



Natural
Resources
Commission

State-wide review of NSW pest animal management

Issues paper



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Image (above): Invasive Animals CRC.

Purpose of this issues paper

The purpose of this paper is to seek feedback from members of the community on pest animal management in NSW. The paper:

- introduces priority issues
- elicits views on what is existing good practice and where there are improvement opportunities
- seeks views on where the barriers are and ways to overcome them
- seeks views on any additional relevant issues.

Making a submission

The Commission invites submissions regarding this Issues Paper from members of the community and stakeholders. Feedback received will be used to inform our findings and recommendations.

The Commission is specifically seeking feedback regarding the priority issues, barriers and opportunities and suggested solutions outlined in this paper. We also encourage you to acknowledge any gaps in the issues presented.

Key questions are provided in each section of this paper to help guide your response. However, other relevant matters may be addressed in your submission.

Enquiries

More information on the review of pest animal management in NSW can be found on the Commission's website.

www.nrc.nsw.gov.au/pest-animal-management

If you have further enquiries please contact the Commission on (02) 9228 4844.

How you can have your say

There is no standard format for submissions. Submissions may range from a short letter outlining your views on a particular topic to a more comprehensive document covering a range of issues. Where possible, you should provide evidence, such as relevant data and documentation to support your views.

Submissions close **5pm 30 November 2015**.

If you are unable to provide a submission before the closing date, you may contact the Commission to discuss whether a late submission can be accepted.

We treat all submissions as public and make them available on our website, unless marked confidential or it contains material that is offensive or in breach of any law. Details of our privacy policy can be found on the Commission's website.

Submissions can be made through the Commission's online form or via email, fax or mail.



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1. Introduction

1.1 Terms of Reference and review approach

The Premier's terms of reference (ToR) request that the Commission identify opportunities to improve the management of pest animals in NSW across all land tenures for environmental, economic and social benefits (refer Appendix A for the full ToR).

The review will recommend options for improving arrangements for pest animal management across NSW, including potential funding models. The review will also consider implementation and transitional issues for any recommendations. The scope of the review will be limited to introduced terrestrial and freshwater vertebrate species. Animals in the marine environment and native animals are excluded.

The review will be consultative and evidence-based. The Commission will objectively look at what is and is not working to identify practical solutions that will bring about change on the ground. In so doing, the Commission will consult with industry, environmental and community groups, as well as relevant Australian, state, regional and local government organisations.

Any recommended changes will align with the principles outlined in section 1.3, with the aim to achieve improved outcomes through more effective pest animal management.

1.2 Context for this review

Over the last decade, there have been a number of state and national reviews on pest animal issues and management in Australia. These reviews were conducted by a variety of government, industry and research organisations, and delivered valuable insights and recommendations that have helped shape pest animal management in NSW. In general these reviews have seen a trend for more cooperative arrangements and shared responsibilities.

More recently, a review of the biosecurity legislation in NSW has resulted in major legislative reform in this area. The key piece of legislation for pest management in NSW will be the *Biosecurity Act 2015*. Yet to commence, the primary objective of the *Biosecurity Act 2015* will be to provide a flexible and responsive statutory framework for biosecurity in NSW.

Alongside this legislative reform are a number of 2015-2019 election commitments made by the NSW Government regarding biosecurity. These include establishing a biosecurity advisory committee to oversee of the development, implementation and operation of the new legislation; a minimum of \$4 million over four years in additional resources to biosecurity and extension services with the Local Land Services; and the reason for this review, conducting a review of pest management in NSW and work on appropriate funding models post review.

Biosecurity is about risk management. The broad objectives of the biosecurity framework outlined in the NSW Biosecurity Strategy 2013-2021 (as it relates to pest animal management) are to prevent the entry of pests into NSW, quickly find, contain and eradicate new entries, and effectively manage those pests that cannot be eradicated.



In terms of this review, the biosecurity framework for pest animal management in NSW provides the opportunity to examine the mechanisms that will support the framework such as better coordination, stronger partnerships, investment maximisation and good practices to improve pest animal management effectiveness.

There are other reviews underway that are relevant to this project and involve similar stakeholders. These include: The National Biosecurity Committee’s review ‘Modernising Australia’s approach to managing established pests and diseases of national significance’ and consultation on the Department of Primary Industries’ draft NSW Invasive Species Plan 2015-2022.

The findings and progress from current and previous reviews will be taken into account during this review. Every effort will be made to ensure consistency of approach.

1.3 Guiding principles

Further to stakeholder feedback received at a workshop in Sydney on 21 September 2015, the following principles have been identified as necessary for an effective pest animal management system. Section 3 discusses issues identified with the current system that create inconsistencies with these principles and opportunities to better meet these principles.

These principles will guide the Commission in conducting the review and developing recommendations.

Table 1. Guiding principles

Outcomes-focused	<ul style="list-style-type: none"> • arrangements should aim for best outcomes on the ground • pest management is one part of overall sustainable landscape management for achievement of triple bottom line outcomes
Shared responsibility	<ul style="list-style-type: none"> • clear leadership to provide direction for stakeholders, resource allocation and for effective cooperation across tenures and jurisdictions • coordinated collective action and ownership • clear understanding of roles and responsibilities
Evidence-based	<ul style="list-style-type: none"> • prioritised, risk-based programs based on best available science and research • effective evaluation and reporting of outcomes
Adaptive	<ul style="list-style-type: none"> • adaptive and responsive to prevent and control new incursions and emerging threats • adaptable to new knowledge and skills, and emerging issues • enable continuous improvement in program deliverables
Cost effective	<ul style="list-style-type: none"> • action is appropriate and proportional to the problem • clear deliverables to measure benefits • deliver desired results efficiently
Accountable	<ul style="list-style-type: none"> • appropriate and implementable compliance arrangements • organisations and, public and private landholders at all scales held accountable for achieving results • appropriate accountability of risk creators

2. Process

The Premier of NSW has requested the Natural Resources Commission (the Commission) undertake an independent, state-wide review of pest animal management in NSW. The review will focus on:

- identifying what is existing good practice
- opportunities and barriers that exist within current arrangements
- ways to overcome barriers to inform recommendations.

The Commissioner for Natural Resources, Dr John Keniry AM, was asked to Chair an Advisory Committee to ensure stakeholder input is appropriately considered and the terms of reference are met. Other Committee members are:

- Dr Bruce Christie, Deputy Director General, Department of Primary Industries
- Mr Tom Gavel, Chair, Central West Local Land Services
- Mr Robert Quirk, A/Director, Parks Conservation and Heritage, Office of Environment and Heritage
- Mr Terry Korn PSM, Independent Expert - Pest Animal Management.

In conducting this review, the Commission will prepare three papers: an issues paper, draft recommendations report and final report.

Two of the three papers, the issues paper and draft report, will be released for public consultation to encourage interested parties to contribute to the review. The final report will be submitted to Government for consideration and then subsequently published.

Issues paper: The issues paper provides an overview of key issues relevant to the current pest arrangements and requests feedback from stakeholders on particular questions.

This paper is based on an initial literature review and consultation, including a workshop held on 21 September 2015 in Sydney, which was attended by a range of pest management professionals and experts from national and state government agencies, Local Land Services, regional pest management groups, landholders, non-governmental organisations, community and research organisations and local government.

Consultation: The issues paper will be available for public comment for six weeks from 15 October 2015 until 30 November 2015. During this period, the Commission will undertake targeted consultation including: regional tours attended by Advisory Committee members and involving local stakeholders (both public and private); focus group meetings; and face-to-face and telephone interviews with key stakeholders.

Draft Report: The draft report will set out the Commission's draft recommendations on key issues for discussion. This report will be based on consultation feedback on the issues paper and analysis.

Consultation: The draft report will be released in late February 2016 and will be available for public comment for six weeks. The Commission will undertake additional targeted consultation during this period and a limited number of public meetings are anticipated following release of the draft recommendations report.

Final Report: Based on feedback on the draft report and further analysis, the Commission will issue a final recommendations report to the Premier by June 2016.

3. Issues

What are the impacts?

Pest animals are one of the most significant biosecurity challenges facing NSW. This issue is complex, long standing and widely considered to be worsening. It is unlikely to be resolved or even contained in the foreseeable future, unless there is a collective willingness to work together, as well as a change in attitudes and behaviours around the way pest animals are managed in NSW.

There is a commonly held view that land such as national parks and forests (both public and private) are the breeding ground for many pest animals. If not managed appropriately, these pest animals can have negative impacts on neighbouring properties, as well as on the public lands themselves.

Pest animals have significant economic, environmental and social impacts upon landscapes and land managers. Estimates of nationwide economic impacts range from \$720 million¹ through to \$1 billion² annually, with rabbits causing the most economic impacts (estimate of \$206 million per year)³.

Recent studies by the Australian Bureau of Agriculture and Resource Economics and Science have found wild dogs are also costing individual farmers up to approximately \$7200 annually.⁴

In addition to economic impacts, there are significant environmental impacts including loss of biodiversity caused by pest invasions. For example, 40 percent of listed threatened species in NSW are affected by pest animals.⁵ Rabbits are listed as having the largest impact, threatening 156 listed species.⁶ Social impacts of pest animals can also be significant, for example the destruction of cultural sites, the costs of which have not been fully quantified.

Emerging issues such as increased globalisation of trade, technological advances, increasing invasive populations, peri-urbanisation, changing climatic conditions, increased commercial use of pests, and social attitudes regarding animal welfare, will also affect the future management of pest animals.

- 1 McLeod R (2004) *Counting the cost: Impact of Invasive Animals in Australia 2004*, Cooperative Research Centre for Pest Animal Control, Canberra
- 2 Department of Primary Industries (2013) *NSW Biosecurity Strategy 2013-2021*, NSW Government, Sydney
- 3 Gong W, Sinden J, Braysher M and Jones R (2009) *The economic impacts of vertebrate pests in Australia*, Invasive Animals Cooperative Research Centre, Canberra
- 4 Brinks B, Kancans, R and Stenekes, N (2015) *Wild dog Management 2010 – 2014 –national landholder survey results*, Australian Bureau of Agriculture and Resource Economics and Science, Canberra
- 5 Department of Primary Industries (2013) *NSW Biosecurity Strategy 2013-2021*, NSW Government, Sydney
- 6 Coutts-Smith AJ, Mahon PS, Letnic M and Downey PO (2007) *The threat posed by pest animals to biodiversity in New South Wales*. Invasive Animals Cooperative Research Centre, Canberra

What are we doing?

Both the Australian and NSW governments are currently examining ways to better coordinate pest management with broader biosecurity initiatives.

The outcomes sought under the NSW Biosecurity Strategy 2013-2021 (including pest animal management) and the draft NSW Invasive Species Plan 2015-2022 are based on a hierarchy reflecting the invasion process for pests, which includes:

- **preventing** new pests establishing in an area
- **eradicating** newly arrived and naturalised pests in an area
- **containing** or **reducing** the spread or severity of pests
- **protecting** assets from the impact of established pests.

Preventing the arrival of new pests or eradicating new arrivals in an area is recognised as the most effective and cost efficient method for tackling pests. However, many invasive species are already well established and widespread in NSW. Eradication with existing control measures is not achievable.⁷ In these situations new approaches to adaptively manage widespread incursions are required.

Adaptive management of emerging and widespread pests requires cooperative, organised approaches that work across tenures and jurisdictions. The review will seek to identify good practices for advancing consistent, community-wide responses for improved outcomes.

The following sections outline key issues and opportunities that have been identified through initial literature review and consultation, namely:

- Roles and responsibilities
- Shared ownership
- Priority pest species
- Landscape approach
- Emerging issues
- Adequate resourcing
- Knowledge building.

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Department of Primary Industries (2015) *Draft NSW Invasive Species Plan 2015-2022 – consultation document*, NSW Government, Sydney



3.1 Roles and responsibilities

In NSW pest animal management is influenced by a range of national and state government legislation, agreements, strategies, plans and programs.

The institutional framework governing pest animal management reflects these arrangements creating a complex structure that transcends the local, regional, state and national scales. With complexity the risk of gaps and duplications (regulatory or institutional) increase, which in turn can lead to process inefficiencies.

With the introduction of the NSW *Biosecurity Act 2015* (the Act), the NSW Government has sought to streamline the regulatory framework by consolidating the legislative requirements for pest management under one Act.⁸ The Act will be consistent with the NSW Biosecurity Strategy 2013-2021 and the recently released draft NSW Invasive Species Plan 2015-2022.

The underlying principle of this framework is 'shared responsibility'. How the responsibility of pest animal management is 'shared' given the multitude of parties involved needs to be clarified if continued stakeholder confusion in this space is to be avoided (refer Table 2).

Table 2. Summary of responsibilities for pest management in NSW

Organisation/ individual	Responsibilities
Federal Government	National legislation and policy framework, including oversight of national agreements such as the Intergovernmental Agreement on Biosecurity (IGAB) and National Environmental Biosecurity Response Agreement (NEBRA)
Department of Primary Industries	Legislation and policy framework, range of responsibilities from raising awareness to conducting research to leading recovery programs
Office of Environment and Heritage	Manages land under its control (National Parks, etc), acts as an advisory body, and develops and implements strategies for invasive species that threaten biodiversity
Local Land Services	Development of key strategies, large scale coordination and advice for best practice, on ground control methods, training and compliance
Government land managers (including Crown Lands)	Manage pest animals on land under their control Contribute to planning and coordinating large scale control programs
Private land holders	Manage pest animals on land under their control
Industry	Manage pest animals on land under their control, and develop industry standards, guidelines and codes of practice Assist in identifying key priority pests Assist in funding programs accordingly
Community groups/ organisations	Assist in pest animal management on both public and private land through direct action Contribute to the development of standards, policies and guidelines for pest animal management (e.g. welfare standards) Raise awareness and build capacity by supporting partnership programs
General public	'eyes and ears' for pest animal incursion activity

A lack of coordination and/or collaboration at the local, regional and agency levels has been noted as a limiting factor to successful implementation of pest animal management activities.

In terms of inter-agency coordination, stakeholders have indicated better coordination of resources and alignment of approaches is required. Stakeholder feedback in relation to improved coordination at a regional /localised scale is more about the need of a coordinator to manage the on-ground programs to assist landholders.

The draft NSW Invasive Species Plan 2015-2022 provides some high level guidance on where roles and responsibilities fall. The Department of Primary Industries is clearly labelled as the 'lead agency', while other state agencies, Local Land Services, industry, private and public land managers are grouped under 'implementation'. What this means in practical terms, however, is uncertain.

Many stakeholders are calling for stronger government leadership to coordinate and co-invest in pest animal management actions and research across the range of stakeholders to improve prioritisation, consistency and effectiveness. There is also a view that governments are increasingly focusing resources on prevention and eradication of new pest animals, and avoidance of future costs, and fewer resources on controlling and containing species that are having significant impacts now.

Barriers to success

Some potential barriers identified by stakeholders regarding current arrangements include:

Lack of clear roles and responsibilities – stakeholders have indicated that a lack of understanding and awareness of roles and responsibilities is currently a barrier to effective collaborative action, as is a lack of leadership.

Lack of accountability – clarity of responsibilities impacts on accountability – how can parties be held accountable for the responsibilities bestowed on them if their responsibilities are unclear?

Better coordination and alignment across programs – it is imperative that duplication of effort is minimised. Coordination of pest animal management is more effective, efficient and leads to better overall outcomes. The need for better alignment of government objectives across institutional silos has also been raised as an issue.

All parties should be working towards common priorities to achieve better outcomes, as inconsistencies in approach and timing will inevitably impact the effectiveness of pest management.

Compliance and enforcement – some stakeholders have raised inconsistencies in the level of enforcement with landholders as an issue. With the new biosecurity framework in NSW, the government is seeking to strengthen this area through audits, new offences and increased penalties.

Questions - Roles and responsibilities

1. Are roles and responsibilities for pest animal management clear at the state, regional or local scales?
2. What works well with the current institutional arrangements? Where are the examples of good institutional arrangements for pest animal management?
3. What is the appropriate level (state/regional/local) for delivery of pest animal management functions such as planning, enforcement, education etc?
4. What arrangements can enable issues to be managed at the appropriate scale for efficiency and effectiveness?
5. What are the triggers for government intervention in pest management? When is it the Government's role to intervene in pest animal management?
6. Are current compliance and enforcement arrangements effective, if not, why not?
7. How can accountability and performance monitoring for pest management be improved?
8. Has anything worked well in the past but can no longer do so because of limited resources?

3.2 Shared ownership

Government, industry, landholders and the broader community all have a role in pest animal management. As discussed in section 3.1, stakeholders are looking to government to take a lead role in pest animal management particularly in the provision of strong oversight, coordination and capacity building, as well as management of pests on public lands. However, support is essential from landholders, industry and the wider community.

The management of pest animals is the responsibility of public and private landholders, but pest animal management is a collective action problem that requires the cooperation of individuals to work together to achieve a common purpose. With government providing more of an oversight and coordination role, on-ground implementation of widespread pest animal management is increasingly relying on engaging and coordinating community resources for long-term collaborative management.

Community groups play an important role assisting in the management of both public and private lands. But collective action of pest animal management by the community can create its own challenges. Building trust between different individuals and groups, and raising the capacity are important precursors to effective community management.

The importance of community awareness, participation and adoption of consistent control strategies for effective pest animal management is widely recognised. However, the effectiveness of community participation cannot rely on motivation and enthusiasm alone. Support mechanisms are required to build capacity, ensure long term funding and manage shifting priorities that impact on the sustainability of community groups.

Recent research indicates that effective programs involve trust and willingness to reciprocate on pest control behaviour, acknowledgement of a mutual problem, positive relationships between public and private land owners and achievable goals.

Development of community groups focused on a specific invasion have been successful in some areas, such as The Wee Jasper and Brindabella Cooperative Wild Dog Management Plan and the re-established working group focusing on wild deer management in the Port Macquarie region.

Awareness and education programs can improve community capacity, facilitate collaborative responses and allow for new information to be quickly disseminated. Such programs are also necessary to enable responsible parties to understand their obligations and how to fulfil them. A good example of an effective community based awareness program is the Southern New England Coordinated Fox Control Program.

Industry has also recognised it has an important role to fulfil if pest animals are to be managed more effectively. Industry specific management action plans for widespread animal pests, industry standards, guidelines and codes of practice have been developed to support primary producers manage animal pests. The Australian Wool Innovation Wild dog management program is a prime example of effective industry intervention.

With all the positive efforts undertaken by industry, how can this be integrated more fully into broader community programs? Some stakeholders have also raised the need for better engagement with industry to enable more collaborative approaches and improved data collection and sharing.



Barriers to success

Despite the positive steps taken by both industry and community, potential barriers to successful and sustainable action remain and include:

Need for leadership and better coordination – some stakeholders have indicated stronger leadership is required as well as a coordinated approach when it comes to achieving better outcomes. Localised management is not sufficient, effective management requires coordination of land managers cross tenures, locations and scales.

Lack of general awareness – feedback and literature indicate that in many cases there is a lack of general understanding of the pest problem and/or of responsibilities under the current regulations. Stakeholders have also indicated awareness programs should be sustained over the long-term and include mechanisms to identify and engage new community members. For example, in some regions the increase in absentee landholders and higher turnover of land have been cited as problems.

Landholders have a range of motivations and perspectives – problems and conflicts arise when land managers lack the resources and/or motivation to control pest animals they do not perceive as pests or do not affect their interests. For example, cattle farmers may not be concerned about wild dogs and foxes as they do not kill their livestock, unlike sheep farmers.

The regulatory environment may need to be strengthened to motivate landholders to act in a more holistic manner. Landholders could be further motivated to a certain degree through planning and coordination, but there are instances where tighter regulation, increased enforcement or financial contributions, such as industry or regional levies, may be required to increase participation and resources.

Need for improved capacity building – pest animal management is an ever-changing area. Volunteer groups play an important role in pest animal management and feedback indicates more support is required to sustain voluntary programs. Improved education and adoption of available technology are potential means to overcome this barrier.

Questions - Shared ownership

1. What do you consider good practice for encouraging community-based pest management and changing landholder practices?
2. Are there better ways to promote community understanding of pest management?
3. Do you feel that the current education/awareness programs are working? Why? Why not?
4. At what scale (local, regional, state) are awareness-raising programs most effective?
5. How can community-based pest management programs be better aligned to ensure efficiency and effectiveness of effort?
6. Do industry bodies need to be better engaged to enable more collaborative approaches? If so, how?
7. Are there opportunities for improved data collection and sharing with industry and the broader community?
8. How can sufficient engagement be encouraged from all landholders regardless of land use?

3.3 Priority pest species

The Terms of Reference clearly define the parameters for this review – introduced terrestrial and freshwater vertebrate species. Animals in the marine environment and native animals are excluded.

Current pest animal groups that fall within these parameters are: wild dogs, rabbits, foxes, feral cats, pigs, goats, feral horses, wild deer, birds, rats, mice, camels, and carp and tilapia. Collectively this includes a lot of species. There is of course, the need to consider new and emerging pest animals too. Hence the prioritisation of pest animal species needs to consider established and, new and emerging pest animals.

It is not practical to apply equal effort to all pest animal species. Criteria for prioritising pest animal species that are critical to manage are needed to determine where resources should be focused to achieve the greatest benefits. Prioritisation of species is compatible with the landscape approach discussed in section 3.4.

Further to a stakeholder workshop, held in Sydney on 21 September 2015, suggested prioritisation criteria included:

Triple bottom line impacts - there are significant environmental, economic and social impacts, caused by pest invasions.

Feasibility of control – is the pest animal established and widespread or new and emerging? The stage of the pest incursion in that region will determine the feasibility of controlling the issue, i.e. prevention, eradication, containment, protection.

Future risks – what are the likely future risks associated with pest animal management of a particular species? For example, reduced winter season for baiting rabbits due to the effects of climate change. Or risks associated with domestic animals/pets escaping and becoming a pest if wild free-living populations are established?

Evidence is essential for supporting prioritisation decisions. Without evidence, the risks and costs cannot be quantified. For example, if the extent of the problem is unknown it is difficult to determine the level of control required. Recent advances in technology, especially in the spatial and telecommunication areas, has resulted in improved tracking and mapping of pest animal species, which leads to a better understanding of the breadth of the problem.

Questions - Priority pest species

1. Within the defined parameters of the ToR, which pest animals do you think the review should focus on and why?
2. What criteria should be used for prioritising pest species?
3. How should the prevention of new or emerging species be prioritised over the management of established species?
4. How can future risks be incorporated into the prioritisation decision process?

3.4 Landscape approach

Pest animal management like many other challenging biosecurity, production and environmental problems involves complex interactions between natural and human created systems across tenures, localities and industries. The dynamics of these landscape systems make their behaviour unpredictable, generating uncertainty and making management challenging.

A landscape systems approach to management is strategic and adaptive, and aims to keep the landscape operating within agreed economic, environmental and social parameters. The approach focuses on increasing capacity and preparedness to respond to the inevitable changes such as fluctuations in pest animal impacts. This approach is cross tenure and provides the opportunity to minimise perverse outcomes from a single targeted approach to pest animal management.

Stakeholders have recognised the importance of adopting such a management approach that transcends tenures and a singular focus of pest animal management, and considers other factors such as fire, drought, weeds, production and social aspects. Such an approach also provides flexibility to incorporate resilience to future risks such as climate change.

Providing flexibility, a landscape scale approach can be applied adaptively; a suite of actions are available to choose from, but how they are implemented in terms of location and combination may change, as will the level of coordination and collaboration. For example, a multiple species approach can be implemented by sequencing programs around the differing species in that particular locality.

This approach also enables trialling and monitoring the effectiveness of different interventions with the aim of learning how to better manage the landscape over time.

Barriers to success

Many of the potential barriers to a landscape scale approach cut across issues raised in section 3.1 and include:

Need for clear goals – clear objectives and goals are essential for collaborative action to be successful. The lack of clarity can lead to frustration, reducing interest in collective action if landholders are not able to see clear progress towards a goal.

Clarity of roles and responsibilities – to be successful, coordinated collective action requires clear roles and responsibilities. The lack of clear roles and responsibilities has been identified as a barrier with the current arrangements.

Need for better coordination – effective management requires coordination of public and private land managers, cross tenures, locations and scales, and organisations.

Ensuring accountability – if collective action is to be successful, parties need to be held accountable for their responsibilities under a landscape approach.

Regulatory burden – some stakeholders have raised concern that regulatory constraints (such as the use of chemical baits) and inconsistencies in planning objectives make programs more complex than necessary.

Questions - Landscape approach

1. How can strategic and coordinated planning for pest management across tenures be improved?
2. Should pest animal management activities be coordinated by species or by locality? Or is there a spatial scale at which both can be integrated?
3. What arrangements are needed to ensure early intervention of pest animal management?
4. Are the social aspects (i.e. education, networks), adequately considered in pest animal management programs?
5. Adaptive management relies on data/feedback of information to make improvements – how can the reliability of this data be ensured?
6. Should the management of pest animals and pest plants be integrated? At what scale should integration occur? Local, regional state?

3.5 Emerging issues

Australia, like the rest of the world, is undergoing change at an accelerated rate. The issues currently defining pest animal management may not be the same for emerging issues, or those yet to arise. There is a need for increased awareness of invasive pest animal threats so that solutions can be developed and capacity built to implement those solutions.

Factors that will shape the future delivery of pest management in NSW include:

Urbanisation – with increasing urbanisation of Australia comes new influences and pressures on pest management, such as increased potential for new and emerging pest animals due to the increasing popularity of exotic pets.

Pests as a commodity – there are potential positive impacts of pest animals - for example, recreational benefits from shooting or fishing and the economic gain from commercial harvesting of feral goats or carp.

Climate change – what impact will the change in climatic conditions have on pest management? Will there be new pests to consider?

Globalisation – will increases in global travel and trade inevitably lead to new pest incursions? Is NSW prepared for this eventuality?

Technological advancement – there is a significant opportunity to improve pest management through the use of new technology such as drones and real time monitoring. The use of drones to monitor pest incursions, brings with it new issues such as privacy concerns. Any such concerns need to be worked through to realise the benefits of the latest technology.

Questions - Emerging issues

1. What do you see as the priority emerging issues, risks or opportunities?
2. Is increasing peri-urbanisation influencing pest management in rural areas?
3. Is enough being done to ensure the welfare of animals in the delivery of pest management?
4. Should governments encourage the establishment of industries that commercially harvest pest animals such as goats, foxes and carp for economic gain?
5. Is enough being done to manage the risk of new incursions from exotic pets?
6. How can potential privacy concerns with the use of unmanned aerial vehicles (drones) be managed to enable improved monitoring and data collection of invasive species?

3.6 Adequate resourcing

Pest animal management activities span the spectrum from rapid responses to new incursions to ongoing programs to manage established pests. Organisations need to build resilience into their organisational capacity to be prepared and responsive to the ever changing nature and demands of pest animal management.

Ensuring staff have the appropriate expertise and knowledge on new technologies and approaches to impart to landholders requires capacity building and training. Skill-sharing through partnerships with other organisations (public/private) could provide a cost effective resource pool that can be utilised when necessary. For example, advances in the use of drones and other technologies requires new skills - could partnerships be established with researchers and/or the private sector, enabling access to suitably qualified people?

Building trust and maintaining relationships with landholders requires more than technical expertise and knowledge. Relationships are built over time and this requires continuity of staff and stability of organisations.

In this era of budgetary constraints, organisations need to be smarter and more accountable in the way they operate and spend funds. Programs (and therefore costs) need to be proportionate to the problem being addressed to ensure value for money.

In the future stronger reliance on collaborative partnerships may be required. This is already happening with the shifting focus of Local Land Services to more of a facilitation and coordination role. Other examples include encouraging greater collaboration with non-government organisations and establishing partnerships with the private sector.

The scarcity of government resources means its investment is primarily directed to those areas where government has responsibility i.e. in instances of market failure, provision of public good or promotion of coordinated action. However, when it comes to pest animal management, research and development has traditionally been a government funded activity.

Organisations such as the Invasive Animals Cooperative Research Centre (CRC), CSIRO, universities and government entities have all relied on government funding to differing degrees. It is generally through funding grants or core funded positions; however, some stakeholders claim that research funding is increasingly reliant on grants rather than core funding of staff within government organisations.

But these grants are also becoming scarce. For example, there has been a reduction in federal funded programs such as the National Feral Animal Control Program, Caring for our Country and funding linked to the national Threat Abatement Plans. Conversely, there has been a recent injection of funds into wild dog management through the National Wild Dog Action Plan. The importance of research and development is further discussed in section 3.7.



Barriers to success

Some potential resourcing and funding barriers and opportunities have been identified, including:

Declining capacity – stakeholders have raised concern about the potential for loss of capacity and knowledge as much of the research depends on temporary contracts and funding.

Opportunities for increased cooperation and skill sharing – are there opportunities for greater collaboration among practitioners? If funding opportunities are reducing, the need for collaborative research and development programs increases, as does the scope for skill-sharing across and within organisations.

Extent and effectiveness of funding – stakeholders have voiced concern about continuity in funding for ongoing management. Pest management programs are dependent on funding, which to date has been cyclic and in many situations dependent on short term funding grants. To provide more stability there are a number of current and alternative funding models that have been raised, such as:

- **Cost-sharing arrangements** - Local Land Services raise revenue from landholders of rateable land (currently defined by government as more than 10 hectares), a proportion of which goes towards biosecurity measures. The current rate could be expanded either by redefining the rateable land, or increasing the rate. To fund specific programs in pest management, there is also the possibility of raising special purpose levies.
Alternatively, building on the rates raised from landholders to carry out control programs for declared pests, there is potential for a funding model for pest management that leverages public funding from the State Government to match the rate base.
- **Community Service Obligations** – if the benefits of pest animal management actions are perceived as a public good there is scope for the costs to be shared by the broader community. There are examples of cost sharing between state and local government in other sectors where the services are seen as a public benefit.
- **Industry funded schemes** - established in other sectors, as well as in agriculture (for instance with locusts), there may be potential to create a fund based on contributions from all industry players to assist with the cost of pest animal management in NSW.

Questions - Adequate resourcing

1. Are the current resourcing and funding arrangements sufficient?
2. Is the distribution of funding equitable and matched to pest animal priorities?
3. Are there more cost-effective methods/approaches to managing pest animals?
4. Are there workable alternative funding models from industry, government or community?
5. What opportunities are there to work with the private sector to deliver programs, or secure funding?
6. Is the current investment in research sufficient (e.g. amount of funding, time scale of funding)?
7. How can available research dollars be used more effectively, better prioritised and coordinated and/or better leverage additional investment?
8. Should new industry players (such as game hunting, wild fur and rangeland goat harvesting) have a role in offsetting pest animal control costs? Similarly, should those that generate pest animal management risks and/or benefit from pest animal management actions contribute to the costs of management?

3.7 Knowledge building

The impact of pest animals requires governments, industry, researchers, landholders and community to constantly seek improved approaches to management. Pest animals are elusive and generating reliable evidence of management effectiveness is difficult.

To date, NSW and Australia have had an enviable research capacity that provides a solid foundation to build upon. Research and development is undertaken by organisations such as the Invasive Animals CRC and CSIRO, as well as state agencies and universities. Stakeholders have indicated there is effective translation of research to on-ground application, especially through close working relationships between government researchers and landholders that have resulted in successful training programs.

However, stakeholders have also stated there is a need for accredited training programs in pest animal management through the vocational education and training sector for practitioners, planners and decision makers. Professionalising the industry will encourage career development and capacity building within and across organisations.

The work of the Invasive Animals CRC has been pivotal in improving research, knowledge and capacity to better manage pest animals. However, there is no certainty over the future of research and development with the Invasive Animals CRC ceasing in June 2017. It is proposed to establish a Centre for Invasive Species Solutions post June 2017, but to date this has not been confirmed.

However, with change comes opportunity, and there may be scope to further improve collaboration in research and development, especially in relation to industry, community and non-government organisations involvement.

There have been recent advances in spatial and telecommunication technology, which provide for improved identification, diagnostics, surveillance coordination and reporting capacity. It has also resulted in greater accessibility to tools such as feral scan and GPS technology. Various groups, from landholders to local councils, have begun using these tools to assist with tracking of pest animals.

Other examples include the Southern Sydney Councils fox mapping resource and wild dog mapping by landholders and the broader community and aerial photography and GPS to locate rabbit warrens.

The Department of Primary Industries has a Biosecurity Information System that allows remote data capture and has reporting and geospatial capabilities that allow collation of data on a State and regional basis across NSW. A project is being initiated to allow the sharing of information for pest animal reporting at state and regional levels.

There is a gap in knowledge building, however, in relation to monitoring and evaluation of program outcomes. Lack of evaluation to assess if programs are achieving the desired results means opportunities to seek improvements through research and development mechanisms are lost. Greater effort is required to design programs with monitoring and evaluation components to determine if the goals are being achieved and if not, why not.

Continuous improvement is essential to ensure new methods and approaches are developed to prevent, eradicate, contain or control pest animals.

Barriers to success

Some potential barriers to more effective implementation of research and development to achieve on-ground outcomes have been identified, including:

Limited collaboration – feedback indicates more collaboration and improved sharing of information is required within and between agencies/organisations. This could be through better coordinated reporting systems and greater communication.

Poor dissemination of information – better dissemination of information to the broader community was also identified as a barrier to knowledge transfer. Information needs to be more readily accessible to the community.

Lack of data collection and reporting – stakeholders have indicated an absence of data collection and reporting stymies the ability for ongoing improvements. A centralised data repository system would assist with data collection and reporting, enabling analysis of performance outcomes, which drives accountability and benefits the broader community.

Limited monitoring and evaluation – feedback indicates more oversight is required to encourage meaningful monitoring and evaluation of programs. Stakeholders have indicated feedback on the success of a program is subjective rather than objective. There is either no feedback (suggesting the pest animal has been successfully dealt with on a particular property) or verbal feedback in relation to the number of pest animals deceased only.

Questions - Knowledge building

1. Are there any additional barriers to effective implementation of pest research outcomes?
2. How can the dissemination of research results and the adoption of new controls and technologies be improved?
3. What roles and responsibilities should research and development corporations have with respect to pests?
4. Is there a need to develop accreditation programs for professional development?
5. How can information be made more readily available/accessible?
6. Are the current surveillance activities likely to identify new pest animal incursions in a timely manner?
7. Is information on the effectiveness of pest animal management programs collected? If not why not?
8. If information is collected, is it used to adapt /change subsequent programs?

Making a submission

Please refer to page 1 for details on how to provide a submission.



Appendix A - Terms of Reference

TERMS OF REFERENCE

State-wide review of pest animal management

The Premier requests the Natural Resources Commission (Commission) to review the management of pest animals in NSW (under Section 13(1) (f) of the *Natural Resources Commission Act 2003*).

Pest animals create economic, social and environmental costs for the NSW community. Across Australia, pest animals have been estimated to cost \$745 million annually, including losses in agriculture and expenditures on management, administration and research. They also threaten the environment. Within NSW more than 350 species, populations and communities are considered to be threatened by the impacts of pest animals. The social and emotional impacts on farmers and communities are also significant, especially where pest animals kill livestock.

Pest animals are managed across different tenures by private and public land managers including the National Parks and Wildlife Service and Local Land Services. Several pieces of legislation are relevant to pest animals and their management, including the *Local Land Services Act 2013*, *Threatened Species Conservation Act 1995*, the *Game and Feral Animal Control Act 2002*, and the *Biosecurity Bill 2014*.

There is a perception that the pest animal problem is getting worse despite efforts of landholders and governments, and that more coordinated approaches are needed.

The purpose of the review is to identify opportunities to improve the management of pest animals in NSW across all land tenures for environmental, economic and social benefits.

In particular, the Commission will investigate and identify:

- quality of the evidence base and processes supporting prioritisation decisions
- priority pest animal issues in NSW and emerging risks
- examples of current good practice, including from other jurisdictions
- any policy, regulatory or organisational barriers to more effective pest animal management
- opportunities to better coordinate, redirect or grow investment and management across tenures and across different pest species and maximise benefit per dollar invested
- priority research needs
- ways to promote community understanding of and involvement in pest animal management.

The review will recommend options for improving arrangements for pest animal management across NSW, including potential funding models. The review will also consider implementation and transitional issues for any recommendations.

The review will consider introduced terrestrial and freshwater vertebrate species. Animals in the marine environment are excluded.

The Commission will chair an advisory committee to inform the review. The Committee will include one representative from each of the Department of Primary Industries, Office of Environment and Heritage, Local Land Services and an independent member with pest animal management expertise.

The Commission will provide an issues paper followed by a draft report within six months of receiving the terms of reference, and a final report including outcomes of public consultation within four months of providing the draft report.