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Perspective

Improving policy efficiency and effectiveness to save more species: A case study of the megadiverse country Australia

Jane A. McDonald [a,*], Josie Carwardine [b], Liana N. Joseph [a,c], Carissa J. Klein [d], Tracy M. Rout [e], James E.M. Watson [c,d], Stephen T. Garnett [f], Michael A. McCarthy [e], Hugh P. Possingham [a]

[a] School of Biological Sciences, University of Queensland, St Lucia, 4072 Brisbane, Australia
[b] CSIRO, Ecosystem Sciences, Boggo Rd, Dutton Park, Brisbane 4102, Australia
[c] Global Conservation Program, Wildlife Conservation Society, Bronx, NY 10460, USA
[d] School of Geography, Planning and Environmental Management, University of Queensland, St Lucia, Queensland 4072, Australia
[e] School of Botany, University of Melbourne, Parkville, Victoria 3010, Australia
[f] Research Institute for the Environment and Livelihoods, Charles Darwin University, Ellengowan Drive, Casuarina, NT 0909, Australia

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ABSTRACT

Native flora and fauna species continue to decline in the megadiverse, wealthy, economically and politically stable nation of Australia despite current efforts in policy and management. Ongoing research is examining these declines, their causes and the adequacy of current policy, but strategies for improving the outcomes for threatened species have attracted less attention. We discuss several key aspects of Australia's national threatened species management approach that potentially hinder the efficiency and effectiveness of management: the threatened species listing process is lengthy and biased; recovery plan development is resource intensive, restricted to a subset of species and often not effective; funding for threatened species management is not allocated efficiently or transparently; and management is not designed to incorporate uncertainties and adapt to changing future threats. Based on these issues we recommend four changes to current process: rationalize listing and assessment processes; develop approaches to prioritize species-based and threat-based responses cost-effectively; estimate funds required to recover species and secure longer term funding; and accommodate uncertainties and new threats into the current planning framework. Cost-effective prioritization for species and threats identifies which actions are likely to achieve the greatest benefits to species per unit cost, thereby managing more species and threats with available funds. These improvements can be made without legislative reform, additional funding or socio-economic shifts. If implemented, we believe more Australian threatened species will benefit from current efforts. Many of the challenges facing Australia are analogous to issues in other countries including the United States, Canada and the United Kingdom and these recommendations could assist in improving threatened species management.

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* Corresponding author. Tel.: +61 410 204 880.
E-mail address: j.mcdonald9@uq.edu.au (J.A. McDonald).

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1. Introduction

Policy interventions in Australia have been unable to halt the loss of species and prevent further extinctions (Environment and Communications References Committee, 2013; Garnett et al., 2011; Woinarski et al., 2014). It is likely the challenges facing policy-makers will be even greater with accelerating climate change, continued population growth and land use change targeted toward increased food and fiber production (Millennium Ecosystem Assessment, 2005). Considerable research has measured species loss in Australia, identified causes of declines and assessed the effectiveness of current management and policy (Bottrill et al., 2011; Evans et al., 2011; Ford et al., 2001; Garnett et al., 2011; Kelly et al., 2003; Kingsford et al., 2009; Moseby and Read, 2006; Ritchie, 2013; Ritchie et al., 2013; Short and Smith, 1994; Steffen et al., 2009; Szabo et al., 2012; Taylor et al., 2011; Walsh et al., 2012; Watson et al., 2011; Woinarski et al., 2011). The recently released Action Plan for Australian Mammals, for example, warns that as well as the highest modern record of mammalian extinctions, a large proportion of extant mammals are under threat and urges urgent and targeted actions to avoid further extinctions (Woinarski et al., 2014). Although Australia is not alone in experiencing unprecedented rates of extinction (Mace, 2005), it presents a compelling example of how efforts to manage threatened species in a megadiverse country can be ineffective in avoiding species loss despite economic wealth, relatively good governance and globally recognized scientific expertise. We believe this situation needs urgent attention and recommend four feasible ways to improve national management of threatened species in Australia.

The need for improved threatened species management in Australia is urgent (Lindenmayer, 2008; Woinarski et al., 2014). Over 10% of mammal species (29) have already become extinct since European settlement in the late 18th Century (Woinarski et al., 2014) and 15% of remaining mammals are listed as Threatened (State of the Environment Committee, 2011). There is mounting evidence that small mammal populations in northern Australia – a region that is considered to contain the largest area of intact tropical savanna left in the world – are in rapid decline (Woinarski et al., 2011). Recently two species on Christmas Island in the Indian Ocean, a microbat (*Pipistrellus murrayi*) and a lizard (*Emoia nativitatis)* are now presumed to be extinct (Beeton et al., 2010; Woinarski and Cogger, 2013). The iconic Orange-bellied Parrot (*Neophema chrysogaster*) is close to extinction in the wild and 23 species of bird have become extinct and at least four other bird species are also possibly extinct since European settlement of Australia in 1788 (Garnett et al., 2011). The large majority of listed bird species continue to decline (Garnett et al., 2011). The few that have recovered (Gould's Petrel *Pterodroma leucoptera leucoptera* and Lord Howe Woodhen *Gallirallus sylvestris,* for example) represent significant success stories of what can be achieved when adequate resources and expertise are applied. Where assessments are conducted, very significant proportions of once common widespread amphibians, reptiles and plants are found to be threatened with extinction (up to 52%, 37% and 30% respectively (State of the Environment Committee, 2011). Outcomes to date indicate many species are becoming more threatened with few recovering (Watson et al., 2010). The extinction of the Christmas Island Pipistrelle and the poor outlook for threatened species in general has been the subject of renewed debate. In response, the Australian Senate established an inquiry in 2012–3 into the effectiveness of threatened species management in Australia to which the recommendations in this paper were submitted (Environment and Communications References Committee, 2013). Recently the Australian Government also appointed a Threatened Species Commissioner with a mandate to prevent further extinctions (DoE, 2014; http://www.environment.gov.au/biodiversity/threatened/commissioner).

The major threats to threatened species in Australia include habitat loss, introduced species, inappropriate fire regimes, over-exploitation and disease (Evans et al., 2011). In the long term, protection and recovery of threatened species in Australia depends on trends in socio-economic drivers such as population growth, per capital consumption and economic growth (Millennium Ecosystem Assessment, 2005; State of the Environment Committee, 2011), the strength of regulatory protection (Environment and Communications References Committee, 2013; Kingsford et al., 2009), the funds to enact protection and amelioration of impacts (Carwardine et al., 2012; McCarthy et al., 2008) and governance arrangements to ensure implementation (Hajkowicz, 2009; Morrison et al., 2010). Changing the level of any of these factors is a significant undertaking, requiring shifts in social and economic trends, increased political will, more funds and legislative reform. There are, however, gains to be made for threatened species that are feasible within the current policy arrangements and achievable in the short term at no extra cost. By improving the effectiveness and efficiency of Australia's existing national approach to threatened species, we propose that the outcomes for threatened species can be improved and thereby the reach of current protection extended to more species.

Threatened species (synonymous with "endangered species" in the United States) have been protected by national legislation since 1993 although evidence suggests more can be done to improve the current approach (Bottrill et al., 2011; Coates and Atkins, 2001; Possingham et al., 2002b; Walsh et al., 2012). The current national legislation is the *Environment Protection and Biodiversity Conservation Act* 1999 (*EPBC Act*) and requires approvals for any activity likely to significantly impact nationally listed threatened species. In this way the federal government can regulate impacts from developments such as new mining, agriculture, and housing estates. Threatened species habitat is also protected to a degree in the protected area network and under the Native Vegetation Framework (Environment and Communications References Committee, 2013). Threatened species are also protected under state and territory legislation. Recovery of nationally listed species is guided through Conservation Advices, a document assessing the status, threats and priority actions of each species or a Recovery Plan, a more comprehensive recovery framework. Recovery actions for threatened species are not automatically funded. There is no dedicated funding for threatened species (Environment and Communications References Committee, 2013) and the level of funding and the projects funded are dependent on governments' environmental objectives and priorities.

To date, the likely inefficiencies in threatened species management include the bias toward large, charismatic species in the listing and recovery process (Possingham et al., 2002b; Walsh et al., 2012), the resource-intensive development of Recovery Plans (Walsh et al., 2012), the ineffectiveness of many Recovery Plans (Bottrill et al., 2011), paucity of information on threatened species