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# Invasive Species in Penguin Worlds: An Ethical Taxonomy of Killing for Conservation

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## Abstract

This paper explores various attempts to manage predation threats to an endangered population of little penguins (*Eudyptula minor*) living in Sydney's North Harbour. Some of these threats have come from species that are generally termed 'exotic' (such as the red fox, *Vulpes vulpes*), while other threats have potentially come from 'natives' (such as the New Zealand fur seal, *Arctocephalus forsteri*). This paper explores the problematic notion of 'invasiveness' as it applies to native and introduced predators, and the role that these rhetorical distinctions play in positioning various species as 'threats' to the continuity of this penguin colony. In particular, the paper is concerned with conservation legislation and practice in New South Wales, and the unique kind of 'ethical work' done by these processes of classifying living things. Finally, the paper asks, in the absence of a simplistic—but helpful—correlation between exotic and invasive species, how might we understand and justify the conservation of an isolated colony of little penguins? What kinds of interventions (from humans and nonhumans) are warranted, and which are not? What might it mean to genuinely inhabit these difficulties, making conservation decisions outside of any space of simple and absolute answers?

**Keywords:** invasive species, conservation, ethics, little penguin, *Eudyptula minor*, red fox, *Vulpes vulpes*, native and exotic species, Australia

## INTRODUCTION

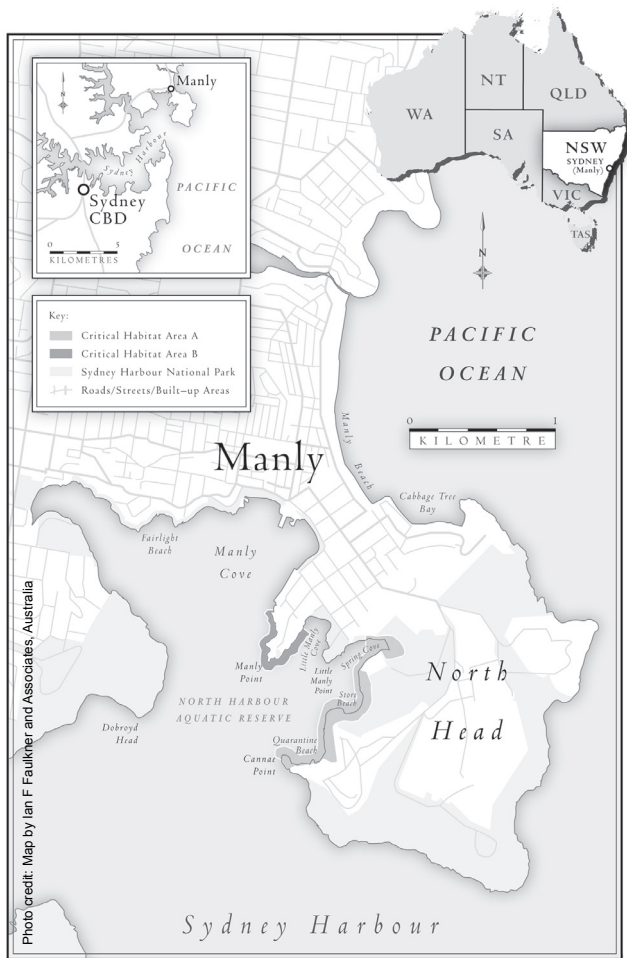
Just inside the mouth of one of Australia's busiest harbours, Sydney Harbour, on a headland that is on one side lapped by the calm waters of the harbour and on the other by the waves of the Pacific Ocean, lives a tiny colony of penguins (Figure 1). They are little penguins—in size and name—*Eudyptula minor*, meaning 'good little diver'. Members of the world's smallest penguin species, they stand roughly 30cm tall and weigh around 1kg. The history of this particular colony is not well known—there is documentary evidence for its existence

since the early twentieth century, but it is widely thought to be much older. While other colonies of little penguins once nested all along the south east coast of Australia and at several other places in and around Sydney Harbour, this tiny colony of around 60 breeding pairs is now thought to be the last on the New South Wales (NSW) mainland.<sup>1</sup> Over the past hundred or so years, all of the other colonies have been wiped out, likely primarily by canid predators (dogs and foxes).<sup>2</sup> As the last mainland colony in the state, in 1997 the little penguins of Manly were declared an 'endangered population' under the NSW *Threatened Species Conservation Act 1995*.

In the middle of 2009, just as the breeding season was beginning, the human and penguin residents of Manly received an awful reminder of the dangers posed to this colony by predators. On Saturday July 4, 2009, the front page of the local newspaper, the *Manly Daily*, announced that four penguins had been found dead on a small local beach. Over the next two weeks, at least six more penguin bodies were discovered on three different beaches. All of these penguins were killed by dogs or foxes, likely a combination of both. This paper focuses

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**Figure 1**  
Little Penguin (*Eudyptula minor*) habitat  
in the Manly area, NSW, Australia

on these events of 2009, alongside other acts of (possible) predation, to explore some of the philosophical, ethical, legislative, and management realities of invasive species in contemporary Australia. Although canines of the domestic variety were clearly responsible for some of the penguin deaths in 2009, this paper largely sets them aside, focusing instead on the role of foxes and other ‘wild’ predators—in particular seals—in the conservation of this small colony.<sup>3</sup> Here, penguins draw us into a tangle of complex relationships. Who counts as an ‘invasive species’, and what kinds of very invasive conservation responses their presence demands, are precisely what is at issue here.

In exploring the interrelationships between these invasive species in penguin worlds, this paper is an attempt to do a kind of ‘ethical taxonomy’ (Smith 2004: 1). The subject of this taxonomy is not so much individual species themselves, but another set of categories, another way of classifying organisms, that has real consequences in terms of who lives, who dies, and how. Central to this discussion are the rhetorical distinctions that position some species as ‘invasive’—as ‘out of place’ in a range of different ways inside local ecologies. The distinction between ‘native’ and ‘exotic’ species is central here, but it is

not the only relevant categorisation: with some exotics being readily accepted as belonging and other natives viewed as thoroughly out of place. ‘Invasiveness’ emerges here not only as an ecological, but also as a thoroughly social and political concept (Robbins 2004)—but in addition I would add that it also does important ‘ethical’ work. In taking up these ethical issues, the aim of this paper is not to provide straightforward *proscriptive* outcomes—arguments about *who* ought to be treated *how*—but rather to explore and problematise the existing frameworks of thinking and practice that so powerfully structure possibilities of life and death for everyone.<sup>4</sup>

Ultimately, my interest is in ‘conservation’; although I am less and less certain what this might actually amount to. And so this writing does not aim to simply problematise categories, but also to think critically about the ecologies that we are trying to produce and why, as well as when and how it might be appropriate to kill for them.<sup>5</sup>

### ‘THREATENING BIODIVERSITY’: PROTECTING PENGUINS FROM FOXES

The first dead penguins were found on a small residential beach on Manly Point; the only visible signs of trauma were the puncture wounds of a dog’s powerful jaw. At the time of these attacks, the National Parks and Wildlife Service (NPWS), the organisation tasked with the conservation of threatened flora and fauna in NSW, appealed to the public for information. Eventually, they sent a letter to local residents announcing that DNA testing may be carried out on the penguin bodies to identify the breed of the culprit dog.<sup>6</sup> In addition, the *Manly Daily* reported, ‘If the breed can be identified, Manly Council will search its database for dogs of that breed in the area, after which the NPWS may execute a warrant to sample a specific dog’s DNA’ (Kleinig & Williams 2009; Morcombe 2009a). Databases and DNA tests—or at least the threat of them, alongside possible fines and imprisonment—came together to produce a strong incentive for people to keep their dogs under control in the area (which is legally required of them under the colony’s *Critical Habitat Declaration* of 2002). In this case, these threats may have done the job. After this announcement no more penguins were killed in the area.<sup>7</sup>

A little further along the coast, however, the message seems not to have been received. The coastline, on which the colony nests, includes land under a range of different tenures—from private residential properties and council managed lands, through to a section of the Sydney Harbour National Park at North Head. While the first penguins had been found on a beach adjoining residential land, over the next two weeks at least another six were found dead in or around the Sydney Harbour National Park. In contrast to the residential area—where dogs were the most likely culprits—the NPWS began to suspect that a fox may have been behind the latest fatalities.<sup>8</sup> The response to this new fox threat was high-tech and multifaceted, deploying a significant arsenal of technologies to detect and kill the culprit.

Initially, infrared cameras were used by the NPWS in the park at night to determine whether or not one or more foxes

were present. By July 14, 2009, a fox had indeed been spotted and the *Manly Daily* ran a black and white still of a fox with the headline ‘Caught ... on tape. Is this a penguin killer?’ (Morcombe 2009a). With a fox in their sights, the NPWS baited the area at North Head with 1080 laced meat (an additional round of baiting on top of the two that are ordinarily conducted in the area, discussed below). Alongside these baits, a sniper was hired to be based in the park by night (AAP 2009). On July 18, 2009, the NPWS also announced that it had enlisted the aid of a tracker dog to help locate possible fox dens in the Sydney Harbour National Park. Although Wilson, the springer spaniel, successfully located two dens in the area, the foxes themselves remained elusive (Morcombe 2009b).<sup>9</sup>

Eventually the attacks stopped. In total, ten dead penguins were reported in the local papers, but the actual number was probably 13 or 14.<sup>10</sup> For such a small colony—where every death likely also indicates a breeding failure for the season—this was a staggering loss. While dogs were likely responsible for many of the deaths, foxes also emerged looking pretty guilty. As the local newspaper and the NPWS kept reminding people, this is precisely why foxes must be targeted in the area (AAP 2009; Morcombe 2009b)—despite the fact that baiting is often unpopular, especially with dog owners whose pets may be inadvertently poisoned. But it was not just penguins at stake. Importantly, the connection was also made between the role of foxes in these very publicised deaths, and their ongoing but less visible impact on native wildlife in general. As one spokesperson for the NPWS succinctly put it at the height of the period of penguin deaths: ‘This is really a microcosm of the devastation foxes can wreak in some areas’ (AAP 2009).

Foxes in Australia have an intimate entanglement with death, having been first brought here almost 150 years ago to satisfy settler desires for a ‘civilised hunt’ (Rolls 1969). Since this time, they have dispersed widely across Australia. Today, they occupy most of the continent, with the exception of the tropical north. Over this vast range, fox diets vary significantly. Where they are available, rabbits seem to make up the vast majority of their food, with the scavenged remains of sheep also being an important food source in agricultural areas (NWS 2001: 12–13; Saunders & McLeod 2007: 147–148). Despite this reliance on rabbits and sheep—both of which were also introduced to Australia after European settlement—it seems that many native species are unable to sustain viable populations in the presence of foxes (NPWS 2001: 12–13). Since their arrival in Australia, foxes have likely contributed significantly to the extinction of several species of mammals (Kinnear *et al.* 2002: 335–336; Johnson 2006: 197–203). But this threat is ongoing. All over Australia, native species are preyed by foxes and at increased risk of extinction (often as a result of a range of other factors as well). In NSW, foxes have been identified as a significant threat to approximately 40 listed threatened species (DEC 2005). In an agricultural context, foxes have also often been perceived as a significant predator of lambs and poultry, although their actual impact may be far less significant (Saunders & McLeod 2007).

It is these ideas about foxes that have led to very widespread

practices of baiting in Australia. While the initial goal of these projects was eradication, it is today widely acknowledged that this is not really a possibility for the wily fox, at least not with existing methods (Saunders *et al.* 1995: 4). Instead, baiting is now understood to be the core of an *ongoing* management plan. The area around Manly is a site of particularly intense fox baiting. The Sydney Harbour National Park at North Head is extensively baited twice a year—to coincide with fox breeding and dispersal events. North Head is included in the list of approximately fifty ‘priority sites’ in NSW identified in the state government’s Threat Abatement Plan (TAP) for predation by the red fox (NPWS 2001). While the endangered population of little penguins is an important part of the justification for this baiting, the other fauna that make their homes in the Sydney Harbour National Park, in particular an endangered population of long-nosed bandicoots (*Perameles nasula*), are also central.

But beyond the park’s borders, extensive baiting is also conducted. For roughly ten years, several of the local councils in the area have been engaged in intensive joint fox control. This program has been carried out under a permit that has reduced the minimum distance allowed for baiting around residences. Traditionally, the requirement that all bait stations be more than 500 m from residential dwellings had greatly reduced the role of baiting for fox control in urban areas. Under the permit granted to the Northern Sydney Regional Fox Baiting Program, this distance has been reduced to 150 m, significantly expanding the range of possible bait sites throughout the region (Mason *et al.* 2002; Debney 2007).

### POISONOUS WORLDS: ECOLOGIES OF EXCLUSION AND THE DRIVE TO EXTERMINATION

How are we to understand these ongoing killing practices, as well as the multifaceted response of the NPWS to the ‘fox threat’ after dead penguins started being found on beaches in Manly in 2009? Any attempt to manage species like the fox in contemporary Australia has to be understood within the context of a complex notion of ‘invasiveness’. There is a great deal of diversity in the use of the term ‘invasive’ within the fields of ecology and invasion biology (Warren 2007). Sometimes it is used interchangeably with terms like ‘exotic’, or ‘introduced’, but others have pointed to the fact that some native species can also act ‘invasively’—for example, when they become overabundant or move into new areas (Head & Muir 2004). Meanwhile, some biologists have argued that a species must also be ‘harmful’ to be considered invasive—although ecological harm remains a difficult concept to define and quantify (Sagoff 2005).<sup>11</sup> Ultimately, the term is a relational one, being used not to describe a species as such, but rather a specific population (or populations) of a species that is deemed to be ‘out of place’ within their current ecological context. It is in this broadest sense that I have employed the term ‘invasive’ in this paper. Taking penguins as our guides, I am interested in what we might learn about the various ways in which species

are figured as being ‘out of’ or ‘in’ place, in the very material discourses of conservation in NSW.

Foxes introduce us to perhaps one of the most important ways in which species might be considered ‘out of place’, namely, with reference to a simplistic dualism between ‘native’ and ‘exotic’ species. Where it is explicitly defined, a ‘native’ Australian species is usually one that was present prior to the arrival of Europeans. In Australia this is a deeply consequential divide (Franklin 2006). In the NSW *Threatened Species Conservation Act* 1995 (TSCA), the pivotal point is specified as ‘European settlement’, usually interpreted as 1788. The species present here at that point are deemed to be ‘indigenous’ plants and animals. In contrast, ‘exotic’ species are usually those that have arrived since European settlement [sometimes also called by a range of other names, like ‘introduced’, ‘alien’ or ‘non-native’ species (Warren 2007)].<sup>12</sup>

While legislation for the protection of fauna and flora in the colony of NSW began in the mid to late nineteenth century with a definite bias towards the conservation of exotic ‘game’ species—and without any regard whatsoever for the ‘peculiar’ native plants and animals—this situation gradually changed, until by the late twentieth century the roles were almost completely reversed (Jarman & Brock 2004; Stubbs 2001; Walker 1991). Today, the base level of protection for all flora and fauna in NSW is provided under the *National Parks and Wildlife Act* 1974 (NPWA). Here, the list of ‘unprotected’ species clearly functions as a means of excluding non-native species from protection (Schedule 11), an exclusion that very explicitly defines and creates the space of valued life that must not be harmed, bought, sold, or possessed without license. Alongside a range of non-native species and biological families (some of which, e.g., rabbits and donkeys, have become problematic in Australia since colonisation) we find listed ‘Carnivora other than Pinnipedia’—the order of carnivorous life to which the fox belongs. Since Australia has relatively few native members of the taxonomic order Carnivora, it has been simpler to list it here as unprotected in its entirety with the exception of the marine mammals like seals and walruses (superfamily Pinnipedia). This group of carnivorous mammals includes species like the New Zealand fur seal and the Leopard seal, which will enter our story a little later as potentially significant predators of the little penguins of Manly.

Similarly, in the TSCA it is only the species and populations of ‘indigenous’ plants and animals that can be listed as threatened and thus offered additional protection. In line with its more active management of threatened species, the TSCA expands this dualistic approach to life into active projects of eradication for conservation. Operating under the TSCA, the same scientific committee that declared the penguins of Manly a threatened population in 1997, prompting the drafting of a Recovery Plan for the colony, the following year declared predation by foxes to be a ‘key threatening process’, prompting the drafting of a Threat Abatement Plan for this species. To date, 14 animal species have been listed as key threatening processes in NSW (alongside four different groups

of plants)—all of which are non-native species, and most are similarly targeted for ‘control’ (DECCW 2010).

In recent decades, these dualistic preferences have very often been incorporated into conservation under the banner of that most powerful of late twentieth century tropes: *biodiversity*. ‘Biodiversity’ is a nebulous term, and one that lacks clarity in important and consequential ways (Haila & Kouki 1994; Maclaurin & Sterelny 2008; Takacs 1996). At the simplest level, it is a scientifically flavoured term for ‘life’, meaning nothing more than the diversity of living things—with the usually accepted caveat that this diversity exists at several levels, including the diversity of ecosystem, the diversity of species, and the genetic diversity within each of those species (Farnham 2007). The importance of conserving biodiversity trades on the perfectly reasonable notion that nature is diverse, and that this heterogeneity is important and valuable in a range of different ways.<sup>13</sup> Although ‘biodiversity’ on the surface seems to offer a very inclusive approach to conservation, in reality the way in which this discourse has been taken up in legislation and management has often reproduced the same exclusions. In NSW, while both the TSCA and the NPWA define ‘biodiversity’ to include the diversity of *all* life, and identify the ‘conservation of biological diversity’ amongst their key objectives, it is only native species (and populations) that are really protected.

Despite its clear legislative appeal, this simplistic dualism between native and exotic species has been the subject of a sustained critique for at least the past three decades. Central to this critique is the fact that this divide is fundamentally premised on the reification of a specific historical moment that ignores the changing and dynamic nature of ecologies (Worster 1990), as well as the serious labour of (usually ‘indigenous’) people in producing these changes—what Rose (2004) calls ‘taking care of country’. The arbitrariness of selecting European arrival as the site of the undoing of ‘nature proper’ has also been well discussed in the context of past and continuing projects of ‘ecological restoration’ that seek, in one way or another, to put things back to how they once were (Donlan & Martin 2004; Keulartz 2009; Chrulew 2011). In contrast to these preferences for specific historical multispecies communities, more recent ecological theory has critiqued the notion of a stable progression towards ‘climax communities’ or ‘homeostasis’, in favour of a recognition of ongoing change.

There is no end point to adaptation and ecological succession, only more change—change that necessarily involves the ‘invasion’ and (re)establishment of new species (Botkin 2001). As such, there is no stable set of member species of any given area. In Australia, prior to European arrival, numerous species made their way here and established; some with the help of humans—from the dingo and various rodents, to tamarind, ginger and a whole range of other plants (Low 2002: 11–16)—but many others appear to have made the journey across the seas unaided after the breakup of Gondwanaland (Low 2002: 9; Kull & Rangan 2008). Some, like the cattle egret (*Ardea ibis*), have probably made the trip without any direct aid since

European arrival (Botkin 2001: 262). These intrepid travellers remind us that it is not just as a result of humans that species are ‘introduced’ to new ecologies—although the rate of current introductions is clearly unprecedented. While the fact of necessary change does not imply that all change is good, what it does mean is that the change brought about by newly arrived species does not *necessarily* equate to harm, to some sort of ecological degradation (Sagoff 2005; Simberloff 2005).

The dynamic and changing nature of ecologies is, in an important sense, ignored by the simplistic divide between native and exotic species that exists in conservation legislation in NSW. In addition, more recent appeals to ‘biodiversity’ have rendered *invisible* these very specific cultural and historical preferences for the native. This kind of slippage between ‘biodiversity’ and ‘native biodiversity’ is now increasingly common in both legislation and conservation biology discussions (Angermeier 1994; Lodge & Shradler-Frechette 2002: 34). No work needs to be done to *justify* the protection of some species and the destruction of others because these values are incorporated into the terminology—specifically worked into the definitions of ‘plant’ and ‘animal’ in the TSCA—and thus made to appear an inherent part of conserving ‘biodiversity’ and healthy ecologies. In this exclusive notion of biodiversity, foxes and other introduced species can only ever emerge as *threats* to an imagined nature, or an imagined community of species who it is understood in a fundamental sense, *should* be here.

In this context, exclusive ecological imaginaries lead directly to efforts to exterminate foxes and other exotic species. Very often, this management takes place outside of any case-by-case analysis of the pros and cons of killing this species in this place, and is instead motivated by a simplistic and uniform drive to extermination. Deborah Bird Rose has analysed a similar drive in her work on the baiting of dingos who are viewed by many pastoralists as pests; this is a process that she argues involves ‘imagining a future emptiness, and then working systematically to accomplish that emptiness’ (Rose 2006: 68). In this context it does not matter *why* a fox is killed; any dead fox is a good thing. Exclusive ecological imaginaries do a strange kind of ‘ethical’ work in this approach to biodiversity conservation. Not only do these imaginaries remake possibilities for life and death, but they also play an important role in providing *justification*, and hence a sense of moral comfort, about killing those that don’t ‘belong’. There is a wholesale declaration that these lives are not *legitimate* lives within the context of contemporary ecologies, and as such that their deaths are not only *condoned* (as they often are in legislation), but also in an important sense *demand*ed for the sake of any genuine conservation.

But it is not just the *who* of life and death in multispecies worlds that is at stake here. In addition, the exclusionary and delegitimising discourses that are at the core of invasive species management in Australia, function in a way that makes unacceptable deaths somehow acceptable. An editorial in the *Manly Daily* from the period of the 2009 penguin deaths points to this potential—it explained that if a fox is responsible for the killings, this “shows why efforts are continually made to

remove such vermin” (Editorial 2009).<sup>14</sup> The term ‘vermin’ is perhaps interchangeable with ‘pest’ (which itself is far from complementary), but arguably carries an even stronger sense of the noxious and undesirable character of another, especially in popular discourse. As Meryll Parker (2007: 76) has noted in her discussion of dingo representations, denigrating discourses can function as an important psychological barrier between cruel treatment and those who carry it out or condone it. This tendency is perhaps nowhere as obvious in Australian conservation practice as it is in the many ‘creative’ ways communities have developed to kill introduced cane toads—practices that, as Trigger *et al.* (2008: 1278) note, would ‘never be tolerated in relation to native or domesticated animal species’.

Foxes in Australia, along with numerous other species, are undeniably bound up in both histories and ongoing practices of cruelty. Traditionally, foxes have been exposed to a range of awful deaths, including steel leg traps and strychnine poisoning. Today, the foxes targeted at North Head, as throughout Australia, are primarily killed by baiting with sodium monofluoroacetate (1080). In Australia, 1080 has become the poison of choice for canids—who are particularly sensitive to it (Saunders & McLeod 2007: 38)—as well as a range of other species. When ingested by foxes, after a short latent period 1080 typically causes ‘manic running, yelping, shrieking, and then collapse and convulsions’, all of which usually lasts several hours (Marks *et al.* 2009: 98).<sup>15</sup> As M. Sherley (2007) has pointed out, most studies of the ‘humaneness’ of 1080 have tended to focus on the later phases of poisoning—characterised by fitting and muscular spasms—and argued that central nervous system disruption likely means that animals do not experience pain at this time. While this conclusion is itself questionable—especially in the context of lucid periods in the midst of fitting—it also fails utterly to take into account the distress caused by earlier symptoms and the lasting effects of poisoning on those animals that recover (Sherley 2007: 452). In short, it is far from clear that 1080 is able to satisfy even that minimal standard of decency—called ‘humaneness’—that is routinely applied to the evaluation of our poisoning of non-human others.<sup>16</sup>

### Foxes in ecologies

These attempts to imagine and produce ecologies without foxes are deeply problematic, not just in the ethical and philosophical senses (discussed above), but also in very practical terms. As undesirable as it may be for many people, foxes are now thoroughly integrated parts of many Australian ecologies. They cannot simply be scraped off the top of ‘real’ native ecologies. This cannot happen both in the sense that complete fox eradication is impossible (as is now widely acknowledged), but also in the more important sense that removing foxes would not somehow restore lost environments, and would not maximise biodiversity (or even native species diversity) in any straightforward, or necessarily desirable, way. For example, in numerous cases removing large numbers of foxes has now been shown to lead to *increased* mortality amongst some native

birds and animals as a result of mesopredator release; in the absence of foxes, feral cat numbers often increase and have a more significant impact on these species, especially in arid areas. Similarly, in the absence of foxes, rabbit populations have sometimes exploded; these rabbits, in turn, often cause additional problems for valued native herbivores and plant species [studies summarised in (NPWS 2001: 19–22)].<sup>17</sup>

In addition, while the removal of foxes may reduce the presence of some valued native species, it can also lead to (what some consider to be) the over abundance of other native species. A particularly interesting example of this situation is that of the many marsupial, especially macropod, species that are threatened on the Australian mainland but abundant on fox-free islands. While larger kangaroo species have often become agricultural ‘pests’ in parts of the country, ‘medium-sized marsupial pests are practically unknown over wide areas of mainland Australia’ (Kinnear *et al.* 2002: 354). On fox-free Kangaroo Island, however, tammar wallabies (*Macropus eugenii*) and some other marsupials are now regularly culled as pests (Wilks 2008: 24). In contrast, the sub-species of tammar wallabies that once existed on the mainland is now extinct (SADEH 2009). A recent proposal to release tammar wallabies on the Yorke Peninsula on the South Australian mainland has highlighted the complex relationship between foxes and native Australian species and ecosystems. When faced with concerns from farmers that released wallabies may become pests, the Department for Environment and Heritage (DEH) responded that while the clearing of bushland for farming on Kangaroo Island has likely allowed a substantial increase in wallaby numbers, this increase had only been possible because of the absence of predators, specifically the fox. As such, tammar wallabies on the mainland would be unlikely to become pests. If they do, however, the DEH has committed itself to conducting an evaluation of losses that they cause to agricultural production, and ‘if these losses are substantial, then DEH will support the active management of the wallaby population’ (SADEH 2009).

This scenario raises a range of interesting, and troubling, questions. Foxes emerge here as simultaneous threats and ‘biocontrol agents’ for native species that are valued and loathed. In the absence of foxes on the mainland, would wallabies and other macropods become pests? What about other native species that are preyed on by foxes and frequently considered pests by people, such as brush tailed possums in residential areas? (Wilks *et al.* 2008). If foxes had never established in Australia, or if they are one day eradicated, would these native species be subject to ongoing culls (as some kangaroo populations are in Australia) to keep their numbers at ‘acceptable’ levels? The more than a million wallabies and pademelons killed last year in (until recently) fox-free Tasmania, suggest that the answer is a resounding ‘yes’.<sup>18</sup> This situation introduces the possibility of a conveyor belt approach to culling in which changes brought about by attempts to remove one species inevitably lead to results that are—at least for some people—undesirable, and thus require further ‘active management’ to be resolved.

These complexities, actual and potential, of fox management must remind us that while maximising (native) biodiversity may be the goal of conservation legislation in NSW, in reality any conservation efforts must take place alongside a range of other agendas—in particular those of agriculturalists and residential communities, for whom species that are deemed to be ‘out of place’ are not always recent arrivals. Australia is a radically transformed and transforming landscape. A simplistic division between ‘native’ and ‘exotic’ species will not help in resolving these conflicts, nor will the removal of the latter guarantee that the natives will thrive.

### NATURAL PREDATION: A SEAL ARRIVES

While in 2009, it was canid predators threatening penguins in Manly, the previous year a visitor of a very different kind was stirring up trouble. In late June 2008, just as most members of the penguin colony were returning to the area to breed, a New Zealand fur seal (*Arctocephalus forsteri*) arrived in Sydney’s North Harbour. To the delight of many locals, the seal found itself a haul-out spot at the Manly Skiff Sailing Club, and spent much of the next few weeks lying in the sun. On land, the seal was well liked; even though some people reported it to be smelly, and more than a little grumpy when they got too close. But it was what the seal was doing—or might be doing—in the water that had some local people concerned; not long after its arrival, these members of the community began to worry that it might be eating penguins. Some locals reported seeing fewer penguins than usual, and on August 12 the *Manly Daily* carried a very blurry photo of a seal with something in its mouth, under the headline “Is this proof the seal is eating penguins?”.

Being made aware of the seal’s presence, and in response to these local people’s concerns, the NPWS announced the results of a survey of the penguin population in early August 2008 that had found no decline. However, these reassurances did little to satisfy some locals, who still felt that the seal should be ‘moved on’. In response to these suggestions, James Dawson, then Head of the Penguin Recovery Team at the NPWS, made the following statement to the *Manly Daily*. He said it was a misconception that New Zealand fur seals were not native to the area.

The New Zealand fur seal is a common animal in NSW waters. They range all the way up to southern Queensland and Antarctica. Their name is a little misleading.

They were hunted to near extinction in the past and their numbers are rising, so that may be why this one is in the harbour.

He said one seal occasionally eating a little penguin was not only natural, but not a threat to the population.

I take the view that it is a good example of a healthy, functioning ecosystem, benefiting from a productive harbour. (Phillips 2009)

There are a lot of complex assumptions contained in this short statement, but my particular interest is the way in which seals are presented as ‘native’ to the area, and therefore engaged in ‘natural predation’ of this colony. In contrast to fox predation that threatens to undermine local ecologies, predation by New Zealand fur seals is an indicator of their healthy functioning. Also, in contrast to foxes, recall that pinnipeds are the singular member of the taxonomic order Carnivora that is protected under the NPWA 1974 (Schedule 11). New Zealand fur seals are also listed as a ‘vulnerable species’ under the TSCA, affording them some additional consideration.

In addition to their very different positioning as native/exotic species, and vulnerable species/threatening process, there are other important differences between New Zealand fur seals and foxes that must have informed the responses of the NPWS to predation of the Manly penguins in each case. Central here is the fact that a single seal may not have been a significant threat to the colony (and foxes are generally disliked for their predation of a range of other species on North Head). While New Zealand fur seals will eat little penguins, their consumption differs drastically between populations and even individuals. As a species, they are by no means penguin specialists, but there are certainly examples of New Zealand fur seal populations where little penguins comprise a significant part of their diet (especially for males), and other examples where individuals have developed a liking for little penguins. If a New Zealand fur seal did set about eating little penguins, it could have a significant impact on a colony as small as the one at Manly (Page *et al.* 2005).<sup>19</sup>

While in this case the seal appears not to have been eating penguins, this fact does not change the significant threat that pinnipeds pose to this penguin colony. Importantly, this is a threat that the discourse of ‘native species’ and ‘natural predation’ is ill equipped to understand and respond to. In the case of this New Zealand fur seal, the concept of ‘nativity’ covers over a complex and interesting story—a story in which human hunting for profit plays a central role. As Dawson points out in his statement, New Zealand fur seals—along with Australian fur seals (*Arctocephalus pusillus doriferus*) and several other species of pinnipeds—were hunted to the brink of extinction. John K. Ling (1999) has helped us in understanding the sheer magnitude of this sealing endeavour, estimating that in the main period, between 1792 and 1830, over 1.3 million fur seal skins were ‘harvested’ around Australia, and this figure is likely vastly underestimated. In fact, sealing was so economically important during this period that it provided the fledgling British colony of NSW with its first export industry. By 1889, however, seals were largely protected by all of the southern states of Australia—with occasional exceptions (Burleigh *et al.* 2008: 247).

Well over one hundred years later, seal numbers are still below very shaky historical estimates. It is only in the past few decades, for example, that New Zealand fur seals have resumed breeding in Bass Strait (between Tasmania and mainland Victoria), where historical records indicate they were once found in abundance (Kirkwood *et al.* 2009). As their numbers

swell, they seem to be establishing winter haul-out sites further and further north along the east coast of Australia (Rogers pers. comm. 2010).<sup>20</sup> The site nearest to Sydney Harbour is now at Steamers Head, just south of Jervis Bay. Over the past few decades, the winter populations of both the New Zealand and the Australian fur seals using this site have grown rapidly (Burleigh *et al.* 2008; Rogers pers. comm. 2010). In addition, only slightly further down the coast, New Zealand fur seals and the Australian fur seals can be found on Montague Island, and in recent years pups have been born there in increasing numbers. Some estimates now suggest that New Zealand fur seal populations around Australia may treble in the next 15–30 years (Goldsworthy *et al.* 2003).

This extreme fluctuation in seal numbers—the massive historical decline followed by recent increases—has not been insignificant for prey species like little penguins. Within the complex and changing marine (and terrestrial) ecosystems that penguins and seals inhabit, it is impossible to point to a simple causal relationship between population fluctuations in these species. Nonetheless, it is quite likely that in some areas little penguins have benefited from the reduced seal population that sealing produced. The flip side of this situation, however, is that recent increases in New Zealand fur seal populations may now be connected to the disappearance or decline of some colonies of little penguins [e.g., in South Australia (Page *et al.* 2005)]. In the coming years, as New Zealand fur seals winter in greater and greater numbers along the south east coast of Australia, it is by no means certain that the small penguin colony at Manly will survive.

But in the background of this discussion of fur seals, lurks an even more important pinniped threat—namely, the leopard seal (*Hydrurga leptonyx*). Although leopard seals are mostly found in Antarctic and sub-Antarctic waters, hungry juvenile dispersers often make their way as far north as Sydney in the winter (during the little penguin breeding season). While these leopard seals are mostly solitary travellers, penguins are their preferred food—a single leopard seal can easily consume 15–20 little penguins in a day. On average, one leopard seal is spotted in Sydney’s waters each year, but records stretching back to the 1950s point to a little understood cyclical pattern in their abundance, with about twelve leopard seals being spotted in big years (Rogers pers. comm. 2010). A single leopard seal, or certainly two of them, could easily wipe out the colony at Manly in a week. As explained to me by biologist Tracey Rogers, this colony is made particularly vulnerable by its specific geography; the way in which access to so much of the area in which the penguins nest is funnelled through a single small bay (Spring Cove). In this environment, an ambush hunter like a leopard seal can simply lie in wait as penguins swim in and out of their nesting area (Rogers pers. comm. 2010).

While leopard seals are by no means common in this area, they have been, and continue to be, consistent visitors to Sydney’s waters. In addition, it is clear that fur seals were once far more abundant than they are today. How have penguin populations survived the presence of these seals in the past?



The answer to this question is probably that little penguin colonies have historically been far larger and more widespread than they are today. While this is the last colony on the NSW mainland, large colonies once existed all along the southeast coast of Australia (NPWS 2000). As recently as the 1950s, it seems that the colony at Manly was far larger than it currently is—with 300 penguins being shot in an act of ‘vandalism’ on a single night in the centre of what is now their critical habitat (Anonymous 1954). And so, prior to the decline in penguin numbers and the complete loss of most colonies since European settlement—as a result of a combination of habitat loss, human violence, and introduced canid predators—both leopard seals and New Zealand fur seals would have consumed little penguins, but from a group of much larger colonies. On the other hand, however, most of the information that we have about little penguin colonies in Australia is from the period after New Zealand fur seal populations had already drastically declined—the earliest written record of the colony at Manly, for example, is from 1912 (Anonymous 1912). Prior to their being wiped out by terrestrial predators, therefore, it is possible that some of the penguin colonies on the southeast coast were established, or became larger, as a result of reduced marine predation by pinnipeds.

In the midst of this ongoing transformation, what can it mean to understand New Zealand fur seals as a native species, especially in the context of their predation on this small penguin colony at Manly? The concept of a ‘native species’ seems to function here as shorthand for the proposition that the species ‘fits’—that it is in its ‘correct’ place—and, as such, will not cause major problems for other ‘native species’ and thus for ‘biodiversity’. But in what sense is the seal native—native to *where*, or perhaps to *when*? Native to which, no longer existing, ecologies? The constant state of change and flux in the populations and the interactions of all of these species undermines the meaningfulness of an appeal to a ‘nativity’ that is rooted in the ecologies of 1788. The fact that both penguins and seals lived here when Europeans arrived—something that we don’t really know, and certainly don’t know with any detail—is no guarantee that they can cohabit happily inside the radically transformed ecologies of the early twenty-first century.

Discourses of native and exotic species are complicit in the erasure of these pinniped threats to the little penguin colony at Manly. Seals, of either the fur or leopard variety, do not make an appearance in the official NPWS *Recovery Plan* for the population. They are not listed with the various other threats, e.g., disturbance at nests; habitat loss; and predation by foxes, dogs, and cats. This is not to say that seals and other native species *cannot* be managed and perhaps even killed if necessary for the preservation of another threatened species or population. Native species can become ‘pests’. In an agricultural context, a species becomes a pest when it significantly interferes with crops or livestock through consumption or competition (as was clear with the tammar wallabies). In a conservation context, however, native species are sometimes also referred to as ‘invasive pests’ when they

threaten the continued viability of other valued native species. Interestingly, which native species come to count as invasive is also often determined with reference to post-European human impacts. Travelling alongside most invasive native species is a simple causal story that explains how recent human activity has altered the population density or the distribution of the native species, such that it has become a threat to other native species.<sup>21</sup> Armed with this story, native species can be more readily controlled. Doing so, however, is not without additional difficulties—both in the legal sense that harming native species requires licensing, and in the political and public relations sense.

As we have seen, New Zealand fur seals off the coast of Australia have a far more complicated and interesting nativity story. In the future, growing populations, alongside a ban on commercial fishing in Sydney Harbour, will likely mean an increase in pinnipeds in the area (at least during winter). It is, however, impossible to predict the end point of New Zealand fur seal population growth. As Rogers (pers. comm. 2010) pointed out to me in an interview, the ‘system’ is so far transformed that historical numbers of New Zealand fur seals may no longer represent the carrying capacity of the area. If they are left to expand completely unchecked, however, it is by no means certain that there will still be a place for the Manly penguin colony.

### **‘STAYING WITH THE TROUBLE’: CONSERVATION WITHOUT INVASIVES**

What does this all mean for the little penguin colony at Manly, or for the conservation of flora and fauna in NSW more generally? Unfortunately, acknowledging the deeply problematic nature of the categories that ground invasive species management, does not leave us in a position in which we can simply abandon all killing for conservation. But, on what grounds should we kill some species to conserve others? What might conservation look like without ‘invasives’?

In particular, my concern is for the many species around the world that are sliding towards extinction—sometimes as a result of predation or competition from other species (many of which are ‘exotic’ or ‘invasive’). As previously noted, foxes are likely to have been significantly involved in the extinctions of several mammal species since their arrival in Australia, and are having an ongoing impact on many others (Johnson 2006). While changes within ecosystems—including significant changes in the abundance and distribution of a species, or even local extirpations—cannot be viewed as ecological ‘harm’ in any simple way, we may still want to view species extinctions as something to be avoided.<sup>22</sup>

In this context, *if* we value the continuity of threatened species then members of some other species will sometimes need to be controlled and even killed. These will not all be ‘exotic’ species, although many will be. *If* we support the long term continuity of the penguin colony at Manly, then pinnipeds as well as canids will likely have to be controlled, and perhaps even killed. But no matter how much and how

many we kill, our goal cannot be to put things back to how they once were. Rather, we are killing to produce *valued natures*—valued multispecies communities which always include diverse member species who have come to this place both before and after that all important date of 1788. This is the unavoidable reality of contemporary life in Australia. Outside of exclusionary ecologies and the drive to extermination that they have produced, these killings must be rethought in important ways. In particular, the deeply undesirable ways in which this killing is often carried out in NSW, as well as the way in which it is made to appear inevitable, unavoidable, and even ethically unproblematic, should all be challenged.

In particular, killing must become a last resort. At present, it is all too often taken up as the first, cheapest and easiest option, especially when those targeted are already unpopular ‘invasive pests’ (especially of the exotic variety).<sup>23</sup> In short, resorting to killing to control ‘problematic’ species is simply *too easy*, and is therefore readily conducted in place of other more difficult options, or where there are no meaningful conservation objectives at all. For example, in NSW a range of other factors have contributed to the decline of species that have ultimately been carried beyond the point of extinction in the fox’s belly. These factors point to other avenues for effective conservation. For example, both habitat fragmentation and the loss of ground cover through grazing are thought to significantly increase fox densities and effective predation of native species (May & Norton 1996; Johnson 2006: 216–227). Similarly, as several biologists have now noted, the historical and current impacts of foxes on other Australian species might have been greatly mitigated by the presence of a larger carnivore—like the dingo, who was greatly reduced or eradicated from much of Australia early into the colonial experiment. While the prospect of stopping the ongoing dingo killing that occurs in Australia (Rose Forthcoming) is very unpopular with some—especially sheep farmers—doing so may have incredibly beneficial outcomes for a wide range of fauna in many parts of the continent (Johnson 2006; Glen *et al.* 2007; Johnson *et al.* 2007). While killing problematic others remains so easy and uncontroversial, it is hardly surprising that we remain unwilling to commit to any substantial or inconvenient changes to our own activities and lifestyles.<sup>24</sup>

In addition, many of the foxes that are baited in Australia each year die for reasons that could not be considered meaningful outside of a simplistic drive to extermination. These fox deaths are part of a widespread phenomena of what we might call ‘aesthetic culls’, in which there are no real conservation objectives. While some conservationists prefer to parse this practice as one of maintaining ‘local identities’ and the ‘place specific features’ of a landscape, in reality these widespread killing practices simply seek to produce desirable scenic ecologies for local inhabitants (of the *Homo sapiens* variety)—people would like to see more birds or wallabies, not foxes. While there may be nothing wrong with a preference for wallabies over foxes, and we might encourage wallaby presences in a range of ways, is *killing* foxes really ethically acceptable as one of them? There is certainly more than a

little of this aesthetic motivation in the extensive decade long baiting that has been conducted by local councils around Manly as part of the Northern Sydney Regional Fox Baiting Program. These aesthetic culls highlight the urgent need for a new ethic in our relationships with flora and fauna, especially in urban areas (Lunney 2010).

My objection, therefore, is not to *all* killing for conservation, but rather to killing that has been made too easy; to killing that is motivated by incoherent exclusionary logics and vilifying discourses; killing that is consequently often done in awful ways, and in many cases unnecessarily—as though any dead fox is a good thing. In the context of invasive species in Australia, no real effort is being made to figure out how best to live with them—to understand them as becoming part of ecologies, for better or for worse. But foxes highlight the fact that this is ultimately what must happen. While our thinking is guided by a drive to extermination, complete extermination is ultimately also acknowledged as an impossibility. And so we are faced with a choice between learning to live with foxes a little better, or continuing to bait them in perpetuity. These are not easy choices to make; dwelling inside these genuine difficulties, without the security of any absolute answers or the moral comfort that they can (but perhaps never *should*) produce, is a sustained practice of ‘staying with the trouble’ (Haraway Forthcoming).

Ultimately, I do not know how best to act in this difficult space. What has become increasingly clear over the course of this paper, however, is that these issues are not specific to the penguins, foxes, pinnipeds, and other species of Manly, but rather point to a set of far more fundamental problems—both practical and philosophical—in the objectives that guide contemporary conservation in Australia. If restoring or holding on to past ecosystems, or even maximising native biodiversity, are such problematic projects, then where are we going? What is the goal of all this conservation, and all this killing? Perhaps, there cannot be *a* goal, and what we need instead are more open discussions about the many goals, values, and priorities that drive our interactions in multispecies communities. If we reject the conceptual divide that hives off ‘the environment’ as a space to be thought about and managed by ‘conservation objectives’, then the need for more than a single goal becomes painfully apparent. How can we *all* get on inside environments that are inescapably productive, residential, scenic, and more? In a globalising world, and one increasingly exposed to the transformations of changing climate, species will more and more frequently refuse to stay in their ‘correct’ place. We desperately need ways of living with others, as well as legislation and environmental management practices that can move beyond this pre-European fetishism and towards more realistic, caring, and inclusive goals.

Back in Manly, the penguins may not survive this reorientation of our conservation values, but perhaps they will. Ultimately it may not matter—there is every chance that a warming climate will make this most northerly part of little penguin distribution simply too warm for future generations (Chambers *et al.* 2009). In this context, perhaps the goal for

a new ecology will be to learn to value and care for what is here now, in a way that holds onto it, but gently; in a way that acknowledges that any given species or ecosystem, while being immensely valuable and precious in itself, is nonetheless a transitory and changing affair.

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### Notes

- All references in this paper to ‘penguins’ refer to little penguins (*Eudyptula minor*).
- All references to foxes in this paper refer to the red fox (*Vulpes vulpes*).
- Domestic dogs have not been focussed on in this paper for a number of reasons. While their predation undoubtedly has a major impact on a wide range of Australian wildlife, they have ordinarily been excluded from discussions of invasive species management, and it is primarily as a contribution to these conversations that I envisage this paper. Even where the conservation impact of dogs is acknowledged in Australia, the role of ‘wild’ or ‘feral’ dogs and dingos is usually emphasised over that of properly domestic dogs (although, see the recent declaration on NSW Key Threatening Process for Predation and Hybridisation by Feral Dogs, *Canis lupus familiaris*). In addition, when domestic dogs are to be managed for conservation purposes, their close association with human communities has usually meant—as in the case of the penguins at Manly—that management takes a very different, usually non-lethal, form.
- This attempt is quite distinct from, but nonetheless inspired by, Donna Haraway’s thinking on ‘sharing suffering’ and the ‘logic of sacrifice’ (Haraway 2008).
- An important part of which is learning to tell more complex ecological stories about newly arrived species (Frawley 2007).
- Letter from NPWS to the residents of Manly, ‘RE: Penguin deaths in the Manly Cove/Spring Cove area July 3–4, 2009’ (undated). Letter on file with author.
- Notes from author’s interview with an anonymous penguin activist in Manly on May 17, 2010. Domestic dogs are clearly an important class of predators for this colony of penguins, as they have been for other penguin colonies in the region and the country more broadly. Attempts to mitigate the impacts of dogs on this colony centre on systems of surveillance and punishment that aim to encourage associated humans to control them. In addition, many parts of the penguins’ breeding habitat around Manly have been declared dog free zones, often with considerable opposition from dog owners. Domestic dogs, however, are not a central part of the story that I will tell in this paper.
- The uncertainty in determining the species (let alone the breed) of the predator/s in this case occurred as a result of the fact that DNA tests were largely inconclusive, so assumptions had to be made on the basis of autopsies, principally the analysis of bite marks.
- In addition to these official responses, some local residents took it upon themselves to protect the penguins. In Manly, some members of the community have a long established history of involvement with the colony, a central part of which is the ‘penguin warden’ program, in which volunteers watch over the five or so breeding pairs that have made their burrows under the busy Manly wharf. When the first four penguins died on a small beach with no public access by land, some of these people snuck onto the beach by night to ensure that these penguins made it to their burrows in safety. In the recent history of the penguin colony, this same small area—Little Manly Cove—has been the sight of at least two other ‘penguin slaughters’ (Alexander 1995; Milligean 2001). In each attack, eight or nine little penguins were killed in a single night, most likely by one or more domestic dogs.
- Notes from author’s interview with an anonymous penguin activist in Manly on May 17, 2010.
- The definition of an ‘invasive species’ on the website of the Australian Government’s Department of the Environment, Water, Heritage and the Arts provides this narrow definition of the term: ‘An invasive species is a species occurring, as a result of human activities, beyond its accepted normal distribution [out of place] and which threatens valued environmental, agricultural or other social resources by the damage it causes’. (<http://www.environment.gov.au/biodiversity/invasive/index.html>. Accessed on July 6, 2010).
- For further discussion on some of the complexities of defining ‘invasive’ species, see: Davis & Thompson 2001; Rejmánek *et al.* 2002; Colautti & MacIsaac 2004; Head & Muir 2004; Warren 2007; Trigger *et al.* 2008.
- In other contexts, however, the distinction between ‘native’ and ‘exotic’ species has been drawn in a range of other, sometimes overlapping or contradictory, ways—leading some to argue that these terms may actually refer to a cluster of related concepts (Wood & Moriarty 2001).
- These values might include aesthetic, economic, ecological, cultural, and numerous other dimensions. There is no getting around the fact that many governments and organisations around the world got on board with biodiversity after the drafting of the 1992 *Convention on Biological Diversity*, which amongst other things is fundamentally about ownership and access to a new kind of natural resource—biological or genetic diversity (Roa-Rodríguez & van Dooren 2008).
- This statement appears in an editorial under the heading “Australian fauna must be protected”. The editorial begins by noting that “Animal lovers will be saddened by the gruesome deaths of four little penguins at Manly Point”—this statement, combined with the call to eradicate foxes, displays the all too common Australian exclusion of introduced species from categories of love and care, an exclusion made explicit a moment later in the same short editorial: “As a nation we love our animals—both pets and our native wildlife” (Editorial 2009).
- This progression is not exceptional. Amongst the many species baited with 1080 in Australia, symptoms of poisoning generally include—“lethargy, retching and vomiting, trembling, faecal and urinary incontinence, unusual vocalisations, hyperactivity, excessive salivation, muscular weakness, unco-ordination, hypersensitivity to nervous stimuli, and respiratory distress. Localised nervous signs including tail twitching, twitching or jerking of limbs, twitching of facial muscles, nystagmus, and tetanic seizures, are common, and may progress to generalised convulsions” (Sherley 2007: 454).
- In addition, 1080 has frequently been implicated in the deaths of non-target species in Australia—both through secondary poisoning and through the consumption of baits by others, including ‘native species’ like the tiger quoll (*Dasyurus maculatus*). For an example, see Belcher (1998). For a more extensive discussion of the ethics of nonhuman pain, see van Dooren (2010).

17. These kinds of situations have led some researchers to argue for a 'whole ecosystem' approach to invasive species management (Zavaleta *et al.* 2001). This may involve attempting to remove all invasive species at the same time, to reduce the impacts of an increased threat from other invasive species in the absence of their (also) introduced prey or predators. Despite its many practical and economic hurdles, this approach would clearly be beneficial for native species in some cases—as recent debates over the management of cats, rabbits, and rats on Macquarie Island have illustrated (Bergstrom *et al.* 2009a, 2009b; Dowding *et al.* 2009). In other cases, however, it is not other introduced species that are 'released' by killing foxes. For example, a recent study in western NSW found that fox baiting may have led to a decrease in nocturnal gecko lizard populations, again through mesopredator release, but this time the predator was the native sand goanna (*Varanus gouldii*). In the absence of foxes, populations of goannas—who are thought to be more efficient lizard predators—increased significantly (Olsson *et al.* 2005).
18. Pademelons are a group of small wallabies. In Tasmania, both 1080 and shooting are used to control small- and medium-sized marsupials (Clark 2010), while in parts of Western Australia where fox control has been carried out on a large scale (as part of the Western Shield program), tamar wallabies and others have 'had to be' culled in recent years (Kinnear *et al.* 2002: 354).
19. A possible connection between declines in little penguin numbers and a growing New Zealand fur seal population has also recently been proposed at Granite Island off the coast of South Australia (Brand 2009).
20. All references to 'Rogers pers. comm. 2010' refer to an interview with Dr Tracey Rogers conducted by the author at the University of New South Wales on 18 May 2010.
21. Two native birds found in abundance in urban environments, noisy miners and pied currawongs, provide a good example of this (Parsons & Major 2004).
22. I have deliberately focused on *species* here—as opposed to talking about killing to preserve threatened 'biodiversity'—because, despite the complex and contested nature of species borders, they are far more stable entities than 'biodiversity' (Maclaurin & Sterelny 2008). In short, I distrust 'biodiversity', which due to its incredibly broad and unspecified nature (Farnham 2007), can be twisted for just about anything. The *scale* at which biodiversity is examined (Davis 2003), as well as our interpretation of what counts as 'diverse' (Farnham 2007: 42–59; Mooers 2007), and the specific categories of life—like non-natives—that can be so cleanly and invisibly excluded from the ambit of this term, all matter here.
23. As William Boarman (1992) has pointed out in the context of raven management in the Mojave Desert, USA: "Predator control is sometimes an easier way of solving a problem than attacking the root causes for the problem. This may be for political, economical, social, or technological reasons".
24. Biologist Chris Johnson (2006: 225) has raised precisely these issues in seeking to explore whether we might be able to "redesign Australian landscapes to tip the balance back in favour of native mammals without actually eradicating cats and foxes". While, his concern seems to be less with the ethics of killing and more with the impossibility of eradication, and I am not partial to the notion of 'redesigning' landscapes, this questioning does point to the vital need for large scale changes to the way in which we live in Australia, in place of simply killing the 'problems' in an escalating and ongoing spiral of destruction.

In an agricultural context, a range of less lethal and cruel methods of control are available to deter foxes, for example, the use of guardian animals to protect livestock. While these possibilities have been considered for some time, and have been shown to be effective in some studies, they have received very little research or application in the face of widespread poisoning practices (Saunders & McLeod 2007). However, companion animals may be less effective against dingos, and in some cases sheep farming would simply have to be abandoned in favour of other land uses. Essential to making some of these difficult changes is a critical rethinking of the myth of Australian agriculture,

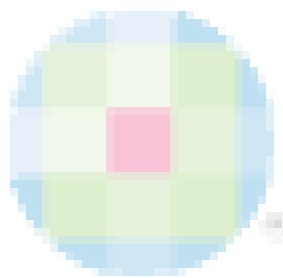
of its importance to the national economy and to the world food basket (Muir 2010).

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