

The case for a National Rabbit Management Coordinator

Discussion Paper



This Discussion Paper has been prepared by the Foundation for Rabbit-Free Australia Inc. in consultation with members of the Australian Rabbit Managers Network.

Cover image: K Greenfield, 2007

2024

Foundation for Rabbit-Free Australia Inc is an environmental charity dedicated to raising awareness about the harm caused by rabbits, the ongoing need for research into effective rabbit controls, and the application of science-based rabbit controls to rid Australia of wild European rabbits and enable productive landscapes supporting natural ecosystems.

For more information see: www.rabbitfreeaustralia.org.au. Follow Us, Join Us, Help Us.



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Contents

- Summary 4
 - Introduction 4
 - Control options 4
 - Complacency..... 5
 - Communication & coordination 5
 - Landscape outcomes 6
 - National coordination 6
- Introduction 7
- About rabbits 7
 - Rabbit impacts 7
 - Distribution and abundance 7
 - Costs and harm 8
 - Control options 9
- Operating environment 10
 - Complacency..... 10
 - Management skills..... 10
 - Rabbit control programs 11
 - Policy and leadership 12
 - Research and monitoring..... 13
 - Landscape outcomes 14
- Beneficiaries of rabbit control 15
- National coordination 17
- The need 19
- Feedback 21
 - Discussion Points 21
 - Further Contact..... 21
 - Feedback..... 21
- References..... 22
- Appendices..... 23
 - Appendix 1. About Rabbits 23
 - Appendix 2. Lessons from National Coordination 25

Summary

Introduction

Wild European rabbits have caused great harm to Australian landscapes, damaging natural ecosystems, primary production, and urban and peri-urban areas alike across the southern two-thirds of Australia.

Well-researched biological controls have significantly reduced rabbit numbers in Australia and are now crucial to effective rabbit control, but they are not sufficient on their own to reduce rabbit populations to levels that are not a risk to the environment.

To effectively control rabbits, land managers need to use additional physical and chemical means to take advantage of the gains generated by biocontrols. A good range of technical rabbit control solutions exist, but over-reliance on biocontrols has meant they are not being applied as widely or as well as required. There are also some situations where new control options are needed, and preparedness is required in case the effectiveness of existing rabbit biocontrols wanes over time.

Two major challenges to the long-term management of wild European rabbits in Australia are:

- optimising the effectiveness of biocontrols through greater effort in other forms of rabbit control
- ensuring there is a constant stream of research so new biocontrols are available as required, as they are the only effective broadscale control available to date and it takes a decade or more for their development and testing.

A National Rabbit Management Coordinator would be an important element in stimulating wider and more effective application of current technologies and provide a link between researchers and managers to assist the development and application of better control techniques.

Control options

Myxomatosis was the first rabbit biocontrol in Australia. Its introduction in the 1950s resulted in a dramatic reduction in rabbit numbers. Since then, a sequence of population recovery phases have been truncated by new biocontrols; with the most recent being the arrival of calicivirus strain RHDV2 nearly a decade ago. That history illustrates that the lasting effectiveness of biocontrols should not be taken for granted and that rabbit populations could soon return to pre-calici densities if the existing biocontrols become less effective. The more contained rabbit populations are, the less risk there is of biocontrols and rabbits quickly co-evolving to reduce the effectiveness of existing biocontrols.

Decades of experience in rabbit control and evolving technologies mean that there are very effective rabbit control techniques available, and skill in their application, to supplement biocontrols. Well-planned control programs that include warren destruction provide lasting benefit and a very positive return on investment. The problem is that much of that knowledge is ebbing away and is no longer widely applied.

Recent analysis by ABARES supports anecdotal observations that many attempts at rabbit control are not applying recommended practices and hence have only limited success. The studies report that nearly 25% of Australian land managers commit some funds to rabbit control, but of them only 24% think they've been effective (Stenekes *et al.*, 2023). The successful programs generate up to a 6:1 return on investment through reductions in production losses due to rabbits (Hafi *et al.*, 2023).

Additionally, new control options are still needed for extensive (outback) areas where existing physical and chemical controls are very costly due to the sheer size of properties, and in highly sensitive environments where traditional techniques may have reduced applicability (such as urban and peri-urban areas and sites of conservation or cultural heritage significance). More research and development is needed, and it should occur in collaboration with rabbit managers so they can share their insights and guide researchers to priority needs.

Complacency

The broad success of biological controls has resulted in rabbits often being overlooked as a pest, being under-recognised and under-rated and not seen as warranting routine management or investment. A level of complacency about rabbits is apparent from land managers through to governments, often resulting in rabbits being ignored until there are local outbreaks that simply cannot be overlooked, but by then it's often too late for efficient and effective control.

Re-engaging, re-invigorating and upskilling land managers in rabbit control is considered a top priority by many rabbit program administrators, and the development and promotion of clear, consistent messaging is paramount to that end.

Communication & coordination

A common feature across much of the country is the lack of opportunities for those managing rabbit control programs to communicate with each other. There are no effective means for isolated rabbit program managers across Australia to be aware of each other, let alone communicate and share ideas and learnings to lead effective, proactive rabbit control programs.

The fragmented application of best practice rabbit control at regional and state levels is a consequence of fractured communication. Inadequate communication across wide areas and between national, state and regional levels risks sub-optimal coordination and outcomes should national collaboration be required, such as for the release of a new biocontrol.

There are structures in place for communication and collaboration on policy responses to pest and biosecurity issues of national significance covering state and national levels, but little that is specific to proactive rabbit management. Strategies and programs to which rabbit management could contribute could be better linked between federal, state and regional levels if resources such as a National Rabbit Management Coordinator and National Rabbit Action Plan were in place.

Furthermore, there is no national guidance on research priorities for rabbit control that has good engagement with the disparate bodies contributing new knowledge, and with networks that may be a conduit between research and practice. An important element is commitment to the long-term monitoring and associated research required to track rabbit populations and the performance of biocontrols across Australia as an early-warning of waning effectiveness from current options.



Image: G Schulz, 1991

Landscape outcomes

Achieving goals such as being 'Nature Positive' and 'threat abatement' require whole-of-landscape approaches, including integrated pest control that would, for example, link rabbit, feral cat and weed control. Expertise in rabbit management is a necessary input to the development of relevant plans and strategies but is often absent.

The pervasive nature of rabbits and the harm they cause, disrupting whole ecosystems and affecting landscape function, mean that a broad cross-section of society benefits from rabbit control.

National coordination

The issues presented in this Discussion Paper suggest that rabbits are under-rated as a pest in regional and peri-urban landscapes, posing a risk to longer term resilience and recovery. The issues could be addressed by a National Rabbit Management Coordinator and National Rabbit Action Plan. The National Coordinator model is being effectively used for wild dogs, feral cats and foxes, feral deer and feral pigs, and their success illustrates the benefits of national coordination for vertebrate pest management.

The main purpose of a National Rabbit Management Coordinator would be to raise the profile of rabbits and re-engage and invigorate land managers, while stimulating the provision of necessary training and support so existing rabbit control techniques were applied more widely and more effectively.

A National Coordinator would, by definition, coordinate. Regardless of the skill and effort shown by the coordinator, if there aren't other resources and willing stakeholders to work with, expectations for the position will not be achieved. It is proposed that, regardless of where the funds come from, the model for a National Rabbit Management Coordinator and Action Plan should be a collaborative one with:

- secure long-term funding – ideally a rolling, annually renewed five-year budget
- investors 'buying in' to a package where they bring funds and in-kind support, such as commitments to work with the National Coordinator and provide operational contacts for them.

Introduction

It is proposed to develop a Business Case as a catalyst for the appointment of a National Rabbit Management Coordinator, promoting the wider application of science-based rabbit control techniques to effectively manage wild rabbits in Australia. The position would operate in conjunction with the National Coordinators for feral cats and foxes, feral deer, feral pigs and wild dogs to achieve broader goals of landscape recovery and resilience. This document sets out the issues and seeks feedback on the level of support for such a position and the most appropriate ways for it to operate.

About rabbits

Rabbit impacts

Wild European rabbits occur across the southern two-thirds of Australia. They are communal, territorial animals based on warrens that provide shelter and a safe breeding environment. They are rapid, profligate breeders and in good conditions their populations boom. Those booms may be followed by ‘busts’ as feed stocks are exhausted or fail during natural disasters like drought.

Rabbits are preferential eaters; their small mouths and chiselled teeth enable them to select the smallest of plants and some plant species are ‘like chocolate’ to them – sought out and consumed no matter how sparsely spread they are. Rabbit densities as low as 0.5 rabbits per hectare are sufficient to prevent the regeneration of palatable species (Bird et al, 2012 & Mutze G et al, 2016). However, when feed is scarce rabbits will eat virtually anything to stay alive. Following droughts rabbits rebound rapidly, as soon as green-pick is available, influencing which plants species regenerate and establishing a competitive position against other slower-breeding herbivores.

Wild rabbits have wrought great harm to Australian landscapes and ecosystems. They reduce vegetation cover and their selective grazing changes the composition and structure of native ecosystems and farmed pastures alike. Unpalatable weeds are more prevalent where rabbits abound. Rabbits are a contributing factor to the plight of more than 320 threatened species of native plants and animals and a Threat Abatement Plan (which is up for review in 2024) guides high-level strategies to contain those threats.

Wild rabbits also sustain feral cats; which are recognised as a priority threat to Australia’s aim of being ‘Nature Positive’. The combination of rabbits, feral cats and foxes is a disaster for the environment. Controlling rabbits is often an important first step toward controlling feral cats. Feral predators can help contain rabbits when rabbits are in low numbers, effectively ‘harvesting’ young rabbits, but in good seasons rabbits quickly outbreed any amount of predation as mature rabbits thrive and continue to breed. ‘Hyper-predation’ of small to medium sized native species due to excessive feral predator numbers can occur, driven by the presence of rabbits.

Distribution and abundance

Well-researched biological controls, myxomatosis, rabbit fleas and calicivirus (RHDV), have significantly reduced rabbit numbers in Australia and are now crucial to effective rabbit control, but rabbits still persist at levels that harm the environment, primary production, and urban and peri-urban areas. Myxomatosis initiated a dramatic reduction in rabbit abundance in the 1950s and a sequence of rabbit recovery phases interrupted by new biocontrols has followed. The latest rabbit virus, RHDV-2, first emerged in Australia around 2014 and began to occur more widely as RHDV-K5 was introduced a few years later.

There are no national measurements of the current distribution and abundance of rabbits, although some states do maintain a monitoring program. The consensus drawn from the available data is that rabbit numbers, although seasonally dynamic, are relatively stable and lower than pre-RHDV2 levels (about 60% in one analysis), with lower rates of increase than in pre-RHDV2 times due to the variant and management interventions. Anecdotally, there is a sense that the number of complaints about damage from hares in some regions is higher now than in previous times.

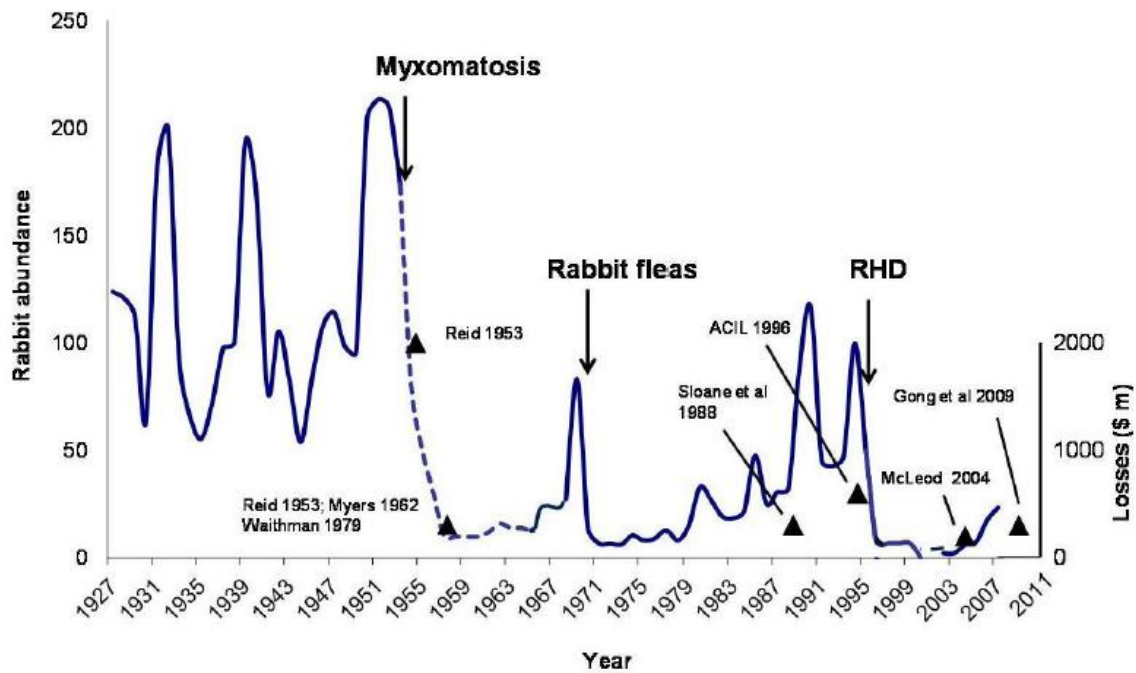


Figure 1 Rabbit abundance & economic loss (Cooke et al., 2013)

See **Appendix 1** for more information on rabbit impacts, distribution and abundance.

Costs and harm

The cumulative cost of rabbits to Australia is estimated at around \$1.3 billion (US), similar to the combined cost of feral cats, rats and mice, and wild pigs; and that figure would have been more than \$50 billion (US) higher if not for the highly effective rabbit biocontrols introduced from the 1950s onward (Brayshaw et al., 2021). Rabbits are estimated to be costing Australian grazing and some cropping industries more than \$200 million per year (McCleod, 2016). That figure is broadly supported by a 2023 publication from ABARES (Hafi et al., 2023) on the average annual cost of pest animals and weeds to Australian agriculture in the five years to 2020-21 which concludes that:

- Rabbits have a total cost of nearly \$200 million a year, consisting of \$114 million lost production for beef, sheep meat and wool industries via competition for pasture (but up to \$192 million under times of higher commodity prices), and \$82 million private expenditure on control. Foxes are similar in total cost and wild dogs are close to \$300 million, while feral pigs are about \$150 million and feral goats \$15 million.
- The \$114 million of lost production due to rabbits far exceeded that of the next most costly species, wild dogs at \$73 million lost production. Just over half (57%) the losses came from beef, the remainder from sheep (for meat and wool) production.
- A subset of land managers who experienced major problems from rabbits but deemed their control to be very effective collectively spent \$5 million, avoiding \$31 million additional losses. That 6:1 return on investment was the highest of all vertebrate pest control efforts. However, only a small percentage of managers attempting rabbit control felt their efforts were very effective. An earlier report (Stenekes et al., 2023) reported that 51% of managers attempting rabbit control did not believe they had been effective.

Losses for irrigated pastures and vegetable production have been estimated as \$50 and \$100/rabbit/year respectively (DPI&F, 2008), but no evaluation has been done of annual costs to those industries, or to viticulture, orchards, forestry, nurseries or carbon plantings. Similarly, there has been no evaluation of the costs of rabbits to infrastructure or parks and sporting grounds (e.g. golf courses), to revegetation efforts, or to urban gardens and housing. Rabbits impact all of those and studies have shown the survival of trees planted for

reforestation declined non-linearly with rabbit density, with even very low rabbit densities having strong negative effects on tree survival (Forsyth *et al.*, 2015).

A recent study (Ross, 2023) has concluded that, even in post-calici times, rabbits are still holding many rangeland areas 'suspended in a state of degradation' with increased weeds and inhibited recruitment of woody native species.

The harm rabbits cause, and the need to destroy them, can cause considerable stress for those involved. That ranges from urban residents battling to save their vegies, through landholders dealing with the reality of having to destroy rabbits to Traditional Owners grappling with the harm that rabbits cause to species and sites of special significance.

Control options

Australia's history of introducing biocontrols for wild rabbits is a global success story that continues to shed light on the science behind them. Myxomatosis, rabbit fleas and calicivirus (RHDV) have, and continue to have, influence over rabbit numbers. A variant of calicivirus (RHDV-K5) is available as a biocide, and the RHDV2 variant is now the dominant biocontrol found in the field. K5 is still used as a local biocide when RHDV2 isn't present, although there were supply issues in 2023.

Biocontrols are not sufficient on their own to reduce rabbit numbers to levels that do not pose a risk to the environment. They must be used as one of several tools in a suite of wisely integrated control measures; with an emphasis on the destruction of warrens or harbour to prevent future breeding.

The lasting effectiveness of biocontrols should not be taken for granted. There is a risk that the effectiveness of biocontrols will wane over time (as has happened previously), resulting in a quick return to pre-calici rabbit densities. A constant stream of research is needed to ensure new biocontrols are available as required, they being the only effective broadscale control available to date. That research must be accompanied by active control using tried-and-true traditional methods, and work to fill gaps in the control armoury.

Additional control options are needed for extensive (outback) areas where existing physical and chemical controls are very costly due to the sheer size of properties, and in highly environmentally or culturally sensitive environments (including urban and peri-urban areas as well as heritage sites) where traditional techniques may have reduced applicability. More research and development is needed, as well as networking amongst managers so they can share their learnings and guide researchers to priority needs.

The management of rabbits in peri-urban and urban areas must deal with numerous social challenges as well as adapting to the limited range of control options suited to such environments. Attitudes within a community can include a total aversion to the death of any animal regardless of the harm it is causing, and a preference to see 'cute bunnies' hopping about, as well as anger and frustration at the seemingly unending damage they cause. Unmanaged populations can become prolific (up to 20 rabbits/ha according to a recent example), a situation that may foster the development of immunity to biocontrols, which could then spread to rural areas.

Decades of experience in rabbit control and evolving technologies mean that there are very effective rabbit control techniques available and skill in planning control programs that integrate those options. Well planned control programs that include warren destruction provide lasting benefit and a very positive return on investment. The problem is that much of that knowledge is ebbing away and is no longer widely applied.

Operating environment

Complacency

The success of biological controls has resulted in rabbits often being overlooked as a pest, being under-recognised and under-rated and seen as not warranting routine management or investment. In many situations around Australia there is an over-reliance on calicivirus and rabbits are ignored until there are local outbreaks that simply cannot be ignored, but by then it is too late for efficient and effective control.

Response-based rabbit control can result in *ad hoc* programs being run when rabbits are at their most numerous and being less likely to be effective. The primary aim is often to treat the symptom (lots of rabbits), without treating the root causes (such as destroying warrens). Furthermore, if RHDV-K5 is used as a biocide when young rabbits are present it can be counter-productive, leading to increased immunity and resistance in surviving populations; reducing the effectiveness of the biocontrol. **Effective rabbit control needs sufficient lead time for comprehensive planning, and actions need to be well executed and well timed to get maximum return on investment.**

A number of factors contribute to rabbits being under-recognised and under-rated as pests.

Nationally, there are fewer rabbits around since the advent of calicivirus; they, and their impacts, are less obvious than in pre-calici times (30-odd years ago). Many land managers haven't seen the severe damage that rabbits can cause and aren't trained to 'see' the subtle harm that lower densities of rabbits cause, even though it may change the entire structure and functioning of a natural system.

There is also a sense that calicivirus has done the job – fixed rabbits for good – resulting in complacency. The reality is that biocontrols are rarely sufficient on their own and are certainly not sufficient with highly fecund species like rabbits. If warrens are not destroyed, any rabbits surviving biocontrols can rapidly breed-up in good seasons – raising the risk that immunity and resistance to biocontrols will spread through rabbit populations.

Another issue is that, because rabbits result in damage and costs to the environment and to primary production, management responsibilities for rabbits may rest with several agencies; e.g. environment agencies and agricultural or biosecurity agencies. It can be unclear who should take a lead. When it comes to setting priorities and budgets, individual agencies may rate rabbits lower from their perspective than would occur if they were jointly assessed in a holistic sense by all stakeholders.

Discussion Point:

Are rabbits over-looked and under-rated as a threat to healthy landscapes and, if so, how can the profile of rabbit issues be raised?

Management skills

Complacency about rabbits is apparent among land managers through to governments. Within government, it has led to reduced investment, risking a broad loss of technical skills in rabbit research and management, with flow-on effects in rural communities and land managers.

There is a sense that land managers overall are paying insufficient attention to rabbit control and the control work undertaken is often not done well. A recent survey of state and federal rabbit program administrators (through the Terrestrial Vertebrates Working Group) found many believed that many land managers were not applying best or recommended practice in their rabbit control efforts.

Complacency in rural communities has meant that management skills have dissipated without renewal and managers have not kept abreast of science-based advances. Whole generations of modern managers have never witnessed the harm rabbits can cause, are not conscious of the damage 'a few rabbits' would quickly cause if biocontrols became less effective, and are not aware of control options and how to implement them.

Knowledge is being lost and there are few mechanisms for new knowledge to be rapidly shared. Consequently, attempts at rabbit control often have limited impact due to inappropriate timing, poor choice of methods and lack of skill in implementation. A lack of success can result in managers abandoning future efforts for rabbit control.

A recent national survey of land managers found that rabbits were a problem for 53% (being a major problem for around 10%) and, of those to attempt rabbit control (around 25% of land holders), 51% felt their efforts were ineffective or were unsure while 24% thought they were very effective. Effective management of rabbits can generate up to a 6:1 return on investment (Stenekes *et al.*, 2023). A review of control projects by Taggart *et al* (2024) found an over-reliance on RHDV with insufficient, and at times inappropriate, use of other options.

Re-engaging, re-invigorating and upskilling land managers in rabbit control is considered a top priority by many rabbit program administrators, and the development and promotion of clear, consistent messaging is paramount to that end.

A Glovebox Guide for Managing Rabbits has been produced as a national summary of recommended practice, but requires updating regarding the advent of RHDV2, wise use of RHDV-K5, and the merits of integrating rabbit control with that of other pests (especially feral cats and foxes) and with weed control (especially species that provide harbor for rabbits). The Guide is supported by the PestSMART website and RabbitScan managed through CISS (Centre for Invasive Species Solutions). Most States have web-based information as do many regional organisations and rabbit-focused groups like VRAN (Victorian Rabbit Action Network) and Foundation for Rabbit-Free Australia.

Some training and update programs are run at state and regional levels by agencies, but it is inconsistent across the nation. VRAN ([Victorian Rabbit Action Network](#)) has a strong focus on mentoring and skill development for land managers and rabbit practitioners, some state and regional bodies adopt 'train the trainers' style programs, while others have no formal training programs.

On-line training is available for some aspects of pest management, including elements of rabbit control, e.g.

- Tocal College (NSW) – [Vertebrate pesticide induction](#) and [Conservation Land Management](#)
- Department of Primary Industries and Regional Development (WA) [Landholder pesticide use](#) training, via their external site.

Discussion Point:

Is there a need for more knowledge, skills and training in rabbit control practices for land managers and, if so, how could these needs be best addressed?

Rabbit control programs

There are numerous examples of innovative and effective rabbit control programs across Australia, with good community participation and proactive campaigns that are well planned, well timed and well executed. However, there are also many cases where managers struggle to generate the results they aspire to and are only resourced to operate *ad hoc* responsive control projects. A common feature across much of the country is the lack of opportunities for the managers of rabbit control programs to communicate with each other.

There are no effective means for isolated rabbit program managers to be aware of each other, let alone communicate and share ideas and learnings to lead effective, proactive rabbit control programs. Better communication would enable those most needing support to learn from the experiences of others from across the country, while those from better resourced situations could further influence national outcomes.

It is not uncommon for officers appointed to roles with rabbit management responsibilities to begin with limited technical knowledge or rabbit control experience, and have little access to specialist peer support, training or advice. It is difficult for them to gain the necessary skills and there can be reluctance to openly seek special support, coping with their situation in isolation instead.

Furthermore, people charged with managing rabbits may work across several pest species and find themselves drawn into reactive measures for publicly visible issues rather than proactive, preventative rabbit control.

The fragmented application of best practice rabbit control at regional and State levels is a consequence of fractured communication. Inadequate communication across wide areas and between national, state and regional levels risks sub-optimal coordination and outcomes should national collaboration be required, such as for the release of a new biocontrol.

For the past year or so, Rabbit-Free Australia and CISS have facilitated the Australian Rabbit Managers Network (three or four people per jurisdiction) to share information and ideas. A Peri-urban Discussion Forum is being trialled as a flow-on from that. It is early days for the networks, with mixed results to date. Their reach is limited by resources, but the initiatives are a start in addressing a need, and will provide learnings for subsequent efforts that may aim to serve a bigger audience. Much of this work, particularly engaging with practitioners about 'best practice', would be better done through direct contact by a National Rabbit Management Coordinator.

Other possible avenues for engagement and communication include:

- [NRM Regions Australia](#) convenes an on-line Community of Practice for biosecurity issues, including rabbits, as a virtual network for regionally based program managers.
- Australian Local Government Association ([ALGA](#)) a national voice for local government. Local Government Association Queensland ([LGAQ](#)) has resolved to seek the appointment of a National Rabbit Coordinator.
- [Australian Land Conservation Alliance](#) (ALCA) bringing together organisations that conserve, manage and restore nature on privately managed land.
- [Landcare Australia Ltd](#) and [National Landcare Network](#) connecting people actively caring for lands and water.
- [Invasive Species Council](#) aims to help build stronger, collaborative biosecurity systems across animals, plants, fungi and microbes, with an emphasis on analysis, alliances, advocacy and action.
- [Rural R&D Corporations](#), such as MLA, AWI, GRDC, FWPA, Wine Australia and Hort Innovation.
- Industry bodies, such as NFF and [commodity bodies](#) for red meat, wool, crops, horticulture and wine.

With regard to general community awareness, Rabbit-Free Australia is keen to expand the use of Easter Bilby and the 'bilbies not bunnies' slogan as a means to raise awareness of rabbit issues in the months before Easter each year, and as a vehicle for organisations to showcase their rabbit control programs and invite participation.

In summary, there is much happening regarding rabbit control in Australia, but it is not enough and what is undertaken is not always done well. It is not reaping optimal returns on investment. Not adequately managing rabbits ensures continuation of the losses and harm they cause, and runs the risk that rabbit populations will grow, potentially rapidly at some stages, and further increase those costs.

Discussion Point:

Could the management of rabbits be improved by better training and information sharing between managers of rabbit control programs and, if so, how could that be achieved?

Policy and leadership

There are structures in place for communication and collaboration on policy responses to pest and biosecurity issues of national significance covering state and national levels, but little that is specific to proactive rabbit management. The main structures are:

- Terrestrial Vertebrates Working Group (TVWG), a sub-group of the Environment and Invasives Committee. The EIC has representatives of national, state and territory primary industry and environment departments providing national policy leadership on the identification, prevention and management of invasive species that adversely impact the environment, economy, community and environmental biosecurity issues.

- National Biosecurity Committee (NBC), made up of senior officials from national, state and territory primary industry and/or environment agencies.
- Agriculture Senior Officials Committee (ASOC), whose members are national, state and territory departmental heads responsible for primary industries policies).

There is also a national Threat Abatement Plan for rabbits, which provides a framework for research, management and other actions to maintain species and ecosystems adversely affected by rabbits. It is due for review in 2024. However, there is neither a broader National Rabbit Action Plan nor National Rabbit Management Coordinator to drive collaboration and strategic management objectives for rabbits (and help deliver the Threat Abatement Plan and other relevant national policies and plans) as there are for several other vertebrate pest species.

The appointment of a National Rabbit Management Coordinator could be a catalyst for a review of the Threat Abatement Plan for rabbits in conjunction with the development of a National Rabbit Action Plan, providing better outcomes for each and the environment.

Rabbit management has a role in drought, fire, and flood recovery, and in building resilience in regional landscapes and communities. There is scope for more inclusion of rabbit management in policies and strategies dealing with such issues.

Strategies and programs to which rabbit management could contribute could be better linked between federal, state and regional levels if resources such as a National Rabbit Management Coordinator and National Rabbit Action Plan were in place.

Discussion Points:

Is there a need for clearer national leadership in rabbit management and, if so, how could it be provided? Would a National Rabbit Action Plan and Coordinator assist?

How could better links be established between federal, state and regional plans and programs regarding rabbit control, as part of broader environmental and regional resilience programs?

Research and monitoring

Many State agencies, universities and institutions (including [CSIRO](#)) undertake research involving rabbits, from genetics and genetic technologies, ecological associations, animal physiology, control techniques, parasitology and diseases, to rabbit impacts. Those organisations are diverse and, outside of CISS, their research efforts are often not connected.

There is no national guidance on research priorities for rabbit control that has good engagement with the disparate bodies contributing new knowledge, and with networks that may be a conduit between research and practice.

At senior research and administrative levels, there is currently no formal forum for the exchange of information and ideas between rabbit scientists in different states, and those experts may be spread across agencies and institutions in disparate agriculture-focused or environment-focused groups. Nor is there a clear picture of how rabbits are being managed nationally, let alone how widespread they are and in what densities, or how biocontrols and rabbits are evolving in the 'arms race' between virulence and resistance. A Rabbit R&D Working Group hosted by CISS provided an opportunity for collaboration between researchers involved in CISS programs, but that is no longer operating.

The Centre for Invasive Species Solutions (CISS) is a provider of collaborative research projects across a range of invasive species. The Centre took a lead role in developing and managing rabbit research projects with a range of collaborating research providers that resulted in the release of RHDV-K5 (an eight-year-long investment), determining if RHDV2 was a suitable biocontrol, optimising current biocontrols, and determining best practice rabbit management techniques.

CISS is now transitioning to a new model of funding and operations, and is planning for a National Rabbit Biocontrol Pipeline Strategy within its portfolio; to be considered by the TVWG. The Australian Government has funded research by NSW DPI to test novel RHDV delivery methods, and CSIRO and MLA (Meat & Livestock Australia) have projects to assess rabbit viruses from overseas as potential bio-controls, to develop a tissue culture technique to accelerate the selection of better biocontrols, and to assess genetic control technologies for use in Australia. CSIRO also invests in gene control technologies and in virus research.

CISS and Rabbit-Free Australia have been convening an annual webinar presenting recent research findings, from various sources, to help bridge the science-to-practice gap. Rabbit-Free Australia also runs an annual call for small projects that are assessed against its [Research Prospectus](#), to help maintain and build research capacity, trigger blue-sky research, and as a catalyst or supplement to larger projects.

In terms of monitoring, CISS worked with NSW DPI to develop [RabbitScan](#) in the FeralScan reporting portal. The portal allows anyone to map sightings, report problems caused by rabbits, document control actions and stay informed about rabbits in their area. It also enables anyone finding a dead rabbit to request a free disease sampling kit and find out whether calicivirus was the cause of its demise.

RabbitScan data has been used to research management practices and the [free tissue sampling](#) has provided CSIRO with data on virus occurrence; resulting in a recent research paper on the surveillance of rabbit biocontrols in Australia (Peng et al., 2023). The Australian Government (DAFF) have recently funded the CSIRO tissue testing service for a further two years.

Some states also maintain monitoring sites to provide long term data on rabbit abundance and often the prevalence of biocontrols as well, but the sites are limited in coverage and some are not assured of ongoing funding. A National Rabbit Data-Base was developed through the University of Adelaide (Roy-Dufresne et al, 2019) and has been used for research, but it is not being maintained or updated.

Because of reduced monitoring there is now limited knowledge of rabbit populations and trends at landscape and national scales. Without long term monitoring and associated research, it is not possible to track rabbit populations and the performance of biocontrols.

Discussion Points:

Would there be value in better monitoring rabbit distribution and abundance and the performance of biocontrols in Australia and, if so, how might that be achieved?

Is it important for rabbit researchers to communicate with each other and, if so, how might that be facilitated?

Landscape outcomes

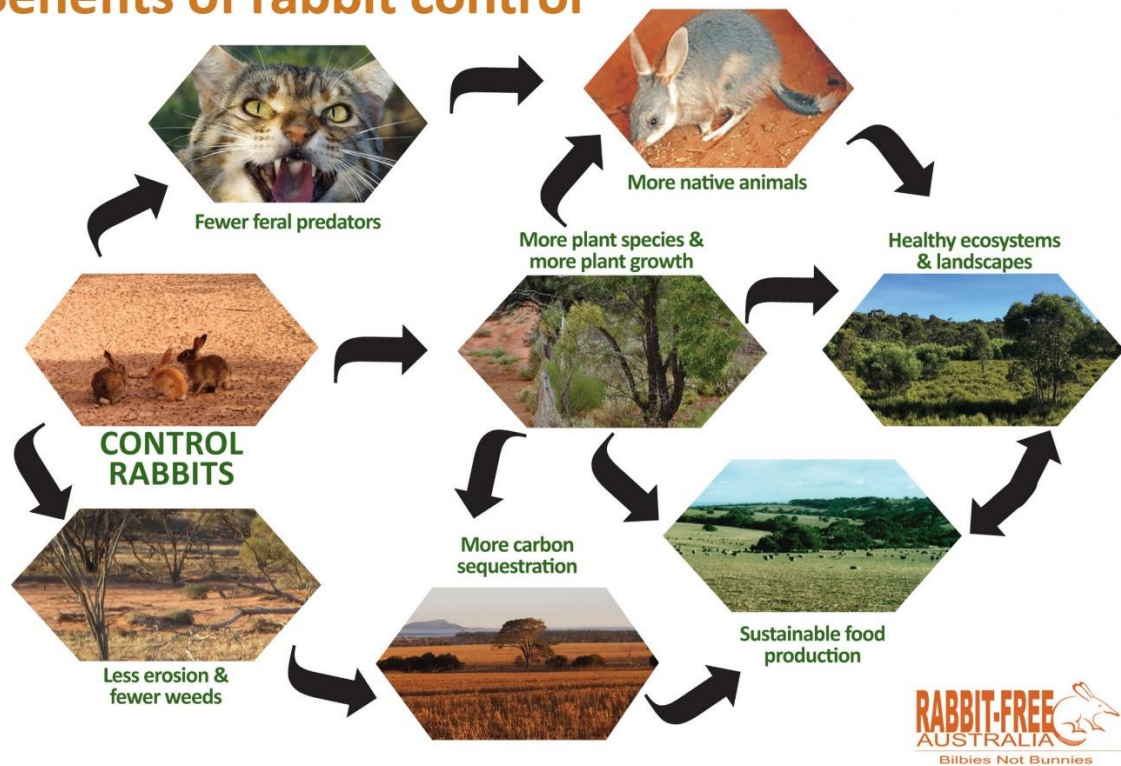
Achieving goals such as being 'Nature Positive' and 'threat abatement' require whole-of-landscape approaches including integrated pest control. Expertise in rabbit management is a necessary input to the development of relevant plans and strategies, but is often absent.

Without a National Rabbit Management Coordinator or National Rabbit Action Plan there isn't consistent high-level input to other national plans, to the design of integrated pest and weed control messaging and programs at the national level, and no effective conduit for rabbit issues between regional, state and national levels.

Beneficiaries of rabbit control

The pervasive effect of rabbits and the harm they cause, disrupting whole ecosystems and affecting landscape function, mean that a broad cross-section of society benefits from rabbit control.

Benefits of rabbit control



Agriculture, especially grazing industries, has traditionally been considered the main beneficiary of rabbit control and, in terms of dollar impact, rabbits still rate as the biggest vertebrate pest. Estimates of losses due to rabbits and benefits from rabbit control for cropping and (largely) grazing include losses of \$1/rabbit/year for sheep and cattle production (DPI&F, 2008), and \$217 million per year for wool, sheep meat and beef production (McLeod, 2016).

However, in many places current population levels of rabbits no longer pose significant threats to grazing enterprises. Rabbits may 'suspend arid landscapes in a state of degradation' (Ross) but, at current densities, they are often not major competitors in terms of total grazing pressure. They are, however, still periodic pests to horticulture (especially annual crops) as well as viticulture and various other irrigated enterprises. Estimates of costs include \$50/rabbit/year for irrigated pastures and \$100/rabbit/year for vegetable production (DPI&F, 2008).

The risk of waning influence from biocontrols, as has occurred before, is of course real. Virus virulence may decrease while rabbit immunity or resistance may increase. Should that happen, agriculture would again be highly exposed until new biocontrols were available for release – a process taking many years. The more that rabbit populations are contained by traditional practices, such as warren ripping and fumigation following the success of biocontrols, the less is the risk of repeated generations of rabbits or viruses evolving to reduce the effectiveness of existing biocontrols.

Post-calici levels of rabbits do pose significant risks to landscape regeneration and to revegetation, often necessitating the use of tree guards and replanting as standard practices for new plantings. No estimates have ever been made of the costs to those revegetating landscapes though studies show that rabbits inhibit revegetation (e.g. Forsyth et al, 2015 & Bennett et al, 2020).

Nor have there been estimates of costs to forestry; turf production, or the maintenance of parks, golf courses and gardens due to rabbits.

Local governments and NRM bodies across Australia grapple with how to manage rabbits in urban and peri-urban areas. Examples include:

- [‘Controlling rabbits on a small property’](#) (2019) South Coast NRM, Albany, WA.
- [‘Rabbit control for peri-urban landscapes’](#) Murrindindi Shire, Victoria
- [‘Controlling rabbits in urban areas’](#) Northern & Yorke Landscape Board, SA
- [‘Rabbits: control in urban areas Landcare Notes.’](#) (2000) Hay P. Department of Natural Resources and Environment, Victoria.
- [‘Removing pests from peri-urban areas’](#) Local Land Services. NSW
- [Logan City Council](#), Qld
- [‘Rabbits’](#). Brisbane City Council

Rabbit damage to domestic gardens in urban and peri-urban areas cause considerable social stress to those suffering losses and having to face decisions about control options that can pose significant ethical questions for people opposed to the use of viruses or chemicals or to the killing of any animal, regardless of the circumstances. Any land manager accepting their responsibility to safeguard the environment through rabbit control can face similar tensions.

Cultural questions also arise when rabbits harm sites of heritage significance, be they sacred places, burial grounds and cemeteries, or heritage buildings. Infrastructure of all kinds, from industrial and chemical handling facilities, to rail-lines, houses or the humble backyard shed, can be put at risk due to undermining by rabbits.

In terms of broadacre benefits and risks ‘the environment’ clearly has much to gain from increased control of rabbits or, at a minimum, containing rabbits to low densities. The benefits of calicivirus have been well documented (e.g. Finlayson *et al.*, 2021, and Peacock *et al.*, 2021), while the increased predation by feral cats that are sustained in high numbers by rabbits is documented by McGregor *et al.* (2019).

Environmental harm and increased weediness generated through soil disturbance by rabbits is described by Eldridge *et al.* (2000 & 2008).

Few of the above-mentioned costs and impacts have ever been quantified, let alone costed.

Rabbits have an insidious influence throughout landscapes and society. That rabbits affect so many elements of a landscape, at such a variety of levels, means it is difficult to ascribe the key beneficiaries of rabbit control. Furthermore, rabbits are often not THE top risk or priority for any individual sector of the community for prolonged periods and, because they affect so many sectors of society, it is always possible to suggest that others have more to gain or should be held more responsible.

Questions of who benefits the most from improved rabbit control, and who should pay for improvements, do not have simple answers.

Discussion Point:

Who should contribute to the cost of better rabbit control and coordination in Australia, and how should their contributions be made?

National coordination

CISS developed the National Coordination Model to enhance community engagement and involvement in best practice pest management. **The National Coordination Model is being effectively used for wild dogs, feral cats and foxes, feral deer and feral pigs, and their success illustrates the benefits of national coordination for vertebrate pest management.**

The coordinators of those programs have provided insights from their experience (see Appendix 2. 'Lessons from National Coordination'), and members of the Terrestrial Vertebrates Working Group along with other rabbit program managers have similarly provided information and advice based upon their experience and that of the organisations they represent.

Some key themes from those sources are:

Independence: A national coordinator needs to be independent. They must be trusted by and able to share ideas with a wide variety of interests, and be responsive to their needs. It is important that they report to an independent committee (even if it is necessarily representative of key interests) and an independent Chair.

Clear Purpose: National coordinators require clear purpose and priorities to operate effectively. In the case of rabbits there is an overwhelming demand for re-engagement and re-invigoration of rabbit control with the adoption of recommended, science-based, practices. An adjunct to that is shaping and delivery of clear, consistent messaging about the necessity of rabbit control and the importance of integrated control programs; especially ones that include the destruction of warrens or harbour.

Collaboration: It will be essential to work with and through existing national, state, territory and regional agencies, and the planners and managers of coordinated rabbit control programs, and to help them in the delivery of their programs through leadership, encouragement and attention to their needs. It will also be beneficial to team-up with other national pest coordinators to learn from their experience, enjoy their support, and jointly plan integrated pest control programs and input to relevant national strategies.

Meeting needs: A number of potential roles have already been nominated for a national rabbit coordinator. They include being a two-way conduit between practitioners and researchers, plotting a course for better management of rabbits in peri-urban and urban areas, serving as a catalyst for the up-skilling of practitioners, helping with matters such as a better understanding of rabbit distribution and abundance and the availability of RHDV-K5, and providing advice to national leaders in matters such as threat abatement planning and drought resilience for rural communities.

Communication: Existing national coordinators emphasise the value of direct contact with people to more easily listen and understand, learn, share, advise, encourage and link them with peers or technical experts in other jurisdictions. Face-to-face contact is often preferred (including occasional national workshops and regional events), but phone, email and on-line meetings all have their place. There have been attempts to create on-line communities and although they have not been effective to-date the concept is still of interest.

A National Plan: Not all national coordinators have a national plan, but if appropriately developed, a National Rabbit Action Plan with the clear aim of achieving more effective control of rabbits, would provide strategic direction for a national rabbit manager coordinator and any other service providers (e.g. an Implementation Manager, a Project Officer, or Administration Officer). It would also establish a framework for communication and collaboration between national, state, territory and regional interests. It should be a plan for all parties to it and give sufficient confidence for it to be funded accordingly.

Funding: Rabbits are an enduring problem and an enduring program of national coordination is required to avoid future complacency and the re-emergence of rabbits. An enduring source of funds will be required; for example, as a rolling five-year budget, that is renewed annually.

CISS provide contract management for many of the existing national coordinator positions and assists with communication services. It would be desirable if such support was available to a rabbit coordinator, especially with an eye to integration of communication across all vertebrate pests.

Discussion Point:

If a National Rabbit Management Coordinator is appointed, what are the most important principles to guide the establishment and governance of the role, and what should be their main roles?

The need

The issues presented in this Discussion Paper highlight that rabbits are under-rated as a pest in regional and peri-urban landscapes, posing a risk to longer-term resilience and recovery. The issues could be addressed by:

- Raising the profile of rabbits to engender more support for rabbit management and related programs. Awareness-raising should cover all sectors of society to ensure broad support and investment.
- Re-engaging and reinvigorating land managers, while upskilling and supporting them to promote more on-ground management with better outcomes through the application of recommended practices. This may translate into 'nil-tenure' programs through cross-boundary collaboration and integrate rabbit control with the control of weeds, feral cats and foxes for optimal landscape outcomes.
- Connecting and supporting rabbit program managers and their programs through federal, state and regional levels, involving communication and funding opportunities. While focused on rabbit control it may also link with priorities such as regional resilience, drought and fire management, and 'nature positive' outcomes and related policies.
- Promoting effective research and development programs and building conduits between them and rabbit managers to give the programs focus and enable ready two-way communication. Research may include monitoring the effectiveness of existing biocontrols and exploring opportunities for new controls, including genetic options, as well as better understanding the inter-laced benefits of rabbit control and developing new control techniques for arid areas and sensitive environments.
- Having a clear goal of reducing the harm caused by rabbits through community-driven rabbit management programs to reduce the distribution and abundance of wild rabbits across Australia. All activities should relate to that goal.

A National Rabbit Management Coordinator could help deliver on that range of measures by:

- Consulting widely to lead the development of a National Rabbit Action Plan, with special attention to linking regional, state and federal programs, and providing guidance, resources and encouragement for optimal rabbit management outcomes. Having a National Action Plan would give investors confidence, help determine agreed priorities for action, and construct a framework for ongoing collaboration and communication.
- Consulting to develop and widely promote clear, consistent messaging on the importance of rabbit control and key practices, such as warren destruction, for effective control. This could involve updating the Glovebox Guide for Rabbits and associated PestSmart website.
- Developing effective communication channels and networking opportunities to engage, enable and assist the managers of regional and district level rabbit control programs, and being a catalyst for training and development programs. Activities could range from regional visits, field days, on-line communication and communities of practice, to supporting the Australian Rabbit Managers Network (or an 'evolution' of it), and national workshops.
- Being a conduit between regional, state and federal interests regarding research and research findings, as well as on policy and the development and implementation of various national strategies. Channels may include helping to draft a national Rabbit R&D prospectus, building on, or transforming, the annual Rabbit R&D Webinar, and numerous ad-hoc opportunities to share ideas and information with senior policy developers.

A National Coordinator's main role would be, by definition, to coordinate. They would be expected to provide leadership and direction, but their success would come from engaging with others and helping them to achieve their goals while contributing to a better national outcome. Regardless of the skill and effort shown by the coordinator, if there aren't other resources and willing stakeholders to work with, expectations for the position will not be achieved.

A National Rabbit Management Coordinator should be supported by:

- An independent Chair and Advisory Committee representing stakeholder interests.
- The provision of administrative and communications services, along with oversight and mentoring arrangements.
- Whatever assistance and funding is required to implement a National Rabbit Action Plan.
- Opportunities for collaboration with other national vertebrate pest management coordinators.
- Opportunities to liaise with equivalent coordinator positions or networks in each state.

Ideally, the funding model for a National Coordinator and Plan would reflect the diverse interests that would benefit from improved rabbit control, but questions of ability to pay, administrative challenges, and community expectations of government would need consideration. Regardless of where the funds come from, the funding model could aim to have:

- Secure long-term funding – ideally a rolling, annually renewed five-year budget.
- Investors ‘buying in’ to a package where they bring funds and in-kind support, such as commitments to work with the National Coordinator and provide operational contacts for them.

Feedback

Your feedback on this document will help determine the path taken to promote the appointment of a National Rabbit Management Coordinator and development of a National Rabbit Action Plan, and the development of Business Case to attract investment to support the position.

Discussion Points

We invite your feedback on matters raised in this Discussion Paper.

- Are rabbits over-looked and under-rated as a threat to healthy landscapes and, if so, how can the profile of rabbit issues be raised?
- Is there a need for more knowledge, skills and training in rabbit control practices for land managers and, if so, how could these needs be best addressed?
- Could the management of rabbits be improved by better training and information sharing between program managers and, if so, how could that be achieved?
- How can the profile of rabbit issues be raised to lift general levels of awareness?
- Is there a need for clearer national leadership in rabbit management and, if so, how could it be provided? Would a National Rabbit Action Plan and National Coordinator assist?
- How could better links be established between federal, state and regional plans and programs regarding rabbit control, as part of broader environmental and regional resilience programs?
- Would there be value in better monitoring rabbit distribution and abundance and the performance of biocontrols in Australia and, if so, how might that be achieved?
- Is it important for rabbit researchers to communicate with each other and, if so, how might that be facilitated?
- Who should contribute to the cost of better rabbit control and coordination in Australia, and how should their contributions be made?
- If a National Rabbit Management Coordinator is appointed, what are the most important principles to guide the establishment and governance of the role, and what should be their main roles?
- Are there any other matters you would like to raise regarding issues raised in this paper?

Further Contact

If you would like to be kept informed of progress in the development of a Business Case and the appointment of a National Rabbit Management Coordinator, please provide your Contact Details:

First Name:Surname:

Organisation:

Email:

Feedback

Please provide any feedback regarding the Discussion Points or letters of support to Foundation for Rabbit-Free Australia by COB Friday, **23 February 2024**.

Email to: exec@rabbitfreeaustralia.org.au or Post to: Chairman, PO Box 145, Collinswood. SA. 5081



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Appendices

Appendix 1. About Rabbits

The European wild rabbit is an introduced pest throughout the southern two-thirds of Australia. They affect natural environments, primary production, and even townships and infrastructure. Wild rabbits are 'ecosystem engineers', fundamentally changing whole ecosystems from the bottom up. Their broad distribution, and the wide range of problems they cause, make them the nation's worst vertebrate pest.

Wild rabbits are well adapted to be wary of predators – they have acute hearing and large eyes on the side of their heads providing panoramic vision. They are highly social, territorial animals centred on warrens (a collection of burrows) or other harbour on which they rely for shelter, safety and for breeding. They are prolific breeders when green feed is available, with a single female (doe) able to produce 50-60 young a year in favourable seasons.

Rabbits prefer to feed within 400 metres of the safety of their warren but will venture much further when feed is scarce. Their small mouths and unique 'buck' teeth (which leave a distinctive chisel-like cut on grazed plants) allow them to be selective eaters, focusing on nutritious, palatable vegetation such as seedlings of preferred plant species.

Even at very low densities – 1 rabbit per 2 hectares (0.5 rabbits: 1 hectare), or 1 warren per 10 hectares – rabbits can prevent the recruitment of entire species of plants, due to their selective grazing and searching out of palatable seedlings. In this way, they affect the structure and composition of vegetation communities, including several endangered ecological communities. If rabbits are seen, they are probably already affecting native vegetation and the ecology of native animals.

Although the impact from rabbit grazing is often severe, even at low densities, it is often unseen. Rabbits don't remove giant, ancient trees from the landscape. Instead, they remove trees while they are tiny seedlings – before they are noticed. The consequence is even worse because they rob the locale of all the benefits those plants would have provided if allowed to survive to old age.

Native vegetation flourishes following the control of rabbits, as do native fauna. Conversely, when rabbits thrive vegetation declines, and so do native fauna. The relationship is especially strong in herbivores competing for similar feed, such as small marsupials with limited foraging ranges. Rabbits may change the vegetation so it no longer suits other species, out-compete them for food, or affect the availability of shelter and nesting sites through vegetation loss or competition.

Rabbits also contribute to the survival of feral predators, especially feral cats for which rabbits can be an important part of their diet. By sustaining populations of feral predators, rabbits indirectly increase the predation by those species on native animals; termed 'hyper-predation'. Rabbit-induced hyper-predation by cats and foxes has been linked to the extinction and decline of conilurine rodents (Muridae), the biggest and most diverse group of Australian rodents, including *Notomys* and *Pseudomys*.

Through the creation of warrens, digging and over-grazing rabbits reduce vegetative ground cover and invite erosion, as well as promoting the growth of unpalatable weeds and a decline in palatable grasses – harming natural systems and lands used for primary production. Their consumption of green-feed and environmental impacts have economic consequences for pasture and grain production, lucerne growing, perennial and annual horticulture, viticulture, nursery, forestry and revegetation initiatives.

Rabbits also undermine or otherwise damage infrastructure and harm peri-urban properties and culturally important sites.

The 'cost' of rabbits includes the losses in production they cause, funds to repair infrastructure, the costs of their control, and the social costs of confronting rabbits such as experiencing the harm they cause and the personal challenges of culling them.

Biological controls (myxomatosis, rabbit fleas and calicivirus) have proven extremely effective in drastically reducing rabbit populations in Australia. They have led to a resurgence of native vegetation and native animals over immense areas in what must be amongst the greatest conservation programs in Australia.

However, as successful as biocontrols have been, they have not reduced rabbit populations to the level needed for all plant species to regenerate, and they may only provide a 'window' of time (measured in decades) before their effectiveness wanes. Furthermore, 'just a couple' of rabbits surviving a wave of biocontrol can soon breed up to problem densities. This is often very evident following natural disasters such as drought when, as soon as there is green feed available, rabbits begin to breed rapidly, dominating the regenerating landscape to outcompete other herbivores and determine the plant species that get to re-establish first.

The success of biological controls doesn't 'fix the rabbit problem', but it does provide the opportunity for landholders to effectively control rabbits through physical and chemical means. By applying recommended rabbit control practices, including an emphasis on warren destruction, land managers can effectively manage rabbits and enjoy the environmental, economic and social benefits that follow.

For more information, references and links to other sources, see [About Rabbits](#) at the Rabbit-Free Australia website.



Appendix 2. Lessons from National Coordination

The value of a National Management Coordinator and National Action Plan for vertebrate pest control has been well illustrated by equivalent measures for wild dogs, feral pigs, deer, and feral cats and foxes. CISS provide contract management for many of the positions and assist with communication services.

Some key learnings from those programs were gathered by interviews with existing coordinators. They are summarised below:

- Independent Steering Committee and Chair. The coordinators are employed under a variety of arrangements but all have an independent committee, with an independent Chair, to whom they report and seek guidance. Those with a National Action Plan (all bar feral cats and foxes) may also have an Implementation Committee (sometimes with an Implementation Manager) to oversee delivery of the Plan.
- Independent voice. Regardless of who formally engages the coordinator, they all have a relatively independent voice. They are not seen as 'from the government' or 'coming from Canberra'.
- Sharing the load. Most of the Coordinators also have an 'off-sider' to assist in the delivery of their work-plan. It is likely to be a person with a different set of skills (e.g. communications and website management), and they may be in a very different part of Australia (creating opportunities for efficiencies of operations by curtailing some travel needs).
- Direct contact. All coordinators place high value on being in direct contact with people to more easily listen and understand, learn, share, advise, encourage and link them with peers or technical experts in other jurisdictions. Face-to-face contact is often preferred, but phone, email and on-line meetings all have their place.
- Key messages. There are several key messages:
 - The importance of clarifying and reinforcing technically sound recommended practices and dispelling 'myths'.
 - There are universal principles to follow but differing state legislation, administrative structures, communities and environments mean there are few universal solutions.
 - Specialist knowledge is required, but it must often be tailored to integrated on-ground programs and presentations.
- National meetings. Opportunities for practitioners to meet are uncommon, so periodic national workshops or symposiums (e.g. every two or three years) are extremely well received by those running pest management programs.
- Regional events. Contributing to, or partnering with, various groups enable national coordinators to engage with regional audiences at things like field days, training programs and producer driven demonstration sites.
- Communities of Practice. There has been some effort to create on-line communities, but the attempts have not been effective to-date. More direct contact seems preferred, though the concept does still attract some interest.
- Diverse, evolving funding. Program managers need to be creative in attracting funds in an ever-evolving finance landscape, e.g. sourcing different funds for different elements of their programs such as for 'implementation' versus 'coordination'.
- National Coordinators. The existing National Management Coordinators meet regularly to share experiences and ideas, and to foster collaboration when integrated control messaging and events are warranted. A national rabbit coordinator would fit in well, learning from the experience of others, 'bringing rabbits to the table', and helping to design and deliver integrated rabbit, cat and fox control messaging.