacts of climate change and the appropriate management responses to those impacts suggests that innovative solutions will be required, perhaps very different to those previously adopted.

Without embarking on undue speculation as to the nature of future approaches, both *in situ* solutions (eg engineering works to protect key natural attributes, experimental translocation of populations of species at particular risk) and *ex situ* solutions (eg expanded use of seed and gene banks, maintenance of captive populations) may be expected to play an increasing role in protected area management as the effects of accelerated climate change begin to be felt. Interventions can be expected to be both issue and area-specific and will rely on adaptive responses by managers to particular circumstances as they emerge.

Notwithstanding the potential for such interventions, it is likely they will be limited in their application, due to very real constraints of resource limitations and inadequate knowledge (among other limiting factors). In the absence of greater certainty regarding its particular impacts, Parks Australia considers the *best overall approach* of addressing climate change is to build the resilience of natural environments so they are in the best position to withstand those *existing* impacts which may be *exacerbated* by climate change. In terms of biodiversity conservation, this approach in essence requires continued and enhanced attention to controlling invasive species, implementing improved fire regimes and mitigating the effects of other threatening processes.

National Approaches

A comprehensive, adequate and representative approach for protected areas at a landscape scale is one of the best ways to support adaptation of Australia's biodiversity to climate change. Through the National Reserve System Program and Indigenous Protected Area Program elements of Caring for our Country, Parks Australia is actively supporting the development of the NRS in cooperation with government, non-government and Indigenous partners and stakeholders.

A particular strength of the NRS is its scientific underpinning. The NRS is being implemented at the landscape-scale through consideration of specific criteria for comprehensiveness, adequacy and representativeness of the protected area estate at the scale of biogeographic regions and sub-regions. The preliminary assessment of the implications of climate change for the NRS undertaken by the CSIRO indicated that this bioregional framework will remain effective under climate change. However, reserve management will need to evolve as the environment and biodiversity change and new threats emerge (Dunlop and Brown 2008).

A long-term national policy framework for the NRS has been put in place by the Australian and state and territory governments which, *inter alia*, recognises the importance of linking with other habitat protection schemes to support adaptation to a changing climate and identifies priority actions to provide a nationally coordinated approach (NRS Task Group 2009). The NRS strategy includes the following national targets:

- examples of at least 80 per cent of all regional ecosystems in each bioregion by 2015
- examples of at least 80 per cent of all regional ecosystems in each subregion by 2025
- core areas for the long-term survival of threatened ecosystems and threatened species habitats in each of Australia's bioregions by 2030
- critical areas for climate change resilience, such as refugia, to act as core lands of broader whole of landscape-scale approaches to biodiversity conservation by 2030.

The NRS is currently comprised of more than 9,400 individual protected areas covering almost 106 million hectares or an average reserve size of over 11,200 hectares. Of particular significance is the number of very large reserves – there are (as of 2010 data) 177 reserves each greater than 100,000 hectares of which 20 extend for more than one million hectares. Together, these very large reserves cover nearly 86 million hectares or more than 80 per cent of the total area covered by the NRS.

The inclusion of many reserves of large size is noteworthy in that larger reserves, in general terms, provide greater opportunities to maintain ecological processes across the landscape. Large reserve size is, however, biased towards areas that are mountainous, arid or remote from settlements and in many bioregions, particularly those subject to past land clearing for agriculture and other development, the options for further reservation of even small remnant natural areas are limited (and in some cases non-existent).

The national strategy focuses further development of the NRS over the next 20 years on inclusion of examples of under-represented ecosystems, together with inclusion of key areas which are thought to have served as refugia during past periods of climate change. In addition, approaches that emphasise and support connectivity across landscapes, encourage consolidation and expansion of existing reserves and promote linkages with off-reserve

biodiversity conservation measures will have the greatest impact in building resilience to the impacts of climate change within the protected area network.

As climate change impacts become more pronounced, protected area managers will face some potentially contentious issues. There may be pressures to relinquish reserves which are no longer effective in conserving the biodiversity they were designed to protect; areas of currently low conservation significance adjoining existing protected areas may need to be rehabilitated in order to allow for migration of species and communities; and the values for which protected areas were declared may no longer exist. Meeting future challenges such as these will require flexible and innovative approaches on behalf of protected area managers, better knowledge of likely climate change impacts and enhanced resources to support effective reserve management.

WHAT IS EFFECTIVE CLIMATE CHANGE ADAPTATION FOR PROTECTED AREAS?

The Productivity Commission's issues paper poses the question 'What does adaptation to climate change mean?' as a basis for its deliberations, in the context of the range of socio-economic considerations for Australia as a whole.

For the *conservation and management of biodiversity in protected areas*, Parks Australia considers adaptation to climate change to comprise the following key components:

- building our understanding of impacts and cost-effective approaches and options for adaptation
- reducing existing threats to biodiversity and building resilience in natural systems and species, particularly those likely to be at increased risk
- working with neighbours and stakeholders to manage protected areas as part of the broader landscape, thereby maximising opportunities for natural dispersal or establishment of species
- assisting the natural adaptation of species and ecosystems through improved on-reserve and off-reserve management of areas of high conservation value.

This approach provides a model of incorporating climate change in all aspects of strategic planning to promote resilience in some of Australia's most fragile and unique ecosystems.

BARRIERS TO EFFECTIVE CLIMATE CHANGE ADAPTATION

Several major factors can be identified which represent barriers to effective climate change adaptation in the context of conservation and management of biodiversity in protected areas. In considering those barriers in more detail, it should be emphasised they are neither novel nor easily overcome. Their scale and significance is nevertheless expected to increase as climate change proceeds, lending greater urgency to the pursuit of measures to address them.

Each of these barriers involves a dimension of dealing with uncertainty. As the Productivity Commission's issues paper points out, individuals and organisations are often required to deal with uncertainty; this is certainly true of nature conservation and natural resource management generally. The particular challenge posed by climate change is thus not uncertainty *per se* but rather the level of uncertainty about the scale and pace of change and

the consequent inability to rely on past practices and approaches to shape future management directions.

1 Inadequate Knowledge

Improved understanding of climate change impacts on natural areas generally and on protected areas in particular is a basic requirement for effective adaptation.

The new discipline of climate change biogeography needs to be further developed and better understanding of what is considered a climate change impact (as opposed to what is an impact from another source) is required. There is a need to prioritise and focus on obtaining information about likely impacts, implications and options on key biodiversity assets.

In terms of priority areas, ecologically-rich areas including the Great Barrier Reef, the Queensland Wet Tropics, south-western Australia and the Australian Alps have been identified as being at particular risk of significant biodiversity loss. A particular knowledge gap nationally concerns the precise location and dynamics of refugial sites within these (and in other) areas which are thought to have been key to the survival of plants and animals through past climate change events. As noted earlier in this submission, such areas already are key priority for long-term protection via inclusion in the NRS.

While there is a growing body of research on the impacts of climate change on Commonwealth reserves, there remains a lack of information in many key areas[2]. In the absence of robust, definitive and location-specific scientific research, a risk management approach needs to be taken supporting dynamic and adaptive reserve management. Such an approach, embedded at a policy level, would assist reserve managers in understanding which adaptation decisions are most urgent and where to focus available resources.

2 Knowledge Consolidation and Dissemination

Notwithstanding the challenge posed by inadequate knowledge, Parks Australia recognises that knowledge is a pathway rather than an endpoint. The option to delay management actions until sufficient knowledge is available to support secure decision-making will often not be possible. The development of decision support tools to help protected area managers deal with uncertainty, while making balanced and cost-effective decisions on climate change adaptation options in the face of competing demands, will increasingly be required.

Parks Australia has recently established a Knowledge Management Working Group with the aim of improving our management of scientific data, information and knowledge. While the ambit of this group extends well beyond climate change adaptation, measures that help to ensure managers 'know what they know' will support more informed decision-making about climate change adaptation for the reserves managed by Parks Australia.

We work actively with a range of research partners to ensure we have access to the best available information and advice, and encourage research that is practical and focused on management priorities.

[2] Two examples of notable knowledge gaps for Parks Australia are understanding of the dynamics of aquifer systems and associated biodiversity at Uluru-Kata Tjuta National Park and modelling of saltwater intrusion to Kakadu National Park

In terms of wider decision-making, there is a need to enhance the ability of the wider community to understand the implications of climate change and be involved in adaptation options regarding protected areas and biodiversity conservation more broadly. Improved approaches to dissemination of information are required to assist community and non-government groups to make use of information that already exists but may not be widely accessible. Consideration of the types of information that will promote community involvement is also a priority.

3 Undervaluation of Ecosystem Services

The failure to properly value the ecosystem services that society derives from natural areas is a significant impediment to implementing effective climate change adaptation processes.

While there has been considerable attention to establishment and effective operation of water (and more recently carbon) markets, there remains considerable scope for applicable of market-based approaches to provision of broader ecosystem services (eg clean air, nutrient and water recycling, plant pollination) from the protected area estate. Failure to properly value ecosystem services can distort conservation investment, with a tendency to focus on 'symptoms' rather than 'causes' of biodiversity decline being an obvious result.

Improved valuation of ecosystem services (including their capacity to ameliorate the socio-economic impacts of climate change) and better understanding of the vulnerability of ecosystem services to climate change would encourage more informed and better targeted decision-making, such as consideration of expected ecosystem change in business decision-making and industry development and adaptation.

4 Cross-jurisdictional Considerations

One of the greatest challenges is that climate change adaptation responses will require coordinated planning and implementation across different sectors, tenures and jurisdictions.

The national strategy for the NRS embodies a successful collaborative approach between all sectors of government as well as non-government interests which provides a potential model for future approaches to climate change adaptation in the protected area context. It would nevertheless be wrong to downplay the difficulties inherent to the establishment of collaborative ventures such as the NRS and also in maintaining their currency in the face of changing socio-economic and political circumstances.

Despite the inherent difficulties, there are a range of collaborative models that have proved effective over time and have potential for wider application. The Australian Alps National Parks Cooperative Management Program was established in 1986 to promote a cooperative cross-jurisdictional approach to management by government agencies responsible for this important part of the Australian landscape; climate change adaptation is an increasingly important component of the program (see attached case study).

In the non-government sector, Gondwanalink is a collaboration between a number of conservation organisations working together to achieve reconnected country across south-western Australia, with the aim of restoring and maintaining ecosystems and the fundamental ecological processes that underpin them: see http://gondwanalink.org/.

There is considerable scope for application of such approaches across wider areas of the Australian landscape.

5 Inflexible Management Objectives and Approaches

Climate change presents an essential dilemma for managers of places with static boundaries.

As climate change proceeds there is the very real prospect that an individual protected area may no longer effectively conserve the species, ecological communities and natural environments for which it was originally established. Present procedures to amend the boundaries of protected areas are (with good reason) administratively complex, reflecting the value society places on ensuring ongoing legal protection for areas so proclaimed. Nevertheless, future management will need to encompass more flexible approaches in design and management of the protected estate to allow for the movement of formerly static boundaries in response to changed species and community distributions.

In addition, there will need to be greater emphasis on managing ecological systems and ecosystem health, rather than on individual components of these systems. Over time, and under climate change pressures, the biodiversity components of ecological systems will inevitably change – in abundance and influence.

More significant perhaps is the prospect that, should current high scenario climate change projections prove accurate, changing the boundaries of protected areas so they continue to protect the natural areas for which they were originally established will often not be an option - due, for example, to land use constraints, prohibitive economic and social costs or the fact that suitable habitats may simply no longer exist. In such circumstances, changing the *management objectives* of a particular protected area so that it continues to contribute to protection of important natural areas and their ecosystems may be preferable to seeking to amend an area's *boundaries* in an attempt to 'chase' natural areas whose distributions continue to change under a rapidly changing climate regime.

There are challenges to introducing such flexibility. It has proved difficult historically to amend the boundaries of or remove proclaimed protected areas that are no longer effective in meeting their biodiversity conservation objectives, even where the case to do so has proved to be sound. Amending the purpose of a protected area may be less challenging administratively but there will be social and cultural considerations to address if a protected area is no longer perceived to be meeting its original intended purpose (eg if key species are no longer able to survive in that geographic location). The ability to reconcile legitimate societal concerns to safeguard the protected area estate with the need for flexible approaches to its establishment and ongoing management will be a particular challenge.

6 National Policy Vision and Leadership

A framework that encompasses national, regional and local perspectives and identifies issues and adaptation responses and outcomes would be useful. In the absence of such a framework, there is little clarity as to what represents suitable and acceptable objectives under the impact of climate change ('adaptation versus preservation').

There are many directions that biodiversity and conservation adaptation could take in response to the impacts of climate change on protected areas. For example, the response to species movement could be to accept a species will no longer inhabit a particular reserve; to assist a species transition to a new habitat; or to promote opportunities for a species to maintain its current habitat. Management decisions on such responses need to consider public perception (in this case, loss of an iconic species from a reserve).

While existing initiatives such as habitat corridor protection programs and development of the NRS will assist in a landscape-based approach to adaptation, a national policy endorsed by the Australian, state and territory governments would help ensure all protected area managers are working towards common climate change adaptation goals.

In similar terms, addressing the implications of climate change for the social and cultural values of protected areas requires a national approach. The impact of altered landscapes on the community is of significance to national wellbeing – the loss of an iconic ecological community is an example, impacts on tourism incomes from the loss of the natural environment that supports those incomes is another, more tangible one. The challenges for protected area managers posed by such impacts will be more difficult to address in the absence of clear national policy approaches.

7 Resource Constraints

It is inevitable that significant adaptation activities beyond current programs will require substantial additional resources. For example, more comprehensive monitoring and evaluation programs for adaptive management to deal with the outcomes of climate change adaptation actions will be necessary; it will be especially important to examine how a particular adaptation was undertaken, its effectiveness and what alternative options may be available.

Such approaches have staffing and financial implications. This represents an undoubted challenge for all protected area managers and agencies, working hard to deal effectively with the range of threatening processes that currently impact negatively on biodiversity.

The corollary is that working within existing or reduced resources will inevitably result in an approach which isolates action to a few key species or areas and which risks effectively ‘abandoning’ sections of the nation’s protected area estate.

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Case study: The Australian Alps – a landscape approach to management

Encompassing 1.6 million hectares the Australian Alps contain eleven national parks and reserves, the highest mountain peaks on the continent and the most extensive winter snow-covered areas in the country.

The management of the Australian Alps is the responsibility of the Victorian, NSW and ACT governments. The Australian Government strongly supports a cooperative approach to the management of the Australian Alps, through supporting the Australian Alps national parks Cooperative Management Program. In 1986, with the signing of the first Memorandum of Understanding (MOU), NSW, Victoria, ACT and Australian government national park authorities formally agreed that the national parks in the Australian Alps should be managed cooperatively to protect the area's special character.

While they may not be obvious to the casual observer, the Alps are already experiencing changes as a result of a warming climate, including:

- changes to plant and animal distribution, including declines in threatened fauna species numbers, changes in the timing of flowering and migration of species to higher elevations
- increases in the number of introduced plants and animals
- a reduction in the number of snow covered days over winter and changes in the depth of snow cover and ice cover on alpine lakes
- less rainfall, resulting in reduced flows into alpine streams and important catchments
- large scale bushfires.

In the future, visitation to the Alps is likely to change as less snow see fewer skiers, while the coolness of the Alps in a warmer environment may encourage other visitors to spend time in the area (Australian Alps National Parks Cooperative Management Program 2011).

To address these challenges, the Australian Alps Cooperative Management Program includes a Climate Change Reference Group whose primary objective is to implement contemporary approaches to planning for and adapting to climate change in the Alps.

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