

Rural landholder attitudes towards the responsibilities and action for managing declared weeds in Western Australia

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Summary

If the role of government in weed management is reduced, the community will need to play a greater role in maintaining or improving the control of declared and invasive weeds. The main objective of this study was to identify barriers and opportunities for greater community investment in declared weed management. A phone survey of 200 landholders in the southwest of Western Australia was conducted to determine attitudes relating to declared and invasive weed management. The level of concern about the spread of both agricultural and environmental weeds was high. The majority applied several biosecurity measures on their property. State government officers provided a valued information source for landholders. Community-based catchment coordinators did not have a widely recognized role in delivering weed management information. Consistent with the public good aspects of invasive weed management, landholders expressed a perceived need and responsibility for government to provide an ongoing role in the control of declared weeds. Support for maintaining a declared plant list was almost unanimous. A high proportion of landholders expressed a willingness to report the presence of declared weeds, not only on their own property, but also on neighbouring properties. However, familiarity with the Declared Plant list for their region was limited. Overcoming this lack of familiarity may increase the potential role for the community in declared weed management.

Introduction

Weeds are an important threat to Western Australia's biodiversity assets (Hancock *et al.*, 1996) and agricultural productivity, with approximately 1000 naturalized weed species in Western Australia (Hussey *et al.* 1997). In addition to the impacts invasive weeds have on our natural environment, weeds were estimated to cost Australian agriculture \$3.3 billion in 1996 (SEAC 1996).

The Agriculture Protection Board (APB) in Western Australia has statutory authority for controlling a list of declared weeds on agricultural and other land. The Department of Agriculture Western Australia (DAWA) provides the service delivery, including investment in the enforcement of the legislation, public awareness and research relating to declared weeds.

In Western Australia there are currently 83 Declared Plants (DAWA 2003a). Under the *Agriculture and Related Resources Protection Act 1976*, landholders are required to control Declared Plants on their property, with control requirements depending on the declaration status of the plant. The APB examines submissions from local shires or other representative groups, to declare a plant, or alter the management category already assigned to a Declared Plant. This is based on factors such as the weed's distribution and rate of spread, the losses it is causing, the effects of control efforts and comparison to other weeds (DAWA 2003b).

While DAWA oversees weed management protocols on agricultural lands, the Department of Conservation and Land Management oversees weed control in national parks, nature reserves, state forests and unvested land. Shires (vested land) and utility providers (such as Western Power, Alintagas, WA Government Railways, Main Roads etc.) oversee the protocols for controlling weeds on their respective lands. The Australian Quarantine and Inspection Service is responsible for overseeing the protocols for reducing accidental and intentional introductions of current and potential Declared Plants.

Socioeconomic factors often play a larger part than ecological factors in plant invasions (Hobbs and Humphries 1995, Perrings *et al.* 2002). If government resources for local weed management decline, landholders and the community will need to assume a greater role in order to maintain current management levels. This includes minimizing the spread of existing weeds and the prevention and detection of new weed incursions.

Compared to management of the major cropping weeds, invasive weed control has greater 'public good' characteristics. This is likely to affect how much landholders will be prepared to invest in the management of weeds that are not imposing a major cost on their agricultural production (Pannell 1994). Recognizing the 'public good' nature of declared weed management and any resulting market failure conditions will be important when considering what role landholders can be expected to embrace.

Other surveys have covered distribution, rate of spread and relative importance of cropping and environmental weeds (see Stansbury and Scott 1999, Jones *et al.* 2000). This paper examines the attitudes of Western Australian landholders towards issues, responsibilities and actions relating to the management of declared weeds. The main objective is to identify barriers and opportunities for the shift towards greater community investment in declared weed management.

A survey was conducted that aimed to:

1. determine the perceived importance of weed management to landholders;
2. identify who landholders perceived as being responsible for invasive weed management; and
3. identify landholders' main sources of declared weed management information.

Results from the survey of Western Australian rural landholders are presented together with likely implications for achieving greater community action to maintain or improve management of invasive weeds.

Methods

Several meetings were held with DAWA's APB personnel to identify key weed management issues. The survey was developed by DAWA around these issues and, in 2002, an independent company (Asset Research) was commissioned by DAWA to conduct a phone survey. Two hundred landholders across eight shires in the southwest answered the questionnaire, with an overall response rate of 54%. Response rates were different in each shire.

The respondents were randomly selected from each region using a list of farmers supplied by DAWA. An equal number of responses (25) were drawn from the shires of Esperance (33.83°S, 121.89°E), Albany (35.02°S, 117.88°E), Jerramungup (33.51°S, 119.04°E), Manjimup (34.25°S, 116.14°E), Serpentine/Jarrahdale (32.33°S, 116.08°E), Toodyay (31.58°S, 116.47°E), Narrogin (32.93°S, 117.17°E) and Merredin (31.47°S, 118.27°E) (see Figure 1). These regions have varying degrees of weed infestation and present a varied sample of landholders involved in the grains, livestock and horticultural industries

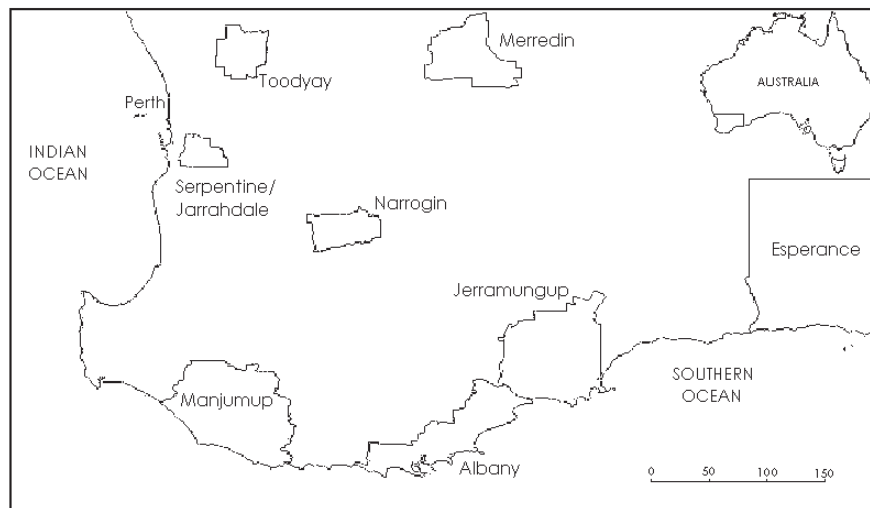


Figure 1. Map showing sample regions in southwest Western Australia.

The questionnaire included attitude statements with answers on a scale from 'strongly agree' to 'strongly disagree' or 'don't know' (see Table 1). Demographic questions such as age, membership of Landcare or weed action groups and main farming enterprises were also asked.

Results

Respondents were involved in various enterprises, although most were involved in

sheep and cropping enterprises, with 10% involved in horticulture and dairy enterprises. Nine per cent of respondents were under 35, 53% between 36 and 55, and 77% of respondents were male. Thirty nine per cent of respondents were members of a Landcare group or weed action group.

Extent of concern with weeds

A high proportion of respondents believed the farming community was

concerned with the spread of weeds, with 83% concerned about the spread of agricultural weeds and 75% concerned about the spread of environmental weeds (Statements 1 and 2, Table 1). Ninety-one per cent of respondents believed that weeds on roadsides, parks, reserves or public land were a serious threat to agriculture or the environment (Statement 3, Table 1).

Action against weeds

The level of concern about the spread of weeds is reflected in the high proportion of the farming community that indicated they were prepared to take on an invasive weeds surveillance role. Eighty-seven per cent of respondents indicated that they would report unfamiliar or declared weeds found on their property (Statement 4, Table 1). Seventy-one per cent indicated that if they discovered a declared weed on their neighbours' property and the neighbour was taking no action to control or eradicate it, they would report it to DAWA (Statement 5, Table 1).

Respondents indicated that they regularly conducted biosecurity measures to prevent weed spread. A majority of growers agreed that they always check against introducing weeds onto their property by checking machinery and vehicles (78%), and by checking livestock, fodder and

Table 1. Responses to questions regarding extent of concern about weeds and action against weeds.

Statement	Per cent of respondents					
	Strongly agree	Agree	Neither/nor	Disagree	Strongly disagree	Don't know
1. The farming community is not concerned with the spread of agricultural weeds.	3	8	5	37	46	1
2. The farming community is not concerned with the spread of environmental weeds.	2	11	10	33	42	2
3. Weeds on roadsides, parks and reserves or public land are not a serious threat to either agriculture or the environment.	2	5	1	50	41	1
4. If I were to discover a Declared Plant on my property I would report it to the Department of Agriculture.	28	59	6	5	1	1
5. If I were to discover a Declared Plant on my neighbour's property and they were taking no action to control or eradicate it I would report it to the Department of Agriculture.	13	58	10	15	0	4
6. I always check against introducing weeds onto my property by checking livestock, fodder and grain.	12	61	15	11	1	0
7. I always check against introducing weeds onto my property by checking machinery and vehicles.	10	68	10	12	0	0
8. The State Government should be responsible for controlling or eradicating weeds on roadsides, parks and reserves.	24	67	8	0	0	1
9. Financial incentives should be made available to encourage farmers to control or eradicate declared weeds on their properties.	9	73	8	7	1	2

grain (73%) (Statements 6 and 7, Table 1).

While most respondents believed that weeds on roadsides, parks, reserves or public land were a serious threat to agriculture or the environment, 91% indicated that the State Government should be responsible for controlling or eradicating weeds on such public lands (Statement 3 cf. Statement 8, Table 1). Eighty-two per cent believed that financial incentives should be made available to encourage farmers to control or eradicate declared weeds on their own property (Statement 9, Table 1).

Awareness and importance of Declared Plant list

Almost all landholders (96%) thought it necessary to maintain a Declared Plant list (Statement 1, Table 2). However, only 51% of landholders consider themselves familiar with the Declared Plant list for their region (Statement 2, Table 2). A high proportion of respondents (70%) were aware that, by law, a person with a Declared Plant on their property is responsible for its eradication or control (Statement 3, Table 2).

Sources of information

One third of landholders thought that too little was being done to educate farmers about weed control and eradication methods (Statement 4, Table 2). The majority of landholders said that if they need information about weed control or eradication methods they contact DAWA (81%) (Statement 5, Table 2) and believed that

advice from DAWA Agriculture Protection Officers (APOs) to be worth following (71%) (Statement 6, Table 2). Only 38% of landholders agreed that the Catchment Coordinator in their region was a good source of weed information, with just over 40% of respondents being unsure if their Catchment Coordinator was a good information source (Statement 7, Table 2).

Discussion

Western Australian landholders expressed a high level of concern about the spread of weeds and almost unanimous support for a declared plant list. A high proportion of landholders expressed a willingness to report the presence of declared weeds to DAWA, not only on their own property, but also on neighbouring properties. However, a substantial proportion of landholders were not familiar with the Declared Plant list for their region. This lack of awareness may be a potential limitation to the community's monitoring and surveillance role.

Landholders perceived that weeds on public lands were a major threat to agriculture and the environment, and the control of these weeds should be the government's responsibility. Consistent with the public good aspects of invasive weed control, the need for a substantial role for government was suggested. This includes a high proportion of landholders who believe that financial incentives should be made available for farmers to control or eradicate declared weeds on their own properties.

DAWA's APOs were used by most landholders as a source of information regarding control methods, with APOs seen to be providers of valuable weed management advice. As part of the shift to greater community responsibility for weed management, the education, training and research component of the Weed Plan for Western Australia (SWPSG 2001) recommends the development of community group partnerships. This is part of the recommended strategic action of (encouraging) greater communication and liaison between groups involved in weed management. Catchment Coordinators are often facilitators of groups such as Weed Action or Landcare Groups.

The results show that a large proportion of respondents were unsure of the role of a Catchment Coordinator as a source of weed management or eradication information. The role of Catchment Coordinators in delivering weed management information will need to be not only promoted, but substantially developed if they are to become widely recognized and utilized sources of weed management information.

Extension efforts to increase the community's role in declared weed management and promote identification of declared plants may lead to greater benefits if they build on landholders' stated willingness to report weed outbreaks. Such efforts could actively engage community-based officers such as catchment coordinators to develop and promote their role as local sources for weed management information. This may

Table 2. Responses to questions regarding the awareness and importance of the Declared Plant list and sources of information.

Statement	Per cent of respondents					
	Strongly agree	Agree	Neither/nor	Disagree	Strongly disagree	Don't know
1. It is no longer necessary to maintain a 'Declared Plant' list for the State.	0	2	1	63	33	1
2. I am familiar with the 'Declared' list for my region.	1	50	9	28	11	1
3. By law, a person with a 'Declared Plant' on their property is responsible for eradicating or controlling it.	10	60	7	11	3	9
4. Too little is being done to educate farmers about weed control and eradication methods.	2	31	12	45	3	7
5. If I need information on eradication and control methods for weeds in my region I contact the Department of Agriculture.	6	75	7	9	3	0
6. Recommendations and advice from the Agriculture Protection Officers is generally worth following.	5	66	13	7	1	8
7. The Catchment Coordinator in my region is a good source of information regarding the management and eradication of weeds.	7	31	6	11	4	41

be more easily achieved if more landholders were involved in organized Landcare groups with an interest in weed management or Weed Action groups. However, for extensive community involvement in weed programs, participation beyond the limited active membership of such groups is needed.

The study has identified some barriers and opportunities for increasing the role of the community in managing declared weeds. Awareness of the weed problem is high and landholders recognize the need for action. Limitations to the community's role and level of investment were evident, consistent with the public good aspects of invasive weed control. However, the very strong support for maintaining a declared plant list and a high willingness to participate in surveillance and reporting demonstrates the potential for furthering the community's role. Raising familiarity with the declared weed list will be a necessary step in this process.

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References

- Agriculture and Related Resources Protection Act 1976*. http://www.austlii.edu.au/au/legis/wa/consol_act/aarrpa1976458/notes.html, last accessed 28/5/04.
- DAWA (Department of Agriculture Western Australia) (2003a). Declaring Plants in Western Australia. URL: http://agspsrv34.agric.wa.gov.au/programs/app/dec_pl/Index.htm, last accessed 28/5/04.
- DAWA (Department of Agriculture Western Australia) (2003b). Declared Plants. URL: http://agspsrv34.agric.wa.gov.au/programs/app/dec_pl/declaredplants.htm, last accessed 28/5/04.
- Hancock, C.N., Ladd, P.G. and Froend, R.H. (1996). Biodiversity and management of riparian vegetation in Western Australia. *Forest Ecology and Management* 85 (1-3), 239-50.
- Hobbs, R.J. and Humphries, S.E. (1995). An integrated approach to the ecology and management of plant invasions. *Conservation Biology* 9 (4), 761-70
- Hussey, B.M.J., Keighery, G.J., Cousens, R.D., Dodd, J. and Lloyd, S.G. (1997). 'Western Weeds. A guide to the weeds of Western Australia'. (The Plant Protection Society of Western Australia (Inc.), Victoria Park, Western Australia).
- Jones, R., Alemseged, Y., Medd, R. and Vere, D. (2000). The distribution, density and economic impact of weeds in the Australian annual winter cropping system. CRC for Weed Management Systems Technical Series No. 4. CRC for Weed Management Systems, Australia.
- Pannell, D.J. (1994). Economic justifications for government involvement in weed management: a catalogue of market failures. *Plant Protection Quarterly* 9, 131-7.
- Perrings, C., Williamson, M., Barbier, E.B., Delfino, D., Dalmazzone, S., Shogren, J., Simmons, P. and Watkinson, A. (2002). Biological invasion risks and the public good: an economic perspective. *Conservation Ecology* 6(1), 1.
- SEAC (State of Environment Advisory Council) (1996). Australia: State of the Environment 1996. (CSIRO Publishing, Melbourne).
- SWPSG (State Weed Plan Steering Group) (2001). A weed plan for Western Australia. October 2001. (Department of Agriculture Western Australia, Perth).