

# **Australian Weeds Strategy Implementation Report**

**2007 - 2012**

**November 2012**

**Australian Weeds Committee**

# National Weed Management Facilitator

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## DOCUMENT CONTROL

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### Client

This document has been prepared for the Department of Agriculture, Fisheries and Forestry and the Australian Weeds Committee (AWC).

### Document Purpose

This document reports on the implementation of the Australian Weeds Strategy from 2007 - 12.

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### Information Sourcing

This document has been compiled from original research by visiting all states and territories, trawling the internet, data basing data collected in Excel, consolidating into Australian Weeds Strategy (AWS) actions and summarising into this report

## Contents

Executive Summary .....	1
Performance Against AWS Strategic Actions .....	3
Introduction .....	8
Methodology .....	9
Achievements Against the AWS.....	10
Goal 1 . Prevent New Weed Problems .....	10
1.1 Prevent the introduction into Australia of new plant species with weed potential ....	10
1.2 Ensure early detection of, and rapid action against, new weeds .....	13
1.3 Reduce the spread of weeds to new areas within Australia.....	16
1.4 Implement weed risk management practices to respond to climate change .....	18
Goal 2 . Reduce the impact of existing priority weed problems.....	20
2.1 Identify and prioritise weeds and weed management problems and determine their causes .....	20
2.2 Implement coordinated and cost effective solutions for priority weeds and weed problems.....	21
2.3 Develop approaches to managing weeds based on the protection of values and assets .....	23
NRM regional activities and investment .....	30
Goal 3 . Enhance Australia's capacity and commitment to solve weed problems.....	35
3.1 Raise awareness and motivation among Australians to strengthen their commitment to act on weeds.....	35
3.2 Build Australia's capacity to address weed problems and improve weed management.....	38
3.4 Monitor and evaluate the progress of Australia's weed management efforts.....	46
Gaps in implementing the AWS .....	48
1.2.1 Establish a nationally coordinated weed alert and early warning system that includes effective surveillance mechanisms.....	48
1.2.4 Establish core capacities at the state and national levels for responding to significant weed incursions. ....	48
1.2.5 Enhance the ability of Australian herbaria to rapidly and accurately identify new introduced species.....	48
1.2.6 Identify, detect and manage sleeper weeds. ....	49
1.4.2 Monitor and respond to other biological, environmental, social and land-use changes that may contribute to weed spread.....	49
2.1.3 Develop effective processes to resolve conflicts between economic and environmental interests.....	49
2.3.1 Identify the threats posed by weeds to key cultural, environmental and production assets and values .....	49
2.3.4 Develop and promote best management practices that address weed threats and causes at the landscape level, and remediate the land. ....	49
3.1.1 Develop and implement a national plan for communicating with stakeholders and engaging them in weed management .....	50

3.1.2 Develop and implement nationally consistent and targeted weed awareness activities.....	50
3.1.3 Recognise and award community achievements in weed management.....	50
3.1.5 Develop and promote improved weed spread prevention practices among industries, public agencies and communities .....	50
3.2.5 Strengthen collaboration between research institutions, industry and government on weed research issues. ....	50
3.2.7 Identify and reduce barriers to adoption of best practice weed management .....	51
3.3.3 Establish nationally consistent legislation to address weed problems.....	51
3.3.4 Develop and implement a uniform national weed categorisation system.....	51
3.3.5 Clearly define and communicate the weed management roles and responsibilities for all managers of public and private land.....	51
3.4.2 Develop, implement and maintain regular and consistent monitoring of weed distribution, impacts and management.....	51
Impediments to implementing the AWS (from jurisdiction perspective) .....	53
Overall Conclusion.....	55
References .....	57
Abbreviations.....	58

## Executive Summary

In December 2006, the Natural Resource Management Ministerial Council (NRMMC) endorsed the Australian Weeds Strategy (AWS).

The original National Weeds Strategy (NWS) was the forerunner of the AWS and significant achievements were made over its nine year life, which formed the basis of this Strategy. This was a period when Australian weed management was significantly reformed.

The AWS provides a national framework to guide and shape the weed management effort of all jurisdictions in Australia. It is comprised of 3 goals supported by 45 strategic actions which cover most aspects of the nation's weed management effort.

Some strategic actions represent new initiatives, but most support continuous improvement of existing core business activities, which ultimately result in more efficient on-ground weed control.

In common with most aspects of natural resource management, it was not possible to find on-ground objective outcome based measures for reduced weed impacts on a national scale. However, due to collaborative efforts weeds are prevented from expanding their range and many actions are described which probably contribute to this result. For example, the establishment of 75 wash-down facilities across Queensland will have reduced weed seed movement, it is difficult to determine how effective this has been in preventing further weed spread establishment. A more direct link exists between the detection and destruction of outlier weed populations through the Weeds of National Significance (WoNS) initiative which disrupts the expansion of these species.

This report attempts to summarise the achievements of the Strategy and is underpinned by a jurisdictional activity database cataloguing specific actions, which should be consulted if more detail is required.

In an attempt to simplify reporting a traffic light approach has been used to assess the extent to which the strategic actions have been implemented and whether the action is likely to be achieved in the future.

Of the 45 strategic actions, 27 have progressed adequately, 15 have fallen short of expectations, but should be achieved in the near future (18 months) and the implementation of 3 has not occurred or the situation has changed making them unachievable.

The extent to which jurisdictions contribute to the Strategy is extensive and reflects the effort required to reduce the impacts of species, recognising that managing invasive species extremely challenging.

Some initiatives of particular note are the strengthening of the international barrier, development of a uniform weed categorisation system, establishment of biodiversity priorities for widespread weeds, progression of the WoNS to include 12 additional weeds and continuation of research and development priorities with supporting funding.

It was not possible to quantify the extent to which the Strategy has influenced the work of states and territories, however, most jurisdictions have used the Strategies to develop their own strategies and plans. The Australian Government has used the Strategy to establish grant priorities and fund initiatives designed to leverage matching funding in order to progress the Strategy.

Overall, the Strategy appears to have been a positive influence on weed management in Australia, creating a focus on strategic management and shaping the general direction of on-ground work to give greater recognition to preventing new weed problems and managing weed impacts on biodiversity.

## Performance Against AWS Strategic Actions

This table has been constructed to provide a quick understanding of the status of each strategic action, which is indicated by traffic light colours as follows:

Green . implementation progressing adequately and meeting 60% of expected outcomes

Yellow . implementation has substantially fallen short of expected outcomes at this time, but it is reasonable to expect that the goal will be achieved in the near future, 33%.

Red - implementation has not occurred or the situation has changed making achievement uncertain or institutional arrangements make it unlikely that the action will be completed, 7%.

The allocation of status is subjective, but based on rational deduction, having observed many situations and identifying significant limitations. It is possible that some institutional impediments exist that are beyond the power of the AWC or other organisation to change, due to their status or the perceived importance of the issue. Red does not mean failure but requires a realistic appraisal of feasibility.

OBJECTIVE	STRATEGIC ACTION	COMMENT	STATUS
1.1 Prevent the introduction into Australia of new plant species with weed potential	1.1.1 Identify pathways for weed invasion and assess the risk of introduction of new weeds	Pathways identified and addressed, but a complex task and not all pathways identified	GREEN
	1.1.2 Maintain, review and update import and release protocols to maximise protection against weed threats	Regularly updated by Biosecurity Australia	GREEN
	1.1.3 Continue to strengthen border and pre-border controls in response to the pathways analysis and risk assessment	Procedures in operation and improved by adoption of technology e.g. X-ray screening	GREEN
1.2 Ensure early detection of, and rapid action against new weeds	1.2.1 Establish a nationally coordinated weed alert and early warning system that includes effective surveillance mechanisms	Project to identify options due for completion 30/06/12	YELLOW
	1.2.2 Develop and implement a nationally agreed weed response plan for eradication or containment	National Environment Biosecurity Response Agreement (NEBRA) Interpretive Guide to be considered by AWC	GREEN
	1.2.3 Governments, regional bodies and industry develop contingency plans for action against new weed infestations	All jurisdictions have some plans	GREEN
	1.2.4 Establish core capacities at the state and national levels for responding to significant weed incursions	Response plan needs updating and response capacity requires review due to staff reductions.	YELLOW
	1.2.5 Enhance the ability of Australian herbaria to rapidly and accurately identify new introduced species	Systems are in place, but need to be formalised	YELLOW
	1.2.6 Identify, detect and manage sleeper weeds	Process in place to achieve management in some jurisdictions?	YELLOW

1.3 Reduce the spread of weeds to new areas within Australia.	1.3.1 Identify pathways and assess the risk for the spread of weeds within Australia.	Pathways have been identified and risk assessed	GREEN
	1.3.2 Develop and implement a national weed spread prevention plan that includes effective measures to prevent legal weed spread between jurisdictions	Plan has been developed, with implementation to be decided based on available resources	GREEN
1.4 Implement weed risk management practices to respond to climate change	1.4.1 Assess the risk of new weed problems arising from climate change and promote awareness of potential impacts	Significant research is being undertaken at national and jurisdictional levels	GREEN
	1.4.2 Monitor and respond to other biological, environmental, social and land-use changes that may contribute to weed spread	Six jurisdictions assess new development Environmental Impact Statement (EIS)	YELLOW
	1.4.3 Assess and respond to threats from new weed genotypes	Known threats have been responded to	GREEN
2.1 Identify and prioritise weeds and weed management problems and determine their causes	2.1.1 Conduct risk analyses to identify and prioritise weed species for action	All jurisdictions use weed risk assessment (WRA) to establish priorities	GREEN
	2.1.2 Conduct risk and cause analyses to identify and prioritise weed management problems for action	As for 2.1.1	GREEN
	2.1.3 Develop effective processes to resolve conflicts between economic and environmental interests	All jurisdictions have declared policies, but no national process established. Some research has been undertaken to inform policy direction.	YELLOW
2.2 Implement coordinated and cost-effective solutions for priority weeds and weed problems	2.2.1 Develop and implement national plans for managing priority weeds and weed problems	WoNS initiative has been reviewed, updated and new species announced. Plans for original WoNS have been reviewed and were successful and are now revised. New Plans are being produced for 12 new WoNS.	GREEN
	2.2.2 Develop improved management practices and promote their adoption.	Extensive research has resulted in continual improvement of management practices	GREEN
2.3 Develop approaches to managing weeds based on the protection of values and assets	2.3.1 Identify the threats posed by weeds to key cultural, environmental and production assets and values	Most jurisdictions have established broad priorities for weed management, but they are not nationally consistent and are not specific for cultural and environmental assets.	YELLOW
	2.3.2 Develop and implement site-based approaches to managing weed threats that protect key assets and values	Site based approach is used for established weed species and applied to the national estate, however the implementation at jurisdiction level is variable.	GREEN

	2.3.3 Build community capacity for implementation of site-based plans for weed management	The Australian Government has extensively supported building community capacity through various grants. The establishment of 56 NRM bodies has actively built weed management capacity. Jurisdictions and commercial organisations also fund to a lesser extent.	GREEN
	2.3.4 Develop and promote best management practices that address weed threats and causes at the landscape level, and remediate the land	WoNS species have well developed management practices backed by remediation. Jurisdictions have management plans, but many regulated species are not addressed systematically.	YELLOW
	2.3.5 Develop and implement systems to integrate weed management into production and ecosystem management	Extensive production systems have integrated systems, but herbicide resistance is increasing	GREEN
3.1 Raise awareness and motivation among Australians to strengthen their commitment to act on weeds	3.1.1 Develop and implement a national plan for communicating with stakeholders and engaging them in weed management	There is no national plan in operation. A whole-of-WoNS communication plan is under development.	RED
	3.1.2 Develop and implement nationally consistent and targeted weed awareness activities	There is a wide range of weed awareness activities undertaken, but they may not be nationally consistent	YELLOW
	3.1.3 Recognise and award community achievements in weed management	A limited number of awards are given by the Council of Australasian Weed Societies (CAWS) and associated societies being main provider. Landcare Awards and those recognised by NRM bodies are partly relevant to weeds.	RED
	3.1.4 Develop and implement targeted incentive programs	Targeted incentive programs do exist but they are sporadic. Between 2007 and 2013 there have been a range of Australian Government grants available for weed management activities.	GREEN
	3.1.5 Develop and promote improved weed spread prevention practices among industries, public agencies and communities	Weed spread prevention is being adopted, but it is technically challenging, particularly in areas of intensive development.	YELLOW
	3.2 Build Australia's capacity to address weed problems and improve weed management	3.2.1 Create opportunities for training and development in weed management skills	AHC10 Agriculture, Horticulture and Conservation and Land Management Training Package in operation and used by the VET sector
3.2.2 Support the development of networks for community-based action		The Australian Government has supported WoNS,	GREEN

		Landcare and other networks which have been backed by action in Natural Resource Management (NRM) regions. In addition, public land managers support networks for community-based weed actions on public lands, eg in National Parks	
	3.2.3 Prioritise weed research needs and identify and facilitate programs to develop new approaches	The Cooperative Research Centre for Australian Weed Management (CRAWM) and National Weeds and Productivity Research Program (NWPRP) have prioritised research and development (R & D) programs	GREEN
	3.2.4 Encourage funding of research that will provide the scientific basis to support weed management decisions	Analysis of R & D projects show that 397 projects were undertaken over the period	GREEN
	3.2.5 Strengthen collaboration between research institutions, industry and government on weed research issues	Extensive collaboration exists across the research network. The Research and Development Corporation (RDC) fund integrated programs and coordinate activities. Researchers and stakeholders reports that this has weakened since the closure of the CRAWM	YELLOW
	3.2.6 Provide ready access to high-quality weed identification and management information.	A wide range of information is available in hard copy and via the internet	GREEN
	3.2.7 Identify and reduce barriers to adoption of best practice weed management	Some work has been undertaken to identify barriers to improved weed management, but much less work has been undertaken to identify ways of improving adoption or gain compliance	YELLOW
3.3 Manage weeds within consistent policy, legislative and planning frameworks	3.3.1 Identify and address weed issues in natural resource, environmental, industry and development planning at all levels and implement action	Strategic plans supported by documentation are widely used at all levels of government. Environmental Impact Statements include weed management where appropriate.	GREEN
	3.3.2 Develop and promote consistent and complementary weed management plans and priorities	Complimentary plans are available for WoNS, incursions and other important species. Jurisdictions prioritise weed work and take a strategic approach	GREEN
	3.3.3 Establish nationally consistent legislation to address weed problems.	The AWC could reconsider the principles and encourage member states to follow them, ensuring that they are	YELLOW

		covered when redrafting legislation.	
	3.3.4 Develop and implement a uniform national weed categorisation system.	Developed, but awaiting population of category 1 (National Surveillance, where the taxon is not known to be in Australia).	YELLOW
	3.3.5 Clearly define and communicate the weed management roles and responsibilities for all managers of public and private land	Policy developed on an jurisdiction basis and several national achievements	YELLOW
	3.3.6 Lead and coordinate implementation of the Strategy	AWC has undertaken this task	GREEN
3.4 Monitor and evaluate the progress of Australia's weed management efforts	3.4.1 Monitor and evaluate management of national priority weeds, including the Weeds of National Significance (WoNS)	AWC has overseen the review of progress and added new WoNS species to the list. National management groups have evaluated national eradication cost-share programs for Siam, 4 tropical weeds and Branched broomrape.	GREEN
	3.4.2 Develop, implement and maintain regular and consistent monitoring of weed distribution, impacts and management	The only coordinated national monitoring for weed management effort available is for bitou bush. National cost-shared eradication programs. Herbaria also contribute to distribution data and new plant records reported by jurisdictions. WoNS also maintain national distribution maps.	RED
	3.4.3 Monitor and evaluate the efficiency, effectiveness and appropriateness of the Strategy	AWC is undertaking this task	GREEN

## Introduction

In 1997, the relevant Ministerial Councils endorsed the NWS. The implementation of the NWS was reviewed and reported on at 5, 7 and 9 years and deemed to have made considerable progress in weed management.

Following the final review, the AWC decided to continue the improvement of weed management across Australia by updating the national direction through the Australian Weeds Strategy. This was endorsed by the NRMMC in December 2006.

The Strategy provides a national framework to guide and complement Australian Government, state, territory and regional and local government strategies and industry initiatives that are ultimately translated into strategic on the ground actions to manage weed problems and protect assets. The Strategy complements national and state legislative controls including implementation of Australia's international obligations to protect biodiversity and plant health status.

The AWC established Implementation and Monitoring, Evaluation, Reporting and Improvement (MERI) Plans including identification of key actions and their attendant priorities.

Given the magnitude of the Australian weed management task, it has been necessary to restrict this assessment of the implementation to national initiatives, the Australian Government and State and Territory governments levels with references to NRM regions and other organisations where appropriate. It does not include all weed management in Australia, particularly that delivered by private enterprise and local government (560 bodies).

A study is being undertaken by Plant Health Australia funded by the NWPRP to develop a report on weed management in Australia has surveyed local government, industry, jurisdictions and other key stakeholders and should also inform the implementation of the AWS when available in July 2012.

## Methodology

Tracking the implementation of the AWS for Australia is a complex task which requires contributions from many people and organisations. Therefore a structured approach was used as follows:

- The National Weeds Management Facilitator (NWMF) progressively assembled national achievements over three years of his contract.
- Appointments were made with all jurisdictions for the NWMF to visit and assemble and catalogue their achievements against the Strategy.
- The approach used varied with jurisdictions according to the situation and included, face to face interviews, workshops comprised of a cross section of weed managers, individual visits to organisations.
- Excel databases of achievements were compiled for each jurisdiction.
- The NWMF trawled the web for weed related activity and updated the databases.
- Databases were sent to jurisdictions for checking, 8 responded with updates.
- The databases were extracted to a single word working document which was sorted by AWS objective and jurisdiction. This document was summarised into this final report.

All the working documents are available for use in the forthcoming Strategy review.

When considering the achievements against the strategic actions it is important to recognise that there is a high degree of overlap as one on-ground project could relate to numerous strategic actions. For example, WoNS relate to research and development, community action, asset management, communication etc. Therefore, it is reported in detail against the most significant action 2.2.1. Similarly, research and development impacts almost all strategic actions, but is dealt with in details under 3.2.2.

## Achievements Against the AWS

### Goal 1 – Prevent New Weed Problems

#### *1.1 Prevent the introduction into Australia of new plant species with weed potential*

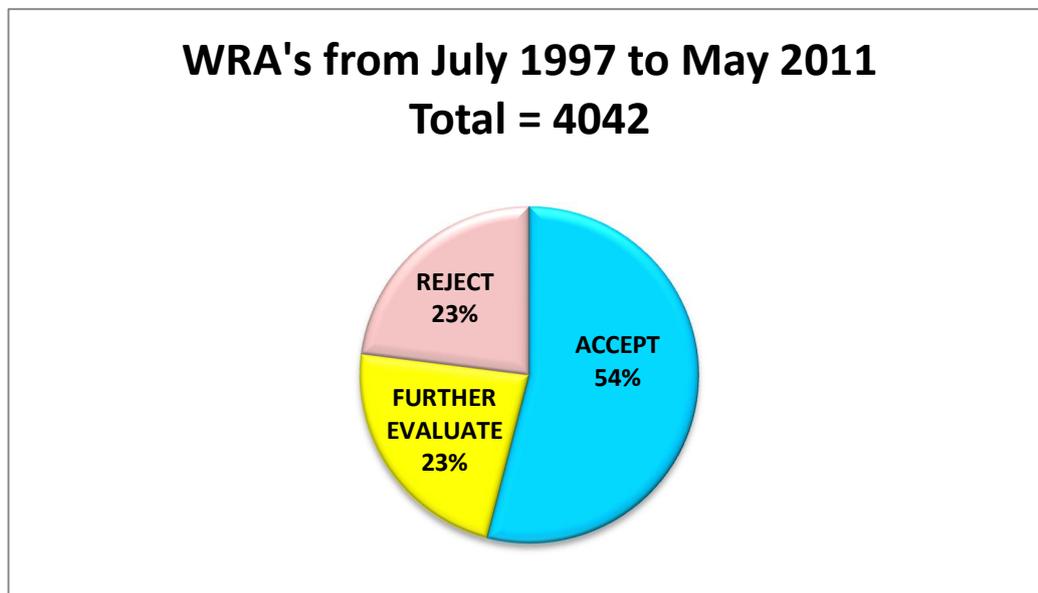
#### **Weed Risk Assessment**

The Australian Government has prime responsibility for border protection, preventing the entry of weed species into Australia. Species excluded are either already in the country and under regulatory control by states and territories or are not present in Australia.

Department of Agriculture, Fisheries and Forestry (DAFF) Biosecurity (previously known as Australian Quarantine Inspection Service . [AQIS]) implements quarantine policy and regulates all types of plant material imported into Australia. DAFF Plant Biosecurity undertake weed species risk assessments which are forwarded to DAFF Biosecurity who update the Permitted Seeds List and publish through the Import Conditions Database at [http://www.aqis.gov.au/icon32/asp/ex\\_querycontent.asp](http://www.aqis.gov.au/icon32/asp/ex_querycontent.asp).

The NWMF updates the National Noxious Weeds Lists every three months and advises DAFF Plant Biosecurity of changes which enables species under %official control+ to be prevented from entering Australia.

**Figure 1.** DAFF Plant Biosecurity update the Weed Risk Assessment (WRA) based on changes to species under regulatory control quarterly.



Results of WRA conducted since the start of the WRA system (Mitterdorfer 2011).

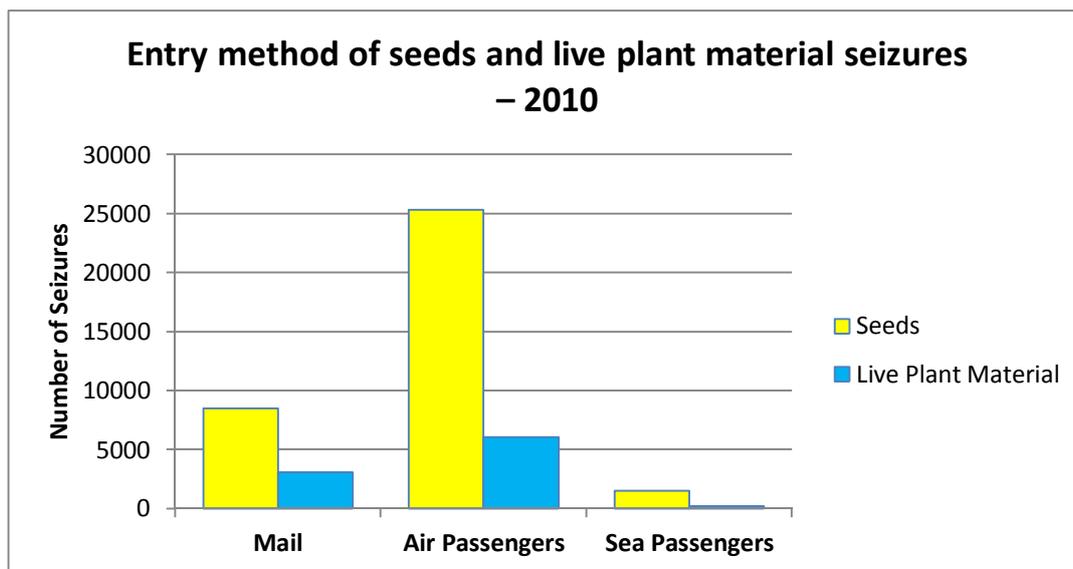
## Border Control Programs

Passengers, cargo and mail arriving at Australia's main entry points are required to meet quarantine conditions which are designed to prevent the entry of invasive species (of which weeds are one group). Mitterdorfer (2011)<sup>1</sup> provides statistics for 2010 as follows:

- Screening 140 million mail items
- Screening 13 million air passengers and crew
- Inspecting 1.7 million cargo containers
- Inspecting 14,000 international vessels each year (ABARE 2009)<sup>2</sup>

In 2010 AQIS seized 35,402 consignments of seeds and 9,415 items of live plant material. These were seized from international air and sea passengers and at mail centres around the country. The main method of entry was through international airports with 25,356 seed items and 6,037 items of live plant material. The figures below show the origins of seizures for seed items and live plant material. The proportion of these which were prevented entry on the basis of being weed species is not known because quarantine restrictions arise from multiple risks.

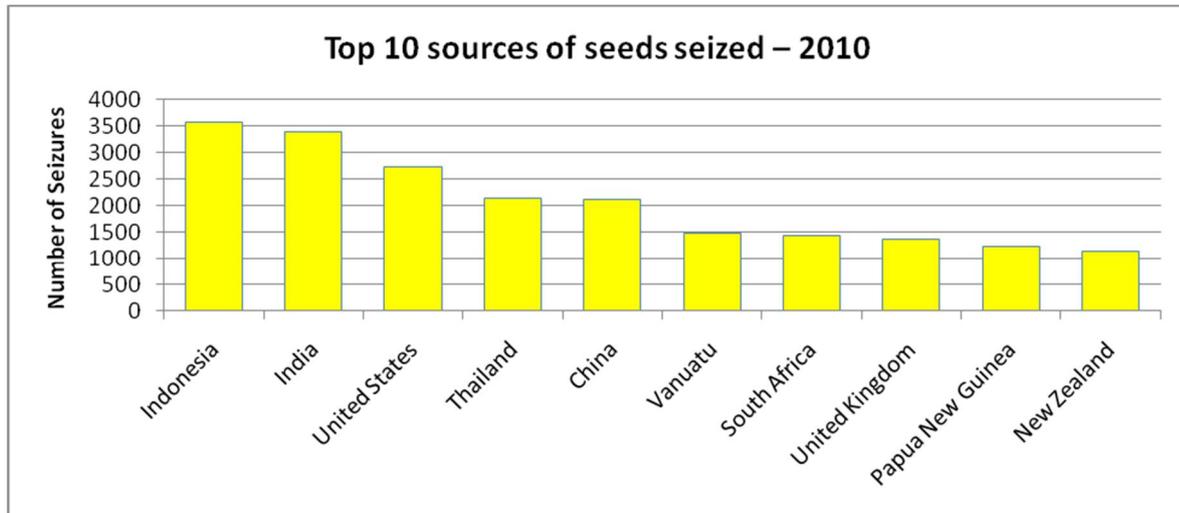
**Figure 2.** Pathways of entry for seed and live plant material seizures in 2010 (data provided by AQIS, Department of Agriculture, Fisheries and Forestry).



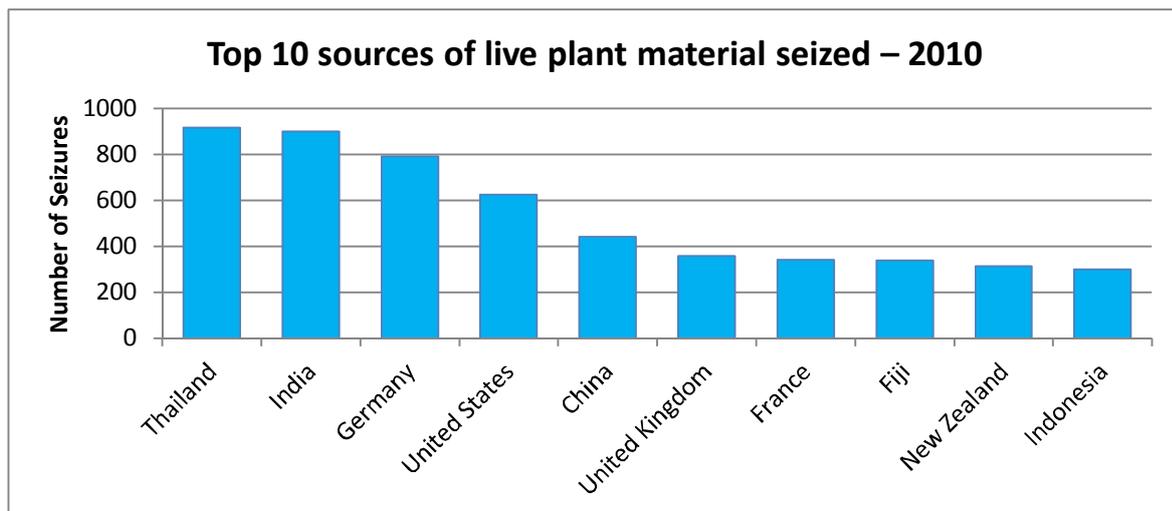
<sup>1</sup> Mitterdorfer, B (2011) National Quarantine Procedures and Risk Assessment of New Plant Introductions, 16th NSW Weeds Conference, Coffs Harbour

<sup>2</sup> ABARE 2009. *Australian commodity statistics 2009*, Canberra, Department of Agriculture, Fisheries and Forestry.

**Figure 3.** The top ten countries of origin for seized seed consignments in 2010 (data provided by AQIS, Department of Agriculture, Fisheries and Forestry).



**Figure 4.** The top ten countries of origin for seized live plant material in 2010 (data provided by AQIS, Department of Agriculture, Fisheries and Forestry).



### Northern Australia Quarantine Strategy (NAQS) DAFF

Quarantine in northern Australia is critical because of its proximity to Southeast Asia and the Pacific, which have many weeds, invertebrate pests and diseases not present in Australia (AQIS 2010). The NAQS program works to develop and implement measures for early detection of target pests in coastal northern Australia. Measures include managing quarantine aspects of border movements through the Torres Strait and undertaking pest surveillance in coastal northern Australia, Papua New Guinea, Indonesia and East Timor (AQIS, 2010). There is also a large amount of work conducted on educational and awareness programs by NAQS which encourages local communities to keep watch for any unusual pests (AQIS 2010).

NAQS botanists stationed at Cairns (2) and Darwin (1) carry prime responsibility for surveying the Tropical North and Torres Strait.

## **States and Territories**

Jurisdiction weed botanists and WRA officers undertake or contribute to WRA as required.

## **Barrier Breaches**

The AWC members report new weed records of species to their jurisdictions to each AWC meeting (6 monthly). They may be reported to the Office of the Chief Plant Protection Officer (OCPPO) when identification is confirmed and if they have potential to pose a threat to other jurisdictions. These are identified as new incursions and may become the subject of a national eradication program.

## **New Plant Incursions**

The Australian Government (DAFF) and jurisdictions co-operate in managing biosecurity issues through the Intergovernmental Agreement on Biosecurity (IGAB). When an incursion occurs, officers of all governments co-operate on a needs basis to manage the outbreak.

## **Internet Sales of Weedy Species**

The OCPPO has a standing agreement with eBay to prevent the sale within Australia of noxious weed species from their website.

## **Research**

Australian Centre of Excellence for Risk Analysis (ACERA) has been funded by DAFF to undertake a number of research projects aimed at understanding biosecurity risks (see 3.2.4) and NWPRP supports risk assessments in biosecurity. Rural Industries Research and Development Corporation (RIRDC) has recently introduced the requirement that emerging industries research projects undertake weed risk assessments on the species being tested.

### *1.2 Ensure early detection of, and rapid action against, new weeds*

## **National Categorisation System**

The AWC in co-operation with Vertebrate Pests Committee (VPC) developed the NCSIS which was endorsed by the National Biosecurity Committee (NBC) and is published at [www.weeds.org.au](http://www.weeds.org.au)

The AWS and the Australian Pest Animal Strategy (APAS) recognise that resources for invasive species management must be targeted at the highest priorities for action. This establishes a need to prioritise pest species as targets for management action.

To progress the implementation of the Strategies, this document outlines four agreed national categories for invasive species taxa, together with selection criteria used to assign candidate taxa to these categories.

Assignment to categories is an ongoing and dynamic process and will therefore require regular review. Responsibility for assigning taxa to Categories 1, 2 and 4 lies with the AWC and the VPC.

Responsibility for nominating taxa to Category 3 lies with those same Committees, with formal assignment achieved by Ministerial endorsement of the nomination.

At the time of compiling this report, the categories had not been populated with species.

### **Weed Surveillance Network**

There is no nationally coordinated Weed Surveillance Network, but 3 jurisdictions (QLD, VIC & TAS) maintain volunteer weed spotters programs supported by training, identification tools and reporting mechanisms.

It is important to recognise that new weed incursions are usually detected by NRM or agricultural department staff, primarily because these staff have access to private and restricted entry land and local botanical knowledge. Volunteer networks have contributed valuable information on range extensions and new incursions and can act as a significant weed awareness raising tool as well as a useful passive weed surveillance network.

All jurisdictions employ field officers staff who opportunistically collect specimens and report detections to their agencies.

In Queensland new naturalisations occur at the rate of 10 each year and some have the potential to become significant weeds.

DAFF is funding a Weed Spread Prevention Initiative to assess the development of a national surveillance system. DAFF has also funded the development of Weed Watcher software by WA, which is an interactive weed mapping tool.

BioSIRT is a computer based management tool for tracking management of animal and plant based incidents. Its development was funded by the AG and jurisdictions for the purpose of ensuring that incidents are managed consistently in line with IGAB, NEBRA, Plant Plan and Ausvet plan principles. This software has been designed for use in emergency incursions but may be appropriate for managing weed incursions and long term management programs.

### **Weed Identification and Liaison**

Herbaria are the lead plant identification authorities in Australia and maintain specimens and databases of native and introduced plant species. Traditionally they have focussed on native species, but in the past seven years have placed more emphasis on introduced species.

Four jurisdictions (NSW, QLD, SA & TAS) have funded weed botanists/taxonomists and embedded them in their respective herbaria with a view to encourage the collection of introduced naturalised flora, conduct field surveys, expedite identification and provide training to industry, NRM regions and community groups. Biosecurity Queensland (BQ) has established with the Queensland Herbarium a system for rapid and accurate identification of potentially invasive plants.

NSW has previously had a botanist in place paid for by noxious weeds grants. This position has since been relinquished due to a lack of funds. This position notably lead to the identification of tropical soda apple because of this capacity.

### **Weed Response Plan**

A national weed incursion response plan was written and endorsed in 2008 and published at <http://www.weeds.org.au/incursion.htm>.

This was supported by the National Weed Incursion Toolkit prepared by Australian Bureau of Agricultural and Resource Economics and Sciences (ABARES) (currently out of date due to broken links). With the continuing development of National Biosecurity these documents have become outdated and are being updated to include the requirements of IGAB and NEBRA agreements.

A draft NEBRA Interpretive Guide for use when responding to weed incursions has been prepared for jurisdictions.

### Eradication Targets

Six eradication targets existed up to 2012 with significant gains made against the four tropical weeds, but it is considered that two species (Branched broomrape and Siam weed) are not eradicable and these are being moved to a management phase. The Australian Government and jurisdictions have co-operated through cost sharing arrangements to implement eradication plans.

Eradication targets for the reporting period:

Siam Weed	<i>Chromolaena odorata</i>
Branched broomrape	<i>Orobanche ramosa</i>
Koster's curse	<i>Clidemia hirta</i>
Limnocharis	<i>Limnocharis flava</i>
Mikania	<i>Mikania micrantha</i>
Miconia	<i>Miconia calvescens, Miconia nervosa and Miconia racemosa</i>

### Sleeper Weed Policy Position

A draft policy position has been prepared on what constitutes a sleeper weed, a term that has been used in varying ways to such an extent that it frequently causes confusion. However, it is a concept that has merit in monitoring for significant range expansion of limited naturalisations.

It is proposed to publish a discussion document on the subject in *Plant Protection Quarterly* to stimulate discussion and resolve an appropriate definition for a term that is in common use.

### Weed Prioritisation (see also 2.1)

All jurisdictions undertake Weed Risk Assessment (WRA) of significant species and develop management plans based on the threat posed by these species. Most WRMs are accessible from a purpose built data base available at <http://www.weeds.org.au/riskassessment.htm>

### Jurisdiction Response Plans

The table below shows the current status of jurisdictional response plans and shows that 3 have been updated to incorporate IGAB/NEBRA requirements.

Table shows status of jurisdictions response plans

National	Australian Government	VIC	QLD	NT	SA	ACT	NSW	TAS	WA
1	2	✓	✓	✓	✓*	✓	✓*	✓	✓*

1. The development of a National Weed Incursion Management plan was funded by Defeating the Weed Menace (DWM) and developed under contract by BQ. The plan is

currently being rewritten to align with the Biosecurity Incident Management System (BIMS), recognising IGAB and NEBRA.

2. A model BIMS has been developed by the Australian Government in line with national emergency management protocols. This will be used as a basis for updating the existing Weed Incident Management Plan (WIMP).

\* Indicates jurisdictions that have updated their response plans to include IGAB/NEBRA procedures.

Jurisdictions indicated that it was not appropriate for NRM regions and local bodies to develop contingency plans as this was a state function and jurisdiction plans were appropriate for all geographic scales.

Department of Agriculture and Food Western Australia (DAFWA) has developed industry biosecurity plans which include the identification of some weed threats.

Plant Health Australia (PHA) and Animal Health Australia do not cover weed incursions, but take an active interest in any that may affect the productivity of agriculture.

### **Post Border Eradication Contingency Funding Sources**

Arrangements for cost sharing between the Australian Government and states and territories have existed for many years, and these have been strengthened and codified through the IGAB and NEBRA. The only formal funding available for managing weed incursions exists through the NEBRA.

Industry has contributed to managing branched broomrape in SA via Grains Research Development Corporation (GRDC) funded research and development projects. Despite this it is unusual for industry beneficiaries to contribute to weed eradication programs.

### **Review of Core Capacities for Responding to Weed Incursions**

A review of core baseline capabilities for responding to weed incursions (Jesser, P 2005) was undertaken for the Australian Government in 2005 and endorsed OOS by AWC11. It focused on early detection and rapid response for weed incursions. AWC agreed to develop a National Weed Incursion Response Plan which was completed in 2008.

No similar study has taken place since that time. However, in the past year significant changes to national weed technical capacity have taken place as a result of reduced funding and it would be opportune to consider updating this review.

#### *1.3 Reduce the spread of weeds to new areas within Australia*

### **Weed Spread Pathways**

The Australian Government funded a project undertaken by Sindel 2008<sup>3</sup> which explored pathway risk analysis for weed spread. The study was comprised of two stages, a literature review followed by surveying key stakeholders.

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<sup>3</sup> Sindel B, van der Meulen A (2008) Pathway risk analysis for weed spread within Australia (UNE61) Final Report to Land & Water Australia

The first stage of the project involved a review of Australian and international literature on weed spread. The review identified 24 weed sources (sites or areas of land where weeds are actively growing and from which new invasions may emerge) and 17 weed pathways (the means by which weed propagules are moved). The 17 pathways were grouped according to: deliberate spread by humans, accidental spread by humans, and natural spread. The effectiveness of management approaches to halt weed movement were evaluated.

Many individuals and organisations, including research and extension agencies, have first-hand experience in the form (levels) and function (principles) of weed spread. The second stage of this project involved collating the experience of these individuals and organisations with respect to each of the weed sources and pathways identified in the literature review. This results in a major repository of information regarding the relative risks of weed sources and spread pathways in Australia.

Australian scientific weed experts were identified and surveyed by questionnaire to provide their experience of relative risks of weed ingress, the effects of changing trade patterns and environmental conditions, and effective management techniques. Over 100 responses to the survey were received.

This study has formed the basis of informing future work on weed spread.

### **Weed Spread Prevention Action Plan**

The AWC has progressively developed a National Weed Spread Prevention Action Plan (NWSPAP) in consultation with a wide range of stakeholders and set implementation goals. All jurisdictions implement components of the plan based according to their needs. For example Queensland uses a voluntary vendor declaration scheme, Victoria conducts Weedstop courses for rural landholders and industry. Tasmania takes a weed hygiene approach providing training and advice on procedures, with emphasis on mobile machinery equipment and vehicles.

The AWC is currently reviewing the extent to which jurisdictions can implement the action plan.

### **Weed Spread Prevention Initiative**

DAFF funded a National Weed Spread Prevention Initiative, primarily through the employment of a project officer to develop a national weed surveillance framework and undertake a feasibility study into the implementation of a national weed surveillance program that builds on the existing work of jurisdictions covered under action 1.2 and is due to report in June 2012.

The National Weed Spread Prevention Initiative (NWSPI) was established by the Department of Agriculture Fisheries and Forestry to facilitate progression of the above strategic actions. A facilitator was appointed to work in collaboration with key stakeholders, over to:

- Develop materials, including key communication messages around weed spread prevention, that can be used to raise stakeholder awareness about the benefits of preventing weed spread
- Raise awareness of the benefits of reducing the spread of weeds
- Publish at least two papers about weed spread prevention in relevant journals/farm guides and presenting in, at least two agreed seminars/symposiums
- Through a workshop, engage with industry to increase the adoption of protocols to mitigate the spread of weeds, drawing on current research being undertaken in relevant Research & Development bodies.

- To assist the work of the National Biosecurity Committee, develop a National Surveillance Framework on behalf of the AWC.

### **Interstate Barriers to Spread**

Two jurisdictions (WA and TAS) operate rigorous quarantine barriers to prevent interstate spread, which is only practical because they are geographically separated from the other mainland states and territories.

Both jurisdictions use WRA to identify permitted and prohibited species. They also rigorously inspect passengers and cargo for prohibited items and weed contamination.

The remaining jurisdictions maintain legislation covering interstate sale and trade which restrict the movement of WoNS and a wide range of regulated weed species. With dedicated programmes to cover particular high risk species, such as parthenium weed management at the QLD-NSW border and inspections for new incursions of branched broomrape (VIC).

#### *1.4 Implement weed risk management practices to respond to climate change*

### **Weed Risk Assessment Including Climate Changes**

Climate change is incorporated into weed risk assessments, however the validity of this is only relevant where the time horizon exceeds 20 years, otherwise the analysis can impact on operational procedures for the short term.

Since 2007, 98 nationwide research projects have been undertaken addressing climate change, which are incorporated into the WRA approach.

#### List of Climate Change Projects

<b>Project Title</b>	<b>Start Year</b>	<b>Finish Year</b>	<b>Proponent</b>	<b>Sponsor</b>	<b>Researchers</b>	<b>AWS Strategic Action</b>
Invasive plants under climate change	2008	2013	CSIRO	CSIRO Climate Adaptation Flagship Theme 1157	Scott, John Darren Kriticos, Helen Murphy, Dan Metcalfe, Bruce Webber	1.4.1
Modelling native and exotic flora distributions under climate change	2007	2008	CSIRO	AGO, AMLRNRM SA, DWLBC	Crossman, Neville	1.4.1
Climate change impacts on agricultural weeds in Western Australia	2009	2010	CSIRO	NWPRP	Michael, Pippa (Curtin Uni), Paul Yeoh, John Scott	1.4.1
Climate change and invasions in the Cape Region of South Africa and South West Australia	2009	2010	CSIRO	DECWA	Scott, John Bruce Webber, Colin Yates (DEC), Guy Migley (SANBI), David	1.4.1

					Le Maitre (CSIR)	
Climate change impact of weeds in South Australia	2008	2010	CSIRO	DWLBC, SA	Kriticos, Darren John Scott, Neville Crossman	1.4.1
Modelling climate change on sleeper and alert weeds	2007	2009	CSIRO	DTWM R&D		1.3.1 & 1.4.1
PC as a model to measure impact of climate change on biocontrol for weeds		Current	RIRDC		Weston, P.	1.4.1
Climate change and the risks of weed invasions in the Murray Darling Basin		Current	RIRDC		Van Klinken, R.	1.4.1

### Land Use Decisions

Lead weed agencies in 6 jurisdictions (QLD, NSW, WA, SA, TAS and ACT) are required to comment on the weed impacts contained in environmental impact statements for developments within their jurisdiction. These include mining, pipeline construction, quarry and other large developments impacting on the landscape. However, there are a range of small developments which do not require EIS approval, that escape weed hygiene requirements.

The development of reserves and conservation areas are predominantly undertaken by conservation departments which all have policies and procedures in place to minimise weed spread. This is complicated by the use of other phytosanitary tools used to prevent the movement of soil borne pathogens (e.g, *Phytophthora*).

### New Weed Genotypes / Biotypes

Several new genotypes have emerged which present management challenges. Most notably the introduced aquatic grass olive hymenachne (a WoNS) has been shown to hybridise with the native species *H. acutigluma*. This potentially presented identification and control challenges, which have been resolved by broadening the definition of the WoNS to include the hybrid, *H. x calamitosa*.

Bitou bush and boneseed is hybridising in Victoria and possibly at the boundary of the two species in NSW. This has implications for biocontrol efficacy.

Bridal creeper exists in two forms, the common species and the Western Cape form. The latter is not susceptible to the biocontrol agent, bridal creeper rust.

A second variety of cat's claw creeper (hairy cat's claw) was recently identified in southeast Queensland. Taxonomic identification is important for biocontrol research and establishment. There is some speculation that hairy cat's claw creeper should be defined as a subspecies. Known distribution is limited, but it appears to have greater environmental tolerances and may have the potential for greater spread and impact than the common species.

Research has been conducted into all these issues, but further work is required for long term solutions to be found.

## Goal 2 – Reduce the impact of existing priority weed problems

### *2.1 Identify and prioritise weeds and weed management problems and determine their causes*

#### **Weed Risk Management**

A system to identify and prioritise weeds (including a risk approach) was followed to determine the 12 new WoNS, with the assessment being independently conducted by ABARES.

All jurisdictions use WRM to prioritise species for regulatory control and management purposes. The methodology broadly follows the National Post Border Weed Risk Management Protocol (Standards Australia 2006), but jurisdictions vary the methodology depending on the availability of species data and the degree of precision required.

A WRM database has been established at <http://invasivespecies.org.au> which covers the Department of Primary Industries (DPI) Victoria assessments and some related work. Other jurisdictions also publicise their WRM work which is accessible through their departments' websites.

Initially several hundred species were assessed, but having processed this significant back log of species, the number has fallen to approximately 50 species per annum assessed annually.

Dept of Sustainability, Environment, Water, Population and Communities (SEWPaC), through the key threatening process (KTP) listed in 2009 ~~£~~ Ecosystem degradation, habitat loss and species decline due to invasion of northern Australia by introduced gamba grass (*Andropogon gayanus*), para grass (*Urochloa mutica*), olive hymenachne (*Hymenachne amplexicaulis*), mission grass (*Pennisetum polystachion*) and annual mission grass (*Pennisetum pedicellatum*) as a KTP under the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act) and initiated the development of a Threat Abatement Plan (TAP).

In January 2010 SEWPaC: listed 'Loss and degradation of native plant and animal habitat by invasion of escaped garden plants, including aquatic plants' as a KTP.

#### **Non Species-Specific Prioritisation**

The previously described ~~£~~ Ecosystem degradation, habitat loss and species decline due to invasion of northern Australia by introduced grasses TAP also applies as it covers a number of introduced grasses.

Biodiversity Priorities for Widespread Weeds (BPWW) is a joint project between NSW Department of Primary Industries (DPI NSW), NSW Office of Environment and Heritage (NSW Office of Environment and Heritage [OEH], formerly Department of Environment, Climate Change and Water) and 13 Catchment Management Authorities (CMAs). The BPWW project uses an adapted TAP (site-led) approach to identify and prioritise widespread weeds impacting on biological assets and sites for weed control within each CMA region in New South Wales. This lists priority sites and a range of implementation options to help guide investment according to the priorities outlined in this Strategy, CMA Catchment Action Plans and broader NSW initiatives. This will also help address Goal 3 of the NSW Invasive Species Plan, which aims to reduce the impacts of widespread invasive species.

The priorities developed are not solely for investment by each CMA, but all stakeholders within each CMA boundary/region. While the outputs are provided at a regional level they may also

inform decisions at smaller (local) scales, for example at Local Government level, for Landcare/Coastcare/Bushcare/Dunecare groups, for Indigenous Peoples, as well as for community conservation and volunteer groups.

DAFWA's Weed Seed Wizard is a computer model to help quantify the soil seed bank. It is designed to enable farmers and agronomists to understand the dynamics of their seed bank and help them generate management strategies.

### **Conflict Resolution**

A national weed management model for resolving conflicts between economic and environmental interests has not been developed because the conflicts are predominantly location specific and are therefore resolved locally, through consultation and development of management guidelines. The example below illustrates how one of the most recent conflict management situations has been resolved:

One intractable conflict management situation which has proved difficult to resolve for many years, was the use of ponded the pasture grass hymenachne for cattle grazing. It is a weed of sugar cane and the environment as well as being a WoNS. Through negotiations with stakeholders it has been possible to create and map a number of management zones for Australia which minimises environmental impacts, but permits cattle grazing in traditional areas at the lower end of catchments, avoiding the invasion of production and conservation assets.

Similar methods have been used for gamba grass (WoNS) in the Northern Territory to contain its spread.

### *2.2 Implement coordinated and cost effective solutions for priority weeds and weed problems*

#### **Eradication Targets and Incursion Management**

This is covered under strategic action 1.2. These 6 nationally co-funded eradication programs represent the most cost effective weed management activities that can be undertaken and are supported by national management plans, advisory committees and cost sharing arrangements.

#### **Weeds of National Significance**

The predominant work undertaken within this objective relate to the WoNS. It should also be noted that the WoNS contribute to work under many other actions of AWS, but they are treated in detail here to avoid duplication.

The techniques and approaches developed to manage WoNS underpin many achievement of the Strategy, from the development of national mapping guidelines through the continuum of weed management to quantifying and evaluating the effectiveness of the initiative.

The WoNS initiative has contributed to a wider awareness of weeds as a natural resource problem, promoting a strategic approach, assembling a critical mass of resources and engaging in community action. Significant work has been undertaken by the community, NRM bodies, local government and public land managers through the leveraging of resources by

having icon species. This has been to an extent that some stakeholders have complained that this focus detracts from other weed programs. Although it does not follow that WoNS funding would have been available for other weed projects.

WoNS have made up a significant proportion of the work undertaken by the AWC, particularly with the inclusion of 12 new WoNS weeds.

In 2007, the AWC commenced reviewing the WoNS. DAFF contracted The Beaten Track Group (2008)<sup>4</sup> to undertake the review which covered the overall initiative and 7 of the 20 original WoNS.

The review made 14 recommendations all of which were supported by NRMCC and actioned by AWC.

The most significant of these was the need to develop a process to move national coordination away from species where most benefits had been captured, to allow other species to be brought into the initiative. A phased approach has been adopted to prioritise the extent of national coordination required for each species.

All of the original 20 WoNS weeds were reviewed by AWC and allocated to a phase which determined the extent of national coordination required. Strategies have been updated recognizing the extent to which previous actions have been achieved.

States and territories nominated new WoNS candidates and funded their assessment, which was undertaken by ABARES. The AWC announced the 12 new WoNS on the 20<sup>th</sup> April, 2012 with a commencement date of 1 July, 2012.

Strategies for these species are currently under development and expected to go to public consultation in June 2012.

The WoNS initiative has been funded by the Australian Government with states and territories contributing a similar amount in kind.

Outstanding features of the WoNS initiative have been the strategic focus of eradicating outlier populations, preventing spread and equipping land managers in core infestations to manage the species.

The initiative is backed up by high quality, up to date technical information, national management maps and relevant, targeted research. This initiative has been backed by extensive funding from the Australian Government through, Defeating the Weed Menace (DWM), Envirofund, Caring for our Country (C4OC) and Biodiversity Fund grants for on-ground work and DAFF support for research through the National Weeds and Productivity Research Program NWPRP administered by RIRDC. All this activity has resulted in WoNS being effectively managed at a national scale, placing jurisdictions in a strong position to continue attacking the problem.

## **Management Guides**

The Australian Government has funded a suite of weed management information, particularly the WoNS Weed Management Guides and Best Practice Manuals which are all available through [www.weeds.org.au](http://www.weeds.org.au). Also a wide range of materials have been funded by the Australian Government through DWM, Natural Heritage Trust (NHT) and C4OC. The majority

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<sup>4</sup> Beaten Track Group 2008 Review of the Management of Weeds of National Significance, consultancy for Dept of Agriculture, Fisheries and Forestry

of these have been made available through the NRM regions which have published a range of products from identification guides to advise about on-ground management.

Jurisdictions also publish similar materials for species under regulatory control.

### **Improved Management Practices**

Biosecurity Queensland in conjunction with other research organisations have developed a number of innovations, including new biocontrol agents, pre-border biocontrol projects, rapid assessments of weed seed longevity and herbicide application trials for emerging weed threats.

The WoNS management guides have also contributed to assembling integrated management practices for those species.

Other jurisdictions undertake applied research which is covered under 3.2.

### *2.3 Develop approaches to managing weeds based on the protection of values and assets*

#### **Protection of Values and Assets**

AWC members have actively promoted the development of approaches that target the protection of values and assets.

SEWPaC is developing a TAP to reduce the impacts on northern Australia's biodiversity by the 5 listed grasses as indicated under 2.1.

DSE/Parks Victoria manage a range of projects under the public land component of the Victorian Government's Weed and Pest Initiative. Updates for these projects are contained in the report *Making a Difference on Public Land (2007-2011)*<sup>5</sup>.

DAFF-Queensland targets the effective management of field crops through integrated management practices which use appropriate herbicides to minimise resistance and reduce the weed seed bank. Specific strategies are available for managing 5 distinct species and farmers are encouraged to test and self assess for the glyphosate resistance risk.

The Department of Environment and Resource Management has developed the *Back on Track Program* developing actions for biodiversity for the 14 NRM regions across Queensland using a prioritising framework.

The Queensland Parks and Wildlife Service Pest Management System includes documents that provide planning and/or strategic direction for pest management at different geographic scales and outlines specific on-ground activities to minimise risk. These plans address weed management as well as other threatening processes.

The Northern Territory Cattleman's Association have developed a Top End Flood Plain Strategic Program which takes a strategic approach to *Mimosa pigra* management.

The Northern Territory Integrated Natural Resource Management Plan (NTINRMP)<sup>6</sup> operates 4 targets for maintaining cultural sites which could involve weed management with one

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<sup>5</sup> Weeds and Pests Initiative Making a Difference on Public Land (2007-2011) mid term progress report (2010) . Victorian Government Department of Sustainability and Environment

specifically targeting weed threats to conservation sites from buffel and couch grasses. However there are a further 4 management actions that target specific geographic areas to minimise fire hazards, arising from gamba grass and other introduced grasses.

SA operates a Sustainable Landscapes Project which includes managing weed threats and has an integrated weed list for the greater Adelaide region.

In Western Australia, the Department of Environment and Conservation (DEC) conducts a plant prioritisation process for DEC-managed lands, which adopts a species- and asset-based approach to managing weed threats. The asset-based approach (still in development) will prioritise the management of weeds threatening assets based on biodiversity criteria and feasibility of control. South Coast Natural Resource Management WA has defined the region's assets and targets weed management accordingly.

In the ACT, the Environmental Weeds Control Operations Plan (EWCOP) prioritises sites by weed risk, feasibility of control and biodiversity status.

In NSW, the two agencies (DPI and OEH) have cooperated to prioritise sites for widespread weeds according to region and biodiversity criteria BPWW. The OEH maintains an asset management database which includes conservation areas, priority actions and work undertaken. The NSW National Parks and Wildlife Service has 14 regional pest management strategies (RPMS) that also provide planning and/or strategic direction for pest management and outlines specific on-ground activities to minimise risk. These plans address weed management from eradication, containment and asset protection. The RPMS are supported by the Pest and Weed Information System, which schedules and tracks costs and effort for pest and weed work as well as being spatially enabled to document output data and results of management effort.

Tasmania operates a voluntary private Land Conservation Program that helps landholders benefit from their natural diversity. These are voluntary conservation agreements with private landholders and include monitoring and stewardship components that identify threats to the condition of the reserves, such as weeds, and provides management solutions for investigating those threats.

Tasmania also has developed a weed-based component to its Natural Values Atlas . this provides a link to weed distributions and natural values, including threatened species and communities.

## **Role of Local government<sup>7</sup>**

All local governments across Australia are required to manage weeds on lands that they control, own or manage within their jurisdiction. This includes public lands, parks and conservation reserves, vacant Crown lands, roadsides and verges, footpaths, and other relevant parcels of land. Other powers, interactions and responsibilities for weed management at a local government level vary according to state.

### **New South Wales**

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<sup>6</sup> Northern Territory Integrated Natural Resource Management Plan 2010 . 2015 (2011) . Territory Natural Resource Management

<sup>7</sup> This section was provided by Plant Health Australia as part of the DRAFT Weeds Status Report funded by the NWPRP that was compiled from a national survey and other sources.

In NSW, local governments are required by the *Noxious Weeds Act 1993* to employ a weeds officer. These officers can be hired with assistance from the Inspectorial Grant, though some have council staff trained or appointed under the Act. These weed officers perform weed inspections on public and private land, carry out weed control as necessary and issue weed control compliance notices to private landholders, who are responsible for weed control on their own land.

There are several county councils in NSW which are formed by a group of local councils banding together to deliver weed management over a larger area and with greater regional coordination and resources than would be available to the constituent local councils separately. These county councils are: Far North Coast, Castlereagh-Macquarie, New England Tablelands, Central Murray, Hawkesbury River, Upper Macquarie, Southern Slopes and Upper Hunter. There are also other committees that some local governments in NSW are involved in, including the Illawarra District Noxious Weeds Committee.

Some regional councils delegate their authority under the Noxious Weeds Act to their relevant County Councils, either because of a lack of resources or for better regional integration of weed control efforts. In the greater Sydney area, the councils have banded together to form the Sydney Weeds Committee, to coordinate weed control efforts across the greater Sydney region. If resources permit, councils also provide education and extension activities and material to raise weed awareness, and support local community groups involved in weed control.

Funding is provided to local councils through the NSW Weeds Action program, with detection of new and emerging weeds a top priority.

In addition to their role with noxious weeds, local governments play a significant role in managing weeds for conservation, especially in council reserves. Local governments develop bush regeneration action plans of management, fund bush regeneration and train volunteers.

## **Victoria**

In Victoria, local governments are responsible for the identification and control of weeds, either by council workers or contracted to private enterprise. Local governments are not authorised to enter private land to perform weed inspections, but are authorised to issue control compliance notices to private landholders who are not controlling weeds in accordance with State legislation. Councils alert residents to weeds in the region and support community groups through grants. In 2010-11, under the Victorian Building the Capacity of Local Government to Respond to Pests grant program approximately \$1,000,000 was provided to local governments for the management of weeds and pest animals on roadsides.

The Victorian Department of Sustainability and Environment provided grants to 7 local governments through the Urban Fringe Weed Management Initiative to the value of \$910,000 in 2010-11.

## **Queensland**

In Queensland, local governments provide inspection and control of weeds on public land, and are authorised to perform inspections and issue weed control compliance notices on private land under the *Land Protection (Pest and Stock Route Management) Act 2002*. Where resources permit, councils also provide extension and education to raise weed awareness, strategic planning to manage weeds on a wider scale and regional weed mapping through liaising with regional catchment, NRM authorities and the Queensland Department of Agriculture, Fisheries and Forestry.

## Western Australia

In Western Australia, councils either appoint or contract people to deal with weeds on public lands. Councils do not have the authority to inspect private land for weeds, but can issue control compliance notices to landholders to control weeds on their land and any adjacent roadsides and verges.

## South Australia

In South Australia, councils either employ a dedicated weeds officer, whose duties include inspections and control of weeds on public land, or hire a contractor to fulfil these duties. Local governments are not authorised to inspect public property or issue control compliance notices, but they will alert residents to weed issues as necessary. Many local governments will also provide grants to local community groups to control weeds.

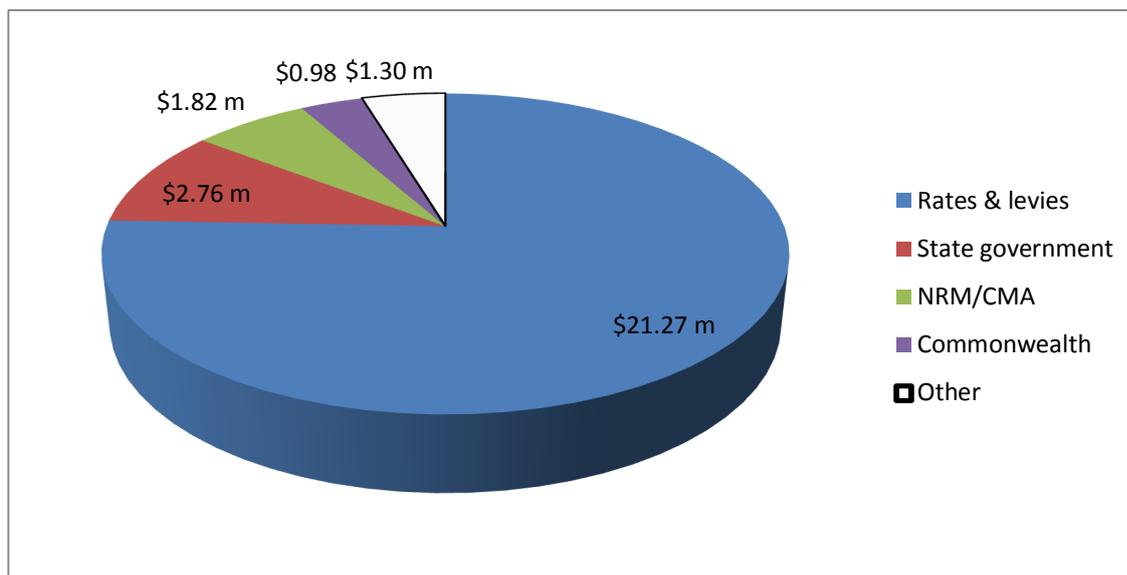
## Tasmania

In Tasmania, there are over 40 local government-authorized weed inspectors with the same powers under the Weeds Act as Department of Primary Industries, Parks, Water and Environment (DPIPWE ) weed inspectors, but their powers are confined to their local government boundaries. Local governments fund these positions from their own budgets, and DPIPWE provides training for weed inspectors.

## Local government weed funding

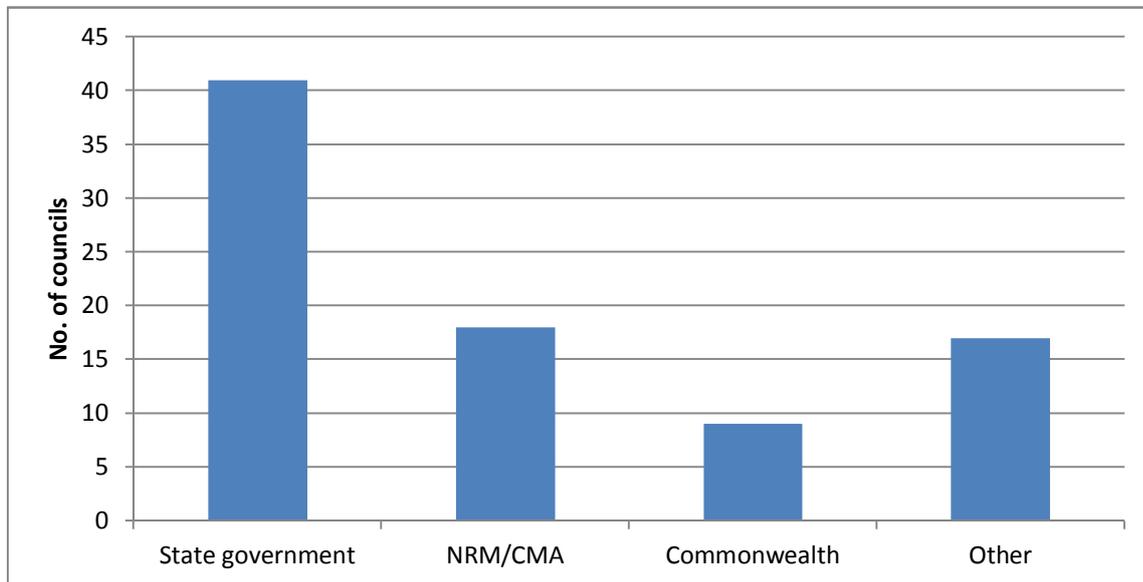
Most of the weed control and surveillance activities conducted by local governments across Australia are funded from general rates, and special environmental levies in some council areas, particularly in NSW. Local governments also receive some level of funding from state and Australian governments. NSW and Victoria are the states with the highest amount of non-rate funding as a percentage of total funding, and in indigenous-controlled areas such as far north Queensland, weed funding comes entirely from state and Australian Government funding.

The following charts summarise the responses from the 105 local government councils of the 560 that were sent questionnaires.



Local council funding for weed management from various sources in 2010-11

The total funding for weed management in 2010-11 reported by the 105 respondent councils was \$28,136,754. Of the 105 respondent councils, 101 reported funding from rates and environmental levies, and the amounts for individual councils ranged from \$1.5 million down to \$98. Funding from rates and levies comprised 75.6% of the total funding reported for weeds management. 62 councils received weeds funding from other sources, and many received grants from several sources.



**Number of respondent councils that received funds for weed management from each source in 2010-11**

Of the 105 local government councils that responded to the questionnaire, 96% received funding from rates and environmental levies for weed management. Figure 4.2 above shows the number of councils that received funding from each of the other sources. Many councils received grants from several sources. 39% of respondent councils received funding from state governments; 17% from NRM/CMA bodies; 9% from the Commonwealth Government and 16% from other sources (including WoNS, transport and water authorities).

### **Local government weed strategies**

In most states, many local governments have produced weed management strategies that are in-line with their state's weed strategy and AWS. In Queensland, this is a legislative requirement of local government, but in Western Australia and South Australia, most local governments do not have a weed strategy. In South Australia, many local governments defer strategic decisions on weeds to their regional NRM Boards. In the absence of any local strategy and no other regional strategy to defer to, weed management decisions are usually based on WoNS and state-declared weeds, asset protection and community concerns.

### **Weeds in green waste disposal**

In most local government areas, some form of green waste collection or disposal is offered partly to deter illegal dumping of green waste in bushland and reserves. Legislative control of weeds also makes the movement of weeds, even to appropriate disposal facilities, difficult at best. Where weeds are not accepted in green waste, landowners are often encouraged to dispose of weeds properly on their own land, usually by burning or composting.

### **Herbicide Resistance**

## Field Crops

Australian cropping industries experience some of the highest rates of herbicide resistance in the world and this is the most significant weed problem facing cropping farmers, particularly the cereal industry. This problem has developed over the last two decades and can be attributed to two factors:

- Misuse of herbicides
- Lack of appropriate crop rotations for the herbicides in use

Herbicides remain the main tool for managing weeds, but the key is rotation of herbicide groups.

Resistance has been confirmed in 34 grass and broadleaf weed species, with resistance now developed to 11 distinctly different herbicide chemical groups. This significantly reduces herbicide options for growers.

Cases of multiple resistance have also been commonly reported, where, for example, annual ryegrass proves resistant to two or more chemical groups.

Glyphosate resistance is occurring along road verges and in natural ecosystems due to the frequent and repeated use of this chemical. Although minimal at this stage, it can be expected to become a significant impediment to weed management in the future, unless appropriate management to reduce the development of higher levels of resistance is adopted for both agricultural and natural ecosystem use.

Research is continuing under the auspices of the Australian Herbicide Research Institute (AHRI) research team within the University of Western Australia, Institute of Agriculture.

While the science of herbicide resistance is well understood, the agricultural techniques for managing the problem have not been extensively adopted by the production and landscape management sectors.

## **Building Community Capacity**

An analysis of Australian Government projects containing on-ground weed management under NHT2, DWM, Envirofund and C4OC for this report period identified a total number of 1,297 projects of which 989, or 75% of all weed projects, related to strategic action 2.3.3. Many of these were small grants originating from the Envirofund or C4OC Community Action Grants (CAG), with most groups undertaking on-ground action. A significant number of projects covered restoration of the riparian zone and were aimed primarily at fencing water ways and controlling weeds.

The Australian Government also provides a number of other non-specific weed grants through the Biodiversity Fund, Stewardship Fund and Landcare. Jurisdictions and corporations also support many and varied grant opportunities targeting NRM initiatives which have weed management components.

Whilst consolidated jurisdictional statistics are not available for the nation, as an indicator in SA in excess of 6,000 volunteers donate approximately 20,000 work days, the Department of Environment Water, and Natural Resources (DEWNR) has 140 Friends of Parks Groups aligned with various parks throughout the state. This is just an example of the capacity to manage weeds that can be contributed by community members.

Every jurisdiction has structured community action networks which operate in parks and reserves, reclaiming community space and reinstating biodiversity. For example in NSW, the National Parks and Wildlife Service estimated that in the 2009-2010 financial year, volunteers contributed 43,972 hours to weed management in specific national parks. These weed management efforts accounted for approximately 42% of all volunteer time on park. In Central Coast-Hunter Region alone, more than two hundred volunteers provide support through a remarkably diverse group of programs. The Region engages community volunteers for Bushcare with over 20 groups active across the Region. Also, in Southern Ranges Region, volunteers have been helping to manage orange hawkweed in Kosciuszko National Park.

## **Regional NRM Bodies<sup>8</sup>**

Australia has 56 separate NRM regions which were established in agreement between the Australian, state and territory governments between 2000 and 2004. The NRM regions facilitate the management of natural resources across their regions using a catchment-based approach and play a critical role linking government agencies, local government, other land managers and the community. As weeds are a land management issue, often on a large scale, weeds feature largely in the long-term goals and objectives in each NRM region. The regions also play a vital role in facilitating on-ground weed control. In NSW and Victoria, the NRM regions are known as Catchment Management Authorities (CMAs).

### *NRM roles and responsibilities*

#### **New South Wales**

In NSW, the CMA Act requires each CMA to develop a Catchment Action Plan (CAP) to outline future priorities that identify natural resource targets and conditions. One target under the CAPs relates specifically to invasive species.

The CMAs facilitate the management of natural resources across their regions using a catchment-based approach and play a crucial role providing links between government agencies, local government, other land managers and the community. The CMAs also play a vital role in facilitating on-ground weed control.

The CMA CAPs are currently being upgraded. The previous CAP target relating to invasive species was ~~φ~~ By 2015 there is a reduction of invasive speciesq with three key indicators of:

- number of new invasive species established
- distribution and abundance of new invasive species
- success of control of widespread species.

#### **Queensland**

Biosecurity Queensland coordinates the Government's efforts to prevent, respond to and recover from pest and disease incursions. Additionally Biosecurity Queensland's role in weed management is clarified in the Memorandum of Understanding between the State of Queensland, the Local Government Association of Queensland and the Queensland Regional Natural Resource Management Groups Collective Incorporated.

#### **Victoria**

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<sup>8</sup> This section was provided by Plant Health Australia as part of the DRAFT Weeds Status Report funded by the NWPRP that was compiled from a national survey and other sources.

In Victoria, CMAs are responsible for developing regional invasive plant and animal strategies to address invasive plants and animals on private and public lands, prioritising actions needed, monitoring and reporting on delivery.

### **Western Australia**

In Western Australia, NRM regional groups undertake community consultation, regional planning (including for weed control) and regional delivery of the Australian Government's CfoC program. The NRM regional groups are incorporated community groups and non-statutory, so do not have legislated roles for weed control or any specific function.

### **South Australia**

In South Australia, regional NRM Boards are responsible for administering the NRM Act and ensuring that landholders comply with statutory requirements to manage declared weeds. Regional NRM plans provide guidance for communities on the implementation of State weed policies within the region and the Board's expectations of landholders.

### **Tasmania**

Tasmania has 3 NRM regions that invest in weed management through funding of staff, regional coordination and/or weed management roles. Investments have been made in a range of weed managements, including on-ground control of WoNS weeds, weed mapping and property planning. There is close liaison between NRM staff and the DPIPWEE Weed Management team.

### **Australian Capital Territory**

In the ACT, the regional NRM body is the ACT Natural Resource Management Council, which is a non-statutory body appointed by the ACT Minister responsible for the Environment. The Council recommends and manages strategic investments in projects that maintain, protect and enhance natural resources in the ACT.

Many NRM regions have either created a stand-alone Weed Management Strategy, sometimes incorporating vertebrate pests as well, or they include weeds as part of their regional strategy. These documents set out the priority weeds for each region, the goals of weed management in the region for a prescribed period, and the procedures for dealing with weeds and weed surveillance. These documents vary in the level of detail for control, management and surveillance activities.

### *NRM regional activities and investment*

As part of this study, information was sought from all NRM regions on the investment in weed management in 2010-11: the major weeds being tackled; did they have a weed management strategy; what is being done to tackle new and emerging weeds; what is being done to increase public awareness; how many staff are involved; and are grants provided to local government and the community? Answers to these questions are set out in the following tables:

## What investment was made in weed management in 2010-11?

State	NRM Region	Investment	Comments
NSW	Central West CMA	\$185,000	To control and manage 7 WoNS species
	Hunter Central Rivers CMA	\$703,000	
SA	Murray-Darling Basin NRM	\$3,511,493	Total expenditure for the NRMB
	SA Arid Lands NRM	\$170,000	
	South East NRM	\$1.64m	Invested from a range of sources
Vic	Goulburn Broken CMA	\$300,000	
		\$430,000	Vic DPI investment
	North East CMA	\$806,000	
	Wimmera CMA	\$294,000	\$154,000 for WoNS projects \$140,000 for 2 <sup>nd</sup> generation Landcare projects
Tas	NRM North	\$205,000	
WA	Northern Agricultural Catchment Council	\$547,000	

## Weed management strategies

State	NRM Region	Weed Strategies
NSW	Central West CMA	Weeds management is included in their annual Business Plan.
	Hunter Central Rivers CMA	The weed management strategy is located within and guided by the Hunter-Central Rivers CMA Catchment Action Plan.
SA	Murray-Darling Basin NRM	SA Murray-Darling Basin NRM Regional Pest Strategy.
	SA Arid Lands NRM	SA Arid Lands NRM Regional Pest Management Strategy.
	South East NRM	South East Pest Management Strategy.
Vic	Goulburn Broken CMA	Goulburn Broken Invasive Plants and Animal Strategy. There is also a Willow Strategy.
	Northern Central CMA	North Central Invasive Plants and Animals Strategy 2010-15.
	North East CMA	The North East regional weed action plan is out of date and will be replaced with an Invasive Plants and Animals Strategy. The Regional River Health Strategy and the Willow Policy sets priorities for weed management for the River Health Program.
	Wimmera CMA	Wimmera Pest Plants and Animals Management Strategy.
Tas	NRM North	Weed Management Strategy . Northern NRM Region Tasmania.
WA	Northern Agricultural Catchment Council	No weed strategy. Has recently applied for State Government funding to develop one.

## What is being done to tackle new and emerging weeds?

State	NRM Region	New or emerging weed programs
NSW	Hunter Central Rivers CMA	Networking, staff presence in landscapes, coordination with government agencies on eradication and management issues.
SA	Murray-Darling Basin NRM	Awareness, education and training \$151,000. <ul style="list-style-type: none"> <li>• Access to pest advice</li> <li>• Community liaison</li> <li>• Promotion of control programs.</li> </ul>
		Managing new and established pests \$132,000. <ul style="list-style-type: none"> <li>• Identification and inspection of priority sites</li> <li>• Identity service for landowners.</li> </ul>
	SA Arid Lands NRM	Works with State agencies, other NRM regions district groups and other land managers to share information. As funding permits, aerial surveys have been conducted along major water courses.
	South East NRM	12 of the 15 staff dedicated to control and management are inspection-based positions. The SENRMB has established a weed spotters group which currently has 34 trained volunteer weed spotters.
Vic	Goulburn Broken CMA	Implementing the State's Weed Alert program to ensure that all known infestations of State Prohibited Weeds are treated every year. Involvement in the Weed Spotter project. Commenced a program to advise the aquarium industry and plant suppliers of the potential impact of aquatic weed incursions.
	North East CMA	Liaison with relevant State government agencies and internal monitoring via the WaterWatch program on their regular site visits.
	Wimmera CMA	The regional working group meets annually to discuss the control works undertaken, trends in asset management and emerging trends.
Tas	NRM North	A system is in place to assist with the identification of unknown plants/weeds. Direct involvement with other Tasmanian weed organisations and groups.
WA	Northern Agricultural Catchment Council	New/emerging weeds are one of the main reasons for wanting to develop an invasive species plan.

**What is being done to increase public awareness?**

<b>State</b>	<b>NRM Region</b>	<b>Public awareness</b>
NSW	Central West CMA	Awareness activities held in conjunction with every WoNS project. 13 activities including Bridal creeper awareness, Serrated tussock identification and management workshop, community weeds and Mesquite identification day.
	Hunter Central Rivers CMA	Field days, demonstrations on control techniques, articles in monthly newsletter.
SA	Murray-Darling Basin NRM	Workshops and training for landowners.
	SA Arid Lands NRM	Extension material provided to land managers and community through workshops, forums and direct engagement.
	South East NRM	Displays in shopping centres, weed hygiene workshops, best practice field days, Weed Warriors program being run for schools. Grow Me Instead workshops, newsletters and the use of media and annual mail out.
Vic	Goulburn Broken CMA	Use of local and regional media to publicise priority issues. Publication and project signage.
	North East CMA	One-on-one extension with landholders, media and news articles and support and advice to community groups.
	Wimmera CMA	Advocates invasive plant messages to the community about Regionally Prohibited Weeds (RPW) through the Future Farming Initiative: improving biosecurity at a regional scale by managing RPW.
Tas	NRM North	Training on weed management, weed hygiene, identification and control. Resources to assist identification and management. Presentations and media articles.
WA	Northern Agricultural Catchment Council	Conducted several information and promotional days across the region. Has a plant guide that highlights problem plants and recommends native garden plants.

## Grants to the community

State	NRM Region	Grants	Comments
NSW	Central West CMA	\$185,000	To control and manage 7 WoNS species.
	Hunter Central Rivers CMA	28 grants to the value of \$701,000.	These grants are for a number of activities including weed management.
SA	Murray-Darling Basin NRMB	\$8,470 for community volunteers.	\$56,500 as part of the Murray Mallee Local Action Planning Woorinen Recovery Project.
	SA Arid Lands NRMB	12 grants to the value of \$70,069.	\$40,000 in other on-ground projects and \$40,000 in developing district weed strategies.
	South East NRMB	\$30,000	For 3 community-based regional NRM Groups.
		\$61,000	Funded 9 individual property projects under the Bucks for the Bush grants scheme.
		\$40,000	Supporting aboriginal involvement in NRM activities across the South East
Vic	Goulburn Broken CMA	\$162,200	For 8 key weed management projects from the State Government through the 2 <sup>nd</sup> Generation Landcare devolved grants.
	North East CMA	Yes, through Landcare groups.	
	Wimmera CMA	\$140,000	Invested through the 2nd Generation Landcare devolved grants.
Tas	NRM North	\$30,000	For 10 grants.
WA	Northern Agricultural Catchment Council	No.	

## Goal 3 – Enhance Australia’s capacity and commitment to solve weed problems

.1 3Raise awareness and motivation among Australians to strengthen their commitment to act on weeds

### National Weed Awareness

The AWC has not been able to develop the National Weed Awareness Action Plan, partly due to lack of resources, but also because jurisdictions have individual programs in place. The following table lists the jurisdictions and main programs that have been in place:

Jurisdiction	
Australian Government	<p>Biosecurity publicity and promotion</p> <p>NWMF and WoNS Coordinators</p> <p>Best practice management guides</p> <p>Weeds Australia website</p> <p>Weeds in Australia website</p> <p>Weed Digest (NWPRP)</p> <p>Weed portal in development (NWPRP)</p> <p>Seed funding for initiatives like %Grow Me Instead; Weed spotter etc (also funded by nursery industry).</p> <p>Weedwatcher (as a pilot for a national community weed mapping application)</p> <p>Programs under the CRCAWM (as pilots for national adoption, Weed Warriors, weed awareness, weed management guides etc.)</p>
Victoria	<p>The Good Neighbour Program</p> <p>Grow Me Instead</p>
Queensland	<p>Weedbuster</p> <p>Weed Warriors</p> <p>BQ and NRM bodies communication campaign</p> <p>BQ school project Wondering About Weedsq</p>
Northern Territory	<p>Attendance at a range of community events, particularly garden events</p>
South Australia	<p>Grow Me Instead</p> <p>Alert Weeds</p>
Western Australia	<p>Grow Me Instead</p> <p>Weedwatcher</p>

Australian Capital Territory	The ACT Parks and Conservation Service runs the Bush Friendly Garden at Floriade and the Weed Swap program (exchanges woody weeds removed from home gardens for non-invasive native plants).
New South Wales	No Space 4 Weeds Weed Warriors Grow Me Instead
Tasmania	Grow Me Instead

All jurisdictions provide extensive weed information over the web, from identification materials to control, regulation and research reports.

The AWC has created the Weeds Australia website, with AG funding. This website publishes all WoNS information on a species basis, carries information on the AWC and provides a weed identification tool for 384 species.

SEWPaC maintains the Australian Government Weeds in Australia website which includes identification, management and policy information. This was implemented on the advice of the National Weeds Advisory Group in 2005 as part of the Defeating the Weed Menace program.

WEEDeckq a pocket field guide identification guide for weeds was established in 2003 in co-operation with Sainty & Associates (the publishers). This arrangement has continued and to date 384 species cards have been produced. The pictures and text enable a weed species to be positively identified in the field. Customised card decks have been used by numerous friends groups, local government and utilities to identify plants for treatment in the field. The NWMF checks every card prior to publication.

### **Smart Phone**

Also emerging technologies provide opportunities to deliver identification tools using electronic media and a number of weed apps are available for the apple and android platforms. See the GRDC web site for examples.

### **Weedbuster Program**

The Weedbuster Awareness Program operated as a national program that was followed by all jurisdictions until 2008. Since that time, Biosecurity Queensland has been the only government department actively supporting the program and it funds the Weedbuster website. Despite the absence of the national program there are a significant number of community groups and regional bodies that still conduct Weedbuster activities in the first week of September each year. In September 2011, 57 events were recorded on the Weedbuster website from Queensland, NSW, Victoria and Tasmania.

### **Other Awareness Activities**

All jurisdictions conduct weed eradication and awareness activities for primary production and environmental situations. They also provide training within jurisdictions for weed identification and weed hygiene management.

The more prominent of these include schools programs, Weedstop courses, publication of newsletters, weed swap days, participation in exhibitions, field days and weed spotter networks.

### **Awards and Recognition**

The jurisdictions supported the giving of awards up until 2008-09 generally under the Weedbuster banner.

Currently NSW DPI annually supports 2 local shire and weed officer awards.

The Council of Australasian Weed Societies, and its member societies, offer community recognition awards and study/travel awards to attend the biennial Australasian Weeds Conference.

Landcare awards recognise community initiatives which usually comprise some form of on-ground weed activity.

The WoNS gorse initiative provided awards to community members and other WoNS programs have encouraged similar activities.

### **Incentive Programs**

In NSW, Vic and Qld, a few local governments provide rate rebates for property weed management, usually sufficient to cover herbicide costs and applied to bush regeneration.

There have been a number of Australian Government grant programs which have encouraged on-ground action:

- Defeating the Weeds Menace
- Envirofund
- Landcare
- C4OC, CAG
- C4OC Open Call Grants
- NHT

Jurisdictions also support grants, e.g. NSW Environmental Trust and SA Heritage Agreement Grants Scheme support landholders to manage native vegetation where heritage agreements exist. Tasmanian Community grants Program provided the funding to establish the Tasmanian Weed Alert Network.

State NRM programs usually make community grants available to support local Landcare, Coastcare and Watercare projects that often have a weeds component.

### **Governance Research**

Professor Paul Martin and his staff at the University of New England Agricultural Law Centre have been conducting research into innovative governance structures for weed control which involves surveying and evaluating existing governance structures with a view to developing ideas that address market failure for weed management and financial incentives which support weed management. The results of this work will be available in June 2012.

## **Weed Spread Prevention**

See previous section under 1.3.

Biosecurity Queensland, DPI (Vic) and DPI (NSW) all encourage vehicle and machinery hygiene by providing training courses, manuals and protocols for cleaning equipment.

Biosecurity Queensland have sponsored/encouraged the building of 75 public clean down facilities across Queensland. This does not include privately operated facilities for light vehicles.

The petroleum and methane gas industry and large corporate utilities comply with weed spread prevention guidelines on a national scale.

## **Memorandum of Understanding**

A three-way partnership between local government, regional NRM groups and Biosecurity Queensland is critical for invasive plant and pest animal management in Queensland. To formalise these arrangements a memorandum of understanding (MoU) for weed and pest animal management was developed by a working group comprising representatives from Biosecurity Queensland, the Regional Groups Collective and the Local Government Association of Queensland Inc. The MoU defines the long-term roles and responsibilities of all three parties for each aspect of invasive plant and pest animal management. These have been formulated to ensure that each party contributes complementary services with regard to each component of pest management. The development of the MoU is consistent with the shared responsibility principle outlined in the 'Queensland Biosecurity Strategy 2009-14'. The MoU applies for a three-year period and includes an annual review.

### *3.2 Build Australia's capacity to address weed problems and improve weed management*

#### **Tertiary Training**

The Chief Scientist (2012) reported that in broad terms there were 5 employment positions for every graduate resulting in a significant under supply of trained staff which has consequences for natural resource and weed management as an ageing workforce moves to retirement. This is a matter which requires consideration and remedial action undertaken, possibly through future strategies.

The CRCAWM university course materials are continuing to be used by UNE, UA and SCU for student teaching.

PhD and post doctoral opportunities have declined since the closure of the CRCAWM, but there has also been a contraction in employment opportunities for skilled weed research scientists which has led to post graduates moving to other disciplines.

The Conservation Land Management Training Package (CLMTP) operated from 2007 and has been used by TAFE and other providers across Australia to guide the delivery of training.

The Professional Weed Officers Association in NSW is an example where professional qualifications have been supported and gained through course attendance and recognition of prior learning. Qualifications used are AHC31910 Certificate III in Weed Management and

AHC51310 Diploma of Pest Management. BQ takes a similar approach to training local government officers in Queensland.

Agrifood Skills Australia reviewed the CLMTP and endorsed the revised training package, AHC10 Version 2 Agriculture, Horticulture and Conservation and Land Management Training Package in April 2011. This package is applicable to VET, certificate level training relating to weed management as a standalone qualification or a component of the industry based qualifications.

### **Analysis of Australian Research and Development Projects from 2007 to 2012 against the Actions of the Australian Weeds Strategy**

Research to underpin the goals and objectives of the AWS is an important resource, as is understanding where research is not available to support the goals of the Strategy. To identify research gaps and scope existing research resources an analysis of Australian research and development projects for the time period 2007 and 2012 was undertaken.

A database of Australian research and development projects related to weeds, for the period 2007 to June 2012, was compiled and an analysis made against the strategic actions of the AWS. The database contains 397 records of research and development projects, which represents approximately 90% of all projects undertaken.

This dataset was compiled from many sources and required considerable effort to remove duplicates and verify records. For example, CRCAWM projects were compiled from publication lists in annual reports, while other projects were identified through other databases, web sites and AWC members contributions. All projects from the NWPRP have been included, although they are scheduled for completion by 30 June 2012.

Projects were classified according to the strategic action/s that they help to inform. However, a number of projects contributed to two or more of the goals, objectives and strategic actions of the AWS and for the purposes of this analysis 511 project codes have been used for the analysis, some projects contribute to more than one strategic action.

Analysis against the AWS main goals showed that some 68.1% of the R&D projects are aligned with reducing the impact of existing weeds (Goal 2). 18.2% of projects address preventing new weed problems (Goal 1) and 13.8% address enhancing capacity and capability (Goal 3).

**Table 1** R&D Projects (2007 to 2012) aligned with AWS Strategic Actions

Strategic Action		Number of Projects	Percentage of total projects
1	Prevent new weed problems	93	18.2%
2	Reduce the impact of existing priority weed problems	348	68.1%
3	Enhance Australia's capacity and commitment to solve weed problems	70	13.8%
<b>Total</b>		<b>511</b>	<b>100.0%</b>

The 86.3% of projects aligning with AWSq Goals 1 and 2 reflect the pressure from stakeholders to deal with problems caused by established weeds. This is to be expected given the impact of weeds on productivity and biodiversity.

Table 2 outlines the research effort for each objective.

**Table 2** R&D Projects (2007 to 2012) aligned with the 11 objectives under each strategic action

Strategic Action		Number of Projects	Percentage of total projects
1.1	Prevent the introduction into Australia of new plant species with weed potential	14	2.7%
1.2	Ensure early detection of, and rapid action against, new weeds	41	8.0%
1.3	Reduce the spread of weeds to new areas within Australia	18	3.5%
1.4	Implement weed risk management practices to respond to climate change	20	3.9%
2.2	Implement coordinated and cost-effective solutions for priority weeds and weed problems	209	40.9%
2.3	Develop approaches to managing weeds based on the protection of values and assets	116	22.7%
3.1	Raise awareness and motivation among Australians to strengthen their commitment to act on weeds	1	0.2%
3.2	Build Australia's capacity to address weed problems and improve weed management	59	11.5%
3.3	Manage weeds within consistent policy, legislative and planning frameworks	8	1.6%
3.4	Monitor and evaluate the progress of Australia's weed management effort	2	0.4%

## Priorities for Weed Research

Defeating the Weed Menace R&D Program . 2005-2008

In the 2004-05 Federal Budget, the Australian Government announced its commitment of \$40 million for the DWM program to tackle the management of Australia's most threatening and invasive weeds through research, biological control and community awareness and on-ground action. An indicative total of \$5.4 million over the period 2005/06 to 2007/08 was provisionally assigned to a Research and Development Component of the DWM Program.

The CRAWM undertook a consultancy for DAFF to develop a Research and Development Plan for Weeds. Their report proposed a set of high priority research and development activities that aligned with the National Weeds Strategy.

The goal of the R&D Component was to provide research and knowledge management to support the Defeating the Weed Menace Program, and to complement existing research activities on invasive weeds.

The scope of the R&D component encompassed weed issues that were having an impact on extensive land systems and conservation areas across Australia, where the benefit was largely to the community as a whole. The component consisted of three priority themes, broken down into sub-themes, addressing needs that were identified through a broad consultation process.

#### National Weeds and Productivity Research Program 2008-09

In 2008-09 under the first stage of the NWPRP the government funded 39 weed research projects worth nearly \$3.6 million. These projects built on existing work and enhanced the innovation of approaches to management of weeds. The first stage of the NWPRP which was managed by DAFF.

#### National Weeds and Productivity Research Program, 2010-12

The Australian Government provided \$12.4 million for two years (2010-11 and 2011-12) for the second stage of the NWPRP which was managed by RIRDC, and built on and complemented previous weeds research.

RIRDC developed a five year plan for the second stage of the Research Program that addresses the broad research priorities that have been set for the Program by the Minister for Agriculture, Fisheries and Forestry. These are to:

- a) investigate and solve the most serious invasive plant problems focusing efforts to improve productivity and the environment;
- b) investigate new methods which reduce reliance on herbicides and promote integrated approaches which also help to reduce energy and chemical inputs in agriculture;
- c) refine landscape-scale integrated weed management strategies to manage the risks associated with invasive plants in agriculture, forests, pastures and native vegetation, including addressing climate change mitigation and adaptation issues;
- d) identify motivators and barriers to the uptake of cost-effective integrated weed management strategies and options to encourage the uptake of integrated practices;
- e) improve understanding of economic, social and environmental impacts of invasive plants; and
- f) ensure better coordination and information exchange between researchers, land managers and regulatory agencies about integrated approaches for priority management of invasive weeds.

## Identify and Reduce Barriers to Adoption

In the most recent funding round four social research projects were funded by the NWPRP, which are summarised below, with more detail available from the summary of research outcomes from the National Weeds and Productivity Research Program 2011-2012 published by RIRDC at <https://rirdc.infoservices.com.au/items/12-079>.

PRJ-007151	Improving regional adoption of weed control- a case study in the New England	Sindel, B.	University of New England	adoption
	<p>This research explored the impediments to adoption of weed control practices amongst private and public land managers, and the potential of collective action programs to overcome these impediments. A case study approach was adopted, involving serrated tussock control in two contrasting grazing regions of NSW, the Northern Tablelands and the Southern Tablelands.</p>	<p>Significant barriers to serrated tussock control included poor management on neighbouring properties, lack of resources to control the weed effectively, a sense of apathy and futility regarding effective management prospects, and difficulty identifying the weed. Important incentives to improve serrated tussock management included controlling new outbreaks early, and ensuring the economic viability of the property. A range of barriers and incentives were identified specific to commercial farm managers, absentee and lifestyle farm managers, public land managers, and staff of relevant government and NRM agencies.</p> <p>Improving adoption of serrated tussock control requires preferred modes of learning, differing property management goals, and relevant strategies to be taken into account. New farming residents in rural communities, particularly on smaller landholdings, need to be educated on their weed control responsibilities beginning at the time of sale. Sufficient information on serrated tussock management exists, but this information does not appear to reach all land managers. Many research participants were strongly in favour of stricter enforcement requiring both private and public land managers to control serrated tussock sooner, to backstop educational and incentive approaches. Weed control authorities were highly regarded, but considered to lack the resources to fulfil their role to full effect.</p> <p>An effective community-based serrated tussock control program must involve trust and willingness to reciprocate on weed control behaviour. Several successful community based land management programs were identified. Their success was based on strong participant interest in program outcomes, converging land management interests, achievable goals, financial or</p>		

			environmental motivation to take part, and external management and/ or funding. These networks and cooperative models offer useful lessons for a serrated tussock program.
PRJ-007483	Who's involved with weeds? A Social Network Analysis of Stakeholders	Lyndal-Joy Thompson	ABARES Communication
	This report examines the current networks in place for managing weeds in Australia, in particular the provision of funding and information through the weed governance system. This research employed a social network analysis approach to investigate where community groups and institutions (such as local and state government agencies) obtain weed related information and funding		The research indicates that involvement and interest in managing weeds is extensive and complex. There is a large public interest in weed management and sources of information and funding are found from multiple sources, though dominated by local and state government departments and regional NRM bodies. The program of funding directed through CfOC is primarily targeted at administration through regional NRM bodies; however a large amount of information and funding is delivered through local and state governments. Survey responses indicate a desire for better coordination of information and funding efforts between levels of government, and in particular the involvement more directly of local government. This coordination is complicated by the role of the Commonwealth and State governments under the Constitution and the impact of historical and current weed management legislation and funding arrangements.
PRJ-007206	Systematic review of Weeds surveys	Lyndal-Joy Thompson	ABARES Policy
	<ul style="list-style-type: none"> <li>~ To systematically review weed-related social survey research in Australia</li> <li>~ To examine what questions had been asked over time, what gaps existed in relation to weed management and perceptions, how appropriate were the methodologies used, and what use had been made of research findings or data collected from past surveys</li> <li>~ To identify questions that could be built into existing surveys or a new ongoing survey to measure weed management behaviour and perceptions over time</li> <li>~ To explore alternative methods of collecting weed-related data</li> <li>~ To review past and current social, economic and institutional research and other information related to weeds and weed management in Australia to help identify a future research agenda that could help address national priorities for weed management</li> </ul>		Review and analysis indicated that much previous research was directed at farmers and other rural landholders, and there was a relative neglect of other stakeholders, including urban dwellers, culturally and linguistically diverse groups, and Indigenous people. Little research dealt with weeds affecting forestry or aquatic habitats. In particular, there was little focus on stakeholders involved along key risk pathways for weeds to spread once in Australia. The main research focus was on current weed management issues with relatively little emphasis on past or likely future issues. Research output appeared to be increasing over time but there was little evidence of trends in research topics or survey questions asked, other than those related to policy initiatives and funding programs current at the time. Few surveys were repeated. Little monitoring and evaluation appeared to be done either of outcomes of past research or previous weed-related programs or initiatives, making it difficult to assess how previous research was used or whether past expenditure had been effective. Alternative methods of collecting weeds-related social data included using omnibus surveys;

			applying anthropological and ethnographic methods, particularly for weed issues in Indigenous communities; and making more use of electronic survey methods.
PRJ-006998	How do decisions by stakeholders affect weed distribution at a landscape scale?	Yvonne Buckley	The University of Queensland   Policy
	This report summarises the motivations of stakeholders to control serrated tussock ( <i>Nassella trichotoma</i> ). Landmanagers were asked what economic and social factors motivated them to control serrated tussock. Landholders were also surveyed for data for Parthenium ( <i>Parthenium hysterophorus</i> ) and Branched broomrape ( <i>Orobancha ramosa</i> ) and a model for Chilean Needle grass ( <i>Nassella neesiana</i> ) and African Lovegrass ( <i>Eragrostis curvula</i> ) was constructed. The focus of this report is on results for serrated tussock (over 100 online surveys completed and 15 phone interviews).		Protecting productivity was the most important motivation to control serrated tussock for sheep farmers. For cattle farmers, conservation land managers, and people whose main income was off farm, the 95% confidence intervals show legal and moral reasons give a similar level of motivation, with protecting productivity tending to be a slightly weaker. A second analysis shows that sheep farmers tend to have a different set of motivations than other enterprises. Surprisingly, cattle farmers and conservation land managers tend to have similar sets of motivating factors.

All these projects recommend that more research be carried out to develop methodologies that improve the application of weed management information at the policy and on ground levels. It would seem that we have considerably more work to do before a formulaic methodology could be proscribed to help weed extension workers with practical ways to improve the effectiveness of their programmes.

### 3.3 Manage weeds within consistent policy, legislative and planning frameworks

#### Use of the AWS

All jurisdictions recognise the AWS in their invasive species / weed strategies and the same comment applies to regional plans and weed specific strategies such as those developed for the WoNS species.

Funding applicants also used the AWS of Weed Management Principles when developing on-ground programs.

#### Environmental Impact Statements (EIS)

Queensland, DEC (WA), ACT Government, Biosecurity SA all have the opportunity to comment from a weed perspective on any new development which is required to have an EIS. The developments covered large mining proposals, gas pipelines and corridor users and industrial developments.

Small quarries, mines and developments are generally not captured in this process.

Tasmania (DPIPWE) require weed management and hygiene plans to be developed as part of the development approval process.

#### Regional NRM Planning

All jurisdictions have actively assisted the development of NRM plans and are involved in their on-ground delivery through field staff. Most NRM plans contain a significant component of fire, pest animals and weed actions, which can often be interrelated or complimentary.

### **WoNS Strategies**

The WoNS strategies for the original 20 are consistent with structure of the AWS. The new 12 WoNS are currently having strategic plans produced and these are also consistent with the AWS structure.

### **Biosecurity Legislation and Weeds**

The Australian Government is developing new legislation to replace the century-old Quarantine Act 1908 to create a responsive and flexible operating environment. The new legislation is a cornerstone of the implementation of a risk based approach to biosecurity management. The new legislation is designed to enable DAFF to better manage the risks of animal and plant pests and diseases entering, establishing, spreading in Australia and potentially causing harm to people, the environment and the economy. It can be expected that the proposed legislative changes will address the introduction of invasive plants, but it will also impact on the introduction of biocontrol agents.

Three jurisdictions (QLD, NSW and WA) are in the process of developing state specific whole of government biosecurity legislation. WA's new legislation combines 17 separate Acts and 27 pieces of subsidiary legislation into one biosecurity Act.

### **Weed Categorisation**

The AWS and the Australian Pest Animal Strategy (APAS) recognise that resources for invasive species management must be targeted at the highest priorities for action. The NCSIS establishes a need to prioritise pest species or targets for control.

To progress the implementation of the strategies, the system outlines four agreed national categories for invasive taxa, together with selection criteria used to assign candidate taxa to these categories. Assignment to categories is an ongoing and dynamic process and will therefore require regular review. This is built on a project undertaken by BQ in 2006, funded by DWM.

Responsibility for assigning taxa to Categories 1, 2 and 4 lies with the AWC and the VPC. Responsibility for nominating taxa to Category 3 lies with those same Committees, with formal assignment achieved by Ministerial endorsement of the nomination.

The categorisation process will:

a) Guide the early detection of, and rapid response to, new incursions of invasive species by:

- (i) Providing criteria for the development and maintenance of nationally agreed lists of high risk species for surveillance and national response.
- (ii) Providing policy justification for the maintenance and improvement of the resources required for identifying potential invasive species.

b) Assist to reduce the spread of invasive species to new areas within Australia by:

- (i) Providing criteria for assessing the threat of sleeper or other isolated populations and providing guidance on the need to eradicate or contain these according to assessments of feasibility, costs and benefits.

(ii) Providing guidance on reducing the spread of invasive species across jurisdictions, particularly where containment is possible and the risks to other parts of Australia can be minimised.

c) Provide criteria for the identification of established invasive species of national significance.

d) Provide guidance on the roles and responsibilities for the management of invasive species under Australia's obligations for honouring international treaties, and contribute to global environmental and trade initiatives (e.g. keeping, sale and trade of invasive species).

At this time the species have not been allocated to categories as weed risk analysis will be required for Categories 1, 2 and 4, However the WoNS list exists for 32 weed species or groups supported by formal Ministerial endorsement.

### **Roles and Responsibilities**

The Constitution and the AWS state that on-ground land management responsibilities, including management of weeds are delivered through state and territory governments.

The AWS includes a clear statement on roles and responsibilities.

There is a widespread expectation by private land managers that the government (local, state and federal) have responsibility for managing numerous weed species, particularly those that are primarily spread by natural means, wind, water etc. There is reluctance by many land managers to accept responsibility for the control of those weeds.

All jurisdictions include policy on roles and responsibilities within their respective weed strategies. Roles and responsibilities are a component of all WoNS species strategies.

### **Implementation of the Australian Weeds Strategy**

The AWC has actively promoted the AWS and established implementation and monitoring plans.

The AG and jurisdiction have co-operated to fund and manage the NWMF position and WoNS coordinators, who link their work, to the Strategy through agreed workplans.

Funding applications at the national and state levels usually require applicants to align their projects with national strategies, particularly the AWS. (e.g. DWM, NHT and C4OC).

Most local government, regional and district natural resource management plans recognise the AWS.

#### *3.4 Monitor and evaluate the progress of Australia's weed management efforts*

### **WoNS Monitoring**

This has been covered under 2.2.

### **Eradication Programs**

The Consultative Committee Exotic Plant Incursions (CCEPI) has established a review process for all incursions and these have been reviewed twice over the period. As a result

two species (Siam weed and branched broomrape) will be moving to a management phase as technical advice has been provided that these species are beyond eradication.

### **National Reporting Portal**

DAFF through the NWPRP has funded 5 projects which contribute to the development of a national weeds portal that includes a weed mapping and reporting tool, all of which will form the basis of a national weeds information system.

### **Review of the AWS**

The AWC has decided to review the Implementation of the AWS with DAFF to oversee an independent review in mid 2012. The results of this review will be used to inform the revision of the AWS.

## Gaps in implementing the AWS

Jurisdictions implementing the AWS do not receive additional resources, but make business improvements and changes in alignment with the Strategy. In a number of instances special funding arrangements may need to be negotiated with stakeholders e.g. the appointment of weed botanists/taxonomists. Consequently there can be no prior certainty as to how the Strategy will be implemented, but its value is that it establishes an agreed pathway forward and sets targets. The Strategy is primarily aspirational.

There is little hard outcome data available for measuring the implementation of AWS, therefore many of the achievements rely upon subjective and qualitative interpretation.

The following comments relate to the yellow and red actions in the traffic light section in pages 2-5. These should be read in conjunction with the action number on the previous section.

### Goal 1 . Prevent New Weed Problems

#### *1.2.1 Establish a nationally coordinated weed alert and early warning system that includes effective surveillance mechanisms.*

A yellow is indicated because as previously described under 1.2, herbaria and core agencies work together to monitor for new species naturalisations and report half-yearly to the AWC. However these processes are not formalised (except Qld) and there is the distinct possibility that new threats may be overlooked.

During discussions with the NWMF, several jurisdictions recognised this shortcoming and described how procedures could be introduced or improved to capture weed observations and ensure appropriate action taken.

A project has identified options (NWPRP Weed Spread Prevention Initiative, Dr Matt Sheehan) for establishing this system and discussions are under way with jurisdictions.

#### *1.2.4 Establish core capacities at the state and national levels for responding to significant weed incursions.*

A yellow is indicated because as described under 1.2 core capacities were assessed in 2008, but with the current decline in resources, capacity is currently unknown. In order to be proactively managing incursions it would be prudent to re-examine and catalogue the skills, staffing and resources available to address weed incidents. On this basis a yellow flag denotes that this matter should be monitored by AWC.

#### *1.2.5 Enhance the ability of Australian herbaria to rapidly and accurately identify new introduced species.*

A yellow is indicated as difficulties experienced by herbaria in this area largely arise from insufficient resourcing to handle voucher specimens in a timely manner and report new naturalisations of introduced species promptly. Three jurisdictions have attempted to overcome this problem by embedding weed botanists/taxonomists within herbaria, however, at the present time only two positions are filled. Because the positions are externally funded on an annual basis, there is some uncertainty about their continuation.

The lack of formal arrangements between herbaria and the lead weed agency for all jurisdictions except Queensland (where an effective process is in place) is an area where an

improvement could be made. This has been allocated a yellow flag because, whilst being operational the systems are not failsafe or timely in operation and improvements can be made.

#### *1.2.6 Identify, detect and manage sleeper weeds.*

A yellow is indicated as a process is in place to achieve management but the actual species have not been formally identified or managed at this time.

#### *1.4.2 Monitor and respond to other biological, environmental, social and land-use changes that may contribute to weed spread.*

A yellow is indicated as six jurisdictions do monitor and comment on development proposal EIS, but smaller developments are not subject to scrutiny. This would also apply to road improvements and other corridor activities that have not been subject to EIS. Some of these developments would be covered by local government bodies of which there are >560 in Australia. It is difficult to see how this can be addressed within the limitations of current resourcing. The matter does warrant further consideration to see if there is a solution, because this strategic action is only partly being fulfilled.

A related issue, and more crucial one, is the lack of resources available to police the implementation of weed management and weed hygiene requirements that have been imposed, consequently this has been given a yellow flag.

### Goal 2

#### *2.1.3 Develop effective processes to resolve conflicts between economic and environmental interests.*

A yellow is indicated as all jurisdictions have policies in place and there are a number of supporting case studies, for example gamba grass, hymenachne and biofuels. However, this has not been codified into a generic national policy/procedure.

#### *2.3.1 Identify the threats posed by weeds to key cultural, environmental and production assets and values*

A yellow is indicated as most jurisdictions have established broad priorities for weed management, but they are not nationally consistent and are not specific for cultural and environmental assets.

#### *2.3.4 Develop and promote best management practices that address weed threats and causes at the landscape level, and remediate the land.*

A yellow is indicated as there are many individual projects addressing asset protection, but often they are small scale and disconnected from work undertaken in adjacent areas. Often this work does not fit into a district or regional strategy or framework. Remedial action can lack continuity which reduces the chances of a project being successful.

Projects are frequently driven by availability of funds, rather than a planned integrated approach. However, there are notable examples where an overarching approach is being taken, such as the WoNS initiative. New incursions are managed in a similar manner. Jurisdictions also have management plans, but the bulk of regulated species are not addressed in a systematic manner. On a smaller scale the Barkly Tablelands Landcare Group attempt to prevent the ingress of weeds into their grazing lands. In Western Australia,

there are industry biosecurity plans that aim to protect specific primary industries from a wide range of threats extending to pests, diseases and weeds. However, there is significantly more to be gained from taking an integrated approach to protecting and remediating the landscape, hence the yellow flag.

### *3.1.1 Develop and implement a national plan for communicating with stakeholders and engaging them in weed management*

A red is indicated because in 2006-07 the CRCAWM and BQ managed a National Weed Awareness Coordinator funded by the Australian Government (DWM). When the position concluded the AWC formed a national Weed Awareness Working Group, but it was not able to establish a coordinated program, partly because jurisdictions were reluctant to redirect their awareness programs into a national program and the general lack of resources available for awareness. One national weed awareness activity has remained, Weedbuster Week, but this is only supported by Queensland and local/district groups.

A whole-of-WoNS communication plan is under development, which covers the 32 weeds.

A national awareness program may not be of value, but from a strategy perspective it is an action that has not been achieved.

### *3.1.2 Develop and implement nationally consistent and targeted weed awareness activities.*

A yellow is indicated as there are a wide range of weed awareness activities undertaken, but they may not be nationally consistent, with the exception of materials and activities related to WoNS species, where national coordination is managed by coordinators.

### *3.1.3 Recognise and award community achievements in weed management*

A red category is indicated because there has been a decline in community awards since 2007 as described previously. CAWS and member organisations, NSW DPI and the Weed Officers Association are the only organisations that make specific weed awards at the jurisdiction level. Landcare Awards and those recognised by NRM bodies are also made, but these are only partly relevant to weeds.

### *3.1.5 Develop and promote improved weed spread prevention practices among industries, public agencies and communities*

A yellow is indicated as weed spread prevention is being adopted by a minority of land managers, but it is technically challenging and difficult to implement at a landscape scale and in areas of intensive development.

### *3.2.5 Strengthen collaboration between research institutions, industry and government on weed research issues.*

A yellow is indicated because information presented in the body of this report shows that over the reporting period there have been national R & D Strategies in place. However, while undertaking jurisdiction visits a common complaint from on-ground workers was about the demise of the CRCAWM but no evidence was presented that this has been detrimental to the overall research effort.

Extensive collaboration exists across the research network including the CSIRO. The Research and Development Corporation (RDC) fund integrated programs and coordinate activities. State-based research bodies promote strong linkages between researchers and land managers, eg. TIAR in Tasmania.

An institute or equivalent model was considered by DAFF when formulating the NWPRP but it was not possible to implement that approach. It is unlikely that a return to the cooperative research model or something similar will occur and the NWPRP has not continuing post June 2012. However, SCoPI has been working on developing a series of national RD&E strategies.

### *3.2.7 Identify and reduce barriers to adoption of best practice weed management*

A yellow is indicated, because some work has been undertaken to identify barriers to improved weed management, but much less work has been undertaken to identify ways of improving adoption or gain compliance.

### *3.3.3 Establish nationally consistent legislation to address weed problems*

A yellow is indicated because establishing consistent weeds legislation has been included as an action in the NWS and AWS. In 2005, 9 national principles of legislation were listed which should underpin any weeds legislation. Most jurisdictions have tested their legislation against them, with three jurisdictions moving to integrated biosecurity legislation. It would appear that nationally consistent legislation will still be maintained, although they will not be uniform and species lists and actions will always reflect varying climatic conditions.

The AWC could reconsider the principles and encourage member states to follow them, ensuring that they are covered when redrafting legislation.

A second difficulty is that jurisdictions have differing legislative mechanisms and priorities. The process of changing weeds legislation can be slow (5-10 years) and follows the priorities of the political party at the time.

### *3.3.4 Develop and implement a uniform national weed categorisation system.*

A yellow is indicated as the categorisation system has been agreed and is in place. However, the categories need to be populated with weed species. The action is partially complete with the need for AWC to devise a mechanism for its completion.

### *3.3.5 Clearly define and communicate the weed management roles and responsibilities for all managers of public and private land.*

A yellow is indicated because jurisdictions have a policy on roles and responsibilities, but little information was available on the active promotion of them other than through funding applications. There is still a widespread expectation on the part of land managers that weeds are a government problem.

### *3.4.2 Develop, implement and maintain regular and consistent monitoring of weed distribution, impacts and management.*

A red is indicated because jurisdictional mapping of weed species is variable and mostly incomplete as there needs to be a clear, justifiable management imperative to collect and

maintain this data, as a result national mapping of species is limited to WoNS and national cost shared eradication programs.

As previously covered, the most credible national species maps are those for the WoNS species and weeds covered by incursion management plans. The National Land and Water Resources Audit attempted to establish national baseline maps for 98 species, but these did not gain the support of AWC. Some members have also questioned the value of this unless a species is under national management.

Herbaria also contribute to distribution data and identification and listing of new plant records, however the national maps produced by the virtual herbarium are often not up to date as there is a significant lag time between specimen lodgement and data uploading.

## **Impediments to implementing the AWS (from jurisdiction perspective)**

The comments in this section are derived from a SWOT analysis compiled from comments received during jurisdiction visits and observations of difficulties the jurisdictions have encountered.

Jurisdictions have valued the Strategy for its broad targets covering policy to on-ground work. It has given many funding applicants a structured approach through the six principles of weed management and 3 goals.

A few comments were received that indicated the document was difficult for some stakeholders to read and that it lacked clearly defined measurable targets. This was more problematic for people undertaking applied/on-ground work. It could be improved as a communication document.

At the time this report was being written, jurisdictions were undergoing cutbacks in resources which were expected to continue for some years. As a result there is little or no flexibility to undertake new initiatives or change priorities.

There is a planned shift away from the established weed species to dealing with those at an earlier stage of invasion curve. This is in-line with the biosecurity policies of Victoria, Queensland and New South Wales.

Jurisdictions expressed concern that the WoNS initiative had drawn Commonwealth resources away from other species. However, this was confounded by most people not having a clear understanding of constitutional limitations and why the Australian Government needed clear boundaries around the eligibility of funding grants that did not impact on jurisdictions sovereignty.

Special purpose Australian Government weed funding has been provided to jurisdictions since 1997, via NHT1 to C4OC and jurisdictions appear to have become reliant on these grants to give flexibility to on-ground action. This is particularly important for assisting community groups to achieve on-ground work. The Australian Government funding is extremely valuable in value adding to existing work funded by the states and territories.

Jurisdictions resource constraints are given as the reason for not collecting base line data for weed distributions. However, they also believe that this data is not particularly useful in helping them manage more effectively.

A number of researchers expressed their concern at the demise of the CRCAWM and the lack of a similar replacement, although R & D strategies have been implemented for the period covered by this report. One policy manager expressed the view that jurisdictions did not benefit greatly from the CRCAWM as it focussed heavily on its own agenda, rather than national objectives.

A significant amount of weeds R & D has been undertaken as described in that section of this report.

Jurisdictions do not have strict control over their lands as they are owned and managed by a multiplicity of land managers who have differing priorities. The result is that there is little coordination across land managers for most of Australia. This difficulty has been addressed by the use of grant incentives with clear policy goals, but that often gets lost in on-ground implementation.

Frequent mention was made of the multiplicity of weed lists, which were said to cause confusion for community groups. However, where on-ground work is being undertaken, the dominant weed species becomes the most pressing priority independent of species lists.

The desire to access Australian Government funding is so dominant that community groups overlook the responsibility of jurisdictions which have prime responsibility for management of their land.

Communities are becoming increasingly opposed to the use of herbicides for weed management, removing a valuable weed management tool for which there is often no alternative. However they are well disposed towards use of biological control methodologies where available and can add significant value to these programs.

Rapid staff turnover and the loss of staff in absolute numbers, particularly in rural areas is a significant difficulty for jurisdictions.

## Overall Conclusion

The AWS is comprised of 3 goals made up of 45 strategic actions. These have been considered individually for each jurisdiction. There is also a considerable overlap across strategic actions which if fully cross indexed would bring a substantial amount of repetition to the report.

A judgement has been made on the extent to which each action has been undertaken and a traffic light approach used to indicate those that have been satisfactorily implemented and where impediments have been identified preventing adoption.

Twenty seven actions have been classed green, showing that 60% of the actions have been completed or satisfactorily operate. Fifteen (33%) were classed yellow because implementation has substantially fallen short of expected outcomes, but these actions are expected to be achieved in the near future.

Three (7%) are classified red, because implementation is stalled or changed circumstances make achievement uncertain or impossible to complete. Institutional arrangements make it extremely unlikely that consistent legislation across jurisdiction can be achieved.

Given the scope of the Strategy, it is a significant achievement that 93% of actions are expected to be achieved. It is important to note that some of the actions cover routine core business activities which would be expected to be maintained adequately. On the other hand, such tools as WRM have been fully adopted across jurisdictions over the period covered by this report.

The WoNS initiative has been most successful as shown by the reviews of work undertaken against the species strategies, movement to phase 3 and the reallocation of co-ordinators to the 12 new WoNS. It was hoped that this model would be transferred to other non WoNS weeds, but, to date, only weedy sporobolus (*Sporobolus* spp.) has benefited from this approach with voluntary national strategies being developed.

The 7% of projects marked red, are largely prevented from completion due to a decline in staff numbers and reduction of resources.

Two of the red categories result from changed institutional arrangements.

Researchers lament the demise of the CRCAMM and made few comments on the continuing Australian Government funded research programs. Of greater concern is the fact that the NWPRP has not been funded beyond June 2012, resulting in the possible demise of the nationally coordinated research effort. It should also be recognised that research needs a funding stream with a sufficient time horizon to accommodate short and longer term projects. Particularly when biocontrol and other long term solutions to weed problems are being sought.

It is also extremely unlikely that nationally consistent weeds legislation can be achieved due to the differing approaches to biosecurity legislation being taken by jurisdictions.

Unfortunately little baseline data was available on weed species reductions and reduced impacts, with the exception of the original WoNS and species under cost shared eradication programs. These all have national distribution maps with supporting management actions.

Jurisdictions were unable to provide financial data on the contribution they make to the weed management task, which would be most useful in focusing attention on national weed management.

It was observed that the community have an overly high expectation and reliance on AG funding programs, failing to acknowledge the valuable role played by states and territories in managing on-ground work. It would be constructive if the jurisdictions could quantify their resourcing of weed management to place a perspective on their contribution.

Overall the Strategy has been largely fulfilled, but it has not been possible to ascribe the extent to which this has resulted in reduced weed impacts, but as a policy document it has clearly influenced the direction of weed management in Australia. Much of the work undertaken may well have been achieved by states and territories independently as core business. However, the Australian Government has used the AWS to guide grant policy, research and development, biosecurity activity and support at the regional level.

For this reason the AWS has been a significant factor influencing the direction and coordination of national weed management effort.

## References

Beaten Track Group (2008) Review of the Management of Weeds of National Significance, consultancy for Dept of Agriculture, Fisheries and Forestry

Jesser P. (2005) Core Baseline Capabilities . early detection and rapid response, consultancy for Dept of Agriculture, Fisheries and Forestry (funded under DWM) undertaken by Department of Natural Resources and Mines QLD

Office of the Chief Scientist (2012), Health of Australian Science. Australian Government, Canberra.

Sindel B, van der Meulen A (2008) Pathway risk analysis for weed spread within Australia (UNE61) Final Report to Land and Water Australia

Standards Australia (2006) National Post Border Weed Risk Management Protocol HB 294:2006

Weeds and Pests Initiative Making a Difference on Public Land (2007-2011) mid term progress report (2010) . Victorian Government Department of Sustainability and Environment

Northern Territory Integrated Natural Resource Management Plan 2010 . 2015 (2011) . Territory Natural Resource Management

## Abbreviations

Acronym	Name
ABARES	Australian Bureau of Agricultural and Resource Economics and Sciences
AHRI	Australian Herbicide Research Institute
APAS	Australian Pest Animal Strategy
AQIS	Australian Quarantine Inspection Service (now DAFF Biosecurity)
AWC	Australian Weeds Committee
AWS	Australian Weeds Strategy
BIMS	Biosecurity Incident Management System
BPWW	Biodiversity Priorities for Widespread Weeds
BQ	Biosecurity Queensland
CAG	Community Action Grants
CAWS	Council of Australasian Weed Societies
CCEPI	Consultative Committee Exotic Plant Incursion
C4OC	Caring for Our Country
CLMTP	Conservation Land Management Training Package
CMA	Catchment Management Authority
CRCAWM	Cooperative Research Centre for Australian Weed Management
CRC	Cooperative Research Centre
DAFF	Department of Agriculture, Fisheries and Forestry
DAFWA	Department of Agriculture and Food Western Australia
DEC	Department of Environment and Conservation (WA)
DEWNR	Department of Environment Water, and Natural Resources
DPI	Department of Primary Industries
DWM	Defeating the Weed Menace
EIS	Environmental Impact Statement
EW COP	Environmental Weeds Control Operations Plan
GRDC	Grains Research Development Corporation
IGAB	Intergovernmental Agreement on Biosecurity
KTP	Key Threatening Process
MERI	Monitoring, Evaluation, Reporting & Improvement
MoU	Memorandum of Understanding
NAQS	Northern Australia Quarantine Strategy
NBC	National Biosecurity Committee
NCSIS	National Categorisation System for Invasive Species
NEBRA	National Environmental Biosecurity Response Agreement
NHT	Natural Heritage Trust
NRM	Natural Resource Management
NRMMC	Natural Resource Management Ministerial Council
NTINRMP	Northern Territory Integrated Natural Resource Management Plan
NWMF	National Weed Management Facilitator
NWPRP	National Weeds and Productivity Research Program
NWS	National Weeds Strategy
NWSPAP	National Weed Spread Prevention Action Plan
OCPPO	Office of the Chief Plant Protection Officer
OEH	Office of Environment and Heritage . NSW
PHA	Plant Health Australia
R & D	Research and Development
RDC	Research and Development Corporation
RIRDC	Rural Industries Research and Development Corporation
SEWPaC	Department of Sustainability, Environment, Water, Population and Communities
SCoPI	Standing Committee on Primary Industries
TAP	Threat Abatement Plan

TIAR	Tasmanian Institute of Agricultural Research
VPC	Vertebrate Pest Committee
WoNS	Weeds of National Significance
WIMP	Weed Incident Management Plan
WRA	Weed Risk Assessment
WRM	Weed Risk Management