Invasive Animals CRC

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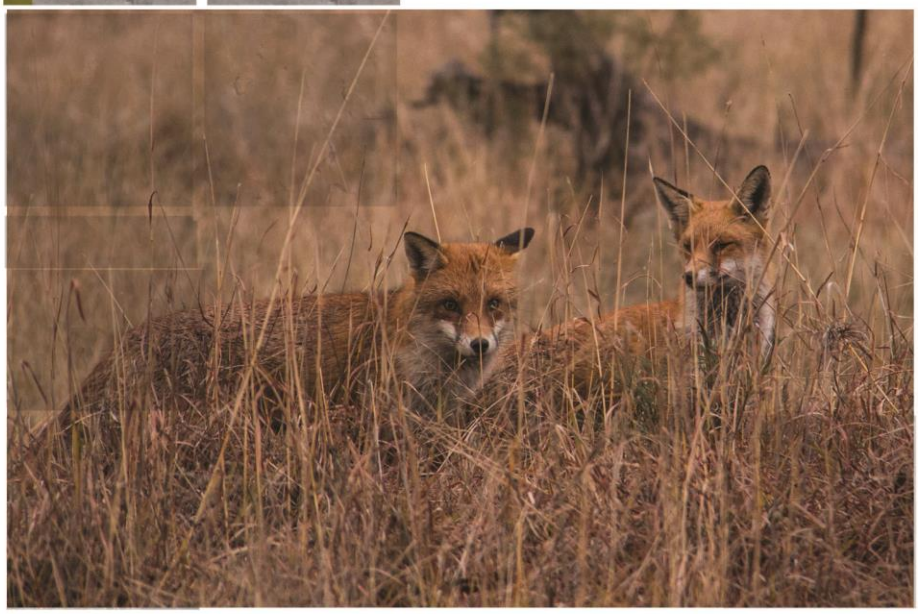

Recommendations for the reform of invasive species management institutions

Professor Paul Martin
Professor Darryl Low Choy

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Australian Government
Department of Industry, Innovation and Science

Business Cooperative Research Centres Programme

Recommendations for the reform of invasive species management institutions

Proposals to enable effective citizen-led management of invasive species

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2016
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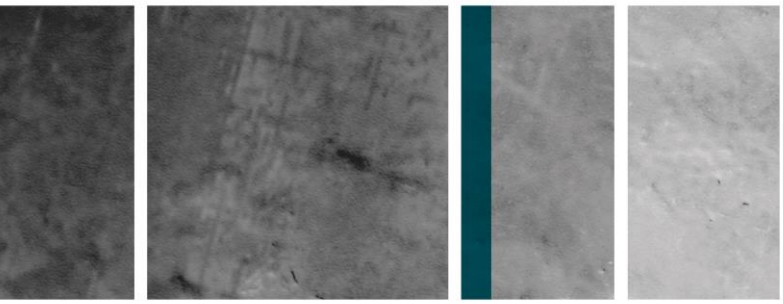

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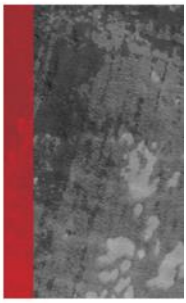
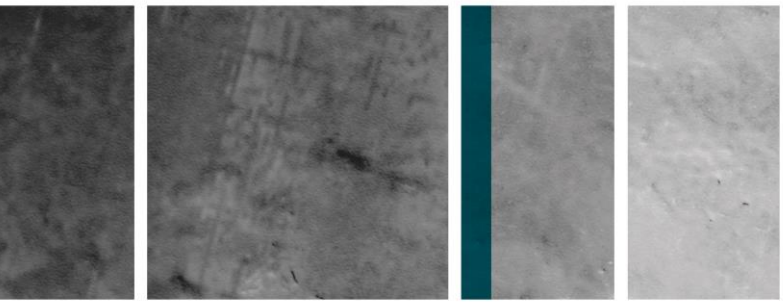


Contents



Executive Summary

Many reports highlight that controlling established invasive species depends on citizens, particularly landholders and volunteers, and recent reforms emphasise a citizen-focused approach. Ideas canvassed in the 2015 Discussion Paper, "*Modernising Australia's Approach to Managing Established Pests and Diseases of National Significance*"[1] are being implemented through the Intergovernmental Agreement on Biosecurity (IGAB), and Australian states have been advancing parallel reforms.[2] State governments are also concentrating their efforts on preventative biosecurity, relying more on landholders to manage established species and emphasising a general biosecurity obligation (a specialised form of a landholder's duty of care).

Starting in 2012, we have investigated what institutional changes are necessary to enable effective citizen action.[3] This has been independent of government and other interests, but has involved extensive consultation. The 2016 Discussion Paper, "*Effective Citizen Action on Invasive Species: The Institutional Challenge* (the "Discussion Paper") details many issues.[4] This report outlines the actions needed to effectively implement these policies.

Five key impediments to effective citizen action

There are five institutional impediments where significant improvements are needed for new policies to be effective:

1. Stronger private incentives are needed. Legal obligations are important, but limited. The total mix of incentives determines whether sufficient action occurs.
2. Systemic resourcing problems limit action, particularly in rural and remote areas. Even with motivation, a lack of money or manpower will prevent effective action.
3. Managing the complex human aspects of a community-based approach will require greater skills and a more disciplined approach.
4. The many barriers to coordinated cross-tenure action need to be addressed to reduce 'non-participation' and increase coordinated collective action.
5. It is also important to reduce avoidable frustrations and transaction costs incurred by citizens who are prepared to take action.

This report contains proposals for reducing these impediments, and the Discussion Paper provides far more detail. There are no simple solutions to these challenges. Some are being partly addressed, but overall the attempts to find solutions are (as yet) piecemeal.

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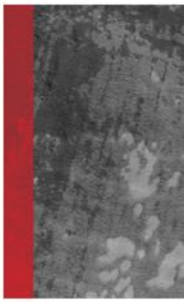
[1] National Biosecurity Committee. 2015. *Modernising Australia's Approach to Managing Established Pests and Diseases of National Significance*. Department of Agriculture: Canberra.

[2] For illustrations see: NSW Natural Resource Commission. 2015. *State-wide Review of NSW Pest Animal Management (Issues Paper)*. NRC: Sydney; *Biosecurity Act 2015* (NSW); Agriculture Victoria. 2012. *Discussion Paper: Invasive Species Management Bill*. Victorian Government: Melbourne; the creation of a general biosecurity obligation in Queensland under the *Biosecurity Act 2014* (Qld); Biosecurity Tasmania. 2016. *Biosecurity Legislation Review: Draft Position on Revised Biosecurity Legislation for Tasmania*. Tasmanian Government: Hobart. The Commonwealth's *Biosecurity Act 2015* is scheduled to commence on 16 June 2016.

[3] The research did not focus on the institutional challenges of preventative biosecurity, which have been the subject of other in-depth investigations and where reforms are also underway.

[4] Martin, P., Low Choy, D., Lingard, K. and Le Gal E. 2016. *Effective Citizen Action on Invasive Species: The Institutional Challenge*. Invasive Animals Cooperative Research Centre: Canberra.



Recommendations

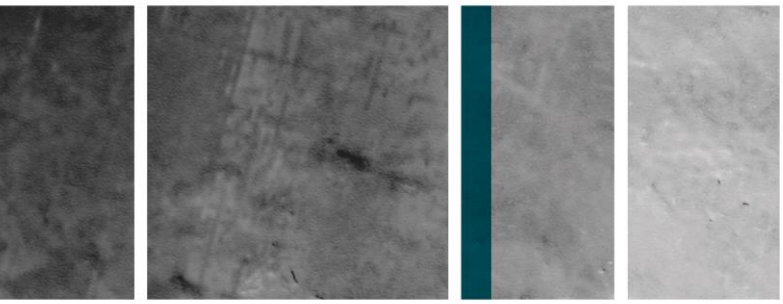
Efficient implementation of community-based invasive species management requires a partnership between government, industry and other stakeholders, reflecting a shared understanding of roles and expectations. The principles and strategies for achieving this have not yet been agreed. This leaves ample room for differing expectations, confusion and conflict, and thus inefficiency in implementation.

Engaging all stakeholders to agree on the roles and principles for implementing community-based invasive species management would provide a more firm basis for partnered strategies. We propose a COAG led consultative process, capped by a meeting to confirm agreed principles, as the starting point towards a National Invasive Species Initiative to guide and monitor implementation of citizen-based invasive species control strategies.

We propose that a strategy to address the implementation challenges should be developed by a temporary commission, over about 18 months. We also propose that the Productivity Commission evaluate the strategy, leading to COAG ratification and subsequent implementation. The precedent of the National Water Initiative suggests how many details of this approach could be managed.

We anticipate that a National Invasive Species Initiative, with detailed implementation plans and commitments by all stakeholder groups, could be in place before 2020. Elements could be progressively put in place before then.

Professor Paul Martin
Professor Darryl Low Choy
3 May 2016



1. Introduction

Australia is reported to have more than 400 invasive weeds, diseases, insects and animals.[5] Identified vertebrate pests include amphibians (2 species), birds (16 species), fish (21 species), mammals (22 species) and reptiles (5 species). Many cause social, economic and environmental harm. Farmers point to the harms caused by invasive animals such as wild dogs, feral pigs and carp on their livestock and crops.[6] There are many estimates of the economic costs. For example, recent studies have shown that rabbits, carp, pigs, foxes, wild dogs, goats and introduced birds in NSW alone have an average annual cost of $170 million; that the cost of weeds to grain production exceeds $3 billion each year; and that the risk management value of biosecurity is many thousands of dollars each year for each Australian farm.[7] The Australian 2011 *State of the Environment Report* (SoE 2011)[8] indicated that the impact of established invasive species on inland waters is 'high' and conditions are deteriorating; and for biodiversity that the impact is 'high' to 'very high' and conditions are deteriorating. Faced with competing demands and limited biosecurity resources, Australia's national and state governments have adopted 'shared responsibility' approaches. These concentrate public resources on preventative biosecurity, relying largely upon citizens to control the invasive species that are already established in the landscape.

Effective implementation of shared responsibility will be affected by things outside the control of individual land managers, as well as by things that land managers do. Some issues arise from the nature of invasive species problems, some from the characteristics of society, and others are institutional. Invasive species problems are uniquely complex from a management perspective. Without sustained, well-coordinated investment and work that spans public and private lands, the control of many species will not be very effective. The ability to achieve effective coordinated citizen action is limited by institutional issues including weak private incentives, limited legal power to require neighbours to cooperate, political opposition to some controls, ignorance of problems or methods, bureaucratic complexities, and a lack of funds and other resources. These reflect deeper issues about laws and other rules, political decision-making, funding and bureaucracy. Over the previous three years, the Invasive Animal Cooperative Research Centre (IACRC) Program 4 has investigated these causes in depth to identify possible solutions and the impediments or supports for reform.

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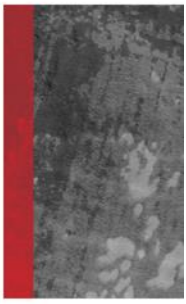
[5] IUCN Species Survival Commission. *Global Invasive Species Database*. Available at http://www.issg.org/database/welcome.

[6] Martin, P., Low Choy, D., Lingard, K. and Le Gal E. 2016. *Effective Citizen Action on Invasive Species: The Institutional Challenge*. Invasive Animals Cooperative Research Centre: Canberra. pp 6-8.

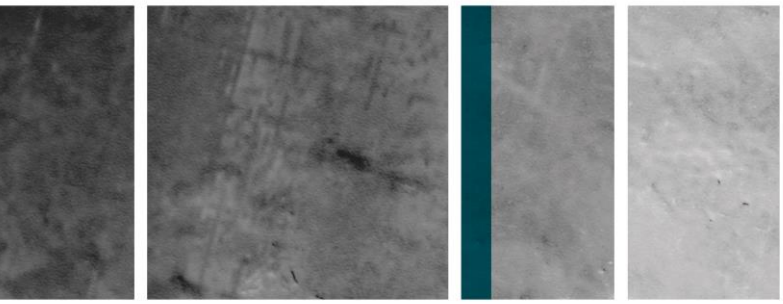
[7] NSW Natural Resources Commission. 2016. *Shared Problem, Shared Solutions: Pest Animal Management Review*. NRC: Sydney; Llewellyn, R., Ronning, D., Clarke, M., Mayfield, A., Walker, S., Ouzman, J. 2016. *Impact of Weeds on Australian Grain Production: The Cost of Weeds to Australian Grain Growers and the Adoption of Weed Management and Tillage Practices*. GDRC: Canberra: Hafi, A., Addai, D., Zhang, K., and Gray, E. M. 2015. *The Value of Australia's Biosecurity System at the Farm Gate: An Analysis of Avoided Trade and On-farm Impacts*. Australian Bureau of Agricultural and Resource Economics and Sciences: Canberra.

[8] Hatton, J. et al. 2011. *State of the Environment 2011* ('SoE 2011'). Australian State of the Environment Committee: Canberra.



1.1 About this report

Initial evidence-gathering involved consultation with invasive species management experts from governments, community organisations and scientific bodies. Drafts of the institutional Discussion Paper were circulated and discussions held with experts. Community consultation was then carried out using a two-stage Delphi survey and a two-stage 'scenario planning' workshop process in four mainland states. Community members and experts helped refine the issues, 'brainstorm' strategic options and identify barriers and supports for reform. This intelligence provided the basis for our recommendations, which are intended to stimulate constructive consideration of possible reforms.



2. Citizen action

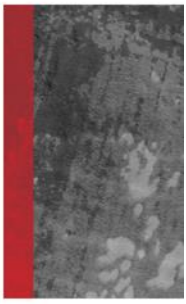
2.1 Why focus on citizen action?

Citizen action is essential to invasive species control, particularly to the success of government policies that emphasise 'shared responsibility' or the 'general biosecurity obligation(s)' of landholders. There are five reasons why effective citizen action is essential to effective control of established pest species (other than in situations where 'silver bullet' control solutions can be found):

1. Many social and environmental problems can be managed by controlling the human causes of harm (e.g. pollution and development), coupled with remediation. However invasive species breed, and evolve or adapt. As a result, control requires sustained, well-coordinated action, often over large areas and involving many land managers. This requires complex coordination and resources from many sources. Achieving this requires more than can be reasonably expected as part of a landholders' personal responsibility, and invasive species can infest properties even when the landholder is acting responsibly.
2. Australia is a large landmass with relatively few people. The population is concentrated on the coast. Government resources are thinly spread, thus private investment and action is pivotal to invasive species control. However, private resources are also 'stretched', particularly in the inland, given the costs of effective control and rural economics and demographics. It is likely that there will always be a significant gap between the resources that can be provided by individual landholders and what is needed for effective management.[9] Securing resources is likely to require ongoing mutual support by landholders, and partnership between landholders, government agencies, industry and community groups.
3. Budgets limit what governments can do. Even when legal obligations exist, it is hard to force action by landholders who are unwilling or unable to control invasive species on their own properties. Many landholders are also naïve about the problems, and ignorant of the methods for control. It is even harder to require cooperation to do more than what constitutes a landholder's duty, such as organising coordination or doing work outside the landholder's boundaries.
4. Laws requiring landholders to exercise control are limited to declared species, non-compliance is hard to detect and enforcement is difficult. No law can force creativity, hard work, a stewardship ethic or efficient cooperation. In practice, legal enforcement encounters many practical difficulties, including legal, technical and evidentiary problems, limited enforcement funds, community resistance and political resistance.
5. Effective control is more likely if people working on the land actively detect and take action on emerging problems. Landholders have authority to take action on their own lands, and it is relatively timely and cost-efficient for landholders to act voluntarily.

However, even assuming a personal commitment to good stewardship and compliance with legal responsibilities, some landholders lack the resources or the ability to take effective

[9] For details see Martin, P. et al. 2016. 'Next Generation Rural Natural Resource Governance: A Careful Diagnosis in Legal Aspects of Sustainable Development Horizontal and Sectorial Policy Issues'. In Mauerhofer, V. (ed.) *Legal Aspects of Sustainable Development*. Springer: New York.



action. There are also particular practical, institutional and political difficulties with managing invasive species on public lands, Indigenous lands and conservation estates.

Legal obligations to control declared species, whilst important, are not likely to ensure adequate private action. Effectiveness will often depend on voluntary community engagement, rather than administration and control. A community engagement-focused approach differs significantly from a traditional government or expert-led approach. In a genuine engagement approach, bureaucrats and experts work 'with' and 'for' community members rather than 'on' citizens.[10] This seemingly philosophical difference has a significant impact on how issues are defined, the criteria for judging the desirability or effectiveness of interventions and how work is conducted.

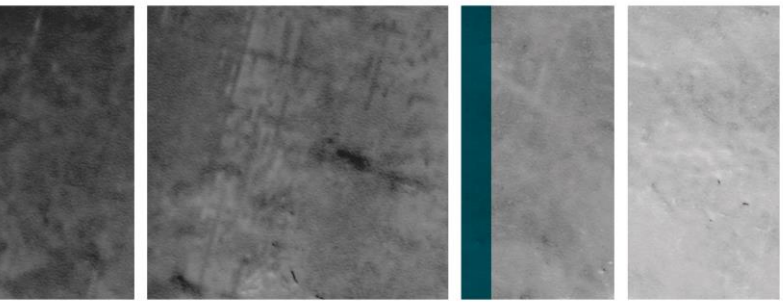
Institutional impediments or prompts and incentives (which may initially seem trivial to those not directly affected by them) can have a disproportionate effect on how citizens behave. Seemingly small details that are easily overlooked will often make a difference to the effectiveness of public policy. An engagement approach to institutional reform aims to treat any institutional issue that affects citizens as crucial, and to prioritise these over issues that may be a priority for the bureaucracy.

2.2 Five institutional requirements for effective citizen action

Achieving effective citizen action on established pest species involves many institutional aspects. 'Institutions' are the rules, implementation and administrative arrangements involved in managing pest species risks or impacts, and the organisations that help govern how people deal with these harms (viz. control, direct, encourage). Effective invasive species citizen engagement requires five things:

1. Private incentives to take action: Private incentives exist to control pest species such as wild pigs, wild dogs, mice and rabbits, which cause harm or risks to human values. For some species (e.g. feral cats), private economic incentives for control are weak. Private incentives vary with the land use and management approaches, and this undermines coordinated 'whole of landscape' action. An example is the control of wild dogs or foxes. These animals are not major problems for cropping enterprises but may be costly for sheep graziers. Laws are not a reliable motivator for action beyond mere compliance, which is not enough to achieve effective management. Other motivations (e.g. environmental attitudes) vary between citizens, and counter-motivations (e.g. sensitivities to perceived animal welfare problems) can make it hard to implement action across the landscape.
2. The resources to take action: Effective action cannot occur unless people have the resources to take action. Where effective action requires coordinated control, poverty or other limitations of a few landholders can undermine program effectiveness and allow residual populations of the harmful species to re-contaminate the areas being managed. Chronic rural or Indigenous peoples' disadvantage (limiting the ability of the land manager), or disadvantage caused by drought, natural disaster and market conditions, can limit the feasibility of management. These human

[10] Martin, P., Low Choy, D., Lingard, K. and Le Gal E. 2016. *Effective Citizen Action on Invasive Species: The Institutional Challenge*. Invasive Animals Cooperative Research Centre: Canberra. p 13.



constraints undermine landholder responsibility. If an action is impossible for the citizen (without support) then that action will not occur.

3. Management ability: Effective control can require specialist knowledge and technologies. Using many poisons and chemicals requires licenses and qualifications. Managing coordinated programs, particularly the human dynamics and institutional coordination, requires skill. To ensure these abilities requires effective education, communication and knowledge transfer.
4. Boundary-spanning strategies: The fragmentation of land uses (and thus variations in control motivations and capacity), and defensive attitudes to private property, make 'nil tenure' coordination difficult. Institutional fragmentation arises from having three levels of government and many specialised agencies, often with weak links between government and industry programs. Effective boundary-spanning requires relationships and institutional arrangements which take a lot of effort to create and maintain but which are easily broken.
5. Effective and efficient governance: The system used to govern (viz. control, direct, shape) how people deal with invasive species involves preventative biosecurity, the detection and control of incursions, scientific and policy research, the development of control technologies and products, and the management of established pests. Organisational structures, bureaucracy and confusion consume energy and funds and can demotivate people. What is efficient from one stakeholder's perspective may be costly for others. For example, it may be efficient from the perspective of a government agency to apply administrative requirements that increase the load on citizens or industry, which may be inefficient if they discourage volunteers.

2.3 Specifying priorities for institutional improvement

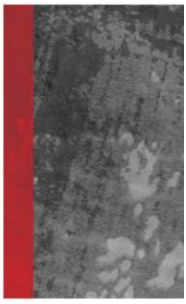
Based on detailed investigation of relevant laws and policies, international comparisons, issues in the media, policy positions of stakeholders, significant studies and consideration of community engagement in invasive species management, the Discussion Paper proposed six criteria for an invasive species governance system that is likely to maximise citizen action:[11]

1. Strong accountability at two levels:
    a. 'Closed loop' accountability for risks or harms; and
    b. Management accountability, including program management.
2. Effectiveness in securing and distributing resources.
3. Effectiveness in securing community engagement in key roles and activities.
4. Effective and efficient management system coordination.
5. Respect for citizen contributions (time, effort and resources), role and knowledge.
6. Administrative requirements that are efficient and feasible for the citizen.

The Discussion Paper proposed eight priorities for institutional improvement based on these criteria:[12]

1. 'Closed loop accountability' so that those responsible for risks or harms are (to the maximum degree possible) held accountable.
2. Ensuring that the invasive species governance system engages all of those who have important roles.

[11] Ibid 17-18.
[12] Ibid pp. 24-28.



3. A negotiated (rather than administered) approach to roles and responsibilities for invasive species control.
4. Ensuring that citizens and organisations with roles in invasive species governance have the resources to do what is expected of them.
5. Institutional coordination for nil-tenure management, to help overcome problems of fragmented land uses, property rights and institutional arrangements.
6. Respect and recognition for those who contribute to invasive species control, particularly citizens who make voluntary contributions.
7. Ensuring that the bureaucratic systems are efficient and feasible for citizens who must engage with them and for the organisations that administer them.
8. Disciplined continuous improvement of the system, including science-based improvement in managing the human and institutional dimensions of invasive species detection and control.

2.4 Conclusions from consultation

During 2015, extensive community consultation helped to further clarify the issues and to identify options for reform. Delphi surveys and scenarios planning workshop processes were used to obtain the views of state and federal regulators, local government, environmental organisations, farmers, invasive species management professionals, and technical experts.

Options to address problems identified through the consultation process are incorporated in the proposals in this report. We stress that these are the authors' conclusions. They should not be represented as the views of the people or organisations we consulted or the IACRC.

Many of the challenges are very difficult to address. However, if invasive species impacts are as significant as the many studies and policies cited in the Discussion Paper indicate, there is a justification for finding solutions even if this is very hard to do. If many of the institutional problems highlighted by the research are not solved, Australia cannot realistically expect to improve its invasive species management outcomes from those reported in national 'State of Environment' reports and the many other reports we cite.

The following represents our summary of the issues raised in consultations.

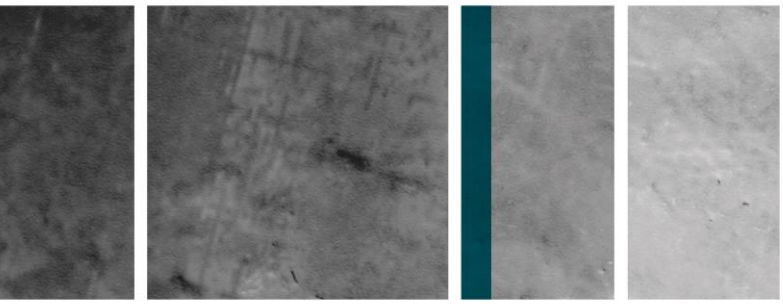
2.4.1 Effectiveness and efficiency of the funding model

There is a chronic insufficiency of funds to control established invasive species. Given the pressures on public and private funding, innovations are needed to reduce the funding gap.

Institutional problems with public funding need to be addressed. Administrative processes cause frustration and transaction costs for community groups, and 'stop-start' funding prejudices control programs. Whilst there are public policy reasons for the approach, competitive funding and changing public program priorities cause community groups to invest effort in pursuing grants that are often not achieved. Reportedly this may result in demotivation and cause the failure of community groups, undermining coordinated collective action.

Our summary from our consultation on the funding issue is that:

1. There is insufficient funding for the control of invasive species from all sources, and for all activities, but particularly 'frontline' work.
2. Markets for agricultural products, land or other resources do not value invasive species management.



3. The lack of private incentives is a significant institutional impediment to effective citizen action.
4. Government resources are insufficient and continuing to shrink.
5. There are disagreements about public investment priorities between science, preventative biosecurity or on-ground control (and between emerging or established species).
6. Changing government programs and priorities often result in 'stop/start' action, which is not delivering 'best practice' control.
7. There are perceived problems in how the costs of invasive species management are shared between government and citizens (and voluntary groups).
8. Concerns were expressed about the value for money from some public invasive species investments.
9. Environmental markets (bio-banking, carbon markets, voluntary schemes etc.) might be used more widely to address some invasive species issues.
10. Commercial opportunities, such as the sale of skins or meat from private hunting, are limited by institutional issues.

2.4.2 Accountability for the control of invasive species

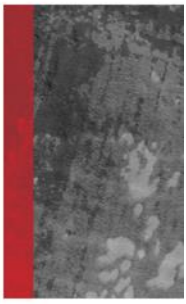
Effective accountability can help to strengthen social norms of responsibility. Effectiveness requires consistent implementation of well-understood (and hopefully community-supported) rules. Among the problems we identified were inconsistent or weak enforcement of regulations, inconsistent treatment of some categories of landholders (e.g. public land managers), narrow specification of species requiring mandatory control, and insufficient public support for accountability and enforcement. Concerns about the accountability of public agencies for their use of program funds, and for the performance of programs, were sometimes raised. Both the community consultation and Discussion Paper indicated deficiencies in accountability.

The following propositions summarise our main conclusions on accountability:

1. Clearer principles are needed for accountability under 'shared responsibility', particularly when people lack the resources to manage pests.
2. Institutional difficulties with regulatory enforcement include community reactions, technical and evidentiary difficulties, and different views about enforcement strategies.
3. A more collective approach to accountability (e.g. industry or region) including collective investment, industry codes, standards, etc. may be possible.
4. There may be an opportunity for commercial interests (e.g. lenders and buyers, or industry standards) to strengthen landholder accountability.
5. Whilst landholders and community groups are formally accountable when they undertake publicly funded projects, the perceived accountability of government agencies to the community is sometimes inadequate.
6. Administrative reporting creates transaction costs for citizens involved in publicly funded projects, but there are concerns about the quality of project accountability and the usefulness of reported information.

2.4.3 Achieving 'nil-tenure' management

Whilst the ideal of managing invasive species without the restrictions of public or private land tenure is attractive, legal rules and community attitudes limit its implementation. Differences in the incentives and motivations of land managers, the variable capacity of



landholders, property and civil rights, political norms and limited resources pose significant difficulties. Stronger supports (economic or social benefits) or accountabilities (costs or penalties) could help reduce these barriers, but there are economic and legal constraints.

The following propositions summarise our conclusions on nil-tenure management:

1. Different public and private tenures, attitudes and land uses make coordinated collective action very difficult.
2. Political issues, private rights and community attitudes limit what can be done to force cooperation.
3. Accountability arrangements for invasive species management on public land are not perceived to be strong enough.
4. Effective oversight and coordinated management require reliable information, which may be unavailable because of cost, privacy or sensitivity concerns.
5. Different attitudes and understandings between urban and rural people, particularly absentee and peri-urban landowners, frustrate coordinated action.
6. The complexities of knowledge, beliefs, rights and capacity to manage invasive species on Indigenous lands need sympathetic attention.

2.4.4 Minimising transaction costs and frustrations

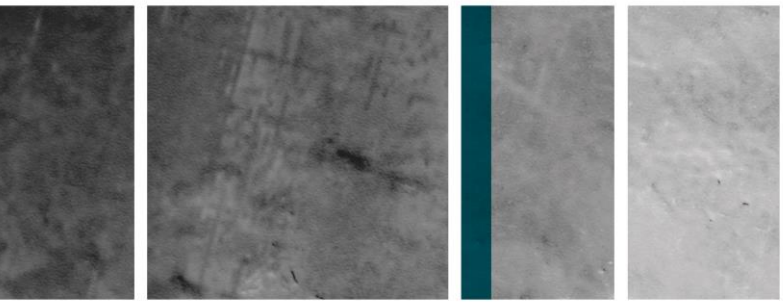
An often-repeated concern is that bureaucratic complexities create difficulties for involved citizens. These complexities include regulation and enforcement issues, restrictions on the use of fatal methods, licenses, funding agreements and landholder arrangements. The involvement of agencies from the three levels of government and regional natural resource management bodies creates complexities. For citizens with limited patience with bureaucracy, or lacking bureaucratic skills, these can be significant impediments. Concerns were expressed about the lack of consistency in policies, regulation and enforcement, and administrative requirements across jurisdictions.

The following propositions summarise our main conclusions on citizen transaction costs and frustrations:

1. There are inconsistencies in legal rules between species, jurisdictions and administrative arrangements (viz. the way 'game species' are treated in different jurisdictions).
2. The fairness and reasonableness of enforcement (or non-enforcement) is a serious concern. Government agencies have different structures, philosophies and views about the effectiveness of enforcement and take different approaches. Clear principles have not been developed.
3. Some rules create barriers to effective management. Of particular concern are legal and administrative controls on the use of poisons and animal welfare requirements.
4. Licensing and training requirements for pest species technicians can be a barrier to invasive species control.
5. Effective techniques need to be more widely applied. Community knowledge about control techniques and responsible agencies is sometimes poor.
6. Legal and administrative restrictions on managing pest species close to homes can be a significant impediment, particularly in peri-urban areas.

2.4.5 'Citizen-friendly' public administration

There are many demands on the citizens who participate in invasive species control, particularly those leading coordinated management. The work consumes resources, and can



be frustrating and difficult to sustain. The conclusion from the Discussion Paper that government agencies must begin to see citizens involved in invasive species management as 'clients', and for systems to become client focused, is consistent with what we found from community consultation.

The following propositions summarise our main conclusions on the citizen-friendliness of invasive species public administration:

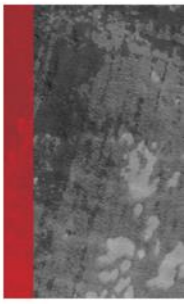
1. Invasive species management increasingly depends on voluntary community action.
2. Working on a partnership basis is different from 'managing' communities, or from science-based extension. Fruitful relationships require earned trust.
3. Approaching engagement with an emphasis on the role of government does not give sufficient weight to the importance of citizen investment and cooperation.
4. Administrative complexities of invasive species control, notably legal requirements and government grant application and management procedures, frustrate those trying to 'do the right thing'.
5. Citizen knowledge and interests are given insufficient recognition and emphasis compared to the knowledge and interests of experts and bureaucrats.
6. Government arrangements could give greater power to community groups to shape programs that fit their needs and interests.
7. Contestability of public funding assists government accountability but results in counterproductive changes in rules and 'stop/start' resourcing.
8. Community groups and citizens often find public governance approaches, including administrative rules, confusing and frustrating.

2.4.6 More effective public communication

Many aspects of the control of invasive species are unpalatable to the broader community. In particular, the killing of animals (if this is perceived to involve pain) can cause community opposition. Limited understanding of the complex issues can lead to failures of political support and community opposition. The inability to create sufficient understanding and support was identified as an increasing risk to control. This highlighted the need for effective public communication and political education.

The following propositions summarise our conclusions from the research on this issue:

1. Social perceptions often drive political responses, and how public agencies approach invasive species management issues.
2. Public communication about invasive species issues has not been sufficiently effective in informing the community and securing their support.
3. Invasive species public relations 'crises' can trigger opposition. Better media and communications skills and preparation to deal with communications issues are needed.
4. Increasingly, social media shapes community and political attitudes and responses. Social media around invasive species issues is particularly difficult to manage.
5. Invasive species management plans and other communications do not adequately communicate the overall context and benefit from action.
6. Politicians and senior bureaucrats may not be well informed when they make important decisions about resources and program management.
7. Animal welfare is becoming a more political and difficult issue. Animal welfare perceptions are increasingly important.
8. Groups who oppose aspects of species control can be politically effective, even if their approaches might be viewed by people involved as unreasonable.

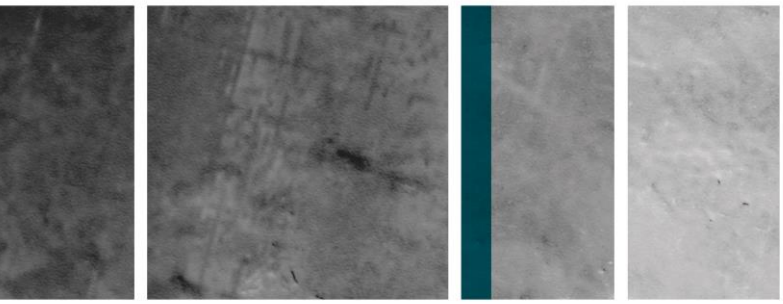


2.4.7 Effective capacity building

Invasive species management requires skills in the use of control techniques, management of complex projects and community engagement and communications. Traditionally, government has had an important role in capacity building, but industry organisations are increasing their involvement as governments reduce this investment. Traditional capacity building and science-based improvement is mainly focused on technical issues and is not strong enough on the human dimensions of the management of invasive species.

The following propositions summarise our conclusions on capacity building:

1. Effective community groups require many skills, and need capacity development opportunities and resources.
2. Practitioner training and continuous improvement need to more effectively support the adoption of new technologies and best practice methods.
3. More sophisticated methods (e.g. engagement, communications, education, psychology etc.) could help improve engagement.
4. Scientific continuous improvement is needed for the human dimensions of invasive species management, as well as for the technical aspects.
5. Reduced services from government will require new capacity building approaches (e.g. mentor or peer group support, non-government extension, online 'communities of practice').
6. New methods of communication and technological change create capacity building opportunities, but require new skills to be effective.
7. Greater use could be made of citizens' knowledge ('citizen science') in the management of invasive species, but this requires new skills.



3. Prioritising improvement

The institutional challenges identified by the research are daunting. While many constructive suggestions were made about how to improve institutional arrangements, there are limits to what might be feasible and effective. All reforms involve a cost and carry the risk of potential failure or undesirable consequences. For example, more public funding may increase dependence or 'crowd out' voluntary work. However, if the institutional problems cannot be fixed then effective citizen-based management of invasive species is at risk.

Five aspects of invasive species management emerged from the research and consultation as central priorities for improvement:

1. Clarifying accountability;
2. Funding innovation;
3. Continuous improvement;
4. Administrative reforms; and
5. Public communications.

These are inter-related, and nil-tenure management principles and the use of best management practices are interwoven through these.

3.1 Accountabilities need to be better developed

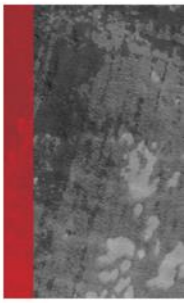
The language of 'shared responsibility', 'biosecurity obligation' and landholder duty of care reflect the generally accepted landholder obligation to manage invasive species on their own land, but there are significant implementation difficulties. It is hard to allocate individual responsibility (or blame) for problems that are long-established in the landscape, mobile and adaptive and requiring collective action. It is also difficult to determine what is fair when land managers' labour under economic or other incapacities, to balance public and private benefits and costs, and to ascertain the complementary obligations of government when the rules are not clear. Specific questions include:

- What are the reasonable limits to a landholder's responsibility?
- How should problems that are beyond the private landholder's control be managed?
- Should the same principles apply equally to all landholders (for example public landholders, impoverished landholders and Indigenous landholders)?

Other challenges arise when an invasive species is not 'declared' for control, when there is political or bureaucratic aversion to enforcement, and when there are doctrinal and evidentiary problems of enforcement. To make landholder responsibility effective requires that these types of complex problems be solved.

More specific principles for the obligations, rights and reasonable expectations of landholders and land managers, government and industry would help provide a stronger basis for implementing shared responsibility. We recommend the following to address this need:

1. A negotiated statement (or statements) that specifies reasonable boundaries between citizen and government responsibility, and provides principles for dealing with practical problems (such as issues of equity and incapacity).
2. Biodiversity, production or industry focused approaches (rather than pest species approaches) to management responsibilities, taking into account regional conditions.
3. Clarification of the responsibilities of public land managers and government agencies, including their roles, responsibilities, funding and coordination mechanisms.



4. Principles for invasive species management on Indigenous lands, or other situations where implementation of landholder responsibility may require bespoke arrangements.
5. Clarification of legal accountability, particularly including principles for enforcement and the management of social equity issues.

3.2 Innovative funding strategies are essential

Innovation is needed to:

- Increase the funds invested in frontline invasive species management;
- Enable continuity of control programs; and
- Diversify the sources of funds.

Many paths could be followed towards more adequate funding. Various combinations and permutations of the options listed below could be explored. These are summarised only as a stimulus for discussion, and are discussed more extensively in the Discussion Paper.

Private funding:

1. Philanthropic funding, used for some biodiversity protection projects in Australia and overseas.[13]
2. Crowd-funding for small projects.[14]
3. Private research and funding to develop control methods, which might be further increased using tax incentives.

Market instruments:

1. Bio-banking or carbon market credits or biodiversity offsets, including requiring effective invasive species control as a condition for carbon or other market credits.
2. Insurance, guarantees or bonds have been proposed to create private incentives to manage the risks of species introductions (e.g. new plant varieties and pet species).

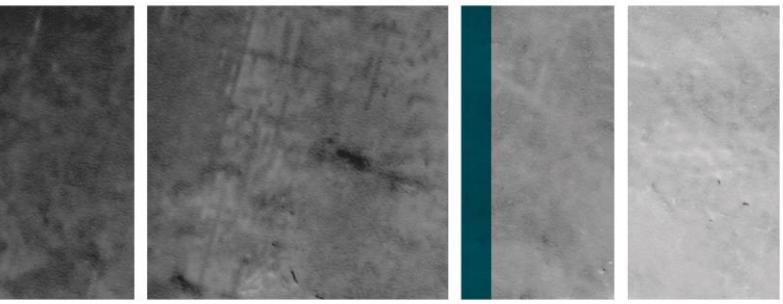
Tax leverage:

1. To qualify for land-management or conservation tax deductions or incentives, taxpayers might be required to certify that invasive species risks are being managed using best management practices.
2. Specific taxes (e.g. mining royalties or a possible ammunition tax) could be dedicated (hypothecated) for invasive species management.
3. Rates relief (e.g. Regional Biosecurity Group rates in Western Australia, Local Land Services rates in New South Wales or rural local government rates) could motivate coordinated pest species control.
4. Tax incentives could be used to support environmental investment funds targeting landscape protection and restoration, including the management of invasive species.

Stimulating landholder investment:

1. Requiring pest status reports for properties prior to their sale could provide private incentives to manage invasive species.

[13] See e.g. Nature Conservancy. Available at: http://www.natureaustralia.org.au.
[14] See e.g. Pozible. Available at: http://www.pozible.com/collection/detail/109.



2. Invasive species 'best management practice' requirements in voluntary stewardship programs and leasehold conditions.
3. Best management practice requirements in eco-label and industry standard programs.
4. Requiring that publicly funded NRM projects report on the status and management of invasive species.

To maximise engagement, citizen organisations should have a strong role in the development and implementation of investment strategies. This suggests the desirability of ongoing regional investment programs that can deliver multiple benefits (including economic benefits to landholders), rather than short-term investments targeted to smaller projects on particular sites. It was suggested that investment performance should be transparent, not only to investors but also to the 'host' communities. This suggests that outcome evaluations should involve affected communities in shaping continuous improvement as well as measuring outcomes (viz. use formative and summative evaluation).

3.3 Administrative systems require streamlining

Three interrelated administrative issues impede effective citizen engagement:

1. The frustrations and costs incurred by citizens;
2. The 'client friendliness' of administrative interactions; and
3. The rules that affect invasive species management projects.

The experience of citizens, who must increasingly be treated as clients or partners of government whose voluntary cooperation cannot be assumed, is of fundamental importance. Administrative processes intended to protect government resources (e.g. funding contestability, paperwork, program change) can increase transaction costs and frustrations for citizens. Potential adverse effects on citizens do not seem to be given sufficient attention in designing government systems. Other difficulties arise from underlying structural issues, such as un-coordinated regulation and administration, the federal system, political dynamics and public service management.

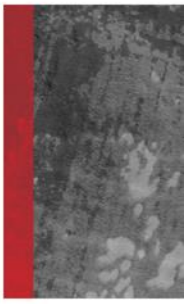
Three aspects of citizen involvement were highlighted:

1. Government support (e.g. funding applications, training and certification, reporting and acquittals).
2. Compliance and certification of control methods (e.g. permits, access to pesticides or herbicides etc.).
3. The use of citizen intelligence, and demonstrating respect for citizens, their efforts and their knowledge.

Proven techniques for system redesign to improve client experience could be applied to these administrative issues. Accountability through service performance standards and objective feedback on the use-ability, usefulness and 'friendliness' of public systems could motivate ongoing improvement and create a sense of citizen 'ownership'.

Other possible initiatives include citizen participation in program development, participatory budgeting and collaborative program reviews, payments for citizens who do more than their stewardship obligations require (e.g. expense reimbursements), and formal and informal signs of appreciation.

A fragmented network of legal rules causes or compounds the administrative problems. It leads to inconsistencies in how agencies treat issues, confusion and poor coordination, and



can impede regulatory improvement. National harmonisation could help overcome these impediments. A more harmonised approach could be pursued at three possible levels:[15]

1. Unified invasive species rules (or a system of rules), using a national law or a coordinated set of national, state and local government rules.
2. More consistent terms and principles (e.g. pest species declarations or the regulation of particular issues such as game species).
3. Clarification of rules, expectations and administrative requirements, harmonised declarations and control measures, and delegated approvals.

Over and above the difficulties of doing so, the arguments against harmonisation are that localised rules can reflect local conditions, regulations that are 'owned' by the regulated communities (which is more likely if they are involved in their development) are more likely to be implemented, and decentralised regulation can enable innovation and experimentation. On balance, we believe that harmonisation of invasive species rules and implementation would make a significant contribution to the management of invasive species.

3.4 The human issues require scientific management

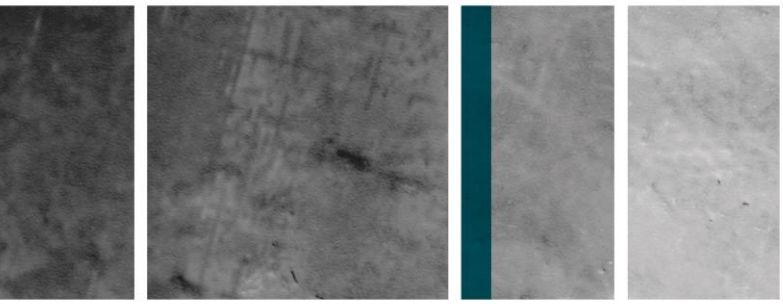
Skill and sophistication in managing many human aspects of invasive species control is fundamental to a regime that relies on voluntary citizen action. The challenges of engagement, education, politics, communication and coordination are difficult. The methods that are currently used are often not science-based, nor is there an institutional framework for scientific continuous improvement. Scientific methods require the use of theory, evaluation and peer review, and scientific integrity and objective evaluation are the impetus for improvement. This requires experts to provide science-informed methods and practitioners in the field working as a professional cohort, who see themselves as human dimension scientists.

The technical aspects of invasive species management in Australia demonstrate these attributes. However, the scientific discipline is weak in the human aspects of invasive species. Two aspects of continuous improvement require particular attention: transparent performance evaluation of the human aspects of invasive species management and a more scientific approach to the human aspects of invasive species control.

A strategy for more transparent performance reporting to support continuing improvement might have the following elements:

1. Regular 'State of Biosecurity' reports on invasive species, their impacts, consequences and control at a regional, state and national scale.
2. Regional-scale management objectives and control plans, with community and industry groups involved in negotiating targets, plans, implementation and resourcing.
3. The implementation and outcomes of negotiated plans would be reported, with an emphasis on continuous improvement. Public agencies would report on their investments, outcomes, causes of outcomes and continuous improvement plans.
4. Specific reporting of what funds are invested, by whom, in what activities, the investment outcomes, and potential improvements in investment performance.

[15] Bartel, R., Martin, P. and Stone, C. 2011. *Harmonising Australia's Environmental Laws: Scoping of Harmonisation of Environmental Regulation and Regulatory Practice across Jurisdictions in Australia*. Report to the Australasian Environmental Law Enforcement and Regulators Network: Adelaide.



Greater transparency is likely to lead to improved project management and management of human issues, and greater trust in how these issues are managed.

Scientific approaches to managing human issues need to be strengthened through projects based on sound science, objective evaluation of experiment, action research, peer-based reflection and synthesis of lessons, and education and training that embeds science-based methods. A strategy to this end could have the following elements:

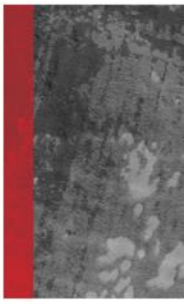
1. Biosecurity policies should prioritise a scientific approach to the human aspects of invasive species practice.
2. Human science evaluation methods are not well developed in Australia. A priority should be to develop, refine and use these extensively.
3. Management of the human dimensions should be made more 'professional', through vocational and scholarly education, training and research.
4. Knowledge sharing and development could be encouraged using practitioner and expert conferences, communities of practice, and master-classes.
5. Formal professional qualifications in the human dimensions of invasive species programs should be promoted, as they are with the technical aspects.

3.5 Better public communication is needed

Invasive species management depends on public support, particularly through political decisions. Many examples were given of community opposition triggered by media reports or activism by special-interest groups. This limits the control of invasive species. There were concerns about decision-makers being swayed by arguments that were considered to be ill-informed, particularly about animal welfare and the risks of control activities. Such difficulties are likely to increase.

More effective communications strategies to build community awareness of (and support for) invasive species management are needed. This will require the skills and resources for proactive communications management. The following aspects were highlighted by the consultation:

1. There is a need for (a) widespread awareness and support for invasive species action, and (b) the management of potential 'public relations disasters'.
2. This will require professional communication skills and research to enable more effective communications in support of citizen action.
3. A comprehensive communications strategy would include face-to-face (e.g. with landholders), traditional media (e.g. with local communities) and social media.
4. Communications strategies and implementation should be conducted independently of public service political constraints.
5. Community awareness raising and education should be part of the strategy, targeting general knowledge and attitudes (e.g. communities or schools), and 'how to do it' capabilities for landholders.
6. It will be increasingly essential for community groups to have 'scientific best practice' communication capabilities in-house or otherwise available to them.



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