

## POLICY PERSPECTIVE

# Market-Based Incentives and Private Ownership of Wildlife to Remedy Shortfalls in Government Funding for Conservation

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Wildlife ownership; proprietorship; market-based incentives; threatened species; Australia and New Zealand; government monopoly; southern Africa; innovation; translocation; off-reserve conservation.

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**Abstract**

In some parts of the world, proprietorship, price incentives, and devolved responsibility for management, accompanied by effective regulation, have increased wildlife and protected habitats, particularly for iconic and valuable species. Elsewhere, market incentives are constrained by policies and laws, and in some places virtually prohibited. In Australia and New Zealand, micro economic reform has enhanced innovation and improved outcomes in many areas of the economy, but economic liberalism and competition are rarely applied to the management of wildlife. This policy perspective examines if commercial value and markets could attract private sector investment to compensate for Government underspend on biodiversity conservation. It proposes trials in which landholders, community groups, and investors would have a form of wildlife ownership by leasing animals on land outside protected areas. They would be able to acquire threatened species from locally overabundant populations, breed them, innovate, and assist further colonization/range expansion while making a profit from the increase. The role of government would be to regulate, as is appropriate in a mixed economy, rather than be the (sole) owner and manager of wildlife. Wide application of the trials would not answer all biodiversity-loss problems, but it could assist in the restoration of degraded habitat and connectivity.

**Introduction**

The newly defined Anthropocene reflects the global damage that humanity is causing such damage to the Earth and its biodiversity that a new epoch has been defined – the Anthropocene. (Steffen *et al.* 2011). Globally, rates of extinction are 100–1,000 times those considered natural (De Vos *et al.* 2015). In Australia, where close to half of the world's mammal extinctions in the last 200 years have occurred (Johnson 2006), the net rate is increasing (Hoffmann *et al.* 2011), their status is worsening (Woinarski *et al.* 2014), and conservation beyond protected areas and national reserves is particularly important (Hayward 2011). While species should be conserved due to their inherent right to exist (Miller *et al.* 2014) and because they have a utility for the ecosystems they sus-

tain, there appears to be insufficient global human support of this view. New models are urgently required to reverse extinction trends (Kareiva *et al.* 2012). Less costly, or cost neutral (or perhaps even profitable) institutional arrangements are needed to encourage individuals and businesses to invest in the conservation of wildlife. Borrowing concepts and tools from other fields broadens our range of options to address the “wicked” complexity of conservation problems (Game *et al.* 2014) and economic valuation and role of markets should be one of them (Scharks & Masuda 2016).

Enabling private sector and personal benefit where wildlife ownership and management were previously vested exclusively in the governments can lead to innovation, competition, and positive outcomes in species and habitat conservation (Child *et al.* 2012;

Lindsey *et al.* 2013). It can also be beneficial where poaching controls are a priority (Challender & MacMillan 2014) and it can supplement regulation and education where animals and plants are being farmed to meet a market (Phelps *et al.* 2014). The process is encapsulated by the “subsidiarity<sup>1</sup> proprietorship, and price principle: if wildlife rights and management are devolved to the lowest level and if the value is captured by the landholder, and (the individual), the probability of successful wildlife and natural resource conservation is greatly increased” (Child *et al.* 2012). Further support for the principle comes from reviews elsewhere in Africa, India, and North America that concluded that providing communities with ownership of land, user-rights over wildlife, and capacity to attract long-term private/donor investment enabled wildlife to fare better, improved poaching control, and increased the effectiveness of protected areas (Pack *et al.* 2013; Lindsey *et al.* 2014). This policy perspective proposes changes to proprietorship and the application of market-based incentives to remedy shortfalls in funding to conserve Australia and New Zealand’s wildlife. Trials of the concept could be relevant to wildlife conservation globally.

### The concept and its scope

Much of the damage to biodiversity in Australia and New Zealand has occurred on private lands due to conversion of natural vegetation to agriculture, forestry and urban areas, and to the effects of invasive species on the function of ecosystems (Lindenmayer 2007). Commercial incentives could encourage landholders to reverse these trends and so complement regulation. Sanctuaries operated without such incentives by philanthropic organizations in Australia and New Zealand have made a significant contribution to threatened species conservation through assisted recolonization in recent years (Innes *et al.* 2015). Our proposal seeks to broaden the freedom they have to dispose of surplus stock and to enhance competition with them. They already have a form of proprietorship over wildlife and have been frequently identified as superior to Government agencies in contributing to biodiversity and wildlife conservation targets including by the Parliament of Australia (2013). Private landholders and other community groups should be permitted to add to that success. The proposed scope is Australian and New Zealand threatened mammals and birds that are currently not the subject of trade either dead or alive. Their progeny would be extractively used (Hutton & Leader-Williams 2003) meaning that they would be removed from founder populations as part of a conservation strategy to expand populations. When released to establish new colonies, they would be helping restore land to uses

that are currently less compatible with biodiversity conservation.

Most landholders who allocate resources to wildlife conservation currently do so for altruistic and aesthetic reasons. Our proposal is that they would allocate more resources if they also had proprietorship of wildlife and a profit incentive. The incentive might come through the sale of live animals for further translocation, through display of animals in wildlife tourism, or even through use of more common species such as kangaroos and emus, parrots and reptiles, although these opportunities are not the primary focus of this article. We propose that landholders who wish to do so, should be able to express a demand for animals, breed them, and so help conserve wildlife off-reserves.

### Importance of property rights

Well-defined, secure, and transferable property rights help to establish and capture the value of resources thereby providing an incentive for owners to efficiently use and maintain them (Demsetz 1967). Property rights encourage owners to consider long-term implications of their activities, and so increase the likelihood of sustainable management (Cooney *et al.* 2015). Without property rights, wildlife users, including harvesters, have little motivation to take into account the cost of their actions on future availability, typically resulting in overuse. Notwithstanding the general wisdom of these observations, wildlife property rights vary around the world from state-owned (e.g., Australia) to landowner-based private (e.g., South Africa). Indigenous ownership responsibility and rights to access wildlife also vary along this spectrum.

The “no-private property rights policy” follows the directives that came out of the 1933 London Convention<sup>2</sup>, that wildlife should be conserved through a combination of “pristine” parks, and nonuse of nationalized wildlife on land outside them. Under this model, the Australian and New Zealand Governments maintain a hegemony over the management of wildlife; notwithstanding that their dominance has not shortened threatened species nor integrated management of more common species with agricultural production. On the other hand, the allocation of property rights policy is consistent with the findings of the 1961 Arusha Conference (IUCN 1963) which concluded that:

“only by the planned utilization of wildlife as a renewable natural resource, either for protein or as a recreational attraction, can wildlife conservation and development be economically justified in competition

with agriculture, stock ranching and other forms of land use." p. 19

### Southern African experience

Since the 1970s, Namibia, Zimbabwe, Mozambique, Botswana, and South Africa have adopted the Arusha principle and landholders have been able to commercially use the wildlife on their lands with far fewer state-imposed restrictions than countries where wildlife is owned by the state. When it became apparent that landholders husbanded valuable wildlife just as they husbanded their domestic stock, regulatory requirements were further reduced (Suich *et al.* 2009). Today, high-value wildlife species are traded to restock properties and establish new populations (Bothma & Du Toit 2016) (Dalerum & Miranda 2016). Wildlife auctions are held on a regular basis at which the South African National Parks and others offer their surplus animals. These auctions contribute valuable funds to government parks. Lands that were formerly dedicated to domestic livestock enterprise have converted to wildlife conservation on a grand scale (Child 2009) and southern Africa has more wildlife than 100 years ago, which stands in contrast to the declining wildlife that is owned by the State elsewhere in Africa (Martin 2012). Indeed, the policy has been so successful that populations of some species are increasing exponentially (Cloete *et al.* 2016) and a collapse in prices and numbers is possible.

### Comparisons with Australia and New Zealand

Wildlife management is one of the few sectors in the Australian and New Zealand economies that has not been opened to markets, devolved property rights, and competition; it is still dominated by government agencies at both the operational and regulatory level. The private sector is constrained by policies and laws and in some Australian States and Territories, private ownership is virtually prohibited for native mammals. Economic liberalization and microeconomic reform that ended the communication monopolies of government agencies in Australia, like the Postmaster Generals Department, and enabled the private sector through Telstra and Optus to innovate and compete (Borland 2014) have not been applied.

In Australia, private conservation areas contribute only 1% to Australia's conservation estate, national parks and State-owned reserves 8.5%, and Indigenous community-owned, jointly managed lands a further 8% (Collaborative Australian Protected Area Database 2014). Conversely, in South Africa, 17% is dedicated to sustainable use of wildlife (e.g., game ranching) and

South Africa's national and provincial parks cover only 6% (Cousins *et al.* 2008). While it would be simplistic to attribute this relative success of off-reserve conservation to the adoption of market-based incentives, or to suggest that the model is easily transferred to circumstances in which there is not an established market for wildlife products, the southern African experience suggests that the subsidiarity, proprietorship, and price policy are worth trialling at least for some species and/or in a defined region of Australia and New Zealand to see if it enhances wildlife conservation. Increasing the size of the private conservation estate and encouraging translocation also increases connectivity and so better prepares wildlife for changes being wrought by climate change (Adams-Hosking *et al.* 2011; Burbidge *et al.* 2011; Lunt *et al.* 2013; Seddon *et al.* 2015).

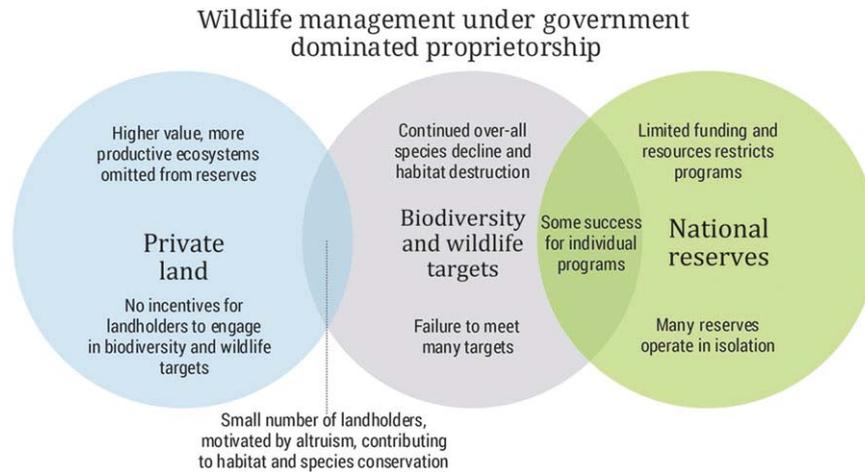
Australia and New Zealand do have the other key attribute to making the devolution of property rights effective, which is not universally available and that is the rule of law. Being able to enforce either statute or customary law is fundamental to contracting property rights (Ostrom 2005). Our proposal would allow Government funding to focus on species and ecosystems where market failure exists and on the output of the sort of strategic analysis proposed by Briggs (2009).

### Enabling trade, forming markets

Figure 1 shows our interpretation of the impact of current policies that rely on government programs and philanthropy. The unintended consequence of government domination is that populations of threatened species are lower than they might otherwise be. Breeding males and females are sterilized or separated because government agencies do not have a mechanism for disposing of surplus progeny (Duka & Masters 2005). Transferring them to private owners is not permitted because the transaction might be seen to involve commercial gain from public monies (Williams 2004).

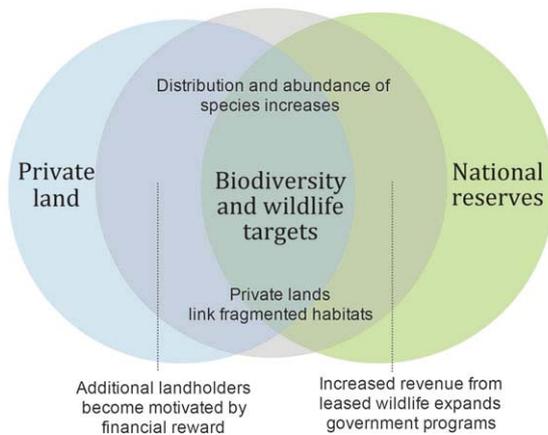
In Figure 2, we present the perspective that if property rights were clearly defined, and regulated trade in species was permitted, private landowners would contribute more to attaining biodiversity and wildlife conservation targets. The components of the process are outlined in Figure 3.

Landholders and community groups wanting to participate in breeding threatened species would identify themselves and create a demand for parent stock, which would be advertised on the internet. They would be motivated by a combination of altruistic, aesthetic, and financial rewards and have a form of wildlife proprietorship on land outside protected area reserves. They would lease animals owned by governments and have devolved responsibility



**Figure 1** The diagram depicts limited overlap between private and national reserve lands in attaining biodiversity and wildlife conservation targets when management is dominated by Government proprietorship.

**Wildlife management with private proprietorship and market-based incentives**



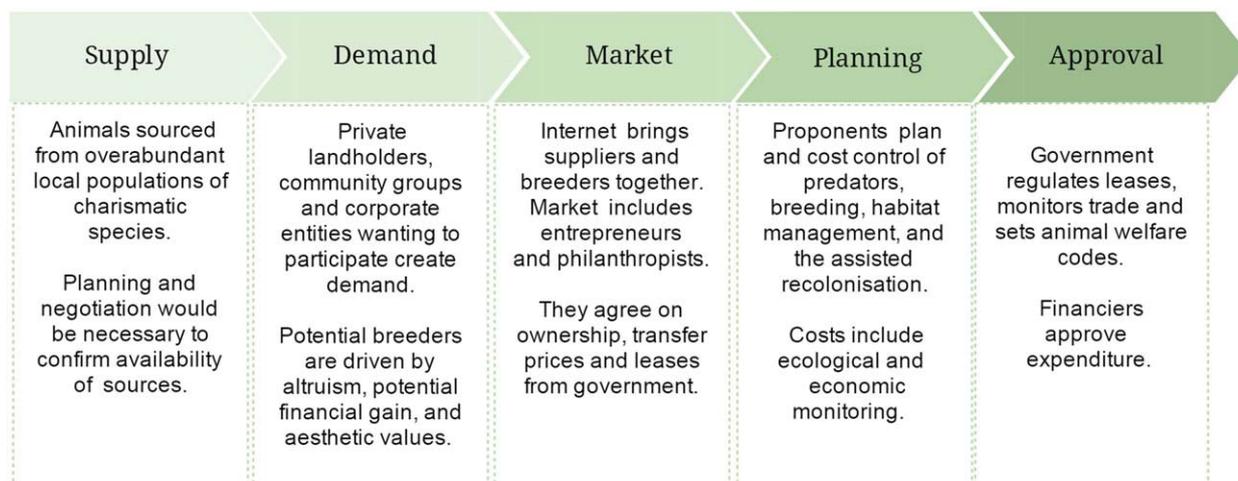
**Figure 2** When private proprietorship of wildlife and market-based incentives are introduced, the overlap between private land and national reserves increases, total capacity to address targets improves, habitat fragments are linked, populations of threatened species increase, and they become more secure. New revenue streams begin.

for them. They would breed these animals and on-sell surpluses to other landholders wanting to establish new colonies. To the extent that most of the animals under consideration are contained by fences to protect them from feral predators, they could be regarded as captive which facilitates proprietorship. Others are captive in a more conventional sense in facilities operated by zoos or similar institutions or on islands, or islands of habitat.

Captive breeding can make a significant contribution to threatened species conservation especially if decisions

to establish captive colonies are made early (Martin *et al.* 2012), (Jacob-Hoff *et al.* 2015). Over the past 20 years, site-specific projects and assisted colonization with predator management have improved the conservation status of birds in New Zealand (Innes *et al.* 2015) and mammal taxa in Australia (Woinarski *et al.* 2014). More new colonies are likely to be established if there is the possibility of making a profit through the sale of live animals. In Australia and New Zealand, nature-based tourism operators are already making an effective contribution to conservation (Biggs *et al.* 2012), (Ateljevic & Doorne 2000). They also could undertake assisted recolonization and would have the incentive to do so if their investment enabled guests to see more threatened species. Other incentives delivered by market mechanisms and suggestions about collaboration and raising finance are presented in the Supplementary Information to this paper.

The role of government would be to regulate the buying and selling of animals as is appropriate in a mixed economy, rather than being the (sole) owner and manager of wildlife. There would be less complex, more outcome-based licensing procedures. Such changes would be consistent with the findings of a 2014 panel reviewing biodiversity legislation in New South Wales, which noted the ineffectiveness of current policies and programs and recommended simplification of legislation restricting the keeping of wildlife (Byron *et al.* 2014). Leases of wildlife to private landholders would have conditions attached. Leased animals could be traded as is currently the case between zoos, and the way leasehold land is sold in much of Australia. Governments would enforce animal welfare codes, administer control over genetic issues, selection and breeding, and releases of



**Figure 3** The anticipated steps in the process of establishing a market place that brings together supply and demand for wildlife, preparing plans to protect and breed more animals, establishing monitoring programs, and obtaining approvals for proposed trials of market-based incentives.

species beyond their natural range. This is necessary because in South Africa some wildlife producers are deliberately manipulating natural variants in color and size to obtain higher prices. (Cloete *et al.* 2016).

Another role of Governments would be to facilitate information exchange, review, and commission animal welfare codes of practice and standards on exclusion fences that both help protect animals and establish proprietorship. Translocation protocols would be informed by IUCN guidelines (IUCN 2013).

### Establishing a trial

Planning and negotiation would be necessary to confirm availability of animals for the trial, the demand by participants for breeding stock, potential sources of funding, and changes to government policy. These and other components, including monitoring and assessing of effectiveness and benefits, are covered more fully in the Supplementary Information. While it is likely that the initial focus of the trial will be on more charismatic and iconic species, such as koalas (*Phascolarctos cinereus*), numbats (*Myrmecobius fasciatus*), quolls (*Dasyurus* spp.), rare wallabies, and ground dwelling birds such as kiwis (*Apteryx* spp.), the benefits would in all likelihood flow to other species by freeing up Government funds currently spread over all species, and by protecting habitat which also benefits all species. The locations of some locally abundant populations are in the Supporting Information. If successful, the trial could be extended to other species listed in the Threatened Species Strategy (Australian Government 2015).

### Potential opposition and criticisms

Market-based conservation mechanisms and private investment in ecosystem services are criticized by some people because they commodify nature (Estes *et al.* 2011). We recognize the problem of advocating expansion of the economic paradigm that drove the decline/demise of wildlife, but relying on the intrinsic value of wildlife that is independent of anthropocentric usefulness or utilitarianism is also not working. We are **not** advocating that economic drivers should replace ethical responsibility. Rather, by enabling market forces to assist with the full suite of conservation options available, we seek to obtain on- and off-reserve conservation benefits that leave global biodiversity in a better state than when we inherited it. Private benefit can lead to co-benefits not only for biodiversity, but also for salinity mitigation, water quality, and soil restoration.

Some critics argue that focusing on iconic species through intensive habitat management could have negative implications for other native species. This criticism is valid for existing high conservation landscapes. Our goal is to improve biodiversity value of degraded areas, to increase the number of insurance populations of threatened species and where possible to improve connectivity between populations.

Many animal rights lobbyists believe that it is unethical to allow financial benefit or markets to operate for wildlife (Miller *et al.* 2014). They feel this most strongly for charismatic and iconic species, like koalas, and for animals used consumptively such as kangaroos. Their feelings translate into political pressures that have the ability to cloud ecological considerations and distort

allocation of scarce government funding. They are focused on “saving” individual animals often placing less emphasis on protecting the very habitat that enables populations to propagate. While we agree that it is sad to see the death of any animal, and we are not proposing the consumptive use of threatened species, we concur with Greg Martin’s African analysis that the protection of the lives of individual animals by banning the realization of commercial value, paradoxically often ends up threatening the species that animal rights lobbyists seek to protect (Martin 2012).

## Conclusion

Time is running out for wildlife in landscapes that are so transformed by agriculture, other human activity, and rampant feral animals that they lack their original mammal and terrestrial bird fauna. Threatened species lists are lengthening and wildlife remains undervalued by policy distortions. With a few exceptions, native animals in Australia and New Zealand remain nationalized assets external to the economy, and, as an externality, their continued existence is usually left to the government to manage/fund. Consequently, they remain a priceless, but paradoxically, commercially valueless asset managed by small bands of dedicated staff that are largely (under)-funded by governments.

If successful in a proposed trial, a new industry that taps into a resource not currently being used efficiently would drive economic expansion and encourage innovation. It would build on the economic value that wildlife already has in some Australian jurisdictions in limited circumstances, such as in zoos and as pets. Ultimately all that is required is to deregulate correctly and let the market establish itself. Governments would cease to be the sole proprietor of native wildlife, as is appropriate in a mixed economy.

Market-based incentives will not remedy all shortfalls in government funding to conserve wildlife or answer all biodiversity problems, but they would complement restoration and rehabilitation of other species by underfunded government agencies and philanthropic organizations. Monitoring of the trial, both economic and ecological, would provide information on the extent to which recognizing market failure, removing externalities, and allowing markets to set a commercial value on wildlife can achieve stated environmental outcomes. Our proposal has a focus on two developed countries, however, provided that the rule of law and proprietorship can be enforced, market incentives and the private sector could be a very important part of the solution to the biodiversity loss crisis in developing countries where funding shortfalls are even more severe.

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## Endnotes

1. Subsidiarity is the organizing principle that matters ought to be handled by the smallest, lowest, or least centralized competent authority.
2. Formally the International “Convention Relative to the Preservation of Fauna and Flora in the Natural State.”

## Supporting Information

Additional Supporting Information may be found in the online version of this article at the publisher’s web site:

Establishing trials.

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