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Continental-Scale Governance Failure Will Hasten Loss of Australia's Biodiversity

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Conserving biodiversity against a global backdrop of rapid environmental change poses one of the biggest and most important challenges to society. For this reason, systems of nature reserves have never been more important. Protected areas are under threat in many parts of the world (Mascia and Pailler 2011), but the weakening of protected areas in a rich, developed country with a global reputation for conservation leadership (Harrison 2006) is particularly alarming (Ritchie 2013). Consequently, we are concerned about the recent spate of substantial policy, legislative and management changes being made by three of six Australian state governments for exploitative uses of national parks—actions that could affect much of Australia and have significant negative effects on biodiversity.

In recent decades, the Australian state and federal governments have collectively built a system of terrestrial and marine conservation reserves that aspires to be comprehensive and adequate, and to form the cornerstone of biodiversity conservation. The resulting national reserve system is imperfect, but goes some way toward protecting Australia's unique species and ecosystems (Taylor et al. 2011). That system is now being systematically undermined, even while continental-scale biodiversity losses are underway.

Australia's highly diverse and predominantly endemic biodiversity is seriously imperiled. In the past two centuries, at least 27 mammals, 23 birds (including island species and subspecies), 4 frogs and over 60 plant species have vanished (Department of Sustainability 2009). In addition, over 1500 mammals, birds, reptiles, amphibians, and plants are currently threatened with extinction, along with over 3000 ecosystem types (Keith et al. 2013). In Victoria, for instance, only ~30% of the original native vegetation remains, and some vegetation types, such as

grasslands and open woodlands, have been reduced by more than 99% since European settlement (Bradshaw 2012). The situation for marine systems is far more uncertain owing to data limitations even for economically important species (Beeton et al. 2012, FRDC 2012). In addition, Australia has the world's most recent mammal extinction, the Christmas Island pipistrelle bat (*Pipistrellus murrayi*) in 2009 (Martin et al. 2012). If current trends continue, many other species such as the Leadbeater's possum (*Gymnobelideus leadbeateri*) will suffer the same fate. Indeed, Lindenmayer and Possingham (2013) suggested that the Victorian government is knowingly condoning activities that will reduce the viability of this IUCN-listed endangered species.

Given these realities, it is not surprising that proposals to weaken the country's nature reserves are raising alarm bells among conservation biologists and concerned members of the public. Recently-proposed or enacted laws will allow an increase in exploitative uses of reserves—including industrial logging, grazing by domestic livestock, mining, commercial development, and recreational hunting and fishing—all of which are known to be detrimental to nature conservation. The overall conservation impact and prognosis worsens because these same Australian state governments are reversing safeguards that curb the clearing of native vegetation outside protected areas. Remnants of many Australian ecosystems persist mostly on private and leasehold land (Benson 2008) or in unreserved marine areas, and these provide a necessary complement to the biodiversity protection offered in reserves. In Queensland and Victoria, hard-won laws constraining vegetation clearing on private land are now being relaxed, and this will certainly accelerate the loss of regional biodiversity. In Queensland, these regressive changes add to the already tenuous status of any conservation covenants with potential for mining exploration and development (Adams and Moon 2013). Western Australia has already seen large excisions of existing conservation land for mining. New South Wales is also considering relaxing anti-clearing laws, even though Pressey et al. (2000) demonstrated that 85% of the state's native vegetation with high conservation priority was on private land. Just as concerning, legal aid funding in New South Wales is being wound back for public interest environmental cases, making it even more difficult to bring the state government to environmental account (Smith 2013).

Collectively, these new proposals represent a serious about-face for government policy on

nature conservation in Australia. They will increase the dependence of Australian biodiversity on protected areas, while simultaneously reducing reserve viability by weakening biodiversity protections inside reserves and reducing ecological connectivity and accelerating habitat loss outside reserves. Recent evidence demonstrates that pressures outside reserves negatively affect species residing within them (Laurance et al. 2012). Species are likely to be further imperiled by a disrupted climate and by increasing pressures from invasive pests, fire, disease, and drought (Brook et al. 2008). Even before these changes, Australia's reserve network was showing signs of inadequacy, with documented collapses in regional faunal communities within national parks (Mac Nally et al. 2009, Woinarski et al. 2011).

Economic rationales are being used to justify the dismantling of park protections. These arguments include providing opportunities to feed cattle in national parks during drought and assisting ailing forestry industries by opening up new areas for logging. However, the use of reserves for such activities has substantial long-term costs. Additional environmental impacts include a likely increase in weed establishment, higher carbon emissions and lower carbon sequestration capacity, increased soil erosion, and damage to sensitive riparian zones and waterways. Indeed, the influence of cattle grazing on ecosystems is likely to be most severe during drought, as the effects of drought and grazing can interact (Loeser et al. 2007). The repair bill for these impacts will dwarf any short-term economic benefits to extractive industries, and some impacts could be irreversible (Cardinale et al. 2012). The fact that State Governments are retreating from the previously accepted principal purpose of reserves – to conserve biodiversity – suggests a shortsighted decline in political and societal concern for nature conservation (McCallum and Bury 2013).

Hunting and fishing lobbies are also arguing for increased access to nature reserves, with one argument being that they might help control problem species. Hunting to manage pest species might occasionally be justified in national parks, but it must be carefully based on scientific evidence. One serious possible consequence of non-strategic hunting is that removing one pest species without consideration of its interactions with and effect on other species can usher in unexpected and disadvantageous ecological consequences (e.g. increases in some pest species' abundances following release from another competitor/predator, and subsequent higher rates of predation of their native prey) (Ritchie and Johnson 2009, Ruscoe et al. 2011). That assumes, of

course, that hunting can be effective in controlling feral animals. Importantly, for most species, effective population reduction through hunting seems unlikely, due to factors such as the cryptic behaviour and patchy distribution of many invasive animals, often very high intrinsic rates of increase, compensatory breeding or survival, and the vast, remote and often rugged nature of many of Australia's national parks, making widespread access for hunting difficult (Booth 2010). Other forms of pest control that involve encouraging or reintroducing apex predators (e.g. dingoes, *Canis lupus dingo*) could be far more effective ecologically and economically in the long term (Ritchie et al. 2012).

Opening up Australia's conservation reserves to extractive uses, whether to support primary industries or to allow hunting and fishing, is all the less defensible because conservation reserves in Australia already occupy the margins of productivity for agriculture, grazing and logging (Pressey et al. 2000). Although Australia's national reserve system covers 13.4% of the country's landmass (of which the 500+ National Parks cover 3.6%), they protect a disproportionately small percentage of productive landscapes. Similarly, marine sanctuary zones represent ~5% of near-shore and ~15% of Commonwealth waters (> 3 nautical miles offshore) but are strongly biased to areas with least value to commercial fishing and without value for hydrocarbon. In other words, protected areas present almost no barrier to economic development in Australia. The residual tendency of Australia's reserves also underlines the importance for stronger, not weaker, protection of biodiversity outside reserves.

The recent legislative threats to Australia's parks have come about not because of a lack of data about their likely consequences (Lindenmayer and Possingham 2013), but apparently to cater to particular political interests. Given that continued weakness in the global economy will increase incentives for governments to allow further exploitation of natural resources, we must remain vigilant to the potentially serious consequences of such actions. There are lessons here for conservation globally: (*i*) laws for nature conservation can be undone because governments change; (*ii*) even wealthy countries are willing to sacrifice long-term conservation outcomes for the possibility of short-term economic gains (Bradshaw et al. 2010); (*iii*) established conservation reserves might need multiple layers of protection from the vagaries of policy and legislation; and (*iv*) as conservation biologists, we need to work harder to build public constituencies that support the protection of reserves and fight against watering down important

environmental legislation.

Poorly-framed and opportunistic legislation that will erode the ecological integrity and conservation value of protected areas and off-reserve management needs to be rescinded. The scientific evidence to support the importance to biodiversity of maintaining a well-managed system of protected areas in terrestrial and marine landscapes is overwhelming. Ultimately, the commitment of any government to nature conservation will be measured not by hectares under nominal protection, but by what development potential it is prepared to forgo to avoid the loss of biodiversity. While Australia's nominally 'protected' areas increase in area, the trajectory of real commitment to conservation is in decline, along with Australia's biodiversity.

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