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Australian museum

27 May 2009

National Biodiversity Response
PO Box 1715
TAMWORTH NSW 2340

Attention: Carey Robinson

Dear Mr Robinson

Draft Australia's Biodiversity Conservation Strategy 2010-2020

I refer to the consultation draft of *Australia's Biodiversity Conservation Strategy 2010-2020*, and provide the following response on behalf of the Australian Museum.

The draft strategy contains many commendable features, including recognition of the important role of Indigenous people in biodiversity conservation, and recognition of the role of the private sector. We welcome the strategy's emphasis on conservation connectivity, and the resulting impetus to develop biodiversity initiatives across state and territory boundaries. Another positive feature of the draft strategy is the central place of community engagement in biodiversity initiatives, and the recognition that raising awareness and ownership of this issue amongst the wider community will be fundamental to achieving the strategy's outcomes.

We would like to make the following additional comments on individual aspects of the draft strategy.

Vision (page 8)
While we support the strategy's guiding principles (page 8), we would like to see an additional guiding principal under the vision that acknowledges the importance of existing and ongoing scientific research. Much of the Australia's biodiversity (terrestrial, marine and fresh water) remains largely undocumented (apart from a few groups of vertebrates, plants and large insects) and the conservation status of most species is currently unknown and unable to be assessed using existing knowledge.

Strategy priorities and the role of scientific research (pages 19-46)
We believe that this strategy needs to do much more to encourage scientific research, particularly in the area of taxonomy, and to address the need for continued biodiversity assessment to assess

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the relative impact of threat abatement activities. In this context, Priority 6 "measuring success" and Action 2.1.3 would seem to rely on a potentially flawed assumption that reliable baseline data is currently available, and that most or all threatened species/communities/ecosystems are currently documented.

This point can be illustrated through case study 11 (page 45), where changes in vegetation and vertebrate diversity are being measured to assess responses to different fire management regimes in Top End National Parks. This research has one significant limitation in demonstrating whether management methods are preserving the biodiversity in these parks: vertebrates and vegetation form only a small part of the total diversity. In other contexts these have been shown to be poor surrogates for the major sources of biodiversity in landscapes, which typically are invertebrates, fungi and microbial diversity[1].

We recommend that the first major priority under the strategy should be documenting Australian biodiversity and understanding how Australian ecosystems function. Under this priority we would like to see specific actions designed to address the key gaps in our knowledge of Australian biodiversity. This could include, for example, the identification and description of poorly known organisms, such as invertebrates, non-vascular plants, fungi and microorganisms, or the study of biodiversity in poorly understood regions and environments.

In addition, we recommend that Action 3.1.3 should be expanded to identify specific actions that stakeholders can take to ensure Australia's biodiversity research capacity is maintained and expanded. We recommend that the strategy explicitly recognises the need to create and fund positions in key disciplines, such as taxonomy, as a core requirement for the preservation of Australia's biodiversity. The strategy should acknowledge and address the decline in the number of working taxonomists, both nationally and internationally, and establish an approach towards coordinated training and career pathways for scientists in relevant areas.

The importance and role of Australian fauna and flora collections as sources of baseline data should be highlighted in the strategy. Currently there is not a single mention in the draft of the importance of natural history collections and the historical information contained in them. Priority actions 1.1.2, 1.1.3, 3.1.1, 6.1.1 and 6.1.3 cannot be properly addressed without reference to museum collections and herbaria. For example, without specimens held in collections, it is not possible to assess whether the distribution of plants and animals is changing in response to climate change[2].

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[1] See French, K. 1999. Spatial Variability in Species Composition in Birds and Insects. *Journal of Insect Conservation*, 3(3):183-189. and Oliver, I., Beattie, A.J. and York, A. 2008. Spatial Fidelity of Plant, Vertebrate, and Invertebrate Assemblages in Multiple-Use Forest in Eastern Australia. *Conservation Biology*, 12(4):822-835.

[2] A recent paper (Morton et al. 2009) addresses the key ecological questions inhibiting effective environmental management in Australia. These questions are all relevant to providing sound scientific knowledge to support the goals of the draft strategy. Of the 22 questions proposed in Morton et al. (2009), five cannot be answered without reference to museum collections and herbaria. See Morton, S.R., Hoegh-Guldberg, O., Lindenmayer, D.B., Harriss, Olson, M., Hughes, L., McCulloch, M.T., McIntyre, S., Nix, H.A., Prober, S.M., Saunders, D.A., Andersen, A.N., Burgman, M.A., Lefroy, E.C.,

Public engagement with biodiversity (pages 25-28)
As noted above, the emphasis in the draft strategy on public engagement with biodiversity initiatives is applauded by the Australian Museum. Priority 2, "mainstreaming biodiversity" notes that "Building awareness is the first step to achieving biodiversity conservation", presumably on the assumption that once citizens better understand biodiversity they will be prompted to participate in practical initiatives to protect and enhance it. We suggest it is worth looking closely at alternative models for driving community participation in biodiversity initiatives, in particular those international programs which seek to drive community awareness of biodiversity through first encouraging practical individual participation.

The success of the "Breathing Places" program in the UK provides an example. Under the program individuals are encouraged to "do one thing" personally for biodiversity, which is typically as simple as creating a compost heap or constructing a bird box. Crucially, having encouraged an individual to take a simple and easy action, the program then invites and provides pathways for participants to expand their knowledge of biodiversity and participate in more depth. This can be either formally, for example through links to the National Curriculum, or informally, for example through joint programs with public libraries. We suggest that the "Breathing Places" campaign provides a powerful model for how aspects of the Commonwealth's strategy could be delivered. The draft strategy rightly seeks to promote direct public participation in biodiversity initiatives (Objective 2.3.1). However, it does not appear to acknowledge or provide a pathway to capitalise on the fact that such participation can itself become a powerful driver towards achieving Objective 2.1, public awareness of biodiversity (rather than vice versa).

Marine versus Terrestrial Connectivity (pages 91-94)
Given the very large size of Australia's Exclusive Economic Zone (EEZ), and the Commonwealth's responsibility for the great majority of this area, marine biodiversity should be given a more prominent role in a Commonwealth biodiversity policy than is currently the case with the Draft.

In particular, the document does not make the implications of a fundamental difference between marine and terrestrial ecosystems explicit enough. By contrast to terrestrial systems, most marine organisms have a complex life history with a morphologically distinct larval stage that lives in a different place than the adult and is subject to dispersal over large distances: another form of connectivity. Thus, the geographic scales over which marine populations must be managed are usually larger than the scales over which terrestrial populations must be managed. For example, one can reasonably expect that most species of terrestrial mammals would be able to complete their life cycles within the boundaries of most terrestrial protected areas, but this would not be the case for most marine fishes due to their dispersive larval life-history stage. Further, a higher proportion of marine than terrestrial vertebrate species are subject to commercial and recreational exploitation, and thus require a very different form of management and reserve design than

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Lonsdale, W.M., Lowe, I., McMichael, A.J., Parslow, J.S., Steffen, W., Williams, J.E., and Woinarski, J.C.Z. 2009. The big ecological questions inhibiting effective environmental management in Australia. *Austral Ecology*, 34:1-9.

unexploited species. Finally, marine protected areas are expected to provide propagules to replenish populations under recreational and commercial exploitation outside their borders, and this is seldom the case for terrestrial populations. All these facts have important implications for biodiversity conservation in marine areas and for the types of research needed to achieve it, and these should be addressed in the strategy.

Marine life cycles have important implications for achieving ecosystem resilience in marine systems (Objective 1.1). Ecological theory predicts that the more connections there are between metapopulations, the more resilient they will be. Therefore, an objective of biodiversity conservation should be to maximize marine population connectivity (Objective 1.1), and this has direct application to the design and operation of marine protected areas[3]. In particular, it is essential to understand the geographical scale of metapopulation connectivity, both genetic and demographic in order to manage for resilience. This requires a better understanding of the biology of the dispersive larval stages, including identification, the duration of the larval stage, and the ontogeny of larval behaviours that influence dispersal outcomes and settlement processes. Typically, these scales of connectivity will be much larger in marine than in terrestrial systems, at least for genetic connectivity, although this may not necessarily be true for demographic connectivity. This means that more attention must be paid to processes that take place outside reserve boundaries, for example. It also means that political boundaries are less relevant for marine than for terrestrial biodiversity conservation (this should be highlighted under objective 4.2).

Fishes constitute about 75% of Australia's vertebrate biodiversity, and the biology of our 4500+ fish species is much less well known than that of our terrestrial reptiles, amphibians, birds and mammals. Because of their different life histories, what we know about other vertebrates is largely not transferrable to fishes. Further, unlike the vast majority of terrestrial vertebrates, a high proportion of Australia's fish species are subject to direct commercial and recreational exploitation. Similarly, a much larger number of marine than terrestrial invertebrate species are exploited for food. Therefore, different processes will be important in conservation of these fish and invertebrate species: our understanding of these is poor and this must be corrected (Objective 3.1).

Implementation strategies

We are concerned that throughout the document responsibilities for implementation of the strategy and its goals/targets/objectives are not clearly identified. Without the relevant organisation being specified, responsibility outlined and budgetary implications considered it less likely that targets will be achieved. For example, and in the context of comments made above, we would particularly like to see:

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[3] McCook, L. J., G. R. Almany , M. L. Berumen , J. C. Day , A. L. Green , G. P. Jones , J. M. Leis , S. Planes , G. R. Russ , P. F. Sale , S. R. Thorrold (2009). Management under uncertainty: guide-lines for incorporating connectivity into the protection of coral reefs. *Coral Reefs* 28:353–366.

- Recognition of government, university and other organisations responsible for delivering research outcomes relevant to achieving the draft strategy's aims. This includes, but is not limited to, collecting institutions such as natural history museums and herbaria,
- Recommendations on agencies which could take a lead role in funding and facilitating biodiversity initiatives at a local and individual level as a means of "mainstreaming biodiversity", and
- Recommendations on agencies which could take a lead role in coordinating State and Commonwealth biodiversity initiatives across different marine jurisdictions, (particularly urgent given the implications of marine connectivity).

There will also be a need to establish government agreements (Action 4.1.1) that are not only long term, strategic and cost effective but equitable and realistic for all levels of government. We are concerned that the Commonwealth's current funding arrangements, which often emphasise joint financial contributions, may be precluding relatively poorly resourced state and local government organisations from participating in biodiversity initiatives.

Specific comments

In addition to the more general comments above, we make the following specific comments on individual aspects of the draft:

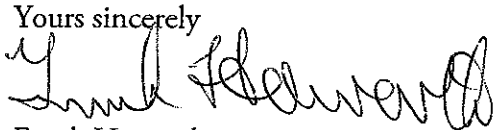
- The linkages referred to under Action 1.1.3 will be one of the main ways in which intra-continental invasive species (endemic eruptives) will cause damage following climate change. Any actions to promote connectivity between bioregions should be examined very closely. In the absence of evidence that there was continuity of habitat before recent anthropogenic fragmentation, it is imperative that precautionary principles should be applied and the actions not undertaken.

- We support Action 6.1.3 in principal, but note that any action must accommodate the likelihood that species distribution will alter with climate change.

- Land clearing (referred to in A9.3, page 85) arguably continues to present the greatest threat to Australian biodiversity, despite clearance controls. One of the key reasons that it continues to be problematic is the reluctance of governments to prosecute individual cases and due to loop holes in existing legislative regimes. It will be important that review of the effectiveness of land clearing legislation is an important outcome under Action 4.3.2.

Thank you for the opportunity to comment on the draft strategy. We look forward to the completion of this important initiative by the Commonwealth Government.

Yours sincerely



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