



# A national information system for weeds: What do end-users need?

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Invasive species — weeds in particular — are one of the major threats to the sustainable management of natural resources. Weed control costs Australian farmers approximately \$1.5 billion per year, with lost agricultural production estimated at more than \$2 billion. These estimates do not account for environmental costs such as the effects of long-term degradation of vegetation and impacts on biodiversity and waterways, or impacts on health, safety, amenity, infrastructure, tourism and the general quality of life.

The Australian Government for some time has been working with state and territory governments to develop a 'National Invasive Species Information System'. Such a system is directed primarily to ensuring ongoing monitoring and evaluation of invasive species. This needs to be done in ways that enable ongoing reporting at different levels across different jurisdictions.

Paterson's curse (*Echium plantagineum*). Photo Jon Dodd.



Land & Water Australia (LWA) is a research broker committed to generating new knowledge for the sustainable management and use of Australia's natural resources. As such, LWA recognises that information tools (e.g. identification aids) and access to accurate weeds related data and information are key elements in the successful management of natural resources. Where available in a timely fashion and in a format that is readily available to interpret, such tools, data and information help reduce uncertainty in planning and clarify issues for further analysis. Strategies to overcome the complex challenges of weed management may then be developed and the results monitored as part of an overall system.

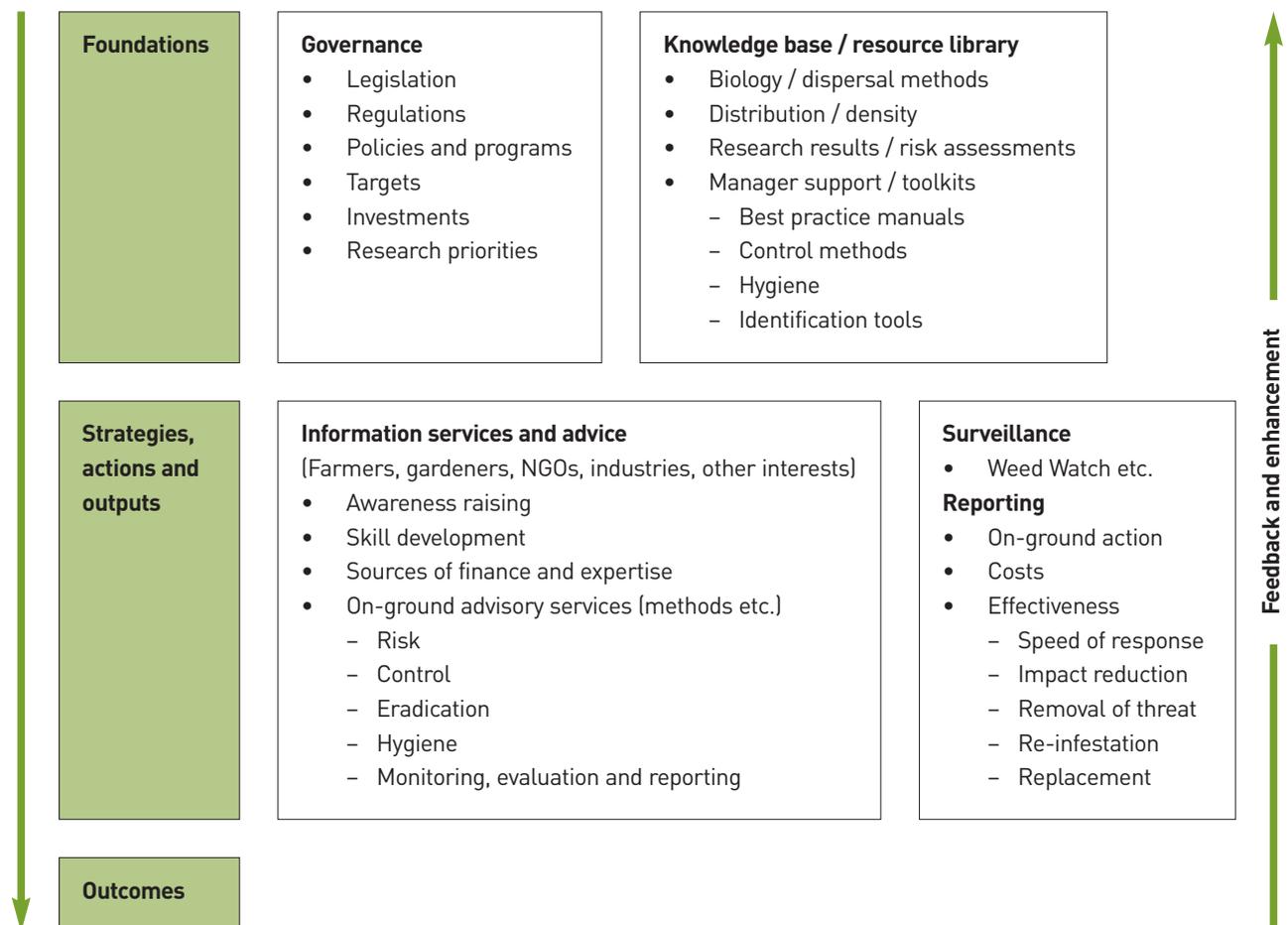
As part of the Defeating the Weed Menace (DWM) R&D program, LWA commissioned a project to assess the potential end-users of a national information system for weeds, and to determine their needs and priorities. The number of potential end-users of weeds information is large and they have an appetite for a wide range of data and information.

To be effective, a national information system must meet the diverse needs of its end-users.

### What the project team did

The project team used a literature review, site visits to state and territory government agencies, and focus group sessions to develop a user survey to determine who might use a national information system for weeds, and to what uses they would put that information. A questionnaire was widely distributed on-line and 385 responses were received from a wide cross-section of the natural resource management (NRM) community, including Australian, state and territory governments, research organisations, NRM regional bodies, local government, non-government organisations (NGOs), educational and tertiary institutions, landholders, industry, community based groups and the media. The survey information was supplemented by targeted in-depth interviews.

### Generic components of an invasive weeds information system



## Who would use a national information system for weeds?

The results of the user needs assessment reveal that the key users of a national information system for weeds would be the Australian, state and territory governments, regional bodies, local government, researchers, community groups/NGOs and industry. Most of these users are involved in program management, policy development or on-ground NRM activities. Interestingly, the nursery and landscape industries and gardeners also stated that they would get considerable value from a national information system — especially as it relates to plant identification.

The box below (using results from survey question 5) summarises the stated requirements for weed information.

<b>5. For what purpose do you require weeds related data or information? (Please check all that apply)</b>		
	Response per cent	Response count
Natural resource management — aquatic	48.4%	177
<b>Natural resource management — terrestrial</b>	<b>80.3%</b>	<b>294</b>
Policy or program development	54.4%	199
Monitoring, evaluation or reporting	66.7%	244
Regulatory	33.9%	124
Input to scientific analysis	23.5%	86
Teaching	26.2%	96
Identification	65.6%	240
Other (please specify)		19
<i>Answered question</i>		366
<i>Skipped question</i>		19

## The drivers for seeking national information in weeds

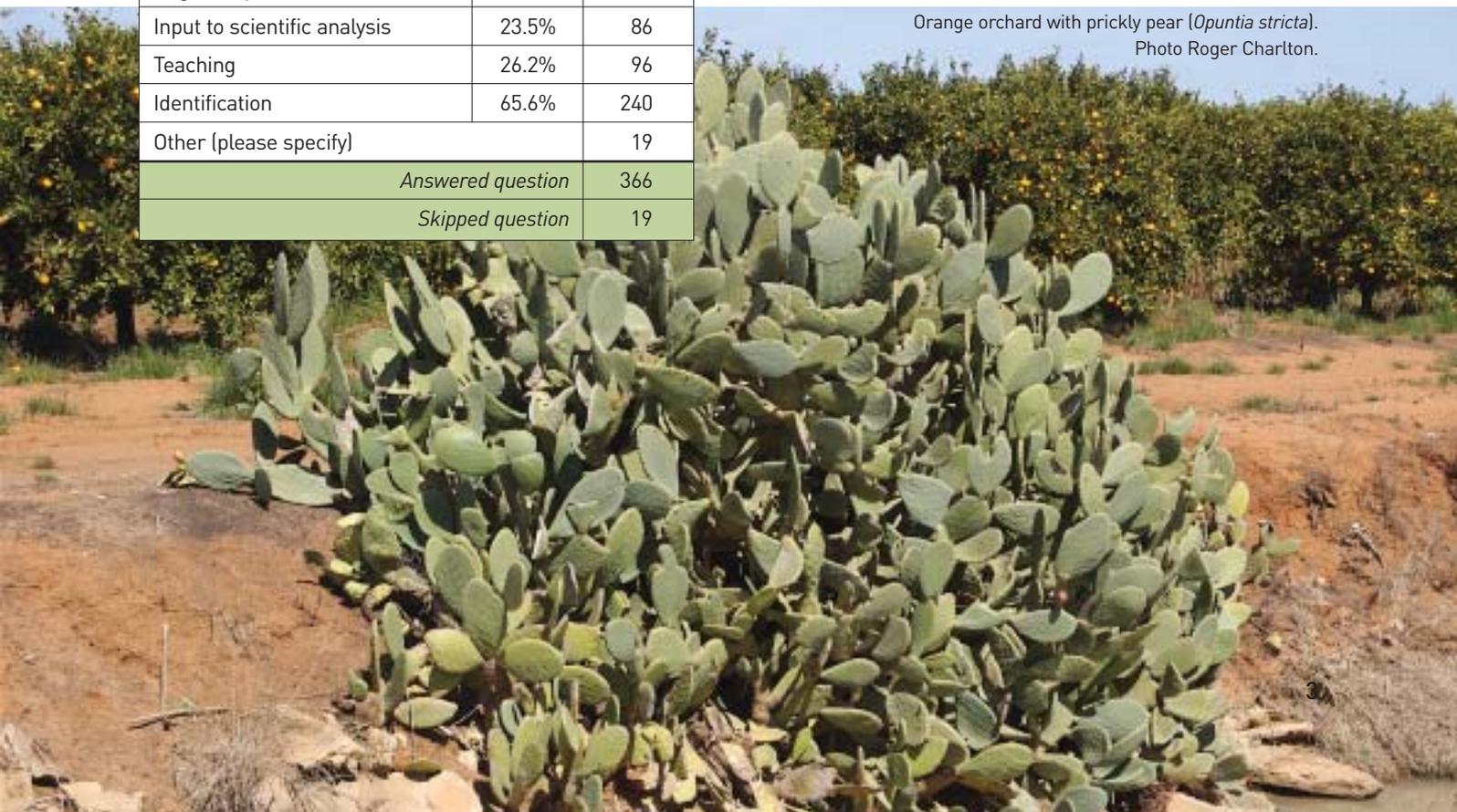
The lists that follow present a generic summary of drivers for seeking weed-related information.

### National, state and territory governments

Ministers, government agencies, ministerial councils and their standing committees require data and information about weeds to:

- underpin assessments of the status and trends in condition of Australia's resources at scales that allow broad priorities to be set and outcomes to be measured against those priorities;
- guide policy and program development;
- evaluate regional plans in the context of partnership initiatives (e.g. the Natural Heritage Trust and the National Action Plan for Salinity and Water Quality), to ensure the plans are robust and address priority issues in the region;
- monitor compliance with legislation;
- track progress in initiatives — such as the Defeating the Weeds Menace (DWM), Caring for our Country, and Weeds of National Significance (WoNS) programs, and assess their impacts and effectiveness; and
- meet regional, national and international reporting obligations.

Orange orchard with prickly pear (*Opuntia stricta*).  
Photo Roger Charlton.





Vineyard with spear thistle (*Cirsium vulgare*). Photo Roger Charlton.

### Regional communities and organisations

Regional communities and organisations require data and information about weeds to:

- underpin community participation in preparing, implementing and evaluating natural resource management and invasive species eradication plans;
- help provide an understanding of the geographic distribution of problems and their implications across the region;
- track improvements in the condition of the environment and progress towards meeting targets and agreed outcomes in regional plans;
- assess the effectiveness of land conservation activities; and
- improve awareness of landscape processes.

### Private sector

The private sector requires better information on weeds to:

- target investment; and
- implement environmental management systems.

### Scientific community

The scientific community requires improved weeds related information to:

- better understand biophysical processes;
- create improved landscape management tools (e.g. better simulation models);
- assess the environmental impact of farming systems;
- develop and test improvements in management practices; and
- develop improved natural resource management systems.

### What type of information is most important?

Issues such as biodiversity conservation, sustainable agriculture and the social and economic impacts of weeds pose questions such as:

- How big is the current problem? (i.e. extent and distribution)
- What is it affecting? (i.e. impacts on various themes e.g. agriculture, biodiversity etc.)
- What is being done about it? (i.e. extent of active management)
- How big could the problem get? (i.e. potential distribution and climate change influences)
- What would be the potential impact?

### What is currently available?

A significant number of tools already exist to assist in collecting, collating and presenting information about invasive species, for example:

- i) at state/territory Level: Weed Watcher in Western Australia; the Integrated Pest Management System (IPMS), and Environment Information System, in Victoria; Pest 2000+ in South Australia; and PestInfo and Annual Pest Distribution Survey (APDS), in Queensland, and
- ii) at the national level: the National Land & Water Resources Audit (NLWRA) Atlas, Map Maker, Data Library and Australian Resources Online (ARO).

However, the the survey results indicate that, while several of the needs of diverse user groups are met by these tools, there are important gaps in coverage and capability.

## What is needed?

As illustrated in response to a key question in the user needs survey (see box below), a variety of data is needed in order to answer the earlier questions. Respondents clearly have a high level of need for information to guide and assist weed prevention and control, early detection and eradication, integrated weed management and ongoing maintenance. Other questions elicited strong support for information on extent and distribution, including potential distribution, of weeds — but with some reservations about the quality and reliability of currently available maps and modelled distributions.

Referring specifically to weed management, survey respondents identified a number of information needs, as shown in the box below (responses to question 9 in the survey).

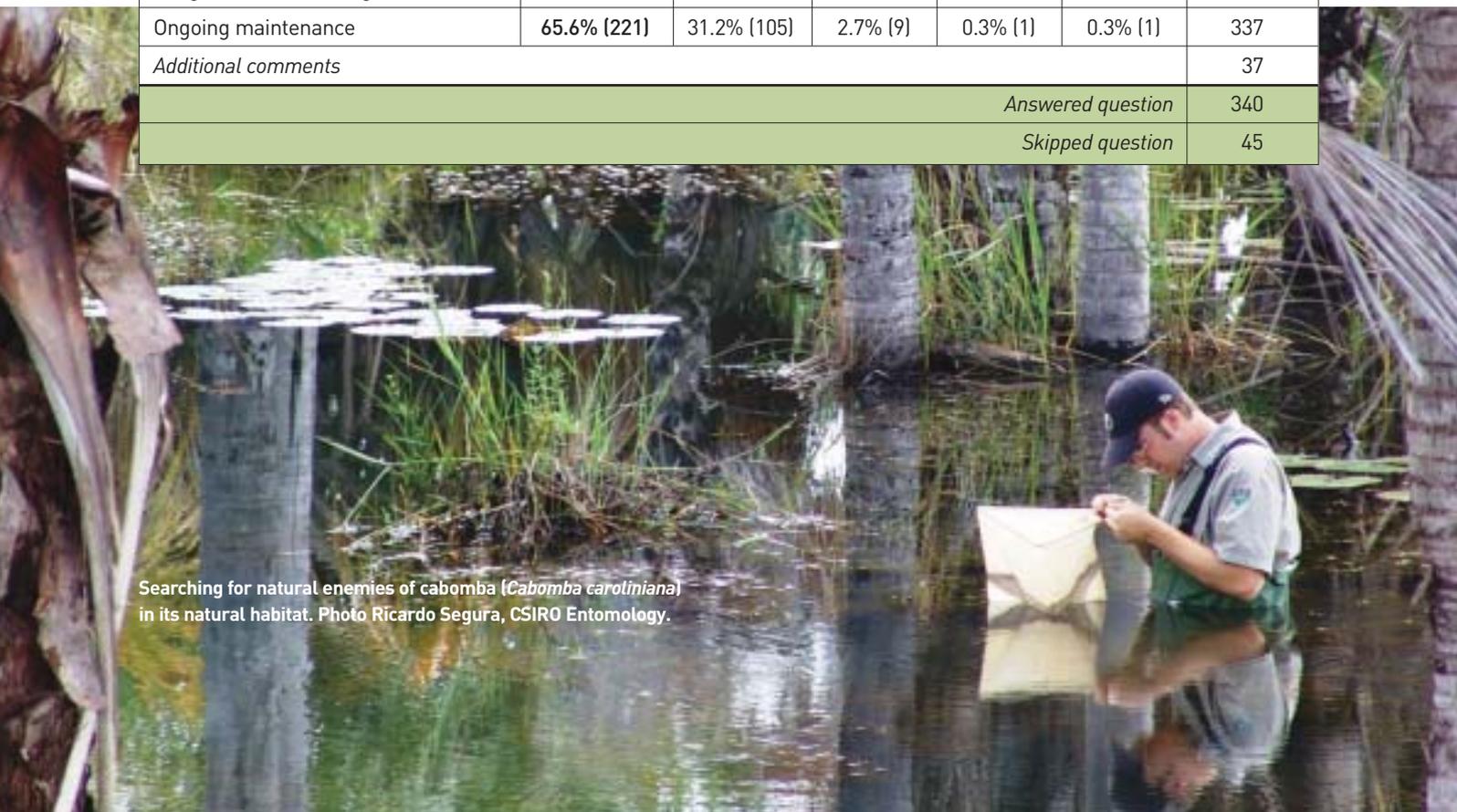
More detailed analysis of the general needs identified provides a wealth of information that will assist in designing a national information system that can meet the needs of the diversity of potential users.

To this end, investment in invasive species data and information must ensure that data are:

- relevant — providing factual social, economic, and environmental information that meet requirements of users with different perspectives, interests and values;
- accessible — presented in a way that is easy to understand and readily available; and
- consistent and comparable — able to be integrated with other data to analyse trends in the state of natural resources.

<b>9. Weed management: A range of specific weed management type of information is potentially available.</b>						
<b>Do you think information on the following would be useful?</b>						
	Strongly agree	Agree	Not sure	Disagree	Strongly disagree	Response count
Weed prevention	70.5% (237)	26.5% (89)	2.4% (8)	0.3% (1)	0.3% (1)	336
Early detection and eradication	77.6% (263)	20.4% (69)	1.8% (6)	0.0% (0)	0.3% (1)	339
Biological control	54.2% (182)	38.1% (128)	5.1% (17)	2.1% (7)	0.6% (2)	336
Physical control	58.3% (197)	37.9% (128)	3.0% (10)	0.6% (2)	0.3% (1)	338
Chemical control	55.9% (189)	37.9% (128)	3.8% (13)	1.8% (6)	0.6% (2)	338
Cultural control	51.8% (174)	36.3% (122)	10.4% (35)	1.2% (4)	0.3% (1)	336
Integrated weed management	69.3% (232)	26.9% (90)	3.3% (11)	0.3% (1)	0.3% (1)	335
Ongoing maintenance	65.6% (221)	31.2% (105)	2.7% (9)	0.3% (1)	0.3% (1)	337
<i>Additional comments</i>						37
<i>Answered question</i>						340
<i>Skipped question</i>						45

Searching for natural enemies of cabomba (*Cabomba caroliniana*) in its natural habitat. Photo Ricardo Segura, CSIRO Entomology.



## Can BioSIRT be adapted to meet national weeds information needs?

BioSIRT (Biosecurity Surveillance Incident Response and Tracing) is a spatial and textual web based software application being developed to enable better management of information and resources in emergency responses across animal or plant diseases, pests and incursions. BioSIRT will be used by each jurisdiction for managing emergency and routine incidents. When planning the end-user needs project, it was anticipated that new modules may be able to be designed to adapt BioSIRT to other user needs. Where possible it is highly recommended that such systems utilise the standards developed for BioSIRT as part of a national set of core attributes<sup>1</sup>, to facilitate interoperability<sup>2</sup> and linkage with BioSIRT.

After consultation with BioSIRT domain experts and BioSIRT state-based administrators it was decided that in its current form BioSIRT is not suited to the capture, collation, storage and mapping of invasive species information for use by the general public. Existing web-based mapping programs such as Weed Watcher with simple user interfaces and functionality are considered more practical for this purpose.

In this respect, consideration should be given to making such systems cover all of Australia. Where possible it is highly recommended that such systems utilise the standards developed for BioSIRT to facilitate interoperability and linkage with BioSIRT.

## Conclusions

Based on the findings of the current project a number of important issues have been identified. Key among these are that:

- To date, there is no nationally agreed information system in place for the collection, collation, storage and management of invasive species data and information and many believe there is a need for such a system to be introduced. Significant improvements have been obtained in recent years, though further work is required before a national system can be put in place.
- Most jurisdictions and organisations (e.g. local governments) have disparate datasets on existing distribution, while existing datasets on potential distribution are considered to be poor.

- Most users require a national system to include a range of data and information including management and policy, legislation, identification, access to research results and reporting tools. Streamlining access to such data and information has been identified as a high priority.
- Enhanced coordination is required to improve efficiencies and remove duplication.

Overall, it is clear that there are great efficiencies to be gained when data and information are acquired, processed and disseminated based on agreed standards and within a collaborative framework involving all levels of data providers and users.

The results of the current project provide a valuable basis from which to pursue the development of a national information system for weeds.

1. Thackway, R., McNaught, I. & Cunningham, D. 2004, 'A national set of core attributes for surveying, mapping and monitoring weeds of national significance', in B.M. Sindel & S.B. Johnson (eds), *Weed management: balancing people, planet, profit*, Papers and proceedings of the 14th Australian Weeds Conference, Wagga Wagga, New South Wales, Australia, 6-9 September 2004.
2. Interoperability is defined as the capability to communicate, execute programs, or transfer data among various functional units in a manner that requires the user to have little or no knowledge of the unique characteristics of those units (ISO 2382-1). Interoperability of spatial information means direct, on-demand access to distributed web-services that support business processes.

This paper is based on the report 'Assessing end-user needs of a national information system for weeds' by Christopher Auricht and Graham Yapp. The full report is available at [lwa.gov.au/weeds](http://lwa.gov.au/weeds)

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