

Best practice for on-ground property weed detection (UNE62)

Final Report to Land & Water Australia

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1 Executive Summary

Weedy species will continue to enter Australia while existing species expand their range via various pathways of weed spread (the subject of Defeating the Weed Menace Project UNE61 – Pathway Risk Analysis for Weed Spread within Australia), particularly as changes in climate occur. The first step in controlling such weedy species is successful detection, and the sooner after introduction that this can be achieved, the more effective management strategies are likely to be.

A large proportion of Australia is privately owned or managed by farmers and graziers, and yet no one has undertaken a comprehensive study to ascertain current weed surveillance levels and practices amongst these landholders. Likewise, public officers in most states and territories have a specified inspection function for weeds but how the states compare in their effectiveness has not been known. Information on existing landholder and weed inspector search patterns (particularly on their best and proven techniques) and data management and use, needed to be collected before we attempt to develop and extend more widely efficient methods for surveying and eradicating emerging weeds.

Two national surveys were therefore undertaken, one of landholders and one of weeds inspectors to determine 1. what the current inspection patterns are for weeds on Australian farms, 2. what steps landholders and inspectors take to report and obtain correct identifications of new species, and 3. which of these surveillance and reporting strategies are most effective at detecting, identifying and eradicating new invasions.

1.1 Weed Inspectors

1.1.1 Weed spread (pathways)

According to weeds inspectors, weeds are most likely to spread onto Australian farms via the natural pathways of birds, wind, water and other animals, as well as by machinery and vehicles, the fodder trade and construction and landscaping materials, though this response varied between states depending on their geography and agricultural enterprises.

1.1.2 Weed surveillance

The surveillance strategies of inspectors are determined most notably by their own professional judgement, legislative guidelines, and availability of resources. Target lists of weeds are used by the majority of inspectors when searching for weeds, and are particularly important in Victoria. Respondents from Tasmania on the other hand are relatively less likely to use target lists. Declaration of a new weed is viewed by a slim majority of respondents as a positive influence on farmer weed surveillance, though the intended visit of a weeds inspector is viewed as influential by over 75 per cent of respondents, perhaps being a more direct 'threat' than declaration.

Inspectors are most likely to target 'high risk' properties, with known target weeds, a history of weed introductions, located near known infestations, or for which complaints have been received. Overall, all inspectors carry out frequent inspection of locations where weeds have been found previously. Less than one fifth of inspectors inspect on an ad hoc basis. Victorian inspectors appear to be more thorough in their inspections of properties. The higher the percentage of properties inspected regularly, the greater the time usually between property visits.

Time of year appears to be the most important factor determining when inspectors look for new weeds, though this factor prompts respondents from SA, WA, NT and Victoria to look for new weeds more than it does for those from Tasmania, NSW and Queensland. The most frequently used form of transport when inspecting for weeds are passenger vehicles and on foot. Likely hospitable areas are generally targeted, though a random walk or drive is also commonly used, rather than specific transects. The average area of a paddock inspected overall is 62.8 per cent but this varied between states. For example, Victorian respondents inspect almost twice the area in each paddock than SA respondents. The surveillance and detection strategies believed to work best include regular visual inspections of properties, responding to complaints and hearing word of mouth about new weeds, and education and extension activities. Overall, respondents are reasonably satisfied with their weed surveillance strategies. Victorians are the most satisfied while Tasmanians are the least satisfied. New weeds are most often found along roads, water ways, and where livestock are fed.

1.1.3 Weed identification

To identify a new plant, weeds inspectors mostly refer to weed identification books and brochures, consult with other local experts such as agronomists and send specimens away to herbaria and botanic gardens. Nearly half of the inspectors have no problem identifying plants. However, the most commonly indicated impediment is insufficient experience.

1.1.4 Weed recording and reporting

Weeds inspectors appear to use a variety of procedures to record the occurrence of a new weed, though the most commonly indicated include using GPS to record the weed's location, recording the location in a database, and marking it on a map. The software used includes various GIS and mapping packages, and tailored database packages including Pestinfo and IPMS (specific to Victorian weeds inspectors). While the response group was

ambivalent about whether there were impediments to standardised reporting, those who see such impediments believe that the main ones are inflexible or non-standardised reporting systems. IPMS in particular is viewed by Victorian respondents as an antiquated system.

Over 74 per cent of respondents have experienced hesitance on the part of landholders to report weeds caused by the costs associated with weed control, fear of potential sanctions or enforcement, lack of interest, and insufficient knowledge. Respondents are relatively undecided overall as to whether information on the distribution of weeds on private property should be made publicly available.

1.1.5 Detection response

Inspectors appear to undertake a range of responses to discovery of a new weed. The highest proportion carries out further searching to map the distribution of the weed. Overall, respondents have rated the level of coordination of response to weed outbreaks as being reasonably good, being rated highest in SA and lowest in the NT. Stress and burnout amongst weeds inspectors appears to be more prevalent in Victoria and WA, and less prevalent in Queensland.

1.1.6 Landholder commitment

Inspectors consider that landholders have a moderate commitment to weed detection overall, with only just over 10 per cent believing that landholders have a high level of commitment. The main incentives committing landholders to weed detection and control are believed to involve landholder knowledge, while the main impediments to landholder commitment involve various 'costs' (financial, time, staffing). The landholders assessed as least committed to weed detection are part-time farmers (absentee landholders, lifestyle farmers, and farmers with off-farm employment).

1.1.7 Government commitment

The most committed government agencies according to the inspectors include weeds authorities, and State agriculture and environment departments, while the least committed include State crown lands departments, roads authorities and the Commonwealth government.

1.1.8 Improvements to on-ground detection

Most (76 per cent) inspectors believe that weed surveillance could be improved through supply of increased resources and personnel, community awareness and education, and through more of their time being devoted to in-field detection work. Although less critical, improvements to weed identification would involve weed identification training for staff, landholders, volunteers and the general public, as well as dedicated weed identification resources.

Other suggestions for improving weed detection involve the themes of training and education of staff, landholders and the general public, increased government resources and funding, improving inspection techniques, and changes to legislation.

1.2 Farmers

1.2.1 Weed information

The individual weeds of most concern to landholders overall are thistles, followed by Paterson's curse, Bathurst burr and blackberry, though these percentages varied considerably between states, while when minor species were grouped, those weeds of most concern were other perennial broadleaf weeds (29.0 per cent), followed by other annual broadleaf weeds (24.6 per cent), perennial grasses (18.3 per cent), woody weeds (18.1 per cent) and other annual grasses (9.5 per cent). Only 3.5 per cent of farmers interviewed are concerned about vines.

1.2.2 Weed spread pathways

'Natural' pathways of weed spread (birds, wind, water) are thought to account for the spread and start of most new weed outbreaks. Variation in response on a state or territory, or property type basis may reflect topographic/landscape features, management philosophies, and circumstances. For example, water and floods are considered to be of minor importance in weed spread in SA where much of the state is dry and there are few major river systems.

1.2.3 Weed surveillance

The great majority of farmers (84.3 per cent) check for weeds on a regular basis though most (65.3 per cent) do so while conducting other on-farm tasks.

Most farmers consider that weed declaration makes no difference to checking for weeds, though it does make a difference for a small majority of WA interviewees, suggesting more effective declaration strategy and promotion in that state. Only 4.8 per cent of landholders indicate that the impending visit of an inspector makes them change their weed checking activity, which is in contrast to the more favourable perception of this impending visit amongst weed inspectors surveyed.

Farmers believe that weed authorities should focus on making sufficient information available to landholders on target plants rather than focusing on getting landholders to simply report suspicious plants to authorities, although 28.5 per cent suggest that both strategies would be useful. More farmers than inspectors (65.3 per cent) believe that weed distribution information on private property should be made publicly available. However, NSW interviewees are less likely to agree with this than their counterparts, especially those in Queensland. Popular reasons for making the information available includes that it made landholders better informed and is in the community interest, while a relatively high proportion suggest that it is an invasion of privacy.

The majority (66.3 per cent) of farmers concentrate on watered areas of the property, boundaries, traffic areas and previous known infestation areas when checking their farms for weeds. These are the areas where most new weeds are regularly found. Even when new weeds are rarely found in these areas, a high proportion of farmers believe that they are still worth checking. Few areas of a property were considered difficult to check.

Overall, 80.2 per cent of interviewees check for weeds on average every three months or less (at least four times per year). While year-round weed checking is not unusual amongst farmers, overall, 67.3 per cent of farmers check for weeds at particular times of year, a practice relatively more common in SA and WA, presumably due to climatic conditions, such as the distinct break of rainfall in the Mediterranean climates of southern SA and WA. The spring months appear to be the most common time for weed inspection, though the pattern varies on a state and territory and property type basis, depending on when weeds are growing rapidly, such as after rain.

Motor bikes and quad bikes are the most widely used (71.3 per cent) mode of transport by farmers when undertaking surveillance for weeds, followed by passenger vehicles (57.6 per cent). Farmers from Victoria check the largest percentage of a property overall (96 per cent) while those from the NT check the lowest (71.6 per cent). Of all property types, crop farmers check the highest overall percentage (96.5 per cent) and horticulturalists the lowest (86.1 per cent). Approximately half of the farmers believe their surveillance strategy is 'mostly effective' while the other half said that it was 'very effective'.

1.2.4 Weed identification

Having found an unknown weed, 74.8 per cent of farmers will ask a local professional for identification advice, while only 26.6 per cent will look the weed up in a book. Sending the weed away for identification is unusual behaviour amongst farmers. Curiosity, or wanting to know what the weed is, is the main motivation for having a weed identified, to a greater degree than concerns about spread, and possible economic losses.

1.2.5 Weed recording and reporting:

When finding a new weed, 42.1 per cent of farmers will mark the site in the paddock with a stick or pole, while 36.8 per cent will make a record of it in a diary or notebook. The majority of farmers believe that impediments to reporting new weed discoveries include the cost of eradication, threat or fear of legal action, and concern over what other landholders might think.

1.2.6 Detection response

Most farmers will either remove a new weed upon finding it or spray it as soon as possible afterwards, with only about a fifth finding out how to control the weed.

1.2.7 Landholder commitment

Farmers in general believe that, compared with 'professional' farmers, hobby farmers or rural retreat farmers are less likely to check for weeds, followed by absentee owners. Factors likely to encourage landholders to check for weeds included subsidising costs such as spray (17.1 per cent), awareness and advertising (16.4 per cent), and research and publicity into weed cost and impact (14.8 per cent). On the other hand, factors that discourage them from checking for new weeds include cost (39.4 per cent), lack of time or labour (17.1 per cent) and laziness and apathy (11.4 per cent).

1.2.8 Government commitment

Over half of all farmers rate the level of government commitment to weed control as 'low'. However, this percentage varies between states. For example, while 72.4 per cent of Victorian interviewees and 68.2 per cent of those from Tasmania rate the level of commitment as 'low', only 41.9 per cent of interviewees from SA do so.

1.2.9 Improvements in on-ground detection

The largest proportion of farmers interviewed (22.2 per cent) have no suggestions for improving on-ground detection of weeds. However, the relatively high proportion of respondents indicating education and awareness campaigns and improved communication between weeds authorities and landholders suggests that many farmers feel inadequately informed with regard to weed control (an opinion shared by many weeds inspectors). The largest proportion of respondents overall (over 19 per cent) indicated that updated local information or weed notification was a worthwhile initiative. A significantly higher proportion of cropping farmers, compared with the overall response group, are happy with the information on weed detection currently available.

2 Introduction

Around 28,000 exotic plant species have been introduced into Australia since European settlement. More than 2,770 of these have become naturalized, of which around 65% are considered a problem for natural ecosystems and about 35% are considered a problem for agricultural systems (Sinden *et al.* 2004). Weedy species will continue to enter the country while existing species will continue to expand their range within Australia via various pathways of weed spread (the subject of Defeating the Weed Menace Project UNE61 – Pathway Risk Analysis for Weed Spread within Australia), particularly as changes in climate occur. The first step in the control of such weedy species is their detection, and the sooner after introduction that this can be achieved, the more effective management strategies are likely to be.

There have been attempts to develop guidelines for professional surveying and mapping of nationally significant weeds (e.g. McNaught *et al.* 2006) and in national parks (e.g. Anon 2005), weed spotting networks (Morton 2006; Smith 2006), and surveillance techniques for weeds that have already been detected in Australia such as branched broomrape (e.g. Correll and Marvanek 2006). However, a large proportion of Australia is privately owned or managed by farmers and graziers, and yet no one has undertaken a comprehensive study to ascertain current weed surveillance levels and practices amongst these landholders or the noxious weeds inspectors (or their equivalents in each state) that already check properties for new and existing invasive plants.

A recent survey of graziers in southern Australia by Trotter, Reeve, Scott and Sindel for MLA (data unpublished) showed that over 80% of the 900 respondents regularly checked their paddocks for weed infestations, but only 10% either recorded those infestations on maps or marked them in-field. Here then is an existing Australia-wide network of people interested and committed to the detection of weeds ('weed spotters') but whose rigour is assumed to be relatively low. Likewise, public officers in most states and territories (for example, noxious weeds officers in NSW) have a specified inspection function for weeds but how the states compare in their effectiveness has not been explored. Information on existing landholder and weed inspector search patterns (particularly on their best and proven techniques) and data management and use, needed to be collected before we attempt to develop and extend widely more efficient methods for surveying and eradicating emerging weeds.

The research questions to be addressed in this project, therefore, were as follows.

1. What are the current inspection patterns for weeds on Australian farms?
2. What steps do landholders and inspectors take to report and obtain correct identifications of new species?
3. Which of these inspection and reporting strategies are most effective at detecting, identifying and eradicating new invasions?

Whilst weed spotter networks have been set up in Victoria (to survey for new and emerging weeds and State Prohibited Weeds not already in the state) and Queensland (working with community groups, such as bush walkers, to improve the capacity to find and record new weeds in national parks and other environmental areas), much private land is inaccessible to such groups. This project therefore complements these two existing systems by expanding enormously the coverage of land (across industries and land uses) and the number of interested people involved in weed detection networks. Indeed, new weeds have a habit of being introduced to farms in imported feed, grain, pasture seeds, on travelling machinery and by livestock. Consequently, one of the best tools for detection of new weeds is landholder's eyes in their own paddocks.

Supplementing landholders are noxious weed managers. The role of this latter group is different in each state and territory and it is therefore essential to collate information from all jurisdictions to obtain a complete picture of inspection patterns (for example, methods, location, frequency, seasonality, time spent, single or multiple species focus, life cycle influences) and how data are then handled for weeds across the country to be able to identify where there are gaps and weak points in on-ground surveillance and eradication efforts.

An important aspect of this inspection picture is how long a plant can be present on a farm before a landholder or weed inspector recognises it as a 'new' weed, or before he or she takes a specimen away for identification. Key to this is the ecology of the weed, how quickly it reproduces after a propagule arrives at a new site, and how quickly the weed then spreads. A further consideration is the extent to which the invading weed has a negative economic impact on the landholder.

The purpose of this research therefore, was to:

1. assess current weed surveillance levels and practices amongst landholders and noxious weeds inspectors; and
2. identify ways to improve weed detection by these groups on-ground.

2.1 Research Approach

Three approaches were taken to answer these questions within the short time frame of this project.

1. Several landholder and weed inspector focus groups were held to obtain a picture of the scope of issues surrounding weed detection strategies on-farm. The findings were used to formulate the questions in the two surveys. The surveys are attached in Appendices 2 and 3.
2. In addition, we collated existing information on the roles, responsibilities and practices of noxious weed inspectors (or their equivalents) through the administering bodies in each state and territory of Australia. This helped us identify the people to whom the inspector surveys should go and also assisted with refining their questions based on state idiosyncrasies. This information is summarised in Appendix 1.
3. The research instruments of the project were two national surveys, which were considered to be relatively quick methods suitable to the short timeframe of the project, able to reach all farm and property types, cover representative biogeographical regions, take into consideration ownership and management structures, and able to provide analysable statistics. The first was a mail survey of approximately 146 noxious weed inspectors and their managers. The second was a telephone survey of approximately 568 respondent landholders. Key questions included the following. Do you get better detection when there's a standard and easy to use reporting system in place? How do states compare in their reporting systems and support for early detection? Is a short list of target species the way to go or just a focus on reporting unusual plants? Is there a hesitance to report due to the cost implications of reporting a noxious weed? Is there burnout because there's no coordinated response to a new outbreak? What is the current level of use of GPS?

The approach and methods taken in this project on the whole resulted in the maximum amount of information on weed surveillance being obtained in a timely and cost efficient way.

3 National Survey of Weed Inspectors

3.1 Methods

3.1.1 Survey Content

The content of the mail survey of weed inspectors was informed by previous research undertaken by the authors, as well as by two informal focus groups held with weed inspectors and farmers in Armidale, NSW, in October 2007. The survey form is included as an attachment to this report (Appendix 2).

3.1.2 The Sampling Frame

The sampling frame for the mail survey of weeds inspectors was constructed using a non-random 'snowball' approach. Project staff established key contacts at management level within Local, State and Federal natural resources, noxious weeds inspection, and primary industries departments, via email, internet search and email. Contact details for supervisors of weeds inspectors were subsequently obtained from these management-level contacts.

Supervisors were contacted by email and telephone to obtain lists of noxious weeds inspectors, pest management officers, bio-security officers, authorised officers and similar officers. In addition, information was collected via internet search of various contacts, using key words in search engines. Contact details were confirmed by email and phone contact directly with officers. This method resulted in a final sampling frame of 385 weeds inspectors and officers from all Australian States and Territories.

3.1.3 The Survey

The survey was conducted by the Institute for Rural Futures at the University of New England. The first survey mail-out resulted in an initial response rate of 15 per cent. After allowing recipients three weeks to respond, a reminder email was sent to non-respondents for whom an email address had been provided. An electronic version of the survey was included in the email (in Microsoft Word format), giving recipients the option to complete the survey on their computer. The reminder email increased the overall survey response to approximately 29 per cent, resulting in more postal surveys being returned in addition to some email surveys.

Finally, a second printed version of the survey was mailed to a generic 'Weeds Officer' at organisations from which no response had been received. This resulted in 133 reminder surveys being sent out. This strategy was adopted since it was noted that the sampling frame included, in some instances, up to 5 people at the one organisation. It was also noted that, where there was more than one person listed for an organisation, only one survey was typically returned.

Further, despite the address list being compiled recently, there were a number of 'Return to Senders' for people who had moved on from an organisation. In this instance, because the letters were personally addressed the survey was returned rather than being passed on to the current weeds officer.

A final issue that became apparent in the initial sampling frame was the number of city (particularly Sydney) council contacts included. Though a significant part of the survey applied to both city and country weeds inspectors, many (though not all) city council officers did not believe the survey was relevant to their situation, due to some of the terminology used in the survey referring to farms specifically, and the general rural focus of many questions. In retrospect, use of more generic terminology in survey questions, or a more targeted sampling frame, would have alleviated this issue.

The final response totalled 146 surveys, amounting to a 38 per cent response rate of the initial sampling frame.

3.1.4 Data Analysis

Data analysis was conducted using Microsoft Excel and SPSS. Written responses were coded where relevant to facilitate quantitative analysis of qualitative data. Verbatim written responses are included in Appendix 4. Cross-tabulations, multiple response tables and tables comparing means were produced with the respondent's State or Territory as an independent variable.

3.1.5 Conventions in Tables

All tables carry a column for the national total on the right hand side. Cross-tabulations with fixed response variables (i.e. questions where respondents could only make one choice among a number of choices read out in the interview) include a line at the base of the table showing the number of respondents included in the table, and the statistics for a chi-square test of independence of factors. Where the chi-square test is significant, a brief discussion before the table points out the main features of the pattern of responses that have led to the significant chi-square test. Where the test is not significant, discussion is largely confined to the national frequencies.

For tabulations with multiple response variables (i.e. questions where respondents could make more than one choice from the options presented in the survey, or where coding of verbatim responses allowed multiple codes to encompass the content of an answer) only the total number of respondents is provided below the table, as chi-square tests could not be applied to this type of data.

For tabulations of rank order variables (i.e. questions where respondents chose an option from among a ranked set of categories, such as "never", "occasionally", "frequently") the non-parametric Kruskal-Wallis test was used to identify significant differences between States or property types. The category coding is provided in the upper part of the table and the Kruskal-Wallis statistics appear at the base of the table. For convenience of interpretation, the tables show means, rather than the mean ranks upon which the Kruskal-Wallis test is based.

3.2 Inspector Information

As Figure 1 and Table 3.1 illustrate, the majority (approximately 55 per cent) of respondents were from NSW, reflecting over-representation of NSW contacts in the sampling frame due to the snowball approach taken (see Section 3.1.2). Contacts within State and Local Government in NSW and, to a lesser degree, Victoria were relatively easy to obtain in comparison with other States and Territories. Nonetheless, the overall response was sufficient to conduct comparative analysis of the data on a State or Territory basis.

Figure 1 Distribution of Respondents by Post Code

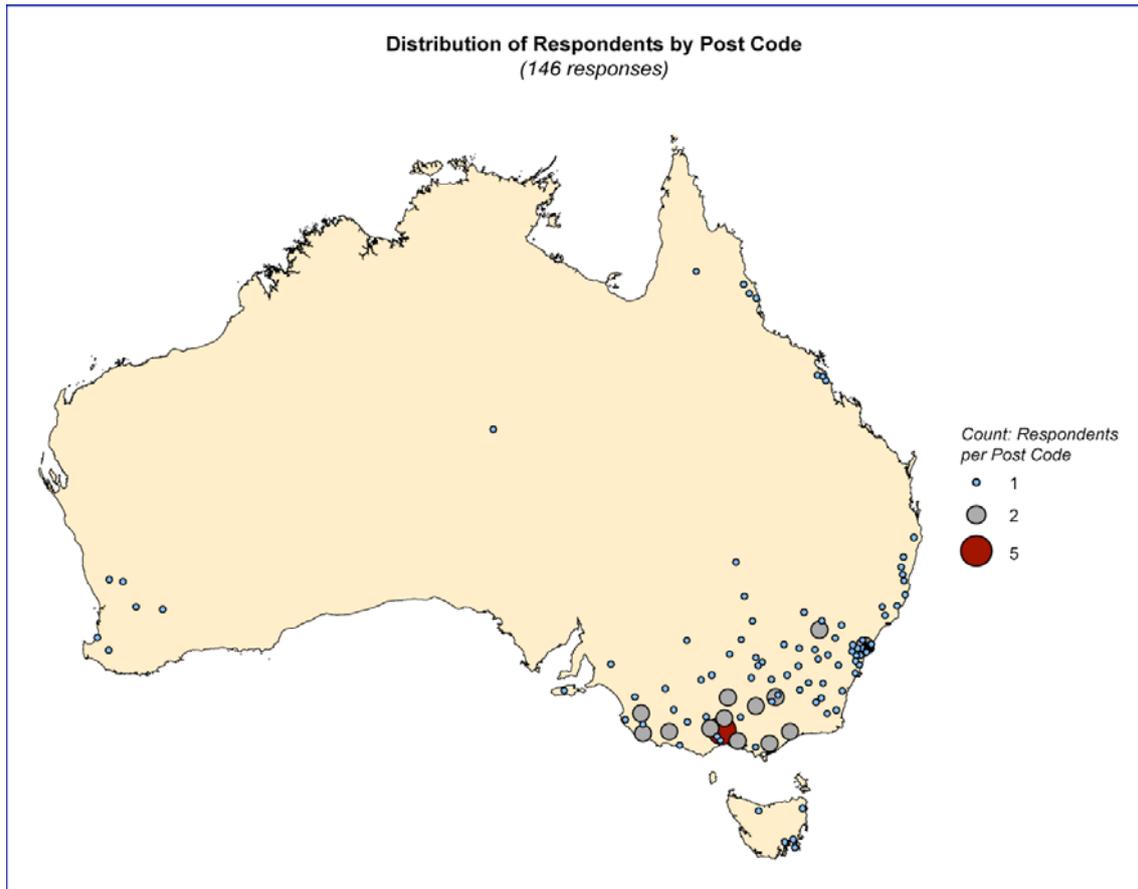


Table 3.1 State or Territory

State or Territory (Count of respondents)	
Qld	8
NSW	80
Vic	36
Tas	5
SA	9
WA	6
NT	2
<i>n</i> = 146	

As Table 3.2 shows, ‘Weeds officer’ or ‘Weeds inspector’ are relatively common job titles in NSW and Tasmania, whereas many respondents from Queensland and Victoria are ‘Pest management officers’, perhaps reflecting their dual role in pest plant and animal species control. ‘Other’ respondents from SA and WA included authorised officers, biosecurity officers, and consultants.

The varied work responsibility of survey respondents is reflected in Table 3.3. A high proportion (77.8 per cent) of SA respondents are involved in pest animal management, as are 31.4 per cent of Victorian respondents and 25 per cent of Queensland respondents. 37.5 per cent of Queensland respondents are involved in the control of declared weeds. Respondents from Victoria and NSW appear to have the widest range of responsibilities, including management and planning, enforcement of legislation and extension activities, property inspection and vegetation management, in addition to weed and pest animal control. As Table 3.3 and Table 3.4 demonstrate, respondents from Tasmania appear to have a marked involvement in bushland and catchment management, perhaps making weeds inspection a secondary work responsibility.

Table 3.2 Proportion of position title/description in each State and Territory

Position title/description	Proportion in State or Territory (%)							Total
	Qld	NSW	Vic	Tas	SA	WA	NT	
Weeds officer	12.5	31.3	17.1	40.0	11.1	0.0	100.0	25.5
Pest management officer	62.5	3.8	51.4	0.0	11.1	16.7	0.0	19.3
Environment/NRM officer	0.0	17.5	11.4	40.0	0.0	16.7	0.0	14.5
Agriculture/bushland protection	25.0	15.0	5.7	20.0	0.0	16.7	0.0	12.4
Weeds inspector	0.0	22.5	0.0	0.0	0.0	0.0	0.0	12.4
Management/coordination	0.0	8.8	2.9	0.0	22.2	0.0	0.0	6.9
Other	0.0	1.3	11.4	0.0	55.6	50.0	0.0	9.0

n = 145, *chisq* = 118.155, *df.* = 36, *p* < 0.0005.

Table 3.3 Proportion of main position responsibilities in each State and Territory

Main position responsibilities	Proportion in State or Territory (%)							Total
	Qld	NSW	Vic	Tas	SA	WA	NT	
General weed management	25.0	26.0	20.0	20.0	66.7	16.7	0.0	26.1
Declared/noxious weed control	37.5	22.1	20.0	0.0	11.1	16.7	0.0	20.4
Management/planning/strategy	25.0	18.2	14.3	20.0	22.2	33.3	100.0	19.7
Pest animal management	25.0	5.2	31.4	0.0	77.8	16.7	0.0	17.6
Property inspection	0.0	24.7	0.0	20.0	11.1	16.7	0.0	15.5
Compliance/legislation enforcement	25.0	9.1	31.4	0.0	11.1	0.0	0.0	14.8
Bushland/vegetation management/ rehabilitation	0.0	24.7	0.0	40.0	0.0	0.0	0.0	14.8
Education/extension	0.0	10.4	37.1	0.0	0.0	0.0	0.0	14.8
Natural resource/catchment management	0.0	0.0	2.9	40.0	0.0	16.7	0.0	2.8
Other	0.0	1.3	2.9	0.0	0.0	0.0	0.0	1.4

n = 142

Table 3.4 Mean percentage of work time spent on weed surveillance tasks by State or Territory

Percentage of work time is spent on weed surveillance tasks <i>(Mean percentage of work time)</i>	
SA	53.33
NSW	52.52
Qld	48.12
Vic	45.88
WA	40.00
Tas	24.80
NT	17.50
Total	48.74
<i>n = 142; p = 0.421; Kruskal-Wallis test</i>	

Table 3.5 shows that roadsides and reserves are the most common land situation in the area of responsibility of respondents overall (84.1 per cent), while forests are the least common (26.2 per cent). A relatively low proportion of Victorian respondents were responsible for native bushland areas (45.7 per cent) and urban areas (48.6 per cent), perhaps reflecting a focus on weeds inspection of agricultural land. In contrast, agricultural land uses (grazing, lifestyle farming, mixed farming and cropping) were relatively less common as a main land use responsibility for NSW respondents, possibly due to the number of respondents based around Sydney. A low proportion (16.7 per cent) of those from WA nominated ‘urban’ as one of the main land uses in their area of responsibility, which is evident from their locations (Figure 1). ‘Other’ responses included Aboriginal lands, parks, nurseries and plantations, and rail corridors. All ‘Other’ responses are listed in Appendix 4.

Table 3.5 Proportion of main property/land types/situations in each State and Territory

Main property/land types/ situations in area of responsibility	Proportion in State or Territory (%)							Total
	Qld	NSW	Vic	Tas	SA	WA	NT	
Roadsides and reserves	100.0	83.8	74.3	100.0	100.0	100.0	50.0	84.1
Grazing	100.0	57.5	85.7	60.0	100.0	83.3	100.0	71.0
Waterways	75.0	65.0	74.3	80.0	77.8	66.7	50.0	69.0
Native bushland	62.5	72.5	45.7	100.0	88.9	100.0	100.0	69.0
Urban	75.0	70.0	48.6	100.0	88.9	16.7	0.0	64.1
Hobby/lifestyle farms	100.0	50.0	85.7	60.0	77.8	83.3	0.0	64.1
Mixed farming	87.5	50.0	74.3	40.0	100.0	66.7	0.0	60.7
Cropping	37.5	36.2	48.6	20.0	100.0	66.7	0.0	43.4
Horticulture	37.5	32.5	25.7	20.0	88.9	33.3	0.0	33.8
Points of sale	37.5	31.2	25.7	40.0	33.3	0.0	0.0	29.0
Forests	25.0	25.0	31.4	0.0	44.4	16.7	0.0	26.2
Other	0.0	13.8	8.6	20.0	0.0	16.7	100.0	12.4
<i>n = 145</i>								

The mean area of land (Table 3.6) and number of properties (Table 3.7) for which respondents were responsible varied greatly between states, ranging from 3391 sq. km in WA to 450,000 sq. km in NT, and from 175 properties in SA to 15809 properties in Tasmania. Queensland and NT respondents did not indicate the estimated number of properties for which they are responsible, and are consequently not represented in Table 3.7.

The large mean number of properties attributed to Tasmanian and NSW respondents in Table 3.7 is explained in part by a high number of respondents from each state being from urban areas (and therefore being responsible for large numbers of urban properties). At the same time, some respondents from these two states clearly have a regional, or possibly even statewide focus. For example, one respondent from Tasmania is responsible for 55,000 properties, while another from NSW is responsible for 100,000 properties.

Table 3.6 Mean size of land for which responsible (sq. km) by State or Territory

Size of land for which responsible (sq. km)	
<i>(Mean area)</i>	
NT	450000
Qld	58878
Vic	28365
Tas	7037
SA	6535
NSW	4590
WA	3391
Total	19794
<i>n = 114; p = 0.013; Kruskal-Wallis test</i>	

Table 3.7 Estimated number of properties for which responsible by State or Territory

Estimated number of properties for which responsible	
<i>(Mean number of properties)</i>	
Tas	15809
NSW	11447
Vic	2082
WA	1573
SA	175
Total	9016
<i>n = 65; p = 0.069; Kruskal-Wallis test</i>	

3.3 Weed Spread

Respondents were asked to identify which of the ways listed were most likely to be a pathway for weed spread in their area of responsibility. As Table 3.8 shows, ‘natural’ pathways (birds, wind, water, and other animals) were rated as relatively more likely ways in which weeds might spread, while medicinal plant trade and research sites were rated as relatively unlikely weed spread pathways. Machinery and vehicles, fodder trade and construction and landscaping materials were viewed by respondents as the most likely ‘human-mediated’ weed spread pathways.

Analysis of the data by State or Territory revealed a significant data relationship with regard to three of the ways listed: machinery and vehicles, fodder trade, and research sites (each denoted by an asterisk). As Table 3.8 shows, respondents from WA and NT all saw machinery and vehicles as ‘very likely’ weed spread pathway, while respondents from NSW were overall less concerned about this, possibly due to differences between those states and territory in geographic scale and population densities.

With regards to fodder trade, respondents from NSW, Tasmania and WA were relatively less concerned, though still indicate an overall rating of ‘likely’, while Victorian respondents saw this as a more likely weed spread pathway than those from other states or territories.

Overall, research sites was viewed by respondents as a relatively ‘unlikely’ way in which weeds might spread, with those from NSW the least concerned. However, Queensland respondents overall seem to view this almost as a ‘likely’ weed spread pathway.

Table 3.8 Mean likelihood of weed spread in area of responsibility by State or Territory

Likelihood of weed spread in area of responsibility for each of the ways listed below (Mean rating, where 1 = 'Very likely', 2 = 'Likely', 3 = 'Unlikely', and 4 = 'Very unlikely')									
	Qld	NSW	Vic	Tas	SA	WA	NT	Total	n
Birds	1.50	1.34	1.42	1.20	1.33	1.67	1.50	1.38	142
Machinery and vehicles	1.12	1.57	1.26	1.40	1.33	1.00	1.00	1.42	143 *
Wind	1.62	1.42	1.55	1.60	1.56	1.17	1.00	1.46	141
Water	1.38	1.48	1.47	1.40	1.89	1.50	1.00	1.49	141
Fodder trade	1.62	1.84	1.30	2.00	1.22	1.80	1.50	1.66	138 *
Other animals	1.62	1.73	1.75	1.60	1.67	1.50	1.00	1.70	141
Construction and landscaping materials	1.50	1.77	1.69	1.20	1.67	2.00	1.50	1.71	139
Livestock movement	1.25	2.05	1.66	1.80	1.33	1.33	1.00	1.81	142
Agricultural produce	1.75	2.05	1.74	2.00	1.56	1.60	1.50	1.90	136
Human apparel and equipment	1.62	2.03	1.94	2.40	2.33	2.40	2.00	2.03	141
Ornamental plant trade	1.88	2.15	1.78	1.60	2.33	2.40	3.00	2.06	136
Waste disposal	2.75	2.04	2.03	1.25	2.44	2.00		2.08	136
Aquarium plant trade	1.75	2.26	1.97	1.80	2.78	2.40	2.50	2.19	139
Revegetation and forestry	2.38	2.54	2.61	2.00	2.33	2.17	3.00	2.51	138
Food plant trade	2.62	2.67	2.78	2.40	2.78	2.60	3.00	2.69	134
Medicinal plant trade	3.00	2.93	2.70	2.50	3.33	3.00	3.50	2.91	132
Research sites	2.38	3.20	3.03	2.75	2.78	2.75	3.00	3.05	133 *
Other		1.00	1.00					1.00	4

* $p < 0.05$; ** $p < 0.01$; Kruskal-Wallis test

3.4 Weed Surveillance

3.4.1 Surveillance Strategy

As Table 3.9 shows, surveillance strategy is determined for the highest proportion of respondents by their own professional judgement, followed by those who follow legislative guidelines. Weeds surveillance strategies in WA and Victoria appear to be determined by legislative guidelines to a greater extent than other states. Legislative guidelines appear to be less important in Tasmania and SA than the professional judgement of the individual weeds inspector.

The availability of resources is markedly less important in Victoria as a factor determining weed surveillance strategy. This finding is supported by Table 3.49, which shows that only 8.7 per cent of Victorian respondents believe that more personnel are required to improve weed surveillance capabilities in their state. In contrast, a high proportion of respondents from Tasmania, SA, WA and NT believe that availability of resources determines their surveillance strategy, suggesting insufficient resources devoted to weed control.

75 per cent of Victorians and 66.7 per cent of respondents from WA follow the recommendations of their employer in defining their weed surveillance strategy. 37.5 per cent of respondents from Queensland stated that their strategy was determined by 'other' factors. 'Other' factors listed by survey respondents included the nature of the local area, the types of target weeds, time and information available, and available funds (see Appendix 4), suggesting that inspectors in Queensland may have less rigid approaches to surveillance. This finding is supported by the results of Table 3.26, where Queensland inspectors overwhelmingly indicated that their surveillance strategy varied between districts and regions, contrary to the national trend.

Table 3.9 Proportion of respondents in each State or Territory mentioning how surveillance strategy is determined

How surveillance strategy is determined	Proportion in State or Territory (%)							
	Qld	NSW	Vic	Tas	SA	WA	NT	Total
It is defined by my own professional judgement	62.5	72.4	61.1	80.0	77.8	83.3	100.0	70.4
I follow legislative guidelines	62.5	65.8	77.8	60.0	55.6	83.3	50.0	68.3
It is defined by the availability of resources	62.5	61.8	33.3	80.0	88.9	83.3	100.0	58.5
I follow the recommendations of my employer	12.5	31.6	75.0	0.0	44.4	66.7	0.0	42.3
Other	37.5	9.2	5.6	0.0	0.0	16.7	0.0	9.2
<i>n</i> = 142								

Table 3.10, Table 3.11, and Table 3.12 suggest that target lists of weeds are an important aspect of the weed surveillance and detection strategy, particularly in Queensland and Victoria. Table 3.10 reveals that Victorian respondents in particular believe that raising awareness and identification skills *for target weeds* tends to be an effective strategy for detecting new weeds, while Table 3.11 and Table 3.12 show that particular weeds, in the form of noxious or declared weeds and alert weeds lists, are targeted by many Victorian inspectors while searching properties.

Tasmanian respondents did not believe to the same degree as other respondents that encouraging landholders to report unusual plants was an effective strategy (Table 3.10), while the majority of Tasmanian respondents did not use a target list of weeds when searching properties (Table 3.11).

Remaining State or Territory respondents (Table 3.10) believe that landholder reporting, and raising awareness amongst landholders, were reasonably effective strategies (rated between 'very effective' and 'somewhat effective'). Table 3.11 shows that an overall majority of respondents (56.1 per cent) search for a list of target weeds, compared to 39.6 per cent who did not use a target list.

Table 3.12 shows that 29.7 per cent of all respondents use a target weed list of 'specific species' (43.3 per cent in NSW, 66.7 per cent in WA, 100 per cent in Tasmania). Local/regional priority weed lists are relatively significant in Queensland and SA, unusual species in Queensland and WA, and WONS lists in WA.

Table 3.10 Mean effectiveness of strategies for detecting new weed incursions by State or Territory

Effectiveness of strategies for detecting new weed incursions									
<i>(Mean rating, where 1 = 'Very effective', 2 = 'Somewhat effective', and 3 = 'Not effective')</i>									
	Qld	NSW	Vic	Tas	SA	WA	NT	Total	n
Raising awareness and identification skills for target weeds	1.38	1.40	1.26	1.40	1.44	1.80	1.50	1.38	139
Encouraging landholders to promptly report unusual plants	1.50	1.64	1.50	2.00	1.44	1.67	1.50	1.60	136
Other	1.00	1.17	1.33	1.00		1.00		1.14	14

* $p < 0.05$; ** $p < 0.01$; *Kruskal-Wallis test*

Table 3.11 Proportion of respondents in each State or Territory using a specific target list of weeds while searching properties

Is there a target list of weeds specifically searched for on properties?	Proportion in State or Territory (%)							
	Qld	NSW	Vic	Tas	SA	WA	NT	Total
Yes	57.1	50.7	71.4	40.0	44.4	66.7	50.0	56.1
No	28.6	46.7	22.9	60.0	44.4	33.3	50.0	39.6
Unsure	14.3	2.7	5.7	0.0	11.1	0.0	0.0	4.3

$n = 139$, $chisq = 10.544$, $d.f. = 12$, $p = 0.568$.

Table 3.12 Proportion of respondents using various target lists of new weed threats while searching properties, by State or Territory

Target list of new weed threats specifically searched for on properties	Proportion in State or Territory (%)							
	Qld	NSW	Vic	Tas	SA	WA	NT	Total
Noxious/prohibited/declared weeds	33.3	23.3	81.8	0.0	0.0	33.3	100.0	43.8
Specific species	0.0	43.3	9.1	100.0	25.0	66.7	0.0	29.7
Alert weeds	0.0	10.0	45.5	0.0	0.0	0.0	0.0	20.3
New/emergent species	0.0	13.3	13.6	0.0	25.0	0.0	0.0	12.5
Local/regional priority species	33.3	3.3	4.5	0.0	50.0	0.0	0.0	7.8
Unusual/unrecognised species	33.3	3.3	4.5	0.0	0.0	33.3	0.0	6.3
Aquatic weeds	33.3	10.0	0.0	0.0	0.0	0.0	0.0	6.3
WONS	0.0	6.7	0.0	0.0	0.0	33.3	0.0	4.7
Other	33.3	20.0	9.1	0.0	0.0	0.0	0.0	14.1

$n = 64$

Table 3.13 suggests that, in the opinion of respondents, new weed declaration is not particularly effective in bringing about attitudinal and practical change amongst landholders with regard to weed control. This is largely supported by the opinion of farmers in Table 4.14. A smaller proportion of survey respondents indicated that declaration of a new weed will improve farmer surveillance and reporting practices than those who believe it has no impact.

Table 3.13 also shows that all Tasmanian respondents believe that the declaration of a new weed does *not* change farmer surveillance and reporting behaviour, perhaps a consequence of the fact that target lists of weeds are less commonly used in Tasmania (see Table 3.11). Furthermore, where target lists of weeds are used, there may be a shortfall in communicating this information to landholders. In contrast, as appears to be suggested by Table 3.14, landholders are believed by the majority (76.9 per cent) of respondents to be likely to improve their weed surveillance strategies when the impending visit of a weeds inspector is taken into account. The data seem to suggest that impending property inspection influences landholder attitudes towards weed control to a much greater extent than the more abstract ‘threat’ posed by weed declaration. This view contrasts markedly with that of farmers interviewed for this project, of whom only 4.9 per cent indicated that the impending visit of an inspector would affect their normal routine (see Table 4.18).

Table 3.13 *Proportion of respondents in each State or Territory rating the influence of new weed declaration on farmer surveillance/reporting*

Influence of new weed declaration on farmer surveillance/reporting	Proportion in State or Territory (%)							Total
	Qld	NSW	Vic	Tas	SA	WA	NT	
No change	50.0	48.5	52.9	100.0	66.7	66.7	100.0	53.8
Improves them	50.0	50.0	47.1	0.0	33.3	33.3	0.0	45.4
Makes it worse	0.0	1.5	0.0	0.0	0.0	0.0	0.0	0.8

n = 130, *chisq* = 6.859, *df.* = 12, *p* = 0.867.

Table 3.14 *Proportion of respondents in each State or Territory rating the influence of intended weed inspector visit on farmer surveillance/reporting*

Influence of intended weed inspector visit on farmer surveillance/reporting	Proportion in State or Territory (%)							Total
	Qld	NSW	Vic	Tas	SA	WA	NT	
Improves surveillance	75.0	75.8	88.6	80.0	50.0	66.7	50.0	76.9
No change	25.0	22.7	11.4	20.0	50.0	33.3	50.0	22.3
Makes it worse	0.0	1.5	0.0	0.0	0.0	0.0	0.0	0.8

n = 130, *chisq* = 8.298, *df.* = 12, *p* = 0.761.

3.4.2 Surveillance Targets

Table 3.15 indicates that weeds inspectors are most likely to frequently inspect those properties which pose the clearest risk regarding weed spread: those with known target weeds (90.2 per cent of respondents), with a history of weed introductions (70.7 per cent of respondents), located near known infestations of target weeds (66.9 per cent of respondents), and those with complaints (66.2 per cent). Properties in proximity to high value assets are less likely to be inspected frequently, with the exception of Victoria, where 60 per cent of respondents indicated that they would inspect such properties frequently. ‘Other’ properties inspected include properties for sale or being subdivided, properties bordering high-risk areas (rivers, bushland), and those where landholders have requested advice (Appendix 4).

Table 3.15 Proportion of respondents in each State or Territory indicating the types of property likely to be inspected most frequently

Types of property likely to be inspected most frequently	Proportion in State or Territory (%)							
	Qld	NSW	Vic	Tas	SA	WA	NT	Total
Those with known target weeds	100.0	87.1	91.4	100.0	87.5	100.0	100.0	90.2
Those with a history of weed introductions	87.5	65.7	71.4	60.0	75.0	100.0	100.0	70.7
Those located near to known infestations of target weeds	75.0	71.4	57.1	80.0	50.0	60.0	100.0	66.9
Those with complaints	100.0	72.9	34.3	80.0	87.5	100.0	50.0	66.2
Those with, or in close proximity to, high value assets	12.5	22.9	60.0	20.0	25.0	0.0	0.0	30.8
Properties selected systematically	25.0	27.1	34.3	0.0	37.5	20.0	0.0	27.8
Those bordering key transport routes	12.5	21.4	8.6	20.0	12.5	40.0	50.0	18.0
Properties selected at random	25.0	12.9	5.7	0.0	0.0	40.0	0.0	11.3
Other	12.5	21.4	31.4	20.0	0.0	0.0	0.0	21.1
<i>n = 133</i>								

Table 3.16 suggests that Victorian weeds inspectors are more likely to carry out a thorough inspection of properties than their counterparts from other states and territories. Their inspection of whole properties, property boundaries, and areas more likely to suffer weed infestations, is significantly more frequent than many other respondents. Respondents from Tasmania are significantly more likely to inspect ‘accessible’ areas of properties only than respondents from other states or territories. Respondents from WA appear to adopt a more targeted approach to weed inspection, being less likely to inspect a whole property though more likely to inspect likely weeds infestation areas, and areas where weeds have been found previously. All respondents are most likely to inspect locations where weeds have been found previously on a frequent basis, and least likely to frequently inspect accessible areas of the property only. That is, many weed inspectors (with the possible exception of respondents from Tasmania) appear to ensure that ‘inaccessible’ areas on properties are inspected.

Table 3.16 Mean frequency of weed inspection in particular places by State or Territory

Frequency of weed inspection in particular places									
<i>(Mean rating, where 1 = 'Frequently', 2 = 'Occasionally', and 3 = 'Never')</i>									
	Qld	NSW	Vic	Tas	SA	WA	NT	Total	n
Inspect locations where weeds were previously found	1.25	1.14	1.06	1.40	1.22	1.00	1.50	1.14	133
Inspect areas more likely to suffer infestation	1.38	1.22	1.14	1.80	1.44	1.00	1.50	1.24	132 *
Inspect property boundaries	1.75	1.38	1.24	2.20	1.56	1.40	2.00	1.42	134 *
Inspect likely weed source areas/products likely to be a source of weed spread	1.75	1.51	1.59	2.40	1.44	1.75	2.00	1.59	130
Inspect whole property	1.62	1.62	1.21	2.00	2.11	2.60	2.00	1.60	134 **
Inspect accessible areas of property only	2.00	1.60	2.12	1.25	1.67	1.75	1.50	1.76	128 *
Other	1.00	1.22	1.00	1.00		1.00		1.13	15

* $p < 0.05$; ** $p < 0.01$; *Kruskal-Wallis test*

As Table 3.17 shows, new weeds appear to have been found most often in the past by inspectors on properties along roadways, areas where livestock are fed, and along water ways, and are least likely to be found in ‘inaccessible’ areas, or near sheds. There are significant differences in the frequency with which new weeds have been found by inspectors along roadways and particularly in areas where livestock are fed. Respondents from SA, Queensland and WA are more likely to find weeds along roadways than those from NSW, Tasmania and Victoria. Similarly, respondents from NT and SA are significantly more likely to find weeds in areas where livestock are fed than WA, NSW and Victorian respondents. ‘Other’ responses to this question (see Appendix 4 for details) included stock yards, council/public lands and reserves, forestry and bushland, gardens and nurseries, and land adjacent to high-risk areas (for example, known infestations).

Table 3.17 Mean frequency of locations in which new weeds found on properties in the past by State or Territory

Locations in which new weeds found on properties in the past									
<i>(Mean rating, where 1 = 'Frequently', 2 = 'Occasionally', and 3 = 'Never')</i>									
	Qld	NSW	Vic	Tas	SA	WA	NT	Total	n
Roadways	1.38	1.74	1.53	1.67	1.00	1.40	1.50	1.60	121 *
Areas where livestock are fed	1.57	2.12	1.75	1.67	1.33	2.50	1.00	1.90	115 **
Water ways	2.00	1.94	1.78	2.00	2.25	2.25	1.50	1.93	121
Downwind of known infestations	1.75	2.03	1.87	2.00	2.40	1.40	1.00	1.94	117
Near neighbour boundaries	2.00	2.09	2.13	2.00	1.71	1.75	1.00	2.05	110
No situation in particular	2.00	2.22	2.26	1.50	2.14	2.25		2.19	96
Near sheds	1.83	2.34	2.28	2.00	1.71	2.50	1.00	2.24	107
On generally inaccessible areas of properties	2.12	2.29	2.27	2.00	2.43	2.50	2.00	2.28	111
Other	1.33	1.80	2.17	2.00	1.60	1.00	1.00	1.75	32 *

* $p < 0.05$; ** $p < 0.01$; *Kruskal-Wallis test*

Table 3.18 suggests that dangerous/inaccessible areas, forests/national parks, aquatic areas and public/crown lands are viewed by the greatest proportion of respondents as difficult land types or situations to inspect, while the smallest proportion of respondents rated pastoral, mining and vineyard situations, and known heavily infested areas, as difficult situations to inspect.

Table 3.18 Proportion of respondents in each State or Territory mentioning different types of land or situations as being difficult to inspect

Types of land or situations difficult to inspect	Proportion in State or Territory (%)							
	Qld	NSW	Vic	Tas	SA	WA	NT	Total
Dangerous/inaccessible areas	50.0	47.1	33.3	40.0	50.0	40.0	0.0	43.2
Forests/national parks	37.5	30.0	18.5	20.0	37.5	20.0	0.0	27.2
Aquatic areas/rivers/riparian zones	12.5	22.9	18.5	0.0	37.5	20.0	0.0	20.8
Public/crown lands	25.0	25.7	14.8	0.0	12.5	0.0	0.0	20.0
Small blocks/urban areas	12.5	12.9	18.5	0.0	25.0	0.0	0.0	13.6
Absentee/difficult landholders	25.0	4.3	11.1	40.0	37.5	40.0	0.0	12.0
Known weed-free/low priority areas	12.5	11.4	14.8	20.0	0.0	0.0	0.0	11.2
Dense vegetation	0.0	7.1	7.4	20.0	0.0	60.0	0.0	8.8
Remote/isolated areas	0.0	8.6	0.0	20.0	0.0	20.0	50.0	7.2
Bushland	0.0	5.7	3.7	0.0	12.5	40.0	0.0	6.4
All land inspected	0.0	1.4	14.8	0.0	0.0	0.0	0.0	4.0
Private property	0.0	5.7	0.0	20.0	0.0	0.0	0.0	4.0
Large properties	0.0	4.3	0.0	20.0	12.5	0.0	0.0	4.0
Industrial/mining sites	12.5	4.3	3.7	0.0	0.0	0.0	0.0	4.0
Pastoral areas	0.0	1.4	0.0	0.0	12.5	0.0	100.0	3.2
Known heavily infested areas	0.0	1.4	3.7	20.0	0.0	20.0	0.0	3.2
Vineyards	0.0	0.0	0.0	0.0	12.5	0.0	0.0	0.8
Other	12.5	17.1	11.1	20.0	0.0	0.0	50.0	14.4
<i>n = 125</i>								

3.4.3 Surveillance Frequency

The majority (76.4 per cent) of survey respondents indicate in Table 3.19 that they inspect at least some properties regularly, while only 19.4 per cent of respondents indicated that they inspect on an ad hoc basis. Only 4.9 per cent of respondents indicated that they do not inspect properties for weeds, suggesting a purely management or strategy role as weeds officers.

Table 3.19 Proportion of respondents indicating the regularity of property weed inspections in each State or Territory

Regularity of property weed inspections	Proportion in State or Territory (%)							
	Qld	NSW	Vic	Tas	SA	WA	NT	Total
At least some properties inspected regularly	100.0	74.4	75.0	80.0	66.7	83.3	100.0	76.4
Ad hoc - no properties inspected regularly	0.0	20.5	22.2	20.0	33.3	0.0	0.0	19.4
Do not inspect for weeds	0.0	6.4	2.8	0.0	0.0	16.7	0.0	4.9
<i>n = 144</i>								

Table 3.20 and Table 3.21 suggest a *limited* correlation in some states (particularly NSW) between the mean percentage of properties inspected on a regular basis, and the mean time between property visits. Respondents from NSW, and to a lesser extent WA and Queensland, inspect the highest percentage of properties regularly, though leave the most time between property visits. Respondents from Victoria visit, on average, 18.7 per cent of properties regularly, but leave approximately 15 months on average between property visits. Respondents from Tasmania and NT leave 12 months between property visits on average, and inspect over 25 per cent of properties regularly.

Table 3.20 Mean percentage of properties inspected on a regular basis by State or Territory

Percentage of properties inspected on a regular basis <i>(Mean percentage of properties)</i>	
NSW	43.1
WA	34.0
Qld	32.3
NT	30.0
Tas	27.8
SA	27.3
Vic	18.7
Total	34.2
<i>n = 103; p = 0.009; Kruskal-Wallis test</i>	

Table 3.21 Mean time between property visits (months) by State or Territory

Mean time between property visits (months) <i>(Mean number of months)</i>	
NSW	26.1
Qld	21.6
WA	15.8
Vic	15.2
SA	14.0
Tas	12.0
NT	12.0
Total	21.2
<i>n = 99; p = 0.71; Kruskal-Wallis test</i>	

3.4.4 Surveillance Methods

Time of year appears to be the most important factor determining when respondents look for new weeds, according to Table 3.22. Significantly, time of year also prompts respondents from SA, WA, NT and Victoria to look for new weeds more frequently than it does for those from Tasmania, NSW and Queensland. Overall, respondents were less frequently prompted by rain and flooding to look for new weeds.

Table 3.22 Mean respondent indication of factors prompting when to look for new weeds by State or Territory

Factors prompting when to look for new weeds									
<i>(Mean rating, where 1 = 'Frequently', 2 = 'Occasionally', and 3 = 'Never')</i>									
	Qld	NSW	Vic	Tas	SA	WA	NT	Total	n
Time of year	1.38	1.36	1.10	1.67	1.00	1.00	1.00	1.26	123 *
Weed lifecycle	1.38	1.38	1.17	1.00	1.00	1.50	1.00	1.29	120
Seasonal conditions	1.50	1.34	1.23	1.67	1.22	1.20	1.00	1.31	123
When weeds are in flower	1.50	1.36	1.34	1.00	1.11	1.20	1.00	1.33	125
Workload	1.50	1.66	1.79	1.33	1.44	1.25	3.00	1.65	110
After rain	1.62	1.74	1.79	1.50	1.12	1.50	1.00	1.68	114
After floods	1.62	1.98	2.25	2.00	2.50	2.00	1.00	2.04	114
Other	1.50	1.33	1.00	1.00				1.25	16

** p < 0.05; ** p < 0.01; Kruskal-Wallis test*

As Table 3.23 shows, survey respondents are most likely to inspect paddocks for weeds in a vehicle or on foot, and least likely to inspect on horseback or using an aircraft. Analysis revealed a significant difference in the extent to which respondents from different States or Territories inspected paddocks on foot, using a motorbike or quad bike, or using an aircraft. Respondents from Victoria, Queensland and Tasmania inspected paddocks on foot more frequently than those from SA, NSW and WA, suggesting that respondents from these latter States are more regularly called on to inspect larger paddocks, or paddocks less accessible on foot. Respondents from NT and Queensland appear to inspect paddocks regularly using a motorbike or quad bike, while those from the remaining states use this mode of transport relatively infrequently. Inspection from the air is, overall, not a very common inspection method, though respondents from NT, Queensland and NSW are more likely to use this method than respondents from other States.

Table 3.23 Mean frequency using various methods of transportation to inspect paddocks for weeds by State or Territory

Method of transportation normally used to inspect paddocks for weeds									
<i>(Mean rating, where 1 = 'Frequently', 2 = 'Occasionally', and 3 = 'Never')</i>									
	Qld	NSW	Vic	Tas	SA	WA	NT	Total	n
In a vehicle	1.50	1.22	1.33	1.40	1.11	1.00	1.50	1.26	129
On foot	1.12	1.54	1.11	1.20	1.89	1.40		1.41	130 **
On a motorbike/quad bike	1.71	2.65	2.42	3.00	2.00	2.75	1.00	2.46	112 **
In a helicopter or plane	2.43	2.51	2.94	3.00	2.88	2.75	2.00	2.67	111 **
On horseback	2.60	2.98	2.97	3.00	3.00	3.00		2.96	104
Other	1.33	2.22	2.50	2.00	1.00	1.00		2.05	21

** p < 0.05; ** p < 0.01; Kruskal-Wallis test*

The most frequently used search method within paddocks by respondents to the survey was to target areas where weeds are likely to arrive and grow, as Table 3.24 illustrates. There was a significant difference in response to the possible search methods ‘random walk/drive/ride’ and ‘use regularly spaced transects’, on a State or Territory basis. Respondents from SA used the former search method frequently overall (a mean rating of 1.11), while respondents from Queensland and most particularly NT were significantly less likely to use this method. Respondents from Tasmania and WA, on average, used regularly spaced transects as a search method more often than respondents from other states or territories.

Table 3.24 Mean indication of search methods normally used within paddocks to inspect for weeds by State or Territory

Search methods normally used within paddocks to inspect for weeds									
<i>(Mean rating, where 1 = 'Frequently', 2 = 'Occasionally', and 3 = 'Never')</i>									
	Qld	NSW	Vic	Tas	SA	WA	NT	Total	n
Target areas where weeds likely to arrive and grow	1.25	1.33	1.12	1.00	1.50	1.50	1.00	1.27	119
Random walk/drive/ride	1.75	1.29	1.42	1.40	1.11	1.25	3.00	1.36	123 *
Inspect paddock perimeter	1.50	1.49	1.34	1.50	1.50	1.40	2.00	1.45	117
Follow roads and tracks	1.62	1.50	1.55	2.00	1.38	1.60	1.00	1.52	120
Parallel sweeps to cover whole paddock	2.00	2.16	1.88	1.67	2.00	1.75	3.00	2.04	112
Use regularly spaced transects	2.00	2.64	2.48	1.50	2.25	1.75	2.00	2.46	112 *
Use randomly spaced transects	2.25	2.57	2.41	3.00	2.25	2.50	2.00	2.48	109
Other	2.00	1.67	1.80				1.00	1.69	13

** p < 0.05; ** p < 0.01; Kruskal-Wallis test*

As Table 3.25 demonstrates, there appears to be significant variation in the percentage of particular paddocks inspected by respondents when visiting a property. On average, Victorian respondents inspected approximately 76 per cent of a paddock, while respondents from SA inspected less than 39 per cent. This response supports the conclusion arising from Table 3.16, which appeared to portray weeds inspectors from Victoria as more thorough inspectors of particular properties than their counterparts elsewhere in Australia.

Table 3.25 Mean percentage of a paddock's area searched each visit by State or Territory

Percentage of a paddock's area searched each visit	
<i>(Mean percentage of paddock area)</i>	
Vic	76.2
NSW	61.5
NT	60.0
Qld	52.8
Tas	50.0
WA	40.0
SA	38.6
Total	62.8

n = 113; p = 0.02; Kruskal-Wallis test

The relatively ambivalent overall response to the question ‘does weed surveillance strategy vary between districts/regions’ (Table 3.26) may illustrate a lack of detection strategy coordination across and within states and territories. Marginally more respondents have a strategy which varies between districts than those who do not. Nonetheless, respondents from Queensland and Tasmania were more likely to indicate variation in strategy compared to other states or territories, particularly SA and WA.

Table 3.26 *Proportion of respondents in each State or Territory indicating whether their weed surveillance strategy varies between districts/regions?*

Does weed surveillance strategy vary between districts/regions?	Proportion in State or Territory (%)							Total
	Qld	NSW	Vic	Tas	SA	WA	NT	
Yes	87.5	52.1	42.9	60.0	22.2	0.0	50.0	48.1
No	12.5	42.3	45.7	40.0	55.6	80.0	50.0	43.7
Unsure	0.0	5.6	11.4	0.0	22.2	20.0	0.0	8.1

n = 135, chisq = 15.784, d.f. = 12, p = 0.201.

Table 3.27 indicates the weed surveillance and detection strategies that work well, in the opinion of respondents. Visual or in-person inspections of properties are considered by the highest proportion of respondents overall (29 per cent) as the most effective practice, followed by complaints or word of mouth, regular/timely inspections, education/extension/media promotion, and community involvement. Practices that were rated as effective by a smaller proportion of respondents included looking for known weeds, cooperating with other organisations, and using geospatial technology. The data suggest that practices which entail timely on-site inspection and involvement of landholders and the community with inspectors form the most effective strategy for weed detection.

Table 3.27 Proportion of respondents in each State or Territory mentioning which weed surveillance or detection practices work well

Weed surveillance or detection practices that work well	Proportion in State or Territory (%)							
	Qld	NSW	Vic	Tas	SA	WA	NT	Total
Visual/in-person inspections	12.5	39.4	13.3	40.0	12.5	40.0	0.0	29.0
Complaints (e.g. from neighbours)/word of mouth	0.0	28.8	10.0	40.0	12.5	0.0	0.0	20.2
Regular/timely inspections (e.g. seasonal)	12.5	22.7	10.0	0.0	37.5	20.0	0.0	18.5
Education/extension/media promotion	37.5	13.6	10.0	0.0	12.5	40.0	50.0	15.3
Community involvement/volunteer weed spotters	12.5	7.6	33.3	20.0	0.0	20.0	0.0	14.5
Cooperation with landholders	37.5	6.1	10.0	0.0	50.0	20.0	100.0	13.7
Focus on known infestation/high risk areas	0.0	13.6	10.0	20.0	25.0	20.0	50.0	13.7
Vehicle/roadside inspections	12.5	7.6	16.7	0.0	12.5	20.0	0.0	10.5
Utilise local knowledge	0.0	6.1	16.7	20.0	12.5	20.0	0.0	9.7
On foot inspections	0.0	7.6	13.3	0.0	0.0	0.0	0.0	7.3
Aerial inspections/aerial photos	12.5	7.6	3.3	0.0	0.0	0.0	50.0	6.5
Accurate/comprehensive record keeping	12.5	4.5	6.7	0.0	0.0	0.0	0.0	4.8
Geospatial technology (e.g. GIS, GPS)	0.0	3.0	3.3	0.0	0.0	20.0	50.0	4.0
Cooperation with other organisations	0.0	4.5	0.0	0.0	0.0	0.0	0.0	2.4
Boat/canoe	12.5	3.0	0.0	0.0	0.0	0.0	0.0	2.4
Look for known weeds	0.0	0.0	3.3	0.0	0.0	0.0	0.0	0.8
Other	12.5	1.5	6.7	0.0	0.0	0.0	0.0	3.2

n = 124

Table 3.28 shows that respondents from Victoria are, on average, the most satisfied with their overall weed surveillance strategy, while Tasmanian respondents emerge as the least satisfied. This may suggest that the relatively thorough weed detection strategy in Victoria (discussed in relation to Table 3.15 and Table 3.16) is the most satisfactory of the various approaches available, while relative dissatisfaction of Tasmanian weeds inspectors with their strategy is borne out by the data presented in Table 3.50 and Table 3.52.

Table 3.28 Mean level of satisfaction with weed surveillance strategy by State or Territory

Level of satisfaction with weed surveillance strategy (Mean rating, where 1 = 'Very satisfied', and 5 = 'Very dissatisfied')	
Vic	2.3
Qld	2.5
NSW	2.7
SA	2.8
NT	3.0
WA	3.2
Tas	3.4
Total	2.6

n = 139; *p* = 0.146; *Kruskal-Wallis test*

3.5 Weed Identification

3.5.1 Identification Practice

Respondents were asked to indicate the procedure or procedures used to identify a new plant. As Table 3.29 shows, weed identification books or brochures were markedly the most common method used, while consulting with other experts and sending the plant away for identification were also relatively common procedures. Internet identification of the plant was also widely used, though not to the same extent. Very few respondents indicated that they had no set procedure for identifying a new plant. These procedures may be contrasted with those used by farmers (see Table 4.60).

Respondents who indicated that they consulted with other local experts, or sent the plant away for identification, were asked to specify which local experts they consulted, and where the plant was sent. The resulting data are shown in Table 3.30 and Table 3.31 respectively. The highest proportion of respondents indicated that they consulted locally with colleagues or other weed experts, followed by various government departments.

Very few respondents consulted with a local herbarium (Table 3.30), presumably due to their location primarily in capital cities. Nonetheless, as Table 3.31 shows, over 50 per cent of respondents send new plants to a herbarium for identification. Significantly, nearly 57 per cent of NSW respondents send new plants to a 'botanist' rather than a herbarium for identification, while all Victorian, Tasmanian and NT respondents use a herbarium. Given that many botanists are based at herbaria it is not clear whether this is a real difference between states. Furthermore, a significant majority (85.7 per cent) of SA respondents use government departments/agencies for new plant identification, and 66.7 per cent of WA respondents have access to in-house plant identification expertise. The data suggest a variety of plant identification options across states and territories.

Table 3.29 Proportion of respondents in each State or Territory indicating procedures used for identification of a new plant

Procedure for identification of a new plant	Proportion in State or Territory (%)							Total
	Qld	NSW	Vic	Tas	SA	WA	NT	
Weed identification books/brochures	75.0	94.9	97.2	100.0	100.0	100.0	50.0	94.4
Consult with other local experts	62.5	82.1	88.9	60.0	88.9	66.7	100.0	81.9
Send away for identification	100.0	69.2	69.4	80.0	100.0	83.3	100.0	74.3
Online (internet) identification	25.0	65.4	55.6	100.0	77.8	100.0	0.0	63.2
No set procedure	0.0	10.3	2.8	20.0	0.0	0.0	0.0	6.9
Other	0.0	2.6	2.8	20.0	0.0	0.0	50.0	3.5
<i>n = 144</i>								

Table 3.30 Proportion of respondents in each State or Territory specifying other local experts consulted with

Consult with other local experts (specify)	Proportion in State or Territory (%)							Total
	Qld	NSW	Vic	Tas	SA	WA	NT	
Colleagues/other weeds inspectors	0.0	30.3	45.0	0.0	60.0	50.0	0.0	35.4
Government dept/agency (e.g. DPI, CMA, HRCC, DEH)	0.0	24.2	25.0	100.0	20.0	50.0	0.0	24.6
Botanist/botanic gardens	100.0	15.2	10.0	0.0	20.0	0.0	100.0	18.5
Agronomist	0.0	21.2	0.0	0.0	0.0	0.0	0.0	10.8
Weeds alert officer	0.0	0.0	15.0	0.0	0.0	0.0	0.0	4.6
Herbarium	0.0	0.0	5.0	0.0	0.0	0.0	0.0	1.5
Other	0.0	9.1	0.0	0.0	0.0	0.0	0.0	4.6

n = 65, *chisq* = 42.007, *df.* = 36, *p* = 0.227.

Table 3.31 Proportion of respondents in each State or Territory specifying where new plants sent away to for identification

Send away for identification	Proportion in State or Territory (%)							Total
	Qld	NSW	Vic	Tas	SA	WA	NT	
Herbarium	80.0	26.7	100.0	100.0	0.0	0.0	100.0	52.2
Botanist/botanic gardens	0.0	56.7	0.0	0.0	14.3	0.0	0.0	26.1
Government dept/agency (e.g. DPI, AQIS, DWLBC)	20.0	10.0	0.0	0.0	85.7	33.3	0.0	15.9
In-house/other specialist/weed scientist	0.0	6.7	0.0	0.0	0.0	66.7	0.0	5.8

n = 69, *chisq* = 87.485, *df.* = 18, *p* < 0.0005.

3.5.2 Identification Impediments

While respondents were asked to indicate any impediments to plant identification, Table 3.32 shows that the largest proportion of survey respondents (49.7 per cent) indicated that they have no problem identifying plants. Nonetheless, a considerable proportion of respondents (42.8 per cent) did indicate that they may not have enough experience in plant identification.

However, while 80 per cent of Tasmanian respondents have no problem identifying plants, only 16.7 per cent of WA respondents did so. Furthermore, 83.3 per cent of WA respondents (and 62.5 per cent of Queensland respondents) felt they may not have enough plant identification experience. Few respondents indicated that they did not have a specific plant identification procedure, or had no incentive to identify plants. 'Other' responses included the fact that grasses are more difficult to identify, lack of identification resources (books/texts), seasonal factors hindering identification, and lack of awareness that a weed infestation exists (see Appendix 4).

Table 3.32 Proportion of respondents in each State or Territory indicating factors that prevent plant identification

Factors that prevent plant identification	Proportion in State or Territory (%)							Total
	Qld	NSW	Vic	Tas	SA	WA	NT	
I usually have no problems identifying plants	37.5	55.7	36.1	80.0	66.7	16.7	50.0	49.7
I may not have enough experience in weed id	62.5	40.5	44.4	20.0	22.2	83.3	50.0	42.8
Lack of other local experts	12.5	20.3	11.1	0.0	33.3	16.7	0.0	17.2
Insufficient time	12.5	19.0	16.7	0.0	0.0	16.7	0.0	15.9
Lack of specific procedure to identify plants	0.0	5.1	5.6	0.0	0.0	0.0	0.0	4.1
No incentive to identify plants	0.0	2.5	5.6	0.0	0.0	0.0	0.0	2.8
Other	12.5	11.4	11.1	0.0	11.1	16.7	0.0	11.0
<i>n = 145</i>								

3.6 Weed Recording and Reporting

3.6.1 Recording and Reporting Practice

As shown in Table 3.33, no single procedure when finding new weeds stands out to a marked degree, indicating that respondents across Australia are prepared to use a variety of approaches to record the details of a new weed infestation, or perhaps are required to use a variety of means to conform to regulation. A relatively small proportion of respondents use paper reporting systems compared with those who use various forms of computerised recording, with over 60 per cent of respondents recording the location of a new weed in some form of database.

Those who use computerised reporting, recording or mapping systems were asked to identify the systems and computer software used. As Table 3.34 shows, a variety of systems are used within and between states and territories. At first glance, IPMS is the most widely used system among respondents, though it should be noted that all respondents using this system are from Victoria (of whom 80.6 per cent use IPMS – presumably a Victorian government requirement). GIS software of various types (including the Arc suite, MapInfo and other GIS software) appear to be commonly used.

Table 3.33 Proportion of respondents in each State or Territory indicating procedures used when finding a new weed

Procedures when finding a new weed	Proportion in State or Territory (%)							Total
	Qld	NSW	Vic	Tas	SA	WA	NT	
Use GPS to record its location	87.5	54.4	76.5	75.0	100.0	83.3	50.0	66.2
Record its location in a database	87.5	50.6	73.5	75.0	77.8	66.7	100.0	62.0
Mark its location on a map	37.5	60.8	67.6	75.0	11.1	66.7	50.0	58.5
Telephone/email/notify others in my organisation	37.5	50.6	52.9	50.0	44.4	33.3	0.0	48.6
Use a standardised computer reporting system	12.5	36.7	67.6	0.0	33.3	66.7	0.0	42.3
Remember where it is	25.0	50.6	26.5	50.0	33.3	33.3	0.0	40.8
Mark its location in the field	62.5	40.5	20.6	50.0	44.4	66.7	0.0	38.0
Use a standardised paper reporting system	12.5	35.4	17.6	25.0	11.1	66.7	0.0	28.9
Other	12.5	15.2	14.7	0.0	11.1	16.7	0.0	14.1
<i>n = 142</i>								

Table 3.34 Proportion of respondents using various computerised reporting/recording/mapping systems by State or Territory

Computerised reporting/recording/mapping systems used	Proportion in State or Territory (%)							
	Qld	NSW	Vic	Tas	SA	WA	NT	Total
IPMS	0.0	0.0	80.6	0.0	0.0	0.0	0.0	22.3
Arc GIS/Arc View (inc. Arc Pad, Arc Map)	28.6	14.3	19.4	25.0	62.5	0.0	100.0	21.4
Mapinfo	42.9	21.4	0.0	50.0	12.5	0.0	0.0	16.1
Other GIS/mapping software	0.0	17.9	9.7	0.0	25.0	25.0	0.0	14.3
Microsoft Office (Excel, Access)	14.3	19.6	3.2	25.0	0.0	25.0	0.0	13.4
In-house software package	0.0	10.7	6.5	0.0	12.5	25.0	0.0	8.9
Weedmap	0.0	16.1	0.0	0.0	0.0	0.0	0.0	8.0
GPS (e.g. Trimble, Etrex, Garmin)	0.0	10.7	0.0	0.0	0.0	50.0	0.0	7.1
Pestinfo	42.9	0.0	0.0	0.0	0.0	0.0	0.0	2.7
Other	0.0	12.5	16.1	25.0	12.5	25.0	0.0	13.4

n = 112

3.6.2 Recording and Reporting Impediments

Respondents were asked to indicate whether they saw any impediments to standardised reporting of weeds in their area of responsibility. As Table 3.35 illustrates, the overall response to this question was ambivalent. Those who experienced impediments to standardised reporting were asked to specify the types of impediment experienced (Table 3.36). Many respondents who answered this question appear to believe that inadequate reporting systems are the main impediment to standardised reporting – an inflexible or inefficient system (24.2 per cent of respondents), lack of a standard system across jurisdictions (19.7 per cent) and lack of a standard procedure or guidelines (13.6 per cent).

Significantly, many of those who indicated their reporting system is antiquated are from Victoria (64.7 per cent of Victorian respondents). As reported in Table 3.34, over 80 per cent of Victorian respondents use the IPMS reporting system. As one respondent noted '[the] IPMS system is a dinosaur!'.

Table 3.35 Proportion of respondents in each State or Territory observing impediments to standardised reporting of weeds in their area of responsibility

Impediments to standardised reporting of weeds in area of responsibility	Proportion in State or Territory (%)							
	Qld	NSW	Vic	Tas	SA	WA	NT	Total
Yes	50.0	53.3	50.0	60.0	28.6	20.0	0.0	49.3
No	50.0	46.7	50.0	40.0	71.4	80.0	100.0	50.7

n = 134, *chisq* = 5.59, *d.f.* = 6, *p* = 0.471

Table 3.36 Proportion of respondents in each State or Territory identifying specific impediments to standardised reporting of weeds in their area of responsibility

Impediments identified by respondents to standardised reporting of weeds in area of responsibility	Proportion in State or Territory (%)						
	Qld	NSW	Vic	Tas	SA	WA	Total
Reporting system inflexible/inefficient/antiquated	0.0	10.0	64.7	0.0	0.0	100.0	24.2
Lack of standard (e.g. cross-jurisdiction) system	33.3	27.5	5.9	0.0	0.0	0.0	19.7
Lack of standard procedure/guidelines	0.0	15.0	5.9	33.3	50.0	0.0	13.6
Insufficient reporting expertise/computer literacy	33.3	5.0	5.9	66.7	0.0	0.0	9.1
Too busy	33.3	7.5	5.9	0.0	0.0	0.0	7.6
Current procedure adequate	0.0	7.5	5.9	0.0	0.0	0.0	6.1
Too costly	0.0	10.0	0.0	0.0	0.0	0.0	6.1
Inconsistent reporting by staff	0.0	0.0	5.9	0.0	50.0	0.0	3.0
No designated weeds inspector	0.0	5.0	0.0	0.0	0.0	0.0	3.0
Other	0.0	12.5	0.0	0.0	0.0	0.0	7.6

n = 66, chisq = 69.128, d.f. = 45, p = 0.012.

Table 3.37 shows that over 74 per cent of respondents had experienced hesitance on the part of landholders to report weeds. Respondents identified a number of causes of this hesitance, as Table 3.38 illustrates. The five most commonly identified causes involve either the monetary or enforcement ‘costs’ associated with controlling weeds, or lack of interest and knowledge on the part of landholders. Variation in response regarding these causes on a State or Territory basis may reflect varied enforcement systems, weed control costs and weeds inspector enforcement powers across Australia.

Table 3.37 Proportion of respondents in each State or Territory who have experienced hesitance on the part of landholders to report weeds

Hesitance experienced by respondents on the part of landholders to report weeds	Proportion in State or Territory (%)							
	Qld	NSW	Vic	Tas	SA	WA	NT	Total
Yes	87.5	71.6	72.2	80.0	77.8	83.3	100.0	74.3
No	12.5	28.4	27.8	20.0	22.2	16.7	0.0	25.7

n = 140, chisq = 2.179, d.f. = 6, p = 0.903.

Table 3.38 Proportion of respondents in each State or Territory identifying specific causes of landholder hesitance to report weeds

Causes of landholder hesitance to report weeds	Proportion in State or Territory (%)							
	Qld	NSW	Vic	Tas	SA	WA	NT	Total
Perceived cost of weed control/lack of money	42.9	30.2	11.5	0.0	14.3	33.3	0.0	23.6
Fear of sanctions/prosecution/fines	14.3	26.4	26.9	0.0	14.3	0.0	0.0	21.7
Fear of enforcement/forced to control weeds	14.3	7.5	23.1	40.0	42.9	16.7	50.0	17.0
Apathy/lack of interest/don't want responsibility	0.0	20.8	3.8	20.0	14.3	0.0	0.0	13.2
Lack of knowledge/awareness	14.3	15.1	0.0	40.0	0.0	0.0	0.0	10.4
Loss of agricultural production/quarantine	14.3	5.7	3.8	20.0	14.3	50.0	0.0	9.4
Desire to keep inspectors/officials off property	0.0	5.7	15.4	0.0	0.0	0.0	50.0	7.5
Guilt/embarrassment	14.3	5.7	3.8	20.0	14.3	0.0	0.0	6.6
Possible damage to relationship with neighbours	0.0	5.7	15.4	0.0	0.0	0.0	0.0	6.6
Insufficient time to devote to weed control	14.3	1.9	0.0	0.0	0.0	33.3	0.0	3.8
Have not experienced any hesitance	0.0	5.7	0.0	0.0	0.0	16.7	0.0	3.8
Possible devaluation of property	0.0	1.9	3.8	20.0	0.0	0.0	0.0	2.8
Feel overwhelmed by weed problems	0.0	1.9	0.0	0.0	0.0	0.0	0.0	0.9
Other	14.3	3.8	3.8	0.0	0.0	0.0	50.0	4.7
<i>n</i> = 106								

The overall response of weed inspectors to the possibility of making information regarding the distribution of weeds on private property publicly available was relatively ambivalent, as Table 3.39 shows. However, the largest proportion of respondents (45.8 per cent) agreed that it should. More landholders (63.9 per cent) were also of this view than against it (26.2 per cent) (see Table 4.25).

Table 3.39 Proportion of respondents in each State or Territory indicating whether they believe specific information on the distribution of weeds on private property should be publicly available

Should information on the distribution of weeds on private property be publicly available?	Proportion in State or Territory (%)							
	Qld	NSW	Vic	Tas	SA	WA	NT	Total
Yes	62.5	48.1	37.1	60.0	22.2	83.3	0.0	45.8
No	25.0	24.1	48.6	20.0	66.7	0.0	50.0	31.9
Unsure	12.5	27.8	14.3	20.0	11.1	16.7	50.0	22.2
<i>n</i> = 144, <i>chisq</i> = 19.399, <i>d.f.</i> = 12, <i>p</i> = 0.079.								

3.7 Detection Response

3.7.1 Response Practice

Weeds inspectors were asked to identify the response or responses made by their organisation to discovery of a new weed (Table 3.40). The largest proportion (72 per cent) carry out further searching to map the current distribution of the weed. However, the number of responses greater than 40 per cent indicate that many weeds inspectors (and the organisations they work for) undertake a range of actions when a new weed is found. ‘Other’ responses included reporting to regional bodies (such as a weeds committee) or other bodies such as particular state departments (e.g. DPI) or Landcare, or to control the weed as soon as possible. Respondents who indicated that they recorded information on the weed were asked to identify where it was recorded. Responses included in-house, online or government department database systems and GIS or weed mapping software (see Appendix 4 for details).

Table 3.40 Proportion of respondents in each State or Territory identifying responses to a new weed being found in their organisation’s area of responsibility

Response when a new weed is found in organisation’s area of responsibility	Proportion in State or Territory (%)							
	Qld	NSW	Vic	Tas	SA	WA	NT	Total
Further searching is carried out to map the weed’s current distribution	87.5	66.7	77.1	40.0	100.0	66.7	100.0	72.0
Management strategies are put in place with the landholder/s	75.0	62.8	57.1	40.0	88.9	83.3	50.0	63.6
An assessment of the feasibility of eradication or containment is conducted	75.0	64.1	57.1	40.0	55.6	83.3	100.0	62.9
Information on the weed is recorded	87.5	52.6	65.7	60.0	66.7	16.7	100.0	58.0
A formal assessment of weed risk is undertaken	62.5	41.0	54.3	20.0	44.4	50.0	100.0	46.2
Legal declarations are considered	50.0	38.5	57.1	20.0	44.4	50.0	100.0	44.8
Report it to the State government	37.5	47.4	17.1	60.0	66.7	16.7	50.0	39.9
Have never found a new weed	12.5	14.1	2.9	20.0	0.0	16.7	0.0	10.5
Unsure	0.0	3.8	2.9	0.0	0.0	0.0	0.0	2.8
Nothing specific	0.0	1.3	2.9	0.0	0.0	0.0	0.0	1.4
Other	0.0	14.1	8.6	20.0	0.0	0.0	0.0	10.5
<i>n = 143</i>								

3.7.2 Response Impediments

Of the survey respondents from various states or territories, those from SA rated the coordination of response to new weed infestations the highest, closely followed by respondents from Victoria. Respondents from NT (of which there were only two) provided the lowest rating, though still one which might be considered as 'satisfactory'. Overall, survey respondents appear to believe the level of coordinated response to weed infestations is good (Table 3.41).

Table 3.41 Mean rating of the level of coordination of the response to new weed infestations in respondent's area of responsibility by State or Territory

Rate the level of coordination of the response to new weed infestations in your area of responsibility (Where 1 = 'Excellent', and 5 = 'Poor')	
SA	2.00
Vic	2.06
WA	2.40
Qld	2.43
NSW	2.43
Tas	2.50
NT	3.00
Total	2.32

n = 135; *p* = 0.286; *Kruskal-Wallis test*

Table 3.42 shows a relatively balanced response to the question 'are you aware of instances of stress and burnout being linked to the inspectorial role?'. Nonetheless, there are statistically significant differences in response on a state or territory basis, as revealed by chi-square analysis of the data ($\chi^2 = 14.705$, *d.f.* = 6, *p* = 0.023). In particular, 100 per cent of WA respondents, and 71.4 per cent of Victorian respondents, are aware of stress or burnout amongst weeds inspectors, while 75 per cent of respondents from Queensland were *not* aware of instances of stress or burnout.

Table 3.42 Proportion of respondents in each State or Territory indicating whether they are aware of instances of stress and burnout being linked to the inspectorial role

Awareness of instances of stress and burnout being linked to the inspectorial role	Proportion in State or Territory (%)							Total
	Qld	NSW	Vic	Tas	SA	WA	NT	
Yes	25.0	45.9	71.4	40.0	44.4	100.0	50.0	53.2
No	75.0	54.1	28.6	60.0	55.6	0.0	50.0	46.8

n = 139, *chisq* = 14.705, *d.f.* = 6, *p* = 0.023.

3.8 Landholder Commitment

As Table 3.43 highlights, the majority of respondents (60.6 per cent) only rate the commitment of landholders and farmers to detection and eradication of new weed infestations as a 'Medium'. Relatively few (10.6 per cent) believe that landholders have a high level of commitment to weed control on their property.

Table 3.43 Proportion of respondents in each State or Territory indicating their rating of the commitment of farmers/landholders to detection and eradication of new weed infestations

Rating the commitment of farmers/ landholders to detection and eradication of new weed infestations	Proportion in State or Territory (%)							Total
	Qld	NSW	Vic	Tas	SA	WA	NT	
Medium	37.5	57.7	65.7	80.0	66.7	60.0	100.0	60.6
Low	25.0	24.4	20.0	0.0	22.2	20.0	0.0	21.8
High	25.0	7.7	11.4	20.0	11.1	20.0	0.0	10.6
Unsure	12.5	10.3	2.9	0.0	0.0	0.0	0.0	7.0

n = 142, *chisq* = 10.799, *d.f.* = 18, *p* = 0.903.

Respondents were asked to rate the importance of various incentives committing landholders to weed control (Table 3.44). Each of the incentives listed received an overall rating between 1 and 2 ('Important' and 'Somewhat important'). Given that the two most 'important' incentives involve landholder knowledge, it may be concluded that sufficient landholder or farmer education will motivate them to control weeds on their land (in the opinion of survey respondents). This conclusion is supported by Table 3.51 and Table 3.52, which show that many respondents identified the importance of education/extension activities to improve weed identification and control. 'Other' incentives identified included compliance or legislation, provision of government funding or rebates, peer pressure, and avoiding prohibitive future costs (see Appendix 4).

At the same time, respondents were asked to identify which impediments reduce landholder or farmer commitment to controlling new weed infestations. As shown in Table 3.45, the most important incentives, in the opinion of respondents overall, involve 'costs' to the landholder: financial cost, cost in time, and cost in labour. Landholders may either require greater external assistance regarding weed control, or may need to be better advised regarding the ways in which such assistance is already available. Lack of knowledge and difficulty of control were also viewed as relatively important impediments, suggesting that improved landholder knowledge or training activities may make assist in negating such impediments.

To compare these findings with what farmers thought were incentives and impediments, see Table 4.80 to Table 4.83.

Table 3.44 Mean rating of the importance of incentives in committing farmers/landholders to detecting and eradicating new weed infestations by State or Territory

Importance of incentives in committing farmers/landholders to detecting and eradicating new weed infestations									
<i>(Mean rating, where 1 = 'Important', 2 = 'Somewhat important', 3 = 'Somewhat unimportant', and 4 = 'Unimportant')</i>									
	Qld	NSW	Vic	Tas	SA	WA	NT	Total	n
Knowing what the weed is	1.25	1.28	1.17	1.40	1.00	1.40	1.50	1.25	138
Understanding of potential weed impacts	1.25	1.29	1.29	1.20	1.33	1.17	2.00	1.29	140
Personal motivation	1.88	1.42	1.41	1.40	1.22	1.80	1.50	1.45	134
Ease of control	1.75	1.54	1.82	1.60	1.22	1.50	1.00	1.59	135
Upcoming visit from a weeds inspector	1.88	1.68	1.43	1.80	1.89	2.17	1.50	1.66	137
Working in a group to secure a grant to carry out works	2.25	1.85	1.76	2.00	1.67	2.00	1.00	1.84	135
Other	3.00	1.10	1.67	1.00		1.00		1.35	20

** p < 0.05; ** p < 0.01; Kruskal-Wallis test*

Table 3.45 Mean rating of the importance of impediments in reducing farmer/landholder commitment to detecting and eradicating new weed infestations by State or Territory

Importance of impediments in reducing farmer/landholder commitment to detecting and eradicating new weed infestations									
<i>(Mean rating, where 1 = 'Important', 2 = 'Somewhat important', 3 = 'Somewhat unimportant', and 4 = 'Unimportant')</i>									
	Qld	NSW	Vic	Tas	SA	WA	NT	Total	n
Financial costs	1.25	1.36	1.18	1.80	1.11	1.50	1.00	1.31	138
Time	1.12	1.40	1.31	1.20	1.11	1.33	1.00	1.33	138
Insufficient labour	1.38	1.52	1.79	1.00	1.22	1.33	1.00	1.52	136
Not knowing what the weed is	1.50	1.49	1.71	1.20	1.44	2.00	2.00	1.56	137
Difficulty of control	1.62	1.60	1.79	1.80	1.44	1.25	2.00	1.64	135
Difficult terrain	1.50	1.90	1.77	1.80	1.56	2.00	1.50	1.82	136
Hesitance to report for fear of legal action	2.12	1.99	1.88	2.20	2.00	2.00	1.50	1.97	137
Slow response time from noxious weed authority	1.62	2.42	2.09	2.00	2.33	2.80	2.50	2.29	135
Hesitance to report for fear of what others will think	2.00	2.49	2.12	2.40	2.22	2.50	2.50	2.35	136
Other		1.00	1.00			2.00		1.20	5

** p < 0.05; ** p < 0.01; Kruskal-Wallis test*

Clearly, Table 3.46 shows that, in the opinion of survey respondents, ‘part-time’ farmers (absentee and lifestyle farmers and those who have a second job off the land) are markedly less likely to look for weeds overall than ‘professional’ farmers (large landholders, grazing and cropping farmers). This suggests a number of possibilities: that ‘part-time’ farmers are not as ‘attached’ to the land as ‘professional’ farmers, given their varied external interests; that ‘professional’ farmers are more likely to control weeds given that their livelihood depends on a productive farm; or that a greater proportion of ‘professional’ farmers possess the experience and training necessary to identify and control weeds on their property. These results are largely supported by the farmer responses in Table 4.78 and Table 4.79.

Table 3.46 Proportion of respondents in each State or Territory indicating groups of landholders less likely to look for new weeds

Groups of landholders less likely to look for new weeds	Proportion in State or Territory (%)							
	Qld	NSW	Vic	Tas	SA	WA	NT	Total
Absentee landholders	100.0	68.1	85.7	80.0	88.9	83.3	50.0	76.6
Hobby/lifestyle farmers	62.5	44.4	40.0	20.0	66.7	50.0	50.0	45.3
Landholders with second jobs other than farming	62.5	33.3	40.0	40.0	44.4	16.7	50.0	37.2
No particular group	12.5	27.8	11.4	40.0	11.1	33.3	0.0	21.9
Large landholders	12.5	13.9	14.3	0.0	22.2	50.0	50.0	16.1
Grazing farmers	0.0	6.9	2.9	0.0	11.1	16.7	0.0	5.8
Cropping farmers	0.0	6.9	5.7	0.0	0.0	0.0	0.0	5.1
Other	25.0	15.3	2.9	0.0	0.0	16.7	50.0	11.7
<i>n = 137</i>								

3.9 Government Commitment

Respondents were asked to identify government agencies associated with weed infestation detection and eradication, and rate the commitment of each agency to this issue. Agencies listed by respondents were coded, using the categories listed in Table 3.47. As this table shows, agencies considered to have a relatively 'high' commitment to weed control include weeds authorities and state departments of agriculture, while agencies receiving a relatively 'low' overall rating included the Commonwealth government, state departments of crown lands and roads authorities. There was a significant difference in overall rating across States or Territories with regard to state departments of agriculture, with Queensland respondents giving a rating of 1.86 (tending towards 'medium'), while Victorian respondents gave a relatively 'high' overall rating to their state department of agriculture (1.1). In contrast, Queensland respondents rated CMA or NRM boards highly (an overall rating of 1), while this agency rated relatively 'medium' to 'low' in NSW (1.83) and particularly Victoria (2.62).

Table 3.47 Mean rating of the commitment of government agencies to detection and eradication of new weed infestations by State or Territory

Rating the commitment of government agencies to detection and eradication of new weed infestations										
<i>(Mean rating, where 1 = 'High', 2 = 'Medium', and 3 = 'Low')</i>										
	Qld	NSW	Vic	Tas	SA	WA	NT	Total	n	
Weeds authorities/agencies		1.29						1.29	7	
State department - agriculture	1.86	1.50	1.10	1.67		1.25		1.39	57	*
State department - environment	2.50	1.50	1.80		1.33	1.67	2.00	1.67	21	
National parks	1.67	1.88	1.67	2.00	2.00			1.83	36	
State government	3.00	2.25	1.17	2.00	2.00		2.00	1.89	19	
CMA/NRM boards	1.00	1.83	2.62		1.25		1.00	1.92	26	*
Local government	1.67	1.81	2.14	3.00	3.00	3.00		2.00	53	
Water authorities		1.67	2.00			3.00		2.00	12	
Rural lands protection boards		2.11						2.11	9	
Housing authorities		3.00						2.33	2	
Railway authorities		2.50	2.00					2.44	16	
State forestry		2.50		3.00	1.00			2.44	18	
Commonwealth government	1.00	3.00	3.00					2.50	4	
Roads authorities	3.00	2.62	2.67			3.00		2.69	13	
State department - crown lands		2.67	3.00					2.71	17	
Other	1.00	1.75						1.60	5	

* $p < 0.05$; ** $p < 0.01$; *Kruskal-Wallis test*

3.10 Improvements to On-Ground Detection

Table 3.48 and Table 3.49 include the overall survey response regarding ways in which weed surveillance, on land for which weeds inspectors are responsible, could be improved. Overall, 76 per cent of respondents believe that there are aspects of weed surveillance that could be improved (Table 3.48). These respondents were asked to identify ways in which weed surveillance could be improved (Table 3.49). Three of the four most common responses overall to this question involve increasing resources available to undertake weed surveillance activities (increased funding, increased personnel, and increased time for weed surveillance).

Improvements in surveillance techniques were of secondary importance overall. The only states whose respondents indicated they did not see a need for increased personnel was SA and WA. Victorian respondents also considered their state to be reasonably well resourced. Respondents from Queensland suggested that improvements in planning/guidelines/strategy/research were needed in that state, while Victorian respondents particularly highlighted a need for improvement in education/extension and their own knowledge and training.

Table 3.48 Proportion of respondents in each State or Territory indicating whether there are aspects of weed surveillance on land for which they are responsible that could be improved

Are there aspects of weed surveillance on land for which responsible that could be improved?	Proportion in State or Territory (%)							Total
	Qld	NSW	Vic	Tas	SA	WA	NT	
Yes	100.0	72.9	71.0	100.0	77.8	80.0	100.0	76.0
No	0.0	27.1	29.0	0.0	22.2	20.0	0.0	24.0

n = 129, chisq = 5.285, d.f. = 6, p = 0.508.

Table 3.49 Proportion of respondents in each State or Territory mentioning specific ways in which weed surveillance could be improved

Ways in which weed surveillance could be improved	Proportion in State or Territory (%)							
	Qld	NSW	Vic	Tas	SA	WA	NT	Total
Increased resources/funding	28.6	29.4	13.0	20.0	0.0	75.0	50.0	25.3
Increased personnel	28.6	33.3	8.7	40.0	0.0	0.0	50.0	24.2
Improved community involvement/awareness/education/extension	14.3	11.8	39.1	20.0	14.3	0.0	0.0	18.2
Greater time for weed surveillance/less office work	0.0	15.7	4.3	40.0	28.6	25.0	0.0	14.1
Increased frequency/timeliness of weed inspection	14.3	9.8	4.3	0.0	14.3	0.0	0.0	8.1
Improved mapping techniques (e.g. GPS, mobile mapping)	0.0	7.8	0.0	0.0	42.9	0.0	0.0	7.1
Improved record keeping techniques/equipment (e.g. hand held device)	0.0	3.9	8.7	20.0	0.0	0.0	0.0	5.1
Improved planning/guidelines/strategy/research	28.6	3.9	4.3	0.0	0.0	0.0	0.0	5.1
Improved surveillance techniques (e.g. aerial)	0.0	7.8	0.0	0.0	0.0	0.0	0.0	4.0
Improved personnel knowledge/training	0.0	0.0	13.0	0.0	0.0	0.0	0.0	3.0
Improved ability to enforce legislation/improved legislation	0.0	2.0	8.7	0.0	0.0	0.0	0.0	3.0
Little/no improvement needed	0.0	2.0	0.0	0.0	0.0	0.0	0.0	1.0
Other	0.0	9.8	13.0	0.0	0.0	0.0	0.0	8.1
<i>n = 99</i>								

While respondents felt strongly that improvements were required in weed surveillance, overall they were relatively undecided as to whether weed identification on the land for which they were responsible could be improved, with only 51.6 per cent seeing room for improvement in this area (Table 3.50). However, those who did see room for improvement indicated a range of ways in which improvement could be achieved, as shown in Table 3.51. The most common response to this question was to suggest improvements in weed ID training activities, of weeds inspection staff, landowners, and volunteer ‘weed spotters’, as well as awareness or education campaigns aimed at the general public. Increased resources dedicated to weed identification were also suggested.

Table 3.50 *Proportion of respondents in each State or Territory indicating whether there are aspects of weed identification on the land for which they are responsible that could be improved*

Are there aspects of weed identification on the land for which responsible that could be improved?	Proportion in State or Territory (%)							Total
	Qld	NSW	Vic	Tas	SA	WA	NT	
Yes	33.3	56.9	50.0	75.0	37.5	33.3	0.0	51.6
No	66.7	43.1	50.0	25.0	62.5	66.7	100.0	48.4
<i>n</i> = 128, <i>chisq</i> = 6.103, <i>d.f.</i> = 6, <i>p</i> = 0.412.								

Table 3.51 *Proportion of respondents in each State or Territory mentioning specific aspects of weed identification that could be improved*

Aspects of weed identification that could be improved	Proportion in State or Territory (%)							Total
	Qld	NSW	Vic	Tas	SA	WA	NT	
Ongoing weed ID training for staff	33.3	37.2	25.0	25.0	33.3	50.0	33.8	
Ongoing weed ID training for landowners/volunteers	0.0	34.9	18.8	50.0	33.3	0.0	29.6	
Updated id resources	0.0	20.9	12.5	25.0	0.0	0.0	16.9	
Increased resources/funding	0.0	11.6	12.5	0.0	0.0	0.0	9.9	
Public awareness/extension (e.g. signage, media)	0.0	7.0	6.2	0.0	0.0	0.0	5.6	
No changes required	33.3	2.3	6.2	0.0	0.0	0.0	4.2	
Improved communication between relevant parties	0.0	4.7	6.2	0.0	0.0	0.0	4.2	
Greater use of external resources (e.g. herbarium)	33.3	4.7	0.0	0.0	0.0	0.0	4.2	
Dedicated weeds officer	0.0	2.3	0.0	25.0	0.0	0.0	2.8	
Early/timely detection/action	33.3	0.0	0.0	0.0	33.3	0.0	2.8	
Greater use of volunteers/weed spotters	0.0	4.7	0.0	0.0	0.0	0.0	2.8	
Other	0.0	2.3	31.2	0.0	0.0	50.0	9.9	
<i>n</i> = 71								

Table 3.52 lists other suggestions made by survey respondents regarding areas in which weed detection strategies might be improved. In this open-ended question, many respondents reinforced some of the main themes emerging from the survey, such as improved education/extension, the need for more public, landholder and weeds inspection staff training, the need for increased government resources and increased staff dedicated to weed detection, improved inspection techniques and use of technology, and changes to relevant legislation. Verbatim responses to this question are included in Appendix 4.

Table 3.52 *Proportion of respondents in each State or Territory mentioning other ways in which on-ground property weed detection strategies can be improved*

Other ways in which on-ground property weed detection strategies can be improved	Proportion in State or Territory (%)							
	Qld	NSW	Vic	Tas	SA	WA	NT	Total
Education/awareness/extension/media	57.1	26.0	35.0	100.0	80.0	50.0	0.0	36.7
Increased government resources/funding	14.3	24.0	15.0	0.0	20.0	25.0	0.0	20.0
Increased staff	14.3	16.0	15.0	66.7	0.0	50.0	0.0	17.8
Greater time/frequency of inspections	0.0	18.0	0.0	0.0	0.0	25.0	0.0	11.1
Staff training/access to information	0.0	10.0	5.0	33.3	0.0	0.0	0.0	7.8
Changes to legislation	14.3	6.0	15.0	0.0	0.0	0.0	0.0	7.8
No improvement needed	0.0	10.0	10.0	0.0	0.0	0.0	0.0	7.8
Cooperation between government agencies	14.3	4.0	10.0	0.0	20.0	0.0	0.0	6.7
Improved mapping techniques	0.0	8.0	5.0	0.0	0.0	0.0	0.0	5.6
Updated brochures/manuals	0.0	8.0	0.0	0.0	0.0	0.0	0.0	4.4
Standardised procedures across jurisdictions	0.0	8.0	0.0	0.0	0.0	0.0	0.0	4.4
Greater use of aerial imagery/surveillance	0.0	6.0	5.0	0.0	0.0	0.0	0.0	4.4
Improved inspection techniques	0.0	2.0	5.0	0.0	0.0	0.0	0.0	2.2
Improved reporting procedures	0.0	2.0	0.0	0.0	0.0	0.0	0.0	1.1
Other	14.3	4.0	10.0	0.0	0.0	0.0	100.0	6.7
<i>n = 90</i>								

3.11 Summary

3.11.1 Inspector Information

- There were 146 respondents to the inspector survey, the majority of whom were from NSW and Victoria, though all states and territories were represented apart from the ACT.
- Position titles vary between states and territories, and include ‘weeds officer’, ‘weeds inspector’, ‘pest management officer’, with others involved in environment or bushland protection, and management.
- Many inspectors are involved in pest animal management, bushland and vegetation natural resource management and rehabilitation, and education, in addition to their role as weeds inspectors. NSW and Victorian respondents appear to have the widest range of responsibilities.
- The most common land situations inspected for weeds include roadsides/reserves, grazing land, waterways, native bushland and urban areas. The least common situations include forests, points of sale, horticulture and cropping.

3.11.2 Weed Spread (Pathways)

- The pathways considered by weeds inspectors as most ‘likely’ to spread weeds include ‘natural’ pathways (birds, wind, water, other animals), machinery/vehicles, fodder trade and construction/landscaping materials. Least ‘likely’ pathways included research sites, medicinal plant trade and food plant trade.
- WA and NT respondents consider machinery as a more ‘likely’ pathway for weed spread than those from NSW in particular.
- Victorian respondents view fodder trade as more ‘likely’ than other respondents, particularly those from NSW, Tasmania and WA.

3.11.3 Weed Surveillance

- Surveillance strategy
 - For many respondents, surveillance strategy is determined by a range of factors, most notably their own professional judgement, legislative guidelines, and availability of resources.
 - Target lists of weeds are used by the majority of respondents when searching for weeds, and are particularly important in Victoria. Respondents from Tasmania are less likely to use target lists.
 - Declaration of a new weed is viewed by a slim majority of respondents as a positive influence on farmer weed surveillance, though the intended visit of a weeds inspector is considered influential by over 75 per cent of respondents, perhaps being a more direct ‘threat’ than declaration.
- Surveillance targets
 - Inspectors are most likely to target ‘high risk’ properties, with known target weeds, a history of weed introductions, located near known infestations, or for which complaints have been received.
 - Overall, all inspectors carry out frequent inspection of locations where weeds have been found previously. Victorian respondents are most likely to carry out thorough inspections of properties. WA respondents appear more likely to target high risk areas.

- New weeds are most often found in the past along roads, water ways, and where stock are fed.
- Areas of land most difficult to inspect overall include dangerous inaccessible areas, forests/national parks, aquatic areas and public/crown lands. Least difficult to inspect appear to be pastoral, mining land, vineyards and known weedy areas.
- The majority of respondents inspect at least some properties regularly. Less than one fifth of respondents inspect on an ad hoc basis.
- A limited correlation exists for some states (particularly NSW) between the percentage of properties inspected regularly, and the time between property visits – the higher the percentage visited, the less frequently they are visited.
- Surveillance methods
 - Time of year appears to be the most important factor determining when survey respondents look for new weeds. This factor prompts respondents from SA, WA, NT and Victoria to look for new weeds more frequently than it does for those from Tasmania, NSW and Queensland.
 - The most frequently used form of transport when inspecting for weeds include a vehicle, and on foot. Horseback and aircraft were the least frequently used.
 - The most frequently used paddock search methods include targeting likely hospitable areas, and a random walk/drive/ride, while the least likely are randomly or regularly spaced transects.
 - Victorian respondents inspect almost twice as much of each paddock than SA respondents, the overall response being 62.8 per cent.
 - There was a relatively ambivalent response to the question ‘does weed surveillance strategy vary between districts/regions’.
 - Surveillance and detection strategies believed to work well by the greatest majority of respondents include visual inspection of property, complaints/word of mouth, regular inspection, education/extension.
 - Overall, respondents appear reasonably satisfied with their weed surveillance strategy. Victorians are the most satisfied overall, while Tasmanians are the least satisfied.

3.11.4 Weed Identification

- Identification practice
 - The most common procedures used to identify a new plant include weed identification books and brochures, consulting with other local experts, and sending weeds away for identification. Other experts consulted include colleagues, various government agencies, botanic gardens and agronomists. The most common places where specimens are sent for identification include a herbarium or a botanist/botanic gardens. Variation in the experts and identification agencies used appear to depend on the state or territory.
- Identification impediments
 - Overall, 49.7 per cent of respondents have no problem identifying plants, however the most commonly indicated impediment appears to be insufficient experience.

3.11.5 *Weed Recording and Reporting*

- Weeds inspectors seem to use a variety of procedures when finding a new weed, though the most commonly indicated include using GPS to record the weed's location, recording the location in a database, and marking it on a map.
- Software used by respondents includes various GIS and mapping packages, and tailored database packages including Pestinfo and IPMS (specific to Victorian weeds inspectors).
- While the response group is ambivalent about whether there were impediments to standardised reporting, those who saw such impediments appear to believe that the main ones were inflexible or non-standardised reporting systems. IPMS in particular is considered by Victorian respondents to be an antiquated system.
- Over 74 per cent of respondents have experienced hesitance on the part of landholders to report weeds. This hesitance is caused by, amongst other factors, the costs associated with weed control, fear of potential sanctions or enforcement, lack of interest, and insufficient knowledge.
- Respondents are relatively undecided overall as to whether information on the distribution of weeds on private property should be made publicly available.

3.11.6 *Detection Response*

- Response practice
 - Respondents appear to undertake a range of responses to discovery of a new weed. The highest proportion of respondents indicate that they carry out further searching to map the distribution of the weed. However, a range of other responses were made.
- Response impediments:
 - Overall, respondents rate the level of coordination of response to weed outbreaks as reasonably good, being rated highest in SA and lowest in the NT.
 - Stress and burnout amongst weeds inspectors appears to be more prevalent in Victoria and WA, and less prevalent in Queensland.

3.11.7 *Landholder Commitment*

- Commitment of landholders is rated by 60.6 per cent of weeds inspectors as 'Medium' (only 10.6 per cent believe landholders have a 'High' level of commitment).
- Respondents believe the main incentives committing landholders to weed detection and control involves landholder knowledge (implying the importance of landholder weed detection training).
- The main impediments to landholder commitment involved various 'costs' (financial, time, staffing), suggesting that landholders may need further advice in regard to weed-related services available to them.
- According to respondents, the least committed landholders to weed detection are 'part-time' farmers (absentee landholders, lifestyle farmers, farmers with an off-farm job), while 'professional' farmers are viewed overall as being more committed. The reasons for this may include attachment to place, farming as a livelihood versus farming as a hobby, the relative skills of 'professional' farmers, and the lack of weed control equipment (for example, spraying equipment) available to 'part-time' farmers..

3.11.8 Government Commitment

- The most committed government agencies listed include weeds authorities, and State agriculture and environment departments, while the least committed include State crown lands departments, roads authorities and the Commonwealth government.

3.11.9 Improvements to On-Ground Detection

- Overall, 76 per cent of respondents believed that weed surveillance could be improved. A number of possible improvements were listed, the most prevalent being increased resources, personnel, community awareness/education, and more time devoted to in-field detection work.
- Respondents were ambivalent overall regarding whether weed identification could be improved, however those who thought it could be identified improvements including weed identification training for staff, landholders, volunteers and the general public, and dedicated resources.
- Other suggestions for improving weed detection strategies highlighted themes such as training and education of staff, landholders and the general public, increased government resources and funding, improving inspection techniques, and changes to legislation.

4 National Survey of Farmers

4.1 Methods

4.1.1 Survey Content

As with the survey of weed inspectors, the content of the telephone survey of farmers was informed by previous research and the two informal focus groups held with weed inspectors and farmers in Armidale, NSW, in October 2007. The telephone interview schedule is also included as an attachment to this report (Appendix 3).

4.1.2 The Sampling Frame

The sampling frame for the telephone survey of farmers was constructed by Australian Fieldwork Solutions, the social research company sub-contracted to undertake the survey, from a number of sources. These included Australia on Disk, the White Pages, the Yellow Pages and electoral rolls. A random sample, stratified by state, was drawn from the sampling frame. Strata were sized to provide an estimate on proportions of at least ± 10 per cent at the 95 per cent confidence level. Strata populations were based on the number of farms in ANZIC categories 0113 to 0169, obtained from the Australian Bureau of Statistics Integrated Regional Database, 2004. These categories cover the main forms of broadacre and mixed farming in Australia. Local government areas in each State were ranked according to the number of farms and a set of target local government areas selected such that they contained 90 per cent of the total population of grain-sheep, beef cattle farms. Local government areas were then converted to postcode areas and these areas were used in selecting the phone numbers of potential interviewees. The initial target was for 600 completed interviews with land owners, however this was reduced during the execution of the survey, due to difficulty in obtaining sufficient land owner phone numbers in the Northern Territory. The initial and final strata sizes and confidence intervals on estimates of proportions are shown in Table 4.1.

Table 4.1 Initial and final sample stratum sizes and confidence intervals.

	State or Territory							Total
	Qld	NSW	Vic	Tas	SA	WA	NT	
Original stratum size	87	87	87	85	87	87	80	600
Confidence interval (per cent) on an estimate of proportions at the 95 per cent confidence level	± 10.5	± 10.5	± 10.5	± 10.6	± 10.5	± 10.5	± 10.7	± 4.0
Number of completed interviews	88	89	88	86	87	89	41	568
Confidence interval (per cent) on an estimate of proportions at the 95 per cent confidence level	± 10.5	± 10.5	± 10.5	± 10.6	± 10.5	± 10.5	± 5.3	± 4.1

4.1.3 The Survey

The telephone interviews were undertaken using Australian Fieldwork Solutions' Computer Aided Telephone Interviewing (CATI) system between 23-April and 4 May, 2008. Call statistics are shown in Table 4.2.

Table 4.2 Call statistics for the telephone survey

Call statistics	
(<i>%</i>)	
Completed interviews	27.2
Appointments	12.5
No answer and call back	10.9
Engaged	0.4
Refused	17.3
Number not connected	6.4
Residential number and not a farm	1.5
Fax number	1.7
Called six times and no answer	8.6
Language problems	0.1
Could not do interview by required date	4.7
Non-farm business	8.2
Don't inspect for weeds	0.4
Total	100

Total number of telephone numbers called - 2008

4.1.4 Data Analysis

Data analysis was undertaken with Microsoft Excel and SPSS. Responses recorded verbatim from interviews were coded where relevant to facilitate quantitative analysis of qualitative data. Cross-tabulations, multiple response tables and tables comparing means were produced with the interviewee's State or Territory and property type as an independent variable.

4.1.5 Conventions in Tables

All tables carry a column for the national total on the right hand side. Cross-tabulations with fixed response variables (i.e. questions where interviewees could only make one choice among a number of choices read out in the interview) include a line at the base of the table showing the number of interviewees included in the table, and the statistics for a chi-square test of independence of factors. Where the chi-square test is significant, a brief discussion follows the table which points out the main features of the pattern of responses that have led to the significant chi-square test. Where the test is not significant, discussion is largely confined to the national frequencies.

For tabulations with multiple response variables (i.e. questions where interviewees could make more than one choice from the options presented in the interview, or where coding of verbatim answers allowed multiple codes to encompass the content of an answer) only the total number of interviewees is provided below the table, as chi-square tests cannot be applied to this type of data.

For tabulations of rank order variables (i.e. questions where interviewees chose an option from among a ranked set of categories, such as "never", "sometimes", "often") the non-parametric Kruskal-Wallis test was used to identify significant differences between states or

property types. The category coding is provided in the upper part of the table and the Kruskal-Wallis statistics appear at the base of the table. For convenience of interpretation, the tables show means, rather than the mean ranks upon which the Kruskal-Wallis test is based.

The figures presented in the tables are weighted data, i.e. they have been adjusted to account for the fact that the sample contained different proportions of the total population of primary producers in each State. However, the statistics presented at the base of each table are for unweighted data, since significance tests can be compromised when used on weighted data. Generally, the differences between weighted and unweighted values in the cells of the tables were less than three percent.

4.2 Farmer Information

‘Mainly commercial grazing’ is the most common type of property owned by interviewees, as Table 4.3 illustrates. Statistically significant variances among interviewees include the relatively low proportion of mainly commercial grazing in WA, and the relatively high proportion of such properties amongst NT interviewees (a situation that is reversed in relation to commercial mixed cropping and livestock operations), the relatively high proportion of hobby farm or rural retreat property types in Tasmania and Victoria, and the lack of ‘mainly commercial cropping’ responses from Tasmania.

Table 4.3 Proportions of the five types of properties in each State and Territory.

Type of property	Proportion of interviewees in State or Territory (%)							
	Qld	NSW	Vic	Tas	SA	WA	NT	Total
Mainly commercial grazing	43.2	37.3	55.6	45.5	28.6	26.7	100.0	41.4
Commercial mixed cropping and livestock	27.2	37.3	27.1	36.4	49.2	61.7	0.0	36.3
Mainly commercial cropping	19.2	11.2	2.3	0.0	11.1	6.7	0.0	9.9
Hobby farm or rural retreat	5.6	4.3	11.3	13.6	6.3	3.3	0.0	6.7
Mainly commercial horticulture	4.8	9.9	3.8	4.5	4.8	1.7	0.0	5.6

n = 568, *chisq* = 103.394, *d.f.* = 24, *p* < 0.0005.

As Table 4.4 shows, interviewees from NT, on average, reside on significantly larger properties than those from other states (nearly three times larger than the next largest, Queensland interviewees). Interviewees from Victoria own, on average, the smallest properties, followed by interviewees from SA and Tasmania.

Grazing properties are significantly larger on average than the other property categories used in the survey of farmers, as Table 4.5 illustrates. Horticulture properties were, on average, the smallest in area. Hobby farms or rural retreats are surprisingly large overall. However, further analysis of the data reveals a number of large ‘rural retreats’ owned by NT interviewees in particular, thereby inflating the overall mean area for this combined property category.

Table 4.4 Mean property area by State or Territory.

Mean property area (<i>ha</i>)	
Qld	6890
NSW	3980
Vic	459
Tas	995
SA	950
WA	3667
NT	19169
Total	3421

n = 568; *p* < 0.0005; *Kruskal-Wallis test*

Table 4.5 Mean property area by type of property.

Mean property area (ha)	
Grazing	5288
Mixed cropping and livestock	2797
Cropping	1165
Horticulture	165
Hobby farm or rural retreat	1309
Total	3421
<i>n = 568; p < 0.0005; Kruskal-Wallis test</i>	

4.3 Weed Information

Farmers were asked to indicate which weeds were of most concern to them. Those that were most frequently mentioned have been included in Table 4.6 and Table 4.7 as is. Other less common species were grouped into functional groups such as ‘other perennial broadleaf weeds’, ‘other annual broadleaf weeds’, ‘perennial grasses’, ‘woody weeds’, ‘other annual grasses’, and ‘vines’.

The individual weeds of most concern to landholders were Thistles, followed by Paterson’s curse, Bathurst burr, and Blackberry, though the percentages varied considerably between states and property types. Unsurprisingly, graziers were most likely to be concerned about thistles, and those with cropping operations least likely to be concerned. When minor species were grouped, the highest proportion of interviewees to the farmer survey (29 per cent) concerned about a specific weed type listed in Table 4.6 and Table 4.7, were most concerned about perennial broadleaf weeds, followed by annual broadleaf weeds (24.6 per cent). The proportion of those concerned about perennial broadleaf weeds was highest in SA, and amongst owners of cropping operations. The smallest proportion of interviewees overall (3.5 per cent) were most concerned about vines. However, the highest proportion of interviewees overall (30.3 per cent) were most concerned about ‘Other’ weeds not listed specifically in the tables.

Table 4.6 *Proportion of interviewees in each State or Territory mentioning various weed species as being of most concern to them.*

Weeds of most concern	Proportion of interviewees in State or Territory (%)							
	Qld	NSW	Vic	Tas	SA	WA	NT	Total
Other perennial broadleaf weeds	21.6	33.7	15.9	23.3	54.0	39.3	2.4	29.0
Other annual broadleaf weeds	23.9	37.1	21.6	9.3	14.9	14.6	17.1	24.6
Thistles	9.1	23.6	36.4	57.0	19.5	13.5	0.0	23.1
Patersons curse	1.1	16.9	37.5	2.3	26.4	18.0	0.0	18.7
Perennial grasses	35.2	20.2	14.8	0.0	6.9	5.6	0.0	18.3
Woody weeds	39.8	21.3	4.5	18.6	5.7	6.7	26.8	18.1
Bathurst burr	3.4	34.8	13.6	1.2	4.6	0.0	4.9	14.4
Blackberry	1.1	6.7	38.6	20.9	2.3	4.5	0.0	12.9
Other annual grasses	2.3	14.6	8.0	3.5	14.9	11.2	2.4	9.5
Capeweed	0.0	4.5	21.6	22.1	8.0	7.9	0.0	9.0
Parthenium weed	27.3	4.5	0.0	0.0	0.0	0.0	0.0	7.2
Spiny emex	1.1	9.0	0.0	0.0	4.6	31.5	0.0	6.5
Wild radish	0.0	5.6	1.1	3.5	12.6	28.1	0.0	6.3
Annual ryegrass	0.0	2.2	1.1	0.0	17.2	30.3	0.0	6.0
Ragwort	3.4	0.0	12.5	29.1	0.0	0.0	0.0	4.8
Caltrop	0.0	3.4	0.0	0.0	24.1	9.0	7.3	4.6
Gorse	0.0	1.1	8.0	39.5	1.1	0.0	0.0	3.9
Vines	11.4	1.1	0.0	0.0	1.1	3.4	22.0	3.5
Others	53.4	29.2	17.0	23.3	24.1	21.3	68.3	30.3
None	1.1	0.0	0.0	0.0	1.1	2.2	4.9	0.7
Unknown	0.0	0.0	0.0	0.0	0.0	0.0	31.7	0.2
<i>n = 568</i>								

Table 4.7 Proportion of interviewees in each property type mentioning various weed species as being of most concern to them.

Weeds of most concern	Proportion of interviewees in property type (%)					Total
	Grazing	Mixed cropping and livestock	Cropping	Horticulture	Hobby farm or rural retreat	
Other perennial broadleaf weeds	27.9	29.8	48.6	17.3	12.1	29.0
Other annual broadleaf weeds	18.7	29.5	27.5	18.6	34.8	24.6
Thistles	30.8	19.2	5.7	18.4	25.0	23.1
Patersons curse	21.1	20.2	7.8	13.0	17.2	18.7
Perennial grasses	23.2	13.0	15.2	28.9	13.4	18.3
Woody weeds	21.2	10.9	20.8	25.2	28.9	18.1
Bathurst burr	12.5	20.1	9.7	4.9	11.8	14.4
Blackberry	19.5	7.6	0.0	9.8	20.7	12.9
Other annual grasses	6.9	10.5	17.8	11.7	5.6	9.5
Capeweed	11.8	9.0	0.0	9.8	3.2	9.0
Parthenium weed	8.5	7.5	2.5	10.4	3.7	7.2
Spiny emex	2.6	11.6	10.1	5.9	0.0	6.5
Wild radish	1.2	13.3	9.2	0.0	0.7	6.3
Annual ryegrass	1.1	11.6	11.5	2.3	0.0	6.0
Ragwort	8.7	2.2	0.0	0.0	5.9	4.8
Caltrop	1.0	7.1	6.3	17.9	0.0	4.6
Gorse	5.7	3.1	0.0	0.8	4.5	3.9
Vines	4.5	1.9	2.5	7.2	3.7	3.5
Others	25.2	23.1	61.5	46.7	41.3	30.3
None	0.9	0.7	0.0	0.0	0.0	0.7
Unknown	0.5	0.0	0.0	0.0	0.0	0.2
<i>n</i> = 568						

4.4 Weed Spread

'Natural' causes of weed spread (birds, wind and water) are considered by the highest proportion of interviewees as likely causes of new weed outbreaks. Of the possible ways in which weed outbreaks occur as a result of agricultural activity, the highest proportion of interviewees overall mentioned vehicles and machinery, livestock, and contaminated fodder.

Variation in response by State or Territory (Table 4.8) or property type (Table 4.9) may reflect topographic or landscape features unique to a particular State or Territory, the circumstances faced by particular categories of farmers, or their differing management philosophies. Variation of this type includes the relatively higher proportion of Queensland, NSW and NT interviewees (and the low proportion of SA interviewees) who mentioned water and floods, the relatively high proportion of cropping interviewees mentioning machinery, and the relatively low proportion of hobby farm interviewees mentioning vehicles, livestock and machinery.

Table 4.8 *Proportion of interviewees in each State or Territory mentioning various modes of weed spread.*

How weed outbreaks start	Proportion of interviewees in State or Territory (%)							
	Qld	NSW	Vic	Tas	SA	WA	NT	Total
Carried by birds	21.6	23.6	34.1	36.0	37.9	29.2	22.0	28.2
Carried on the wind	11.4	31.5	34.1	31.4	23.0	40.4	9.8	27.5
Carried by water and floods	35.2	40.4	18.2	12.8	4.6	23.6	48.8	27.5
Carried by vehicles	25.0	22.5	8.0	3.5	28.7	36.0	29.3	21.0
Carried by livestock	17.0	27.0	12.5	10.5	17.2	22.5	14.6	19.2
In hay or fodder fed to livestock	14.8	12.4	20.5	17.4	13.8	16.9	19.5	15.7
Carried by machinery	14.8	19.1	6.8	17.4	19.5	15.7	14.6	14.8
Carried by other wildlife/vermin	13.6	14.6	15.9	5.8	13.8	7.9	17.1	13.6
Reinfestation from own or neighbours properties	9.1	3.4	13.6	11.6	13.8	10.1	4.9	9.2
After soil disturbance	5.7	10.1	12.5	11.6	5.7	3.4	0.0	8.5
In grain fed to livestock	8.0	2.2	8.0	12.8	10.3	6.7	7.3	6.7
In seed sown for crops	4.5	3.4	3.4	4.7	9.2	7.9	0.0	4.8
In seed sown for pastures	1.1	3.4	1.1	3.5	3.4	3.4	0.0	2.3
No new outbreaks	3.4	1.1	0.0	1.2	1.1	1.1	4.9	1.4
Other	6.8	13.5	9.1	5.8	5.7	5.6	4.9	9.0
Does not know	0.0	0.0	0.0	0.0	2.3	1.1	2.4	0.4
<i>n = 568</i>								

Table 4.9 Proportion of interviewees in each property type mentioning various modes of weed spread.

How weed outbreaks start	Proportion of interviewees in property type (%)					
	Grazing	Mixed cropping and livestock	Cropping	Horticulture	Hobby farm or rural retreat	Total
Carried by birds	31.8	21.9	24.6	24.6	48.6	28.2
Carried on the wind	23.4	33.6	30.9	11.2	27.8	27.5
Carried by water and floods	27.2	25.9	34.5	16.9	34.7	27.5
Carried by vehicles	16.1	24.6	27.9	31.5	13.6	21.0
Carried by livestock	15.7	25.6	23.5	11.3	5.6	19.2
In hay or fodder fed to livestock	19.8	13.8	6.9	11.1	17.3	15.7
Carried by machinery	7.2	19.0	37.1	17.1	5.2	14.8
Carried by other wildlife/vermin	16.6	10.0	19.0	11.1	8.8	13.6
Reinfestation from own or neighbours properties	11.2	7.7	5.0	9.0	11.0	9.2
After soil disturbance	9.4	9.8	2.5	8.1	5.2	8.5
In grain fed to livestock	9.5	5.1	3.2	4.9	3.9	6.7
In seed sown for crops	3.3	7.8	3.2	4.6	0.0	4.8
In seed sown for pastures	1.5	3.1	3.2	5.4	0.0	2.3
No new outbreaks	2.8	0.3	1.2	0.0	0.0	1.4
Other	6.6	7.1	15.1	29.3	7.5	9.0
Does not know	0.0	0.7	1.3	0.0	0.0	0.4
<i>n</i> = 568						

4.5 Weed Surveillance

4.5.1 Surveillance Strategy

The great majority (84.3 per cent) of interviewees overall check for weeds on a regular basis. None of the interviewees indicated that they don't check for weeds at all, confirming that landholders are an important existing network of weed spotters. As Table 4.10 and Table 4.11 illustrate, regular checking for weeds is carried out by a large majority of interviewees from all states and territories, and by those managing all property types.

Table 4.10 Proportion of interviewees in each State or Territory who inspect for weeds regularly, on an ad hoc basis or not at all.

Whether inspect for weeds	Proportion of interviewees in State or Territory (%)							
	Qld	NSW	Vic	Tas	SA	WA	NT	Total
Regular	81.8	86.5	85.2	73.3	82.8	84.3	82.9	83.8
Ad hoc	18.2	13.5	14.8	26.7	17.2	15.7	17.1	16.2
Don't inspect for weeds at all	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

n = 568, *chisq* = 6.733, *d.f.* = 6, *p* = 0.346.

Table 4.11 Proportion of interviewees in each property type who inspect for weeds regularly, on an ad hoc basis or not at all.

Q2. Inspect weeds on property	Proportion of interviewees in property type (%)					Total
	Grazing	Mixed cropping and livestock	Cropping	Horticulture	Hobby farm or rural retreat	
Regular	84.3	86.4	87.5	77.4	73.7	84.3
Ad hoc	15.7	13.6	12.5	22.6	26.3	15.7
Don't inspect for weeds at all	0.0	0.0	0.0	0.0	0.0	0.0

n = 568, *chisq* = 2.125, *d.f.* = 4, *p* = 0.713.

Table 4.12 shows that the majority of interviewees (65.3 per cent) combine property weed inspection with other jobs, while a further 23.8 per cent of interviewees combine weed inspection with other jobs *and* check for weeds while undertaking paddock inspections. However, there was significant variance in response to this question on a State or Territory, or property type basis (*chisq* = 39.598, *d.f.* = 18, *p* = 0.002).

A relatively *high* proportion of Victorian and Tasmanian interviewees check for weeds while doing other jobs, though at first glance a relatively *low* proportion of NSW, SA and WA interviewees do so. However, a relatively high proportion of NSW, SA and WA interviewees inspect for weeds while doing other jobs *as well as* while undertaking paddock inspections.

Table 4.13 shows that a relatively high proportion of grazier interviewees, and a relatively low proportion of interviewees in charge of cropping operations, check for weeds while doing other jobs. A significantly high proportion of cropping interviewees (28.6 per cent) check for weeds during paddock inspections, while none of the interviewees managing a horticulture operation check for weeds during paddock inspections.

Table 4.12 Proportion of interviewees in each State or Territory who combine weed inspection with other jobs.

When check for weeds	Proportion of interviewees in State or Territory (%)							
	Qld	NSW	Vic	Tas	SA	WA	NT	Total
When doing other jobs	71.6	53.9	76.1	77.9	56.3	58.4	75.6	65.3
Both	14.8	36.0	15.9	16.3	31.0	25.8	12.2	23.8
During paddock inspections	13.6	10.1	8.0	5.8	11.5	15.7	9.8	10.8
Neither	0.0	0.0	0.0	0.0	1.1	0.0	2.4	0.2

n = 568, *chisq* = 39.598, *d.f.* = 18, *p* = 0.002.

Table 4.13 Proportion of interviewees in each property type who combine weed inspection with other jobs.

When check for weeds	Proportion of interviewees in property type (%)					
	Grazing	Mixed cropping and livestock	Cropping	Horti-culture	Hobby farm or rural retreat	Total
When doing other jobs	73.2	59.7	50.0	64.5	61.5	64.7
Both	21.3	27.7	19.6	35.5	20.5	24.2
During paddock inspections	5.5	12.6	28.6	0.0	17.9	10.9
Neither	0.0	0.0	1.8	0.0	0.0	0.2

n = 568, *chisq* = 41.945, *d.f.* = 12, *p* < 0.0005.

Farmers were asked to indicate whether declaration of a noxious weed changes makes a difference to the way in which they check for weeds. As Table 4.14 and Table 4.15 show, the majority of interviewees (over 61 per cent) indicated that it does not make a difference. This response should be read in conjunction with the response of weeds inspectors to a similar question regarding the effectiveness of weed declaration on farmer behaviour (see Table 3.13).

Significantly, however, Table 4.14 shows that declaration of a weed does make a difference to weed checking for a small majority of interviewees from WA, suggesting a more effective weed declaration strategy (communication and education, enforcement and compliance and so on) in WA than other States or Territories. In contrast, less than 30 per cent of Victorian interviewees believe that weed declaration makes a difference to their weed checking behaviour, perhaps suggesting less effective use of weed declaration in Victoria.

The type of property for which interviewees are responsible also appears to influence the extent to which weed declaration impacts on weed checking behaviour, as Table 4.15 illustrates. A significantly low proportion of grazing, cropping and hobby farm or rural retreat interviewees indicated that weed declaration changes how they check for weeds. In contrast, weed declaration appears to have an impact on a greater proportion of interviewees managing mixed cropping and livestock, and horticultural operations.

Table 4.14 Proportion of interviewees in each State or Territory for whom noxious weed declarations make a difference to how they go about checking for weeds on their property.

Whether weed declaration makes any difference to checking for weeds	Proportion of interviewees in State or Territory (%)							
	Qld	NSW	Vic	Tas	SA	WA	NT	Total
No	55.7	60.7	70.5	62.8	65.5	47.2	68.3	61.3
Yes	44.3	39.3	29.5	37.2	34.5	52.8	31.7	38.7
<i>n</i> = 568, <i>chisq</i> = 13.257, <i>d.f.</i> = 6, <i>p</i> = 0.039.								

Table 4.15 Proportion of interviewees in each property type for whom noxious weed declarations make a difference to how they go about checking for weeds on their property.

Whether weed declaration makes any difference to checking for weeds	Proportion of interviewees in property type (%)					
	Grazing	Mixed cropping and livestock	Cropping	Horticulture	Hobby farm or rural retreat	Total
No	67.7	51.5	69.6	45.2	74.4	61.2
Yes	32.3	48.5	30.4	54.8	25.6	38.8
<i>n</i> = 568, <i>chisq</i> = 12.4, <i>d.f.</i> = 4, <i>p</i> = 0.015.						

Those interviewees who indicated that weed declaration does affect how they go about checking for weeds were asked *how* it has an effect. As is shown in Table 4.16 and Table 4.17, a large majority of interviewees overall (75.1 per cent) indicated that weed declaration makes them check for that particular weed more closely and more often. Table 4.16 indicates that such behaviour is more prevalent amongst NT, WA and Victorian interviewees, while Table 4.17 indicates relative prevalence of this behaviour amongst mixed cropping and livestock interviewees in particular.

29.4 per cent of interviewees overall make an attempt to control the declared weed, and 17.2 per cent spray the weed more aggressively. Interviewees from Tasmania, NSW and Queensland are more likely to make an attempt to control the weed than those from NT and WA in particular (Table 4.16). Hobby farmers are far more likely to attempt to control the weed than those managing other types of property (Table 4.17), but unlikely to do so using herbicides, perhaps indicating their relative concern for the environmental aspects of weed control, or the time they have available to control weeds in comparison to ‘professional’ property managers, or their lack of spraying equipment.

Table 4.16 Proportion of interviewees in each State or Territory for various differences in how they go about checking for weeds that have been declared noxious.

Difference that declaration makes to checking for weeds	Proportion of interviewees in State or Territory (%)							
	Qld	NSW	Vic	Tas	SA	WA	NT	Total
Check for it more closely and more often	69.2	74.3	76.9	65.6	76.7	87.2	100.0	75.1
Attempt to control it	33.3	40.0	19.2	40.6	26.7	12.8	7.7	29.4
Spray more aggressively	17.9	22.9	19.2	18.8	10.0	8.5	0.0	17.2
Other	5.1	2.9	7.7	3.1	3.3	10.6	0.0	5.4
<i>n</i> = 222								

Table 4.17 Proportion of interviewees in each property type for various differences in how they go about checking for weeds that have been declared noxious.

Difference that declaration makes to checking for weeds	Proportion of interviewees in property type (%)					
	Grazing	Mixed cropping and livestock	Cropping	Horticulture	Hobby farm or rural retreat	Total
Check for it more closely and more often	72.1	78.8	70.9	74.4	75.4	75.1
Attempt to control it	25.6	29.9	41.9	19.2	48.1	29.4
Spray more aggressively	17.7	17.5	12.0	31.4	0.0	17.2
Other	8.1	5.8	0.0	0.0	0.0	5.4
<i>n</i> = 222						

Table 4.18 and Table 4.19 show that the large majority of interviewees (95.2 per cent) believe that the impending visit of a weeds inspector does not affect their normal routine. Furthermore, this result is relatively consistent across state or territory and property type, as the tables show.

Those who indicated that their routine was changed by the impending visit of a weeds inspector were asked in what areas changes were made, as shown by Table 4.20 and Table 4.21. Most common changes included farmer interviewees making their own inspection, and removing weeds before the inspector's visit.

Interestingly, this response differs somewhat from the response of weeds inspectors regarding the effect of an impending visit on landholder behaviour, an issue dealt with by the survey of weeds inspectors. This is discussed further in Section 3.4.1 (see also Table 3.14).

Table 4.18 Proportion of interviewees in each State or Territory who make changes to what they normally would be doing if a visit by an inspector is impending.

Whether an impending visit by inspectors affects normal routine	Proportion of interviewees in State or Territory (%)							
	Qld	NSW	Vic	Tas	SA	WA	NT	Total
No	97.7	92.1	97.7	95.3	92.0	95.5	97.6	95.1
Yes	2.3	7.9	2.3	4.7	8.0	4.5	2.4	4.9
<i>n</i> = 568, <i>chisq</i> = 6.879, <i>d.f.</i> = 6, <i>p</i> = 0.332.								

Table 4.19 Proportion of interviewees in each property type who make changes to what they normally would be doing if a visit by an inspector is impending.

Whether an impending visit by inspectors affects normal routine	Proportion of interviewees in property type (%)					
	Grazing	Mixed cropping and livestock	Cropping	Horticulture	Hobby farm or rural retreat	Total
No	96.2	94.7	98.2	87.1	94.9	95.2
Yes	3.8	5.3	1.8	12.9	5.1	4.8
<i>n</i> = 568, <i>chisq</i> = 5.225, <i>d.f.</i> = 4, <i>p</i> = 0.265.						

Table 4.20 Proportion of interviewees in each State or Territory who make various changes to what they normally would be doing if a visit by an inspector is impending.

Changes made if an impending visit by inspectors	Proportion of interviewees in State or Territory (%)							
	Qld	NSW	Vic	Tas	SA	WA	NT	Total
Conduct an inspection	50.0	71.4	50.0	50.0	14.3	75.0	0.0	55.6
Get rid of any weeds	50.0	28.6	50.0	50.0	57.1	25.0	0.0	40.7
Make a note of what weeds are on the property	0.0	14.3	50.0	25.0	0.0	0.0	0.0	14.8
Other	0.0	0.0	50.0	25.0	28.6	25.0	100.0	14.8
<i>n</i> = 27								

Table 4.21 Proportion of interviewees in each property type who make various changes to what they normally would be doing if a visit by an inspector is impending.

Changes made if an impending visit by inspectors	Proportion of interviewees in property type (%)					
	Grazing	Mixed cropping and livestock	Cropping	Horticulture	Hobby farm or rural retreat	Total
Conduct an inspection	57.2	53.7	0.0	83.7	14.3	55.6
Get rid of any weeds	41.7	14.7	100.0	58.2	100.0	40.7
Make a note of what weeds are on the property	16.0	16.5	0.0	0.0	14.3	14.8
Other	17.0	21.1	0.0	0.0	0.0	14.8
<i>n</i> = 27						

Interviewees were asked to indicate which of two approaches they believed it was best for local weeds authorities to follow: to make information and pictures available to landholders regarding weeds, or to concentrate on getting landholders to report any weeds or ‘suspicious’ plants to weeds authorities (Table 4.22 and Table 4.23). Overall, the largest proportion of interviewees (43.4 per cent) favoured information and pictures, while a further 28.5 per cent indicated that weeds authorities should focus on both strategies. Analysis did not reveal a statistically significant variation of response on the basis of State or Territory, or property type.

Table 4.22 Proportion of interviewees in each State or Territory with various views about the focus for weeds authorities.

Views on the focus for weeds authorities: provision of information or encouraging reporting by landholders	Proportion of interviewees in State or Territory (%)							
	Qld	NSW	Vic	Tas	SA	WA	NT	Total
Make plenty of information and pictures available to landholders	46.6	44.9	40.9	40.7	52.9	31.5	26.8	43.4
Both	34.1	25.8	23.9	25.6	26.4	37.1	39.0	28.5
Just concentrating on getting people to report any plant to weeds authorities	6.8	21.3	15.9	18.6	14.9	21.3	17.1	16.1
Neither	11.4	6.7	18.2	11.6	4.6	7.9	12.2	10.5
Not sure	1.1	1.1	1.1	3.5	1.1	2.2	4.9	1.4
<i>n</i> = 568, <i>chisq</i> = 35.593, <i>d.f.</i> = 24, <i>p</i> = 0.06.								

Table 4.23 Proportion of interviewees in each property type with various views about the focus for weeds authorities.

Views on the focus for weeds authorities: provision of information or encouraging reporting by landholders	Proportion of interviewees in property type (%)					
	Grazing	Mixed cropping and livestock	Cropping	Horticulture	Hobby farm or rural retreat	Total
Make plenty of information and pictures available to landholders	40.9	47.8	33.3	61.3	39.5	43.7
Both	30.2	27.5	29.8	16.1	31.6	28.5
Just concentrating on getting people to report any plant to weeds authorities	15.3	14.5	26.3	16.1	13.2	16.0
Neither	11.5	9.2	10.5	6.5	15.8	10.6
Not sure	2.1	1.0	0.0	0.0	0.0	1.2

n = 568, *chisq* = 10.521, *d.f.* = 16, *p* = 0.838.

The majority of interviewees overall (63.8 per cent) indicated that they believe weed distribution information on private property should be made publicly available, as Table 4.24 and Table 4.25 illustrate. Table 4.24 shows a statistically significant variation in response to this question on a state or territory basis. NSW interviewees were, on the whole, significantly less likely to agree to this course of action than their counterparts in other states or territories, while a significantly higher proportion of interviewees from Queensland agreed in comparison to the aggregate response.

Table 4.24 Proportion of interviewees in each State or Territory who believed that weed distribution information should be publicly available.

Views on whether weed distribution information should be publicly available	Proportion of interviewees in State or Territory (%)							
	Qld	NSW	Vic	Tas	SA	WA	NT	Total
Yes	75.0	49.4	70.5	68.6	57.5	69.7	53.7	63.8
No	13.6	38.2	20.5	27.9	35.6	22.5	41.5	26.3
Don't know	11.4	12.4	9.1	3.5	6.9	7.9	4.9	9.9

n = 568, *chisq* = 30.486, *d.f.* = 12, *p* = 0.002.

Table 4.25 Proportion of interviewees in each property type who believed that weed distribution information should be publicly available.

Views on whether weed distribution information should be publicly available	Proportion of interviewees in property type (%)					
	Grazing	Mixed cropping and livestock	Cropping	Horticulture	Hobby farm or rural retreat	Total
Yes	65.1	64.1	61.4	51.6	69.2	63.9
No	23.8	26.7	33.3	35.5	20.5	26.2
Don't know	11.1	9.2	5.3	12.9	10.3	9.9

n = 568, *chisq* = 4.853, *d.f.* = 8, *p* = 0.773.

Interviewees were asked to indicate their reasons for making or not making information on weed spread on private property publicly available. As Table 4.26 and Table 4.27 illustrate, a wide range of reasons were given. The largest proportion of interviewees overall (34.4 per cent) indicated that the information would allow landholders to be better informed. Other often-mentioned reasons for and against included that it was in the community interest (for), it is an invasion of privacy (against), and that it allows weed spread to be dealt with more effectively (for).

Table 4.26 *Proportion of interviewees in each State or Territory with various reasons for why information on weed distribution should or should not be publicly available.*

Reason for making or not making information on weed distribution publicly available	Proportion of interviewees in State or Territory (%)							
	Qld	NSW	Vic	Tas	SA	WA	NT	Total
Allows landholders to be better informed	41.0	29.5	36.3	27.7	29.6	37.8	33.3	34.4
In the public/community interest	24.4	9.0	20.0	15.7	13.6	20.7	15.4	17.0
An invasion of privacy	9.0	28.2	7.5	14.5	12.3	12.2	25.6	15.0
Puts pressure on the landholder to treat the problem	11.5	9.0	12.5	20.5	9.9	9.8	7.7	11.3
Weeds can be treated more effectively	10.3	11.5	17.5	9.6	7.4	4.9	5.1	10.9
Of benefit to landholders	10.3	3.8	3.8	4.8	3.7	8.5	2.6	5.7
Stop the spread of weeds	9.0	6.4	3.8	1.2	2.5	7.3	2.6	5.7
May infringe on landholders rights to use the property as they wish	0.0	1.3	2.5	3.6	2.5	6.1	2.6	2.3
Would not buy hay/fodder if from a known weed area	2.6	3.8	1.3	4.8	2.5	0.0	2.6	2.0
May decrease value of property	2.6	1.3	0.0	3.6	3.7	3.7	0.0	2.0
Heavy handed approach/needs to be a more personal approach	1.3	0.0	1.3	2.4	2.5	1.2	7.7	2.0
Allows neighbours to be informed/work together	2.6	0.0	0.0	2.4	2.5	3.7	0.0	1.6
Increases awareness/more people on the lookout	1.3	0.0	1.3	4.8	0.0	3.7	0.0	1.4
Industries, government departments require it	2.6	1.3	2.5	1.2	3.7	0.0	0.0	1.4
Unnecessary government expenditure	2.6	0.0	1.3	1.2	1.2	3.7	0.0	1.4
Local governments require it/Provide information to local government	2.6	1.3	2.5	0.0	0.0	1.2	2.6	1.2
Allows potential purchasers of property to be informed	1.3	1.3	1.3	1.2	3.7	0.0	0.0	1.2
Not a feasible option/system	0.0	1.3	1.3	0.0	3.7	1.2	0.0	1.2
May reduce level of reporting	0.0	0.0	1.3	0.0	3.7	1.2	2.6	1.0
May cause friction between neighbours	0.0	0.0	1.3	0.0	2.5	0.0	5.1	0.8
May decrease the value of the product	0.0	0.0	0.0	1.2	1.2	2.4	0.0	0.6
Information is available/adequate as it is	0.0	1.3	0.0	2.4	0.0	1.2	0.0	0.6
Case dependent/depends on the weed/seriousness of the problem	0.0	1.3	1.3	0.0	0.0	2.4	0.0	0.6
Weeds Authority	1.3	0.0	1.3	1.2	0.0	0.0	2.6	0.4
May decrease value of livestock	0.0	0.0	1.3	0.0	1.2	0.0	2.6	0.4
Some landholders cannot afford eradication	0.0	0.0	0.0	0.0	1.2	1.2	0.0	0.4
Increased bureaucracy/red tape	0.0	0.0	1.3	0.0	1.2	0.0	0.0	0.4
Would not buy stock from an infected area	0.0	1.3	0.0	0.0	0.0	0.0	0.0	0.2
Other	2.6	9.0	3.8	3.6	3.7	4.9	7.7	5.1
Don't know	0.0	0.0	1.3	1.2	1.2	1.2	0.0	0.6

n = 521

Table 4.27 Proportion of interviewees in each property type with various reasons for why information on weed distribution should or should not be publicly available.

Reason for making or not making information on weed distribution publicly available	Proportion of interviewees in property type (%)					
	Grazing	Mixed cropping and livestock	Cropping	Horti-culture	Hobby farm or rural retreat	Total
Allows landholders to be better informed	41.2	32.0	23.3	11.6	42.6	34.4
In the public/community interest	16.3	20.6	9.3	16.4	14.3	17.0
An invasion of privacy	17.4	12.0	16.8	32.4	0.7	15.0
Puts pressure on the landholder to treat the problem	11.7	11.1	11.3	10.3	12.1	11.3
Weeds can be treated more effectively	12.2	11.3	8.7	6.2	9.5	10.9
Of benefit to landholders	5.5	3.8	6.5	0.0	21.3	5.7
Stop the spread of weeds	4.4	4.8	8.7	6.7	13.2	5.7
May infringe on landholders rights to use the property as they wish	1.8	2.4	7.3	0.0	0.7	2.3
Would not buy hay/fodder if from a known weed area	1.0	3.0	0.0	6.7	0.0	2.0
May decrease value of property	1.5	2.0	3.9	0.0	4.4	2.0
Heavy handed approach/needs to be a more personal approach	1.7	2.6	2.6	0.0	0.7	2.0
Allows neighbours to be informed/work together	1.6	1.1	2.6	5.6	0.0	1.6
Increases awareness/more people on the lookout	0.8	1.9	0.0	2.6	2.6	1.4
Industries, government departments require it	1.1	1.8	2.6	0.0	0.7	1.4
Unnecessary government expenditure	2.1	0.8	1.3	2.6	0.0	1.4
Local government require it/Provide information to local government	1.0	0.5	2.6	5.6	0.0	1.2
Allows potential purchasers of property to be informed	0.9	0.8	0.0	2.4	6.4	1.2
Not a feasible option/system	1.6	0.9	0.0	0.4	2.0	1.2
May reduce level of reporting	0.7	1.3	1.2	0.0	0.0	1.0
May cause friction between neighbours	0.0	2.3	0.0	0.0	0.3	0.8
May decrease the value of the product (general)	0.1	0.5	3.4	0.0	0.0	0.6
Information is available/adequate as it is	0.0	0.8	2.6	0.0	0.3	0.6
Case dependent/depends on the weed/seriousness of the proble	0.7	0.1	0.0	0.0	4.4	0.6
Weeds Authority	0.3	0.8	0.0	0.0	0.0	0.4
May decrease value of livestock	0.0	0.0	3.4	0.0	0.0	0.4
Some landholders cannot afford eradication	0.0	1.2	0.0	0.0	0.0	0.4
Increased bureaucracy/red tape	0.0	1.2	0.0	0.0	0.0	0.4
Would not buy stock from an infected area	0.3	0.4	0.0	0.0	0.0	0.2
Other	3.7	4.3	10.6	2.6	10.6	5.1
Don't know	0.8	0.8	0.0	0.0	0.0	0.6
<i>n = 512</i>						

4.5.2 Surveillance Targets

The majority (over 66 per cent) of interviewees indicated that they concentrate on particular parts of their property when checking for new weed outbreaks, particularly in SA and in horticulture and hobby farms (Table 4.28 and Table 4.29).+

Table 4.28 Proportion of interviewees in each State or Territory who concentrate upon particular parts of their property when checking for new outbreaks.

Whether particular parts of the property are concentrated upon when checking for new outbreaks of weeds	Proportion of interviewees in State or Territory (%)							Total
	Qld	NSW	Vic	Tas	SA	WA	NT	
Yes	64.8	68.5	67.0	60.5	73.6	55.1	75.6	66.3
No	35.2	31.5	33.0	39.5	26.4	44.9	24.4	33.7
<i>n = 568, chisq = 10.112, d.f. = 6, p = 0.12.</i>								

Table 4.29 Proportion of interviewees in each property type who concentrate upon particular parts of their property when checking for new outbreaks.

Whether particular parts of the property are concentrated upon when checking for new outbreaks of weeds	Proportion of interviewees in property type (%)					Total
	Grazing	Mixed cropping and livestock	Cropping	Horticulture	Hobby farm or rural retreat	
Yes	68.1	59.7	64.9	80.6	82.1	66.4
No	31.9	40.3	35.1	19.4	17.9	33.6
<i>n = 568, chisq = 7.63, d.f. = 4, p = 0.106.</i>						

Interviewees who indicated that they did concentrate on particular parts of their property when checking for new weed outbreaks were asked to indicate the place or places on their property on which they concentrated. As Table 4.30 and Table 4.31 show, the largest proportion of overall responses (44.1 per cent) indicated water courses or irrigation channels or dams, followed by boundaries, traffic areas and previous known infestation areas, giving some indication as to the ‘vulnerable’ areas of rural properties with regards to weed infestation. Water courses appear to be less important in SA but more important in NT, Queensland and NSW, presumably due to the extent of river systems and flooding in these states and territories. Water courses were also emphasised by those involved in cropping. The relatively high proportion (27 per cent) of hobby farmers or rural retreaters who highlighted difficult terrain as areas for checking for weeds may indicate a poor focus by these types of landholders.

Table 4.30 Proportion of interviewees in each State or Territory who concentrate upon various parts of their property when checking for new outbreaks.

Parts of property concentrated upon	Proportion of interviewees in State or Territory (%)							
	Qld	NSW	Vic	Tas	SA	WA	NT	Total
Water courses/irrigation channels/dams	57.9	60.7	33.9	30.8	15.6	26.5	54.8	44.1
Boundaries with neighbours and fencelines	15.8	24.6	16.9	25.0	28.1	24.5	19.4	21.3
Roadways and traffic areas	24.6	19.7	16.9	13.5	21.9	26.5	19.4	20.7
Previous known infestation areas	17.5	11.5	22.0	26.9	18.8	24.5	9.7	17.8
Cultivation paddocks	14.0	19.7	10.2	17.3	15.6	16.3	0.0	15.2
Difficult terrain/remote/non-crop areas e.g. bushland	14.0	11.5	15.3	17.3	10.9	10.2	9.7	13.0
Livestock feeding areas	8.8	9.8	10.2	9.6	7.8	8.2	12.9	9.3
Utility areas e.g. around sheds	1.8	4.9	5.1	7.7	12.5	8.2	3.2	5.6
All areas/anywhere	7.0	1.6	3.4	0.0	0.0	0.0	3.2	2.9
Other	7.0	3.3	3.4	5.8	10.9	10.2	3.2	5.9
Other livestock areas	1.8	6.6	1.7	7.7	12.5	2.0	9.7	4.8
Other crop areas	0.0	4.9	0.0	1.9	1.6	4.1	3.2	2.1
<i>n = 373</i>								

Table 4.31 Proportion of interviewees in each property type who concentrate upon various parts of their property when checking for new outbreaks.

Parts of property concentrated upon	Proportion of interviewees in property type (%)					
	Grazing	Mixed cropping and livestock	Cropping	Horticulture	Hobby farm or rural retreat	Total
Water courses/irrigation channels/dams	48.8	36.8	60.3	34.7	38.6	44.1
Boundaries with neighbours and fencelines	19.5	23.3	22.7	24.4	18.3	21.3
Roadways and traffic areas	21.4	26.2	9.6	10.0	17.4	20.7
Previous known infestation areas	16.4	22.9	9.6	7.2	23.5	17.8
Cultivation paddocks	7.6	21.4	33.4	19.8	4.8	15.2
Difficult terrain/remote/non-crop areas e.g. bushland	18.2	7.5	0.0	7.2	27.0	13.0
Livestock feeding areas	12.4	7.6	0.0	10.0	10.7	9.3
Utility areas e.g. around sheds	1.9	7.4	6.9	8.8	12.7	5.6
All areas/anywhere	2.1	3.6	7.8	0.4	0.0	2.9
Other	4.5	7.1	9.6	3.2	4.4	5.9
Other livestock areas	5.4	5.5	0.0	8.8	0.8	4.8
Other crop areas	0.1	1.1	0.0	21.6	3.1	2.1
<i>n</i> = 373						

As shown by Table 4.32 and Table 4.33, the majority of interviewees (over 67 per cent) believe there are particular areas on their property where new outbreaks of weeds are regularly found. Statistical analysis did not reveal significant variation in response on a state or territory, or property area basis. However, taken with Table 4.28 and Table 4.29, this response indicates a spatially targeted approach to weed control by the majority of farmers.

Table 4.32 Proportion of interviewees in each State or Territory who have areas on their properties where new outbreaks are regularly found.

Whether there are areas where new outbreaks are regularly found	Proportion of interviewees in State or Territory (%)							
	Qld	NSW	Vic	Tas	SA	WA	NT	Total
Yes	68.4	73.8	69.5	53.8	60.9	53.1	54.8	67.5
No	31.6	26.2	30.5	46.2	39.1	46.9	45.2	32.5
<i>n</i> = 373, <i>chisq</i> = 9.77, <i>d.f.</i> = 6, <i>p</i> = 0.135.								

Table 4.33 Proportion of interviewees in each property type who have areas on their properties where new outbreaks are regularly found.

Whether there are areas where new outbreaks are regularly found	Proportion of interviewees in property type (%)					
	Grazing	Mixed cropping and livestock	Cropping	Horticulture	Hobby farm or rural retreat	Total
Yes	65.6	67.2	72.2	73.1	65.6	67.3
No	34.4	32.8	27.8	26.9	34.4	32.7
<i>n</i> = 373, <i>chisq</i> = 1.831, <i>d.f.</i> = 4, <i>p</i> = 0.767.						

Interviewees were asked to identify the place or places on their property in which new outbreaks of weeds are regularly found. As Table 4.34 and Table 4.35 show, the largest proportion of interviewees overall (41.3 per cent) regularly find new weed outbreaks around water courses or irrigation channels or dams. Boundaries or fencelines, and roadways or traffic areas, are also relatively common weed outbreak locations. Table 4.34 appears to show that interviewees from Queensland and NSW are more likely to find new weed outbreaks on watered areas of their property.

Table 4.34 *Proportion of interviewees in each State or Territory who regularly find new outbreaks in various parts of their property.*

Places where new outbreaks are regularly found	Proportion of interviewees in State or Territory (%)							
	Qld	NSW	Vic	Tas	SA	WA	NT	Total
Water courses/irrigation channels/dams	53.8	60.0	31.7	14.3	10.3	11.5	35.3	41.3
Roadways and traffic areas	7.7	13.3	19.5	21.4	28.2	23.1	17.6	18.1
Boundaries with neighbours and fencelines	20.5	15.6	17.1	10.7	23.1	23.1	11.8	16.1
Previous known infestation areas	12.8	6.7	12.2	17.9	12.8	19.2	5.9	11.0
Livestock feeding areas	7.7	8.9	7.3	17.9	2.6	19.2	0.0	8.7
Cultivation paddocks	7.7	8.9	7.3	7.1	10.3	11.5	5.9	8.3
Difficult terrain/remote/non-crop areas e.g. bushland	7.7	8.9	4.9	17.9	7.7	3.8	11.8	7.5
Utility areas e.g. around sheds	0.0	2.2	4.9	0.0	7.7	7.7	0.0	3.1
All areas/anywhere	0.0	0.0	2.4	0.0	0.0	0.0	0.0	0.8
Other	7.7	2.2	4.9	7.1	5.1	11.5	11.8	5.1
Other livestock areas	0.0	4.4	0.0	3.6	10.3	3.8	5.9	3.1
Other crop areas	0.0	2.2	0.0	0.0	2.6	0.0	5.9	1.2
<i>n</i> = 235								

Table 4.35 *Proportion of interviewees in each property type who regularly find new outbreaks in various parts of their property.*

Places where new outbreaks are regularly found	Proportion of interviewees in property type (%)					Total
	Grazing	Mixed cropping and livestock	Cropping	Horti-culture	Hobby farm or rural retreat	
Water courses/irrigation channels/dams	45.5	35.6	51.2	31.4	41.9	41.3
Roadways and traffic areas	17.6	23.9	13.3	13.6	8.8	18.1
Boundaries with neighbours and fencelines	12.0	22.0	19.3	13.6	12.5	16.1
Previous known infestation areas	9.6	13.7	8.1	9.8	14.7	11.0
Livestock feeding areas	11.8	7.6	0.0	13.6	1.2	8.7
Cultivation paddocks	6.1	13.5	12.3	3.5	0.0	8.3
Difficult terrain/remote/non-crop areas e.g. bushland	8.1	3.9	0.0	9.8	25.8	7.5
Utility areas e.g. around sheds	0.0	3.3	9.6	8.1	7.3	3.1
All areas/anywhere	1.4	0.0	0.0	0.0	0.0	0.8
Other	5.0	6.0	5.4	8.6	0.0	5.1
Other livestock areas	2.5	5.1	0.0	3.8	0.0	3.1
Other crop areas	0.1	0.0	0.0	9.8	3.4	1.2
<i>n</i> = 235						

As Table 4.36 and Table 4.37 illustrate, only a slight majority of interviewees (53.3 per cent) indicated that it is still worth checking areas of their property where new weed outbreaks are *not* found regularly, perhaps suggesting ambivalence amongst the response group to the importance of whole-property weeds inspection.

Table 4.36 *Proportion of interviewees in each State or Territory who have places on their property where new outbreaks are rarely found, but believe these places are still worth checking.*

Whether there are places on their property where new outbreaks are rarely found, but they believe these places are still worth checking	Proportion of interviewees in State or Territory (%)							
	Qld	NSW	Vic	Tas	SA	WA	NT	Total
Yes	56.1	50.8	52.5	46.2	56.3	57.1	41.9	53.3
No	43.9	49.2	47.5	53.8	43.8	42.9	58.1	46.7
<i>n = 373, chisq = 3.375, d.f. = 6, p = 0.761.</i>								

Table 4.37 *Proportion of interviewees in each property type who have places on their property where new outbreaks are rarely found, but believe these places are still worth checking.*

Whether there are places on their property where new outbreaks are rarely found, but they believe these places are still worth checking	Proportion of interviewees in property type (%)					
	Grazing	Mixed cropping and livestock	Cropping	Horti-culture	Hobby farm or rural retreat	Total
Yes	46.9	52.8	51.4	76.9	71.0	53.3
No	53.1	47.2	48.6	23.1	29.0	46.7
<i>n = 373, chisq = 5.461, d.f. = 4, p = 0.243.</i>						

Those interviewees who indicated that it is still worth checking areas of the property where new weed outbreaks are rarely found were asked to indicate the area or areas checked as part of this policy (Table 4.38 and Table 4.39). Surprisingly, the area or areas checked with the highest proportion of interviewees for this question were the same as those indicated by the highest proportion of interviewees as areas where new weed outbreaks are most regularly found – watered areas of the property, roadways or traffic areas, and boundaries or fencelines (see Table 4.34 and Table 4.35). This suggests that many farmers remain wary of the risks associated with weed outbreaks on these potentially ‘sensitive’ parts of their property, perhaps as a result of previous experience, education and extension, or discussion with weeds inspectors and neighbours, even though the incursion of new weeds may be rare.

Table 4.38 Proportion of interviewees in each State or Territory nominating various places where weeds are rarely found but are believed to still be worth checking.

Places where new outbreaks are rarely found but are still worth checking	Proportion of interviewees in State or Territory (%)							
	Qld	NSW	Vic	Tas	SA	WA	NT	Total
Water courses/irrigation channels/dams	28.1	16.1	19.4	37.5	19.4	17.9	38.5	20.9
Roadways and traffic areas	6.3	19.4	25.8	16.7	19.4	17.9	23.1	17.9
Boundaries with neighbours and fencelines	6.3	25.8	12.9	4.2	13.9	17.9	0.0	15.4
All areas/anywhere	9.4	3.2	16.1	29.2	5.6	17.9	0.0	10.9
Bushland/scrub/non- crop areas	9.4	9.7	12.9	8.3	11.1	14.3	7.7	10.4
Difficult terrain/remote areas	6.3	19.4	6.5	12.5	11.1	3.6	0.0	10.0
Livestock feeding areas	9.4	12.9	6.5	8.3	2.8	3.6	0.0	8.0
Utility areas e.g. around sheds	6.3	9.7	6.5	0.0	0.0	10.7	7.7	6.5
Cultivation paddocks	9.4	0.0	0.0	0.0	5.6	3.6	7.7	3.0
Previous known infestation areas	3.1	3.2	3.2	0.0	0.0	3.6	0.0	2.5
Other	15.6	9.7	16.1	4.2	25.0	17.9	15.4	14.9
Other livestock areas	9.4	9.7	0.0	0.0	5.6	3.6	15.4	6.0
Other crop areas	3.1	0.0	0.0	0.0	2.8	0.0	0.0	1.0
<i>n = 195</i>								

Table 4.39 Proportion of interviewees in each property type nominating various places where weeds are rarely found but are believed to still be worth checking.

Places where new outbreaks are rarely found but are still worth checking	Proportion of interviewees in property type (%)					Total
	Grazing	Mixed cropping and livestock	Cropping	Horti-culture	Hobby farm or rural retreat	
Water courses/irrigation channels/dams	21.8	18.3	22.4	18.5	27.0	20.9
Roadways and traffic areas	19.9	18.2	19.1	11.1	13.3	17.9
Boundaries with neighbours and fencelines	24.6	12.1	0.0	12.6	8.2	15.4
All areas/anywhere	8.6	5.4	30.8	18.5	11.2	10.9
Bushland/scrub/non- crop areas	9.0	10.4	17.0	0.0	19.7	10.4
Difficult terrain/remote areas	8.6	13.5	14.9	7.7	3.0	10.0
Livestock feeding areas	7.9	6.8	14.9	9.2	6.9	8.0
Utility areas e.g. around sheds	2.4	5.9	14.9	0.0	22.4	6.5
Cultivation paddocks	2.0	6.6	3.5	0.0	0.0	3.0
Previous known infestation areas	4.8	0.0	0.0	9.2	0.0	2.5
Other	11.8	18.1	7.2	31.4	10.1	14.9
Other livestock areas	4.0	11.7	0.0	0.0	6.4	6.0
Other crop areas	1.9	0.0	0.0	3.6	0.0	1.0
<i>n = 195</i>						

Overall, a minority of interviewees (36 per cent) indicated that there were areas of their property that are difficult to check for weeds, as shown in Table 4.40 and Table 4.41. Statistical analysis ($\chi^2 = 13.212$, $d.f. = 4$, $p = 0.01$) revealed a significant difference in response to this question on the basis of property type (Table 4.41). Grazing property interviewees are significantly *more* likely to have areas of land that are difficult to check for weeds, while those with cropping operations were significantly *less* likely.

Table 4.40 Proportion of interviewees in each State or Territory who have places on their properties that are difficult to check.

Whether there are places on the property that are difficult to check	Proportion of interviewees in State or Territory (%)							Total
	Qld	NSW	Vic	Tas	SA	WA	NT	
No	56.8	62.9	70.5	52.3	64.4	71.9	58.5	63.8
Yes	43.2	37.1	29.5	47.7	35.6	28.1	41.5	36.2

n = 568, $\chi^2 = 11.172$, $d.f. = 6$, $p = 0.083$.

Table 4.41 Proportion of interviewees in each property type who have places on their properties that are difficult to check.

Whether there are places on the property that are difficult to check	Proportion of interviewees in property type (%)					Total
	Grazing	Mixed cropping and livestock	Cropping	Horticulture	Hobby farm or rural retreat	
No	56.2	69.9	70.2	68.8	66.7	64.0
Yes	43.8	30.1	29.8	31.3	33.3	36.0

n = 568, $\chi^2 = 13.212$, $d.f. = 4$, $p = 0.01$.

Interviewees who indicated that places on their property were difficult to inspect for weeds were asked to indicate which places. As Table 4.42 and Table 4.43 show, the highest proportion of interviewees (53.4 per cent) find it difficult to inspect difficult terrain or remote areas, followed by watered areas of the property (28.4 per cent) and bushland/scrub/non-crop areas (24 per cent). Table 4.43 appears to suggest that those who own cropping farms are less likely to have areas of difficult terrain or bushland on their property, and more likely to have extensive watered areas which are difficult to inspect for weeds. This response may suggest a need for targeted weed management strategies dependent on type of property, and the need for methods for inspecting difficult places.

Table 4.42 *Proportion of interviewees in each State or Territory who find various places on their properties difficult to check.*

Places on property that are difficult to check	Proportion of interviewees in State or Territory (%)							
	Qld	NSW	Vic	Tas	SA	WA	NT	Total
Difficult terrain/remote areas	63.2	57.6	57.7	43.9	32.3	28.0	47.1	53.4
Water courses/irrigation channels/dams	26.3	12.1	11.5	46.3	51.6	40.0	23.5	28.4
Bushland/scrub/non- crop areas	21.1	48.5	19.2	14.6	9.7	36.0	41.2	24.0
Boundaries with neighbours and fencelines	2.6	0.0	0.0	0.0	3.2	8.0	0.0	1.5
Roadways and traffic areas	0.0	0.0	3.8	2.4	3.2	0.0	0.0	1.0
Utility areas e.g. around sheds	2.6	0.0	0.0	0.0	0.0	0.0	0.0	0.5
Cultivation paddocks	0.0	0.0	0.0	2.4	0.0	0.0	0.0	0.0
Other	13.2	6.1	7.7	4.9	12.9	16.0	0.0	9.8
<i>n = 211</i>								

Table 4.43 *Proportion of interviewees in each property type who find various places on their properties difficult to check.*

Places on property that are difficult to check	Proportion of interviewees in property type (%)					
	Grazing	Mixed cropping and livestock	Cropping	Horticulture	Hobby farm or rural retreat	Total
Difficult terrain/remote areas	60.4	45.4	25.6	20.1	94.4	53.4
Water courses/irrigation channels/dams	30.6	24.6	48.8	34.9	0.0	28.4
Bushland/scrub/non- crop areas	19.0	36.4	19.0	10.1	22.9	24.0
Boundaries with neighbours and fencelines	1.4	3.3	0.0	0.0	0.0	1.5
Roadways and traffic areas	0.9	0.0	8.9	0.0	0.0	1.0
Utility areas e.g. around sheds	1.4	0.0	0.0	0.0	0.0	0.5
Cultivation paddocks	0.0	0.4	0.0	0.0	0.0	0.0
Other	3.6	12.6	25.0	34.9	5.2	9.8
<i>n = 211</i>						

4.5.3 Surveillance Frequency

Interviewees were asked how regularly (on average) they inspect their paddocks for weeds. As Table 4.44 and Table 4.45 illustrate, a large majority of interviewees (80.2 per cent) inspect each of their paddocks on average every three months or less. A very small proportion of interviewees check their paddocks for weeds rarely (1 or more years between paddock inspections on average). Nearly all interviewees from all States and Territories, and owners of all property types, appear to inspect for weeds regularly.

Table 4.44 Proportion of interviewees in each State or Territory with various frequencies of checking for weeds.

Frequency of checking for weeds	Proportion of interviewees in State or Territory (%)							
	Qld	NSW	Vic	Tas	SA	WA	NT	Total
Less than 3 months	84.1	77.5	84.1	74.4	78.2	74.2	73.2	80.2
No particular frequency, ad-hoc checks etc	9.1	14.6	11.4	11.6	10.3	19.1	12.2	12.4
3 to less than 6 months	2.3	4.5	2.3	8.1	5.7	5.6	2.4	3.9
6 months to less than 1 year	3.4	1.1	1.1	4.7	3.4	1.1	7.3	2.1
5 or more years	1.1	2.2	1.1	0.0	2.3	0.0	0.0	1.4
1 to less than 3 years	0.0	0.0	0.0	1.2	0.0	0.0	4.9	0.0
<i>n = 568, chisq = 40.526, d.f. = 30, p = 0.095.</i>								

Table 4.45 Proportion of interviewees in each property type with various frequencies of checking for weeds.

Frequency of checking for weeds	Proportion of interviewees in property type (%)					
	Grazing	Mixed cropping and livestock	Cropping	Horticulture	Hobby farm or rural retreat	Total
Less than three months	79.9	79.7	75.4	86.7	86.8	80.2
No particular frequency, ad-hoc checks etc	12.4	15.0	12.3	0.0	7.9	12.4
3 to less than 6 months	4.7	2.9	5.3	6.7	2.6	4.1
6 months to less than 1 year	1.7	1.0	5.3	3.3	2.6	1.9
Five or more years	1.3	1.4	1.8	3.3	0.0	1.4
1 to less than 3 years	0.0	0.0	0.0	0.0	0.0	0.0
<i>n = 568, chisq = 15.027, d.f. = 20, p = 0.775.</i>						

The majority of interviewees (67.3 per cent) check for weeds at particular times of year, as illustrated in Table 4.46 and Table 4.47. Statistical analysis reveals a significant difference in the proportion of interviewees who do check at particular times of year on a State or Territory basis. As Table 4.46 shows, a significantly higher proportion of interviewees from SA (80.5 per cent) check for weeds at a particular time of year, in contrast to the much lower proportion of interviewees from Queensland, Tasmania and NT. This response suggests that time of year is not as important a factor in weed outbreaks in Queensland, Tasmania and NT, perhaps a consequence of relative lack of variation in climatic conditions, or relative prevalence of year-round species in these locations. The latter suggestion is supported by the relatively high proportion of respondents concerned with woody perennial weeds in these two states and territory as well as perennial vines in Queensland and NT (Table 4.6).

Table 4.46 *Proportion of interviewees in each State or Territory who check for weeds at particular times of year.*

Whether or not interviewee checked for weeds at particular times of year	Proportion of interviewees in State or Territory (%)							Total
	Qld	NSW	Vic	Tas	SA	WA	NT	
Yes	52.3	68.5	71.6	54.7	80.5	78.7	51.2	67.3
No	47.7	31.5	28.4	45.3	19.5	21.3	48.8	32.7

n = 568, chisq = 32.436, d.f. = 6, p < 0.0005.

Table 4.47 *Proportion of interviewees in each property type who check for weeds at particular times of year.*

Whether or not interviewee checked for weeds at particular times of year	Proportion of interviewees in property type (%)					Total
	Grazing	Mixed cropping and livestock	Cropping	Horticulture	Hobby farm or rural retreat	
Yes	69.9	63.6	64.9	74.2	69.2	67.3
No	30.1	36.4	35.1	25.8	30.8	32.7

n = 568, chisq = 1.355, d.f. = 4, p = 0.852.

Table 4.48 and Table 4.49 show the proportion of interviewees who inspect for weeds during particular months of the year. The relatively high proportion of responses for each month suggests that year-round weed inspection is not unusual for many farmers (a conclusion supported by Table 4.46 and Table 4.47). The highest proportion of interviewees overall inspect for weeds during the spring and, to a slightly lesser degree, summer months.

However, as Table 4.48 illustrates, the best time for checking varies between states due to differences in climate. Interviewees from NT are less likely to check for weeds during the spring months, and more likely to check from December to March. WA and SA interviewees, on the other hand, are more likely to check for weeds in late autumn, after the start of the autumn break (in rainfall), and in early spring when there is still sufficient soil moisture from winter rains and warmer temperatures for weed growth.

Table 4.49 shows that a relatively high proportion of those owning horticulture operations check for weeds in August, September, October and January, graziers and hobby farmers are relatively less likely to check for weeds during the winter months, while those who own cropping or mixed cropping operations appear more likely to adopt a year-round approach to weed inspection.

Clearly, time of year, geographic location and property type all have a significant impact on weed inspection behaviour amongst farmers.

Table 4.48 *Proportion of interviewees in each State or Territory who check for weeds in each month of the year.*

Month when regularly check for weeds	Proportion of interviewees in State or Territory (%)							Total
	Qld	NSW	Vic	Tas	SA	WA	NT	
January	60.9	65.6	31.7	31.9	34.3	22.9	52.4	46.0
November	56.5	65.6	31.7	38.3	32.9	27.1	42.9	45.7
October	50.0	54.1	38.1	46.8	35.7	44.3	19.0	45.4
September	39.1	45.9	41.3	55.3	47.1	55.7	9.5	44.9
December	54.3	63.9	30.2	38.3	35.7	20.0	66.7	44.1
February	56.5	62.3	23.8	31.9	25.7	22.9	61.9	41.3
May	21.7	26.2	33.3	21.3	45.7	68.6	19.0	34.7
March	45.7	41.0	25.4	23.4	22.9	18.6	66.7	32.4
April	23.9	29.5	38.1	27.7	31.4	31.4	38.1	31.1
June	21.7	16.4	20.6	12.8	37.1	58.6	9.5	26.1
August	23.9	18.0	17.5	29.8	30.0	54.3	9.5	25.1
July	21.7	16.4	12.7	10.6	25.7	54.3	9.5	21.9
<i>n = 378</i>								

Table 4.49 *Proportion of interviewees in each property type who check for weeds in each month of the year.*

Month when regularly check for weeds	Proportion of interviewees in property type (%)					Total
	Grazing	Mixed cropping and livestock	Cropping	Horticulture	Hobby farm or rural retreat	
January	40.4	41.6	71.6	61.8	52.3	46.0
November	44.1	43.2	64.1	36.6	49.9	45.7
October	47.9	36.9	52.8	60.3	48.6	45.4
September	41.1	42.0	50.8	63.4	60.5	44.9
December	40.3	37.8	71.8	45.9	58.0	44.1
February	36.2	39.9	56.9	61.8	38.9	41.3
May	28.5	42.7	37.2	39.7	26.3	34.7
March	31.2	28.0	36.5	60.5	31.3	32.4
April	31.4	24.4	39.4	71.9	17.1	31.1
June	18.3	33.0	41.1	14.6	29.0	26.1
August	10.5	30.7	51.2	52.3	29.5	25.1
July	11.5	29.1	43.0	14.6	29.0	21.9
<i>n = 378</i>						

Interviewees who check for weeds at a particular time of year were asked to provide the reason or reasons why (Table 4.50 and Table 4.51). As the tables show, the highest proportion of response was in relation to weeds growing rapidly at certain times of year (43.1 per cent), followed by weeds coming up after rain (30.5 per cent). ‘Weeds come up after rain’ appeared to be a relatively less important reason for Tasmanian interviewees than those from other states or territories (Table 4.50). At the same time, a relatively high proportion of interviewees with cropping or horticulture operations indicated that particular times of year gave them the best chance of killing or controlling weed outbreaks. In contrast, hobby farmers, with presumably relatively poor knowledge of weeds, were more likely to check for weeds when they were more noticeable (Table 4.51).

Table 4.50 Proportion of interviewees in each State or Territory who gave various reasons for checking for weeds at a particular time of year.

Reason for checking for weeds at a particular time of year	Proportion of interviewees in State or Territory (%)							
	Qld	NSW	Vic	Tas	SA	WA	NT	Total
Weeds are growing rapidly	26.1	45.9	55.6	36.2	47.1	32.9	19.0	43.1
Weeds come up after rain	45.7	26.2	25.4	12.8	28.6	35.7	81.0	30.5
Weeds are more noticeable	19.6	26.2	19.0	31.9	25.7	31.4	9.5	24.0
Best chance of controlling/killing them	15.2	24.6	19.0	21.3	17.1	14.3	14.3	19.3
Weeds are flowering	13.0	8.2	14.3	19.1	21.4	15.7	0.0	13.6
Other	10.9	6.6	3.2	2.1	5.7	12.9	9.5	7.0
<i>n = 378</i>								

Table 4.51 Proportion of interviewees in each property type who gave various reasons for checking for weeds at a particular time of year.

Reason for checking for weeds at a particular time of year	Proportion of interviewees in property type (%)					
	Grazing	Mixed cropping and livestock	Cropping	Horticulture	Hobby farm or rural retreat	Total
Weeds are growing rapidly	44.7	48.9	27.5	40.1	28.2	43.1
Weeds come up after rain	29.1	32.6	31.5	23.4	36.1	30.5
Weeds are more noticeable	24.7	20.5	27.3	14.1	40.3	24.0
Best chance of controlling/killing them	17.2	14.3	32.3	42.8	17.8	19.3
Weeds are flowering	20.5	10.3	5.8	3.1	5.5	13.6
Other	3.6	4.3	14.7	15.7	22.9	7.0
<i>n = 378</i>						

4.5.4 Surveillance Methods

Table 4.52 and Table 4.53 indicate the proportion of interviewees using various modes of transport when checking their paddocks for weeds. Overall, the highest proportion of interviewees (71.3 per cent) use a motor bike or quad bike, while 57.6 per cent of interviewees check their paddocks for weeds travelling in a vehicle (ute or four-wheel drive). Paddock inspection conducted on horseback was relatively less common, though appears relatively widely used in Queensland and NT, and amongst grazier interviewees. Inspection using a light aircraft or helicopter was undertaken by a small proportion of interviewees overall, though appears to be a relatively common method in NT. Hobby farmers are highly likely to inspect for weeds on foot.

Table 4.52 Proportion of interviewees in each State or Territory using various modes of transport for checking weeds.

Mode of transport when checking for weeds	Proportion of interviewees in State or Territory (%)							
	Qld	NSW	Vic	Tas	SA	WA	NT	Total
On a motor bike or four wheeler	79.5	71.9	75.0	57.0	63.2	58.4	58.5	71.3
In a vehicle	51.1	60.7	54.5	41.9	62.1	70.8	65.9	57.6
On foot	31.8	39.3	40.9	51.2	43.7	41.6	29.3	39.1
On a tractor	34.1	25.8	28.4	25.6	27.6	24.7	17.1	28.3
On a horse	17.0	7.9	8.0	4.7	5.7	4.5	24.4	9.3
In a light aircraft or helicopter	2.3	1.1	1.1	0.0	0.0	1.1	12.2	1.2
<i>n = 568</i>								

Table 4.53 Proportion of interviewees in each property type using various modes of transport for checking weeds.

Mode of transport when checking for weeds	Proportion of interviewees in property type (%)					Total
	Grazing	Mixed cropping and livestock	Cropping	Horti-culture	Hobby farm or rural retreat	
On a motor bike or four wheeler	79.5	72.1	62.7	56.0	42.2	71.3
In a vehicle	53.8	68.1	66.4	34.5	31.3	57.6
On foot	35.8	31.8	29.2	65.6	92.1	39.1
On a tractor	24.6	21.2	65.9	44.6	20.2	28.3
On a horse	15.4	4.2	7.7	10.4	0.7	9.3
In a light aircraft or helicopter	2.5	0.0	2.5	0.0	0.0	1.2
<i>n = 568</i>						

Table 4.54 and Table 4.55 show the proportion of interviewees who believe that particular search methods are useful when checking for weeds. Overall, combining weed inspection with other property tasks appears a more common approach than conducting specific weed searches, particularly when using a motor bike or quad bike as a mode of transportation (30.1 per cent). However, specific weed searching is still a relatively important search method amongst interviewees (19.5 per cent conduct specific searches on foot, and 17.8 by motor bike or quad bike). While hobby farmers will do most weed searching on foot, cropping farmers will do very little checking on foot (Table 4.55).

Table 4.54 *Proportion of interviewees in each State or Territory nominating various search methods that they believe work best when checking for weeds.*

Search method for checking for weeds	Proportion of interviewees in State or Territory (%)							
	Qld	NSW	Vic	Tas	SA	WA	NT	Total
Combining with other tasks using quad/motor bike	36.4	28.1	34.1	31.4	24.1	19.1	29.3	30.1
Specific searching on foot	13.6	21.3	21.6	18.6	24.1	19.1	14.6	19.5
Specific searching using quad/motor bike	20.5	19.1	13.6	12.8	17.2	21.3	9.8	17.8
Combining with other tasks on foot	8.0	19.1	13.6	18.6	16.1	22.5	12.2	15.3
Combining with other tasks by car	5.7	9.0	18.2	11.6	19.5	14.6	19.5	12.3
Specific searching by car	9.1	11.2	3.4	11.6	12.6	19.1	12.2	9.9
Concentration in specific areas	9.1	10.1	6.8	7.0	6.9	2.2	12.2	7.9
Specific searching by other means	10.2	7.9	5.7	3.5	3.4	1.1	14.6	6.5
No particular approach	6.8	2.2	12.5	4.7	5.7	4.5	4.9	6.3
Combining with other tasks by other means	6.8	2.2	4.5	5.8	9.2	4.5	12.2	4.9
Other	10.2	5.6	2.3	8.1	4.6	3.4	7.3	5.6
<i>n = 568</i>								

Table 4.55 *Proportion of interviewees in each property type nominating various search methods that they believe work best when checking for weeds.*

Search method for checking for weeds	Proportion of interviewees in property type (%)					
	Grazing	Mixed cropping and livestock	Cropping	Horticulture	Hobby farm or rural retreat	Total
Combining with other tasks using quad/motor bike	41.0	23.7	27.8	12.9	15.0	30.1
Specific searching on foot	17.0	21.1	7.5	25.6	40.3	19.5
Specific searching using quad/motor bike	20.4	18.5	20.4	4.6	5.5	17.8
Combining with other tasks on foot	16.6	13.7	5.6	24.9	22.6	15.3
Combining with other tasks by car	14.1	11.9	13.4	4.6	8.4	12.3
Specific searching by car	6.9	14.0	13.3	5.9	5.0	9.9
Concentration in specific areas	8.6	5.7	5.0	24.5	5.4	7.9
Specific searching by other means	7.2	2.8	14.7	11.7	6.6	6.5
No particular approach	5.5	8.9	1.2	0.8	10.5	6.3
Combining with other tasks by other means	7.3	3.2	6.4	0.3	1.8	4.9
Other	6.5	5.2	7.5	0.8	3.2	5.6
<i>n = 568</i>						

Interviewees were asked to estimate the percentage of their property checked for weeds. As shown in Table 4.56, interviewees from Victoria check the largest percentage of their property overall (96 per cent), while those from NT check the lowest (71.6 per cent), most probably as a consequence of property size (Table 4.4) and accessibility.

Table 4.57 shows that owners of cropping farms check the largest percentage of their property on average (96.5 per cent), while horticulturalists check the lowest percentage (86.1 per cent). Overall, though, interviewees from all states and territories, and property types, appear to check a large proportion of their property for weeds.

Table 4.56 Mean percentage of property checked for weeds by State or Territory.

Mean percentage of property checked (%)	
Qld	89.0
NSW	91.2
Vic	96.0
Tas	88.7
SA	89.4
WA	86.0
NT	71.6
Total	90.9
<i>n</i> = 565; <i>p</i> < 0.0005; <i>Kruskal-Wallis test</i>	

Table 4.57 Mean percentage of property checked for weeds by property type.

Mean property area (ha)	
Grazing	90.7
Mixed cropping and livestock	90.7
Cropping	96.5
Horticulture	86.2
Hobby farm or rural retreat	88.4
Total	90.9
<i>n</i> = 568; <i>p</i> = 0.197; <i>Kruskal-Wallis test</i>	

Interviewees were asked to rate the general effectiveness of their weed checking strategy. As Table 4.58 and Table 4.59 show, a slight majority of interviewees (just over 50 per cent) believed their strategy was ‘mostly effective’, and that there are only occasional weed outbreaks on their property, while nearly 48 per cent indicated that their strategy was ‘very effective’, and that they had no problems detecting new weed outbreaks. No statistically significant differences in response on the basis of State or Territory, or property type, were determined.

Table 4.58 *Proportion of interviewees in each State or Territory with various levels of self-rated effectiveness of their methods for checking for weeds.*

Self-rated effectiveness of methods for checking for weeds	Proportion of interviewees in State or Territory (%)							
	Qld	NSW	Vic	Tas	SA	WA	NT	Total
Mostly effective, but occasionally a new weed outbreak will occur	52.3	43.8	51.1	54.7	56.3	55.1	63.4	50.6
Very effective and no problems detecting new weed outbreaks,	45.5	55.1	46.6	45.3	43.7	42.7	34.1	47.8
Not very effective as have problems detecting new weed outbreaks	2.3	1.1	2.3	0.0	0.0	2.2	2.4	1.6
<i>n = 568, chisq = 9.973, d.f. = 12, p = 0.618.</i>								

Table 4.59 *Proportion of interviewees in each property type with various levels of self-rated effectiveness of their methods for checking for weeds.*

Self-rated effectiveness of methods for checking for weeds	Proportion of interviewees in property type (%)					
	Grazing	Mixed cropping and livestock	Cropping	Horti-culture	Hobby farm or rural retreat	Total
Mostly effective, but occasionally a new weed outbreak will occur	46.8	57.8	35.1	71.0	41.0	50.5
Very effective and no problems detecting new weed outbreaks,	50.2	41.3	63.2	29.0	59.0	47.7
Not Very effective as have problems detecting new weed outbreaks	3.0	1.0	1.8	0.0	0.0	1.8
<i>n = 568, chisq = 11.989, d.f. = 8, p = 0.152.</i>						

4.6 Weed Identification

4.6.1 Identification Practice

Table 4.60 and Table 4.61 summarise the method or methods used by interviewees to identify unknown weeds. Overall, the highest proportion of interviewees (74.8 per cent) asked a local professional to identify the weed (e.g. department of agriculture, local weeds authority or CMA), while 26.6 per cent of interviewees overall look the weed up in a book. Very few interviewees send unknown weeds away for identification, reinforcing the importance of local weeds officers to landholders.

The small proportion of interviewees who send unknown weeds away for identification were asked to identify where they sent weeds. As shown in Table 4.62 and Table 4.63, those who responded to this question have sent weeds to departments of primary industry or agriculture and to a local weeds inspector for identification.

Table 4.60 Proportion of interviewees in each State or Territory taking various actions with unknown weeds.

Actions taken with unknown weeds	Proportion of interviewees in State or Territory (%)							
	Qld	NSW	Vic	Tas	SA	WA	NT	Total
Ask a local professional	76.1	83.1	60.2	66.3	77.0	83.1	63.4	74.8
Look it up in a book	26.1	24.7	28.4	30.2	27.6	24.7	36.6	26.6
Ask another landholder or neighbour or Landcare member	18.2	10.1	22.7	9.3	17.2	20.2	7.3	16.7
Check on weed websites	6.8	3.4	10.2	16.3	5.7	9.0	2.4	7.0
Does not get new plants identified	3.4	4.5	10.2	10.5	2.3	1.1	4.9	5.3
Send away for identification	2.3	3.4	2.3	1.2	4.6	2.2	7.3	2.8
Other	4.5	5.6	5.7	3.5	3.4	3.4	2.4	4.8
<i>n</i> = 568								

Table 4.61 Proportion of interviewees in each property type taking various actions with unknown weeds.

Actions taken with unknown weeds	Proportion of interviewees in property type (%)					
	Grazing	Mixed cropping and livestock	Cropping	Horticulture	Hobby farm or rural retreat	Total
Ask a local professional	72.7	75.4	89.8	62.0	71.7	74.8
Look it up in a book	27.2	23.3	18.9	54.1	28.3	26.6
Ask another landholder/ neighbour/Landcare member	18.5	16.1	6.1	6.9	31.1	16.7
Check on weed websites	8.1	5.6	6.3	9.8	7.7	7.0
Does not get new plants identified	4.5	6.0	2.5	5.9	9.4	5.3
Send away for identification	3.7	2.8	0.0	4.9	0.0	2.8
Other	2.6	4.4	9.1	10.4	9.7	4.8
<i>n</i> = 568						

Table 4.62 Proportion of interviewees in each State or Territory sending unknown weeds to various organisations for identification.

Organisation unknown weed sent to for identification	Proportion of interviewees in State or Territory (%)							
	Qld	NSW	Vic	Tas	SA	WA	NT	Total
Department of Primary Industries	100.0	33.3	100.0	0.0	0.0	0.0	100.0	50.0
Department of Agriculture	0.0	33.3	0.0	100.0	50.0	100.0	0.0	31.3
Local weed inspector	0.0	0.0	0.0	0.0	50.0	0.0	0.0	6.3
Other	0.0	66.7	0.0	0.0	25.0	50.0	33.3	31.3
<i>n = 17</i>								

Table 4.63 Proportion of interviewees in each property type sending unknown weeds to various organisations for identification.

Organisation unknown weed sent to for identification	Proportion of interviewees in property type (%)			
	Grazing	Mixed cropping and livestock	Horticulture	Total
Department of Primary Industries	58.1	24.3	100.0	50.0
Department of Agriculture	21.0	51.3	0.0	31.3
Local weed inspector	0.0	24.3	0.0	6.3
Other	43.0	23.5	0.0	31.3
<i>n = 17</i>				

4.6.2 Identification Motivations

Table 4.64 and Table 4.65 list the various motivations of interviewees for having new weeds discovered on their property identified by an expert. Perhaps surprisingly, curiosity, or wanting to know what the weed is, was indicated by the largest proportion of interviewees as a motive, gaining a higher proportion of response than ‘concern’-related factors such as concerns about spread, and possible economic losses. As Table 4.65 shows, cropping farmers appear to be less concerned about spread of unidentified weeds than interviewees from other property types (19.1 per cent compared with an overall response of 32.7 per cent), perhaps reflecting the relative effectiveness of weed control amongst cropping farmers.

Table 4.64 Proportion of interviewees in each State or Territory reporting various motivations for having new weeds identified.

Motivations for having new weeds identified	Proportion of interviewees in State or Territory (%)							
	Qld	NSW	Vic	Tas	SA	WA	NT	Total
Curiosity/want to know what it is	43.2	44.9	35.2	43.0	37.9	49.4	53.7	41.9
Concerns about spread	31.8	32.6	31.8	33.7	33.3	37.1	29.3	32.7
If new to the property	17.0	14.6	15.9	16.3	20.7	24.7	22.0	17.3
Possible stock/crop/economic losses	12.5	20.2	14.8	8.1	11.5	22.5	14.6	16.0
The need to control weeds	9.1	11.2	18.2	12.8	14.9	7.9	14.6	12.5
Other	8.0	6.7	6.8	8.1	4.6	7.9	7.3	7.0
<i>n = 568</i>								

Table 4.65 Proportion of interviewees in each property type reporting various motivations for having new weeds identified.

Motivations for having new weeds identified	Proportion of interviewees in property type (%)					
	Grazing	Mixed cropping and livestock	Cropping	Horticulture	Hobby farm or rural retreat	Total
Curiosity/want to know what it is	43.8	37.0	50.2	39.4	46.9	41.9
Concerns about spread	33.0	35.2	19.1	35.8	36.3	32.7
If new to the property	15.8	19.4	22.8	8.5	13.6	17.3
Possible stock/crop/economic losses	11.4	16.8	18.3	17.6	35.5	16.0
The need to control weeds	11.4	13.2	7.0	24.3	14.9	12.5
Other	5.2	7.9	4.9	14.5	9.7	7.0
<i>n = 568</i>						

4.7 Weed Recording and Reporting

4.7.1 Recording and Reporting Practice

Interviewees who indicated that they mark or record the location of a new weed on their property were asked how they do this. As Table 4.66 and Table 4.67 illustrate, the greatest proportion of interviewees overall (42.1 per cent) mark the location, for example with a stick or pole, while 36.8 per cent overall record the location of the new weed in the farm notebook or diary. A further 21.1 per cent record the location using a GPS device.

Table 4.66 Proportion of interviewees in each State or Territory reporting various methods for marking a site where a new weed outbreak is found.

Method of marking a site where a new weed is found	Proportion of interviewees in State or Territory (%)						
	Qld	NSW	Tas	SA	WA	NT	Total
Mark where it is in the paddock with a stick or pole or some other object	50.0	0.0	0.0	33.3	62.5	0.0	42.1
Note where it is in a note book or diary	50.0	0.0	100.0	66.7	12.5	100.0	36.8
Use a GPS to obtain its location	16.7	100.0	0.0	0.0	12.5	0.0	21.1
Other	16.7	0.0	0.0	33.3	25.0	0.0	15.8
<i>n</i> = 23							

Table 4.67 Proportion of interviewees in each property type reporting various methods for marking a site where a new weed outbreak is found.

Method of marking a site where a new weed is found	Proportion of interviewees in property type (%)				
	Grazing	Mixed cropping and livestock	Cropping	Hobby farm or rural retreat	Total
Mark where it is in the paddock with a stick or pole or some other object	27.0	77.1	0.0	0.0	42.1
Note where it is in a note book or diary	41.6	14.6	100.0	100.0	36.8
Use a GPS to obtain its location	49.4	0.0	0.0	0.0	21.1
Other	27.0	16.6	0.0	0.0	15.8
<i>n</i> = 23					

4.7.2 Recording and Reporting Impediments

Interviewees were asked to indicate whether, in their opinion, there were factors which make landholders *reluctant* to report weed outbreaks on their property. Overall, 68 per cent of interviewees believe there are such factors, as Table 4.68 and Table 4.69 show. The factors nominated by these interviewees are listed in Table 4.70 and Table 4.71.

Chi-square statistical analysis of these data reveals significant differences in response on the basis of state or territory *and* property type. Significantly more interviewees from NSW indicated that cost of eradication was a factor, compared with the overall response. A relatively high proportion of interviewees from NSW, and a relatively low proportion from SA and WA, nominated threat or fear of legal action. A significantly high proportion of interviewees indicated fear of quarantine (Table 4.70).

A relatively high proportion of cropping farmers appeared to believe that what others might think was a factor making landholders reluctant to report weed outbreaks, while no interviewees from this category nominated poor attitude or slow response of weeds authorities as a factor. A significantly high proportion of horticulturalists considered fear of quarantine a factor (Table 4.71).

Table 4.68 Proportion of interviewees in each State or Territory who believed that there were factors that made landholders reluctant to report weeds to local authorities.

Whether or not there are factors that make landholders reluctant to report weeds to local authorities?	Proportion of interviewees in State or Territory (%)							Total
	Qld	NSW	Vic	Tas	SA	WA	NT	
Yes	63.5	71.0	67.2	63.6	66.1	76.3	50.0	68.0
No	36.5	29.0	32.8	36.4	33.9	23.7	50.0	32.0

n = 568, *chisq* = 8.046, *df.* = 6, *p* = 0.235.

Table 4.69 Proportion of interviewees in each property type who believed that there were factors that made landholders reluctant to report weeds to local authorities.

Whether or not there are factors that make landholders reluctant to report weeds to local authorities?	Proportion of interviewees in property type (%)					Total
	Grazing	Mixed cropping and livestock	Cropping	Horticulture	Hobby farm or rural retreat	
Yes	68.1	70.4	66.1	67.7	61.5	68.3
No	31.9	29.6	33.9	32.3	38.5	31.7

n = 568, *chisq* = 1.879, *df.* = 4, *p* = 0.758.

Table 4.70 Proportion of interviewees in each State or Territory reporting various factors that they believed made landholders reluctant to report weeds to local authorities.

Factors that make landholders reluctant to report weeds to local authorities?	Proportion of interviewees in State or Territory (%)							
	Qld	NSW	Vic	Tas	SA	WA	NT	Total
Cost of eradication	13.9	32.8	22.2	28.6	17.1	20.0	0.0	23.1
Threat/fear of legal action	16.5	26.7	20.0	14.3	12.2	13.3	0.0	19.5
Worried what others might think	16.5	12.9	20.0	14.3	14.6	15.6	0.0	15.8
Poor attitude/slow response of weed authorities	5.1	7.8	12.2	14.3	9.8	11.1	0.0	9.1
Fear of quarantine	13.9	3.4	0.0	7.1	12.2	15.6	0.0	7.3
Apathy to weed control	11.4	3.4	5.6	7.1	9.8	2.2	0.0	6.2
Affect income/property values	8.9	0.0	0.0	0.0	2.4	11.1	0.0	3.4
Other	13.9	12.9	20.0	14.3	22.0	11.1	0.0	15.6

n = 382, *chisq* = 63.947, *df.* = 42, *p* = 0.016.

Table 4.71 Proportion of interviewees in each property type reporting various factors that they believed made landholders reluctant to report weeds to local authorities.

Factors that make landholders reluctant to report weeds to local authorities?	Proportion of interviewees in property type (%)					
	Grazing	Mixed cropping and livestock	Cropping	Horticulture	Hobby farm or rural retreat	Total
Cost of eradication	24.8	22.1	28.9	19.0	12.5	23.1
Threat/fear of legal action	21.7	20.0	10.5	14.3	20.8	19.5
Worried what others might think	15.5	13.1	28.9	9.5	25.0	16.2
Poor attitude/slow response of weed authorities	6.8	11.0	0.0	19.0	12.5	8.7
Fear of quarantine	5.0	9.0	5.3	23.8	4.2	7.5
Apathy to weed control	6.8	6.2	5.3	0.0	4.2	5.9
Affect income/property values	1.2	5.5	7.9	0.0	0.0	3.3
Other	18.0	13.1	13.2	14.3	20.8	15.7

n = 382, *chisq* = 43.858, *df.* = 28, *p* = 0.029.

4.8 Detection Response

Interviewees were asked to indicate the action or actions taken when they locate a known weed on their property. As Table 4.72 and Table 4.73 illustrate, over 50 per cent of interviewees indicated that they either remove the weed (dig or pull it out), or spray the weed as soon as possible, with some undertake both courses of action. Other relatively common actions include checking on the correct control measures to be used, and burning the weed. Relatively few interviewees indicated that they mark or record the weed location in the paddock, or inform neighbours, perhaps indicating a preference for dealing with weed outbreaks immediately rather than dealing with the problem at a later time.

While hobby farmers were highly likely to dig or pull out new weeds, there were very few (0.2 per cent) in comparison with the other farmer types who check on control measures or how best to eradicate the weed, indicating a lack of engagement with best weed management practices (Table 4.73).

Table 4.72 *Proportion of interviewees in each State or Territory reporting various actions they take on finding a new plant known to be a weed.*

Action on finding a new plant known to be a weed	Proportion of interviewees in State or Territory (%)							
	Qld	NSW	Vic	Tas	SA	WA	NT	Total
Dig it out/pull it out	44.3	53.9	64.8	55.8	56.3	46.1	46.3	53.9
Spray it as soon as possible	58.0	58.4	46.6	51.2	46.0	44.9	43.9	52.5
Check on control measures/how to eradicate	17.0	25.8	18.2	22.1	27.6	21.3	12.2	21.7
Burn it/use gas flame	8.0	18.0	12.5	12.8	20.7	7.9	14.6	13.6
Contact someone in an official capacity	8.0	7.9	1.1	10.5	11.5	12.4	7.3	7.2
Check in weeds book	4.5	9.0	4.5	2.3	3.4	3.4	2.4	5.5
Record/note occurrence	6.8	4.5	2.3	4.7	5.7	5.6	7.3	4.8
Mark site in paddock	4.5	0.0	0.0	1.2	4.6	9.0	4.9	2.5
Never found a new weed	0.0	1.1	4.5	1.2	0.0	3.4	4.9	1.8
Inform neighbours	2.3	0.0	2.3	0.0	1.1	0.0	0.0	1.2
Other	5.7	2.2	1.1	1.2	2.3	2.2	9.8	2.8
<i>n = 568</i>								

Table 4.73 Proportion of interviewees in each property type reporting various actions they take on finding a new plant known to be a weed.

Action on finding a new plant known to be a weed	Proportion of interviewees in property type (%)					
	Grazing	Mixed cropping and livestock	Cropping	Horticulture	Hobby farm or rural retreat	Total
Dig it out/pull it out	56.2	48.9	46.8	43.3	84.5	53.9
Spray it as soon as possible	51.2	55.2	48.4	40.9	59.9	52.5
Check on control measures/how to eradicate	20.0	24.3	29.6	27.8	0.2	21.7
Burn it/use gas flame	14.2	15.8	3.9	26.3	0.7	13.6
Contact someone in an official capacity	5.7	7.2	12.5	10.7	6.8	7.2
Check in weeds book	8.2	2.0	5.7	11.7	1.8	5.5
Record/note occurrence	4.3	3.7	10.8	2.3	6.4	4.8
Mark site in paddock	1.9	4.1	1.3	0.0	1.8	2.5
Never found a new weed	2.1	2.6	0.0	0.0	0.0	1.8
Inform neighbours	1.9	0.7	1.3	0.0	0.0	1.2
Other	1.5	3.5	5.7	0.0	4.7	2.8
<i>n = 568</i>						

4.9 Landholder Commitment

Interviewees were asked to rate the commitment of landholders as a whole to checking for new weed outbreaks (Table 4.74 and Table 4.75). Overall, the largest proportion of interviewees (over 43 per cent) rated the level of commitment at ‘medium’, followed by a further 30.4 per cent who rated level of commitment as ‘high’. Statistical analysis revealed significant variation in response to this question on the basis of property type (Table 4.75). A relatively high proportion of graziers, and a relatively low proportion of cropping and horticulture farm owners, gave a ‘medium’ rating. At the same time, a relatively low proportion of graziers and hobby farmers rated the level of commitment as ‘high’, in contrast to the relatively high proportion of cropping farmers giving the same rating.

Table 4.74 Proportion of interviewees in each State or Territory rating various levels of commitment among landholders to checking for new weed outbreaks.

Level of commitment among landholders to checking for new weed outbreaks	Proportion of interviewees in State or Territory (%)							Total
	Qld	NSW	Vic	Tas	SA	WA	NT	
Medium	42.4	45.1	44.0	52.4	36.5	43.3	25.0	43.2
High	38.4	25.9	29.9	23.8	36.5	23.3	25.0	30.4
Low	16.8	25.9	19.4	23.8	25.4	28.3	50.0	22.7
Unsure	2.4	3.1	6.7	0.0	1.6	5.0	0.0	3.7

n = 568, *chisq* = 27.249, *d.f.* = 18, *p* = 0.074.

Table 4.75 Proportion of interviewees in each property type rating various levels of commitment among landholders to checking for new weed outbreaks.

Level of commitment among landholders to checking for new weed outbreaks	Proportion of interviewees in property type (%)					Total
	Grazing	Mixed cropping and livestock	Cropping	Horticulture	Hobby farm or rural retreat	
Medium	50.6	40.6	31.6	28.1	43.6	43.3
High	23.8	34.3	45.6	40.6	17.9	30.4
Low	23.4	22.2	19.3	15.6	28.2	22.5
Unsure	2.1	2.9	3.5	15.6	10.3	3.9

n = 568, *chisq* = 25.584, *d.f.* = 12, *p* = 0.012.

As Table 4.76 and Table 4.77 show, over 72 per cent of interviewees overall believe that there are particular types of landholders who are less likely to check for new weed outbreaks. These interviewees were asked to indicate the type or types of landholders they believed fit this category. Table 4.78 and Table 4.79 show that hobby farmers or rural retreat farmers were considered by the highest proportion of interviewees (35.9 per cent) as less likely to check for weeds, followed by absentee owners (24.4 per cent). This response supports the conclusion of the largest proportion of interviewees to the weeds inspector survey that ‘part-time’ farmers are less diligent than ‘professional’ farmers where weeds are concerned (see Section 3.8).

Table 4.79 presents some interesting responses to this question on the basis of property type. Particular groups of farmers (by property type) appear to consider other groups as relatively less likely to check for weeds. For example: a relatively high proportion of graziers and horticulturalists indicate hobby farmers or rural retreaters; cropping farmers have indicated graziers in a relatively high proportion; and a high proportion of mixed farm

owners have indicated many of the categories. Hobby farmers appear to have admitted to their own relative lack of diligence, with 56 per cent of hobby farm or rural retreat interviewees conceding that their own group of landholders are relatively less likely to check for new weed outbreaks.

Table 4.76 Proportion of interviewees in each State or Territory who believed there are particular types of landholders who are less likely to worry about checking for new weed outbreaks.

Whether there are landholders who are less likely to worry about checking for new weed outbreaks.	Proportion of interviewees in State or Territory (%)							
	Qld	NSW	Vic	Tas	SA	WA	NT	Total
Yes	61.6	74.1	77.4	66.7	80.6	71.2	75.0	72.3
No	38.4	25.9	22.6	33.3	19.4	28.8	25.0	27.7
<i>n</i> = 568, <i>chisq</i> = 10.987, <i>d.f.</i> = 6, <i>p</i> = 0.089.								

Table 4.77 Proportion of interviewees in each property type who believed there are particular types of landholders who are less likely to worry about checking for new weed outbreaks.

Whether there are landholders who are less likely to worry about checking for new weed outbreaks.	Proportion of interviewees in property type (%)					Total
	Grazing	Mixed cropping and livestock	Cropping	Horti-culture	Hobby farm or rural retreat	
Yes	72.8	72.3	73.2	67.7	66.7	72.0
No	27.2	27.7	26.8	32.3	33.3	28.0
<i>n</i> = 568, <i>chisq</i> = 1.34, <i>d.f.</i> = 4, <i>p</i> = 0.854.						

Table 4.78 Proportion of interviewees in each State or Territory nominating various types of landholders as being less likely to worry about checking for new weed outbreaks.

Landholder types less likely to check	Proportion of interviewees in State or Territory (%)							
	Qld	NSW	Vic	Tas	SA	WA	NT	Total
Hobby farmers or rural retreaters	27.8	24.2	52.9	38.6	35.7	42.9	14.3	35.9
Absentee owners	16.7	25.8	30.9	17.5	18.6	28.6	10.7	24.4
Graziers	14.8	24.2	16.2	17.5	14.3	9.5	7.1	17.4
Landholders with large properties	14.8	7.6	2.9	12.3	12.9	7.9	21.4	8.8
Lazy or uncommitted landholders	7.4	10.6	4.4	3.5	12.9	9.5	10.7	8.3
New or inexperienced farmers	5.6	6.1	4.4	3.5	5.7	3.2	10.7	5.1
Government owners	5.6	4.5	4.4	8.8	4.3	4.8	17.9	4.9
Croppers	1.9	7.6	1.5	7.0	4.3	6.3	3.6	4.4
Other	31.5	33.3	8.8	31.6	25.7	22.2	39.3	24.7
<i>n</i> = 406								

Table 4.79 Proportion of interviewees in each property type nominating various types of landholders as being less likely to worry about checking for new weed outbreaks.

Landholder types less likely to check	Proportion of interviewees in property type (%)					Total
	Grazing	Mixed cropping and livestock	Cropping	Horticulture	Hobby farm or rural retreat	
Hobby farmers/rural retreaters	41.0	31.9	15.6	37.6	56.0	35.9
Absentee owners	24.0	24.0	21.7	36.4	23.5	24.4
Graziers	17.4	16.5	34.9	0.0	8.5	17.4
Landholders with large properties	7.3	10.6	8.6	8.7	7.7	8.8
Lazy/uncommitted landholders	6.6	8.8	20.0	0.0	5.8	8.3
New/inexperienced farmers	7.6	3.1	3.4	0.0	7.7	5.1
Government owners	5.1	4.0	7.1	3.4	6.8	4.9
Croppers	4.7	5.4	4.4	0.0	0.0	4.4
Other	21.6	23.0	21.6	59.2	32.0	24.7
<i>n</i> = 406						

Table 4.80 and Table 4.81 list the factors that might encourage landholders to check for weeds, in the opinion of interviewees. Overall, interviewees favour various forms of assistance (such as financial subsidies and increased assistance from weeds inspectors) and various forms of education or extension (such as awareness and advertising campaigns, and research and publicity regarding the impact and costs of weeds). As Table 4.81 shows, hobby farmers appear relatively relaxed about the use of fines and enforcement to encourage diligent behaviour. Overall, 23 per cent of hobby farm or rural retreat owners indicated this as a possible encouragement, compared to an overall response of 9.9 per cent.

Table 4.80 Proportion of interviewees in each State or Territory nominating various factors that might encourage landholders to check for new weed outbreaks.

Factors that might encourage landholders to check for weeds	Proportion of interviewees in State or Territory (%)							
	Qld	NSW	Vic	Tas	SA	WA	NT	Total
Subsidies e.g. on sprays	18.2	15.7	23.9	22.1	11.5	5.6	29.3	17.1
More awareness or advertising campaigns	19.3	16.9	15.9	15.1	14.9	12.4	7.3	16.4
Research and publicity about weed costs and impact	9.1	24.7	6.8	23.3	13.8	15.7	19.5	14.8
More weed inspectors or frequent inspections	4.5	11.2	14.8	10.5	9.2	9.0	4.9	10.0
Fines or enforcement	2.3	7.9	14.8	11.6	13.8	15.7	2.4	9.9
Rewards or incentives	8.0	6.7	3.4	5.8	6.9	6.7	4.9	6.2
One to one inspections/visits by weed inspectors	4.5	5.6	8.0	5.8	5.7	2.2	7.3	5.6
Higher income	8.0	6.7	1.1	7.0	5.7	5.6	0.0	5.5
More time and labour resources	2.3	6.7	4.5	2.3	5.7	6.7	4.9	4.9
If Government controlled weeds on its land	5.7	3.4	4.5	3.5	1.1	3.4	9.8	4.0
Field days or workshop or demonstrations	4.5	5.6	4.5	2.3	1.1	0.0	0.0	3.9
Coordination with neighbours and council	2.3	0.0	3.4	2.3	3.4	1.1	0.0	1.9
Other	13.6	11.2	10.2	8.1	8.0	10.1	14.6	10.9
Does not know	19.3	11.2	13.6	9.3	24.1	23.6	14.6	16.2
<i>n</i> = 568								

Table 4.81 Proportion of interviewees in each property type nominating various factors that might encourage landholders to check for new weed outbreaks.

Factors that might encourage landholders to check for weeds	Proportion of interviewees in property type (%)					
	Grazing	Mixed cropping and livestock	Cropping	Horticulture	Hobby farm or rural retreat	Total
Subsidies e.g. on sprays	18.4	20.5	8.2	7.5	10.2	17.1
More awareness/advertising campaigns	18.3	11.6	13.2	35.2	19.6	16.4
Research and publicity about weed costs/impact	13.3	15.0	21.7	16.1	12.4	14.8
More weed inspectors/frequent inspections	10.1	8.9	10.4	10.4	15.1	10.0
Fines/enforcement	10.7	8.2	0.0	14.7	23.6	9.9
Rewards/incentives	4.9	7.3	11.5	1.1	4.3	6.2
One to one inspections/visits by weed inspectors	3.7	5.6	2.5	17.6	12.6	5.6
Higher income	5.2	6.2	4.5	10.4	0.0	5.5
More time and labour resources	5.7	4.2	3.2	4.9	7.2	4.9
If Government controlled weeds on its land	4.7	4.7	0.2	0.0	4.2	4.0
Field days/workshops/demonstrations	4.0	2.6	7.0	5.9	3.7	3.9
Coordination with neighbours and council	2.8	1.2	1.3	2.3	0.7	1.9
Other	12.4	8.2	14.4	11.7	11.5	10.9
Does not know	13.2	20.6	20.0	6.9	12.8	16.2
<i>n = 568</i>						

Overall, the largest proportion of interviewees (39.4 per cent) indicated cost as a factor that may discourage landholders from checking for new weed outbreaks, as Table 4.82 and Table 4.83 illustrate. Other potentially discouraging factors, in the opinion of interviewees, include lack of time or labour (17.1 per cent), laziness or apathy (11.4 per cent), and lack of knowledge or education (10.9 per cent). There does not appear to be significant variation in response on a state or territory, or property type basis. Once again, however, the response of farmers to this issue correlates with the overall opinion of weeds inspectors regarding the key impediments to diligent weed checking behaviour on the part of landholders (see Section 3.8).

Table 4.82 Proportion of interviewees in each State or Territory nominating various factors that might discourage landholders from checking for new weed outbreaks.

Factors that might discourage landholders from checking for new weeds	Proportion of interviewees in State or Territory (%)							
	Qld	NSW	Vic	Tas	SA	WA	NT	Total
Cost	33.0	40.4	38.6	40.7	39.1	51.7	41.5	39.4
Lack of time/labour	18.2	16.9	13.6	15.1	28.7	12.4	7.3	17.1
Laziness/apathy	14.8	10.1	11.4	10.5	9.2	11.2	4.9	11.4
Lack of knowledge/education	8.0	12.4	13.6	19.8	12.6	2.2	0.0	10.9
Technical difficulties eg terrain and speed of spread	6.8	11.2	11.4	9.3	2.3	4.5	0.0	8.5
Insufficient enforcement by authorities	3.4	10.1	12.5	7.0	4.6	5.6	12.2	8.1
Weedy neighbours	5.7	5.6	5.7	12.8	3.4	3.4	7.3	5.5
Old age/ill health	3.4	5.6	4.5	4.7	5.7	0.0	0.0	4.2
Absentee/short term farmers	3.4	1.1	2.3	1.2	3.4	3.4	2.4	2.5
Other	3.4	9.0	6.8	2.3	3.4	7.9	9.8	6.3
Other enforcement reasons	4.5	2.2	0.0	5.8	6.9	9.0	2.4	3.5
Does not know	20.5	20.2	22.7	14.0	18.4	16.9	31.7	20.1
<i>n</i> = 568								

Table 4.83 Proportion of interviewees in each property type nominating various factors that might discourage landholders from checking for new weed outbreaks.

Factors that might discourage landholders from checking for new weeds	Proportion of interviewees in property type (%)					
	Grazing	Mixed cropping and livestock	Cropping	Horticulture	Hobby farm or rural retreat	Total
Cost	35.1	45.1	43.5	37.6	31.0	39.4
Lack of time/labour	17.8	18.6	12.0	11.1	16.9	17.1
Laziness/apathy	10.2	8.6	25.3	9.0	15.3	11.4
Lack of knowledge/education	18.3	4.3	0.0	7.2	19.5	10.9
Technical difficulties eg terrain and speed of spread	10.0	7.6	4.9	6.7	10.1	8.5
Insufficient enforcement by authorities	8.6	8.5	5.9	13.7	0.7	8.1
Weedy neighbours	6.5	4.8	2.5	2.3	9.2	5.5
Old age/ill health	1.8	5.2	2.5	9.5	12.3	4.2
Absentee/short term farmers	2.9	2.2	1.3	0.0	3.7	2.5
Other	5.0	6.7	5.7	6.2	12.6	6.3
Other enforcement reasons	1.7	5.8	4.9	4.6	0.7	3.5
Does not know	18.3	23.4	16.7	15.0	23.3	20.1
<i>n</i> = 568						

4.10 Government Commitment

Interviewees were asked to rate the level of commitment of government agencies and departments responsible for controlling new weed outbreaks. As Table 4.84 and Table 4.85 show, the largest proportion of interviewees overall (54 per cent) rate this level of commitment as 'low'. Significantly, however, 72.4 per cent of Victorian interviewees, and 68.2 per cent of those from Tasmania, rate the level of commitment as 'low', while only 41.9 per cent of interviewees from SA do so. SA interviewees appear to be relatively satisfied with the response of government agencies to weed control, with 17.7 per cent of interviewees giving a 'high' rating compared with an overall 'high' response of 9.3 per cent.

Table 4.84 Proportion of interviewees in each State or Territory rating various levels of commitment among government agencies to detecting and controlling new weed outbreaks.

Level of commitment of government agencies to detecting and controlling new weed outbreaks	Proportion of interviewees in State or Territory (%)							
	Qld	NSW	Vic	Tas	SA	WA	NT	Total
Low	45.6	49.1	72.4	68.2	41.9	50.8	66.7	54.0
Medium	37.6	40.5	19.4	22.7	30.6	33.9	33.3	32.4
High	8.8	9.2	6.0	4.5	17.7	11.9	0.0	9.3
Unsure	8.0	1.2	2.2	4.5	9.7	3.4	0.0	4.2

n = 568, *chisq* = 46.795, *d.f.* = 18, *p* < 0.0005.

Table 4.85 Proportion of interviewees in each property type rating various levels of commitment among government agencies to detecting and controlling new weed outbreaks.

Level of commitment of government agencies to detecting and controlling new weed outbreaks	Proportion of interviewees in property type (%)					Total
	Grazing	Mixed cropping and livestock	Cropping	Horticulture	Hobby farm or rural retreat	
Low	55.1	56.5	48.2	41.9	55.3	54.2
Medium	30.9	33.8	39.3	32.3	23.7	32.4
High	8.1	8.2	8.9	12.9	18.4	9.2
Unsure	5.9	1.4	3.6	12.9	2.6	4.2

n = 568, *chisq* = 15.182, *d.f.* = 12, *p* = 0.232.

4.11 Improvements to On-Ground Detection

Interviewees were asked to suggest the way or ways in which on-ground weed detection practices might be improved (Table 4.86 and Table 4.87). The largest proportion overall (22.2 per cent) indicated that they had no suggestions to offer. However, the relatively high proportion of interviewees indicating education and awareness campaigns and improved communication between weeds authorities and landholders suggests that many farmers feel inadequately informed about weed control strategies (an opinion shared by many weeds inspectors – see Section 3.10). A further 10.2 per cent indicated that weeds need to be managed more effectively on government-owned land. Only 3.3 per cent of interviewees indicated that the present system is adequate.

Table 4.86 *Proportion of interviewees in each State or Territory suggesting various improvements to on-ground detection of weed outbreaks.*

Suggestions for improvements	Proportion of interviewees in State or Territory (%)							
	Qld	NSW	Vic	Tas	SA	WA	NT	Total
None or no suggestions	22.7	22.5	19.3	23.3	28.7	20.2	22.0	22.2
Education and awareness campaigns in general	15.9	21.3	11.4	8.1	13.8	10.1	12.2	15.3
Better communication/weed authorities & farmers	17.0	10.1	12.5	19.8	16.1	11.2	4.9	13.4
Management of weeds on government controlled land	9.1	9.0	14.8	20.9	3.4	9.0	14.6	10.2
Better resourced and active councils	4.5	7.9	13.6	5.8	4.6	7.9	4.9	8.1
Government to provide subsidies for chemicals	6.8	7.9	9.1	14.0	3.4	7.9	17.1	7.7
More weed inspectors or frequent inspections	3.4	11.2	5.7	4.7	4.6	4.5	9.8	6.5
Government to provide help with labour	5.7	2.2	9.1	4.7	2.3	3.4	4.9	4.9
Advertising by television and newspaper	6.8	3.4	3.4	0.0	5.7	7.9	2.4	4.8
Enforcement of weed standards or penalties	2.3	4.5	6.8	3.5	5.7	0.0	4.9	4.2
Better liaison or weed authorities and industry groups	5.7	2.2	2.3	9.3	2.3	3.4	4.9	3.3
Present system is working okay	3.4	4.5	2.3	1.2	5.7	1.1	7.3	3.3
Other	15.9	6.7	13.6	12.8	14.9	21.3	7.3	13.0
Other forms of education or awareness	12.5	19.1	5.7	9.3	12.6	7.9	9.8	12.1
Does not know	6.8	6.7	5.7	4.7	5.7	10.1	7.3	6.7
<i>n = 568</i>								

Table 4.87 Proportion of interviewees in each property type suggesting various improvements to on-ground detection of weed outbreaks.

Suggestions for improvements	Proportion of interviewees in property type (%)					
	Grazing	Mixed cropping and livestock	Cropping	Horticulture	Hobby farm or rural retreat	Total
None/no suggestions	24.9	23.9	24.2	7.5	6.3	22.2
Education & awareness campaigns in general	16.4	11.1	3.8	44.3	23.3	15.3
Better communication/weed authorities & farmers	12.0	14.1	10.8	12.6	21.5	13.4
Management of weeds on government controlled land	8.4	10.0	14.7	15.3	12.4	10.2
Better resourced/active councils	9.2	7.1	6.9	5.9	8.9	8.1
Government to provide subsidies for chemicals	9.9	8.0	2.5	2.4	5.4	7.7
More weed inspectors/frequent inspections	5.1	8.4	5.7	6.9	6.0	6.5
Government to provide help with labour	6.3	5.4	0.0	4.9	0.0	4.9
Advertising by television and newspaper	1.8	7.5	5.0	9.1	3.9	4.8
Enforcement of weed standards/penalties	5.4	3.9	3.4	0.0	2.5	4.2
Better liaison/weed authorities and industry groups	1.4	5.8	2.5	7.7	0.7	3.3
Present system is working okay	1.9	4.9	6.9	0.0	2.3	3.3
Other	12.2	9.8	23.1	6.2	25.8	13.0
Other forms of education/awareness	13.4	10.3	10.2	25.1	7.2	12.1
Does not know	7.0	7.3	4.4	5.9	5.6	6.7
<i>n</i> = 568						

Table 4.88 and Table 4.89 list initiatives which, in the opinion of interviewees, would make it easier for landholders to identify suspected weeds. The largest proportion of interviewees overall (over 19 per cent) indicated that updated local information or weed notification was a worthwhile initiative. Overall, 16.1 per cent indicated that they were satisfied with the existing system.

There are statistically significant differences in response to the question on the basis of both state or territory *and* property type. As Table 4.88 shows, interviewees from NSW were *more* likely (and Victorian interviewees *less* likely) to suggest that updated information of notification on weeds was important. However, Victorian interviewees were *more* likely (and NSW interviewees *less* likely) to favour written materials which include colour photos of weeds.

Table 4.89 suggests that a significantly higher proportion of cropping farmers, compared with the overall response group, are happy with the information currently available. Farmers have a greater focus on weeds given the need to control them in a planted crop. A significantly high proportion of hobby farmers or rural retreat owners, however, indicate that updated local information or notification on weeds is important, suggesting that hobbyists may be less aware of avenues for obtaining information on weeds.

Table 4.88 Proportion of interviewees in each State or Territory suggesting various initiatives to make it easier for them identify new plants suspected to be weeds.

Initiatives to make it easier for landholders to identify new plants that they suspect might be weeds?	Proportion of interviewees in State or Territory (%)							
	Qld	NSW	Vic	Tas	SA	WA	NT	Total
Updated local information or notification on weeds	14.4	30.4	13.3	16.7	14.3	18.3	0.0	19.1
Happy with what is currently available	20.8	12.4	17.0	12.5	15.9	15.0	25.0	16.1
Nothing	8.8	11.2	12.6	16.7	17.5	11.7	25.0	12.1
Comprehensive handbook or reference booklet	14.4	6.8	11.1	4.2	9.5	8.3	25.0	10.0
All material to contain coloured photos of weeds	8.8	4.3	13.3	8.3	9.5	6.7	0.0	8.4
More pamphlets or brochures or wallcharts for landholders	7.2	9.3	5.9	12.5	7.9	11.7	0.0	8.2
More field days or workshops	7.2	12.4	3.7	4.2	3.2	1.7	0.0	6.6
Comprehensive one-stop web site	4.8	4.3	5.9	8.3	1.6	11.7	0.0	5.4
More inspectors and visits	3.2	3.1	3.7	4.2	6.3	6.7	0.0	4.0
Other	10.4	5.6	13.3	12.5	14.3	8.3	25.0	10.1

n = 568, *chisq* = 74.553, *d.f.* = 54, *p* = 0.033.

Table 4.89 Proportion of interviewees in each property type suggesting various initiatives to make it easier for them identify new plants suspected to be weeds.

Initiatives to make it easier for landholders to identify new plants that they suspect might be weeds?	Proportion of interviewees in property type (%)					
	Grazing	Mixed cropping and livestock	Cropping	Horticulture	Hobby farm or rural retreat	Total
Updated local information/notification on weeds	16.2	22.8	14.0	16.1	32.4	19.4
Happy with what is currently available	15.3	12.6	38.6	6.5	13.5	16.1
Nothing	13.6	12.6	3.5	16.1	8.1	12.0
Comprehensive handbook/reference booklet	12.8	6.8	14.0	9.7	2.7	9.9
All material to contain coloured photos of weeds	7.7	9.2	1.8	9.7	16.2	8.3
More pamphlets/brochures/wallcharts for landholders	5.5	10.7	10.5	9.7	0.0	7.8
More field days/workshops	7.2	5.8	1.8	12.9	8.1	6.5
Comprehensive one-stop web site	6.0	3.9	8.8	6.5	5.4	5.5
More man power and visits	3.4	6.8	0.0	0.0	2.7	4.1
Other	12.3	8.7	7.0	12.9	10.8	10.4

n = 568, *chisq* = 59.761, *d.f.* = 36, *p* = 0.008.

4.12 Summary

4.12.1 Farmer Information

- There were 568 completed farmer survey interviews, with ‘commercial grazing’ being the most common property type amongst interviewees, followed by ‘commercial mixed cropping and livestock’. Smaller percentages of interviewees were involved in cropping alone, hobby farming and horticulture.
- Interviewees from the NT own significantly larger properties than those from other states. Victorian interviewees own, on average, the smallest properties, followed by South Australia and Tasmania.
- The surprisingly large size of hobby farms or rural retreats is a reflection of the very large ‘rural retreats’ owned by NT interviewees in particular.

4.12.2 Weed Information

- The individual weeds of most concern to landholders overall are thistles, followed by Paterson’s curse, Bathurst burr and blackberry, though the percentages vary considerably between states. When minor species are grouped together, the highest proportion of interviewees overall (29 per cent) are concerned about other perennial broadleaf weeds (29.0 per cent), followed by other annual broadleaf weeds (24.6 per cent), perennial grasses (18.3 per cent), woody weeds (18.1 per cent) and other annual grasses (9.5 per cent). Only 3.5 per cent of interviewees are concerned about vines.

4.12.3 Modes of Weed Spread

- ‘Natural’ pathways of weed spread (birds, wind, water) are considered by the largest proportion of interviewees as important in originating new weed outbreaks.
- Variation in response on a state or territory, or property type basis may reflect topographic/landscape features, management philosophies, and circumstances. For example water and floods are considered to be of minor importance in weed spread in SA, where much of the state is dry and there are few major river systems.

4.12.4 Weed Surveillance

- Surveillance Strategy
 - Frequency of weed checking: the great majority of interviewees overall (84.3 per cent) check for weeds on a regular basis.
 - When checking for weeds: the majority of interviewees (65.3 per cent) combine weed checking with other on-farm tasks, while a further 23.8 per cent adopt a combined approach as well as undertaking specific weed inspection activity. Some significant variations in response exist on the basis of property type: a significantly high proportion of cropping interviewees (28.6 per cent) check for weeds during paddock inspections, while none of the interviewees managing a horticulture operation check for weeds during paddock inspections.
 - Importance of weed declaration: the largest proportion of interviewees believe that weed declaration makes no difference to checking for weeds, though it does make a difference for a small majority of WA interviewees, suggesting more effective declaration strategy and promotion in that state. Of those who agreed it does make a difference, 75.1 per cent indicated that it makes them check for the declared weed more closely and more often.
 - Impending visit of an inspector: Only 4.8 per cent of interviewees indicated that the impending visit of an inspector makes them change their weed checking activity.

For those, the most common change was to conduct their own inspection and remove weeds before the inspector arrives.

- Focus of weed authorities: a larger proportion of landholders support making sufficient information available to landholders on target plants than focusing on getting landholders to simply report suspicious plants to authorities, though 28.5 per cent suggest that both strategies would be useful.
- Making weed distribution information publicly available: the majority of interviewees overall (65.3 per cent) indicated that they believe weed distribution information on private property should be made publicly available. However, NSW interviewees are less likely to agree with this than their counterparts, especially those in Queensland. 'Popular' reasons for making the information available include that it made landholders better informed and is in the community interest, while a relatively high proportion suggest that it is an invasion of privacy.
- Surveillance Targets
 - Weed check focus: the majority (66.3 per cent) of interviewees concentrate on particular parts of their property when checking for new weed outbreaks. Particular areas focused on by these interviewees include watered areas of the property, boundaries, traffic areas and previous known infestation areas. These are the areas where the majority of interviewees (67 per cent) believe new weeds are regularly found.
 - Low risk areas: even when new weeds are rarely found in these areas above, a surprisingly high proportion of interviewees believe that they are still worth checking.
 - Difficult to check places: the majority of interviewees do not have areas of property which are difficult to check. For those that do, commonly indicated areas included remote areas, watered areas and bushland and scrub.
- Surveillance Frequency
 - Frequency: Overall, 80.2 per cent of interviewees check for weeds on average every three months or less (at least four times per year). Very few interviewees check for weeds infrequently (over 1 year between inspections).
- Time of year
 - Overall, 67.3 per cent of interviewees check for weeds at particular times of year, a practice relatively more common in SA and WA than Queensland, Tasmania or NT, presumably due to climatic conditions, such as the distinct break of rainfall in the Mediterranean climates of southern SA and WA.
 - Year-round weed checking is not unusual amongst interviewees, however the spring months and to a slightly lesser degree the winter months appear to be the most common time for weed inspection. This pattern varies however on a state or territory and property type basis.
 - The highest proportion of interviewees overall check at certain times of year due to plant characteristics (weeds are growing rapidly, weeds come up after rain).
- Surveillance Methods
 - Mode of transport: motor bikes and quad bikes are the most widely used (71.3 per cent of interviewees) mode of transport when undertaking surveillance for weeds, followed by passenger vehicles (57.6 per cent).
 - Search method: overall, combining weed inspection with other property tasks appears a more common approach than conducting specific weed searches, particularly when using a motor bike or quad bike as a mode of transportation (30.1

per cent). However, specific weed searching is still a relatively important search method amongst interviewees (19.5 per cent conduct specific searches on foot, and 17.8 per cent by motor bike or quad bike).

- Percentage of property checked for weeds: interviewees from Victoria check the largest percentage of a property overall (96 per cent) while those from NT check the lowest (71.6 per cent). Crop farmers check the highest overall percentage (96.5 per cent) and horticulturalists the lowest (86.1 per cent).
- Effectiveness of weed check strategy: slightly over half of the respondents overall believe their strategy is 'mostly effective' while nearly 48 per cent said it was 'very effective'.

4.12.5 Weed Identification

- Identification practice
 - Action for unknown weeds: 74.8 per cent of respondents ask a local professional for identification advice, while 26.6 per cent look the weed up in a book. Sending the weed away for identification is relatively unusual behaviour amongst farmer interviewees, however those who do send specimens away use their Departments of Primary Industry or Agriculture or a local weeds inspector.
- Identification motivations
 - Motivations: curiosity, or wanting to know what the weed is, is indicated by the largest proportion of interviewees as a motive for having a weed identified, gaining a higher proportion of response than 'concern' related factors such as concerns about spread, and possible economic losses.

4.12.6 Weed Recording and Reporting

- Recording/reporting practice: methods used to mark a weed site include marking it in the paddock with a stick or pole (42.1 per cent) and recording it in a diary or notebook (36.8 per cent).
- Recording/reporting impediments: 68 per cent of interviewees believe that there are impediments to reporting new weed discoveries. The highest proportion of interviewees indicate the reasons for such reluctance as the cost of eradication (23.1 per cent), threat or fear of legal action (19.5 per cent), and concern over what other landholders might think (15.8 per cent). Significant differences emerged in the data on the basis of both state or territory, and property type.

4.12.7 Detection Response

- Actions when finding a new weed include removing it (53.9 per cent), spraying the weed as soon as possible (52.5 per cent) and finding out how to control the weed (21.7 per cent).

4.12.8 Landholder Commitment

- Overall, 72 per cent of interviewees believe that there are particular types of landholders who are less likely to check for new weed outbreaks. Hobby farmers or rural retreat farmers are considered by the highest proportion of interviewees (35.9 per cent) as less likely to check for weeds, followed by absentee owners (24.4 per cent). Responses from interviewees differed however on the basis of property type.
- Encouraging landholder weed checking: factors mentioned by interviewees that would encourage them to check for weeds include subsidising costs such as spray (17.1 per cent), awareness and advertising (16.4 per cent) and research and publicity into weed cost and impact (14.8 per cent).

- Discouraging landholder weed checking: important factors that discourage them from checking for new weeds include cost (39.4 per cent), lack of time or labour (17.1 per cent) and laziness and apathy (11.4 per cent).

4.12.9 Government Commitment

- 54 per cent of interviewees rated the level of government commitment to weed control as 'low'. Significantly, however, 72.4 per cent of Victorian interviewees, and 68.2 per cent of those from Tasmania, rate the level of commitment as 'low', while only 41.9 per cent of interviewees from SA do so.

4.12.10 Improvements in On-Ground Detection

- Suggestions for improvement: the largest proportion of interviewees overall (22.2 per cent) indicated that they have no suggestions to offer for improving on-ground detection of weeds. However, the relatively high proportion of respondents indicating education and awareness campaigns and improved communication between weeds authorities and landholders suggests that many farmers feel inadequately informed with regard to weed control (an opinion shared by many weeds inspectors).
- Making it easier for landholders to identify weeds: the largest proportion of respondents overall (over 19 per cent) indicated that updated local information or weed notification was a worthwhile initiative, while 16.1 per cent indicated that they are satisfied with the existing system. Interviewees from NSW are more likely (and Victorian interviewees less likely) to suggest that updated information of notification on weeds was important. Victorian interviewees are more likely (and NSW interviewees less likely) to favour written materials which include colour photos of weeds. A significantly higher proportion of cropping farmers, compared with the overall response group, are happy with the information on weed detection currently available.

5 Conclusions

On the whole, this research project has shown that Australian farmers are alert to new weeds, and have a reasonably high level of commitment to detection and control of such species, whether they be so called 'alert weeds', 'sleeper weeds', 'weeds of national significance', or simply weeds that are well established in Australia but spreading to new areas and properties. As a group, farmers therefore need to be encouraged, and equipped where needed, to be vigilant and effective weed spotters. This may be achieved through, amongst other things, training opportunities, greater extension and educational activities, increased resources devoted to weed detection, and greater cooperation between landholders and weeds authorities.

Weeds inspectors have also been shown to play a vital role in supporting and facilitating weed detection and control. While sometimes differing in opinion to the farmers, for example on the value of an inspection visit on weed control, the legally sanctioned surveillance of weeds by inspectors complements the generally voluntary approach adopted by farmers.

While certain questions in the surveys specifically called for suggestions to improve on-ground weed detection, the assumption made here is that the predominant approaches taken by farmers and weeds inspectors are most likely to be the more effective or efficient on-farm weed detection strategies. This assumption is based on the fact that, due to their long history of involvement with weeds, many farmers and inspectors will have determined the best management practice for weeds.

There was often considerable variation between states and territories, and property types in relation to weed spread detection and reporting. Some states and territories, and landholder types were considered as performing better than others, though geographic and climatic differences, as well as enterprise differences, accounted for some of the variability. Research and extension programs aimed at improving weed detection strategies will need to take into account such variation and target specific groups appropriately.

Overall, there was seen to be a low level of government commitment to weed detection. Given the high environmental, social and economic impact of weeds, this situation needs to be remedied, since early detection is much more cost-effective than later cure.

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8 Appendices

Appendix 1 – Weeds Inspection Responsibilities in States and Territories

Appendix 2 – The National Survey of Weed Inspectors

Appendix 3 – The National Survey of Farmers

Appendix 4 – Aggregated Responses to the Weed Inspector Survey