

# The status and management of wild deer in Australia

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## ABSTRACT

With their introduction into Australia beginning in the early nineteenth century deer have joined a long list of introduced species, many of which have become significant pests. Unlike rabbits, feral pigs, foxes and others, deer have not been considered to have had significant adverse environmental or socio-economic impacts in Australia until quite recently. There are long-standing wild populations in several states that have been managed for many years as a valuable resource for hunting rather than as a pest. In very recent times a perception has developed that wild deer numbers are increasing in Australia, with a wider distribution. The basis for these concerns will be examined, with a review of wild deer management in Australia.

## Introduction

There is an increasing focus on the need for effective management of wild deer in Australia, with concerns being expressed in some quarters about their status as an emerging pest animal. In looking at the origins of these populations, the role of the acclimatisation schemes of the nineteenth century in introducing deer to Australia is well known, and reviewed very ably by Bentley (1998). This activity was a response to the fact that there were no native cervids to be found on the continent, just as there were no endemic primates, felids, bears, elephants or rhinoceros. Indeed the fauna of the Australian region is totally and dramatically different from that of Asia, with the biota of the two regions separated by the Wallace Line, which at one point between Bali and Lombok runs through a strait only 25 kilometres across. It was realisation of this difference that was one of the drivers for Alfred Wallace in developing his theories on biogeography and evolution in the 1880s (van Oosterzee 1997). In any event, the absence of endemic deer species resulted in early and persistent attempts after European settlement in 1788 to introduce these animals into Australia. The first introduction is attributed to Surgeon John Harris, who imported chital deer (*Axis axis*) from India in 1803. By 1809 the herd had grown to some 400 animals on his property near Bathurst. It is an interesting historical footnote that these deer were apparently able to escape through broken fences, thus creating what was probably Australia's first wild deer herd (Bentley 1998).

In his definitive work on the origins of the wild deer herds now found in Australia, Bentley (1998) indicates that at least 25 species or subspecies of deer were brought to this country, largely during the nineteenth century. Today only six species survive in the wild, these being sambar deer (*Cervus unicolor*), red deer (*C. elaphus*), rusa deer (*C. timorensis*), European fallow deer (*Dama dama*), chital deer (*A. axis*) and hog deer (*A. porcinus*) (Strahan 1995). The origins and distribution of wild deer in Australia have been reviewed more recently by Moriarty (2004), with a more intensive survey of land managers conducted in New South Wales and the Australian Capital Territory by West

and Saunders (2003). The former estimated that there are about 200,000 wild deer in 218 herds in Australia, with 7% of these herds originating from acclimatisation society releases, 35% from deer farm escapes/releases and 58% from transplantations (deliberate releases). Moriarty (2004) further estimated that the acclimatisation societies were responsible for introducing the forbears of about 85% of the current wild deer in Australia, with 6% originating from deer farms and 9% from deliberate releases. West and Saunders (2003) found that the six deer species collectively inhabit 5% of NSW and the ACT, compared to 2% in an earlier survey in 1996. Even earlier reports by Wilson *et al.* (1992) and Murray and Snowdon (1976) suggested that wild deer inhabited smaller areas of NSW than those observed in 1996. Despite this apparent increase in the size of the wild deer population, West and Saunders (2003) noted that in contrast to the many other introduced species in NSW, a majority of respondents to their survey did not perceive wild deer to be overly abundant. A majority (41%) did indicate that there had been a moderate to high increase in the distribution and abundance of wild deer, and attributed increased illegal and deliberate releases or escapes as the main reason for this increase. Hard evidence to support this belief was not provided, but given that they were found to inhabit only 5% of the state, deer are still much less widespread than animals like feral pigs and foxes.

It is a belief in some quarters of an apparent increase in both the number and distribution of wild deer in Australia that has resulted in the current discussion about the potentially adverse environmental and socio-economic impacts of wild deer, as opposed to their value as game animals. There is certainly a significant diversity of opinion on the true status of wild deer, and an intense debate about how they should be managed, involving conservation and animal health authorities, land owners, hunters, animal rights groups, the animal welfare lobby and the community at large. There is now a need to resolve these difficulties, and to determine how best to manage Australia's wild deer in the time ahead.

Progress will only be made in this regard with better knowledge of the ecology and actual impacts of Australia's wild deer herds, whether these impacts are in protected areas, on agricultural and horticultural enterprises, as a traffic hazard and as a possible complicating factor during exotic disease outbreaks. This is not to suggest that no action should be taken until all the issues are resolved, but the adoption of rational and cost-effective management strategies for wild deer in Australia is constrained to a large extent by the lack of scientific data on the actual rather than the perceived impacts of all of the deer species across their present range.

## Options for management

There are relatively few options currently available for the management of wild deer in Australia, complicated not only by technological constraints but also by the elusive nature of the animals, their scattered distribution and the rugged terrain that many populations inhabit.

The options for controlling a wild deer population are as follows:

- a. Shooting from the ground or from helicopters,
- b. Trapping and relocating,
- c. Poisoning,
- d. Fertility control.

Ground shooting is generally more appropriate than aerial shooting, given the nature of the terrain and vegetation where most deer are found. Skilled hunters are required to deal with these elusive animals, and in protected areas this will often be the preferred option for removing a new wild deer population. Trapping has been successful in some situations, but there will always be animals that are trap-shy and shooting is usually required as well. A successful fallow deer trap was described by English (1979), with a similar approach being used to capture rusa deer in the Royal National Park (Shephard 2002).

The poisoning of deer is not sanctioned in Australia due to animal welfare and non-target species concerns with the use of toxins like 1080. The fertility control option is promoted heavily by animal rights groups and others who seek a non-lethal solution for the control of wild deer. There is no such technology available that could be applied to Australia's wild deer, despite considerable research in this area. Current systems require that the animals be injected or implanted with the contraceptive agent, and this is simply not feasible with these wild populations.

The current management of wild deer in Australia is restricted to giving them partial protection as a game animal in Tasmania and Victoria, with the adoption of restricted annual open hunting seasons, while in all other states and territories they are considered to be introduced non-indigenous species that may be controlled as pest animals. Until quite recently very little concern has been expressed about their pest status, and there has been little systematic management of any description outside Tasmania and Victoria. A recent review by the Bureau of Rural Sciences (BRS) on the management of pest animals

in Australia did not have deer listed as having even minor pest status, but did acknowledge their value as a game animal (Hart 2002).

A new development in NSW has been the bringing down of the *Game and Feral Animal Control Act 2002*, administered by the Game Council of NSW. Under this new Act, deer have been given game status, as have a number of species of introduced birds. The Game Council is required to direct a significant proportion of its revenue towards research on biodiversity conservation, and habitat restoration. As a consequence of this legislation, deer can now only be hunted by holders of a Game Council permit, whether on public or private land. The effects of this new status for deer in NSW are yet to be determined, particularly in the face of the NSW Scientific Committee listing all six deer species as a Key Threatening Process in NSW. This may result in the putting in place a Threat Abatement Plan (TAP), and it is far from clear how this process will be affected by the status under legislation of the same animals as game species. This is typical of the dilemma confronting those responsible for developing rational management strategies for wild deer in Australia.

## Ecology of wild deer

Any management plan for wild deer in Australia must start with an understanding of their ecology, with environmental conditions here often being very different from those in the regions from which they originated. It is no coincidence that only six of the 25 or so deer species that were brought to this country have survived in the wild, with a belief that only sambar and possibly rusa have shown an ability to readily extend their range away from the crops and pastures of man (Bentley 1998). In seeking the most effective methods for the management of Australia's wild deer herds, these elusive and cryptic animals pose significant challenges for land owners and those concerned with the management of protected areas. They often live in rugged inaccessible terrain, which makes aerial and ground shooting quite difficult. This is precisely why they are viewed as a challenge by deer hunters. West and Saunders (2002) believe that the ineffectiveness of the available control techniques may be partly the reason why the control effort has not increased over recent years, to match a perceived increase in deer abundance and associated impacts. This is further complicated by the varying community attitudes and values attributed to deer, from their being considered to be a premier game animal to their being seen as an introduced pest species, or as an alternative farm species.

## Adverse impacts

There have been wild deer in Australia since the early nineteenth century, but they are at low densities in most areas (see accounts of the various deer species in Strahan 1995). It is therefore not surprising that there have been relatively few specific studies on the nature and extent of their social, economic and environmental impacts. The available pool of funding has clearly been directed to research on more important pest species. Furthermore, Murray and Snowden (1976) concluded that wild deer

would pose a relatively small risk in the event of an exotic disease outbreak, compared with pest species like feral pigs and goats. This is still the view expressed in AUSVETPLAN, Australia's contingency plan for dealing with an exotic disease, with the distribution of wild deer seen as limited to small, localised populations that are considered unlikely to play an important role in an outbreak of a disease like Foot and Mouth disease (FMD) (AUSVETPLAN Wild Animal Response Strategy 2005). The potential for wild deer to be involved in any major way in the transmission of other diseases has not been raised as a major concern by Australian animal health authorities. There might be concerns if Chronic Wasting Disease (CWD) were to enter this country, but this has not happened to date.

Nonetheless, there is a perception that wild deer constitute a new and emerging pest problem (Moriarty 2004), but the hard evidence to support such concerns must be examined. A significant proportion of the research that has been carried out with wild deer in Australia has been with Javan rusa deer in NSW, most recently by Moriarty (2005). The past and present management of this population is an example of the challenges that arise in seeking to understand the impacts that these animals might or might not have, with a view to the development of sound management strategies that the community will accept.

### Rusa deer in Royal National Park NSW

The Javan rusa deer (*C. t. rusa*) in the Royal National Park (RNP) south of Sydney have long been the centre of controversy. Present in the Park since 1907, these deer have been viewed variously as interesting, charismatic animals, as introduced pests, or as a source of breeding stock for deer farms – several hundred were trapped for this purpose starting in the 1970s (Bentley 1998). The population in RNP has apparently fluctuated in size due to factors such as bushfires (most recently in 1994 and 2002), and these deer are now also to be found in the coastal escarpment country well south of RNP. They range across all public and private land tenures.

A study in RNP by Hamilton (1981) found that rusa deer could alter the structure, species abundance and composition of grassland communities, but he concluded that the influence of rusa deer on the regeneration of bush appeared to be small. He also examined the dietary overlap between rusa deer and swamp wallabies (*Wallabia bicolor*), and found that they ate substantially different foods. Overlap was only 13% in summer, increasing to 54% in winter when there was less plant growth. Hamilton (1981) concluded that there was little evidence of any major impact of the deer on native plants and animals, with some apparent benefits in their utilisation of invasive plant species like blackberry (*Rubus fruticosus*).

In the two decades after Hamilton's study, the rusa deer in RNP continued to attract community interest, with some opposition to a series of unsuccessful attempts to reduce the number of deer in the Park. A variety of methods were used, including the use of baited enclosure traps. As well as their potential environmental impacts (trampling

and overgrazing, ring barking, antler rubbing, dispersal of weeds, creation of trails, exposing soils to erosion and compaction) the deer were also causing concern as a potential traffic hazard and as a significant nuisance in urban gardens adjacent to RNP. A further concern was the regular poaching of deer in RNP by illegal hunters, with possible effects on public safety. As a consequence, the NSW National Parks and Wildlife Service (NPWS) developed a Deer Management Strategy in 1997, which was done with the involvement of the community and a number of stakeholders in seeking the best way to manage the RNP deer population. To assist with this process, an ecological study was conducted between 1999 and 2002 by Moriarty (2005), focussing on the population dynamics and impacts of rusa deer in the Park. He found that grazing and trampling by rusa deer could alter the composition and structure of a number of Endangered Plant Communities, including the Sutherland Shire Littoral Rainforest. Eight threatened species of plants were being eaten by the deer. The deer population in RNP was estimated to be about 3000 animals.

The RNP Rusa Deer Working Party was established by NPWS in 2000, with the task of developing a Deer Management Plan. This was achieved using a very comprehensive process of community consultation and public education, which resulted in a plan to reduce deer numbers in the Park by ground shooting (Anon 2002). The plan has now run for three years, with the target of reducing the number of deer in RNP to a population of no more than 1000. With only a little over 500 deer removed by ground shooting, the effectiveness of this plan is questionable, just as it must be said that the figure of 1000 deer was chosen with no scientific data to support such a target. This illustrates the current difficulty referred to by Hart (2002) in seeking to understand the nature and extent of the actual environmental impacts of herbivores, and in relating population densities to the level of these impacts. This certainly applies to all wild deer populations in Australia, and is arguably the most significant obstacle to the development of effective management plans. The involvement of Rural Lands Protection Board staff in this ground shooting program in RNP highlights the wider role of the Boards in NSW in the control of vertebrate pests.

### Deer as game animals

From their earliest introduction to Australia, deer have been prized as a trophy animal, and as a source of a game meat. Sambar deer are generally acknowledged as the major game species in Australia, with an estimate of at least 17,500 recreational deer hunters in Australia (Cause 1990). O'Brien (1990) made a case for the pragmatic reassessment of exotic species management in Australia, including recognition of values for recreational hunting and game meat production. This has been taken up in Tasmania and Victoria, where game management units have been established within the conservation departments of those states. There is certainly a longer tradition of deer hunting in Victoria and Tasmania than in other states and territories in Australia. The intensive management of deer for hunting in both states produces

very significant income for land holders, for communities and for the conservation of biodiversity. In these programs, deer are seen as a resource rather than as a liability and they are managed accordingly. This applies in Victoria not only to sambar deer but also to hog deer, which are found in a population that constitutes arguably the most significant genetic resource for this species outside the Indian subcontinent (Mayze and Moore 1990). This population has been managed and monitored quite intensively for many years, which has included disease surveillance and population control by the use of balloted hunts.

The potential value of deer as game animals has been recognised for many years, just as has the positive role of ethical hunters in the conservation of biodiversity. An often quoted example is the regulated use of hunters to remove feral goats and foxes as an integral part of "Operation Bounceback" in the Flinders Ranges of South Australia. A new role for hunters has arisen in the national disease surveillance system, with an awareness that hunters may be amongst the first to encounter an exotic disease in remote areas. Future hunter education courses will include information on the recognition of unusual signs in animals in the field and what to do when they are encountered.

## Animal welfare

The humaneness or otherwise of all pest animal control techniques is under constant public scrutiny. It must be acknowledged that there is community concern about some of the methods used to control pest animals in Australia, and this includes hunting. In the case of hunting, public perception is further complicated by the increasing level of restriction being placed on the ownership and use of firearms in Australia, coupled with the negative stereotypes often associated with hunters. This can only be countered by effective public education on the conservation and economic benefits of well regulated hunting, and by hunters consistently adopting high ethical standards in all their activities. To assist in this process, the Game Council of NSW has developed a Code of Practice for hunters, with a number of mandatory provisions. These relate particularly to animal welfare, ethical behaviour and respect for land owners and the environment.

## Conclusion

The wild deer of Australia are now attracting more attention than they have done in 200 years. The surveys of West and Saunders (2003) and Moriarty (2004) raise concerns that wild deer might become a much bigger problem in the future if nothing is done about them. The simple fact is that almost nothing is known of the actual impacts of wild deer in Australia. West and Saunders (2003) found that wild deer still only inhabit about 5% of NSW, while Moriarty (2004) calculated that 85% of the present wild deer population was derived from animals released by Acclimatisation Societies in the nineteenth century. These long-standing populations of wild deer have been viewed much more as a resource than as a problem for many years now. This is not to say that local deer problems cannot occur, and in the case of protected areas, all reasonable steps should be taken to prevent the development of new populations of wild deer. This could well include the use of accredited hunters in selected areas. However, until the inconsistencies in the legislation such as they occur in NSW, are resolved, and until the pest versus resource issue is also resolved to the satisfaction of the many and varied stakeholders, the present dilemma will continue. What is quite clear is that any consideration of the situation with wild deer in Australia raises little doubt that the debate about the values that should be attributed to these animals in this country will continue for many years to come. The development of effective management strategies for wild deer in Australia should occur in the context of what has been an often indifferent outcome with control programs for a number of other pest species, with the opportunity to take a more strategic approach rather than merely a reactive one. Furthermore, there will certainly be a continued search for new and more effective control options for wild deer when they are causing problems, but it should be emphasised that any such new technologies will not in themselves be the solution. They will be tools for use when the question of the nature and extent of the adverse impacts of wild deer is answered, and there is agreement that control is necessary - whether this is occurring in protected areas, agricultural lands, horticultural enterprises or on roads. There is clearly an urgent need for research to clarify this situation with all six deer species, to ensure that control programs are based on good data and not on anecdotal opinions.

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