

QUEENSLAND'S NEWEST INVASION: FERAL URBAN DEER

¹MARIAMA MATTILA AND ²SHELLEY BURGIN

¹ Faculty of Mathematics and Natural Sciences, Department of Biology,
Section of Ecology, University of Turku, Finland, FI-20014

² Institute of Sustainable Development and Architecture, Bond University,
Gold Coast, Australia, 4229

Abstract Deer are not endemic to Australia and, until recent decades, were not a major component of the landscape. With the collapse of deer farming in the 1990s, subsequent deliberate release and translocation of deer from defunct farms, feral deer numbers are increasing dramatically. Historically, only urban centres associated with Royal National Park (New South Wales) have had to contend with urban feral populations. Recently deer have begun to encroach into other urban areas, including South Eastern Queensland. We interviewed stakeholders associated with urban deer management and concluded that awareness was poor there was a need to strategically deal with this emerging issue.

Key words Stakeholder knowledge, introduced deer.

INTRODUCTION

Deer are not endemic to Australia. They were first introduced by acclimatisation societies in the 18th century (Groves and Bishop, 1989) for game hunting and aesthetics. The practice of release continued into 20th century (Firth, 1973). Of the 18 species introduced, six (*Axis axis chital*, *Axis porcinus*, hog, *Cervus elaphus*, red, *Cervus timoriensis*, rusa, *Rusa unicolor*, sambar, and *Dama dama*, fellow) formed feral populations (Strahan, 1995). Four (fellow, red, rusa, chital) have established in Queensland (DAFF, 2012). Moriarty (2004a) reported that of the 200,000 feral deer in Australia, 14 herds (two in Queensland), some with in excess of 10,000 deer emerged from these releases. They represent 87% of the Australia's feral deer.

Deer have been farmed in Australia since 1803 but until recent decades all feral deer herds originated from acclimatisation society releases. The deer industry, based on captive animals, was modest until the 1970s/1980s when its popularity exploded with a 'massive' increase in farmed stock. However, the boom was short-lived. The industry collapsed in the 1990s due largely to low commodity prices (MacDonald, 1995; Moriarty, 2004 a, b). Although always a trickle of escapes, the collapse of deer farming resulted in the release of many deer on site. These releases have added 10 herds in Queensland, typically of < 500 individuals.

Although illegal throughout Australia, deer from defunct farms are translocated into bushland for game hunting. Many of these joined existing herds (descendants of earlier releases) or formed the basis of new ones (Low, 1999; Moriarty, 2004a). This has added an additional 20 feral herds in Queensland, typically of < 500 individuals.

Feral deer have formed 96 herds in New South Wales (NSW), compared to 32 in Queensland, and are a recognised issue in urban areas abutting Royal National Park (e.g., Southern Sydney, Moriarty, 2004a; Wollongong, WCC, 2013). In contrast, urban feral deer is just becoming an urban issue. This

is because there are expanding herds throughout much of the State (Moriarty, 2004a), many of which have the potential to encroach into urban centres (Moriarty, 2004a). For example, recently thousands of feral deer have invaded Brisbane suburbs (McCathy, 2013). In parallel, with the expansion of herds (numbers and distribution), the human urban population continues to increase and expand its footprint (ABS, 2013). These parallel expansions will inevitably increasingly overlap.

Unlike the United States of America (Conover et al., 1995; Cornicelli et al., 1996), urban deer are not on the ‘radar’ as an issue in Queensland. However, based on the current indications (McCathy, 2013) and the known pattern of increase of deer (Jesser, 2005) and humans (ABS, 2013), we consider that strategically the development of policy/legislative instruments is required before the agenda is driven by necessity. A first step is to assess current awareness of urban feral deer. This is the aim of our paper. We report here on interviews with the most influential Queensland stakeholders, and compare the results with NSW counterparts, the only Australian State with an acknowledged urban feral deer problem.

MATERIALS AND METHODS

Those interviewed to determine awareness of urban feral deer were not chosen randomly because even among our academic environmental colleagues the issue had not surfaced. We therefore deliberately focused on individuals most likely to be appointed to a government advisory group to develop policy. Omission of any stakeholder group was because there was no representative identifiable. Telephone interviews were conducted in late March/early April, 2013. Respondents encompassed State and local governments, the community (environmental activists) and deer researchers.

RESULTS AND DISCUSSION

Themes explored, and the major points distilled from the respondents are listed in Table 1. Respondents considered community views of deer were polarised. Estimates of 20–50% were considered to view deer positively, the rest of the population considered negative. One researcher only commented on deer as an ‘important hunting resource’. The only previous Queensland survey focused on rural producers - 50% had a positive attitude to deer on their land, 64% a saw them as a hunting resource, 39% a pest (Finch and Baxter, 2007). These data supported the view of polarisation.

Table 1. Question themes and response of representatives from governments (State (1) and local (2)), community (3) and researchers (4) from the Sydney (New South Wales) and Brisbane (Queensland), the areas of largest human population in areas of expanding deer populations

	General attitude (<i>Brisbane</i>)	General attitude (<i>Sydney</i>)
1.	Polarised (negative/‘Bambi factor’, unaffected – ambivalent)	Polarised (80% negative/20% positive)
2.	Polarised (50/50 - love/hate)	Not aware of any issue
3.	Asthetically attractive animal, not a pest, not feral but native	Polarised (Majority negative vs minority positive)
4.	Polarized (50/50 - love/hate), hate due to vehicle collisions	Hunting resource, large populations in Royal National Park

	Population changes (<i>Brisbane</i>)	Population changes (<i>Sydney</i>)
1.	Increasing	Increasing (Northern NSW)
2.	Increasing (estimation problems)	'No idea'
3.	No awareness, rare in urban areas, seldom in media	Increasing in numbers
4.	Increasing (especially number of males)	Increasing in numbers and species
	Deer impacts (<i>Brisbane</i>)	
1.	Damages to gardens, lawns, fruit trees, farm property damages, grazing turf, sorghum	
2.	Overgrazing, damage native vegetation, transmit diseases browse ornamentals, cause soil erosion, water pollution, vehicle collisions	
3.	No general knowledge of deer in urban areas, but damage private properties and vehicle collisions (need warning signs on roads)	
4.	Vehicle collisions (30 in 3 years), grazing/browsing, preventing spread of native species	
	Deer impacts (<i>Sydney</i>)	
1.	Vehicle collisions (2 lethal), disturbance in urban areas, damage in Royal National Park	
2.	No awareness of damage on private properties in urban areas	
3.	Agricultural and native vegetation damages, vehicle collisions, rare private property damage	
4.	Major issue is deer-vehicle collisions	

Most considered deer numbers were increasing, although a minority had 'no idea'. The latter comment was justified with 'deer are rarely observed in urban areas and seldom in the media'. Several of the Queensland-based respondents spoke of issues in Northern NSW but not South Eastern Queensland, implying they did not consider deer an issue in their jurisdiction. With one exception deer-vehicle collision was identified as an issue, although whether perceived as an urban issue was unclear because, despite the interviewer's focus on urban deer, respondents tended to concentrate on non-urban issues, such as competition with cattle, grazing on native vegetation, damage to national parks, preventing spread of native species, although damage to urban gardens was discussed. Another indication that respondents often failed to focus on urban deer, were the offering of views on hunting, landholders on large properties, although others also acknowledged that shooting was inappropriate or difficult in urban areas. There was, comment that local governments carried out control; for example, by trapping in urban areas. Several demonstrated a lack of knowledge of urban deer: not aware of any issue, no knowledge of urban deer. However, despite a claim that deer were seldom a media topic, one respondent reported that, in Queensland, culls after major fires (2001) failed due to a media campaign. (*Table 2.*)

The answers to questions directed at urban deer management were also confused with management in rural areas: landholders of large properties, need for different treatment of long-established and farm escapes; difficulties of finding sufficient recreational shooters. One respondent had no idea how to manage urban populations, another considered the solution was trapping, which occurs on request in much of urban SE Queensland, although it was stated that trapping and relocation had no effect on the overall population's size. Indeed, most respondents that explicitly referenced urban deer

management included (or implied) the need for increased shooting/trapping to reduce pest numbers. One respondent identified the need to identify strategies to reduce urban populations. To deter deer from urban gardens, repellents applied to plants preferred by deer was suggested. Other suggestions included householders keeping gardens garbage free, and although acknowledged as costly, exclusion fences were suggested as was use of 'urban bow hunting' instead of guns.

Table 2. (Continuation) Question themes and response of representatives from governments (State (1) and local (2)), community (3) and researchers (4) from the Sydney (New South Wales) and Brisbane (Queensland), the areas of largest human population in areas of expanding deer populations

	Management (<i>Brisbane</i>)
1.	Declared pest species (landholders of large properties control deer population densities), in urban areas difficult to manage (local governments carry out control – trapping)
2.	Joint planning/managing of urban/suburban landscapes. Who is responsible for deer management? Lethal control: trapping, shooting (trapping is successful in Gold Coast). Relocation: no effect on population size (animal welfare), exclosures: fence building too expensive
3.	No understanding on how to manage urban populations, and it is costly to recruit hunters
4.	Shooting (impossible in urban areas), trapping (in Brisbane City/Moreton Bay local governments trap deer on request)
	Management (<i>Sydney</i>)
1.	Long-established herds and farm escapes perceive differently (impact monitoring). Population reduction strategies in urban areas, residents must keep areas garbage free, fencing in high density urban areas. Increase hunter numbers. Urban bow hunting?
2.	Interest conflict - community positive attitude, state government desire removal of deer, local government not aware of current situation. Deer much lower priority than other feral animals
3.	Conflict among stakeholders (e.g., after 2001 fire, attempts to reduce deer numbers failed due to media campaign against reduction. Drivers should be aware they are in deer territory. Difficult to find enough recreational shooters.
4.	Trapping/shooting, recreational hunting licenses increase, use repellents (e.g., chilli on preferred forage in urban gardens)

It was acknowledged that urban deer management was problematic. Development of joint planning/urban management instruments were suggested although it was acknowledged that it would be a challenge to name a single stakeholder responsible since common decisions were required multiple stakeholders. A Queensland-based respondent suggested that due to the difficulty of managing

urban deer, local government currently 'carried out control'. Presumably this comment referred to the trapping on request by local governments including Brisbane City, Moreton Bay and Gold Coast, (much of SE Queensland urban area). Respondents also identified the need to raise awareness, for example, educating licensed drivers with warning signs in deer-prone areas. To achieve, just this one outcome, requires jurisdiction beyond local government, and thus supports the suggestion that urban deer management individual local governments do not have the resources/responsibilities to deal with issues of encroachment into urban areas.

CONCLUSIONS

We have identified that there is general acceptance that deer are increasingly in numbers. However, even though we deliberately sought stakeholders who definitely had deer encroachment into their urban jurisdictions, we considered that the level of awareness of the issues of urban deer was poor. For example, there was constant confusion between urban and rural issues. Apart from response to complaints, and the subsequent trapping and removal, there appears to be no clear management strategies in place. One respondent admitted that the issues were considered less important than other feral species problems. However, there is no doubt that deer are increasingly encroaching on urban areas (e.g., Melbourne, Webb, 2013; Wollongong, WCC, 2013; Brisbane, McCarthy, 2013), and with 94% of Queensland herds having developed in the last 20 years, it is inevitable that the issues of urban deer will increase. As Warren (1997) predicted for the US, we suggest that management of urban deer will become one of the 'greatest challenges' in Queensland, and 'undeniably' the most complicated due to the polarisation of views associated with deer.

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