

Issues Paper

Review of weed management in NSW

1 Introduction

The Minister for Primary Industries has requested the Natural Resources Commission (NRC) to undertake an independent evaluation of the effectiveness and efficiency of weed management arrangements in NSW, with the view of informing the further development of the proposed NSW Biosecurity Act, and other relevant strategies under the NSW Biosecurity Strategy. The review will focus on existing good practice, opportunities and barriers that exist within current arrangements and ways to overcome barriers to inform the recommendations.

The Commissioner for Natural Resources, Dr John Keniry AM, was asked to Chair a Steering Committee to ensure the terms of reference are met and stakeholder input is appropriately considered. The Steering Committee consists of Cr Reg Kidd - Noxious Weeds Advisory Committee, Dr Bruce Christie - Biosecurity NSW, and Mr Mick O'Flynn - Office of Environment and Heritage.

1.1 Terms of reference

The Minister's terms of reference (see Appendix A), received on 20 August 2013, request the NRC to:

- assess (based on existing data) the distribution and abundance of weeds across NSW, their impacts, likely trajectories and risk creators and bearers
- evaluate current regulatory and institutional arrangements across both public and private tenures
- evaluate weed management programs funded by the Australian and NSW Governments
- identify and assess viable alternative weed management arrangements
- provide advice on potential transitional arrangements for the future implementation of the NSW Biosecurity Act and NSW Biosecurity Strategy 2013-2021.

For the purposes of the review:

- The assessment of the current and projected distribution and abundance of weeds and their impacts is to rely on existing data.
- Weeds include both introduced and native species, but are limited to terrestrial and freshwater aquatic species only; marine species and marine environments are excluded. The review will consider weeds identified under a variety of legislation including noxious weeds as defined under the *Noxious Weeds Act 1993*, invasive native scrub and feral native species under the *Native Vegetation Act 2003*, environmental weeds identified in the biodiversity priorities for widespread weeds, and Weeds of National Significance and National Environmental Alert List Weeds noted in the Australian Weeds Strategy.

1.2 Purpose of this Issues Paper

The purpose of this paper is to:

- clarify priority issues
- elicit stakeholder and community views about barriers and opportunities
- seek to identify any additional issues
- identify relevant evidence to inform the review.

1.3 Context for this review

There have been several previous reviews into weed management in NSW, most recently the 2009 Weeds Summit, the 2010 Statutory Review of the *Noxious Weeds Act 1993*, and a Weed Management Task Force convened in 2011. While some recommendations from these reviews have been implemented, there is still considerable community concern about weeds, as reflected at the Local Land Services community consultation meetings.

The review of biosecurity legislation provides an opportunity to examine current weed management arrangements and identify any opportunities to improve their effectiveness. Findings and progress from previous reviews will be taken into account. However, the NRC will be taking a fresh and objective look at what is and is not working to identify practical ways to achieve better outcomes.

There are several other reviews underway that are relevant to this project and involve similar stakeholders. These include: the Independent Local Government Review; the review of NSW Crown Land Management; the review of the *Native Vegetation Act 2003* and regulations, and reviews of the NSW Invasive Species Plan and the Australian Weeds Strategy.

2 Review approach

The review will be evidence-based and recommended changes will aim to achieve improved outcomes through more effective weed management, rather than focusing on processes. The review will consult with relevant Australian, state, regional and local government organisations, as well as industry, environmental and community groups. The process for completing the review will be as follows:

1. **Issues Paper:** The NRC developed this Issues Paper based on an initial literature review and consultation, including a workshop attended by a range of weed management professionals and experts from local government, other government agencies, regional weed management groups, Catchment Management Authorities (CMAs), non-governmental organisations (NGOs), community and research organisations.
2. **Consultation phase:**
 - The Issues Paper will be available for public comment for six weeks until 6 December 2013. The NRC will review all comments to inform a draft report.
 - The NRC will undertake targeted consultation from October through December including: regional tours attended by Steering Committee members and involving local stakeholders; focus group meetings; and face-to-face and telephone interviews with key stakeholders.

3. Draft report: The NRC will issue a draft recommendations report in late February 2014 based on consultation, feedback on the Issues Paper and NRC analysis.

4. Consultation phase:

- The draft report will be available for public comment for one month beginning in late February 2014.
- The NRC will undertake additional targeted consultation during this period.
- A limited number of public meetings are anticipated following release of the draft recommendations report.

5. Final report: The NRC will issue a final recommendations report to the Minister by 20 May 2013.

2.1 Guiding principles

The NRC has identified the following principles as necessary for an effective weed management system. Section 4 discusses issues identified with the current system that may prevent accomplishment of these principles, and opportunities to better meet these principles.

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

Principle	
Outcomes-focused	<ul style="list-style-type: none"> ▪ arrangements should aim for best outcomes on the ground ▪ weed management is one part of overall sustainable landscape management for achievement of triple bottom line outcomes
Shared responsibility	<ul style="list-style-type: none"> ▪ effective cooperation across tenures and jurisdictions ▪ coordinated collective action e.g. on widespread weeds ▪ clear understanding of roles and responsibilities
Evidence-based	<ul style="list-style-type: none"> ▪ prioritised, risk-based programs based on best available science and research ▪ effective evaluation and reporting of outcomes
Consistent	<ul style="list-style-type: none"> ▪ equity in approach across tenures (tenure neutral) ▪ consistency in management of native and introduced invasive species ▪ consistency in planning and reporting processes
Responsive	<ul style="list-style-type: none"> ▪ effective emergency response to new threats ▪ responsive/agile to prevent and control new incursions ▪ responsive and adaptable to emerging issues and new knowledge
Administratively effective and efficient	<ul style="list-style-type: none"> ▪ aligned institutional arrangements, policies, legislation and funding ▪ action at scale appropriate to the problem ▪ research aligned with needs
Accountable	<ul style="list-style-type: none"> ▪ appropriate and implementable compliance arrangements ▪ organisations at all scales held accountable for achieving results ▪ appropriate accountability of risk creators

Consistent with the theme for the NSW Biosecurity Strategy, a core principle is that weed management must be a shared responsibility to succeed. Both emergency response to emerging weeds and management of widespread weeds require cooperative, organised approaches that work across tenures and jurisdictions. The review will seek to identify good practices for advancing consistent, community-wide responses for improved outcomes.

3 How to provide a submission

The NRC invites submissions regarding this Issues Paper from members of the community and stakeholders, and will use this feedback to inform our findings and recommendations. Submissions should be received by close of business on **6 December 2013**.

The NRC is specifically seeking feedback regarding the implications, drivers/barriers and suggested solutions in relation to the identified issues, as well as comment on any gaps in the issues identified. Questions are presented throughout this paper; however, stakeholders may address any matters in their submission.

There is no standard format for submissions. Submissions may range from a short letter outlining your views on a particular topic to a more comprehensive document covering a range of issues. Where possible, you should provide evidence, such as relevant data and documentation, to support your views. We treat all submissions as public and make them available on our website unless a submission is clearly marked confidential or it contains material that is defamatory, offensive or in breach of any law. Details of the NRC privacy policy can be found via the Have Your Say website link below.

Electronic submissions can be provided through the Have Your Say website - <http://engage.haveyoursay.nsw.gov.au/weed-management-review>

Paper copy submissions can be faxed to (02) 8227 4399 or mailed to:

Weed Management Review
Natural Resources Commission
GPO Box 4206
Sydney NSW 2001

Submissions must be provided by the closing date to allow us sufficient time to consider them before making our findings and recommendations. If you are unable to provide a submission before the closing date, you may contact us to discuss whether a late submission can be accepted.

4 Issues

Weeds are a significant concern in NSW, with over 170 weed species listed as Noxious Weeds, 52 weeds listed as invasive native scrub and several hundred recognised as a threat to biodiversity. One estimate indicates that weeds cost NSW \$1.2 billion in lost productivity alone each year. The NRC will work with Department of Primary Industries (DPI) to review this figure, and related cost estimates as part of the review. There are also significant environmental and social impacts, including loss of biodiversity caused by weed invasions and health impacts, the costs of which have not been fully quantified.

Both the Australian and NSW governments are currently examining ways to better coordinate weed management with broader biosecurity initiatives. The outcomes sought under the NSW Biosecurity Strategy (including weed management), and the Australian Weeds Strategy are based on a hierarchy reflecting the invasion process for weeds. They include:

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

NSW and Australian Government investments are moving towards greater focus on preventing the arrival of new weeds or eradicating new arrivals in an area, as this is recognised as the most effective and cost efficient method for tackling weeds. However, this focus has implications for management of widespread weeds that will be examined in the review.

The following sections outline issues and opportunities that have been identified through initial literature review and consultation.

4.1 Community ownership

Effective weed management relies on community-wide awareness and adoption of consistent control strategies. Land managers tend to focus on widespread weeds due to their more obvious presence, their impact on production and biodiversity, and the costs associated with controlling them. Governments are increasingly focusing resources on prevention and eradication of new weeds, and avoidance of future costs. Generally speaking responses to new incursions will require strong oversight, coordination and capacity for rapid response, whereas the management of widespread weeds relies on engaging and coordinating community resources for long-term collaborative management.

Awareness and education programs can improve community capacity, facilitate collaborative responses and allow for new information to be quickly disseminated. They are also necessary to ensure that responsible parties understand their obligations and how to fulfil them.

There are some promising programs and success stories in the area of community ownership that can be built upon. For example:

- Development of community groups focused on a specific invasion have been successful in some areas. Recent research indicates that effective programs involve trust and willingness to reciprocate on weed control behaviour, acknowledgement of a mutual problem, positive relationships between public and private land owners and achievable goals.

- Many local and regional organisations have established successful awareness programs which can be shared across regions.

Potential barriers to successful capacity building and awareness include:

- **Lack of clear goals/vision** – Stakeholders have indicated that a barrier to successful management, particularly of widespread weeds, is the lack of clear objectives for management programs. This can lead to frustration, reducing interest in collective action as landholders are not able to see clear progress towards a goal.
- **Lack of clear roles and responsibilities** – Stakeholders have indicated that lack of understanding and awareness of roles and responsibilities is currently a barrier to successful collaborative action.
- **Lack of general awareness** – Feedback and literature indicate that in many cases there is a lack of general understanding of the weeds problem and/or of responsibilities under the current regulations. Further, because the impacts of weeds are not always evident and are slow acting it can be difficult to gain and maintain the broader community's attention.
- **Landholders have a range of motivations and perspectives** – Education programs must be adapted to local situations. For example, in some regions the increase in absentee landholders and high turnover of land have been cited as problems with building capacity. Many researchers have also found that there may be cultural differences in how weeds are viewed and education programs must be culturally appropriate to be effective.
- **Short-term education programs** – Weed management is an ever-changing area. Landholders and agency personnel may also be in a state of flux. Feedback indicates that awareness programs should be sustained over the long-term, and include mechanisms to identify and engage new community members.
- **Lack of notification on sale of land** – Current systems do not require that purchasers are notified of weed issues on their land. This means that new landholders may not be aware of their obligations.
- **Need for improved extension services** – Some stakeholders have indicated that in some instances there is limited capacity for weed identification. Improved education and adoption of available technology are potential means to overcome this barrier.
- **Lack of tenure consistent approaches** – There has been considerable feedback about the lack of equity in the current system between different types of land tenure. This can lead to lack of motivation, and poor collaboration, reducing the effectiveness of control programs.
- **Limited pathway focus**– Recent research indicates that there is little focus on pathways beyond the farm gate and public conservation lands. For example vehicles, particularly earth-moving equipment, nurseries, fodder and railways are cited as potentially significant sources for weed incursions. Methods for bringing managers associated with these pathways into community efforts should be considered.

Questions:

- What do you consider good practice for encouraging community-based weed management and changing landholder practices?
- Do you feel that the current education/awareness programs are working? Why? Why not?
- What are possible means for improving incentives for collaborative actions or penalising non-involvement/requiring involvement?
- How can we improve community ownership of weed management?
- At what scale (local, regional, state) are awareness-raising programs most effective?

4.2 Policy and regulatory framework

In NSW weed management is influenced by a range of national and state government agreements, strategies, legislation, plans and programs. An overview of these arrangements is presented in Figure 1.

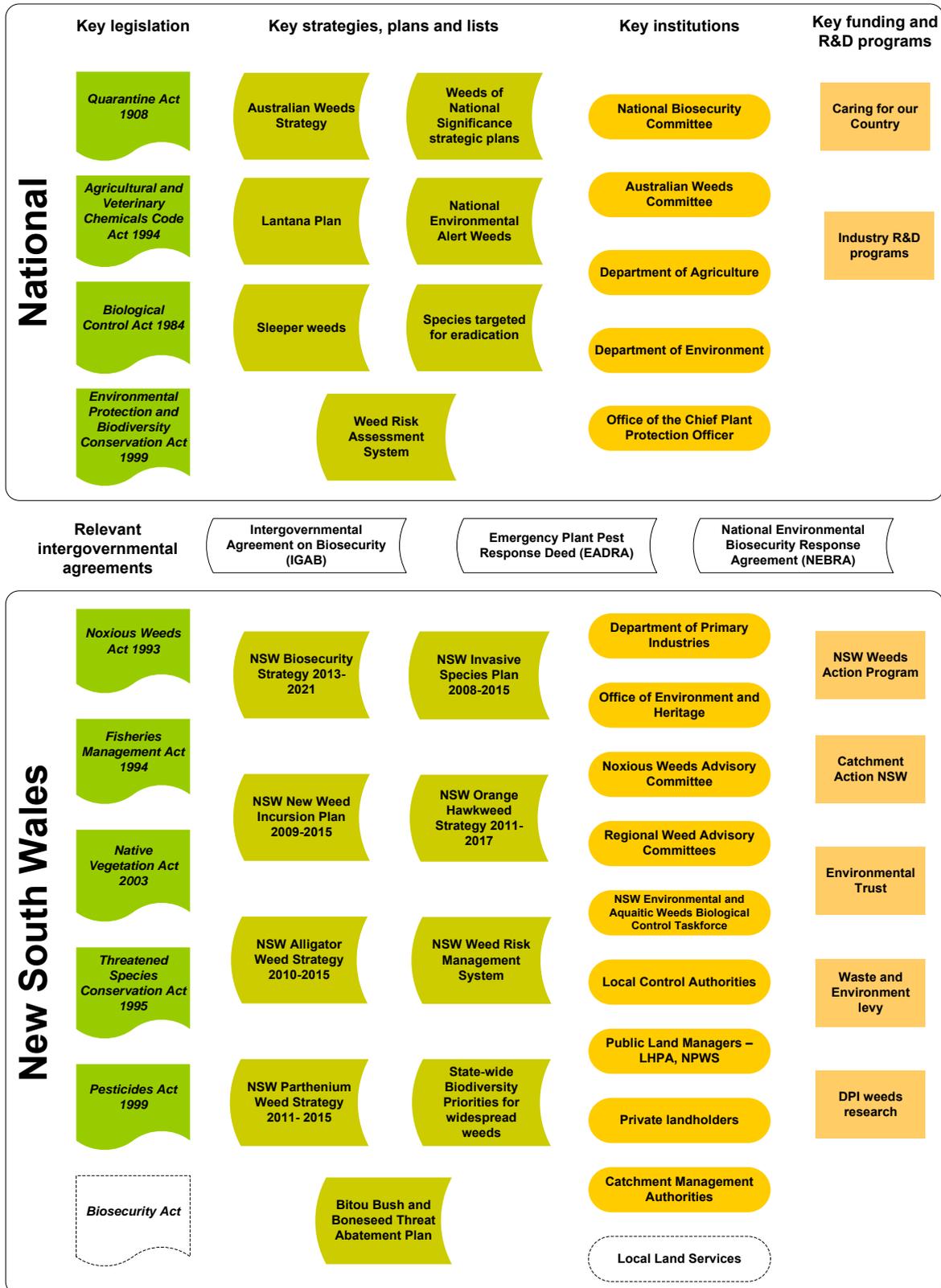


Figure 1: An overview of Australian Government and NSW regulatory, institutional and funding arrangements for weed management

The key piece of legislation for weed management in NSW is the *Noxious Weeds Act 1993*; however a variety of other national and state legislation also apply. The *Noxious Weeds Act 1993* was reviewed in 2005, and again in 2010. These reviews focussed on identifying statutory amendments to improve the effectiveness and efficiency of the Act and provide greater consistency with the NSW Invasive Species Plan. This review will examine the broader suite of policy and legislation for weed management in light of the NSW Biosecurity Reform Project and proposed NSW Biosecurity Act.

In recent years there has been a movement at the national and state level towards consistent and coordinated management of all types of invasive species including pest animals, weeds and diseases. There has also been an increased focus on integrated land management, as demonstrated by the creation of the Local Land Services. There are opportunities to better align weed management policies and regulations with these new directions.

Some identified barriers to more effective and efficient weed management outcomes include:

- **Multiple policies, strategies and plans operating at different scales** - Stakeholders have raised concerns that the varying scales and focus (e.g. biosecurity, natural resource management and production) of the range of policy instruments has led to poor alignment or conflict, particularly in relation to prioritising control actions and the allocation of resources. Some stakeholders have indicated that one comprehensive system for handling all types of weeds would be more effective and efficient. Previous reviews have also identified potential efficiencies in integrating strategies for invasive pest animals and plants.
- **Inconsistencies between different legislation** - Inconsistencies and duplication between legislation have been identified as barriers to effective weed management. For example, while introduced weed species are managed through the *Noxious Weeds Act 1993*, feral native species and invasive native scrub fall under the provisions of the *Native Vegetation Act 2003*. Inconsistencies also contribute to uncertainty regarding management objectives and stakeholder roles and responsibilities. Opportunities for improvement were identified in relation to alignment of weed management and land use planning. This is especially important on the rural-urban fringe, where residential development is leading to significant changes in land management, with potentially significant weed management implications.
- **Multiple weed listings** - Multiple listing systems apply at state and national scales. The current listing systems can be confusing and create duplication. The differentiation between 'environmental' and 'noxious' weeds, and the agencies responsible for managing them can also impact efforts for integrated weed control. Several questions have been raised regarding the listings including:
 - whether the classification systems are appropriate or effective
 - the comprehensiveness of the lists
 - whether NSW should be using a 'permitted list' (or 'white list') approach, similar to the process applied in other jurisdictions and the national quarantine program
 - how to manage 'conflict species' which may have positive commercial benefits for some, but negative effects for others if released.
- **Noxious weed listing process** - In addition to concerns over multiple lists, stakeholders have raised concerns with the listing system under the *Noxious Weeds Act 1993* specifically. Research indicates that the declaration process may not be effectively or consistently implemented resulting in a poor understanding of where weeds actually occur. Some have questioned the effectiveness of the five-level classification system within the *Noxious Weeds Act 1993*. It has also been noted that not all classes are prohibited from sale and distribution.

- **Adequacy of emergency response** – Currently the Minister may make an emergency weed control order in response to the detection of new weed species. Stakeholders have identified that this process is sometimes too slow, and that existing structural arrangements impact the ability to initiate a coordinated response and mobilise officers, particularly at a landscape scale. Limitations of current surveillance programs for early identification of new incursions have also been noted. Some stakeholders have suggested establishing a binding mechanism between government and industry (such as the deed used for animal health) to facilitate more effective emergency response.
- **Barriers to compliance and enforcement** - A number of concerns have been raised regarding the compliance and enforcement arrangements under the *Noxious Weeds Act 1993*. Local Control Authorities (LCAs), as well as landholders have noted the conflict created by LCAs having both an extension and enforcement role. Many have questioned whether the local level is the appropriate scale for delivery of consistent enforcement activities. Penalties are not based on the severity of the offence, and may be insufficient to deter non-compliance. LCAs have highlighted the difficulties in terms of cost, time and evidence requirements, to progress a case to court. Several stakeholders have raised concerns over the lack of enforcement for obligations on public land, with the only enforcement mechanism being for a Weed Control Notice to be issued by the Minister.
- **Different obligations for private and public land** - Private land owners and LCAs are required to *control* noxious weeds in accordance with a Weed Control Order, with penalties applying to private landholders for non-compliance. In comparison, public authorities are required to control noxious weeds to the extent necessary to prevent the weeds from *spreading* to adjoining land. Several high-risk weed invasion pathways including roads, rail lines and utility corridors, are the responsibility of public authorities. Many neighbouring landholders perceive these pathways and public lands, such as National Parks, as sources of weeds. The differing obligations can undermine private landholder control efforts, and their motivation for weed control on their own property.
- **Effectiveness in managing widespread weeds** – Current policy at state and national levels emphasises prevention and eradication of new and emerging weeds as the most cost-effective approach to weed management. Research indicates that the regulatory approach for new and emerging weeds is less suited to widespread weeds, as evidenced by the increased distribution of many species. Furthermore, an enforcement approach has been identified as a barrier to the reporting of weeds, and establishment of effective relationships between landholders and extension services. Studies suggest that voluntary collective action is more effective for managing widespread weeds and that current regulatory arrangements may not be the most effective for promoting collective action.
- **Management of aquatic weeds** – Stakeholders have raised questions over the efficacy of the current arrangements for management of aquatic weeds. Under the legislation landholders are responsible for aquatic weeds in waterways on their property. Several stakeholders have suggested that aquatic weeds should be comprehensively managed by one organisation.

Questions:

- What works well with the current policy and regulatory arrangements?
- Are current regulations appropriate and effective for managing emerging and widespread weeds?
- What are the opportunities for greater alignment of regulation and policy?
- What are your views on the appropriateness of current compliance and enforcement arrangements? How can compliance and enforcement be more effective?
- Should public land managers be held accountable to the same extent as private landholders? If so, how?
- What would be a more appropriate and effective weed listing approach?

4.3 Institutional arrangements

The institutional arrangements for weed management in NSW have evolved over time, and as a result involve a multitude of players at varying scales. Responsible parties for weed management include the DPI, the Office of Environment and Heritage (OEH), Noxious Weeds Advisory Committee, Regional Weeds Advisory Committees, LCAs (some of which are County Councils), public authorities, CMAs, private landholders, volunteers and the new Local Land Services. The complicated institutional arrangements for weed management have led to reports of confusion regarding weed management roles and responsibilities.

Government has developed strategies for better prioritising management effort, for example, OEH, DPI and CMAs worked closely together to develop regionally-focussed and risk-based Biodiversity Priorities for Widespread Weeds, and DPI has developed the NSW Weeds Action Program (WAP) in cooperation with Local Government, member organisations of the Noxious Weeds Advisory Committee and the community. The WAP replaced a range of noxious weed grant programs provided by the NSW Government to local and public authorities and trustees of reserves and commons, aiming to target these funds more directly and strategically to weed outcomes specified in the NSW Invasive Species Plan. The focus on improved regional coordination arrangements has been well received by many as it encourages a more strategic process for prioritising new and emerging weeds, clearer regional priorities and facilitates better partnerships and resource sharing. Feedback also indicates that the Weeds of National Significance program has supported partnerships and cooperation across scales.

Stakeholders have indicated that in the past decade there has been a positive focus on improved training, resulting in more skilled and professional weed officers.

This review provides the opportunity to look at the structural arrangements in an integrated manner and potentially address the following issues identified by stakeholders:

- **Effectiveness of administrative arrangements** - There are several agencies and committees involved in weed management at the State, regional and local level. Stakeholders have identified concerns over administrative efficiency, duplication of efforts, appropriate scale for the delivery of particular services (e.g. strategic planning, enforcement, and education), governance processes and unclear roles and responsibilities. There may be opportunities to integrate weed management with other biosecurity initiatives and simplify compliance and management for landholders.

- **Opportunities for increased cooperation** - A common theme among stakeholders has been the need for greater cross-agency and cross-sectoral cooperation between state and Australian Government agencies, industry and the community. Better co-ordination between the various layers of management within NSW was also noted as an area where there are opportunities for improvement. Feedback indicates that 'siloing' has impacts on information sharing, developing integrated management programs and including stakeholders with key weed management responsibilities in decision-making processes. Stakeholders highlighted the need for greater transparency in decision-making, such as listing and classification of weed species.
- **Need for consistent, risk-based prioritisation** - Given the large number of weed species, there is broad agreement that effective programs must direct effort and funding towards actions that will achieve the greatest outcomes. Concerns have been raised over whether there is consistent prioritisation across the state and whether prioritisation is evidence-based. While the current weed management programs are based on risk assessment principles, stakeholders have suggested risk assessment could be more effectively used to prioritise investment. Prioritisation might be enhanced for example by improving consideration of risk pathways, biophysical factors and boundaries and whether programs support coordinated and collaborative action, span tenures and are responsive to new information.
- **Limited accountability** - Stakeholders have identified that under the existing arrangements there is little accountability for whether weed management activities achieve outcomes. Furthermore, there is little evaluation of the effectiveness, efficiency and appropriateness of weed management actions, plans and policies. For example, currently there are no consistent audits of weed management programs. Those responsible for allocating and expending funds should be held accountable for tracking expenditure and monitoring whether outcomes are being achieved. Concerns have also been raised over whether current management arrangements hold risk creators accountable.
- **Extent and effectiveness of funding arrangements** - Funding for weed management is currently derived from a number of sources including Australian, state and local governments, industry and private landholders; however, the exact amount spent by each sector is unknown, as is the cost of weeds on the NSW economy. Feedback on the issue of funding has varied. Many feel that current funding is insufficient. There is general agreement that better coordination of overall funding, and cooperation between funding providers is needed to ensure a consistent and strategic approach to weed management. Feedback also indicates that there is currently a lack of long-term funding which is necessary to address many weed management issues.
- **Variable implementation by LCAs** - Under the *Noxious Weeds Act 1993* local councils are nominated as LCAs which are responsible for implementation of the Act. In some instances noxious weeds functions are conferred on a county council, or a regional weeds authority. In addition, there are 14 Regional Weeds Advisory Committees across NSW to assist in regional coordination. Stakeholders report variable implementation with respect to resourcing, prioritisation of weeds and management actions, planning and funding.

Questions:

- What works well with the current institutional arrangements?
- What do you believe is the appropriate scale (state, regional, local) for delivery of key weed management activities, including strategic planning, enforcement, education and extension services?
- What changes to current institutional arrangements would you propose?
- How can strategic and coordinated planning for weed management be improved?
- How can accountability and performance within the management system be improved?

4.4 Evidence-based decision making

Evidence is essential for effective decision making across all aspects of weed management, including building confidence in program priorities, understanding impacts, and assessing the outcomes and cost-effectiveness of management actions and programs. Although it is widely indicated that the “war on weeds” is being lost and that the weed problem is growing worse, it is difficult, if not impossible, to assess with currently available data both the extent of the weed problem and the changes over time. As part of this review, the NRC will examine what data is currently available and what the key data gaps are.

There have been recent advances in spatial and telecommunication technology, which provide for improved identification, diagnostics, surveillance coordination, and reporting capacity for strategic weed management. Various weed management groups have begun to use these technologies and there is opportunity to expand their use for improved tracking of progress, and to identify weed management priorities. Some regions have also made improvements in evidence-based prioritisation of actions, and are working towards standardisation of reporting.

Some of the identified barriers to better evidence-based decision making include:

- **Lack of standardised data collection and reporting systems** – NSW does not have a standardised system for monitoring, evaluating, mapping, managing or reporting weed information. Inconsistencies in data collection impact the ability to aggregate data at different scales. The lack of an integrated information system to provide accurate and timely identification of risk impacts the ability to develop effective and strategic weed management responses.
- **Limited capacity for monitoring and evaluation** – Under current legislation LCAs are required to monitor the presence of noxious weeds, maintain records, and as required report to DPI on the presence, distribution and the implementation of weed control activities. Stakeholders have reported a lack of capacity (particularly resources and skills) within some local governments, and even state government agencies, for the monitoring and evaluation of weed data. This is made more difficult as IT and Geographical Information Systems (GIS) capacity varies between LCAs.
- **Lack of performance data to drive accountability** – Stakeholders have noted that much of the reporting on weed management is output rather than outcome focused. This has made it difficult to assess effectiveness and efficiency of management activities or the performance of weed management institutions. Without consistent reporting of outcomes it is difficult to assess overall progress, or to adapt programs to promote continual improvement.

- **Opportunities for greater sharing of information** - Weeds are a problem that can quickly cross borders. Feedback indicates that there may be opportunities to improve sharing of information within and between agencies, through better coordinated reporting systems and greater communication between agencies and regions.
- **Evidence-based management decisions** - The classification of weed species as either new and emerging or widespread has significant consequences for their management. Decisions regarding whether to eradicate, contain or 'do nothing' can have major cost implications and should be transparent, objective and evidence based.

Questions:

- What are examples of effective weed management information and mapping systems?
- Are you aware of any examples of standardised monitoring, evaluation and reporting processes that may also be effective for weed management?
- What tools are you aware of that should be considered for state-wide weed monitoring?
- Do you feel that management decisions (i.e. which actions to take and where) are currently evidence-based?
- Who is best placed to make evidence-based decisions regarding the management approach for weeds (i.e. eradicate, contain, do nothing)?

4.5 Research and development

Although challenges for managing weeds continue to increase, there are indications that investment in research has been declining. Over the past six years several key weeds research organisations have ceased to exist including the CRC for Australian Weed Management, Land and Water Australia, and the National Weeds and Productivity Research Program. Over the same period investment in weeds research is reported to be declining in publicly funded organisations such as the CSIRO and Government agencies. Some Research and Development Corporations such as the Grain Research and Development Corporation and Meat and Livestock Australia are still investing in weeds of production systems, but it is widely held that funding for weeds research generally is insecure and too short-term to be fully effective.

Some claim that weeds research capacity has fallen almost to the point that it will be difficult to rebuild, with potentially serious implications for agricultural productivity and biodiversity conservation. Stakeholders have also indicated that research findings are often not disseminated effectively, reducing uptake of new approaches and technology.

While significant concerns have been raised over the current state of research funding, there is some important research and development taking place. For example, Weed Futures Australia is providing important information about the potential spread of weeds under expected climate change scenarios. CSIRO is investing in biosecurity through their Biosecurity Flagship program. Some Regional Weeds Advisory Committees and LCAs have begun to implement innovative technologies for tracking and controlling weeds. There may be opportunities to improve collaboration in research and development work with the Australian Government, industry, academia and NGOs.

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

- **Long-term programs** – Many research activities require consistent, long-term funding as results must be evaluated across spatial and temporal scales in order to provide meaningful results. For instance, for biological controls it takes years to identify an organism which will impact just one pest and not adversely affect others, and achieve necessary permissions to test under Australian conditions. Current arrangements make it difficult to secure long-term funding, which may reduce the effectiveness of research investment.
- **Declining capacity** – In addition to the loss of several research groups, stakeholders have raised concerns over an increasing loss of capacity and knowledge as fewer people are becoming involved in weeds research, and current experts are retiring. Development of new controls in response to issues such as herbicide resistance and climate change will require increased capacity in weed science and land management.
- **Prioritisation of funding** – Research indicates that although it is more cost effective to address emerging weeds before they become widespread, very little research funding is spent on emerging weed issues. A strategic evaluation of research funding priorities and agreement on shared priorities might improve effectiveness of research spending.
- **Limited collaboration** – Stakeholders have indicated that research programs could be improved through better collaboration among practitioners (both government and landholders) and researchers. Improved collaboration would allow for use of citizen knowledge, assist in prioritisation of research activities, and support adaptive management.
- **Poor dissemination of information** – Stakeholders have indicated that research results are often not effectively shared. This has been attributed to several causes including, a siloed culture such that results are not effectively spread beyond the funding organisation, limited education and awareness programs, and poor communication between researchers and practitioners, as well as between weed management agencies and landholders.
- **Slow uptake of new technologies** – There are many new technologies being adopted by various weed management groups that could benefit the entire State. A coordinated approach and broad adoption of new technologies could help target research and development and facilitate tracking of results. For example, there are several different apps available to locate and identify weeds, but there is currently no central repository or consistent data format for such information.

Questions:

- Is the current investment in research sufficient (e.g. amount of funding, time scale of funding)?
- How can available research dollars be used more effectively, better prioritised and coordinated and/or better leverage additional investment?
- Are you are aware of any additional barriers to effective implementation of weed research outcomes?
- How can the dissemination of research results and the adoption of new controls and technologies be improved?
- What roles and responsibilities should research and development corporations have with respect to weeds?

Appendix A – Terms of Reference

Terms of Reference for review of weed management in NSW

NSW 2021 sets out a range of actions to improve economic growth in regional NSW and strengthen local environment and communities. One of these actions is to reduce the impact of weeds on our production and natural assets, such as prime agricultural land and the reserve system. Under the recently released NSW Biosecurity Strategy, NSW intends to develop new biosecurity legislation that will further enhance the current risk-based approach to managing weeds (and disease and pests).

Weeds impact production and natural assets in varying ways. 'Noxious' weeds are declared under the *Noxious Weeds Act 1993*, and subject to a range of different controls. This Act obliges private and public landholders and managers to control declared noxious weeds on their land. Local Weed Control Authorities (i.e. Local Shires and Councils) have the primary responsibility to administer this Act. Other Acts such as the *National Parks and Wildlife Act 1974*, *Threatened Species Conservation Act 1995* and *Fisheries Management Act 1994* also provide for the management of terrestrial, freshwater and marine weeds and noxious vegetation. Native species acting in a weed-like manner (such as Invasive Native Scrub) are regulated under the *Native Vegetation Act 2003*.

Other mechanisms such as intergovernmental agreements and funding for regional bodies under Australian and NSW Government programs provide alternative drivers to promote the weed management outcomes sought by the NSW Government.

Evaluation of weed arrangements in NSW

The Minister for Primary Industries requests the Natural Resources Commission (the Commission) to evaluate the effectiveness and efficiency of the current weed management arrangements in NSW, with the view of informing the further development of the NSW Biosecurity Act and other relevant strategies under the NSW Biosecurity Strategy.

In developing its advice the Commission should:

- assess (based on existing data) the distribution and abundance of weeds across NSW and their impact on production and natural assets, having regard to historical trends and likely trajectory, current condition and risk creators and bearers
- evaluate current regulatory and institutional arrangements in meeting state agreed outcomes across both public and private tenures, including identifying characteristics of any constraints, barriers and best practice
- evaluate weed management activities funded by the Australian and NSW Government incentive and grant programs such as (but not limited to) *Caring for our Country* and *Catchment Action NSW*, *NSW Weeds Action Program*, including identifying characteristics of any constraints, barriers and best practice
- identify and assess viable alternative weed management arrangements, including risks and opportunities.

Any recommendations should include potential transitional arrangements for the future implementation of the NSW Biosecurity Act and NSW Biosecurity Strategy.

For the purpose of this work, 'weeds' is defined as both introduced and native species but is limited to terrestrial and freshwater aquatic species only.

The Commission should also have regard to the following in undertaking the work:

- the likely future trajectory in the distribution of weeds in States bordering NSW, including the potential implications of climate change on range extension, conflicting commercial plant usage and food security
- NSW Biosecurity Strategy, NSW Invasive Species Plan and NSW Statewide Framework of Biodiversity Priorities for Widespread Weeds
- arrangements for weed management in other jurisdictions
- community expectations and feedback
- previous reviews on weed management in NSW
- any reports and recommendations from the Independent Local Government Review Panel and NSW

Crown Lands review

- functions and services of Local Land Services
- intergovernmental agreements for biosecurity
- any monitoring, evaluation and reporting arrangements for weeds.

The Commission should work closely with Department of Primary Industries and consult with relevant stakeholders and agencies, including Noxious Weeds Advisory Committee, Office of Environment and Heritage, NSW Aboriginal Land Council, Local Control Authorities, Local Government NSW, Catchment Management Authorities, Regional Weed Advisory Committees, Livestock Health and Pest Authorities, peak farming, industry and environmental groups and relevant Australian government bodies. The Commission will also undertake public consultation to inform its assessment and development of recommendations.

The Commission is to provide:

- a Draft Report, including draft recommendations, within six months of receiving the terms of reference
- a Final Report, including outcomes of consultation, within three months of providing the Draft Report.