

Australian Weeds Strategy Evaluation

FINAL REPORT

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Prepared for the
Evaluation Steering Committee –
Australian Weeds Committee

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Australian Weeds Strategy Evaluation

Executive summary

In late November 2012, the Australian Government Department of Agriculture, Fisheries and Forestry (DAFF), on behalf of state and territory governments and the Australian Government, engaged Community Solutions to undertake independent evaluations of both the Australian Weeds Strategy (AWS) and the Australian Pest Animal Strategy (APAS).

The Terms of reference for each evaluation asked for an assessment of:

- I. A qualitative assessment of the achievements and failings of the Strategy
- II. Analysis of the role of stakeholders in implementing the Strategy
- III. Identification, assessment and provision of recommendations on the impact of signing of an Intergovernmental Agreement on Biosecurity (IGAB), and its national strategies, on the current and any future Strategies
- IV. Identification of options and recommendation of the next version of the Strategies and whether they are still required.

The timelines for these evaluations extended from 26 November 2012 to 30 April 2013. At critical points during the evaluations, the consultancy team liaised with and sought feedback from a project Reference Group which included state-based and Australian Government representatives from both the Australian Weeds Committee and the Vertebrate Pest Committee.

Information gathered from a targeted literature review, 52 in-depth interviews with key stakeholder, and an on-line survey completed by 267 stakeholders in weeds and/or pest animal management, resulted in the following key findings in relation to the AWS.

Achievements and failing of the AWS

The Australian Weeds Strategy agreed by the Australian Government and all state and territory governments in 2006, and adopted by the NRM Ministerial Council in 2007, is widely identified as providing an important strategic framework for weed management in Australia. That the AWS and the principles underpinning it have been agreed by national, state and territory governments is important in building and maintaining collaborative effort to address Australia's weed problems.

Among the major objectives of the AWS, prioritisation of weeds and weed management problems and implementation of coordinated and cost-effective solutions for priority weeds and weed problems have some prominence. Throughout this evaluation the WoNS program has consistently rated quite highly. While there may be issues around the need for a shift in focus from single prioritised species to broader landscape-scale approaches to managing weeds as an integral part of whole landscapes, the science-based weed risk approach to WoNS identification and the role played by the WoNS Coordinators are seen to have been important in:

- raising community awareness
- providing targeted and timely management information
- facilitating collaborative effort among different stakeholders
- establishing strategic management plans and monitoring progress against them.

These strongly positive perspectives on the AWS and its achievements are tempered by widely held perceptions that it has not been a driver of weed management *action*. Seen as a high level strategic document (the purpose for which it was developed), many who participated in this evaluation identify a lack of effective connection between the Strategy and on-ground weed management.

The extent and persistence of weed problems in itself presents challenges to sustaining effort, a situation exacerbated by the absence of suitable measures of current trends.

Particular failings in implementing the Strategic Actions in the AWS include a lack of capacity, at both national and state levels, to achieve ‘early detection and rapid action against, new weeds’; failure to effectively communicate with stakeholders the importance of their engagement in addressing national weed problems; and a failure to ‘establish nationally consistent legislation to address weed problems’.

Stakeholder role in implementing the AWS

As recognised in the AWS, there are a diverse range of stakeholders each of whom has a role to play in addressing Australia’s major weed problems. These problems require ongoing collaborative effort in order to make and sustain significant gains.

The complexities of weed management in Australia and the need for continuity of effort call for strong and effective leadership and coordination. A majority of participants in the current evaluation did not see such leadership and coordination as evident at present.

One of the challenges for the Australian Weeds Committee is to facilitate improvements in the understanding of roles and responsibilities in managing weeds.

The current evaluation indicates that almost half of all stakeholders are not currently aware of their roles and half are not perceived to take those responsibilities seriously. Stakeholder accountability and uptake in the implementation of the AWS is widely variable within each sector. A number of factors contribute to this variability.

Impacts of IGAB signing on the current and future AWS

The IGAB is a high level document which can help to strengthen collaborative effort needed for effective weed management. Any future Weeds Strategy should build close links with the IGAB, whilst remaining separate from it.

Many stakeholders involved in this evaluation lacked knowledge and understanding of the IGAB.

Given the potential for this Agreement to play an important role in building collaborative effort by all jurisdictions to strengthen aspects of biosecurity in Australia- pre-border, at border and also within our borders - it is important that stakeholders become familiar with the IGAB. The Australian Weeds Committee has an important role to play in this regard, as do the agencies that represent their jurisdictions in the IGAB process.

The cascade of collaborative activities agreed as part of the IGAB and the relevance to weed management of the areas of focus of the Schedules to it, make it important that a new AWS is developed in an iterative process that builds strong links between the two documents.

Options and recommendations for a future AWS

It is recommended that the Australian Weeds Strategy be retained as a separate strategy providing consistent guidance to all parties involved, or needing to become involved, in weed management in Australia.

The Vision, underpinning Principles and overarching Goals within the Strategy should be retained and reaffirmed by all levels of government (including local government).

Roles and responsibilities should be more clearly articulated within the Strategy, consistent with a need identified both within this evaluation and in the Beale Report (Beale *et al.* 2008).

It is at the point where the Strategy moves to implementation that a new Strategy needs further collaborative work. Strategic Actions that have closer and more tangible links to measuring progress towards on-ground outcomes in weed management are needed to enhance ownership and commitment to the Strategy.

In summary, the major recommendations arising from this evaluation are as follows.

Recommendation 1: That a national weeds strategy be retained as a separate strategy, rather than combining it with a national pest animal strategy to become an invasive species strategy.

Recommendation 2: That a new national Weeds Strategy provide a ‘roadmap’ to assist stakeholders in implementation planning, monitoring and adaptive management aspects of the weeds strategy to ensure that the high level principles underpinning weed management in the current Strategy have clear relevance to on-ground managers as a step towards greater collaborative action.

Recommendation 3: That the Australian Weeds Committee (or an Australian Invasive Species Committee overseeing both a national weeds strategy and a national pest animal strategy) work with the National Biosecurity Committee to ensure that the cascade of planned activities from development of the Schedules to the Intergovernmental Agreement on Biosecurity, through Action Plans and Work Plans are used to strengthen nationally integrated management of weeds.

Recommendation 4: That the Australian Weeds Committee (or an Australian Invasive Species Committee overseeing both a national weeds strategy and a national pest animal strategy) work with all jurisdictions to enhance partnerships, shared understanding based on sound science, and engagement of all stakeholder groups in the management of weeds in the landscape.

Recommendation 5: That the Australian Weeds Committee (or an Australian Invasive Species Committee overseeing both a national weeds strategy and a national pest animal strategy) monitor not only progress against its own agreed outcomes, but also the extent to which a new Weeds Strategy is reflected in regional NRM strategies as they are developed.

Recommendation 6: That in developing a new and updated national Weeds Strategy, particular attention should be paid to addressing gaps identified in implementing the current Strategy.

Recommendation 7: That, in developing a new national Weeds Strategy, the Australian Weeds Committee (or an Australian Invasive Species Committee overseeing both a national weeds strategy and a national pest animal strategy):

- a) **prepare a consultation draft using the existing Australian Weeds Strategy Vision, Principles and overarching Goals, and taking account of Recommendations 1 to 5 (above), and**
- b) **take this draft out to stakeholder consultation to help build ownership and connection between the high level national aspects of weed management and the ‘roadmap’ that links those to on-ground activities and the cascade of activities planned in moving from the IGAB through Strategies to Action Plans and Work Plans.**

Recommendation 8: Recognising that a national Weeds Strategy addresses one of several important aspects of national biosecurity, the Australian Weeds Committee (or an Australian Invasive Species Committee overseeing both a national weeds strategy and a national pest animal strategy) build stakeholder and wider community understanding of links to the national Pest Animals Strategy, the National Plant Biosecurity Strategy, the National System for Prevention and Management of Marine Pests, the National Biosecurity Response Agreement, and the National Strategy for the Conservation of Australia’s Biological Diversity and to major funding programs relevant to weed management.

Each of these recommendations is addressed briefly below.

Recommendation 1: That a national weeds strategy be retained as a separate strategy, rather than combining it with a national pest animal strategy to become an invasive species strategy.

Based on stakeholder feedback throughout this evaluation, it is recommended that the Australian Weeds Strategy be retained as a separate strategy providing consistent guidance to all parties involved, or needing to become involved, in weed management in Australia.

The Vision, underpinning Principles and overarching Goals within the Strategy should be retained and reaffirmed by all levels of government (including local government).

Widespread concerns are expressed among stakeholders that weed problems in Australia are so complex, persistent and wide-ranging that they are deserving of attention in their own right, rather than being part of a bigger pool of knowledge and information relating to invasive species or biosecurity. Considerable effort and investment has already been made in building awareness of ‘weeds’ and ‘pest animals’ and there are stakeholder concerns that much of this would be lost in a shift of emphasis to either ‘invasive species’ or ‘biosecurity’. Weed and pest animal professionals, whether scientists or on-ground practitioners are generally seen to have strong expertise in one or other of these areas – expertise that may be ‘devalued’ in a more generic approach.

Furthermore, in a resource-constrained operating environment, concerns exist that the urgency associated with biosecurity issues posing a risk to health will outweigh the funding of weed prevention and management, and that even the more visible problems associated with pest animals

will leave more under-resourced the challenging but less immediately visible problems presented by weeds.

A separate weeds strategy is therefore recommended as part of sustaining and building stakeholder engagement.

Recommendation 2: That a new national Weeds Strategy provide a ‘roadmap’ to assist stakeholders in implementation planning, monitoring and adaptive management aspects of the weeds strategy to ensure that the high level principles underpinning weed management in the current Strategy have clear relevance to on-ground managers as a step towards greater collaborative action.

While the Australian Weeds Strategy is widely viewed by stakeholders as providing a useful overarching framework for weed management nationally, many among the participants in this evaluation identified a need to strengthen links between the Strategy, policy and programs that facilitate on-ground action. The Strategy should be designed as a catalyst to on-ground actions that contribute to higher level outcomes. To the extent possible, the Objectives, Strategic Actions and Outcomes associated with each Goal should be made more tangible to those responsible for on-ground actions in managing weeds.

Making clearer to end-users how implementation of the Strategy can contribute to on-ground outcomes will be important in managing expectations. It would be valuable to include in the Strategy principles that aid in understanding the ways in which monitoring can be of value beyond reporting and accountability. Guidance on the use of monitoring as a tool to assist on-ground managers in determining whether their work is making progress against agreed weed management objectives and where changes can play an important role in enhancing its relevance to those who need to be engaged in weed management.

Recommendation 3: That the Australian Weeds Committee (or an Australian Invasive Species Committee overseeing both a national weeds strategy and a national pest animal strategy) work with the National Biosecurity Committee to ensure that the cascade of planned activities from development of the Schedules to the Intergovernmental Agreement on Biosecurity, through Action Plans and Work Plans are used to strengthen nationally integrated management of weeds.

At present, many involved in weed management in Australia are not familiar with the IGAB and do not recognise the potential it has to address weaknesses identified in managing weeds. Development of national decision-making and investment strategies, providing a collaborative national approach to data collection and sharing, enhanced national surveillance, detection and early response to weed problems, national prioritisation of management actions to address established weeds, strengthening of national collaborations in R, D & E and perhaps most importantly, given current lack of knowledge and understanding of the full spectrum of biosecurity initiatives, national communication and engagement efforts are important to improved weed management.

By structuring action-oriented aspects of a new Weeds Strategy around these initiatives, the Australian Weeds Committee will provide guidance and leadership that encourages other stakeholders at state, regional and local levels to also adopt that approach. This will help to strengthen the links between biosecurity and weed management and weeds will remain one of several focus aspects of the IGAB’s implementation.

Monitoring against agreed outcomes, coordination of data collection and management and public reporting of progress against agreed outcomes were identified as important aspects of strengthening the Strategy.

The need for sound leadership and coordination are repeatedly identified as a priority for effective weed management across Australia. While institutional arrangements can go some way to facilitating such leadership and coordination, human relations are also important.

Recommendation 4: That the Australian Weeds Committee (or an Australian Invasive Species Committee overseeing both a national weeds strategy and a national pest animal strategy) work with all jurisdictions to enhance partnerships, shared understanding based on sound science, and engagement of all stakeholder groups in the management of weeds in the landscape.

Although the WoNS approach received some criticism because of the implications of working with a relatively small number of individual species, the role of WoNS Coordinators was highly valued. This is, in significant part, because of the role they have played in bringing together good science and available information, policy and programs in different jurisdictions, and the provision of information in ways that enable on-ground managers to act effectively in managing weeds. The work of the WoNS Coordinators contrasts, to some extent, with the perceived role of the National Weeds Management Facilitator, whose brief was not well understood by stakeholders and was seen to be directed more to servicing government program needs.

Recommendation 5: That the Australian Weeds Committee (or an Australian Invasive Species Committee overseeing both a national weeds strategy and a national pest animal strategy) monitor not only progress against its own agreed outcomes, but also the extent to which a new Weeds Strategy is reflected in regional NRM strategies as they are developed.

The national body overseeing the Strategy has only limited capacity to monitor the effectiveness of the Strategy in influencing on-ground management of weed problems in Australia. Given an ongoing need to actively engage stakeholders from all relevant sectors in managing weeds, and the identified need to build closer links between the Strategy and on-ground actions, the extent to which the national Strategy is providing guidance and direction to regional efforts is an important consideration. As new and updated regional NRM strategies are developed, each could be encouraged to incorporate aspects of the national Strategy. There is a role for the Australian Weeds Committee in monitoring this uptake and in providing guidance to regional NRM bodies.

Recommendation 6: That in developing a new and updated national Weeds Strategy, particular attention should be paid to addressing gaps identified in implementing the current Strategy.

Few, if any, major gaps in the content of the current Australian Weeds Strategy were identified during this review. However, there are a number of significant gaps in implementation, several of which have also been recognised recently both by the National Weeds Management Facilitator in his

final report (Thorp 2012)¹ and by Cattanach et al. (2013)² in their very recently published report mapping weed management systems in Australia.

For example, while Australia is recognised as a leader in weed risk assessment, both capacity and commitment to following that through with surveillance, detection and early action directed to eradication of weeds are areas in which the existing Strategy has largely failed to deliver. Ensuring that local landholders and managers can readily access plant identification expertise and incentives to stimulate local surveillance will likely play an important role.

An ongoing tension between prioritisation of established species that are highly invasive and likely to have major impacts (the WoNS species) and a focus on early action at a time when eradication may be more feasible, needs to be addressed. Collaborative efforts to prioritise aspects these two aspects of weed management will benefit from input from all key stakeholder sectors.

A further example exists in a need to improve consistency of legislative, regulatory and policy mechanisms governing weed management. A broad mix of international, national, state/territory, regional and local legislative and policy instruments have some relevance to weed management in Australia.

In an operating environment where stakeholders rate highly the importance of ‘legislation and government policy enabling clear actions in managing weeds’, many of those stakeholders in this evaluation called for ‘harmonisation’ of legislation. Ideally, this requires states, territories and the Australian Government, each with their own legislative and policy priorities and political constraints, to come together in a smoothly integrated operating environment that maximises national benefits. This is a challenging task, as recognised in the National Plant Biosecurity Strategy (Plant Health Australia 2010)³, which aims to “adopt nationally consistent plant biosecurity legislation, regulations and approaches *where possible within each state and territory’s overarching legislative framework*” [Emphasis added to highlight the challenge].

However, there are areas emerging from this evaluation that are worthy of attention by the Australian Weeds Committee. These include consideration of opportunities for consistency of

- i) definitions and language that make clearer to end-users what is intended
- ii) management of cross-border movement of weeds between adjoining states
- iii) compliance and enforcement measures across different jurisdictions
- iv) approaches to listing of Noxious plant species, at least at the state level, given some current confusion appears to arise from some jurisdictions adopting a ‘prohibited species’ approach while others adopt a ‘permitted species’ approach

Given a range of legislative changes seem likely to result from the IGAB, readily accessible information to help the different end-users understand the legislation in place in each jurisdiction in relation to weed management may also assist.

¹ Thorp J (2012). Australian Weeds Strategy Implementation Report 2007-2012. Report to the Australian Weeds Committee.

² Cattanach G, Harris A & Horne J (March 2013). Mapping Australia’s Weed Management System. RIRDC Publication No. 13/019, Rural Industries R&D Corporation.

³ Plant Health Australia (December 2010). National Plant Biosecurity Strategy. Plant Health Australia, Deakin ACT, Australia.

Although the current Australian Weeds Strategy identifies key stakeholders in weed management and briefly summarises the role of each, considerable confusion still exists across all sectors. In a federated system such as ours, clarity of sometimes overlapping responsibilities is difficult to obtain. However, as highlighted by Beale in his report (Beale et al., 2008)⁴, greater clarity of roles and responsibilities is necessary to improved weed management.

The Australian Weeds Committee can make a significant impact by seeking the cooperation of each state in making readily accessible, information about weed management responsibilities within its jurisdiction. Recent work by Cattnach et al. (2013) provides a useful starting point for this initiative.

The scale and persistence of weed problems in Australia is such that no single sector, including government, can be expected to fully resource effective management activities. Prioritisation of resource allocations and improved coordination have an important role to play in maintaining longer-term funding needed both for weeds research, development and community engagement (rather than post-hoc extension) and for ongoing weed management. In considering resource allocations to weed research and management it is important to recognising that short-term funding cycles and discontinuity of funding lead to a loss of impact of investment in weed management, given the long-term nature of the problems.

In addition to existing government resources, new and innovative funding mechanisms will be needed. Beneficiary pays approaches and accountability mechanisms for those who increase weed risk, taxation incentives for investment in weed management directed to sustainability outcomes and other new approaches are needed. Existing research in this area (for example, Martin et al. 2012)⁵ warrants examination in progressing this aspect of weed management.

Not only are existing and new funding mechanisms needed, but it is important that the funding available is used in the most organised, strategic and coordinated ways possible. The Australian Weeds Committee has an important role to play in optimising these efforts and in enabling social research that will enhance the role of people in managing weeds effectively.

Recommendation 7: That, in developing a new national Weeds Strategy, the Australian Weeds Committee (or an Australian Invasive Species Committee overseeing both a national weeds strategy and a national pest animal strategy):

- a) prepare a consultation draft using the existing Australian Weeds Strategy Vision, Principles and overarching Goals, and taking account of Recommendations 1 to 5 (above), and**
- b) take this draft out to stakeholder consultation to help build ownership and connection between the high level national aspects of weed management and the ‘roadmap’ that links those to on-ground activities**

⁴ Beale R, Fairbrother J, Inglis A & Trebeck D (2008). One Biosecurity: A Working Partnership. Independent Review of Australia’s Quarantine and Biosecurity Arrangements. Report to the Australian Government.

⁵ Martin P, Verbeek M, Riley S, Bartel R & Le Gal E (2012). Innovations in institutions to improve weed funding, strategy and outcomes. Report No. 12/091, Report prepared for Rural Industries R&D Corporation, Canberra.

and the cascade of activities planned in moving from the IGAB through Strategies to Action Plans and Work Plans.

Successful management of Australia's weed problems requires engagement and co-operative effort from a broad range of people.

While the Australian Weeds Strategy is seen as providing an important framework for weed management, familiarity with it varies widely, even among key stakeholders involved in this evaluation. Gaining input from the diversity of people who might be its end-users, through interactive opportunities to contribute can play a valuable part in building better understanding of the Strategy, its role in weeds management nationally, and the links between a new Strategy and on-ground actions needed for its implementation.

Recommendation 8: Recognising that a national Weeds Strategy addresses one of several important aspects of national biosecurity, the Australian Weeds Committee (or an Australian Invasive Species Committee overseeing both a national weeds strategy and a national pest animal strategy) build stakeholder and wider community understanding of links to the national Pest Animals Strategy, the National Plant Biosecurity Strategy, the National System for Prevention and Management of Marine Pests, the National Biosecurity Response Agreement, and the National Strategy for the Conservation of Australia's Biological Diversity and to major funding programs relevant to weed management.

Weeds are one important component of a broader suite of risks to the economy, the environment and the community which must be managed as part of protecting Australia's biosecurity. As the Intergovernmental Agreement on Biosecurity enhances collaborative approaches to addressing the broad range of threats posed by the entry, emergence, establishment and spread of these risks, it is important that opportunities for mutual gain are achieved. While much of the scientific and technical expertise relevant to weed management is specialist knowledge that must be retained, strategies for prevention of new weed problems, prevention of weed spread and minimising the spread of weeds all have elements common to other biosecurity problems. Increasing community awareness of the links between weed, pest animal, marine pest and other threats will play an important role in gaining collaborative management effort across whole landscapes.

Australian Weeds Strategy Evaluation Report

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Chapter I – Introduction

Towards the end of 2012, the Australian Government Department of Agriculture, Fisheries and Forestry (DAFF) contracted consultants Community Solutions to evaluate the Australian Weeds Strategy (the AWS or the Strategy). The review period extended from 26 November 2012 to 30 April 2013.

Evaluation requirements

The requirements of the evaluation, as defined in the project Terms of Reference were:

- I. Assessing qualitatively the achievements and failures under the AWS, including:
 - (a) Details of the achievements and failures under the AWS.
 - (b) Identification and analysis of factors/impediments influencing the implementation of the AWS.
 - (c) Detail those uncompleted actions relating to the current AWS and make recommendations addressing these areas under the department's next weed strategy.
- II. Analyse the role of stakeholders in implementing the AWS:
 - (a) Detail and assess how effective the role of the AWS National Facilitator has been in raising awareness and facilitating strategic actions under the AWS.
 - (b) Report on stakeholder awareness of their responsibilities in regards to ongoing management of weeds.
 - (c) Report on stakeholder willingness to accept their responsibilities and participate in the AWS.
 - (d) Report on stakeholder accountability and uptake in the implementation of the AWS.
 - (e) Analyse and assess stakeholder feedback regarding the current AWS and provide recommendations, incorporating this feedback, regarding the implementation of the next version of the weed strategy.
 - (f) Provide recommendations on how to effectively engage with stakeholders in implementing a new AWS.
- III. Identify, assess and provide recommendations on the impact of the signing of an Intergovernmental Agreement on Biosecurity (IGAB), and its national strategies, on the current AWS and any future weed strategy – does the AWS need to be rewritten (or exist) at all?
- IV. Identify options and recommendations for the next version of the AWS; if you find that the strategy is still required, including:
 - (a) Identify the vision/principles/goals/actions applicable to the AWS.
 - (b) Identify and detail any shift in focus or priorities of the AWS.

- (c) Provide recommendations on strategies to improve accountability under the AWS.
- (d) Identify and provide recommendations to address gaps that have been overlooked under the current AWS.
- (e) Provide recommendations on the development/formulation and structure of a new AWS.
- (f) Are there any data gaps that need to be addressed to inform the next AWS?
- (g) Can linkage be found or formed between the AWS with other national and local strategies?

About the current Australian Weeds Strategy

The Australian Weeds Strategy⁶ was developed by the Australian Weeds Committee - a Commonwealth, state and territory government committee - with the support and assistance of the National Weeds Management Facilitator. Reporting via the Natural Resource Management Standing Committee, and more recently to the National Biosecurity Committee, the Australian Weeds Committee provides coordinated policy and planning solutions related to weeds to the Council of Australian Governments. The Australian Weeds Committee has a small number of observers who provide technical input and other perspectives that could aid in managing weeds in Australia.

The AWS built on the achievements of the previous National Weeds Strategy (1997) and updated that earlier strategy to take account of institutional, legislative, policy and program changes that had occurred in the interim. The updated Australian Weed Strategy and a parallel Australian Pest Animal Strategy were endorsed by the Natural Resource Management Ministerial Council in 2007.

The AWS was set up as a national framework directed to achieving the vision of an Australia in which *'economy, environmental and social assets are secure from the impacts of weeds'*.

To guide the achievement of this vision, the AWS was set up to provide consistent guidance to plans, actions and investment by all stakeholders with a role in responding to the weeds challenge. It aims to guide and complement state, territory, regional and local government strategies and industry initiatives that are ultimately, though not directly within the Strategy, translated into strategic on-the-ground actions to manage weeds. The AWS aims to improve the coordination and integration of weed management activities across Australia and where possible to leverage resources to effectively reduce risks posed by weeds across the biosecurity continuum.

The AWS has three goals:

- 1) To prevent new weed problems
- 2) To reduce the impacts of existing priority weed problems
- 3) To enhance Australia's capacity and commitment to solve weed problems

Recognising that weeds have major economic, environmental and social impacts in Australia, the AWS sets out seven key principles that underpin and guide a nationally coordinated approach to the prevention and management of weeds:

- I. Weed management is an essential and integral part of the sustainable management of natural resources for the benefit of the economy, the environment, human health and amenity.

⁶ Commonwealth of Australia (2007). Australian Weeds Strategy: A national strategy for weed management in Australia. Natural Resources Management Council, Canberra.
www.environment.gov.au/biodiversity/invasives/weeds/

2. Combating weed problems is a shared responsibility that requires all parties to have a clear understanding of their roles.
3. Good science underpins the effective development, monitoring and review of weed management strategies.
4. Prioritisation of and investment in weed management must be informed by a risk management approach.
5. Prevention and early intervention are the most cost-effective techniques for managing weeds.
6. Weed management requires coordination among all levels of government in partnership with industry, land and water managers and the community, regardless of tenure.
7. Building capacity across government, industry, land and water managers and the community is fundamental to effective weed management.

The evaluation team

The project team undertaking this review is led by Dr Judy Lambert, Director of Community Solutions, working in collaboration with Vicki Woodburn (Garland Outcomes), Michael Clarke (AgEconPlus) and Heather Pearce (Community Solutions).

The structure of this report

This report is presented in eight chapters, as follows.

Chapter 1 provides an introduction to the evaluation requirements, the Australian Weeds Strategy (AWS), the evaluation team and the approach taken in conducting the evaluation.

Chapter 2 provides a context for the Australian Weeds Strategy, the challenges faced in weed management in Australia, the institutional framework within which weed management occurs and the principal links between the AWS and other strategies and policies.

Chapter 3 provides a brief overview of those who participated in the evaluation process.

Chapter 4 summarises the evaluation findings against the foundational, shorter-term outcomes needed to progress towards achievement of the AWS vision for weed management in Australia. Institutional arrangements, knowledge and capacity of stakeholders are the focus of this chapter.

Chapter 5 assesses the contribution of the AWS to the achievement of the intermediate goals of preventing new weed problems, preventing the spread of weeds and reducing the impacts of existing weeds.

Chapter 6 explores gaps, opportunities and requirements for future weed management in the light of the 2012 Intergovernmental Agreement on Biosecurity

Chapter 7 develops recommendations for future strategy for national management of weeds, taking account of the achievements and failures under the AWS, an analysis of the role of stakeholders in implementing the AWS, stakeholder feedback on the current AWS, and the impact of the signing of an Intergovernmental Agreement on Biosecurity. This chapter also addresses options for a future AWS.

Finally, **Chapter 8** provides a synthesis of findings from parallel reviews of the AWS and the Australian Pest Animal Strategy.

Evaluation approach

The Community Solutions team developed this evaluation report on the Australian Weeds Strategy (2007) and its implementation using the following approach.

1) Develop evaluation framework and finalise approach through scoping meeting

- Consider evaluation requirements for the Goals, Objectives and Actions of the Australian Weed Strategy
- Identify information requirements



2) Undertake background research and a strategically targeted review of relevant literature, both from Australia and internationally



3) Collect stakeholder Insights and Feedback

- On-line stakeholder survey, available 3 January - 8 February 2013, with personal alerts to several hundred stakeholders (212 weeds respondents)
- More in-depth telephone or face to face interviews with 20-30 key stakeholders (a total of 39 completed)



4) Evaluation Analysis

- Analyse information obtained from desktop review, survey and more in-depth interviews.
- Statistical and qualitative analysis of feedback



5) Feedback from Australian Weeds Committee project reference group - Insights and Feedback

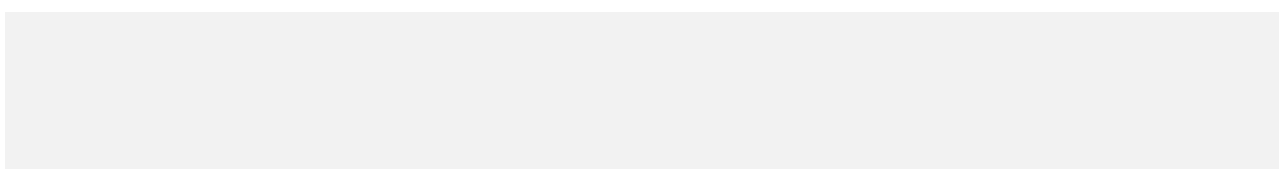
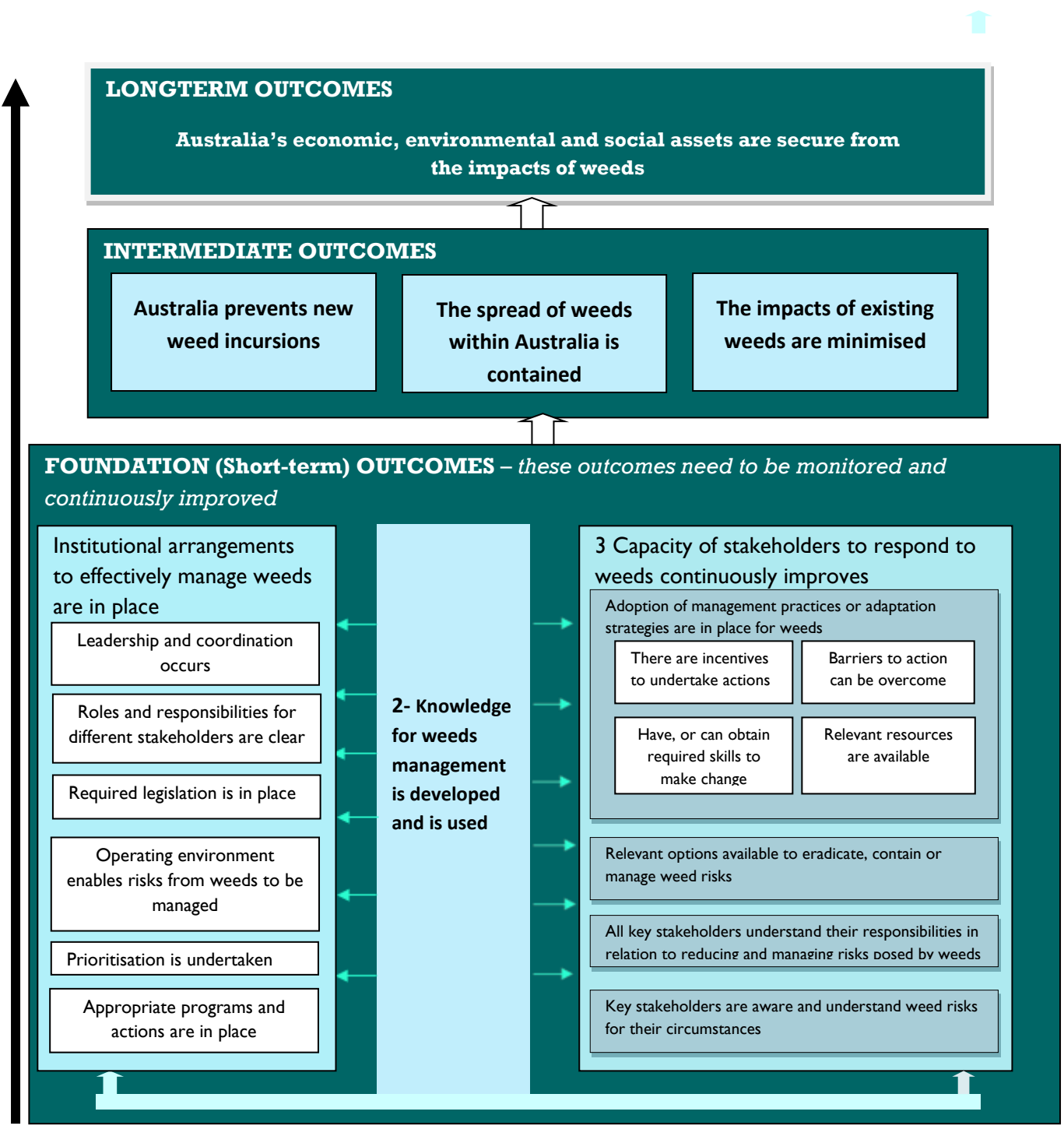
- Development of an Outcomes & Directions paper
- Feedback from evaluation Reference Group



6) Reporting

- Draft Report
- Incorporate feedback into a Final Report

The on-line survey, stakeholder interviews and other research were based on the following program logic, which was developed by the project team, for use in this evaluation after it had been checked by members of the project Reference Group.



Chapter 2 – Managing weeds in Australia: the context for the AWS

The challenges posed by weeds

Throughout recent decades, weeds have been recognised to have major economic, environmental and social impacts across Australia. The problems caused to the environment, agricultural production and human health by weeds are as relevant today as they were in 2007 when the current AWS was established. Their extent, persistence and impacts are such that they will remain a challenge that needs to be managed on an ongoing basis. The scale and impact of the challenge will escalate if proactive prevention, monitoring and management does not occur – doing nothing is not an option for the long-term interests of Australia.

A snapshot of the challenges posed by and impacts of weeds in Australia prepared for the Rural Industries R&D Corporation (RIRDC) as part of the process of scoping a new weeds R&D program in 2010 remains pertinent today.

Challenges and impacts associated with weeds (extracted from Scoping Paper prepared for RIRDC R&D Plan⁷)

Land Use	Description of different challenges associated with weeds and their impact
Productivity	<ul style="list-style-type: none"> The cost of weeds to Australian agriculture is estimated to be at least \$3.9 billion per year in lower farm incomes and higher food costs (Sinden 2005⁸). Weeds can impact both the quantity and quality of agricultural products. They affect quantity through yield loss due to competition, and by acting as alternate hosts to pathogens, viruses and insect pests. Primary producers bear a substantial proportion of the costs of managing weeds, while consumers are also affected.
- Annual Cropping	<ul style="list-style-type: none"> These systems are presently reliant on herbicides as the main approach to managing weeds, particularly with the trend of moving to no-till farming practices which move away from a primary weed control method of cultivation. Livestock are also being (re)introduced into these farming systems to manage weeds, but this can again have both positive and negative weed consequences. The key challenges for weed control using herbicides include deregistration of older herbicides, reduction in the number of new herbicides introduced and reduced efficacy due to herbicide resistance (particularly Glyphosate resistance).
- Permanent Planting/ Intensive Cropping (e.g. horticulture, viticulture)	<ul style="list-style-type: none"> These systems are characterised by the ability to intensively treat each weed – spot weed or target specific weeds on an as needs basis. However, increased property/production areas coupled with decreasing workforce employment are making intensive weed management less feasible. Off-site impacts on waterways and other systems (e.g. the Great Barrier Reef) are a growing concern for some cropping systems (e.g. sugar cane) A challenge for this type of agricultural practice can be that there is a lack of approved herbicides for their use (small volumes required do not warrant chemical registration) and increasing herbicide resistance.
- Extensive Grazing and perennial cropping	<ul style="list-style-type: none"> Graziers can suffer big impacts from weeds and the impacts tend to spill over into (and from) environmental systems. These productivity systems are characterised by perennial grazing often using large areas of land. Treatment of weeds in this system cannot be as specific/localised as in intensive

⁷ Woodburn V et al. (2010). Weeds R&D plan scoping paper. Prepared for Rural Industries R&D Corporation, Canberra.

⁸ Sinden J, Jones R, Hester S, Odom D, Kalisch C, James R & Cacho O (2005). The Economic Impact of Weeds in Australia. CRC for Weed Management Technical Series No. 8, Adelaide.

Land Use	Description of different challenges associated with weeds and their impact
	<p>cropping (i.e. it is not practical or cost effective to spot weed) – a systems approach is required.</p> <ul style="list-style-type: none"> The costs of managing weeds in these systems can be high and has the potential to prevent effective management of weeds. There are management and control options for a large portion of weeds impacting this sector but these often involve whole of systems approaches and the challenge has been in getting these options adopted.
- Forestry	<ul style="list-style-type: none"> Weeds compete for water and nutrients and thus can reduce tree growth. Tree growth cannot be optimised while competing with weeds and the immediate benefits of weed removal are greater for seedling survival and increased tree growth rates. The forestry sector uses a range of techniques to control weeds including site preparation and eradication strategies that include the use of herbicides. Growing concerns about off-site impacts on waterways and other systems (e.g. the Great Barrier Reef) present a new challenge for this sector.
Environment - Biodiversity - Threats to significant national and international natural areas	<ul style="list-style-type: none"> The impacts of weeds on the environment are equally wide-ranging as they are for production land users. The cost of these impacts has only been estimated broadly but is expected to be in the same order of magnitude as for the agricultural sector. Public amenity of natural areas is substantially reduced by weed invasions which reduce biodiversity through direct competition and adverse impacts on ecosystem function, changed fire and water regimes and the harbouring of pests and diseases. While control options are available for environmental weeds during the early stages of invasion, challenges remain in restoring biodiversity once the weed has been removed. Weeds pose a threat to nationally and internationally significant natural areas, including National and World Heritage areas and Ramsar-listed wetlands and to National Parks and Nature Reserves. In doing so, there is potential to impact on the growing numbers of both Australians and international visitors who rely on these areas for recreational activities. Interested individuals, tourism operators and the wider community which relies on significant natural areas for the provision of a diversity of ecosystem services are thus all affected.
Cultural	<ul style="list-style-type: none"> Weeds also pose a threat to many of Australia's Indigenous lands and the original Australians who live there, clogging waterways and preventing access to food collection and places of cultural significance.
Other Risks	<ul style="list-style-type: none"> Some weed species affect both human and animal health. Asthma and other severe respiratory problems, allergies and dermatitis, as well as poisonings following exposure to some problem species. Through the accumulation of heavy fuel loads, weed infestations (e.g. tall invasive grasses in northern Australia) increase the risk of high intensity bushfires which, in some systems, threaten both biodiversity and many in nearby communities. There are challenges associated with weed management solutions in that there are a range of public and private benefits which can make public investment decisions in relation to accelerating the development and adoption of solutions difficult.

The Australian Weeds Strategy

The Australian Weeds Strategy was developed at a time when the growing influences of climate change, limitations on chemical and herbicide use, and the impacts of increasing trade and travel on transfer of potentially invasive plants from one location were recognised to pose increased threats from an already challenging problem created by weeds.

Within the AWS, each of the high-level goals identified in Chapter 1 of this report is underpinned by Objectives directed to achieving the overall vision, consistent with the Strategy's mission of 'providing guidance for national leadership so all Australians can work together against the serious impacts of weeds'.

Vision	Australia's economic, environmental and social assets are secure from the impacts of weeds
Objectives for Goal 1	1. Prevent new weed problems
	1.1 To prevent the introduction into Australia of new plant species with weed potential
	1.2 To ensure early detection of, and rapid action against, new weeds.
	1.3 To reduce the spread of weeds to new areas within Australia.
Objectives for Goal 2	1.4 To implement weed risk management practices to respond to climate change.
	2. Reduce the impact of existing priority weed problems
	2.1 To identify and prioritise weeds and weed management problems and determine their causes.
	2.2 To implement coordinated and cost-effective solutions for priority weeds and weed problems.
Objectives for Goal 3	2.3 To develop approaches to managing weeds based on the protection of values and assets.
	3. Enhance Australia's capacity and commitment to solve weed problems
	3.1 To raise awareness and motivation among Australians to strengthen their commitment to act on weed problems.
	3.2 To build Australia's capacity to address weed problems and improve weed management.
	3.3 To manage weeds within consistent policy, legislative and planning frameworks.
	3.4 To monitor and evaluate the progress of Australia's weed management effort.

Forty-five high-level strategic actions, each with a broadly defined outcome, are identified against these objectives.

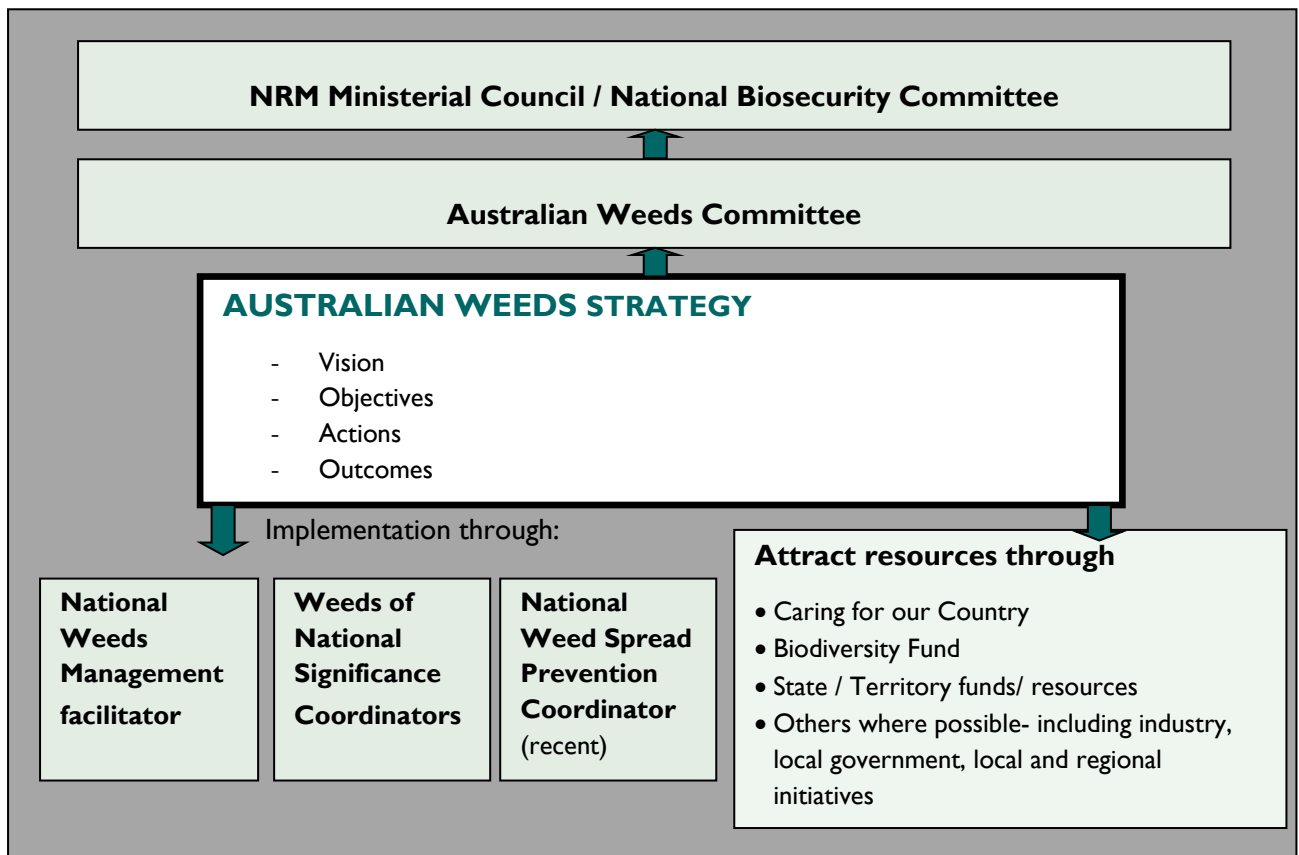
The Strategy identifies the combatting of weed problems as ‘a shared responsibility that requires all parties to have a clear understanding of their roles’. In doing so, it also provides an overview of responsibilities for each of the key stakeholders in weed management including:

- Australian government
- State and territory governments
- Local governments
- Regional natural resource management bodies
- Industries affected by weed impacts
- Weeds research and development organisations, and
- Communities and Individuals within Australian communities.

Institutional arrangements and Governance of the AWS

Oversight

The Australian Weeds Strategy and its implementation is overseen by the Australian Weeds Committee comprised of high level government officials from each state and territory and from the Australian Government Departments of Agriculture, Fisheries and Forestry and Sustainability, Environment, Water, Population and Communities, together with a small number of scientific and technical observers (including the National Weeds Management Facilitator). In its early stages, this committee reported to the Natural Resources Management Ministerial Council, and more recently to the National Biosecurity Committee (see diagram below). In addition, the Committee is responsible for “planning, coordinating and monitoring the implementation of the Strategy, building linkages between key stakeholders; identifying potential and emerging weed problems; implementing consistent approaches to weed management; and developing a communication strategy for increasing the profile of weed issues” (AWS, p.9).



Investment and resources

Implementation of the Australian Weeds Strategy relies heavily upon operational funding from each state and territory, with the Australian Government providing secretariat services to the AWC and supporting the Coordinator positions. Both research and implementation funding is also provided through Caring for our Country and Biodiversity Fund.

Relationship with other strategies and policies

The Australian Weeds Strategy is closely paralleled by the Australian Pest Animal Strategy (APAS)⁹, which is overseen by the Vertebrate Pest Committee and addresses another major element of invasive species management in Australia. These strategies were developed as part of an enhanced national approach to biosecurity. Plant Health Australia has observer status on the Australian Weeds Committee, as do the National Weeds Management Facilitator and a CSIRO research scientist.

Many of the states that are parties to the AWS have also developed their own strategies for managing invasive species.

Since the AWS was agreed upon in 2007 there have been various changes to the operating environment, most notably the introduction of an Intergovernmental Agreement on Biosecurity

⁹ Commonwealth of Australia (2007). Australian Pest Animal Strategy: A national strategy for the management of vertebrate pests in Australia. Natural Resources Management Council, Canberra. www.environment.gov.au/biodiversity/invasives/

(IGAB)¹⁰, to which the Australian Government and all states and territories other than Tasmania became signatories in January 2012. A high-level, overarching document setting out the principles, purpose and scope of shared biosecurity management in Australia, direct linkages between the IGAB and the AWS have not yet been developed.

As part of a national approach to biosecurity, the Weeds Strategy also needs links to the National Plant Biosecurity Strategy, the National System for Prevention and Management of Marine Pests and the National Environmental Response Agreement.

Reducing the impacts of both weeds and pest animals are explicitly recognised within the Caring for our Country Business Plans, as one important aspect of conserving Australia's biodiversity and natural icons, and both also feature in the national Biodiversity Fund. This recognition reflects a connection between the Australian Weeds Strategy and the Australian Biodiversity Conservation Strategy 2010-2030. Major threats that weeds present to some of Australia's endangered species and ecological communities also create links between some weeds and Threat Abatement Plans made under the provisions of the *Environment Protection and Biodiversity Conservation Act*.

Chapter key messages and observations

1. The Australian Weeds Strategy clearly identifies weeds as having major economic, environmental and social impacts across Australia, damaging natural systems, agricultural lands, waterways and coastal areas.
2. The scale and persistence of the problems are such that ongoing prevention, monitoring and management of weeds is essential.
3. Responsibility for combatting weed problems is a shared responsibility across all levels of government, industry, the scientific community, local communities and individuals.
4. Developed as a high-level framework document, the AWS provides consistent guidance for all parties in managing weeds.
5. Few direct resources are provided for implementation of the strategy, relying on investment from natural resource management, biodiversity conservation and other sources.

¹⁰ Commonwealth of Australia (2012). Intergovernmental Agreement on Biosecurity. www.coag.gov.au/node/47

Chapter 3 – Evaluation participants

Stakeholder interviewees

Members of the Community Solutions project team completed semi-structured interviews with a total of 52 key stakeholders in weed management. Consistency of interviews was provided using a standard template, with interviews varying in duration from approximately 30 minutes to almost two hours.

Those interviewed came from all states and territories, with the sector in which they are involved in weed management shown in Table 1.

TABLE 1

Sector	No. of respondents
Australian Government	11
State/Territory government	14
Regional NRM body	5
Local government ⁽¹⁾	3
Primary industry	7
Agribusiness ⁽¹⁾	1
Research & Development	8
Other ^{(1),(2)}	3
Total	52

Note: (1) Difficulties were encountered in locating staff in Local Government, agribusiness, environmental NGOs and the education & training sectors willing to complete an interview

(2) 'Other' includes community-based environment/NRM organisations and the education & training sector

Many of those interviewed had extensive experience in the sector. Participants had been involved in weeds/invasive species management from three to 45 years, with a Mean (\pm Standard Error) of 19.28 (\pm 1.41) years.

On-line survey respondents

The on-line survey was developed and made available using the commercial Survey Monkey facility. The survey was promoted directly to almost 200 people identified by AWC members or the Community Solutions project team, to have an interest in weed management. The availability of the survey was also promoted through the individual interviewees and through the weekly electronic newsletter Weeds News Digest.

A total of 218 respondents from across all states and territories completed weeds-related aspects of the survey, the majority coming from New South Wales (26.3%), South Australia (18.8%), Queensland (16.5%) or Victoria (13.5%).

A majority (53.4%) were within the 41-60 year age group, with their experience in weed management being fairly evenly spread from 0-5 years (22.2%) through to more than 20 years (30.1%). Two-thirds of respondents were male, one-third female.

Survey respondents self-classified their main interests in weed management as shown in Table 2.

TABLE 2

Main sectoral interest in weeds	% of survey respondents (N=266)⁽¹⁾
Member of NRM staff in regional body	15.8
Primary producer/farmer/grower/	12.0
Facilitator, coordinator or extension officer	11.3
Research scientist/analyst	8.3
Local government staff member	7.9
Local non-government organisation	7.9
State agency policy/program officer	6.0
State agency land manager	4.9
Rural lifestyle land owner	4.9
Australian government policy/program officer	3.4
Other	17.7
Total	100%

Note: (1) N = total number of on-line survey respondents addressing weeds and/or pest animal aspects of the survey. Of these 212 indicated that weeds were their main interest. One respondent preferred not to identify their sector.

Chapter key messages and observations

1. Both the key stakeholder interviewees and those who completed the on-line survey represented a broad spectrum of policy, program and on-ground interests in weed management.
2. While the categorisations used did not allow direct comparison of the two groups, it appears that the key stakeholders interviewed were generally more experienced in relation to weeds and their management.

Chapter 4 – Evaluation findings against the short term outcomes

A) Institutional arrangements to effectively manage weeds

The institutional arrangements surrounding weed management are complex and multi-layered. As identified in summary in the Australian Weeds Strategy, national, state/territory and local governments, regional bodies, local communities and individuals all have responsibilities in weed management. The policy, legislative and planning frameworks within which this occurs are numerous and diverse.

In the context of this evaluation, institutional arrangements include more than just the organisations involved, referring instead to “policy, organisation, rules, agreements, value or cultural norm” (as defined in the *Australian Government Natural Resource Management Monitoring, Evaluation, Reporting and Improvement Framework*). Six key areas were considered as part of this evaluation:

- Leadership and coordination
- Roles and responsibilities for different stakeholders are clear
- Required legislation is in place
- Operating environment enables management of risks from weeds to be maintained
- Prioritisation is undertaken, and
- Appropriate funding and programs that enable action are in place.

Recognising that weeds are among the most significant environmental threats in Australia, the AWS has sought, in various ways and to greater or lesser extent, to influence all of the above outcomes. Consistent with Australia’s responsibilities to global environmental and trade initiatives, the AWS makes clear that effective weed management relies on a number of parties each playing a role by contributing to each of these outcomes.

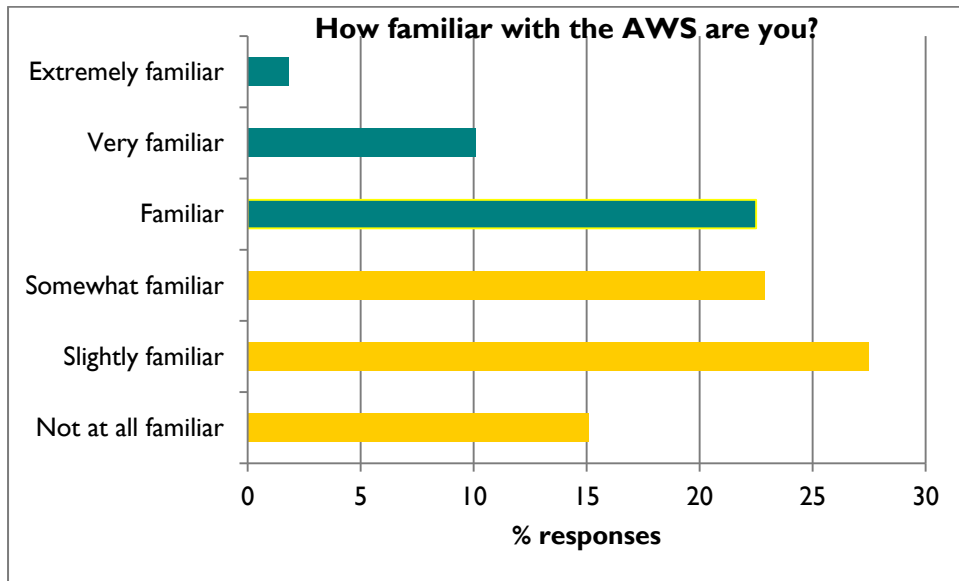
As a consequence of this diversity of inputs it is difficult to attribute outcomes to the AWS alone. Given the characteristics of weed management nationally and the overarching aspirational approach within the Strategy, the evaluation team determined that a conservative approach would be taken to separating out the performance of the AWS compared with other activities. In general, the approach used in the evaluation considers performance aspects for broader weed prevention and management, whether directly attributable to the Strategy or not.

Role of the strategy

Familiarity with the AWS varied widely, even among key stakeholders with whom in-depth interviews were completed. Among interviewees, the mean score (\pm Std Error) for familiarity with the AWS (rated on a scale from 0 = Not at all familiar to 5 = Extremely familiar) was 3.30 (\pm 0.22), with scores ranging from 0 to 5.

Among the more than 260 people who responded to the on-line survey conducted as part of this evaluation 218 responded to questions specifically related to weeds and the AWS. More than 40 per cent of those 218 AWS respondents reported that they were either not at all familiar or only slightly familiar with the strategy, whilst only 12 per cent reported being very familiar or extremely familiar with the AWS. Among the on-line survey respondents (Figure 1), the mean familiarity score dropped to 1.90 (again with a range of scores from 0 to 5).

FIGURE I



Source: Community Solutions on-line survey 2013; question respondents = 218

Although attribution is difficult, those interviewed rated the contribution of the AWS to improvements in weed management in the past five years at an average 2.90 (± 0.18) assessed on a 0 to 5 scale.

While many interviewees commented that they could not report the Principles underpinning the AWS directly, those Principles agreed by all major stakeholders were frequently identified as a strength of the Strategy. Typical comments included:

The Strategy and its principles provided a consistent national direction (a framework) for all.

The Strategy provided a focus for governments and its clear goals, responsibilities and principles improved collaboration, and

It was critical in the development of state strategies, and provided a framework for partnerships.

During stakeholder interviews, staff in government agencies at all three levels, research scientists, NRM facilitators and industry representatives all reported that the AWS provided a useful overarching framework, guiding shared direction, policy, and funding applications and even ‘inspiring on-ground action’.

At the same time, many also saw such a high-level document as failing to initiate or support real action, as is reflected in comments such as:

The Strategy itself cannot do anything.

It was there in the background, but it is not a key driver, and

A lack of resourcing has limited implementation, creating a case of ‘the emperor has no clothes’.

This feedback suggests a need to take the strategic approach further and to strengthen links between strategy, policy and programs that facilitate on-ground action. Monitoring against agreed

outcomes, coordination of data collection and management, and public reporting all require investment of funding and collaborative effort to strengthen these links.

Despite the deficiencies identified by some, a typical overall comment was that the AWS was:

The right kind of document for its purpose.

Leadership and coordination

The extent and complexity of weed management issues in Australia and the need for continuity of effort call for significant leadership and coordination if maximum benefit is to be gained from the resources invested.

Who is providing leadership and coordination?

Although not directly a measure of leadership and coordination, interviewee responses to a question on 'How important have each of the following been in implementing sound weed management in Australia in recent years' provides useful insights into stakeholder perceptions. Rated on a scale from 0 = 'not at all' to 5 = 'extremely important', responses varied widely within each group, as shown in Table 3a.

TABLE 3a

Weeds management stakeholder	Mean importance score (Range of scores, 0-5) Interviewees
WoNS Coordinators	3.64 (0-5)
Regional NRM bodies	3.42 (2-5)
Research scientists	3.36 (2-5)
National Weeds Management Facilitator	3.25 (0-5)
Private landholders	3.04 (0-5)
Australian Government	3.03 (1-5)
State/territory government agencies	3.00 (1-5)
Other public land managers	2.67 (0-5)
Agribusiness advisers	2.60 (0-5)

Among key stakeholder interviewees, Landcare and other volunteers were frequently mentioned as an important group omitted from the list provided, a typical comment being:

Volunteers are critical – they go beyond those in Landcare and NGOs to others in the community and are often the champions, and

Although they need some coordination, NGOs and those in community groups are very important.

In a similar vein, survey respondents were asked ‘Which of the following do you see as having an important role to play in preventing the spread of weeds and maintaining the impacts of weeds that are already a problem?’. Percentages of respondents providing a positive answer are shown in Table 3b.

TABLE 3b

Weeds management stakeholder	% positive responses Survey respondents
Private landholders	95.6
Landcare and/or local environment groups	87.3
Local government	86.8
State/territory government agencies	84.4
Regional NRM bodies	78.0
Primary industry bodies	74.6
Australian Government	72.2
Urban land owners	67.3
The business sector	41.5
Other	21.0

Indigenous landholders were mentioned several times as an increasingly important sector because of increases in the extent of their land title and management. The Nursery industry was also mentioned several times among both interviewees and survey respondents, with the mining industry also rating several mentions.

The role of the Australian Weeds Management Facilitator

As a contractor to the Australian Weeds Committee, the Australian Weeds Management Facilitator’s role includes ‘assisting in the implementation of the Australian Weeds Strategy’ and providing secretariat services for the Australian Weeds Committee.

As reflected in his various reports to DAFF, the National Weeds Management Facilitator has undertaken a broad range of activities relevant to the implementation of the AWS. In addition to necessary liaison with the AWC Chair and participation in meetings and working group sessions, key roles have included:

- Maintenance and regular updating of the Weeds Australia web portal
- Development and circulation of out-of-session policy and advisory papers

- Drafting of implementation plans, liaison with states and territories, and reporting on that implementation
- Presentations on the AWS to various key stakeholder groups
- Collation of current weeds research activities and on-ground regional weed management activities
- Assisting with aspects of a review of the WoNS program

However, as is clear from the Goals and Objectives of the AWS and from feedback during this review, there are many aspects of weed management that need coordination – a task well beyond the capacity of any one individual to provide.

Many key stakeholders interviewed clearly saw the National Weeds Management Facilitator role as important to the coordination of weed management in Australia. However, several commented that changes to the position brief during the life of the AWS had, in their opinion, shifted the emphasis away from AWS implementation relevant to on-ground outcomes and towards provision of secretariat services to the Committee.

Many who responded to the on-line survey did not see leadership and coordination being evident at present. Asked how strongly they agree or disagree with the statement ‘There is good leadership and coordination of weed management’ (scored on a scale from -2 = strongly disagree to +2 = strongly agree) 50.3% either disagreed or strongly disagreed, while only 21.2% agreed or strongly agreed. The mean agreement score (-0.43) tended towards disagreement with the statement on leadership and coordination.

Perceptions of leadership and coordination in weed management did not differ significantly with level of familiarity with the Strategy or between stakeholder groups.

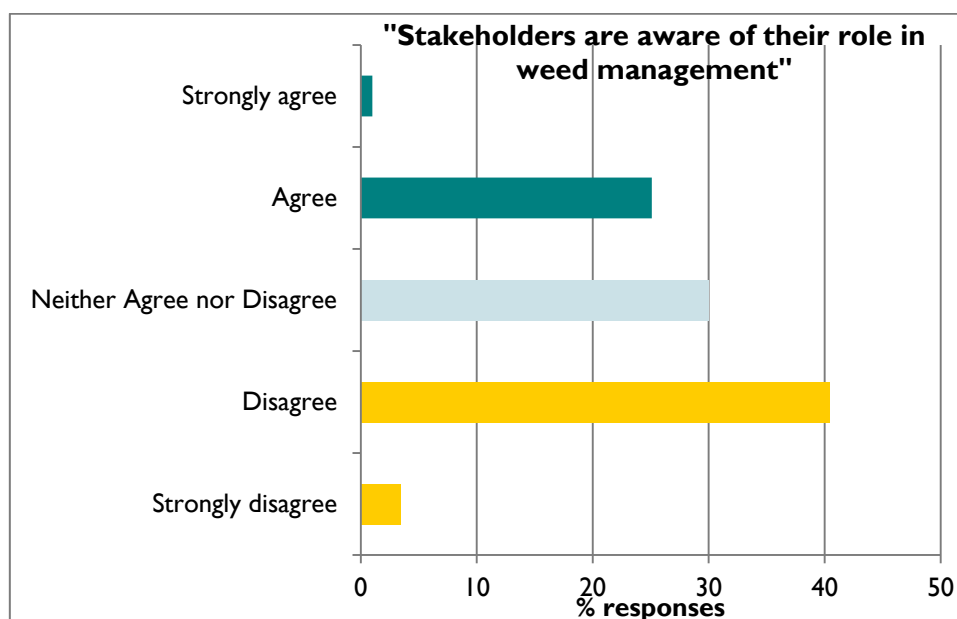
Roles & responsibilities of different stakeholders are clear

The AWS provides both a section summarising the agreed roles and responsibilities of the various stakeholders in weed management and an Appendix identifying relevant policy, legislative and planning frameworks for weed management. However, despite some improvements in the collaborative management of weeds, roles and responsibilities in weed management continue to lack clarity among many of those involved.

Feedback from participants in this evaluation focused both on clarity of roles across different levels of government (and in particular between state and local governments) and between different agencies within a given jurisdiction.

The on-line survey also identifies a spread of views on the extent to which stakeholders are aware of their roles and responsibilities for weed management. Although 26.1% of respondents reported that they agree or strongly agree that “stakeholders are aware of their role in weed management” almost 44% reported that they disagree or strongly disagree. Almost a third neither agreed nor disagreed (see Figure 2).

FIGURE 2



Source: Community Solutions on-line survey– question respondents=203

As was the case for perceptions of leadership and coordination among on-line survey respondents, perceived awareness among stakeholders of roles and responsibilities did not differ significantly with level of familiarity with the Strategy or between the different stakeholder groups involved.

This perceived lack of clarity around roles and responsibilities is supported by the findings of the *Beale Report – One Security – A working partnership*¹¹. In 2008 Beale and his colleagues reported some confusion between the role of the Commonwealth and state and territory governments. Several interviewed stakeholders commented that improved clarity is being worked through as part of the Intergovernmental Agreement on Biosecurity agreed in January 2012.

Recent resource constraints were reported to add significant challenges and pressures for areas where multiple parties are involved or where one jurisdiction (particularly one of the smaller jurisdictions) may need assistance in the national interest for a particular species or to protect a high-value asset. Agreements on leadership, resourcing and coordination arrangements in these circumstances should be a priority. Based on feedback received, the constraints resulting from leadership, coordination approach and resourcing need to be resolved. This need to improve clarity is particularly important for weed species which have received considerable investment since a lack of continuity will result in waste of past effort.

Although not directly part of the AWS, the prioritisation associated with Weeds of National Significance (WoNS) and the Coordinators working within that program were frequently mentioned among interviewed key stakeholders as providing leadership in building collaborations and bringing together policy, programs and on-ground action and in making weed science relevant to a diversity of end-users (results reflecting the findings of a review of stakeholder perceptions of the WoNS

¹¹ Beale R, Fairbrother J, Inglis A & Trebeck D (2008). *One Biosecurity: A Working Partnership*. Independent Review of Australia's Quarantine and Biosecurity Arrangements. Report to the Australian Government.

program conducted by Raphael *et al.* in 2010¹²). Although the single species approach was questioned for what it caused to be 'missed out', the WoNS program was widely seen as a strong positive.

Outside the WoNS program, implementation of weed management appears to have been opportunistic and, lacking effective communication. The AWS is seen to lack detail regarding implementation actions. The lack of an effective national plan for communicating with and engaging the diversity of people who should be engaged in weed management was also identified as a weakness (a feature contrasted with the Australian Pest Animal Strategy).

More detailed outcomes and performance indicators are required - the AWS was criticised for having goals and objectives that are aspirational and for lacking performance measures for assessing progress in eradicating, containing and minimising the impacts of weeds (other than the WoNS). In recent times, the Australian Government has generally sought to identify a limited number of specific outcomes then to seek partners to deliver those outcomes. Any future strategy should build on the current AWS and take steps to articulate priorities, targets and measurable performance indicators against which adaptive weed management can occur.

Asked about future leadership and coordination requirements, interviewees reported that future leadership is required for:

- encouraging and maintaining continuity of national research, development and extension (RD&E) which is strategic, takes a longer term approach, maintains and builds capacity of researchers and coordinates research activities (seen as declining since the discontinuation of the Weeds CRC, an area in which weeds are contrasted with Pest Animals, for which the Invasive Animals CRC is seen to play a key role)
 - weed prevention, early detection and capacity for early response
 - *coordinated weed risk assessment (an area in which Australia has become a global leader)* across jurisdictions and sectoral interests cross-jurisdictional effort in which the Australian, state and territory and even local governments learn from each other. This is especially so where species occur across state borders, are widespread, or need careful strategic determinations as to the appropriate level of management based on the weed risk management continuum (e.g. decisions as to when to move from eradication attempts to containment)
 - coordinated management of data (including mapping) and knowledge management
 - effectively communicating and raising awareness of the importance of **ongoing** weed management and prevention
 - Identifying agreed approaches and funding mechanisms for responding to new weed problems, especially those that arise from international purchasing of plant species (including purchases using Internet) and increased travel

Despite some significant weaknesses, the AWS is seen to have strengthened the coordinated effort of government – it is seen to have significantly strengthened coordination across stakeholder groups and jurisdictions, resulting in more coherent and targeted approaches to weed management.

¹² Raphael B, Baker J, Tennant P, Sparkes J & McCowen S (2010). Stakeholder perceptions of the Weeds of National Significance program and progress against individual species plans. Bureau of Rural Sciences, Canberra.

Required legislation/ arrangements are in place

Brief reference to Appendix I of the AWS makes apparent the broad mix of international, national, state/territory, regional and local legal and policy instruments relevant to weed management in Australia.

Recognising the need for cooperative effort, Objective 3.3 of the AWS is to 'Manage weeds within consistent policy, legislative and planning frameworks'.

More than 90% of the 199 survey respondents who participated in this aspect of the evaluation saw 'Legislation and government policy enabling clear actions in managing weeds' as either Important (27.6%), Very Important (31.7%) or Extremely Important (32.2%), making this the factor most identified as important in improving weed management in Australia.

This need was reinforced by interviewees, who frequently identified a need for 'harmonisation' of legislation across the jurisdictions. As identified by the National Weeds Management Facilitator in his 2012 Implementation Report, the need for consistent weeds legislation has been recognised at least since 2005. However, differing legislative mechanisms and jurisdictional priorities make this difficult to achieve. Because of the importance placed on 'harmonisation' of legislation by stakeholders, the opportunities presented by the IGAB should be explored.

Recent moves by some states (New South Wales, Queensland and Western Australia) from separate weeds and pest animals approaches to a biosecurity approach may also offer opportunities for greater consistency across jurisdictions. However, several interviewees expressed concerns that by moving to a broader 'biosecurity' focus, some of the gains made in weed awareness and management may be lost in the community.

Operating environment enables management of risks from weeds to be maintained

As previously identified, successful management of risks from weeds requires sound cooperation across jurisdictions and among different sectors. Yet, as discussed in considering the legislative framework for weed management, requiring states, territories and the Australian Government to come together in a smoothly integrated operating environment that maximises national benefit is a challenge. The nub of the challenge is that each has their own legislative and policy priorities and political constraints.

Australia has a strong international reputation in Weed Risk Assessment (see, for instance, Auld 2012)¹³, with risk assessment methods increasingly being applied to decision-making and management, both within governments and in some sectors of industry (most particularly the nursery and garden industry). However, 30.7% of on-line survey respondents indicated that they are either not at all aware or only slightly aware of the risk assessment approach being used in weed management.

One of the challenges in enabling management of risks from weeds to be maintained lies in a significant tension between operationalising early intervention and ensuring investment can be sought at the appropriate time and to the relevant area. Another is how this directly links to the single species prioritisation approach adopted for WoNS. Although the WoNS program is seen generally as one of the more successful aspects of weed management in recent years, numerous interviewees raised questions about how we can invest more strategically in early intervention, while still having available the very considerable resources needed to manage established weeds of greatest threat.

The mismatch between the long-term persistent problems presented by weeds and the relatively short-term funding cycles available within government programs was repeatedly identified as one of

¹³ Auld B (2012). An overview of pre-border weed risk assessment and post-border weed risk management protocols. *Plant Protection Quarterly* 27(3), 105-111.

the greatest challenges presented by the operating environment. “Funder fatigue” and a lack of continuity between programs were frequently mentioned, and at times with exasperation, by interviewees as setting back effective weed management.

Although discordances remain within the operating environment for weed management, the AWS was frequently identified by key stakeholders interviewed as an important framework enabling sharing of information, coordination of activities and leverage of effort by governments and other stakeholders.

Prioritisation of effort and resources is undertaken

The WoNS program is generally seen as one of the successes of national weed management in recent years. Feedback from interviewees indicates that the initial prioritisation of 20 weeds as being of national significance is widely viewed as positive. So too is the science of potential impact and invasiveness that underpinned the prioritisation process. Although some interviewees expressed concerns that the recent second round of WoNS declarations lacked the same scientific rigour and transparency applied in the previous round, leaving the process more vulnerable to political priorities and influences, no documented evidence supporting this perception could be located. However, the assessment process was done by a technical panel and did not include an open call for input. For some, this lack of transparency equated with a potential loss of rigour in the assessment process.

When asked to rate the contribution of the WoNS program to ‘improving prioritisation of effort to prevent, control and manage impacts of weeds in Australia’ key stakeholders interviewed provided a mean score of 3.30 (\pm 0.18), on a scale from 0 = no contribution to 5 = Extremely strong contribution.

WoNS, as prioritised species, were reported to have enabled a targeted approach, building cooperation across jurisdictions, and linking science, policy, research and ‘best practice’ on-ground management. Typical comments included:

The WoNS program saw significant initial investment, enabling increases in awareness, bringing people together to work successfully and focusing investment, and WoNS increased awareness, investment and the inclusion of weeds in NRM regional plans.

There were, however, mixed views on the current effectiveness of the single species prioritisation approach for weeds. The need for greater effort in early-intervention, with a perceived resulting increase in the likelihood that a weed can be eradicated, was strongly supported in helping to shape decisions around prioritisation. Many of those interviewed commented on the complexity of achieving the correct balance between prevention, eradication and management. Some interviewees expressed concerns that highly visible current problems gain precedence among politicians responding to community pressures ahead of potentially more severe future problems from a new weed incursion.

Although the scale of weed problems – their extent, the number of species, their impacts and their need for persistent management – are such that some prioritisation is recognised as necessary, there were differing views around the effectiveness of the prioritisation approach with concerns expressed in areas such as:

- the narrow focus on single weed species risks missing integrated ecosystem approaches that could play a role in managing other weed species
- a focus on weeds that have already demonstrated the strength of their invasiveness and their capacity to impact on the environment (whether natural or agricultural) has

resulted in a substantial under-investment in early detection at a time when eradication is perhaps feasible

- the difficulties of resourcing regional weed priorities
- trade-offs between environment and agricultural impacts and how to determine where priorities for effort should lie
- impact versus abundance and the influences this has on community perceptions
- a need for flexibility to address climate and seasonality opportunities that may increase the likelihood of success for some species at particular times

These concerns align closely with many of the findings of a 2008 report on the future of pest management in New Zealand (Enfocus Ltd 2008¹⁴). Of particular relevance in the prioritisation debate is the New Zealand observation that ‘The traditional driver of protecting primary production is giving way to a principal concern for the impacts of pests on environmental quality (particularly *indigenous biodiversity*). This in turn is changing the business of pest management from a focus on single species management to *multi-pest*, site-led management requiring a different set of management and operational skills’.

Programs and funding are in place to respond to weeds

In the absence of dedicated budget funding for weed management, it is difficult to identify the extent of government investment. Both annual ‘Caring for our Country’ Business Plans and the Australian Government Biodiversity Fund make explicit commitments to ‘Reducing the impact of vertebrate pest animals and/or weeds’, with a strong focus on Weeds of National Significance.

Historically, because of Australia’s constitutional arrangements in which state governments have primary responsibility for land management, state-based programs have carried the major responsibility for on-ground implementation of weed management.

Both interviewees and respondents to the on-line survey repeatedly identified available resources as a significant constraint on AWS implementation. Particular concerns were expressed around the serious consequences of short-term funding and lack of continuity of investment in addressing the long-term issues in weed research and management. These concerns have been exacerbated by recent decreases in NRM programs more generally in several states.

Numerous interviewees expressed concerns that in the absence of dedicated invasive species programs, and without a body such as the former Weeds CRC, researchers and on-ground managers have to adopt opportunistic approaches to attract investment for key implementation activities. This, in turn, is seen to create a less integrated approach to weed management with diminished coordination between sectors and between jurisdictions.

Decreases in skilled personnel available to provide advice to on-ground managers was also identified by various interviewees as detracting from the likelihood of improved early detection and eradication of weed species – a particular concern at a time when climate change is likely to change the distribution of many weed species.

Attracting resources for long-term strategic action is a key and ongoing challenge for weed management. Researchers noted that the AWS was useful for preparing research proposals and relevant projects, with the AWS reported to help attract investment or provide a useful framework for applications for investment.

¹⁴ Enfocus Ltd (2008). The Future of Pest Management in New Zealand: A Think Piece. Report prepared for Local Government New Zealand.

Key observations on institutional arrangements

1. The AWS provides an aspirational framework which aligns with the biosecurity continuum approach and is relevant in the current context.
2. The AWS, and more particularly the national coordination provided by the WoNS program, has provided an important platform for a targeted approach to some of Australia's worst weed problems, encouraging collaborations and linking research, policy and 'best practice' on-ground management across government and other stakeholders
3. However, the AWS is seen as a high level document lacking necessary links to on-ground outcomes. In the absence of agreed outcome targets, against which progress in weed eradication, containment, and reduction of impacts can be measured, it is difficult to assess the influence of the AWS on weed management in Australia
4. A lack of clarity around roles and responsibilities in weed management persists, with almost half of those involved in this review believing that many stakeholders are not aware of their role in weed management and several key stakeholders commenting on the lack of compliance enforcement adding to inaction. Particular concerns exist around roles and responsibilities in relation to early detection and action to eradicate weeds.
5. Clear and consistent legislation has long been identified as a fundamental underpinning to improved weed management- both the AWS and its predecessor National Weeds Strategy included this among their objectives. A need for greater harmonisation of legislation across the different jurisdictions was frequently highlighted again in this evaluation. While it is recognised that this may be difficult to achieve, implementation of the Intergovernmental Agreement on Biosecurity may present new opportunities to address this long-identified need.
6. The current operating environment presents particular challenges for weed management.
 - While Australia is seen as a leader in weed research, the absence of both a dedicated funding program and a coordinating body, such as that provided to pest animal management by the Invasive Animals CRC, is leading to more fragmented and opportunistic, rather than strategic approaches to R&D.
 - The impacts of this loss of strategic and targeted research capacity are further exacerbated by recent declines in state agency on-ground staff in several jurisdictions. The effect is a widening of the already significant gap between generation of knowledge and translation of that information into appropriate formats available to end-users in a timely way.
 - Coupled with these challenges is the ongoing impact of a mismatch between long-term, persistent weed problems requiring continuity of funding and short-term funding cycles.
7. The scale and persistence of weed problems in Australia is such that a need for prioritisation of effort is widely accepted. However, this is an aspect that needs further work.
 - The challenge is to develop prioritisation processes that are transparent, science-based and best able to serve the national interest while also addressing regional and local needs.
 - While the single species WoNS approach has been a valuable contributor to coordinated weed management for these high priority species, further exploration of other prioritisation approaches is necessary to address the gaps in control and management resulting from the WoNS approach. One possible approach suggested by several interviewees is to adopt a priority landscapes or ecosystems approach, with coordinators dedicated to each landscape, providing important linkages and addressing the various aspects of the weed management continuum.

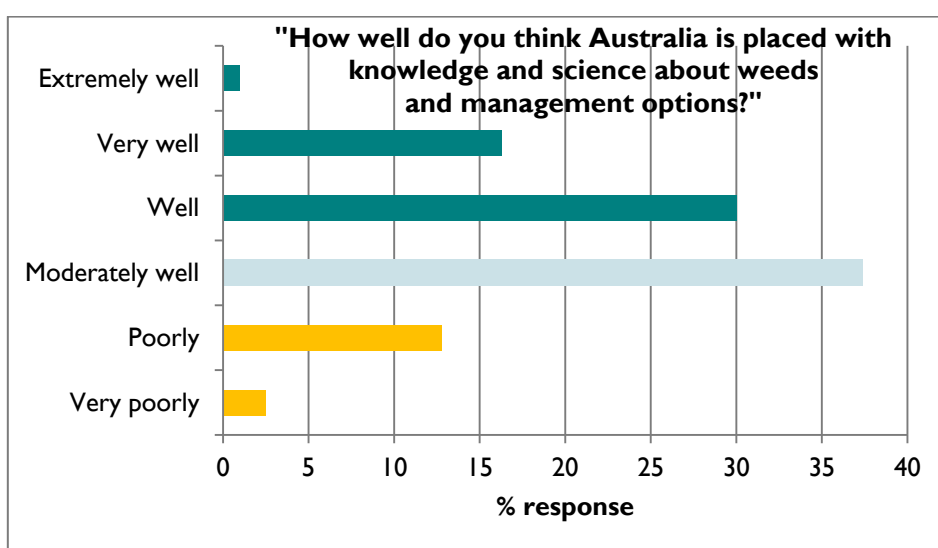
8. Various aspects of communication and awareness-raising also need further attention.
- The gap between good science and availability of information for those who seek it, and the translation and delivery of that information in ways that enable on-ground managers to act effectively in managing weeds is a recurring theme in this review. While the WoNS Coordinators have played an important role in this regard, that role is constrained to their prioritised species.
 - In the past the Weeds CRC played a key role in communication and extension of key aspects of weed management and was valued for this role. The value of this is also reflected in contrasts highlighted between current weeds communication and extension, and that for pest animals, for which the Invasive Animals CRC is seen to play an important role.
 - Acting in the national interest, the Australian Weeds Committee has an important role to play in helping people to better understand the biosecurity continuum and how weeds fits within the pre-border; at border and post border continuum.

B) Knowledge for weed management is developed and used

Good science is an essential underpinning to effective weed management, and in this regard Australia is seen as one of the global leaders. However, the extent and persistence of weed problems, and the changes occurring with changing land uses and the likely impacts of climate change, mean that this science effort is an ongoing need. New techniques, management options, tools and their accessibility for weed prevention and management are crucial. Several interviewees placed particular emphasis on the importance of ongoing, long-term investment in the development and use of biological control. Across the biosecurity continuum, science and knowledge are needed to partner with and to support both policy and programs and on-ground management.

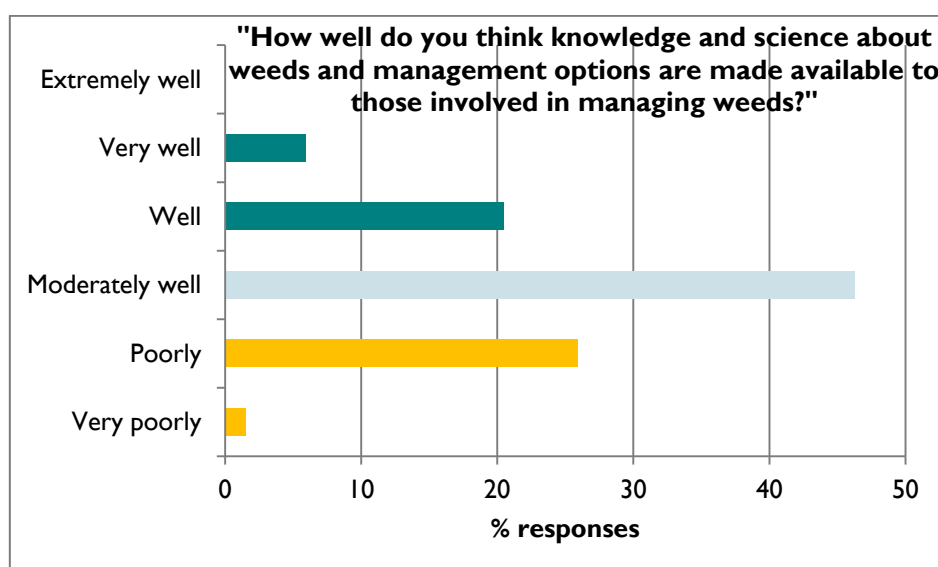
The on-line survey respondents in this evaluation reported that Australia is well placed with science and knowledge for weed management (see Figure 3) and that this science and knowledge is moderately accessible (see 4).

FIGURE 3



Source: Community Solutions on-line survey - question respondents=203

FIGURE 4



Source: Community Solutions on-line survey – question respondents=205

This is reinforced by on-line survey feedback in which participants rated a lack of access to information and knowledge last among six likely main barriers to effective management of weeds.

In assessing how well Australia is doing in enabling individuals to address weed problems, key stakeholders interviewed scored this an average 2.71 (± 0.17), on a scale from 0 = not at all to 5 = Extremely well. Many interviewees commented on a gap between sound science-based information and the timely and appropriate dissemination of that information to potential end-users.

The identified challenge is in ensuring that information is readily available in formats and within timeframes that land managers need. The WoNS Coordinators were frequently identified as providing important linkages between research, policy and 'best practice' on-ground management for the priority species that are their brief, and the Weeds Australia website (weeds.org.au) received mention as a useful source for those actively seeking weed management information.

- Capacity of researchers to continue to support current and future R&D requirements needs effective consideration and resourcing. Particular areas of concern mentioned by interviewees included:
 - a need for ongoing commitment to biocontrol work which, although requiring longer-term effort, has a high return on investment when successful
 - a declining availability of people with the necessary technical skills to assist in early identification of new and emerging weed species
 - an almost complete absence of research into the human/social dimensions of weed management. One interviewee captured the sentiment of others in the comment that:

The social aspects are critical – the linkages and partnerships, and the work of volunteers. We need to know which people want to do what and act on that.

Key Observations on knowledge for weed management

1. Australia is a leader in weed science, which is an essential underpinning to sound policy and on-ground management to reduce the risks and impacts of weeds.
 - It is important that mechanisms for directly linking R&D with extension in formats and timeframes appropriate to the end-users are maintained or strengthened. The present gap between science and knowledge and its application in weed management is widely recognised and of growing concern as national and state/territory government resources decline.
2. In the absence of a Weeds CRC, it is important that other mechanisms for ensuring coordination between research, policy and on-ground management are established or maintained. Without this, research is likely to become more fragmented, less targeted to end-use needs and poorly coordinated across jurisdictions.
3. There are widespread concerns that biocontrol and other aspects of weed management research requiring long-term commitment may be lost from Australian science as a consequence of short-term, discontinuous funding cycles.
4. People and their commitment are a critical element in achieving improved weed management, yet at present there is little investment in understanding the human/social dimensions of managing Australia's weed problems.

Future challenges

- The scale and persistence of weed problems in Australia, at a time when government resources are more constrained than usual and the impacts of climate change are likely to change the distribution of many species, means that effective dissemination of information in formats that will maximise adoption by end-users is essential.
- The need to enhance knowledge and understanding of the human/social dimensions of weed management has been recognised for several years, yet it has not become an integral part of weeds R&D.

C) Capacity of stakeholders to respond to weeds continuously improves

As outlined earlier in this report, there is a diversity of stakeholders in weed management, each of whom has a role to play in ensuring continuous improvement.

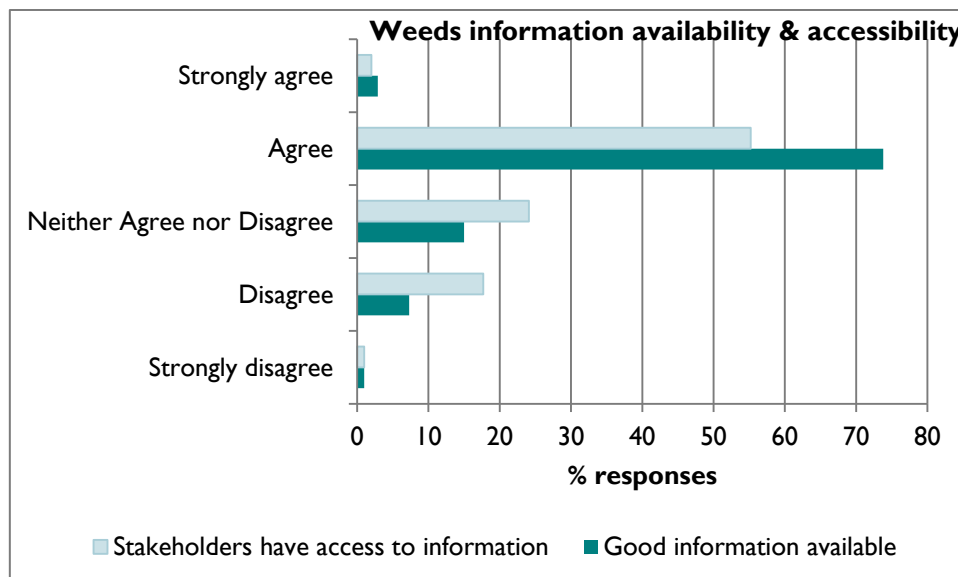
This section provides some insights into the findings in relation to stakeholder capacity to respond to weed problems.

Stakeholders are aware of and understand weed risks for their circumstances

Feedback from stakeholder interviews suggests that awareness and understanding of weeds varies significantly within stakeholder groups, with the importance of the problem for their circumstances or role being a key driver of this understanding.

Stakeholders in the on-line survey identified that they consider good information is available on the risks, characteristics and likely impacts of weeds and this information is generally accessible (Figure 5). This appears slightly at odds with the results presented in Figure 4. However feedback during stakeholder interviews suggests this is a matter of end-user willingness or ability to seek out information when needed.

FIGURE 5



Source: Community Solutions on-line survey – question respondents=203

During in-depth interviews, key stakeholders suggested that information is available if you are looking for it but a better approach to information storage and management could be achieved. In particular, the targeting of the information and resources for particular stakeholders and their needs was seen as important, as was the timeliness of information. WoNS Coordinators were identified as an example of the important role played by knowledge brokers in making information available in relevant and timely ways.

An analysis of these perceptions across different stakeholder groups found no significant differences between landholders, government staff at all three levels, regional NRM and extension staff, representatives of community based organisations, or research scientists.

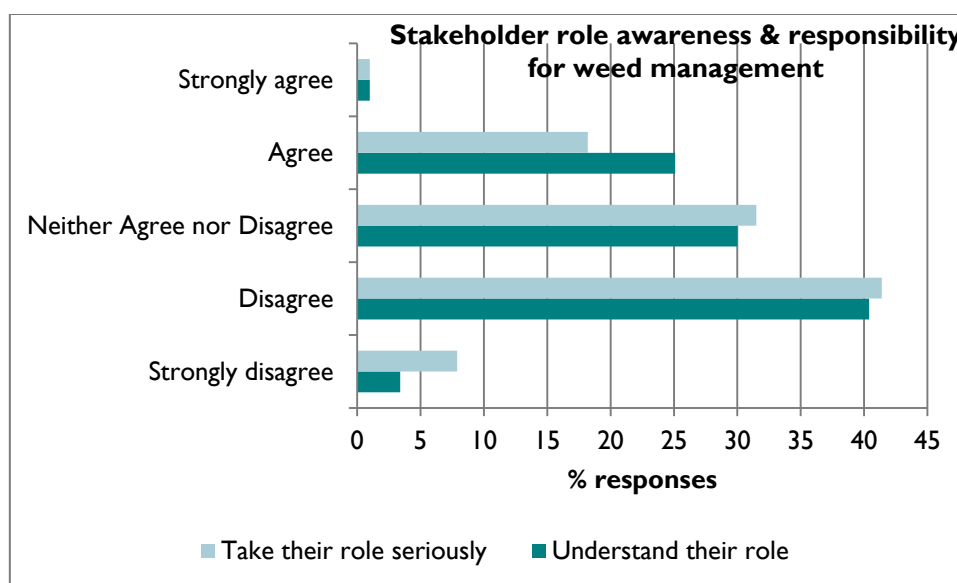
Various interviewees commented on the need for monitoring and evaluation to enable an understanding of the scale of the impacts of various weed species and the extent to which management initiatives are producing results.

Key stakeholder interviewees also indicated that among the broader public and in the community, perceptions regarding weeds and the influence these views and perspectives (whether based on fact or perception) have on public policy investment and directions are important considerations. Of particular note was the disconnection between weed spread and impact and the need to focus on outcomes in order to maximise return on investment of funding and effort.

Stakeholders understand their responsibility in relation to reducing and managing risks posed by weeds

As noted in the institutional section of this report, there is confusion regarding roles and responsibilities, with views varying widely on the level of awareness of stakeholders' roles in managing weeds. Almost half of all survey respondents (43.7%) believe that stakeholders are not aware of their roles. Building on this there were varying views on whether stakeholders take responsibility for their role, with 49.3% of stakeholders nominating that they either disagreed or strongly disagreed that stakeholders were taking responsibility for their respective roles (Figure 6). An analysis across the different stakeholder groups showed no significant differences in these perspectives between the various respondent groups.

FIGURE 6



Source: Community Solutions on-line survey – question respondents=203

There was a view, often expressed by key stakeholder interviewees, that land managers and landholders lacked either capacity or motivation to manage weeds, other than when they have significant adverse effects on productivity or incomes. It was widely acknowledged that the pressures on individual landholders and on public land managers has increased in recent years, such that weeds are less likely to reach a high level of priority among competing demands. There was also feedback about a lack of weed management compliance by many land managers, both private and public. In some instances, interviewees attributed this, at least in part, to a lack of understanding among those managing the land, as to the true and full costs of weed impacts. A diminished

presence of on-ground extension services previously delivered by state departments was seen to have exacerbated this aspect of weed management.

Relevant options are available to eradicate, contain or manage weed risks

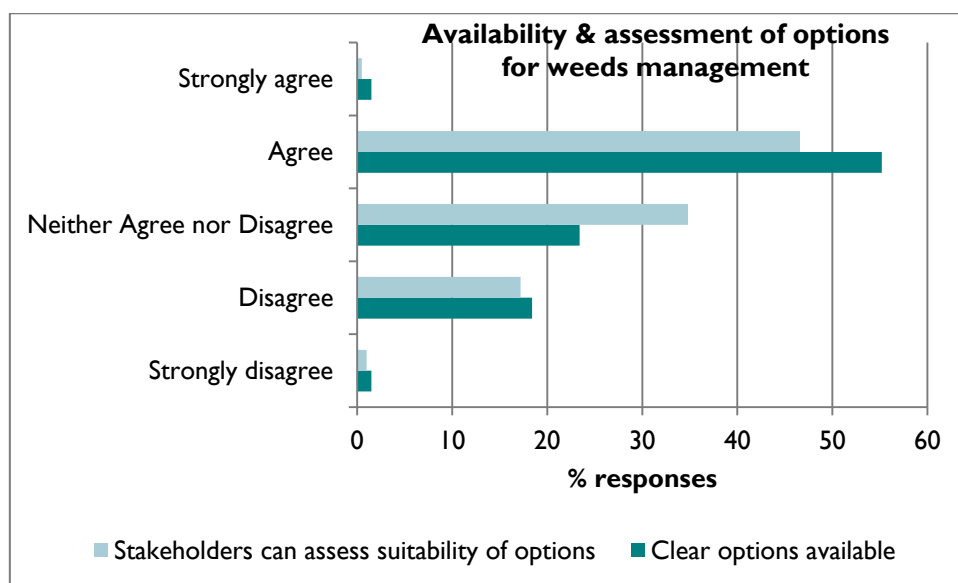
On-line survey participants generally thought that there were good options available for management of weeds, with 56.7% of respondents identifying that they agree or strongly agree that there are clear options for weed management. Almost half of the stakeholders surveyed (47.1%) thought that the options could be assessed for the individual’s circumstances with 34.1% neutral on this issue (see 7).

One issue of concern among interviewees was the decline in on-ground expertise to guide and sustain the current capacity in relation to available options. Losses of both facilitation/’extension’ positions and experienced researchers with skills in weed identification and management were cited in this context.

Concerns were also expressed that as funding for research becomes short-term and with limited capacity for continuity over longer periods, biocontrol agents will become less available as an option. Biocontrol agents were seen as a favoured long term solution for many weed species.

Although not mentioned often, decreasing availability of some chemicals for use in weed control and concerns about herbicide resistance were also highlighted by a small number of respondents

FIGURE 7



Source: Community Solutions on-line survey – question respondents=203

Stakeholders have, or can obtain, required skills to implement required weed management

Having, or being able to easily obtain, the skills to manage weeds effectively was identified by survey respondents as an important factor in improving weed management. On a scale from 0 = not at all important to 5 = extremely important this factor was most often rated ‘very important’, the mean score being 3.78, second in a list of factors only to ‘having legislation and policy that enables clear actions in managing weeds’. Support from the extension and training sector rated an average 3.53 within that same list of important factors.

Among key stakeholder interviews, there are several recurring themes in relation to whether land managers can obtain the relevant skills to undertake effective weed management. These include:

- Minimum safety requirements for the practices required have been extended in recent years
- More stringent legislative requirements for minimum skills/qualifications, resulting in increased commitment of both time and resources required of weed managers, including individual landholders
- The important role but declining availability of extension officers and others in providing on-ground support and advice, and
- Access to training and skill development, which is seen as declining in NRM generally and for invasive species in particular. This latter concern parallels findings by Brown & Munckton (2010)¹⁵, in their scoping study of training and capacity building in Vertebrate Pest Management.

One interview experienced in Vocational Education and Training summed up these concerns as follows:

The cut back to courses and training packages means that there are few running and those that are have not been modified to the strategic approach or embraced the biosecurity context. NSW DPI call it a 'thin market' in that there is not one industry that engages with the area, it is just piecemeal engagement. On the ground and in training, that translates to only being trained in areas like chemical awareness and shooting. There is no context related to the Strategy.

Relevant resources are available

The scale and persistence of weed problems in Australia is such that resources for on-ground action are spread very thinly across the landscape. Both public and private investment is needed. While some industries, including the Nursery & Garden Industry, grains and meat producers are seen to be investing in weed management, other primary industry sectors that benefit from effective weed prevention and management are not.

Repeated feedback during key stakeholder interviews indicate that on-ground activities are limited by resources. Although supported through Caring for our Country, concerns about recent declining commitment and uncertainties surrounding the future of regional NRM bodies exist in several states.

In addition to financial resources, on-line survey respondents rated as 'very important' (mean score 3.69 on a scale from 0 = not at all important to 5 = extremely important) the availability of information, service providers and equipment to enable action on weed management.

Novel mechanisms for attracting new investment in weed management, proposed by Prof. Paul Martin (see Martin 2008¹⁶) at the University of New England are worthy of further consideration.

¹⁵ Brown M & Munckton C (2010). Scoping Study: Training and Capacity Building in Vertebrate Pest Management. Report prepared for NSW Department of Industry & Investment. Invasive Animals Cooperative Research Centre, Canberra.

¹⁶ Martin P (2008). Cross-pollination or cross-contamination: Directions for informing the management of invasives with market-economy concepts. Proceedings of the 16th Australian Weeds Conference, Cairns. <http://www.casw.org.au/awc/2008/awc200810061.pdf>

There are incentives to undertake actions

While incentives for managing weed problems are not identified as the highest priority among factors likely to improve weed management, most survey respondents identify them as ‘important’ (21.7%), ‘very important’ (30.3%) or ‘extremely important’ (31.3%).

With costs of managing weeds relative to the benefits gained by the individual manager ranking among the top barriers to improved weed management, and numerous key stakeholder interviewees identifying costs to individual landholders as one of the key negative influences, it is likely that, as in other areas of NRM, incentive-based programs will assist significantly.

Incentives might gainfully target private landholders/agricultural producers but also public land managers, Indigenous land owners and managers and resource companies. They need not necessarily be financial but could target capacity building and the provision of relevant expertise.

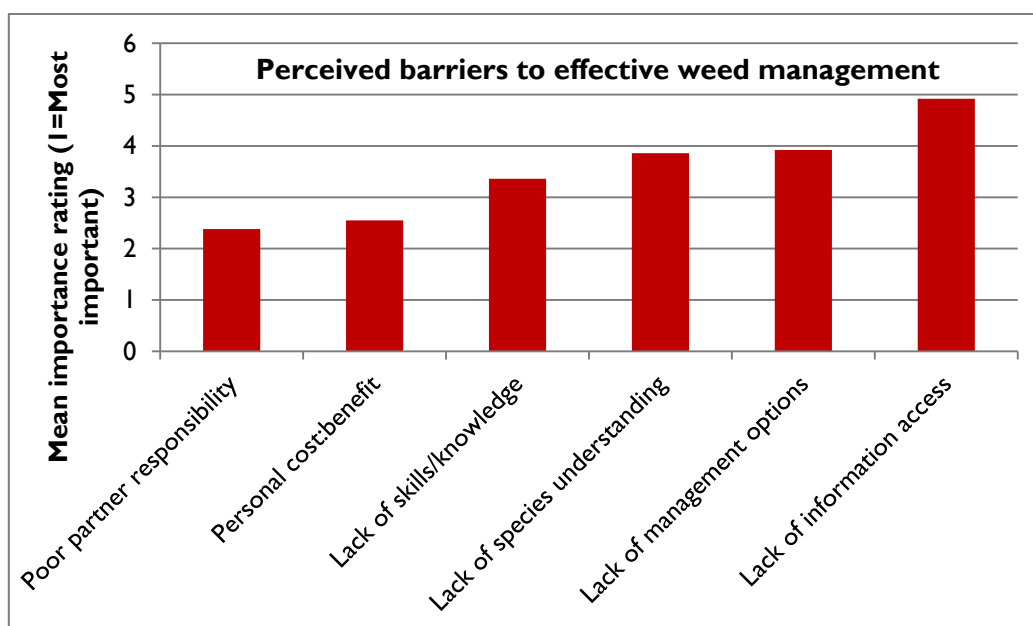
Overall effectiveness in enabling individuals to address weed problems

Both key stakeholders interviewed and those responding to the on-line survey were asked to rate (on a scale from 0 = not at all effective to 5 = extremely effective) ‘How effective Australia has been in the past 5 years in enabling individuals to address weed problems’. Interviewees rated this a mean score of 2.71 (± 0.17), while for those who responded to the on-line survey, the mean score was 1.80. A number of the factors discussed above were seen as contributing to this result, most notably the mismatch between availability of information and access to it in a timely manner when needed by individuals.

Barriers to action can be overcome

Consistent with findings reported above, the main barrier to improved weed management as identified by survey respondents from a list provided is the failure of key partners to take seriously their responsibility for the management of invasive species (Mean rating 2.38, see Figure 8). A number of the factors discussed above appear as contributors to this situation.

FIGURE 8



Source: Community Solutions on-line survey – question respondents=193

Note: This question was scored differently from others in the on-line survey, with respondents being asked to **rank** from 1 = Most important barrier to 6 = Least important barrier. Low scores thus represent greater importance as a perceived barrier to effective weed management.

That partners in weed management are seen not to be taking responsibility for managing weeds likely relates strongly to the lack of clarity around these roles identified both by Beale *et al.* (2008) and earlier in this report. In a federated system such as ours, in which the Australian, state and territory and local governments share responsibilities with other stakeholders, such clarity is difficult to attain but at the same time necessary.

Asked a more open-ended question about the most significant barriers to improved weed management, both key stakeholder interviewees and on-line survey respondents identified a broad range of factors.

The scale of economic and environmental threats from weeds are a major concern, not just in Australia (see, for instance Mooney *et al.* 2006¹⁷). While Australia is seen as being at the forefront in addressing these challenges, declines in government funding (especially in some states in recent times), lack of continuity of available funding over periods relevant to the long-term needs of weed research and management and a resulting lack of sustained effort were frequently mentioned as barriers to improved management.

Limited capacity of landholders (both public and private) to manage weeds as a priority amid competing demands on their time and resources was also mentioned several times, with lack of compliance enforcement being seen as exacerbating this.

Also of concern to several respondents was a perceived lack of effective monitoring and evaluation of the successes and failures of funded projects, with some placing emphasis on the importance of learning from what has not worked, rather than creating expectations that an unsuccessful project will jeopardise future funding opportunities.

Some interviewees also identified the lack of 'visibility' of weeds (when compared with pest animal species such as camels) and a consequent lack of prioritisation of investment both by government decision-makers and by the community as another important barrier to effective management. In turn this was seen as contributing to what was called 'funder fatigue' – a failure to recognise that weeds are here to stay and that their effective management requires ongoing investment.

Failures of coordination across jurisdictions and between different sectors involved in weed management, the previously mentioned need for 'harmonisation' of legislation, and resulting loss of strategic approaches in investment were also identified several times.

¹⁷ Mooney HA, Zavaleta ES & Hobbs RJ (2006). Invasive alien species – are we up to the challenge? CAWS Oration. Proceedings 15th Australian Weeds Conference, Adelaide.

Key Observations on capacity of stakeholders to respond to weeds

Ongoing challenges exist in enhancing the capacity of stakeholders to better manage weeds.

1. Although awareness of weeds is much greater than for pest animals, there remains a significant gap between awareness and improved management action. Several factors are seen to contribute to this:
 - As discussed earlier, stakeholders responding to the on-line survey concluded that roles and responsibilities in relation to weed management were still not clear
 - The costs to those responsible for taking action to address weed problems outweigh the benefits seen to be gained by those individuals, a situation exacerbated by lack of compliance enforcement
 - Resources (both financial and expertise) to support on-ground management are thinly spread and declining.
2. While some sectors of primary industry (most notably the Nursery & Garden Industry, Grains and Meat production) are contributing, there is substantial opportunity for greater contribution from those industries that are beneficiaries of sound weed management.
3. Novel funding mechanisms, such as the certification and compliance mechanisms proposed by Professor Paul Martin are worthy of further exploration.
4. More stringent safety regulations and requirements for increased training and certification for chemicals handling and other aspects of management are a disincentive to many land owners and managers. This problem is enhanced by a declining offer of practical, skills-based training courses in rural areas
5. There is a role for incentives (both financial and motivational) targeting all land tenure types and potentially this might be managed by a successor to AWS.
6. Control options are available for many species but the short term nature of RD&E funding works against the development of much needed biological controls.

Chapter 5 – Evaluation assessment against intermediate outcomes

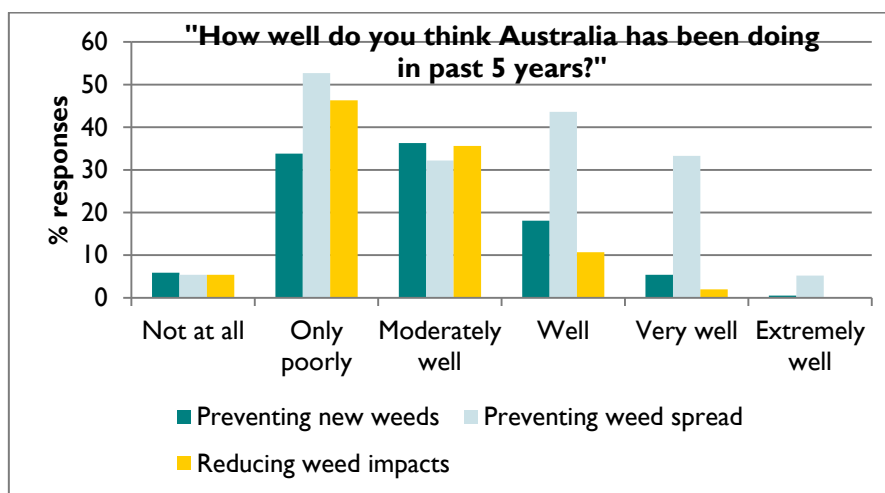
As part of this evaluation we have sought input from stakeholders on how Australia has performed over the last five years across each of the key areas identified as intermediate outcomes in the program logic for the evaluation.

- Preventing new weed problems
- Preventing the spread of weeds
- Reducing the impact of established weeds

These observations from both key stakeholder interviewees and on-line survey respondents provide useful information on how the system is performing, or perceived to be performing, from stakeholders' perspectives. We note that the AWS is not the only contributor and therefore attribution to AWS has not generally been sought.

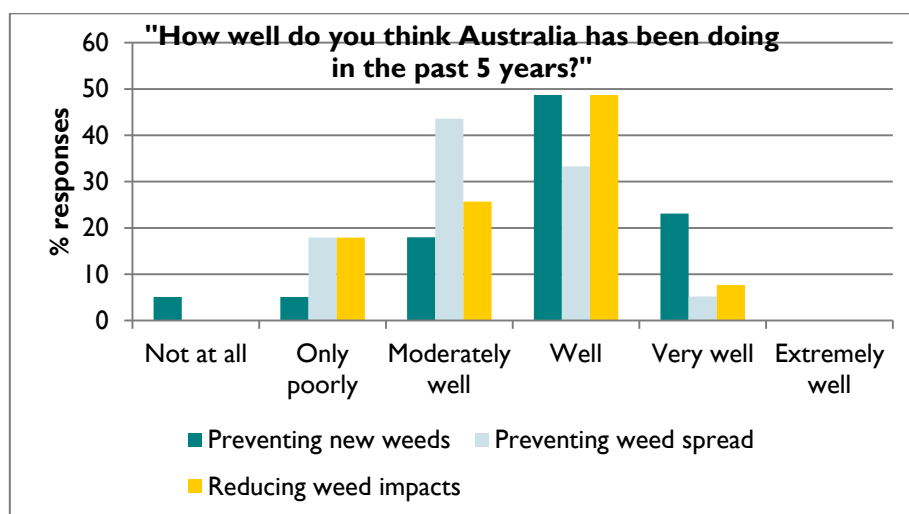
Judged on each of these aspects of weed management, performance is not strong, with very few among both on-line survey respondents and interviewees rating recent efforts either 'very well' or 'extremely well' (see Figures 9a and 9b). In each of these aspects of weed management, key stakeholder interviewees rated performance slightly above the ratings provided by on-line survey respondents (compare Figure 9a and 9b results). Overall, the trends indicate that there is a long way to go in improving the performance of the system and raising stakeholder awareness of the performance of the system.

FIGURE 9a: Survey responses



Source: Community Solutions - survey respondents=205; interviewees = 39

FIGURE 9b: Interviewee responses



As highlighted elsewhere in this report, the scale of the problem relative to available resources is a contributing factor not unique to Australia. Adding to the challenges are the constitutional arrangements in Australia and the need to develop coordinated approaches across jurisdictions each with their own legislative and policy priorities.

Australia prevents new weed incursions

Stakeholders interviewed rated Australia's effectiveness in preventing new weed problems over the last five years as moderate to sound (mean score 2.73 ± 0.17 , on a 0- 5 scale). This compared less than favourably with the same perspective on preventing new pest animal problems (mean score 3.71 ± 0.17). Measured on the same scale, on-line survey respondents scored this a mean of only 1.52, with 76% of those respondents seeing performance on preventing new weed problems as only 'moderate' or less.

Those interviewed noted that the weed risk assessment approach and quarantine system is highly regarded internationally, a view that is confirmed by Auld (2012)¹⁸.

Risks were reported to be higher for species entering Australia through postal or on-line delivery services rather than as part of in-person border entry – a risk that is exacerbated by a big increase in international on-line shopping.

There was a reported limited understanding on the ground of the strategic national approach to preventing new weeds from entering Australia. Many did not understand the risk assessment approach used within Australia. The spread of understanding is confirmed with 30.7% of on-line survey respondents rating their awareness of the risk assessment approaches used in Australia as either non-existent or only slight and a further 22.9% rating themselves as 'somewhat aware', leaving less than half of all respondents 'aware' or better.

A recurring theme among key stakeholder interviewees was the lack of effective monitoring of the system, making it difficult to accurately assess progress towards improved outcomes.

¹⁸ Auld B (2012). An overview of pre-border weed risk assessment and post-border weed risk management protocols. *Plant Protection Quarterly* 27(3), 105-111.

The spread of weeds within Australia is contained

Stakeholders reported a disappointing performance in reducing the spread of existing weeds. Among both key stakeholder interviewees (mean score 2.21 ± 0.13 on a 0-5 scale) and those who completed on-line surveys (mean score 1.47) this was seen as the least effective of Australia's efforts in managing weeds. More than half of all on-line survey respondents rated this 'only poorly'.

Among key stakeholder interviewees, resource constraints and lack of continuity of programs were repeatedly seen as important barriers to more effective prevention of weed spread.

With the exception of containment efforts for some WoNS, the focus on spread prevention is seen as lacking a strategic approach.

An ongoing tension between prioritisation of established species that are highly invasive and likely to have major impacts (the WoNS species) and a greater focus on surveillance, early detection and identification and a follow-up capacity to act at a time when eradication may be more feasible was often mentioned by interviewees.

Lack of effective monitoring systems make it difficult to assess how Australia is performing.

The impacts of existing weeds are minimised

Stakeholders reported that weeds are an extensive challenge and that despite a considerable effort focused on WoNS in recent years, overall the impacts of weeds are growing, and are likely to do so even more under the influences of climate change.

Among key stakeholder interviewees, the mean score for effectiveness in reducing the impacts of existing weeds was 2.41 ± 0.14 (on a scale of 0- 5), while that from survey respondents was 1.58, with more than half of all on-line respondents rating reduction in impacts of existing weeds either 'only poorly' or 'not at all'.

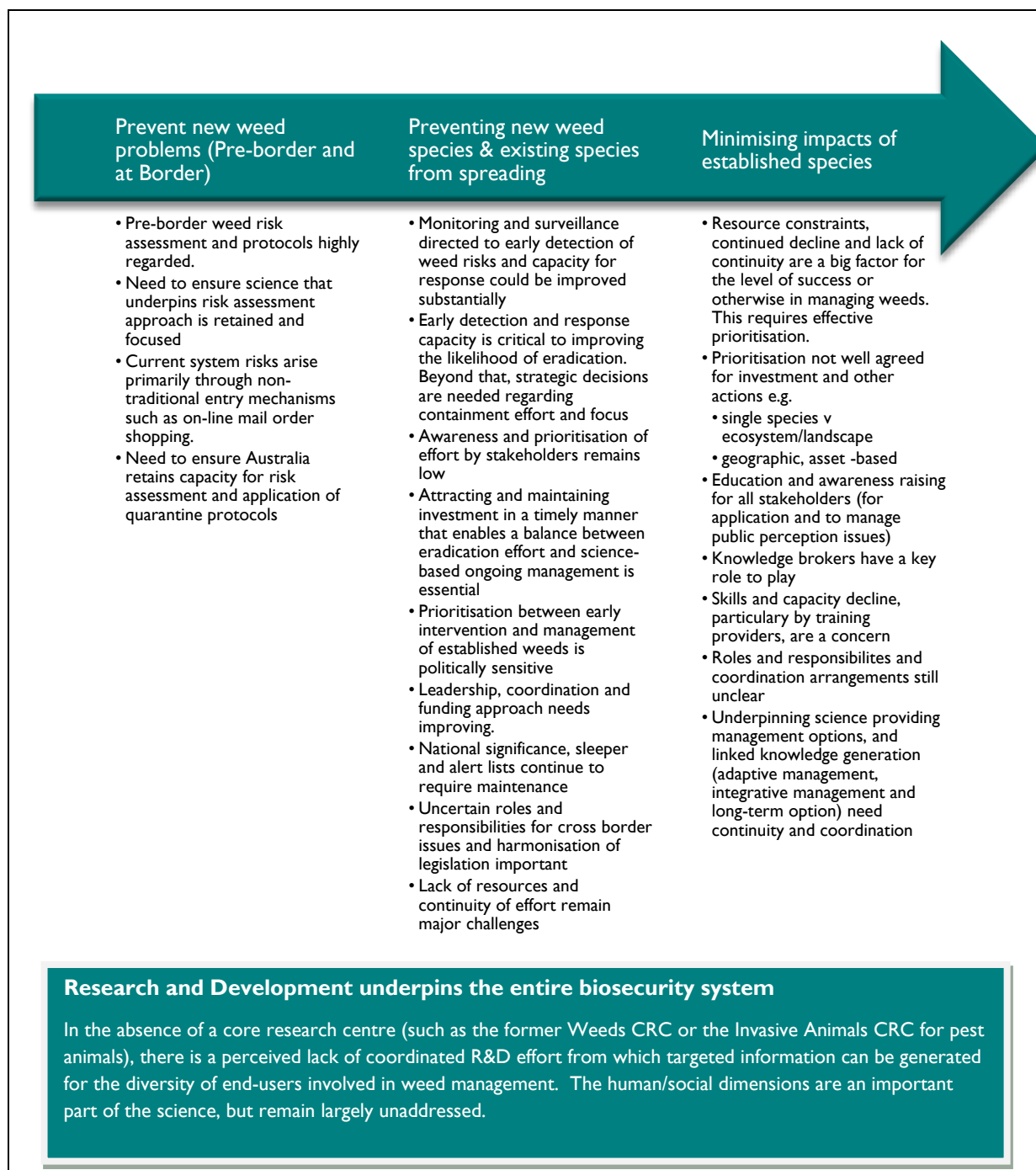
The scale and persistence of the problem and resource constraints relative to this were seen by many interviewees as a major limiting factor.

During various interviews, concerns were also expressed that a lack of adequate monitoring and availability of relevant data makes it difficult to make other than subjective judgments on this aspect of weed management.

Ensuring that all stakeholders play their role was seen as important in addressing the big challenges faced in this area.

Key messages and observations

The key messages and observations relating to achievement of the intermediate outcomes used in evaluating the Australian Weeds Strategy can be summarised as follows:



Chapter 6 – Gaps, opportunities, and the impacts of IGAB

The National Weeds Management Facilitator, in his May 2012 Implementation Report on the Australian Weeds Strategy, highlights a small number of Strategic Actions which have not been progressed as part of achieving the Objectives of the Strategy. Each of these has a resonance with feedback received during the current evaluation review. These Strategic Actions are:

1.2.4 Establish core capacities at the state and national levels for responding to significant weed incursions – an action directed to enhancing early detection and rapid action against new weeds;

3.1.1 Develop and implement a national plan for communicating with stakeholders and engaging them in weed management – directed to raising awareness and motivation among Australians to strengthen their commitment to act on weeds;

3.1.3 Recognising and awarding community achievements in weed management – also directed to raising awareness and motivation among Australians to strengthen their commitment to act on weeds;

3.2.5 Strengthen collaboration between research institutions, industry and government on weed research issues – directed to building Australia’s capacity to address weed problems and improve weed management; and

3.4.2 Developing, implementing and maintaining regular and consistent monitoring of weed distribution, impacts and management (an action undertaken only for WoNS species)

Ways of addressing these identified strategic actions, along with gaps identified through the current evaluation survey and interviews, are best considered within the opportunities presented by the introduction of the Intergovernmental Agreement on Biosecurity (IGAB).

What is the IGAB?

The IGAB is an agreement between the Commonwealth of Australia, state and territory governments to ‘enhance Australia’s biosecurity system and strengthen the collaborative approach between the Commonwealth of Australia (the Commonwealth) and state and territory governments (the Parties) to address Australia’s broad range of biosecurity issues’.

Responding to the Beale review ‘*One Biosecurity: A Working Partnership*’, the IGAB aims to strengthen the working partnership between governments, broadly identify their roles and responsibilities and outline the priority areas for collaborative effort to improve the national biosecurity system.

Relationship between the IGAB and the AWS

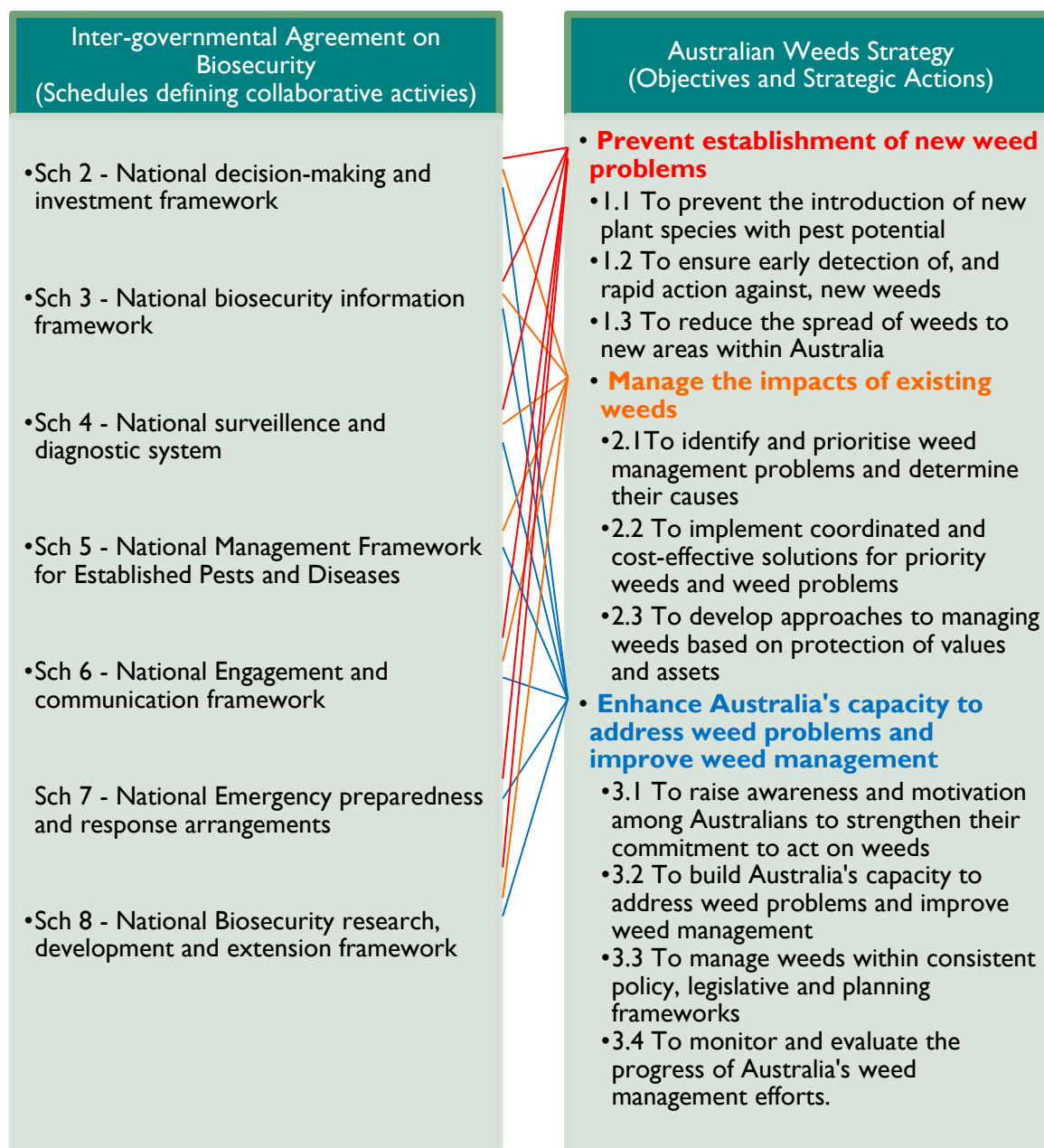
The Vision, Objectives and Principles that underpin the IGAB share much in common with those of the AWS (Figure 10, below).

FIGURE 10

Features of the IGAB	Features of the AWS
<p><i>Goal:</i> The goal of a national biosecurity system is to minimise the impact of pests and diseases on Australia’s economy, environment and the community, with resources targeted to manage risk effectively across the continuum, while facilitating trade and the movement of animals, plants, people, goods, vectors and vessels to, from and within Australia.</p>	<p><i>Vision:</i> Australia’s economic, environmental and social assets are secure from the impacts of weeds.</p>
<p><i>Objectives</i></p> <ol style="list-style-type: none"> 1. Reduce the likelihood of exotic pests and diseases, which have the potential to cause significant harm to the economy, the environment, and the community (including people, animals and plants), from entering, becoming established or spreading in Australia; 2. Prepare and allow for effective responses to, and management of, exotic and emerging pests and diseases that enter, establish or spread in Australia; and 3. Ensure that, where appropriate, significant pests and diseases already in Australia are contained, suppressed or otherwise managed. 	<p><i>Goals and Objectives</i></p> <ol style="list-style-type: none"> 1. Prevent new weed problems 2. Manage the impacts of established pest animals 3. Enhance Australia’s capacity and commitment to solving weed problems
<p><i>Principles</i></p> <ul style="list-style-type: none"> • Biosecurity is a shared-responsibility between all governments, industry, natural resource managers, custodians or users, and the community. • In practical terms, zero biosecurity risk is unattainable. • The pre-border, border and post-border elements of the biosecurity continuum are managed to minimise the likelihood of biosecurity incidents and mitigate their impacts. • The biosecurity continuum is managed through a nationally integrated system that recognises and defines the roles and responsibilities of all sectors and sets out cooperative activities. • Activity is undertaken and investment is allocated according to a cost-effective, science-based and risk-management approach, prioritising the allocation of resources to the areas of greatest return. • Relevant parties contribute to the cost of biosecurity activities: <ol style="list-style-type: none"> a. Risk creators and beneficiaries contribute to the cost of risk management measures in proportion to the risks created and/or benefits gained (subject to the efficiency of doing so); and b. Governments contribute to the cost of risk management measures in proportion to the public good accruing from them. 2. Governments, industry, and other relevant parties are involved in decision-making, according to their roles, responsibilities and contributions. 3. Australia’s biosecurity arrangements comply with its international rights and obligations. 	<p><i>Principles</i></p> <ul style="list-style-type: none"> • Weed management is an essential and integral part of the sustainable management of natural resources for the benefit of the economy, the environment, human health and amenity. • Combating weed problems is a shared responsibility that requires all parties to have a clear understanding of their roles. • Good science underpins the effective development, monitoring and review of weed management strategies. • Prioritisation of and investment in weed management must be informed by a risk management approach. • Prevention and early intervention are the most cost-effective techniques for managing weeds. • Weed management requires coordination among all levels of government in partnership with industry, land and water managers and the community, regardless of tenure. • Building capacity across government, industry, land and water managers and the community is fundamental to effective weed management.

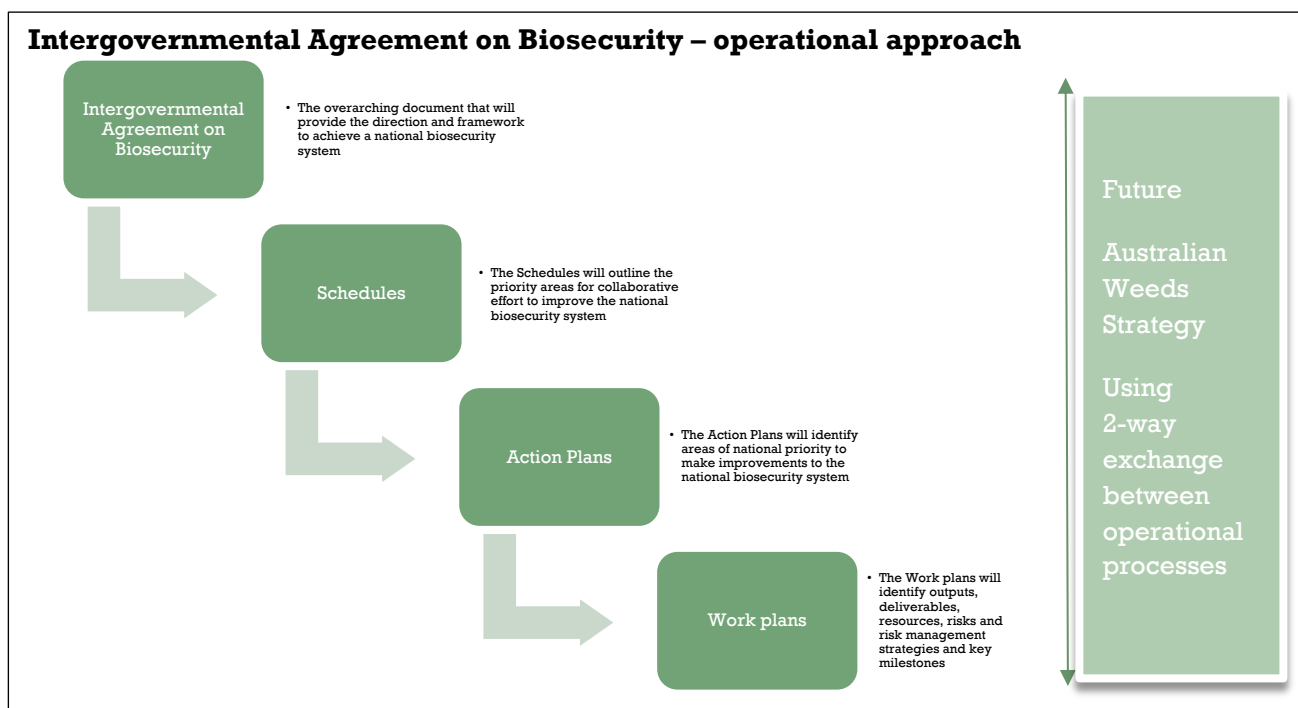
Furthermore, the collaborative activities which the IGAB seeks to deliver are strongly related to many of the strategic actions agreed within the AWS. Consideration of linkages between the activities sought through the IGAB and the Strategic Actions agreed within the AWS presented in Figure 11, leads to an extensive web of connectivity between the two.

FIGURE 11



The IGAB operational approach of moving from the overarching Agreement, through Schedules defining collaborative action, to agreed national priority Action Plans and ultimately Work Plans (see Figure 12) provides important intervention points through which the Australian Weeds Committee (and its parallel in the Vertebrate Pest Committee) can seek improved collaboration in many aspects of the implementation of the AWS.

FIGURE 12



This same cascade of activities from an agreed high level strategy, through Action Plans and Work Plans offers a framework through which a new weeds strategy can build links to activities that give it more direct relevance to on-ground weed management.

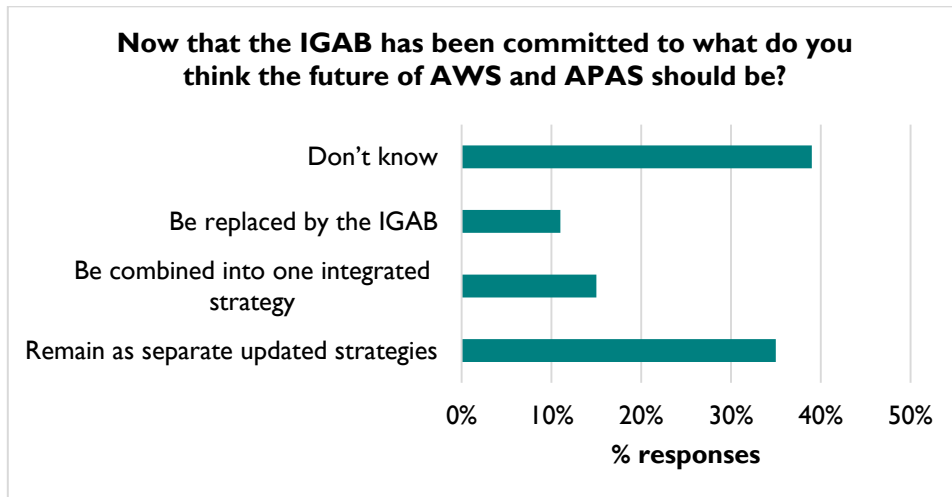
Stakeholder perspectives on the relationships between the AWS and the national biosecurity system (the IGAB)

The current evaluation of the Australian Weeds Strategy has highlighted a considerable interest among stakeholders, as reflected in receipt of feedback from 39 key stakeholders willing to commit to semi-structured interviews lasting from 30 minutes to two hours, together with 212 on-line survey responses from participants with an interest in weed management.

In the final stages of key stakeholder interviews and on-line surveys, respondents were asked about their views on the implications of the IGAB for the existing Weeds and Pest Animal Strategies.

Approximately 40% of on-line survey respondents in this review and in the parallel review of the Australian Pest Animal Strategy are not yet familiar with the Intergovernmental Agreement on Biosecurity (IGAB) (see Figure 13, 'Don't know').

FIGURE 13

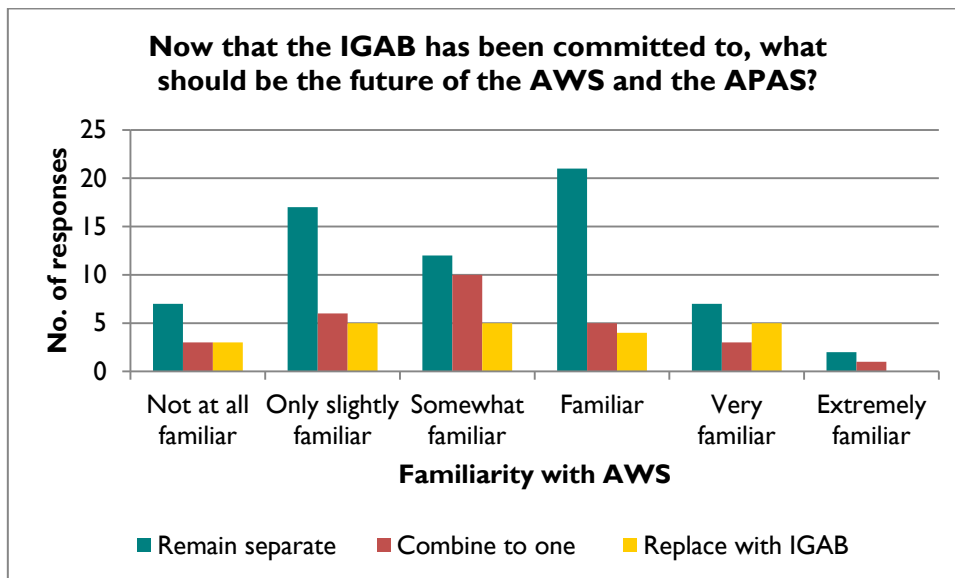


Source: Community Solutions on-line survey – question responses = 200

Among those who felt able to express an opinion on the future of the AWS and APAS, a majority (57.6%) felt that these two Strategies should remain as separate, updated strategies.

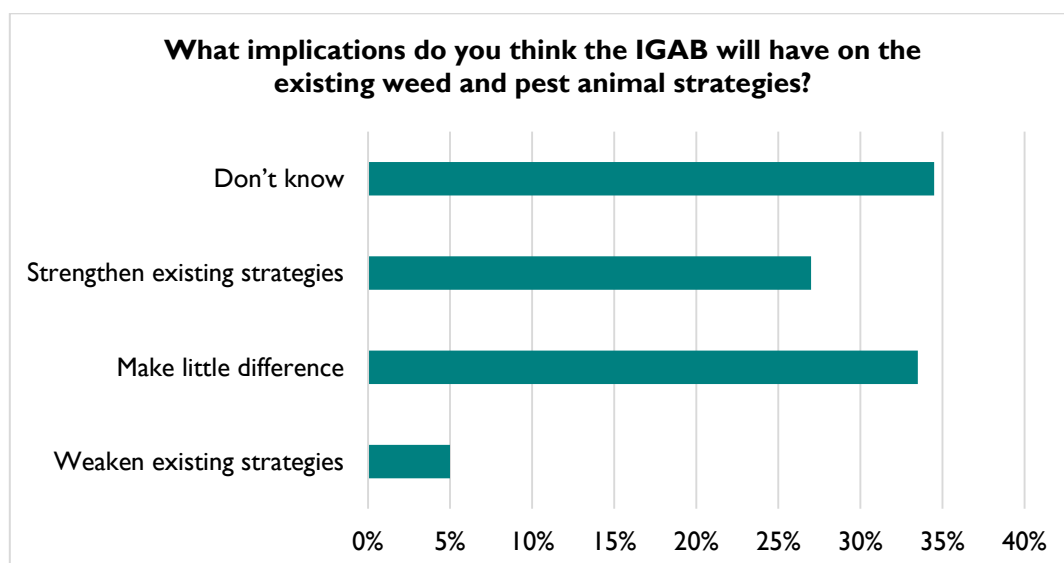
Omitting those who were not sufficiently familiar with the IGAB to express a view about its implications for the future of the AWS and APAS, the level of familiarity with the AWS had no significant impact on preferred future for the Strategies (see Figure 14).

FIGURE 14



While many of the survey respondents (34.5%) did not know what implications the IGAB might have for the existing Weeds and Pest Animal Strategies, a small majority of those who expressed an opinion (51.2%) thought it would strengthen the existing strategies, while 41.2% thought it would make little difference (see Figure 15).

FIGURE 15



Source: Community Solutions on-line survey – question responses = 200

Key stakeholders interviewed were not specifically asked about the future of the AWS in light of the newly adopted IGAB. However, both interviewees and those who responded to the on-line survey expressed opinions on their reasons for seeing the IGAB as likely to strengthen existing Strategies. Recurring themes are reflected in comments such as:

The Agreement is a good initiative and will hopefully foster more collaboration between governments, and reduce institutional and legislative barriers.

Hopefully, it will give other strategies more backing and reasoning for being implemented.

It provides a foundation of principles and a framework for harmonising of state strategies.

Currently each Government Agency is doing their own thing. The Intergovernmental Agreement will bring with it appropriate funding.

On the other hand, among those who saw it as weakening existing Strategies, lack of funding specific to weeds (and pest animals) was a recurring concern, as reflected in comments such as:

Unless there is a financial commitment from government to assist with specific control strategies not much will happen.

It will be an excuse for cost shifting and cost cutting and like so many great ideas will fail because the execution will be feeble and the funding inadequate to do the job properly.

It rather depends on the follow up funding to implement the agreement. If it is not adequately funded it is just another piece of paper.

And on a different theme:

The push for generic biosecurity strategies/agreements can diminish the key elements that are specific to weeds or pest animals.

The focus of NEBRA is biosecurity and preventing the entry of new pests and diseases into Australia. Control of existing weeds does not feature as part of the strategy.

One Strategy or two?

To assist in deliberations as to the future of the AWS and APAS, and whether they should continue to exist as separate strategies (as preferred by a majority of respondents in this evaluation) or be combined into a single Invasive Species Strategy, the benefits and disadvantages of retaining two separate Strategies are summarised in Table 4. This Table was developed by the evaluation team, taking account of the feedback received from various stakeholders during the evaluation process.

Because of the overarching role of the Intergovernmental Agreement on Biosecurity (IGAB) in strengthening collaborative approaches to addressing the spectrum of biosecurity issues in Australia, and the critical place that weeds and pest animals occupy in biosecurity considerations, the framework provided by the IGAB is used to provide this assessment.

TABLE 4 Benefits and disadvantages of moving to a single 'Invasive Species' Strategy

	Benefits of moving to a single Strategy	Disadvantages of moving to a single Strategy
National decision-making & investment	<p>'Weeds' and 'Pest animals' are part of 'biosecurity' – often same policy staff involved – efficiencies of joint decision-making</p> <p>Consistency & transparency of approaches to prioritisation across biosecurity spectrum</p> <p>Increased opportunities to access total pool of 'biosecurity' funding</p>	<p>Possible loss of specialist expertise available to science-based decision-making</p> <p>Risks to human health and production posed by disease aspects of 'biosecurity' likely to take precedence in resource-constrained operating environment</p>
National information framework	<p>Many of the underpinning Principles are common to both – strengthening shared understanding</p> <p>Enabling collaborative approach to data collection & sharing</p>	<p>Scale of the problems are so large that shared data maintenance is already an issue – combining will exacerbate this</p>
National surveillance & diagnostic system	<p>Weeds and pest animal surveillance, detection and early response processes currently under-resourced/ serviced at post-border level – potential to enhance in shared system</p>	<p>Risk of loss of profile/priority for weeds & pest animals to higher profile 'disease' issues</p>
National management for established weeds	<p>Opportunities for shared improvements in</p> <ul style="list-style-type: none"> i) prioritisation processes and landscape-scale approaches ii) Monitoring, reporting & evaluation against outcome measures 	<p>Impacts and responses unique enough to warrant separate considerations</p> <p>Higher level Strategy will further erode connection to measurable on-ground outcomes</p>
National engagement and communication	<p>Single Strategy with sound Implementation Plan provides a strong national focus and 'one stop shop'</p> <p>Weeds and pest animals don't recognise 'lines on maps'</p>	<p>Existing Strategies generally seen as sound framework. Work already done to build awareness of 'weeds' and 'pest animals' lost under 'invasive species' label</p> <p>Concerns that the 'biosecurity' label and IGAB are at such a high level that there will be further erosion of engagement</p>
National emergency preparedness & response arrangements	<p>Risk management approaches already well developed for weeds readily extendable to pest animals, enabling timely decisions & action</p>	<p>Likely downplaying of weeds and pest animal priorities in the face of health-risk related disease incursions</p>
National research, development & extension	<p>Possibilities for strengthening of collaborative R&D</p> <p>Cross-fertilisation of innovations and new technology applications</p> <p>On-ground staff often involved in both weeds and pest animal issues</p>	<p>Research scientists are generally specialists in weeds or pest animals – the two not filled by single person</p> <p>At present roles of local government and regional NRM bodies differ for weeds & pest animals in some jurisdictions</p>

Chapter 7 – Discussion and Recommended Future Directions for a national approach to weed management

The brief for this evaluation required:

- A qualitative assessment of achievements under the Australian Weeds Strategy (AWS)
- An analysis of the role of stakeholders in implementing the AWS
- Recommendations on the signing of an IGAB on the current and future AWS
- Options and recommendations for the next version of the AWS

Assessing qualitatively the achievements and failures under the AWS

The Australian Weeds Strategy agreed by the Australian Government and all state and territory governments in 2006, and adopted by the NRM Ministerial Council in 2007, is widely identified as providing an important strategic framework for weed management in Australia. Staff in government agencies at all three levels, NRM facilitators, research scientists and others, identify the AWS as important in guiding shared direction in weed management, shaping consistent policy and strategy, enhancing cooperative effort and collaborative funding application.

Agreement of the AWS and the Principles underpinning it by national, state and territory governments is important in building and maintaining collaborative effort to address Australia's weed problems.

Among the major objectives of the AWS, prioritisation of weeds and weed management problems and implementation of coordinated and cost-effective solutions for priority weeds and weed problems have some prominence. Throughout this evaluation the WoNS program has consistently rated quite highly. While there may be issues around the need for a shift in focus from single prioritised species to broader landscape-scale approaches to managing weeds as an integral part of whole landscapes, the science-based weed risk approach to WoNS identification and the role played by the WoNS Coordinators are seen to have been important in:

- raising community awareness
- providing targeted and timely management information
- facilitating collaborative effort among different stakeholders
- establishing strategic management plans and monitoring progress against them

These strongly positive perspectives on the AWS and its achievements are tempered by widely held perceptions that it has not been a driver of weed management *action*. Seen as a high level strategic document (the purpose for which it was developed), many who participated in this evaluation identify a lack of effective connection between the Strategy and on-ground weed management.

A lack of effective monitoring and evaluation against identified and agreed outcomes that contribute to the higher level Objectives of the AWS was seen as a factor limiting the relevance and connection of the AWS to on-ground outcomes. In his Implementation Report to the Australian Weeds Committee, the National Weeds Management Facilitator¹⁹ highlighted a failure to 'develop,

¹⁹ Thorp J (2012). Australian Weeds Strategy Implementation Report 2007-2012. Report to the Australian Weeds Committee.

implement and maintain regular and consistent monitoring of weed distribution, impacts and management' (AWS Strategic Action 3.4.2) for species other than the Weeds of National Significance. The extent and persistence of weed problems in itself presents challenges to sustaining effort, a situation exacerbated by the absence of suitable measures of current trends.

Other areas in which implementation of the AWS has failed to occur, as identified by the National Weeds Management Facilitator in his Implementation Report (Thorp 2012) highlight further areas for attention that are reinforced by the outcomes of the current evaluation.

Capacity at both national and state levels, to achieve 'early detection and rapid action against, new weeds' AWS Objective 1.2); failure to effectively communicate with stakeholders the importance of their engagement in addressing national weed problems (AWS Strategic Action 3.1.1) and to recognise and reward community achievements in weed management (AWS Strategic Action 3.1.3); and a failure to 'establish nationally consistent legislation to address weed problems' (AWS Strategic Action 3.4.2) are oft-identified issues in the current evaluation.

In a resource-constrained operating environment, the AWS Objective of early detection and rapid action against new weeds once in Australia is seen to be lacking significant achievement. In part this is attributed to a focus on WoNS, which have by definition already established their national invasiveness and impact. To this are added tensions between a focus on agricultural weeds and those environmental weeds that bring clear economic impacts along with the need to more holistically manage landscapes for biodiversity and ecosystem services.

While the development to 'improved management practices' (part of AWS Strategic Action 2.2.2) is seen as sound, results of this evaluation indicate that 'promoting the adoption' of those practices has been less than successful for weeds other than the WoNS. Involvement and interest in managing weeds is extremely complex and there are clearly many factors influencing the translation of sound science into on-ground action. Better coordination of information, coupled with more targeted and timely information access are essential if individuals and communities are to become more engaged. As reported by Thompson *et al.* (2012)²⁰ 'local government, Landcare groups and NGOs play[ing] a larger role in information provision' than do the Australian Government, state/territory governments and regional NRM groups.

Thorp also highlights a failure to 'strengthen collaborations between research institutions, industry and government on weed research issues' (AWS Strategic Action 3.2.5). WoNS Coordinators are widely identified to have played an important role in facilitating such collaborations. However, lack of continuity arising from short-term funding cycles when seeking to address the long-term and persistent problems of weed management, together with recent declines in funding in various jurisdictions are significant concerns. The absence of a CRC comparable to the Invasive Animals CRC and the absence of a dedicated funding program directed to weeds are seen to exacerbate these concerns.

One of the oft-identified issues underpinning many of these gaps in successful implementation of the AWS is the ongoing mismatch between long-term and persistent weed problems that require continuity of funding and short-term funding cycles. At a time when governments at all levels are experiencing significant constraints on available resources, both innovation in recruiting resources and strategic approaches to allocation of resources are necessary. It is in this context that Martin's

²⁰ Thompson L-J, Kruger H & Trestrail C (2012). Who's involved with weeds? A social network analysis of funding and information networks for weed management. Rural Industries R&D Corporation report, Canberra.

(2008) advocacy for the application of a transaction cost approach to funding of weed management becomes most relevant.

Analysing the role of stakeholders in implementing the AWS

As recognised in the AWS, there are a diverse range of stakeholders each of whom has a role to play in addressing Australia's major weed problems. These problems require ongoing collaborative effort in order to make and sustain significant gains. They are, as the AWS identifies 'an essential and integral part of the sustainable management of natural resources for the benefit of the economy, the environment, human health and amenity'. As such 'Combating weed problems is a shared responsibility that requires all parties to have a clear understanding of their roles'.

The complexities of weed management in Australia and the need for continuity of effort call for strong and effective leadership and coordination. Areas particularly identified as needing leadership and coordination at a national level included:

- encouraging and maintaining continuity of national research, development and extension (RD&E) which is strategic, takes a longer term approach, maintains and builds capacity of researchers and coordinates research activities (seen as declining since the discontinuation of the Weeds CRC, an area in which weeds are contrasted with Pest Animals, for which the Invasive Animals CRC is seen to play a key role)
 - weed prevention, early detection and capacity for early response
 - coordinated weed risk assessment (an area in which Australia has become a global leader) across jurisdictions and sectoral interests cross-jurisdictional effort in which the Australian, state and territory and even local governments learn from each other. This is especially so where species occur across state borders, are widespread, or need careful strategic determinations as to the appropriate level of management based on the weed risk management continuum (e.g. decisions as to when to move from eradication attempts to containment)
 - coordinated management of data (including mapping) and knowledge management
 - effectively communicating and raising awareness of the importance of **ongoing** weed management and prevention
 - Identifying agreed approaches and funding mechanisms for responding to new weed problems, especially those that arise from international purchasing of plant species and increased travel

A majority of participants in the current evaluation did not see such leadership and coordination as presently evident.

One of the challenges for the Australian Weeds Committee is to facilitate improvements in the understanding of roles and responsibilities in managing weeds. Most stakeholder groups are seen to encompass a wide spread of commitment in implementing sound weed management. Public land managers beyond the agriculture, environment and NRM agencies; industries other than the nursery and garden industry, grain growers and meat producers; and agribusiness advisers having greatest room for improvement. While Landcare and other community groups were frequently identified as important contributors to weed management, competing pressures on both private and public landholders were repeatedly identified as constraining improved action. Many participants in this evaluation commented that only when weeds begin to have significant impacts on production do they gain the priority needed to see individuals actively engage in weed management. This observation highlights the importance of both incentives and effective compliance measures.

Many who contributed to the evaluation commented on a need for 'harmonisation' of relevant legislation. The National Weeds Management Facilitator, in his 2012 AWS Implementation Report (Thorp 2012) indicates that this is likely to be difficult to achieve because of jurisdictional differences in governance. Highlighted in the Beale report (2008), this is a challenge that should be faced and dealt with if roles and responsibilities are to be better understood and accepted.

The current evaluation indicates that almost half of all stakeholders are not currently aware of their roles and half are not perceived to take those responsibilities seriously.

The National Weeds Management Facilitator might be seen by some as being in a position to provide much-needed leadership. While key stakeholders interviewed in this evaluation generally saw this as a role important to the coordination of weed management in Australia, changes to the Terms of Reference for this position during the life of the AWS are seen to have shifted the emphasis of the position towards assisting the Australian Weeds Committee in implementing the AWS and to providing secretariat services to the Committee.

Stakeholder accountability and uptake in the implementation of the AWS are widely variable within each sector. A number of factors again contribute to this variability. Translation of sound science into targeted information that is accessible in a timely manner is of paramount importance.

A national communication plan aimed at raising awareness and motivation among Australians to strengthen their commitment to act on weeds (AWS objective 3.1) is lacking. Such a plan could assist greatly in raising awareness of the scale and significance of weed problems to all Australians, improving shared communication across jurisdictions and linking weeds research and policy to on-ground outcomes in ways that are targeted to the needs of different end-users. Experience with the WoNS program indicates that, with the right people in position, knowledge brokers play a critical role in achieving this.

Uptake of implementation by a diversity of stakeholders might also be significantly enhanced if the AWS contained a range of mechanisms for monitoring progress towards on-ground outcomes from weed management. Evaluation participants frequently identified a need to bring the Strategy down from its current high level policy role and to link it more clearly to practical aspects of weed management. Linked to this was a need to ensure consistency of agreed indicators against which progress can be assessed and reported regularly.

Just as consistent methods of maintaining regular monitoring of weed distribution, impacts and management and tracking trends to inform future management are important (AWS Strategic Action 3.4.2), so enforcement of compliance with weed management requirements was identified by several participants as a key to greater uptake of implementation.

Stakeholder feedback on the current AWS and recommendations for the next version of the Strategy

The current AWS is widely seen as an important document that provides an aspirational framework against which governments at all levels, research scientists and others with an interest in tackling Australia's weed problems can act collaboratively.

Agreement of the Vision, Goals and Objectives and high level Strategic Actions across the Australian Government and state and territory governments provides a sound and consistent approach to policy and strategic direction. It also influences shared commitment to strategic research.

However, the AWS is not seen (and was not designed to be) a driver of weed management. In the absence of both designated funding programs directed to its implementation and a coordinating body, such as the former Weeds CRC or the Invasive Animals CRC addressing vertebrate pest issues, the AWS is seen to do little to facilitate on-ground weed management.

Those who participated in this review generally placed strong emphasis on the need for an ongoing Weeds Strategy, separate from but with linkages to both the Australian Pest Animal Strategy and the Intergovernmental Agreement on Biosecurity.

Some of the key reasons for advocating a separate national Weeds Strategy were:

- The complex, wide-ranging and persistent nature of weed problems in Australia, making weeds deserving of attention in their own right, rather than as part of an even bigger pool of knowledge and information
- The need to maintain what scientific and technical expertise there is available to address weed problems in ways that are soundly based in science. Weed and pest animal professionals, whether scientists or on-ground practitioners were generally seen as having strong expertise in one or other of these fields and each currently being seen as at risk of 'devaluation' within a more generic approach to biosecurity nationally
- Concerns that work already done to build awareness of 'weeds' and 'pest animals' would be lost in a transition to either an 'invasive species' or 'biosecurity' emphasis
- The importance of dedicated funding mechanisms to address weed problems, rather than facing the risk of weeds having to compete with more visible pest animal species or the health risks posed by disease incursions.

Strong feedback in the current reviews suggests a need for future strategies (and implementation plans), to consider the following:

- How to ensure that the IGAB approach performs well for weeds and pest animals (reducing risks and impacts)?
- In what ways can the AWS and the APAS and their respective committees drive and show leadership for relevant key outcome areas?
- Where are the requirements for weeds and pest animals the same as those required for other sectors participating in the IGAB? How can collaboration and leveraging effort for these occur effectively? How can weeds and pest animal stakeholders understand and participate in these collaborations effectively?
- Where do the unique challenges posed by weeds and by pest animals require different actions or approaches from other sectors? How can these be considered and achieved? How might these fit in with (complement or contradict) other approaches?
- What are the priorities for weeds and for pest animals and how can these be pursued effectively and consistently with the broader IGAB directions?
- How can a strategy or plan effectively link national high level goals with the actions and outcomes that need to be achieved on the ground?; and
- Where (and when?) will the importance of social research to strengthen understanding of the human dimensions of weed and pest animal management be accommodated?

The impact of the signing of an Intergovernmental Agreement on Biosecurity (IGAB) on the AWS

The IGAB is a high level document which can help to strengthen collaborative effort needed for effective weed management. Any future Weeds Strategy should build close links with the IGAB, while remaining separate from it.

Many among stakeholders involved in this evaluation lacked knowledge and understanding of the IGAB.

Given the potential for this Agreement to play an important role in building collaboration by all jurisdictions in strengthening numerous aspects of biosecurity in Australia, both pre-border and at border, but also within our borders, it is important that stakeholders become familiar with the IGAB. The Australian Weeds Committee has an important role to play in this regard, as do the agencies that represent their jurisdictions in the IGAB process.

The cascade of collaborative activities agreed as part of the IGAB and the relevance of the areas of focus of the Schedules to it, to weed management, make it important that a new AWS is developed in an iterative process that builds strong links between the two documents.

Options and recommendations for the next version of the AWS

As outlined earlier in this chapter, based on stakeholder feedback throughout this evaluation, it is recommended that the Australian Weeds Strategy be retained as a separate strategy providing consistent guidance to all parties involved, or needing to become involved, in weed management in Australia.

The Vision, underpinning Principles and overarching Goals within the Strategy should be retained and reaffirmed by all levels of government (including local government).

Roles and responsibilities should be more clearly articulated within the Strategy, consistent with a need identified both within this evaluation and in the Beale Report (Beale *et al.* 2008).

It is at the point where the Strategy moves to implementation that a new Strategy needs further collaborative work. Strategic Actions that have closer and more tangible links to measuring progress towards on-ground outcomes in weed management are needed to enhance ownership and commitment to the Strategy.

The structure and cascade of activities agreed within the Intergovernmental Agreement on Biosecurity, while at an even higher level than the Australian Weeds Strategy, provide some guidance on how this might best be approached.

Members of the Australian Weeds Committee and the sister Vertebrate Pest Committee could reasonably progress along a similar pathway, injecting input to the development of the Schedules, Action Plans and Work Plans proposed as part of the IGAB process and drawing on work within the IGAB process to progress agreed Action Plans and Work Plans for the new Weeds Strategy.

Given the extent of commonality of membership of the AWC and the VPC and the similarity of broad principles underpinning both weed and pest animal management, it may be that a single Invasive Species Committee can oversee both a new Weeds Strategy and a new Pest Animal Strategy. However, any such merger should ensure that scientific and technical expertise addressing each is included in the committee's membership.

It is important to the success of the next version of the AWS that agreed mechanisms are put in place to enable consistent data collection and management, and public reporting of progress against shared targets for weed management. To the fullest extent possible, these targets should be designed to enable consistent and regular monitoring of trends in outcomes and shared learning from the information collected.

Also important to the success of future weed management is the inclusion in a new Weeds Strategy of one or more Objectives that focus on the social dimensions of weed management.

Linkage between the AWS with other national and local strategies?

As discussed in Chapter 6, the IGAB provides valuable opportunities for strengthening the collaborations needed to effectively implement an AWS. Active participation by the Australian Weeds Committee in the cascade of activities proposed for implementing the IGAB is important, as is an enhancement of collaboration through consideration of weed management needs in each of the proposed IGAB Schedules.

While a new Australian Weeds Strategy need not parallel the Australian Pest Animal Strategy as closely as has been the case in the current documents, strong synergies between the two should be retained. Maintaining this relationship would help build community understanding that both weeds and pest animals are invasive species that need to be managed as an integral part of natural resource management. This alignment would also bring clarity to and strengthen the management continuum relevant to all aspects of Australia's biosecurity and reflect them as equally relevant to these invasive species as to introduced diseases that impact on human and animal health, the environment and our economy.

Although the AWS has provided a sound platform from which state and territory weed management policy is developed, careful consideration should be given to the most effective mechanisms for ensuring that this consistency is maintained and enhanced, especially as several states are moving from separate weeds and pest animal policies and programs to more generic biosecurity approaches. Two of the strong messages from stakeholders in this review were the need to maintain separate weeds and pest animals strategies, and to ensure that in moving to a stronger biosecurity emphasis, hard-won community engagement with weeds and pest animal problems are not lost.

Linkages to the Australian Biodiversity Conservation Strategy currently exist and the Threat Abatement Plans to protect threatened species often address weed problems. However, there is need to strengthen program links between a new Weeds Strategy and the Australian Biodiversity Conservation Strategy. This will become important in addressing a shift already recognised in New Zealand (Enfocus Ltd 2008²¹), namely that 'The traditional driver of protecting primary production is giving way to a principal concern for the impacts of pests on environmental quality (particularly *indigenous biodiversity*). This in turn is changing the business of pest management from a focus on single species management to *multi-pest*, site-led management requiring a different set of management and operational skills'.

Chapter key messages and observations

The Australian Weeds Strategy agreed by the Australian Government and all state and territory governments in 2006, and adopted by the NRM Ministerial Council in 2007, is widely identified as providing an important strategic framework for weed management in Australia.

Since the AWS was developed, new challenges have arisen in relation to prioritisation of collaborative strategies to address Australia's very considerable weed problems.

Capacity at both national and state levels, to achieve early detection and rapid action against new weeds should be enhanced.

Failure to effectively communicate with stakeholders the importance of their engagement in addressing national weed management is reflected in deficiencies in understanding of roles and acceptance of responsibilities for weed management across different sectors, and in lack of recognition of the place of weeds in the biosecurity continuum.

Despite the challenges posed in achieving consistency of legislation to address weed problems across jurisdictions, such consistency is necessary to achieve greater engagement by all sectors.

Given strong alignment between the objectives and areas of focus of the IGAB and the AWS, the IGAB provide significant opportunities to strengthen much-needed collaboration and ownership of weed problems.

²¹ Enfocus Ltd (2008). The Future of Pest Management in New Zealand: A Think Piece. Report prepared for Local Government New Zealand.

Recommendations

In summary, the major recommendations arising from this evaluation are as follows.

Recommendation 1: That a national weeds strategy be retained as a separate strategy, rather than combining it with a national pest animal strategy to become an invasive species strategy.

Recommendation 2: That a new national Weeds Strategy provide a 'roadmap' to assist stakeholders in implementation planning, monitoring and adaptive management aspects of the weeds strategy to ensure that the high level principles underpinning weed management in the current Strategy have clear relevance to on-ground managers as a step towards greater collaborative action.

Recommendation 3: That the Australian Weeds Committee (or an Australian Invasive Species Committee overseeing both a national weeds strategy and a national pest animal strategy) work with the National Biosecurity Committee to ensure that the cascade of planned activities from development of the Schedules to the Intergovernmental Agreement on Biosecurity, through Action Plans and Work Plans are used to strengthen nationally integrated management of weeds.

Recommendation 4: That the Australian Weeds Committee (or an Australian Invasive Species Committee overseeing both a national weeds strategy and a national pest animal strategy) work with all jurisdictions to enhance partnerships, shared understanding based on sound science, and engagement of all stakeholder groups in the management of weeds in the landscape.

Recommendation 5: That the Australian Weeds Committee (or an Australian Invasive Species Committee overseeing both a national weeds strategy and a national pest animal strategy) monitor not only progress against its own agreed outcomes, but also the extent to which a new Weeds Strategy is reflected in regional NRM strategies as they are developed.

Recommendation 6: That in developing a new and updated national Weeds Strategy, particular attention should be paid to addressing gaps identified in implementing the current Strategy.

Recommendation 7: That, in developing a new national Weeds Strategy, the Australian Weeds Committee (or an Australian Invasive Species Committee overseeing both a national weeds strategy and a national pest animal strategy):

- a) prepare a consultation draft using the existing Australian Weeds Strategy Vision, Principles and overarching Goals, and taking account of Recommendations 1 to 5 (above), and
- b) take this draft out to stakeholder consultation to help build ownership and connection between the high level national aspects of weed management and the 'roadmap' that links those to on-ground activities and the cascade of activities planned in moving from the IGAB through Strategies to Action Plans and Work Plans.

Recommendation 8: Recognising that a national Weeds Strategy addresses one of several important aspects of national biosecurity, the Australian Weeds Committee (or an Australian Invasive Species Committee overseeing both a national weeds strategy and a national pest animal strategy) build stakeholder and wider community understanding of links to the national Pest Animals Strategy, the National Plant Biosecurity Strategy, the National System for Prevention and Management of Marine Pests, the National Biosecurity Response Agreement, and the National Strategy for the Conservation of Australia's Biological Diversity and to major funding programs relevant to weed management.

Each of these recommendations is addressed briefly below.

Recommendation 1: That a national weeds strategy be retained as a separate strategy, rather than combining it with a national pest animal strategy to become an invasive species strategy.

Based on stakeholder feedback throughout this evaluation, it is recommended that the Australian Weeds Strategy be retained as a separate strategy providing consistent guidance to all parties involved, or needing to become involved, in weed management in Australia.

The Vision, underpinning Principles and overarching Goals within the Strategy should be retained and reaffirmed by all levels of government (including local government).

Widespread concerns are expressed among stakeholders that weed problems in Australia are so complex, persistent and wide-ranging that they are deserving of attention in their own right, rather than being part of a bigger pool of knowledge and information relating to invasive species or biosecurity. Considerable effort and investment has already been made in building awareness of 'weeds' and 'pest animals' and there are stakeholder concerns that much of this would be lost in a shift of emphasis to either 'invasive species' or 'biosecurity'. Weed and pest animal professionals, whether scientists or on-ground practitioners are generally seen to have strong expertise in one or other of these areas – expertise that may be 'devalued' in a more generic approach.

Furthermore, in a resource-constrained operating environment, concerns exist that the urgency associated with biosecurity issues posing a risk to health will outweigh the funding of weed prevention and management, and that even the more visible problems associated with pest animals will leave more under-resourced the challenging but less immediately visible problems presented by weeds.

A separate weeds strategy is therefore recommended as part of sustaining and building stakeholder engagement.

Recommendation 2: That a new national Weeds Strategy provide a 'roadmap' to assist stakeholders in implementation planning, monitoring and adaptive management aspects of the weeds strategy to ensure that the high level principles underpinning weed management in the current Strategy have clear relevance to on-ground managers as a step towards greater collaborative action.

While the Australian Weeds Strategy is widely viewed by stakeholders as providing a useful overarching framework for weed management nationally, many among the participants in this evaluation identified a need to strengthen links between the Strategy, policy and programs that facilitate on-ground action. The Strategy should be designed as a catalyst to on-ground actions that contribute to higher level outcomes. To the extent possible, the Objectives, Strategic Actions and Outcomes associated with each Goal should be made more tangible to those responsible for on-ground actions in managing weeds.

Making clearer to end-users how implementation of the Strategy can contribute to on-ground outcomes will be important in managing expectations. It would be valuable to include in the Strategy principles that aid in understanding the ways in which monitoring can be of value beyond reporting and accountability. Guidance on the use of monitoring as a tool to assist on-ground managers in determining whether their work is making progress against agreed weed management objectives and where changes can play an important role in enhancing its relevance to those who need to be engaged in weed management.

Recommendation 3: That the Australian Weeds Committee (or an Australian Invasive Species Committee overseeing both a national weeds strategy and a national pest animal strategy) work with the National Biosecurity Committee to ensure that the cascade of planned activities from development of the Schedules to the Intergovernmental Agreement on Biosecurity, through Action Plans and Work Plans are used to strengthen nationally integrated management of weeds.

At present, many involved in weed management in Australia are not familiar with the IGAB and do not recognise the potential it has to address weaknesses identified in managing weeds. Development of national decision-making and investment strategies, providing a collaborative national approach to data collection and sharing, enhanced national surveillance, detection and early response to weed problems, national prioritisation of management actions to address established weeds, strengthening of national collaborations in R, D & E and perhaps most importantly, given current lack of knowledge and understanding of the full spectrum of biosecurity initiatives, national communication and engagement efforts are important to improved weed management.

By structuring action-oriented aspects of a new Weeds Strategy around these initiatives, the Australian Weeds Committee will provide guidance and leadership that encourages other stakeholders at state, regional and local levels to also adopt that approach. This will help to strengthen the links between biosecurity and weed management and weeds will remain one of several focus aspects of the IGAB's implementation.

Monitoring against agreed outcomes, coordination of data collection and management and public reporting of progress against agreed outcomes were identified as important aspects of strengthening the Strategy.

The need for sound leadership and coordination are repeatedly identified as a priority for effective weed management across Australia. While institutional arrangements can go some way to facilitating such leadership and coordination, human relations are also important.

Recommendation 4: That the Australian Weeds Committee (or an Australian Invasive Species Committee overseeing both a national weeds strategy and a national pest animal strategy) work with all jurisdictions to enhance partnerships, shared understanding based on sound science, and engagement of all stakeholder groups in the management of weeds in the landscape.

Although the WoNS approach received some criticism because of the implications of working with a relatively small number of individual species, the role of WoNS Coordinators was highly valued. This is, in significant part, because of the role they have played in bringing together good science and available information, policy and programs in different jurisdictions, and the provision of information in ways that enable on-ground managers to act effectively in managing weeds. The work of the WoNS Coordinators contrasts, to some extent, with the perceived role of the National Weeds Management Facilitator, whose brief was not well understood by stakeholders and was seen to be directed more to servicing government program needs.

Recommendation 5: That the Australian Weeds Committee (or an Australian Invasive Species Committee overseeing both a national weeds strategy and a national pest animal strategy) monitor not only progress against its own agreed outcomes, but also the extent to which a new Weeds Strategy is reflected in regional NRM strategies as they are developed.

The national body overseeing the Strategy has only limited capacity to monitor the effectiveness of the Strategy in influencing on-ground management of weed problems in Australia. Given an ongoing need to actively engage stakeholders from all relevant sectors in managing weeds, and the identified need to build closer links between the Strategy and on-ground actions, the extent to which the national Strategy is providing guidance and direction to regional efforts is an important consideration. As new and updated regional NRM strategies are developed, each could be encouraged to incorporate aspects of the national Strategy. There is a role for the Australian Weeds Committee in monitoring this uptake and in providing guidance to regional NRM bodies.

Recommendation 6: That in developing a new and updated national Weeds Strategy, particular attention should be paid to addressing gaps identified in implementing the current Strategy.

Few, if any, major gaps in the content of the current Australian Weeds Strategy were identified during this review. However, there are a number of significant gaps in implementation, several of which have also been recognised recently both by the National Weeds Management Facilitator in his final report (Thorp 2012)²² and by Cattanach et al. (2013)²³ in their very recently published report mapping weed management systems in Australia.

For example, while Australia is recognised as a leader in weed risk assessment, both capacity and commitment to following that through with surveillance, detection and early action directed to

²² Thorp J (2012). Australian Weeds Strategy Implementation Report 2007-2012. Report to the Australian Weeds Committee.

²³ Cattanach G, Harris A & Horne J (March 2013). Mapping Australia's Weed Management System. RIRDC Publication No. 13/019, Rural Industries R&D Corporation.

eradication of weeds are areas in which the existing Strategy has largely failed to deliver. Ensuring that local landholders and managers can readily access plant identification expertise and incentives to stimulate local surveillance will likely play an important role.

An ongoing tension between prioritisation of established species that are highly invasive and likely to have major impacts (the WoNS species) and a focus on early action at a time when eradication may be more feasible, needs to be addressed. Collaborative efforts to prioritise aspects these two aspects of weed management will benefit from input from all key stakeholder sectors.

A further example exists in a need to improve consistency of legislative, regulatory and policy mechanisms governing weed management. A broad mix of international, national, state/territory, regional and local legislative and policy instruments have some relevance to weed management in Australia.

In an operating environment where stakeholders rate highly the importance of 'legislation and government policy enabling clear actions in managing weeds', many of those stakeholders in this evaluation called for 'harmonisation' of legislation. Ideally, this requires states, territories and the Australian Government, each with their own legislative and policy priorities and political constraints, to come together in a smoothly integrated operating environment that maximises national benefits. This is a challenging task, as recognised in the National Plant Biosecurity Strategy (Plant Health Australia 2010)²⁴, which aims to "adopt nationally consistent plant biosecurity legislation, regulations and approaches *where possible within each state and territory's overarching legislative framework*" [Emphasis added to highlight the challenge].

However, there are areas emerging from this evaluation that are worthy of attention by the Australian Weeds Committee. These include consideration of opportunities for consistency of:

- i) definitions and language that make clearer to end-users what is intended
- ii) management of cross-border movement of weeds between adjoining states
- iii) compliance and enforcement measures across different jurisdictions
- iv) approaches to listing of Noxious plant species, at least at the state level, given some current confusion appears to arise from some jurisdictions adopting a 'prohibited species' approach while others adopt a 'permitted species' approach

Given a range of legislative changes seem likely to result from the IGAB, readily accessible information to help the different end-users understand the legislation in place in each jurisdiction in relation to weed management may also assist.

Although the current Australian Weeds Strategy identifies key stakeholders in weed management and briefly summarises the role of each, considerable confusion still exists across all sectors. In a federated system such as ours, clarity of sometimes overlapping responsibilities is difficult to obtain. However, as highlighted by Beale in his report (Beale et al., 2008)²⁵, greater clarity of roles and responsibilities is necessary to improved weed management.

The Australian Weeds Committee can make a significant impact by seeking the cooperation of each state in making readily accessible, information about weed management responsibilities within its

²⁴ Plant Health Australia (December 2010). National Plant Biosecurity Strategy. Plant Health Australia, Deakin ACT, Australia.

²⁵ Beale R, Fairbrother J, Inglis A & Trebeck D (2008). One Biosecurity: A Working Partnership. Independent Review of Australia's Quarantine and Biosecurity Arrangements. Report to the Australian Government.

jurisdiction. Recent work by Cattanach et al. (2013) provides a useful starting point for this initiative.

The scale and persistence of weed problems in Australia is such that no single sector, including government, can be expected to fully resource effective management activities. Prioritisation of resource allocations and improved coordination have an important role to play in maintaining longer-term funding needed both for weeds research, development and community engagement (rather than post-hoc extension) and for ongoing weed management. In considering resource allocations to weed research and management it is important to recognising that short-term funding cycles and discontinuity of funding lead to a loss of impact of investment in weed management, given the long-term nature of the problems.

In addition to existing government resources, new and innovative funding mechanisms will be needed. Beneficiary pays approaches and accountability mechanisms for those who increase weed risk, taxation incentives for investment in weed management directed to sustainability outcomes and other new approaches are needed. Existing research in this area (for example, Martin et al. 2012)²⁶ warrants examination in progressing this aspect of weed management.

Not only are existing and new funding mechanisms needed, but it is important that the funding available is used in the most organised, strategic and coordinated ways possible. The Australian Weeds Committee has an important role to play in optimising these efforts and in enabling social research that will enhance the role of people in managing weeds effectively.

Recommendation 7: That, in developing a new national Weeds Strategy, the Australian Weeds Committee (or an Australian Invasive Species Committee overseeing both a national weeds strategy and a national pest animal strategy):

- a) prepare a consultation draft using the existing Australian Weeds Strategy Vision, Principles and overarching Goals, and taking account of Recommendations 1 to 5 (above), and**
- b) take this draft out to stakeholder consultation to help build ownership and connection between the high level national aspects of weed management and the ‘roadmap’ that links those to on-ground activities and the cascade of activities planned in moving from the IGAB through Strategies to Action Plans and Work Plans.**

Successful management of Australia’s weed problems requires engagement and co-operative effort from a broad range of people.

While the Australian Weeds Strategy is seen as providing an important framework for weed management, familiarity with it varies widely, even among key stakeholders involved in this evaluation. Gaining input from the diversity of people who might be its end-users, through

²⁶ Martin P, Verbeek M, Riley S, Bartel R & Le Gal E (2012). Innovations in institutions to improve weed funding, strategy and outcomes. Report No. 12/091, Report prepared for Rural Industries R&D Corporation, Canberra.

interactive opportunities to contribute can play a valuable part in building better understanding of the Strategy, its role in weeds management nationally, and the links between a new Strategy and on-ground actions needed for its implementation.

Recommendation 8: Recognising that a national Weeds Strategy addresses one of several important aspects of national biosecurity, the Australian Weeds Committee (or an Australian Invasive Species Committee overseeing both a national weeds strategy and a national pest animal strategy) build stakeholder and wider community understanding of links to the national Pest Animals Strategy, the National Plant Biosecurity Strategy, the National System for Prevention and Management of Marine Pests, the National Biosecurity Response Agreement, and the National Strategy for the Conservation of Australia's Biological Diversity and to major funding programs relevant to weed management.

Weeds are one important component of a broader suite of risks to the economy, the environment and the community which must be managed as part of protecting Australia's biosecurity. As the Intergovernmental Agreement on Biosecurity enhances collaborative approaches to addressing the broad range of threats posed by the entry, emergence, establishment and spread of these risks, it is important that opportunities for mutual gain are achieved. While much of the scientific and technical expertise relevant to weed management is specialist knowledge that must be retained, strategies for prevention of new weed problems, prevention of weed spread and minimising the spread of weeds all have elements common to other biosecurity problems. Increasing community awareness of the links between weed, pest animal, marine pest and other threats will play an important role in gaining collaborative management effort across whole landscapes.

Chapter 8 – Synthesis of findings from AWS and APAS evaluations

Common findings for APAS and AWS

- Both the APAS and the AWS were viewed to be useful high level reference points, particularly for governments, but also in guiding R&D investment and encouraging cross-sectoral collaboration.
- The strategies were aspirational and lacked necessary practical links to outcomes. This partly reflected in a lack of performance indicators and public priorities for the strategies objectives and actions and also in reflecting on implementation.
- Resourcing is a major challenge for both pest animal management and weeds – not just availability of resources, but also continuity, given the long-term nature of the problems.
- Many stakeholders comment on the lack of dedicated resources for pest animals or weeds, referring to a government program specifically for pest animals and weeds. In a resource-constrained operating environment, the ‘funder fatigue’ associated with long-term weeds and pest animals problems is seen to be at a disadvantage when compared with other programs in which shorter-term, more persistent gains can be made.
- Knowledge and information are essential for effective future pest animal and weed management. R&D is required and without it the future capacity of reducing risks and impacts would be challenged.
- Stakeholder awareness of weeds and pest animals at ground level is not strong. While Australia is seen as well placed with sound, science-based information, there is a disconnect between this information and its timely provision in formats targeted to specific end-user needs.
- The capacity of education and training sectors was reported to be declining and concerns exist that further decline will impact on ability to manage both pest animals and weeds. Noting many practices (e.g. use of chemicals, guns for control) require minimum education and training qualifications – if land owners and managers cannot access training then this could pose a problem.
- There is a role for coordination at many levels:
 - National – between governments, and high level industries. This national coordination role is about getting the foundations right and enabling the supporting information to be available. Harmonising of legislation presents a challenge but one that needs to be addressed.
 - Coordination is required to find the balance in effort between early detection and action and a focus on managing and containing long-established pests or weeds which have been shown to have significant impacts.
 - Regional/local – there needs to be coordinated action for some species/integrated with other aspects of the ecosystem.

APAS

- The increasing scrutiny by the broader community regarding how animals are managed and treated will require active monitoring, updating of practices and demonstration to the public of humane practices being used into the future. Based on the trend within Australia and internationally, this area will continue to emerge and will need proactive approaches to ensure

that risks posed from limiting control options for some pest animals do not result in increasing impacts of pest animals on the economy, environment and other social values.

- Effective 'signals', either incentives or enforcement, are lacking that will result in wide-scale adoption of appropriate pest animal management.
- Options available to manage pest animals were reported to have been improved over the last five-years, in a large part due to the Invasive Animals CRC.
- Lack of national prioritisation for pest animals emerged as an issue. Some stakeholders report this as a weakness for pest animals as compared with weeds i.e. WoNS enable resources to be attracted and because there are no agreed pest animal priorities some reported that this limited access to resources.
- Current system higher risks were reported for ornamental fish, some aviary species and for reptiles. (These were a combination of ineffective quarantine process and risk assessment/protocols could be improved)
- Monitoring and surveillance to detect pest animal risks could be improved. Surveillance was reported to be highly challenging for pest animals (they move and hide).
- There is significant confusion around roles and responsibilities – there are mixed views on whether stakeholders understand their roles and responsibilities.
- The Invasive Animals CRC was regularly cited as playing a highly valued role for pest animal management.

AWS

- The scale, persistence, diversity and number of species to be addressed.
- Declining investment in biological control – a long-term investment but with high returns on investment when successful, part of an overall decline in longer-term funding that provides necessary continuity to R&D projects.
- Australia is a leader in weed risk assessment processes and strength in this area should be maintained and expanded to sectors not yet engaged.
- The identified gaps in R&D are in biocontrol, lack of a coordination point and absence of significant social research.
- WoNS Coordinators – highly viewed and valued, providing focused coordination/ information transfer role across all key stakeholder sectors involved in weed management.
- WoNS – good at attracting revenue but many question the approach for the future (need to think about how to improve prioritisation approach).
- Coordinator – more valued than for APAS, but the National Weeds Management Facilitator has been in the role for much longer than for APAS.