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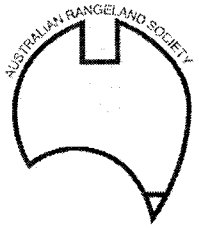

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FENCES FOR BIODIVERSITY CONSERVATION IN THE ARID ZONE: SOME LESSONS FROM HISTORY

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ABSTRACT

The history of vermin fences in Australia provides key lessons for biodiversity fences in the Australian arid zone: the best available design based on hard experience is essential; maintenance is essential; and maintenance is expensive and essentially indefinite.

Proponents of predator-proof fences need to address key questions that rigorously explore details of the long-term aspects of any proposal: What is the real objective of the fence, and how do we measure its success? How long will the project last? (typical 3-5 year projects should be rejected). What is the maintenance protocol and budget? What happens if/when the fences are successful? Is there a plan for wild-release? Where? (Unless wild release piggy-backs on other programs, this implies perpetual and expensive predator control). What happens if predators outside the fence can't be controlled for decades? Is private land to be fenced? (In general, this should not be funded). Unless proponents can answer these questions, funding should be refused. In any event, unless predators are controlled outside the fence, then the enclosure remains a captive breeding zoo which achieves little for conservation at a landscape-scale.

INTRODUCTION

The history of vermin-proof fences in Australia provides several lessons applicable to the current generation of predator-proof fences used for biodiversity conservation. Australia has the most complex set of vermin-proof fences ever erected in the world. Besides the well-known "Dog Fence" running 5,400 km from the Great Australian Bight to central Queensland, we currently have 1,170 km of emu-proof State Barrier Fences in Western Australia and 555 km of the Darling Downs – Moreton Rabbit Fence in south-eastern Queensland. South Australia and Queensland have thousands of kilometres of derelict private dingo-proof fences, and all states have thousands of kilometres of private rabbit-proof fences, many now derelict.

I am not concerned here with how to build predator-proof fences. Long and Robley (2004) provide an excellent summary and critical assessment of current best practice and designs. However, I am concerned with what I perceive to be both unspoken and unrealistic expectations of predator-proof fences, especially what happens in the long-term (> 50 y) to any animals inside the fence.

LESSONS FROM VERMIN-PROOF FENCES

Lesson #1: If fences are to be used to exclude predators, then the best available design, based on hard experience is essential. Anything less is a waste of money. The current designs for cat- and fox-proof fences (Long and Robley 2004, Table 3) are designed specifically to counter the ability of both predators to climb fences or dig under them. The top overhang and multiple electric wires have proved effective, at least in the short-term. But Long and Robley's list of recommended research sounds a note of caution; many critical

aspects of design have not been rigorously tested. Indeed, such lack of testing and proper experimentation is a recurring and disappointing theme of attempts to control feral animals for biodiversity conservation. It is also worth remembering that biodiversity fences may have to resist other animals besides predators. Central Australia is infested with feral camels which can flatten a 1.8 m high dingo fence. Any predator-proof enclosures in these areas would need fences sufficiently strong to resist rampaging camels, and to date, such fences have not been developed on a large-scale in Australia.

Lesson #2: Maintenance is essential. Almost as soon as pastoralists erected dog-fences, maintenance became a problem. Shrubs and trees grow up between the netting, floods wash out the fences, burrowing native animals (e.g. echidnas and goannas) create small holes which are exploited by other native animals (e.g. wallabies) and feral predators to create large passages, sand buries the fences, etc. Lack of maintenance, perhaps more than anything else, causes fences to fail. There are good reasons why the major vermin-proof fences today are all managed and maintained by government agencies. The prime one is that history has repeatedly shown the reluctance of many pastoralists to adequately maintain the fence where it bounds their properties. Similarly, there are good reasons why access roads are cleared on both sides of major fences, and the fences are regularly sprayed with herbicide to reduce regrowth along the line of the fence. If the fence is electric, then routine and regular spraying is essential.

Long and Robley (2004, pp. 13-14) list some of the likely maintenance issues that can arise. But there is no recognition of long-term experience in the newer designs of predator-proof fences incorporating a mix of high netting and high voltage electric wires. Farmers with decades of experience with electric fences know only too well that they are efficient and cost-effective, but rapidly have maintenance problems with regrowth of shrubs, grass, etc. This is one area of design that needs careful monitoring and testing.

Lesson #3: Maintenance is expensive and must be continued indefinitely. All current dog fences in Australia are maintained by government agencies because of maintenance problems when they were run by adjoining landholders. Directly comparing maintenance costs (Figure 1) of these fences is difficult because they serve different purposes (Queensland, NSW and South Australia: dingoes; Darling Downs-Moreton: rabbits; WA: emus) and thus have different physical structures, and also because the responsible agencies have different responsibilities and different methods of apportioning costs. However, it is instructive to look at general patterns in the annual maintenance costs.

There is a flag-fall of maintenance costs of around $1,500/km on fences shorter than about 500 km, but the costs fall rapidly to less than $400/km on fences over 1,000 km long. The higher costs for the Queensland Wild Dog Barrier Fence are probably due to considerable distances of rough and forested terrain crossed by the fence. Extrapolating from the major vermin-proof fences, annual maintenance costs are likely to be over $1,000/km on fences shorter than 500 km. Brook *et al.* (2004) estimated that the *minimum* annual maintenance costs of a 6 km fence to exclude cane toads from Cobourg Peninsula in the Northern Territory would be almost $70,000/km. Such massive perpetual expense would make any funding agency draw a deep breath.

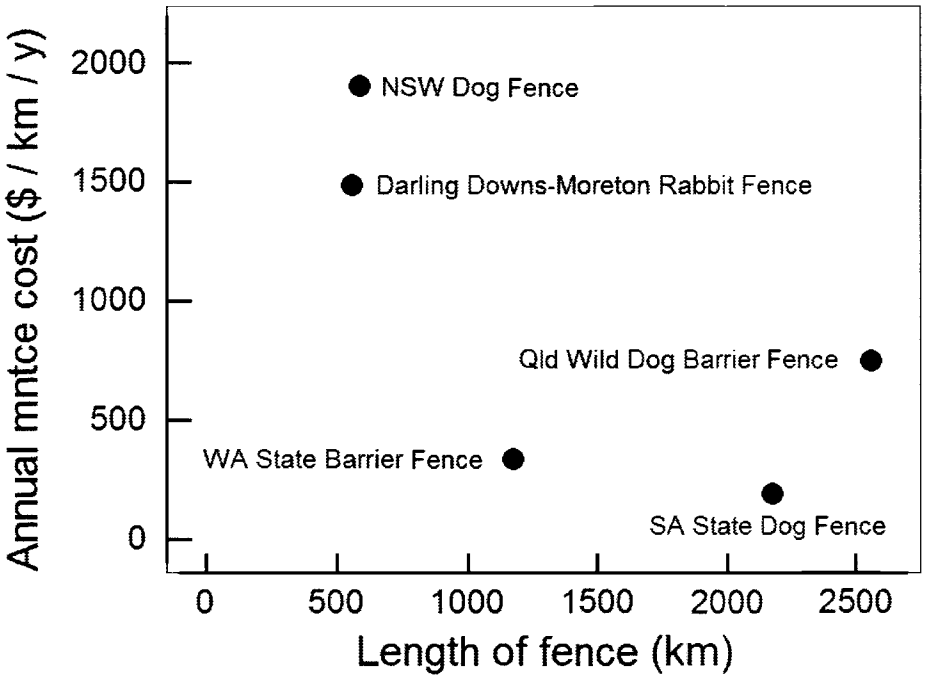

Figure 1: Annual maintenance costs (financial year 2004-2005 except WA: 2003-04) for major Australian vermin-proof fences

Sources: personal communications (April - May 2005) with NSW Wild Dog Destruction Board, Darling Downs-Moreton Rabbit Board, South Australian Dog Fence Board, Western Australia Agriculture Protection Board, and Queensland Department of Natural Resources and Mines.

WHAT IS SUCCESS, AND WHAT HAPPENS NEXT?

Most animals will breed if they are warm, well-fed, and protected from predators. This is one measure of success for our exclosure fenced with a predator-proof fence. But is it the right measure, and what happens next? Feral predators (dogs, foxes, cats and cane toads) eat native wildlife. Some supporters of captive-breeding programs seem blissfully unaware that any increase in target species must be placed somewhere, or spend the rest of their life in a cage. It is a bit glib to blithely say "control the predators and then release the threatened animals back into the wild." This works very well in Western Australia where many of the native fauna are resistant to sodium monofluoroacetate (1080), the current poison of choice for cats and foxes. Elsewhere in Australia, 1080 has a greater impact on native fauna and may not be able to be used, making predator control more difficult.

Unless and until predators are controlled *outside* the fence, then wild release is not an option. Most conservation agencies would baulk at providing a smorgasbord of threatened animals to waiting predators. So what do we do with the captive-bred animals?

CONCLUSIONS: ASKING THE RIGHT QUESTIONS

Erecting a predator-proof fence is a relatively straightforward, albeit expensive task, and one that is eminently satisfying. A modern cat-proof fence with all its netting, 2 m high posts, overhangs and electric wires is a sight to behold. It is also a tangible sign that "something is being done", and thus can be of great benefit in involving the wider community. But the fence is just a tool, not an end in itself, so we need to look more closely at its purpose. Given the

current interest in predator-proof fences, I believe that funding agencies need to look very hard and very closely at requests for funding. Very specific questions need to be asked to explore a range of longer-term issues:

- How long will the project last? Typical three- or five-year funding is pointless because of problems of on-going maintenance, and wild release.
- What will happen to the captive-bred animals?
- What happens if the predators outside the fence can not be controlled for decades?
- What is the fence maintenance protocol and budget? Is this budget realistic and based on experience with other similar fences?
- How will maintenance be audited?
- What is the contingency plan if/when the fence is breached and some predators enter the enclosure?
- Is private land to be fenced? Funding agencies should think very carefully before funding predator-proof fences on private land, and in most/all cases reject the applications.

I will close by quoting Peter Waite (1913) who would not accept that his low fences didn't work against dingoes:

> *... no fence will kill dogs. It can only be a barrier, and call a halt for the dogs, which gives an opportunity to kill them by means of traps and poison. If advantage is not constantly taken to systematically employ these methods of destruction, it is only a question of time when the dogs will get inside ...*

The lesson here, if we don't forget or ignore it, is clear: predator-proof fences only provide an opportunity and time for other action. Whether we use that time profitably is up to us.

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