Problems with Feral Animal Management in New South Wales

Submission to the
NSW Natural Resources Commission
review of pest management

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The submitters

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The **Nature Conservation Council of NSW** is the peak environment organisation for New South Wales, representing 150 member societies across the state. Together we are committed to protecting and conserving the wildlife, landscapes and natural resources of NSW. Email ncc@nature.org.au.

BirdLife Australia is Australia's largest organisation dedicated to the protection of birds and their habitat. Email: info@birdlife.org.au.

Introduction

This is a submission from the Invasive Species Council, BirdLife Australia and the Nature Conservation Council of NSW, collectively which are committed to the conservation of NSW's highly diverse biota, and protection and restoration of its natural habitats. It is in response to the Issues Paper released by the Natural Resources Commission to improve feral animal management in NSW, requested by the Minister for Primary Industries.

We welcome the interest by the Natural Resources Commission. Feral animals are a major concern to the conservation community, as the main cause of mammal extinctions and mammal endangerment in Australia. *The Action Plan for Australian Mammals 2012*, written by three leading mammologists and sponsored by the Australian environment department, rates feral cats the number one problem for Australia's threatened mammals, with red foxes in third place.[1] . (Inappropriate fire regimes come second and habitat loss fourth.). Cats and foxes were identified as the main cause of extinction of 18 species, and a major contributing factor to another three extinctions. Other feral animals that seriously threaten Australia's vulnerable and endangered animals and plants include deer, rabbits, black rats, mosquitofish, carp, wolf snakes and cane toads. The native species at threat from their impacts include frogs, birds, invertebrates and plants. The recovery plan for shiny nematolepis, to give one example of a vulnerable plant, lists sambar deer as the greatest threat to the species' survival.[2]

Feral animal control is difficult and expensive, and funding is often not allocated in the most prudent ways. The public may expect the worst pests today to be targeted, when a focus instead on new and emerging pests often delivers the best returns on investment and makes it possible to significantly address the pests that are likely to be of concern to the public in decades to come. Where funding for control is episodic, in response to fluctuating budgets, it can be ineffectual by not maintaining the sustained control needed to reduce populations. We live at a time when governments argue they should reduce spending, but budget cuts to pest control seldom serve the public interest. Any government that underspends today is merely creating a greater cost for the future, as pest populations that could have been reduced for a moderate budget today escalate in scale to become more expensive problems for the future.

It is important that pest authorities in NSW and throughout Australia have one eye on the future rather than fixing all their attention on a set list of known pests. A wide range of species could establish in NSW in the future. There are reasons to be concerned, for example, about black-spined toads, smooth newts, barbary doves, guinea fowl and new aquarium fish, based upon recent Australian evidence.

National intergovernmental processes on biosecurity and invasive species mainly involve agricultural ministers and agriculture departments with formal channels of input from industry stakeholders. The environmental impacts of pests tend to be accorded a lower priority than agricultural impacts through these processes and are sometimes neglected altogether.

The submission does not address all feral animal issues, but instead focuses on areas where we believe improvements are needed. A list of recommendations is provided first, followed by details about each recommendation. These are grouped into recommendations about specific species or groups of species, followed by general policy recommendations.

[1] Woinarski, Burbidge and Harrison (2014)
[2] https://www.environment.gov.au/resource/national-recovery-plan-shiny-nematolepis-nematolepis-wilsonii

Summary of recommendations

Recommendations about species

1. In national parks with feral horse problems reinstate aerial culling and on site euthanasia to avert future management disasters.
2. Develop a goat policy to ensure that a growing goat industry does not result in land degradation caused by increasing numbers of feral goats.
3. a. Declare deer pests, remove any limitations on their harvest so that they can be more easily controlled and implement a statewide containment program.

   b. Review regulations for deer farming to reduce the probability of escapes

   c. Develop a better deer control toolkit incorporating a wider range of control techniques.
4. Reduce government investment in wild dog control.
5. Remove exotic game birds from the *Game and Feral Animal Control Act 2002* and prohibit their release into wild or semi-wild situations.
6. Investigate the status of barbary and laughing doves in captivity in NSW to see if a policy is warranted to reduce the risk of feral populations forming.
7. Introduce a phase-out of Indian ringneck parrots, allowing pet owners to keep the ring-necks they have, but not to breed or replace them, leading to a prohibition on this species when no captive birds remain.
8. Introduce a legislative requirement that shops selling aquarium and pond fish display a sign warning against disposal of fish, snails and plants in waterways and suggesting safe alternatives.
9. Develop a red-eared slider policy to ensure there is no further spread, to review the prospects of eradication and provide more public information about the threats they pose.
10. Build a barrier according to the guidelines of Knight (2010) to prevent redfin perch colonising the Kedumba River and harming endangered Macquarie perch.

General recommendations

11. Provide a greater leadership role in national policy, for example by accepting the recommendations to the 2015 Senate Inquiry into environmental biosecurity, supporting the proposal to establish Environment Health Australia, improving the National Environmental Biosecurity Response Agreement, improving transparency and involvement of the environmental sector in biosecurity decision-making, and closing off pathways for high risk environmental invasive species.
12. Develop a foresighting unit to monitor pest trends and better predict future problems.
13. Reform funding processes so that long-term funding of pest control is achieved, and funding achieves public good rather than private gain.
14. Establish a pest animal advisory committee to review the operation of current pest management activities, identify gaps and opportunities, respond early to future risks identified during foresighting and improve engagement and cooperation.

15. Revise classifications under the Non-indigenous Animals Regulation 2012 in Schedule 1 to align with the risk assessments conducted for the Vertebrate Pests Committee.
16. Fund social research into the behaviours of those who deliberately or unwittingly spread pests, to guide policy responses.
17. NSW DPI to acknowledge growing public concerns about animal welfare by becoming more pro-active in its operations and the messaging it undertakes.
18. Update NSW DPI 2009 website maps of feral animal distributions.
19. Reject any calls to introduce bounties.
20. Be wary of proposals to reduce feral animal numbers by creating markets for their products.

Recommendations about species

1. Cull feral horses

Feral horse policy in NSW appears to have been compromised by capitulation to brumby lovers, resulting in policy settings that will bring grief to the government in future, cause immense suffering to horses, generate welfare concerns and create very damaging environmental outcomes.

Kosciuszko National Park epitomises the problems. In an ABC news item published online on 23 May 2015, Tom Bagnat from the NSW National Parks and Wildlife Service is quoted saying that in Kosciuszko National Park, existing control measures – which consist of trapping and re-homing – are 'not keeping pace with the growth in the population'.[3]

Bagnat is reported saying that in 2009 the park held about 4,200 horses, while a 2014 survey indicated the number had reached about 6,000 – after rangers had removed 2,000 horses in the intervening years. According to the Kosciuszko National Park Horse Management Plan, the horse population in 2003 was only 1700.[4]

NSW has ruled out culling, following opposition from brumby lovers, who want horses running free in national parks, and horses treated humanely. There is some acceptance from brumby lovers that horse numbers in national parks are too high, justifying some horse removal, but they hold misconceptions about what methods are humane.

Bagnat is quoted saying that 2,600 horses have been removed from Kosciuszko National Park since 2003, and despite popular belief, most were subsequently killed: 'We've re-homed about 30 per cent, the rest of them end up being transported and taken to knackeries.'

Bagnat criticised the stress horses endure when they are trapped. It is more humane to shoot horses from helicopters or on the ground, or to euthanase them in traps, than to trap and transport them to a knackery to be killed. Both alternatives are far quicker and cheaper as well as more humane but are not allowed. In a submission to the Victorian Government, the RSPCA endorsed shooting as a method of control:

> 'We believe that the biggest issue in feral horse management is how stressed the horse become during control activities. In the absence of humane, effective, non-lethal alternatives, shooting, in some circumstances and when done properly, is generally the least stressful method of control. If lethal control by shooting is proven to be necessary, shooting should be carried out in situ and effective protocols must be employed. We support the stance on shooting from Sharp and Saunders' Model code of practise for the humane control of feral horses and the associated standard operating procedure for the ground and aerial shooting of feral horses… aerial shooting in particular, when performed under strict protocols by highly competent operators, can be the most humane and effective option in situations where the country is rugged and large scale control is required. Concerns that lethal control may be

[3] http://www.abc.net.au/news/2015-05-23/cull-being-considered-to-combat-growing-number-of-brumbies/6490458

[4] NSW National Parks and Wildlife Service (2008) *Kosciuszko National Park Horse Management Plan*. Department of Environment and Climate Change (NSW)

publically or politically sensitive or relatively expensive should not override concerns for the horses' welfare.'[5]

Because the number of horses that can be trapped is so small, the feral population keeps growing, portending massive problems in the future, including widespread degradation of habitats, traffic accidents, horse starvation from depletion of pastures, accusations of park mismanagement, and a horse population so large that mass culls will become necessary, resulting in negative publicity and accusations about a problem that was left to get out of control.

A recent development during the 2015 winter was the release of about one quarter of the trapped horses[6], mostly because they were pregnant mares that pro-horse lobbyists said should not, for humane reasons, be transported. Population reductions can hardly be achieved under such circumstances, given the limited number of horses that can be trapped.

Horse carcasses can become a problem when lethal methods are used. Their disposal may greatly increase the costs of control and be impractical in inaccessible sites. While a pulse of horse carcasses may not lead to a permanent increase of feral carnivores, as horse numbers increase the number of horse carcasses would be expected to increase, even if the goal is merely to stabilise the population at a high level.

The current policy is ostensibly about treating horses humanely, but it is not humane for those horses that are trapped and transported to knackeries, nor will it look humane in the future when very large numbers of horses will need to be culled because the population was allowed to grow.

In adjoining Namadgi National Park, in the ACT, horses are culled, and the horse problem is negligible. Victoria does, however, have horse problems and control actions in NSW need to be accompanied by similar actions over the border in Victoria.

In NSW, feral horse populations are expanding, not only in the Australian Alps, but in Burragorang Valley/Warragamba, Guy Fawkes and some parts of the north east, requiring a response in multiple locations.

The NSW DPI has mapped areas with feral horses and their densities.[7] The problem today is largely on national parks. If feral horse populations are allowed to expand, the problem will increasingly be one facing private land managers and all public land managers.

The state should reform its policy to embrace aerial culling and on site euthanasia. It can be assured of public support from a wide range of organisations and potentially the RSPCA. To keep to the current policy is to court disaster in future.

Recommendation 1: In national parks with feral horse problems reinstate aerial culling and on site euthanasia to avert future management disasters.

[5] Victorian Alps Wild Horse Management Plan Public Submissions. Submission No 67, RSPCA (Victoria). 22 July 2013

[6] Kosciuszko National Park Wild Horse Management Plan Review Update for Stakeholders, NSW National Parks and Wildlife Service. 3 Sep 2015

[7] http://www.dpi.nsw.gov.au/__data/assets/pdf_file/0019/423352/feral-horses.pdf

2. Develop a goat policy

Feral goats are increasing in numbers in western NSW.[8] They pose a conundrum for the state because they are damaging to landscapes while also providing income.[9] The Meat and Livestock Association is promoting goat farming, and between 2003 and 2014 goat slaughter in Australia doubled to 2.129 million.[10] According to the MLA, 'Around 90% of Australia's meat production is derived from rangeland [wild] goats, the majority of which are mustered from semi-arid western regions of the eastern states.'

Goat harvesting is often seen as a way of reducing feral goat impacts, but it cannot be relied upon to do so.[11] Indeed, there is the potential for mismanagement by some landholders to result in serious land degradation. This could occur where landholders decide to stock fenced goats, but because of failed expectations or neglect the animals form feral herds that contribute to land degradation. Degradation could also arise if landholders with semi arid properties damaged by overgrazing opt for a short-sighted strategy of running goats in high numbers without consequence for the erosion and other harm this causes. The large numbers of goats evident on some properties in western NSW suggest that many landholders are operating like this. They are obtaining a financial return from the land, but at the cost of degrading the vegetation and soil. Their strategy is not in the public interest.

A study of feral goat harvesting in Western Australia found that harvesting rates fell when rainfall was high, presumably because goats were difficult to harvest when water supplies were dispersed and vehicle tracks muddy.[12] Harvesting rates also dropped when the price of goat meat fell. This study showed that harvesting cannot be relied upon to keep goat numbers at modest levels because harvesting rates are sensitive to price and weather conditions, such that low prices can see a rise in goat densities.

Landholders are cross-breeding feral goats with boer goats to broaden the genetic base of the wild population, including on one property close to Yathong Nature Reserve[13], which faces serious feral goat problems. This broadening of the gene pool can be expected to improve the success of feral goats, resulting in more grazing pressure on fragile landscapes.

The NSW government should undertake an investigation the state's goat industry, with a view to developing options to limit the land degradation that is occurring, and which may increase significantly in future. Rising temperatures that cause stress to sheep and cattle could see more landholders relying on goats, resulting in accelerated rates of landscape degradation. Low (2011) warned about this scenario in a climate change report for the Queensland Government.[14]

Recommendation 2: Develop a goat policy to ensure that a growing goat industry does not result in land degradation caused by increasing numbers of feral goats.

3. Declare deer pests and improve control methods

Despite the economic and environmental problems deer cause they are managed under the *Game and Feral Animal Control Act 2002* as a resource for hunters. They are treated very differently from goats,

[8] Khairo et al. (2013)
[9] Khairo et al. (2013), Hacker & Alemseged (2014)
[10] MLA (2015)
[11] Khairo et al. (2013)
[12] Forsyth et al. (2008)
[13] MLA (2015)
[14] Low (2011)

which cause similar problems. A hunting license must be obtained from the Game and Pest Board to hunt deer[15]. Hunters must not pursue them using spotlights 'or electronic devices that enhance vision or hearing', or shoot them from a vehicle or hunt them at night. There are bag limits, and there are closed seasons for fallow, red, Wapiti and hog deer.[16]

None of these restrictions apply to anyone hunting rabbits, foxes, goats, pigs, hares or cats. The DPI website says that closed seasons exist 'due to an increased likelihood of animal welfare concerns'. The real reason is to conserve deer populations for the benefit of hunters. There is nothing different about deer welfare to justify a closed season when none applies to goats, pigs and other hunted species. Spotlights, night hunting and vehicles are prohibited only because they are effective, allowing large numbers of deer to be culled in a short space of time.

What is called 'Ecological Deer Management (EDM) programs' are operating in four NSW State Forests.[17] Use of the word 'ecological' is perverse. The guidelines specify that it is an offence to harvest 'more than one buck per EDM forest in a calendar year'. This is despite Herbivory and environmental degradation caused by feral deer having been listed as a Key Threatening Process in NSW.[18] The EDM programs are clearly being run to provide ongoing recreational opportunities for hunters, not to protect the ecological values of state forests, which would be better served by abandoning bag limits.

The conservation community commends the NSW Government for having disbanded the Game Council in 2013. The Game Council claimed to be providing a public benefit by controlling feral animals when in fact it was serving the interests of hunters, in particular deer hunters. It opposed the declaration of deer as pests. Hunters can play a useful role in pest control, but only when they operate under the supervision of authorities as part of well-coordinated control programs that maintain high hunting pressure where needed.

Feral deer represent the greatest emerging animal pest problem in Australia (Strahan and Van Dyck 2008). Farmers in NSW are increasingly complaining about deer impacts on farm productivity.[19] Deer pose a threat to various rare plants including orchids[20] and threatened species[21]. Populations were relatively low until the 1990s, but are now rapidly increasing in many places, partly because of releases by hunters to create new hunting opportunities. Andrew Moriarty, a former employee of the Game Council, has predicted that on current trends, the 'range, abundance and impacts' of deer will spread to rival that of feral pigs and goats.[22] The CSIRO has warned that deer could spread a major livestock disease, bluetongue, which exists in Australia but has yet to cause harm, and a lyme-like disease of humans.[23] For these and other reasons, deer should be declared a pest animal and a statewide containment strategy developed.

Queensland, South Australia and Western Australia have declared deer feral pests. Hunters do not want deer classified as pests because it undermines the image of deer as noble game animals that require skill to hunt. But a pest classification in NSW would not hinder hunting, just as it does not limit the hunting of other feral pests. The NSW government should stop putting the aspirations of hunters ahead of the costs imposed on farmers and the environment.

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[15] http://www.dpi.nsw.gov.au/hunting/hunting-licences
[16] http://www.dpi.nsw.gov.au/hunting/what-can-i-hunt
[17] http://www.dpi.nsw.gov.au/__data/assets/pdf_file/0006/507867/identify-harvestable-deer-ecological-deer-management-forests.pdf
[18] http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=20012
[19] http://www.theland.com.au/news/agriculture/general/news/deer-cost-farmers-dearly/2724010.aspx
[20] Duncan et al. (2009)
[21] NSW Scientific Committee (2004) [six NSW threatened plant species listed at risk from feral deer:
[22] Moriarty 2009
[23] Simpson & Srinivasan (2014)

Feral deer cannot be entirely eradicated from NSW, but their spread can be limited. Smaller populations are good candidates for local eradication. Targeted effort should contain and draw in the out limits of larger deer populations to prevent further spread. Where serious ecological and economic damage is being caused, ongoing reduction in densities will be necessary.

Capacity to quickly respond to new deer releases from illegally relocations or escapees from deer farms are essential. Regulations governing deer farm fencing and accountability for escaped deer require review.

The NSW DPI should invest more in developing new methods of deer control, including traps, baits and aerial shooting. Because recognition of deer as major pests has lagged behind recognition of many species, a diverse toolkit of control methods has not been developed. At present DPI research in feral deer control is regarded as too politically sensitive and has stopped.

Recommendation 3:

a. ***Declare deer pests, remove any limitations on their harvest so that they can be more easily controlled and implement a statewide containment program.***
b. ***Review regulations for deer farming to reduce the probability of escapes***
c. ***Develop a better deer control toolkit incorporating a wider range of control techniques.***

4. Reduce wild dog control

The conservation community does not support the widespread killing of dingoes and wild dogs by government agencies. This represents a public subsidy for agricultural production at a cost to the environment. Dingoes and wild dogs play a useful ecological role by preying on feral pigs, goats, deer, and also kangaroos, which in high numbers deplete rare plants. Dingoes and wild dogs suppress foxes, and there is evidence that they also suppress feral cats, although scientists disagree about the extent to which this occurs. The conservation community hopes that future research will clarify the role dingoes/dogs play in suppressing cats and foxes, and hopes that NSW policy will be adjusted to reflect this.

Recommendation 4: Reduce government investment in wild dog control.

5. Prohibit release of game birds

The NSW DPI lists eight bird species as game birds[24], seven of which do not occur in the wild in NSW (see Table 1). All seven species have formed feral populations elsewhere in the world[25]. Five of them have formed feral populations in other states of Australia[26]. These birds can only be hunted if they are released into outdoor situations, creating a risk that feral populations could form. Hunters have been responsible for some of Australia's worst pest problems, including the red fox, an agent of extinction and major agricultural pest. Ducks, pigeons, quail, mynas and starlings are already available to hunters,

[24] http://www.dpi.nsw.gov.au/hunting/what-can-i-hunt
[25] Long (1981)
[26] Christidis & Boles (2008)

as are a wide range of feral mammals. Exotic game birds should be removed from the *Game and Feral Animal Control Act 2002* and their release into wild or semi-wild situations prohibited.

Table 1. NSW 'Game Birds'

Game Bird	Locations of Feral Populations
Bobwhite Quail	West Indies, New Zealand, England
California Quail	Norfolk Island, King Island (Tasmania), New Zealand, Chile, Argentina, Hawaii
Guinea Fowl	North Queensland, South Africa, Cuba
Partridge	Europe, Canada, Mexico, Hawaii, New Zealand
Peafowl	Islands in Tasmania, WA & SA; Pakistan, California, Hawaii
Pheasant	King Island (Tasmania), Rottnest Island (WA), New Zealand
Turkey	King & Flinders Islands (Tasmania), Hawaii

Recommendation 5: Remove exotic game birds from the Game and Feral Animal Control Act 2002 and prohibit their release into wild or semi-wild situations.

6. Assess doves and act accordingly

The barbary dove was added to the list of Australia's wild-breeding birds in 2008,[27] following evidence of a feral population breeding in Alice Springs, which has since been removed. Adelaide also has a recently established feral population, which has not been removed. Barbary doves are on the list of approved birds for NSW, but there is every prospect of them forming feral populations – if birds escape or are freed.

Another approved bird in NSW is the laughing dove, despite the existence of a feral population occupying a large area of South-western Australia. Both species pose a risk for NSW. A ban could prove unwise if it resulted in aviary owners releasing their birds. NSW should investigate the status of these species in captivity in NSW and see if a policy is warranted to reduce the risk of feral populations forming.

Recommendation 6: Investigate the status of barbary and laughing doves in captivity in NSW to see if a policy is warranted to reduce the risk of feral populations forming.

7. Phase out ringneck parrots

The Indian ringneck parrot often escapes from captivity in Australia, with evidence of breeding noted in Western Australia.[28] It has formed feral populations in many parts of the world, including England, Africa, Asia and North America.[29] The Department of Agriculture and Food in Western Australia conducted a scientific risk assessment finding that this parrot poses an extreme threat (the highest of

[27] Christidis & Boles (2008)

[28] https://www.agric.wa.gov.au/birds/indian-ringneck-parakeet-animal-pest-alert?page=0,2

[29] Long (1981)

four categories) to Australia. [30] This assessment was endorsed by the national Invasive Plants and Animals Committee.[31] The ringneck is a serious crop pest in its native range and could compete with native parrots for food and hollows. NSW should introduce a phase-out of this species, allowing pet owners to keep the ring-necks they have, but not to breed or replace them, leading to a prohibition on this species when no captive birds remain.

Recommendation 7: Introduce a phase-out of Indian ringneck parrots, allowing pet owners to keep the ring-necks they have, but not to breed or replace them, leading to a prohibition on this species when no captive birds remain.

8. Require fish warnings

More than any other sector, aquarium hobbyists have the potential to increase the number of introduced species in NSW. The major pathway of introduction is people who dispose of unwanted aquarium fish by releasing them into waterways. Exotic snails and water plants also escape via this pathway. The NSW Government recognises the risk and has website information about appropriate disposal of fish. But this information can easily be missed by the public. The government should go further and introduce a legislative requirement that shops selling fish display a sign warning against disposal of fish, snails and plants in waterways and suggesting safe alternatives. This should be supported by an ongoing education program. The impost on stores is justified by the serious threats posed to waterways. Rising temperatures will increase the number of exotic fish species that can establish in NSW waters. The north east of the state is especially at risk.

9. Additional work is required at the national level to lower the incidence of freshwater escapes and this is discussed briefly in section 11: 'Adopt a national leadership role'.

Recommendation 8: Introduce a legislative requirement that shops selling aquarium and pond fish display a sign warning against disposal of fish, snails and plants in waterways and suggesting safe alternatives.

10. Develop a red-eared slider policy

NSW has small wild populations of the red-eared slider (*Trachemys scripta*), a freshwater turtle on the IUCN list of 100 examples of the world's worst invasive species.[32] A risk assessment by the Queensland government found 'considerable evidence that red-eared sliders can negatively affect locally native turtle species' – they mature more quickly than locally native turtle species, are more aggressive, have higher fecundity and grow larger.[33] They could impact on rare frogs and other aquatic prey. Tadpoles of native frog species may not be able to recognise a new exotic predator. There is a significant risk of captive bred red-eared slider turtles spreading diseases and parasites into wild reptile populations.[34] There is evidence that a malaria-like blood parasite was transferred to two native turtle species from

[30] https://www.agric.wa.gov.au/birds/indian-ringneck-parakeet-animal-pest-alert?page=0,2
[31] https://www.agric.wa.gov.au/birds/indian-ringneck-parakeet-animal-pest-alert?page=0,2
[32] Lowe et al. (2000)
[33] Csurhes and Hankamer (2012)
[34] Csurhes and Hankamer (2012). Illegally smuggled specimens are likely to have passed through Asian wet markets, where they are housed in terrible conditions with multiple species from all over the world. Reptile diseases are hard to detect, with some having long incubation periods (Scott O'Keefe, personal communication).

infected red-eared slider turtles in the Lane Cove River, Sydney.[35] Burgin (2006) said they show 'all of the hallmarks of being the reptile equivalent to the carp' for their impacts on wetland biodiversity.

In Queensland this turtle was banned from possession and sale in 1985, and when feral populations were discovered in 2004, an eradication campaign was mounted. Illegally held pets were volunteered after a publicity campaign was mounted. The eradication was successful. South Australia, Queensland, Victoria and Western Australia have issued pest alerts and public information about the red-eared slider.[36] Western Australia has also run an eradication campaign with community support, recently achieving success.[37]

In NSW this turtle cannot be legally kept as a pet, but there appears to be no serious effort to contain its spread. It is not listed on the DPI's page about pests, nor on an Office of Environment and Heritage page about pests (though it is mentioned on an Office of Environment and Heritage page about freshwater turtles).

Burgin (2006) was critical of the NSW government for showing no interest in the discovery of sliders at Yeramba Lagoon (South Sydney):

> "the implications of the find were not recognised, despite providing evidence that five of the six females captured had developing ovarian follicles (the other was immature) and there was evidence that they were laying eggs in the area. The data were ignored by government, and dismissed by scientific reviewers, as being inconsequential because of the low numbers captured."[38]

There is a dramatic difference in the approaches taken towards this pest species by the Queensland and NSW governments. Queensland has published a risk assessment[39], and run an eradication campaign associated with a media campaign. Victoria and Western Australia have also taken prompt action to remove sliders from waterways.[40]

The NSW government, by contrast, has done almost nothing. This is despite Henderson and Bomford (2011), in their report *Detecting and preventing new incursions of exotic animals in Australia,* recommending 'priority be given to educating the public, particularly through media coverage, about the risks posed by red-eared sliders, so that people are less likely to keep or release them, and are more likely to recognise and report sightings.'

We are not saying that red-eared sliders can necessarily be eradicated from NSW, but their status in state should be assessed, and policies developed to prevent further spread. The possibility of eradication should be reviewed. There should be more public information about the environmental threat they pose, in recognition of the fact that they are one of the most common smuggled, illegally kept and illegally released wildlife species in Australia. There is an urgent need to ensure they do not

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[35] Department of Agriculture and Food (WA) (2009)

[36] https://www.agric.wa.gov.au/amphibians-and-reptiles/red-eared-slider-animal-pest-alert http://pir.sa.gov.au/__data/assets/pdf_file/0004/231961/Red_earedSlider.pdf http://agriculture.vic.gov.au/agriculture/pests-diseases-and-weeds/pest-animals/a-z-of-pest-animals and https://www.daf.qld.gov.au/plants/weeds-pest-animals-ants/pest-animals/a-z-listing-of-pest-animals/photo-guide-to-pest-animals/red-eared-slider-turtle

[37] http://www.pestsmart.org.au/last-known-red-eared-slider-in-western-australia-captured/?utm_source=Invasive+Animals+CRC+subscriber+list&utm_campaign=cff662851c-Feral_Flyer_issue_281_17_Sept_2015&utm_medium=email&utm_term=0_dca65e59c7-cff662851c-36260933

[38] Burgin (2006)

[39] Csurhes and Hankamer (2012)

[40] Department of Agriculture and Food (2009); Department of Environment and Primary Industries (nd)

establish in the Murray-Darling catchment, where, like carp, they could contribute to a loss of environmental values.

Recommendation 9: Develop a red-eared slider policy to to ensure there is no further spread, to review the prospects of eradication and provide more public information about the threats they pose.

11. Build redfin barrier

Introduced redfin perch pose a threat to the endangered Macquarie perch. They were recently detected in the Hawkesbury-Nepean catchment, which has a viable Macquarie perch population. James T. Knight (2010) of the Port Stephens Fisheries Institute has prepared a detailed report advocating a barrier be installed on the Kedumba River to prevent redfin from colonising this river from the dam and harming the perch population. The NSW government should act on this recommendation, and investigate whether other Macquarie perch populations can be protected with barriers.

Recommendation 10: Build a barrier according to the guidelines of Knight (2010) to prevent redfin perch colonising the Kedumba River and harming endangered Macquarie perch.

General recommendations

12. Adopt a national leadership role

As the state with the largest human population, NSW should be providing a greater leadership role in national policy on biosecurity and invasive species. National biosecurity policy is dependent on a cooperative approach with other governments, largely guided by the Intergovernmental Agreement on Biosecurity. NSW should exert more influence to achieve much needed reforms, for example by accepting the recommendations to the 2015 Senate Inquiry into environmental biosecurity, supporting the proposal to establish Environment Health Australia[41], improving the National Environmental Biosecurity Response Agreement, improving transparency and involvement of the environmental sector in biosecurity decision-making, and closing off pathways for high risk environmental invasive species. Aquatic freshwater fish imports are an obvious area where NSW could provide needed leadership.

Leadership in these areas would not only benefit NSW but all of Australia.

Recommendation 11: Provide a greater leadership role in national policy, for example by accepting the recommendations to the 2015 Senate Inquiry into environmental biosecurity, supporting the proposal to establish Environment Health Australia, improving the National Environmental Biosecurity Response Agreement, improving transparency and involvement of the environmental sector in biosecurity decision-making, and closing off pathways for high risk environmental invasive species.

13. Develop a foresighting capacity

When managing pests, prevention is far better than cure, and early intervention is far more cost effective than managing pests that have become abundant. To anticipate new and emerging pest problems, NSW should develop a foresighting capacity. A foresighting unit could monitor new trends in aquaculture and animal husbandry and newly established pests in other states. Examples of what should be monitored include: online pet stores; hunting magazines that discuss new hunting opportunities; the goat industry; interstate pest incursions and establishments such as that of the smooth newt; the aquarium industry; changing public expectations about animal welfare; climate change and its impacts on pests and production.

The 2009 Hawke review of the EPBC Act identified the need to focus on future threats and recommended the establishment of a federal foresighting unit to identify potential and future threats and set in place preventative strategies[42]. The establishment of a NSW foresighting capability would address this gap at the national level and provide specific advice relevant to NSW.

A foresighting unit would achieve more efficiency if it had a focus on all pests (weeds, invertebrates and marine species as well as feral animals).

Recommendation 12: Develop a foresighting unit to monitor pest trends and better predict future problems.

[41] Cox and Booth (2013) and http://invasives.org.au/project/environment-health-australia/
[42] Recommendations 23 (2) and (3) in Hawke (2010)

14. Reform funding processes

ISC spoke with a commercial hunter who does contract work for the NSW National Parks and Wildlife Service, culling feral animals, which he said was often useless because funding was so episodic. Funds often became available near the end of a financial year and had to be acquitted during late June, which, because of weather conditions at that time, was often not conducive to hunting success. Alternatively, funding was available for one or two years but not for the next. The hunter said that two years of fox or deer control can easily be undone by one year of no control, achieving no long term gain. He said control programs should run for at least five years to be effective. Local government also finds itself in this situation when federal government funding for feral animal control is not followed by a further grant. A well-recognised principle of pest control is that programs have to be sustained to be effective. The issues paper released in conjunction with this review mentions the need to 'ensure long term funding', and one measure of the success of the review will be whether it establishes reliable mechanisms to ensure long term funding.

One obstacle to continuity of funding arises when governments respond to strong sector pressure by reallocating budgets. One example of concern is more public funding going into wild dog control to the neglect of other pests. Spending is often reactive, as when more funding is given for pig control after their numbers expand after rain, when the same funding would have achieved much more had it been spent on pig control during previous dry years when numbers were lower.

Funding for public interest pests that cause environmental damage, such as cats, is rarely provided by government, except on NPWS reserves. In contrast, the government readily funds private interest pest control. Most pests do in fact have environmental and agricultural impacts, but government has typically prioritised spending on agricultural impacts.

Funding should be reallocated to ensure more long term consistency of funding, and more public funding of public interest pests, both on public and private land. The private sector should be funding pest control that benefits commercial interests. The role of state government in private interest pest control should focus on collaboration, coordination, research and regulation.

A fundamental problem with feral animal funding is that it is often inadequate to achieve the required goals. This problem is exacerbated when funding is so episodic that what is spent does not achieve any long term result.

Reform to funding processes is urgently needed.

Recommendation 13: Reform funding processes so that long-term funding of pest control is achieved, and funding achieves public good rather than private gain.

15. Create an advisory committee

There is currently no formal mechanism for regular review of NSW pest management issues that involves government and stakeholder interests. The creation of the new NSW biosecurity advisory committee does provide a high level channel, but there is no equivalent to the NSW Noxious Weeds Advisory Committee (due to be reconstituted when the NSW Biosecurity Act commences). A pest animal advisory committee would provide a useful opportunity to review the operation of current pest management activities, identify gaps and opportunities, respond early to future risks identified during foresighting and improve engagement and cooperation. Such a committee would also boost confidence in collective pest management programs and improve accountability.

Recommendation 14: Establish a pest animal advisory committee to review the operation of current pest management activities, identify gaps and opportunities, respond early to future risks identified during foresighting and improve engagement and cooperation.

16. Reform classifications under the Non-indigenous Animals Regulation 2012

Although we endorse the general approach taken under the Non-indigenous Animals Regulation 2012 to the classification of exotic animals (Reg 4), we question the consistency of the classifications in Schedule 1. It was intended that the classifications be based on risk assessments conducted for the Vertebrate Pests Committee. However, some classifications are based not on risk assessments but are the consequences of political pressure applied by those who wish to keep certain species as pets or for commercial or recreational reasons.

For example, ferrets were assessed by the Vertebrate Pests Committee (2007) as an 'extreme' threat but have been classified under the regulation only as category 4 (animals that would be unlikely to present a threat to the environment, agriculture or persons or greatly worsen an existing threat if they escaped into the wild, the importation and keeping of which are not restricted).

Blackbuck were assessed by the VPC as a 'serious' threat, which justifies classification under the regulation in category 2. But presumably due to political pressure from those who wish to run commercial hunting enterprises blackbuck have been assigned to category 3b (animals that have the potential to establish in the wild a population that would present a new threat to the environment, agriculture or persons or aggravate an existing threat and that may only be kept under licence).

Banteng and bison were each assessed by the VPC as an 'extreme' threat, which justifies classification under the regulation in category 1a. Instead, presumably for the same reasons, they also have been assigned to category 3b.

There are several other such inconsistencies. All 'game' birds have been listed as category 4 no matter what the VPC-assessed risk.

These inconsistencies undermine the integrity of NSW's system to prevent new invasive vertebrates establishing in the state.

Decisions about species classifications should be based on science not lobbying pressure. The potential costs to the community and the environment of the establishment of yet more exotic species in the wild far outweigh the slight benefits likely to accrue to a few individuals from being permitted to keep such animals.

The risk applies beyond NSW as animals originating in NSW may be deliberately or accidentally taken to other states. It is appropriate to apply the precautionary principle given the long-term high cost potential of invasive species. This should include taking into account the propensity for human error, irrationality or selfishness; it is reasonable to assume worst case scenarios for exotic animals.

We recommend that the criteria for the NIA categories be applied consistently to avoid political decisions that are not in the public interest.

Recommendation 15: Revise classifications under the Non-indigenous Animals Regulation 2012 in Schedule 1 to align with the risk assessments conducted for the Vertebrate Pests Committee.

17. Fund social research

The key to reducing many invasive species threats is in changing community behaviour. Serious problems are created when tilapia, redfin and other fish are released into waterways, deer and pigs are released to create hunting opportunities, and exotic reptiles are smuggled into the country and locally traded. Laws against such activities do not stop them occurring in all cases, but there may be opportunities to promote behavioural changes if the motives of the participants are better understood. Social research can also be the key to devising publically acceptable programs for culling feral horses, and for responding appropriately to welfare concerns. The NSW DPI should be funding social research as one way of achieving better outcomes on invasive species. It should also be drawing extensively on whatever social research exists. Pest experts are seldom experts in human behaviour, and they should be drawing on the expertise of those who have studied human thought processes.

Recommendation 16: Fund social research into the behaviours of those who deliberately or unwittingly spread pests, to guide policy responses.

18. Acknowledge welfare concerns

The NSW DPI should acknowledge growing public concerns about animal welfare by becoming more pro-active in its operations and the messaging it undertakes. Welfare is an issue that will only grow in importance. Research into the most humane methods of control should be funded. There is a need to explain that killing a smaller number of animals today can be far kinder than the alternatives: feral herbivores starving because they have run out of food, or very large culls becoming necessary when populations become very damaging. It should also be explained that feral animals cause suffering and death when they prey on native animals, or consume pastures and other plants that native mammals would otherwise eat. Australia is fortunate in having the RSPCA playing a constructive role in this area by trying to balance welfare with the need to control some species.

A recent article on *The Conversation* by two university academics shows how far the welfare argument is being pushed.[43] Arian Wallach and Daniel Ramp argue that if everyone stops killing cats, Australia's threatened native species will benefit, and we will benefit as well by unburdening ourselves of causing suffering and death to cats.

Recommendation 17: NSW DPI to acknowledge growing public concerns about animal welfare by becoming more pro-active in its operations and the messaging it undertakes.

19. Update distribution maps

The NSW DPI has on its website maps of feral animal distributions[44], but these date back to 2009. For some species, especially deer, these maps are likely to be out of date. Updated maps should be published alongside these older maps to better inform feral animal management. Compilation of projected feral animal expansion under different scenarios would also help support timely action. A recently published study for Tasmania (Potts et al. 2015) provides a useful model.

Recommendation 18: Update NSW DPI 2009 website maps of feral animal distributions.

[43] https://theconversation.com/lets-give-feral-cats-their-citizenship-45165

[44] http://www.dpi.nsw.gov.au/agriculture/pests-weeds/vertebrate-pests/distribution-maps-for-vertebrate-pests

20. Reject bounties

The NSW Government recognises that bounties are an ineffective means of control, but some organisations making submissions to the commission may argue in their favour. Reviews of past bounty programs show clearly that they do not work[45], and the government should resist any pressure to introduce them.

Recommendation 19: Reject any calls to introduce bounties.

21. Be wary of commercialisation

The call is often made to treat pests as resources to be harnessed. For example, when camel numbers in central Australia grew to levels indicating that a major cull was needed, action was delayed for some years by arguments that the camels represented a resource for indigenous communities and other landholders[46]. Because most camels occur in remote regions far from abattoirs, no market for their meat materialised, but the talk about them having value delayed action. Under other circumstances the creation of a market creates a disincentive to remove pest problems. As Nunez et al. (2012) have noted: 'A prominent problem is that creating a market engenders pressure to maintain that problematic species.' The warnings they raise should be heeded. Evidence from around the world confirms that the creation of markets for pests seldom reduces pest problems and often becomes counterproductive.

Recommendation 20: Be wary of proposals to reduce feral animal numbers by creating markets for their products.

[45] For example, Fairbridge and Marks (2005) and Hassall and Associates (1998)
[46] Norris & Low (2005)

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