A review of the National Weed Detection Project

S. Jane Morton
Cooperative Research Centre for Australian Weed Management, Queensland Herbarium, Brisbane Botanic Gardens Mt Coot-tha, Mt Coot-tha Road, Toowong Queensland 4066, Australia
Email: jane.morton@epa.qld.gov.au

Summary Prevention and early intervention are the most cost-effective means of dealing with potential, new and emerging weeds in Australia. Drawing on previous and new initiatives, the National Weed Detection Project (NWDP) has tested a model for community-based weed detection in Queensland. Six regions have been involved, covering a substantial area of Queensland. The Weeds CRC and the National Heritage Trust (NHT) have provided funding, with substantial collaboration with the Queensland Herbarium. With the NHT final reporting phase in October 2007 and the conclusion of the trial project in June 2008, the opportunity exists to review the NWDP. This paper will examine two of the principal aims of the project.

Keywords Weed detection network, NWDP, community-based, volunteers, Weed Spotters, weed surveillance.

INTRODUCTION

Weeds are and continue to be a significant threat to the primary industries and natural resource management sectors in Australia. Monetary costs to Australian agriculture are over $4 billion per annum in lost production, contamination and control costs (Sinden *et al.* 2004). Invasive species spread is considered one of the three system-wide threats to Australia's biodiversity (Natural Resource Management Ministerial Committee 2005) and weeds in particular are a key cause of biodiversity loss in nature conservation reserves across Australia (Coutts-Smith and Downey 2006).

Yet, one of the major weaknesses in Australia's defences against new weeds is the lack of a national early warning detection and surveillance system. In October 2007 the final report 'Building a national, community-based model for preventing new weed incursions' (Morton 2007a) was delivered to Department of Agriculture, Fisheries and Forestry (DAFF) as part of the funding contract for the National Weed Detection Project (NWDP).

The key objective of the NHT funded project was to address the weakness in the early stages of invasive species management *by building a better incursion detection capability in regional Australia through harnessing and fostering community interest and skills in invasive plants, and assisting herbaria to play a supporting role*.

A review of the principal aims of the project was presented in Morton (2007b). This paper will examine further two of the principal aims of the project: 1) to create a new model for other states to adopt and/or adapt in the early detection of invasive plants and 2) to develop a conceptual framework for a new national system.

TO CREATE A NEW MODEL

Since June 2004 the Weeds CRC has developed and road-tested the pilot early detection model known locally as the Queensland Weed Spotters network.

Benefits The benefits of the pilot include Weed Spotters submitting over 800 naturalised plant specimens to the Queensland Herbarium with 61% of these being incorporated into the Herbarium collection. One new naturalisation to Australia, six new naturalisations to Queensland, 12 doubtfully naturalised species to Queensland and over 159 new records of declared species were submitted providing qualitative data to those state authorities whose core business is verification, notification and response to new weed incursions. Over 502 people receive the Weed Spotters newsletter informing them about the new and emerging weeds in Queensland and 274 people were trained in collection techniques involving over 28 community groups from the pilot regions.

In addition, the project provided active surveillance of high-impact potential weeds (Class 1 taxa under the *Queensland Land Protection (Pest and Stock Route Management) Act 2002* and improved confidence that high-impact Class 1 taxa are not yet in Queensland.

Other long-term benefits that are estimated to go far beyond the life of the project are:

- Increased awareness of new and emerging weeds at a local and regional level.
- More people know about the Queensland Herbarium and its services and how to access these, resulting in high quality specimens that are more likely to be kept as vouchers.
- Natural resource management regional bodies

have become interested and have a ready-made framework and support network which will assist them with weed project concepts and funding.
- Community groups are networked with others around Queensland and will feed off each other's ideas (this is primarily through the newsletter).
- Spotters get to know their own patch and each other, which can readily lead to further local awareness and action.

Impediments Six main impediments to managing the early stages of invasive species invasion were identified.

1. Taxonomic skill shortage The pilot highlighted the taxonomic skill shortage in Australia. Expertise and knowledge required to identify a large proportion of weeds resides with taxonomists in herbaria in Australia. These herbaria need to have the capability and resources to validate weed specimens through botanical expertise and national and international networks associated with plant taxonomy. It is the plant taxonomist with detailed knowledge of plant species who identifies non-indigenous taxa when first encountered. Plant taxonomists are most certainly the first line of defence, and the cheapest, against economic losses from exotic species.

In Queensland and across Australia, curators of plant families in some cases are non-existent or are at post-retirement age continuing in a voluntary capacity, and the expertise is not being sustained. All herbaria have backlogs of unstudied specimens and undescribed new species. It is crucial that we have the taxonomic skills in Queensland and Australia to identify new and emerging weeds and revise existing weed species groups, especially where species are difficult to identify.

2. Baseline data for the pilot regions No Australian herbaria have adequate data on naturalised flora. Unless active surveillance for new and emerging weeds is funded through external organisations, national data, such as available through the Australian Virtual Herbarium (AVH) will not reflect the current distribution of naturalised flora for a particular region.

3. Response to Weed Spotters' finds Difficulty in providing a response to spotters' finds was often highlighted in the pilot. Weed Spotters collected species which were not declared under either state regulation or local declaration, yet in some cases they were potential weeds that for strategic reasons required a quick response. Here the project coordinator needed to provide sufficient information to the local agency in the hope that the agency would have the funds to respond.

4. Lack of available weed risk assessment material The paucity of weed risk assessments for Queensland creates a substantial gap in the invasive species management process. The pilot project detected new and emerging weeds; the next stage is to assess whether these weeds are a potential threat to Queensland. Unless there is a formal, accepted and timely process available for agencies to source this information, the response system will continue to be *ad hoc*. This is particularly unsatisfactory when early detection might still allow eradication.

5. Retaining volunteers in the network Weed Spotters volunteer their time to detect new and emerging weeds. It is important to make them feel valued, supported, recognised and rewarded for their efforts. The main challenges for retaining volunteers in the network have been:
- spotters become discouraged when they have provided a specimen of a weed species they consider to be a potential threat in their region and the assessment information is either non existent or the weed species may be considered a minor weed compared to the transformer weeds in that region.
- episodic volunteering continues to be the growing trend. Volunteers are increasingly looking for meaningful and challenging roles such as jobs with tangible and measurable outcomes and an end date.

6. Spotter finds at local nurseries Further to this is the issue of Weed Spotters collecting new naturalisations of weed species that are being sold locally by the nursery industry. There is no component in the existing pilot to engage with the nursery industry, nor for Weed Spotters to be involved in detecting potentially weedy species being sold by local nurseries.

TO DEVELOP A CONCEPTUAL FRAMEWORK

The conceptual framework developed consists of five elements designed to assist with establishing a weed alert early warning system in Australia (Morton 2007b). These elements are the fundamentals of the early stages of invasive species management. Each element and associated goals are listed below.

1. Detection and surveillance Establish a community weed detection network to enhance the reporting of potential, new and emerging weeds in Australia. Establish a surveillance network of professional botanists to enhance the reporting of potential, new and emerging weeds in Australia.

2. Identification and vouchering Improve the capacity of herbaria to effectively and rapidly identify, voucher and report suspected invasive plants.

3. Notification systems Improve the capacity of herbaria to effectively and rapidly notify national, state and territory authorities of suspected invasive plants.

4. Rapid assessment Conduct accurate and reliable science-based weed risk assessments of verified new plants and potential weed threats to Australia.

5. Information management Develop an information management system to store data on both people involved in the network and the weed species submitted through the network. Promote the development of a Web-based information system comprised of plant databases, WRA sites, weed management strategies, photo gallery, and information and awareness material on known and potentially invasive plants. Include taxonomy, distribution, ecology, biology, classification (regulatory and ecological) impacts, and management.

In addition to the goals, strategic actions for applying the framework were listed, as well as the impediments that would need to be addressed.

The following five key recommendations were delivered to DAFF based on the outcomes of the pilot model and the conceptual framework. These recommendations are fundamental to addressing the weakest point in the early stages of invasive species management in Australia.

Recommendations

1. Adopt the five elements in the conceptual framework for establishing a weed alert early warning system in Australia.
2. Support the continuation of existing weed alert early warning systems in Queensland and Victoria. Explore the possibilities in other states and territories in collaboration with government agencies.
3. Endorse the expansion of a national weed categorisation and risk assessment system. A database containing risk-assessed species delivered through the categorisation system should be made available to the public. This should include the designation and support of a specialist national weed risk assessment officer to guide agency decisions in a consistent, science-based manner across Australia.
4. Develop a formal early warning system for Australian herbaria. Conduct a national workshop involving senior herbarium and senior weed policy representatives to seek a consistent formal early warning system for Australian herbaria. Establish protocols and procedures for reporting new state and national plant records.
5. Increase the capacity of Australian herbaria to identify and voucher weed species. Increase resources for Australian herbaria for the identification and vouchering of new and emerging weeds and the taxonomic revisions of existing weed species, especially where species are difficult to identify.

ACKNOWLEDGMENTS

Thank you to the NWDP reference group for their help and guidance on this project, the Regional Coordinators for their dedication, the staff at the Queensland Herbarium who have supported the project and Weed Spotters in Queensland who have committed their time and enthusiasm to the project.

REFERENCES

Coutts-Smith, A. and Downey, P. (2006). Impact of weeds on threatened biodiversity in New South Wales. CRC for Australian Weed Management, Technical Series No. 11.

Natural Resource Management Ministerial Council (2005). Record and Resolutions, Ninth Meeting, Launceston, 27 October 2005. Resolution 9.11 'National Biosecurity and Invasive Species Management', pp.71-4. Department of Agriculture, Fisheries and Forestry, Canberra.

Morton, S.J. (2007a). Building a national, community-based model for preventing new weed incursions. National Heritage Trust Final report. Department of Agriculture, Fisheries and Forestry, Canberra.

Morton, S.J. (2007b). A community based weed detection network: developing a model for application in Australia. Proceedings of the 9th Queensland Weeds Symposium, pp.751-4. (Weed Society of Queensland, Brisbane).

Sinden, J., Jones, R., Hester, S., Odom, D., Kalisch, C., James, R. and Cacho, O. (2004). The economic impact of weeds in Australia. CRC for Australian Weed Management, Technical Series No. 8.