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Submission for the Inquiry into Australia's biodiversity in a changing climate

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Dear Standing Committee on Climate Change, Environment and the Arts,

With co-authors from the Australian National University and the Swedish University of Agricultural Sciences, we have written a paper addressing the conservation of biodiversity in relation to climate change. In particular, we examined the interaction of existing threats to biodiversity with climate change, demonstrating that severe interactions are very likely and that action can be taken now to substantially reduce the threats. Countering the interaction between climate change and existing threats is a key component of any thorough program of adaptation to climate change. Our paper, published in the international journal Climatic Change, is provided as an attachment to this submission and gives full details on the threats, and provides detailed consideration of the management and policy responses that are urgently needed. The paper will be available from the publishers on-line from August 1. In the following summary I highlight key points from the paper in relation to the terms of reference. Most of our recommendations refer to terrestrial biodiversity (Term of Reference-1).

TOR 2. connectivity between ecosystems and across landscapes that may contribute to biodiversity conservation

To address the core threat posed by poor connectivity, we suggest the following broad goals must be met by taking the recommended actions below:

Broad goal	Recommended action
Reduce land clearing	Address fundamental drivers of land clearing: per-capita consumption and population growth; Support strong governance Remove taxation and other financial incentives to clear land Eliminate perverse carbon-accounting rules that promote forest clearance for plantations Apply regional market-based instruments, including offsets for no net biodiversity loss.
Restore native vegetation to create carbon sinks and to enhance biodiversity	Identify priority areas for restoration Create guidelines to choose species for restoration Use carbon pricing schemes to fund revegetation Guard against perverse outcomes, especially invasive species risk in new plantings.

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TOR 4. strategies to enhance climate change adaptation, including promoting resilience in ecosystems and human communities

It is now critical to fund vastly improved efforts to combat threatening processes that place biodiversity at increasing risk of decline. In addition to those recommendations made to improve connectivity above, improvements to biosecurity are critical to counter the likely interaction of climate change with invasive exotic species and the growing threat that such species pose to Australian native species.

Broad goal	Recommended action
Prevent new introductions of potentially invasive species	Urgent modification to World Trade Organization international agreements Remove incentives for imports with high risk of accidental introductions Improve quarantine
Manage established alien invasive species	Identify potentially invasive species before they escape captivity and implement policy to support education and regulation Create new policies to regulate sales of potentially invasive garden plants Apply new and existing technology to better control invasive species.
Detect range changes of concern	Establish targeted monitoring programs using both scientists and citizens as primary data collectors

Further, to reduce the extent to which resource exploitation interacts with climate change, with growing negative impacts on biodiversity, the following recommendations are made:

Broad goal	Recommended action
Alter management of natural resources including:	
Water management	Ensure environmental flows are adequate Regulate and police water extraction Reduce demand
Livestock grazing	Implement conservative not opportunistic stocking rates Exclude stock from land set aside for conservation, especially during drought Use outreach programs to educate land owners about ecosystem services Financial incentive schemes for stewardship Off-farm income support
Forest Logging	Retain habitat features to provide native species with resilience to disturbance Reduce and regulate post-disturbance logging Use indigenous species in reafforestation

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TOR 6. an assessment of whether current governance arrangements are well placed to deal with the challenges of conserving biodiversity in a changing climate

An overwhelming trend highlighted in our review is the importance of international agreements in driving or resolving threats to biodiversity. Climate change adaptation is intrinsically linked, not just to international climate change conventions, but also international trade and conservation conventions. National effort to combat the effects of climate change must include engagement in such international negotiations, particularly those associated with international trade. Better engagement in these international trade negotiations is needed by government staff to secure changes that remove those mechanisms that are embedded in trade agreements that threaten biodiversity.

TOR 7. mechanisms to enhance community engagement.

We recommended above that community input may be used to increase the amount of data gathered for monitoring. Expanding the use of smart phones linked to peer-reviewed, professionally developed and run software has the potential to allow enormous amounts of good quality data to be collected, in addition to providing for broad public engagement. Applications that could be developed using existing technology include a bird and frog-call identifier, and possibly identifications based on photographs of animals. It needs investment to bring together those experts in Australia who have the expertise to build these systems.

An unfortunate by-product of the complex interaction between climate change and biodiversity loss, is the potential that key responses will be delayed. This is based on the assumption that many impacts and outcomes are uncertain and greater efficiencies will be achieved as our understanding improves. It is much easier to delay decisions under the justification of “inadequate information” than to embark on the difficult processes of informed decision making. We have shown, however, that for the vast majority of major threatening processes to biodiversity, sufficient ecological knowledge and policy options currently exist for effective adaptation efforts to be implemented or improved upon, today. Policy makers and land managers can take practical action now to reduce the impacts of climate change on biodiversity. Such actions will critically determine the trajectory that the biodiversity crisis will take over coming decades.

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