1. Introduction

1.1 Background of Lantana

Lantana is now a major weed in over 60 countries and is recognised as one of the ten worst weeds worldwide. In Australia, lantana is recognised as a Weed of National Significance (WoNS) due to its invasiveness, potential distribution range and impacts on primary industries, conservation and biodiversity. It is a brittle, multi-branched, thicket-forming shrub, normally 2-4 metres tall but capable of scrambling over other vegetation to 15 metres high. It is an aggregate species derived from natural and horticultural hybridisation, and has the ability to cross-pollinate with other weedy and ornamental varieties to form new, more resilient strains (CRC for Australian Weed Management, 2003).

1.2 Purpose of Study

The AEC Group Limited (AEC*group*) was commissioned by Queensland Department of Natural Resources and Water (NRW) to undertake an analysis and comparison of two surveys of land holders and managers (primarily in New South Wales and Queensland) regarding the spread and impact of lantana on their properties. These two surveys were conducted in 2003 and 2006 and the survey instruments are contained as Appendices A and B. The purpose of the analyses is to report key outcomes of the survey results.

1.3 Approach and Methodology

1.3.1 Cleaning the Data

Survey response databases were provided by NRW and then cleaned to facilitate the analysis. The following modifications were made to the data:

Common Lantana Survey (2003)

- *Natural Resource Management Region.* All respondents were allocated to the relevant Natural Resource Management (NRM) Region based on the shire or city council name provided.
- *Question 3 – What is the main enterprise or use of the property?* The following similar categories were aggregated to reduce the number of response items:
  - The survey response categories of "Reserve" and "Conservation" were aggregated to Reserve / Conservation;
  - The survey response categories of "Forestry – Commercial" and "Agriculture or Horticulture" have been aggregated to Forestry / Agriculture;
  - The survey response categories of "Pasture for Grazing" and "Intensive Animal Production" have been aggregated to Pasture – Grazing / Intensive; and
  - The survey response category of "Mixed" has been disaggregated between the five categories of Vacant Land, Reserve / Conservation, Forestry / Agriculture, Pasture – Grazing / Intensive and Other based on the text responses for this category.
- *Question 5 – Tick one phrase that best describes the overall extent of lantana growth on this property.* The infested area of each property was inferred by reducing the phrase indicated by respondents for Question 5 and converting to a percent range as follows:
  - "Small density of lantana in isolated areas" is equivalent to < 1%;
  - "Small density of lantana scattered over many areas" is equivalent to 1% - 10%;
  - "Medium density of lantana in isolated areas" is equivalent to 11% - 25%;
  - "Medium density lantana scattered over many areas" is equivalent to 26% - 50%;
  - "High density infestations in limited areas" is equivalent to 51% - 75%; and
  - "High density infestations across extensive areas" is equivalent to > 75%.

  The percent ranges used are indicative only and have been developed based on expert departmental officer opinion. Analysis based on this assumption (including cross tabulations) will be subject to the relative accuracy of these ranges. Due to

these assumptions care should be taken when comparing to the 2006 survey results on infestation extent.

- *Question 11 – Last year what costs were incurred in managing lantana on this property?* Where the sum of costs for sub-components was greater than the total indicated, the total was changed to equal the sum of the sub-components.

Lantana Aware Survey (2006)

- *Natural Resource Management Region.* All respondents were allocated to the relevant Natural Resource Management (NRM) Region based on the shire or city council name provided.
- *Question 4 – How much of the total property area is covered in lantana?* In order to facilitate comparison with the 2003 survey results, the infested area of each property was aggregated into the following seven categories based on the percent figure provided:
  - 0%;
  - < 1%;
  - 1% - 10%;
  - 11% - 25%;
  - 26% - 50%;
  - 51% - 75%; and
  - > 75%.
- *Question 15 – Detail the lantana control costs incurred over the last 12 months.* In order to facilitate comparison with the 2003 survey results, the following similar categories were aggregated:
  - The survey response categories of "Machinery running costs", "Machinery lease / hire costs" and "Spray equipment costs" were aggregated to Machinery;
  - The survey response categories of "Consumable items", "Permits" and "Other costs" were aggregated to Other.

  Where the sum of costs for sub-components was greater than the total indicated, the total was changed to equal the sum of the sub-components.

1.3.2 Analysis of Data

In general, all analysis of data has been conducted in terms of a breakdown of respondents that have responded in the affirmative for each item of inquiry as a percent of total number of people surveyed **that responded to the question**.

All tables provided in the analysis sections of this report should be read across rows rather than down columns. That is, the numbers presented indicate the proportion of total respondents (identified in the category reported in the row headings) that replied in the affirmative to the category reported in the column headings. Note that not all rows will sum to 100% as a number of questions provided multiple response items (thus can some to more than 100%).

The number of respondents for each row has also been included in the last column of the tables. Care should be taken in interpreting the results where there are few respondents, particularly where less than 20, due to a large degree of standard error for these items.

1.4 Abbreviations

The following abbreviations have been used throughout this report.

Abbreviation	Description
NRM Region	Natural Resource Management Region
N/a	Not applicable
PER	Pink-edged-red
Q	Question
SEQ	South East Queensland

2. Common Lantana Survey (2003)

2.1 Flower Type and Property Details

2.1.1 Flower Colour (Lantana Extent)

Pink lantana is the most common lantana type, with 76.2% or respondents reporting this type of lantana on their property. Pink-edged-red (PER) is the next most common (18.6%) followed by white (8.3%).

White lantana was only reported in Queensland, particularly in the NRM Regions of Condamine Alliance (71.4%) and SEQ Catchments (14.1%).

Table 2.1. Flower Colour by NRM Region

Region	Pink	White	PER	Red	Orange	Other [(a)]	Responses
Hawkesbury-Nepean	83.3%	0.0%	16.7%	0.0%	0.0%	0.0%	6
Hunter-Central Rivers	100.0%	0.0%	5.6%	0.0%	0.0%	0.0%	18
Northern Rivers	74.5%	0.0%	24.5%	7.5%	0.9%	0.0%	106
Southern Rivers	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	10
Sydney Metro	80.0%	0.0%	20.0%	20.0%	0.0%	0.0%	5
New South Wales	**80.0%**	**0.0%**	**20.0%**	**6.2%**	**0.7%**	**0.0%**	**145**
Burdekin	90.5%	0.0%	19.0%	0.0%	38.1%	0.0%	21
Burnett-Mary	91.2%	8.8%	1.8%	4.4%	1.8%	0.0%	114
Cape York	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	3
Condamine Alliance	28.6%	71.4%	0.0%	0.0%	0.0%	0.0%	35
Fitzroy	77.8%	0.0%	40.7%	0.0%	0.0%	7.4%	27
FNQ	65.2%	4.3%	37.0%	4.3%	0.0%	8.7%	46
Mackay Whitsunday	93.5%	0.0%	16.1%	0.0%	0.0%	3.2%	31
Northern Gulf	75.0%	0.0%	8.3%	8.3%	0.0%	8.3%	12
SEQ Catchments	72.2%	14.1%	17.7%	2.0%	5.2%	2.0%	248
Queensland	**74.9%**	**11.2%**	**18.1%**	**2.1%**	**5.5%**	**2.9%**	**419**
Australia	**76.2%**	**8.3%**	**18.6%**	**3.2%**	**4.3%**	**2.1%**	**564**

Note: Rows may not sum to 100% as flower colour was a multiple response question. (a) Other flower colour includes *lantana montevidensis* as well as some other, less common lantana flower varieties.

2.1.2 Lantana Present on Property (Q1)

Of the total properties surveyed, 98.9% reported that lantana was present on the property. There was no significant difference between NRM Regions, with all regions reporting over 98.5% of properties with lantana present.

Table 2.2. Lantana Present on Property by NRM Region

Region	Yes	No	Responses
Hawkesbury-Nepean	100.0%	0.0%	8
Hunter-Central Rivers	100.0%	0.0%	30
Northern Rivers	99.3%	0.7%	145
Southern Rivers	100.0%	0.0%	19
Sydney Metro	100.0%	0.0%	10
New South Wales	**99.5%**	**0.5%**	**210**

Region	Yes	No	Responses
Burdekin	100.0%	0.0%	44
Burnett-Mary	99.4%	0.6%	174
Cape York	100.0%	0.0%	4
Condamine Alliance	98.6%	1.4%	69
Fitzroy	100.0%	0.0%	68
FNQ	100.0%	0.0%	70
Mackay Whitsunday	100.0%	0.0%	61
Northern Gulf	100.0%	0.0%	16
SEQ Catchments	98.7%	1.3%	393
Queensland	**98.9%**	**1.1%**	**702**
Australia	**98.9%**	**1.1%**	**916**

2.1.3 Size of the Property (Q2)

The majority of properties surveyed (58.0%) were less than 100 hectares in size. There were also a considerable number of properties 101 to 500 hectares in size represented in the survey (21.8%). Less than 8% of all properties surveyed were greater than 5,000 hectares in size. The average property size was 1,127.6 hectares.

New South Wales had a higher proportion of properties less than 100 hectares in size (76.4%), with the NRM Regions of Northern Rivers, Southern Rivers and Hawkesbury-Nepean all having over 85% of respondents from this property size. Overall, the average property size of respondents in New South Wales was approximately half that of the Australian average at 632.9 hectares.

Queensland recorded a higher average property size of 1,275.5 hectares, with all property size categories other than less than 100 hectares recording a higher representation than in New South Wales. Within the NRM Regions there was considerable variation in property size, with Fitzroy, Burdekin and Mackay Whitsunday recording an average property size of greater than 2,500 hectares.

Table 2.3. Property Size by NRM Region

Region	< 100 ha	101-500 ha	501-1,000 ha	1,001-5,000 ha	5,001 - 10,000 ha	> 10,000 ha	Average Property Size (Ha)	Responses
Hawkesbury-Nepean	87.5%	0.0%	0.0%	0.0%	0.0%	12.5%	1,606.3	8
Hunter-Central Rivers	71.4%	25.0%	3.6%	0.0%	0.0%	0.0%	137.5	28
Northern Rivers	75.9%	13.1%	3.6%	2.9%	1.5%	2.9%	666.8	137
Southern Rivers	88.9%	0.0%	5.6%	0.0%	0.0%	5.6%	780.6	18
Sydney Metro	70.0%	20.0%	0.0%	10.0%	0.0%	0.0%	395.0	10
New South Wales	**76.4%**	**13.6%**	**3.5%**	**2.5%**	**1.0%**	**3.0%**	**632.9**	**199**
Burdekin	18.2%	34.1%	4.5%	13.6%	15.9%	13.6%	3,452.3	44
Burnett-Mary	48.5%	26.3%	5.8%	14.6%	2.9%	1.8%	1,024.3	171
Cape York	66.7%	33.3%	0.0%	0.0%	0.0%	0.0%	133.3	3
Condamine Alliance	16.7%	56.1%	10.6%	13.6%	1.5%	1.5%	968.2	66
Fitzroy	23.8%	9.5%	9.5%	20.6%	20.6%	15.9%	4,262.7	63
FNQ	49.3%	42.0%	0.0%	1.4%	4.3%	2.9%	882.6	69
Mackay Whitsunday	28.3%	23.3%	15.0%	10.0%	13.3%	10.0%	2,746.7	60
Northern Gulf	93.3%	6.7%	0.0%	0.0%	0.0%	0.0%	66.7	15
SEQ Catchments	69.8%	20.1%	4.2%	2.3%	1.3%	2.3%	587.2	384
Queensland	**52.5%**	**24.3%**	**6.2%**	**8.4%**	**4.1%**	**4.6%**	**1,275.5**	**680**
Australia	**58.0%**	**21.8%**	**5.6%**	**7.0%**	**3.4%**	**4.2%**	**1,127.6**	**881**

2.1.4 Land Use (Q3)

Pasture is the most common land use of properties surveyed (58.7%), followed by reserve / conservation (36.4%). Pasture is more prominent in Queensland (63.5%), while reserve / conservation is more prevalent in New South Wales (50.8%).

Table 2.4. Land Use by NRM Region

Region	Pasture / Grazing	Reserve/ Conservation	Forestry/ Agriculture	Vacant land	Responses
Hawkesbury-Nepean	0.0%	60.0%	0.0%	40.0%	5
Hunter-Central Rivers	42.3%	57.7%	7.7%	7.7%	26
Northern Rivers	47.6%	46.8%	21.8%	6.5%	124
Southern Rivers	50.0%	35.7%	0.0%	21.4%	14
Sydney Metro	0.0%	100.0%	0.0%	11.1%	9
New South Wales	**43.5%**	**50.8%**	**16.4%**	**8.5%**	**177**
Burdekin	82.1%	7.7%	17.9%	5.1%	39
Burnett-Mary	71.1%	27.5%	20.8%	1.3%	149
Cape York	50.0%	100.0%	0.0%	0.0%	2
Condamine Alliance	90.0%	10.0%	21.7%	0.0%	60
Fitzroy	80.6%	14.5%	17.7%	0.0%	62
FNQ	83.9%	12.9%	24.2%	0.0%	62
Mackay Whitsunday	70.2%	17.0%	29.8%	4.3%	47
Northern Gulf	55.6%	44.4%	22.2%	0.0%	9
SEQ Catchments	48.9%	46.6%	18.0%	6.6%	305
Queensland	**63.5%**	**31.9%**	**18.9%**	**4.2%**	**567**
Australia	**58.7%**	**36.4%**	**18.3%**	**5.4%**	**745**

Note: Rows may not sum to 100% as land use was a multiple response question. The percentage breakdown provided in the table does not indicate the percent split of land use overall, just the proportion of respondents that indicated that some portion of their property is used for each purpose.

2.1.5 Type of Country (Q4)

The topography of the properties surveyed was predominantly hilly (43.2%) or gradual slope (26.9%). Topography representation was relatively consistent between Queensland and New South Wales, although varied between regions as outlined in the table below.

Table 2.5. Topography

Region	Mountainous	Hilly	Gradual Slopes	Plain	River Flat	Other	Responses
Hawkesbury-Nepean	0.0%	37.5%	62.5%	0.0%	0.0%	0.0%	8
Hunter-Central Rivers	3.7%	33.3%	40.7%	3.7%	18.5%	0.0%	27
Northern Rivers	15.7%	43.3%	20.9%	4.5%	15.7%	0.0%	134
Southern Rivers	0.0%	64.7%	17.6%	0.0%	11.8%	5.9%	17
Sydney Metro	0.0%	0.0%	90.0%	0.0%	10.0%	0.0%	10
New South Wales	**11.3%**	**41.2%**	**28.4%**	**3.6%**	**14.9%**	**0.5%**	**194**
Burdekin	23.3%	27.9%	20.9%	9.3%	18.6%	0.0%	43
Burnett-Mary	8.2%	52.0%	29.2%	2.3%	7.6%	0.6%	171
Cape York	0.0%	25.0%	0.0%	0.0%	75.0%	0.0%	4
Condamine Alliance	14.9%	56.7%	20.9%	0.0%	4.5%	3.0%	67
Fitzroy	33.9%	32.2%	25.4%	0.0%	8.5%	0.0%	59
FNQ	8.6%	51.4%	34.3%	0.0%	5.7%	0.0%	70
Mackay Whitsunday	41.4%	32.8%	17.2%	1.7%	6.9%	0.0%	58
Northern Gulf	0.0%	68.8%	12.5%	0.0%	18.8%	0.0%	16
SEQ Catchments	14.4%	46.2%	27.0%	2.1%	10.2%	0.0%	381
Queensland	**16.9%**	**43.8%**	**26.6%**	**2.1%**	**10.2%**	**0.4%**	**676**
Australia	**15.6%**	**43.2%**	**26.9%**	**2.4%**	**11.4%**	**0.5%**	**872**

2.2 Infestation Extent and Spread

2.2.1 Extent of Lantana (Q5)

The majority of properties reporting the presence of lantana had over 25% of the property infested, with 23.1% reporting 26% to 50% of land infested, 18.7% reporting 51% to 75% of land infested and 11.9% reporting over 75% of land infested. Queensland had a slightly higher proportion of properties reporting infestations of less than 1% and 1% to 10% than in New South Wales.

Table 2.6. Extent of Lantana by NRM Region

Region	<1%	1-10%	11%-25%	26%-50%	51%-75%	>75%	Responses
Hawkesbury-Nepean	12.5%	25.0%	0.0%	0.0%	37.5%	25.0%	8
Hunter-Central Rivers	13.8%	17.2%	13.8%	20.7%	24.1%	10.3%	29
Northern Rivers	16.4%	10.7%	17.1%	25.7%	22.9%	7.1%	140
Southern Rivers	15.8%	0.0%	10.5%	26.3%	36.8%	10.5%	19
Sydney Metro	30.0%	0.0%	10.0%	30.0%	20.0%	10.0%	10
New South Wales	**16.7%**	**10.8%**	**15.2%**	**24.5%**	**24.5%**	**8.3%**	**204**
Burdekin	14.0%	2.3%	27.9%	20.9%	16.3%	18.6%	43
Burnett-Mary	23.8%	12.5%	16.7%	25.6%	13.1%	8.3%	168
Cape York	0.0%	0.0%	33.3%	66.7%	0.0%	0.0%	3
Condamine Alliance	9.0%	20.9%	6.0%	38.8%	13.4%	11.9%	67
Fitzroy	18.8%	9.4%	14.1%	14.1%	20.3%	23.4%	64
FNQ	31.9%	24.6%	10.1%	11.6%	14.5%	7.2%	69
Mackay Whitsunday	13.3%	3.3%	26.7%	25.0%	13.3%	18.3%	60
Northern Gulf	26.7%	33.3%	13.3%	26.7%	0.0%	0.0%	15
SEQ Catchments	23.6%	11.7%	10.6%	22.3%	19.1%	12.7%	377
Queensland	**21.0%**	**12.6%**	**13.8%**	**22.8%**	**16.9%**	**12.9%**	**675**
Australia	**20.1%**	**12.1%**	**14.1%**	**23.1%**	**18.7%**	**11.9%**	**882**

Note: The percent ranges applied for extent of lantana are indicative and are based on departmental officer opinion.

Respondents indicated that the average proportion of property infested was approximately 33.9%, equating to an estimated average infestation size of 495.8 hectares[2].

Table 2.7. Size of Infestation by NRM Region

Region	Average Proportion of Property Infested	Number of Responses	Average Size of Infestation (Ha)	Responses
Hawkesbury-Nepean	46.6%	8	31.1	8
Hunter-Central Rivers	35.2%	29	43.1	27
Northern Rivers	33.8%	140	291.3	134
Southern Rivers	44.0%	19	634.2	18
Sydney Metro	34.4%	10	141.6	10
New South Wales	**35.1%**	**204**	**272.8**	**195**
Burdekin	39.4%	43	1,875.7	43
Burnett-Mary	28.7%	168	332.6	166
Cape York	30.8%	3	18.8	2
Condamine Alliance	35.5%	67	341.2	66
Fitzroy	41.5%	64	2,029.7	61
FNQ	22.9%	69	391.7	68
Mackay Whitsunday	38.7%	60	1,164.1	59
Northern Gulf	14.1%	15	6.9	14
SEQ Catchments	34.0%	377	267.0	372
Queensland	**33.5%**	**675**	**562.8**	**663**
Australia	**33.9%**	**882**	**495.8**	**860**

[2] The analysis of total hectares infested, which has been calculated as a weighted average using the mid-point of these ranges, is subject to the relative accuracy of the assumed percent ranges applied.

2.2.2 Spread of Lantana in Last Two Years (Q6)

Over the past two years, 8.3% more respondents indicated that the lantana infestation on their property decreased rather than increased, with 35.2% of properties surveyed reporting a decrease in spread of lantana, while 27.0% of respondents reported an increase in spread[3]. Meanwhile, 37.8% reported little or no change in the spread of lantana.

There were considerably more respondents indicating either a decrease in spread of lantana or minimal change in spread in New South Wales when compared to Queensland (net balance of -22.9% compared to -3.7%), which may be a reflection of legislative requirements in New South Wales.

Table 2.8. Spread of Lantana in Last Two Years by NRM Region

Region	Increased Spread	Decreased Spread	Little Change	Net Balance [(a)]	Responses
Hawkesbury-Nepean	25.0%	12.5%	62.5%	12.5%	8
Hunter-Central Rivers	28.6%	39.3%	32.1%	-10.7%	28
Northern Rivers	22.5%	48.8%	28.7%	-26.4%	129
Southern Rivers	25.0%	43.8%	31.3%	-18.8%	16
Sydney Metro	12.5%	50.0%	37.5%	-37.5%	8
New South Wales	**22.9%**	**45.7%**	**31.4%**	**-22.9%**	**188**
Burdekin	45.2%	26.2%	28.6%	19.0%	42
Burnett-Mary	30.8%	28.3%	40.9%	2.5%	159
Cape York	0.0%	66.7%	33.3%	-66.7%	3
Condamine Alliance	36.1%	32.8%	31.1%	3.3%	61
Fitzroy	43.3%	16.7%	40.0%	26.7%	60
FNQ	24.6%	30.8%	44.6%	-6.2%	65
Mackay Whitsunday	32.7%	34.7%	34.7%	-2.0%	50
Northern Gulf	13.3%	26.7%	60.0%	-13.3%	15
SEQ Catchments	21.8%	37.9%	39.9%	-16.1%	347
Queensland	**28.3%**	**32.0%**	**39.7%**	**-3.7%**	**622**
Australia	**27.0%**	**35.2%**	**37.8%**	**-8.3%**	**812**

Notes: (a) Net Balance is the difference between the proportion of respondents indicating that the spread of lantana has decreased and the proportion of respondents indicating that the spread of lantana has increased. A negative value indicates that more respondents reported a decrease, and vice versa.

Of the properties reporting an increase in spread over the past two years, the average increase reported was 19.9%. By comparison, of the properties reporting a decease in spread the average decrease was 37.1%.

Overall, the spread of lantana was reported to have decreased by 7.7% on average[4], with New South Wales recording a 12.9% decrease and Queensland a 6.1% decrease. Fitzroy was the only NRM Region to report an average increase in spread over the past two years.

Table 2.9. Percent Spread of Lantana in Last Two Years by NRM Region

Region	Average % Increase	Average % Decrease	Average % Change
Hawkesbury-Nepean	17.5%	-50.0%	-1.9%
Hunter-Central Rivers	14.4%	-40.5%	-11.8%
Northern Rivers	25.1%	-40.8%	-14.3%
Southern Rivers	11.3%	-30.7%	-10.6%
Sydney Metro	25.0%	-17.5%	-5.6%
New South Wales	**21.5%**	**-39.0%**	**-12.9%**

[3] The reported changes in spread of lantana do not indicate nor infer any changes in the density of lantana in infested areas.

[4] While a higher proportion of respondents may have indicated a decrease in spread this does not necessarily infer that the overall spread of lantana has decreased, but only that more properties surveyed recorded a decline in spread than recorded an increase.

Region	Average % Increase	Average % Decrease	Average % Change
Burdekin	17.4%	-39.1%	-2.4%
Burnett-Mary	23.8%	-33.6%	-2.2%
Cape York	N/a	-65.0%	-43.3%
Condamine Alliance	13.5%	-45.5%	-10.0%
Fitzroy	20.8%	-21.0%	5.5%
FNQ	21.6%	-34.5%	-5.3%
Mackay Whitsunday	16.3%	-26.2%	-3.8%
Northern Gulf	7.5%	-61.3%	-15.3%
SEQ Catchments	17.5%	-38.6%	-10.8%
Queensland	**19.5%**	**-36.3%**	**-6.1%**
Australia	**19.9%**	**-37.1%**	**-7.7%**

2.3 Control and Management Techniques

2.3.1 Control Type by Area Type (Q7)

The tables below identify the proportion of properties surveyed (that responded to this question) that use a particular type of control technique over different area types. Differences between NRM Regions is outlined in the tables.

2.3.1.1 Water Courses

Approximately 56.2% of the 74.5% of respondents indicating they have water courses on their property use a mechanical or hand removal technique to control lantana around these areas. Herbicide (43.4%) is also a common control technique, while approximately one quarter of respondents indicated that they use a combination of herbicide, mechanical or hand removal techniques and/or fire. Approximately 16.2% of respondents do not control lantana around water courses.

Mechanical or hand removal techniques are more common around water courses in New South Wales, while fire is a relatively more common control technique in Queensland than in New South Wales.

Table 2.10. Control Type Around Water Courses

Region	No Control	Herbicide	Mechanical or Hand Removal	Fire	Integrate (a)	Biological Control	Grazing	Responses
Hawkesbury-Nepean	0.0%	25.0%	100.0%	0.0%	25.0%	0.0%	0.0%	4
Hunter-Central Rivers	9.5%	47.6%	76.2%	4.8%	33.3%	0.0%	9.5%	21
Northern Rivers	16.8%	33.7%	68.3%	5.0%	21.8%	0.0%	5.9%	101
Southern Rivers	28.6%	42.9%	42.9%	14.3%	28.6%	0.0%	7.1%	14
Sydney Metro	20.0%	40.0%	80.0%	0.0%	40.0%	20.0%	0.0%	5
New South Wales	**16.6%**	**36.6%**	**68.3%**	**5.5%**	**24.8%**	**0.7%**	**6.2%**	**145**
Burdekin	12.8%	38.5%	51.3%	35.9%	30.8%	0.0%	5.1%	39
Burnett-Mary	15.6%	38.5%	54.1%	22.1%	24.6%	5.7%	9.8%	122
Cape York	0.0%	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	1
Condamine Alliance	16.3%	65.1%	30.2%	11.6%	23.3%	11.6%	4.7%	43
Fitzroy	10.5%	52.6%	50.9%	36.8%	40.4%	8.8%	8.8%	57
FNQ	17.6%	54.9%	47.1%	7.8%	25.5%	3.9%	5.9%	51
Mackay Whitsunday	17.3%	53.8%	42.3%	25.0%	32.7%	3.8%	7.7%	52
Northern Gulf	25.0%	37.5%	50.0%	12.5%	25.0%	0.0%	12.5%	8
SEQ Catchments	15.6%	44.4%	60.7%	7.6%	25.8%	4.0%	4.4%	275
Queensland	**16.1%**	**45.4%**	**52.6%**	**16.3%**	**26.8%**	**5.0%**	**5.6%**	**504**
Australia	**16.2%**	**43.4%**	**56.2%**	**13.8%**	**26.3%**	**4.0%**	**5.7%**	**650**

Note: Rows may not sum to 100% as control type was a multiple response question. (a) Integrate refers to the proportion of respondents that use two or more of herbicide, mechanical or hand removal and fire techniques in this area type.

2.3.1.2 Pasture or Crops

Approximately 60.0% and 58.8% of respondents indicated that they use herbicide or a mechanical or hand removal technique to control lantana in pasture or crop areas, respectively, with over 30% of respondents indicating they integrate the use of these techniques. Only 3.3% of respondents indicated that they do not control lantana in pasture or crop areas.

Mechanical or hand removal techniques and grazing are relatively more prevalent in New South Wales than in Queensland for this areas type, while herbicide, fire and biological control are more prominent in Queensland.

Table 2.11. Control Type in Pasture or Crops

Region	No Control	Herbicide	Mechanical or Hand Removal	Fire	Integrate (a)	Biological Control	Grazing	Responses
Hawkesbury-Nepean	N/a	N/a	N/a	N/a	N/a	N/a	N/a	0
Hunter-Central Rivers	0.0%	40.0%	80.0%	20.0%	40.0%	0.0%	40.0%	5
Northern Rivers	2.6%	55.3%	71.1%	0.0%	31.6%	0.0%	26.3%	38
Southern Rivers	0.0%	50.0%	50.0%	50.0%	50.0%	0.0%	0.0%	2
Sydney Metro	N/a	N/a	N/a	N/a	N/a	N/a	N/a	0
New South Wales	**2.2%**	**53.3%**	**71.1%**	**4.4%**	**33.3%**	**0.0%**	**26.7%**	**45**
Burdekin	0.0%	90.0%	40.0%	10.0%	40.0%	10.0%	20.0%	10
Burnett-Mary	2.4%	40.5%	64.3%	11.9%	26.2%	2.4%	16.7%	42
Cape York	0.0%	100.0%	100.0%	0.0%	100.0%	0.0%	0.0%	1
Condamine Alliance	4.2%	87.5%	45.8%	4.2%	33.3%	4.2%	0.0%	24
Fitzroy	3.7%	51.9%	70.4%	18.5%	40.7%	7.4%	7.4%	27
FNQ	5.3%	73.7%	50.0%	0.0%	28.9%	7.9%	7.9%	38
Mackay Whitsunday	0.0%	82.1%	42.9%	10.7%	28.6%	3.6%	10.7%	28
Northern Gulf	0.0%	60.0%	80.0%	0.0%	40.0%	0.0%	0.0%	5
SEQ Catchments	5.0%	57.5%	55.0%	6.3%	26.3%	5.0%	16.3%	80
Queensland	**3.5%**	**61.5%**	**56.0%**	**8.0%**	**29.5%**	**5.0%**	**11.0%**	**200**
Australia	**3.3%**	**60.0%**	**58.8%**	**7.3%**	**30.2%**	**4.1%**	**13.9%**	**245**

Note: Rows may not sum to 100% as control type was a multiple response question. (a) Integrate refers to the proportion of respondents that use two or more of herbicide, mechanical or hand removal and fire techniques in this area type.

2.3.1.3 Natural Bushland

Approximately 56.0% and 45.1% of respondents indicated that they use a mechanical or hand removal technique or herbicide to control lantana in natural bushland, respectively, with over 30% of respondents indicating they integrate the use of these techniques. 20.3% of respondents indicated that they do not control lantana in this area type.

Mechanical or hand removal techniques are more prominent in New South Wales for controlling lantana in natural bushland, while fire and biological control are more common in Queensland.

Table 2.12. Control Type in Natural Bushland

Region	No Control	Herbicide	Mechanical or Hand Removal	Fire	Integrate (a)	Biological Control	Grazing	Responses
Hawkesbury-Nepean	0.0%	80.0%	100.0%	0.0%	80.0%	0.0%	0.0%	5
Hunter-Central Rivers	11.8%	52.9%	82.4%	11.8%	47.1%	0.0%	0.0%	17
Northern Rivers	23.8%	39.6%	62.4%	4.0%	27.7%	1.0%	5.0%	101
Southern Rivers	12.5%	62.5%	68.8%	12.5%	50.0%	0.0%	6.3%	16
Sydney Metro	0.0%	85.7%	100.0%	28.6%	85.7%	14.3%	0.0%	7
New South Wales	**19.4%**	**47.2%**	**68.1%**	**6.9%**	**36.8%**	**1.4%**	**4.2%**	**144**

Region	No Control	Herbicide	Mechanical or Hand Removal	Fire	Integrate (a)	Biological Control	Grazing	Responses
Burdekin	7.4%	55.6%	40.7%	51.9%	40.7%	3.7%	14.8%	27
Burnett-Mary	15.9%	30.8%	55.1%	25.2%	24.3%	2.8%	7.5%	107
Cape York	33.3%	33.3%	33.3%	0.0%	0.0%	0.0%	0.0%	3
Condamine Alliance	22.0%	64.0%	44.0%	6.0%	32.0%	8.0%	2.0%	50
Fitzroy	24.4%	48.8%	36.6%	24.4%	26.8%	14.6%	4.9%	41
FNQ	27.5%	40.0%	40.0%	12.5%	15.0%	7.5%	0.0%	40
Mackay Whitsunday	20.0%	55.0%	25.0%	32.5%	20.0%	0.0%	10.0%	40
Northern Gulf	27.3%	18.2%	54.5%	0.0%	0.0%	0.0%	0.0%	11
SEQ Catchments	19.1%	42.2%	64.9%	10.6%	32.6%	3.2%	1.4%	282
Queensland	**20.6%**	**44.5%**	**52.1%**	**16.6%**	**28.7%**	**5.1%**	**3.6%**	**470**
Australia	**20.3%**	**45.1%**	**56.0%**	**14.3%**	**30.7%**	**4.2%**	**3.7%**	**616**

Note: Rows may not sum to 100% as control type was a multiple response question. (a) Integrate refers to the proportion of respondents that use two or more of herbicide, mechanical or hand removal and fire techniques in this area type.

2.3.1.4 Sloping Hills (Accessible)

Herbicide (72.0%) is the most common method used to control lantana on sloping hills. Fire is the next most common technique (21.5%), although this is predominantly used in Queensland rather than in New South Wales, with approximately half the respondents using fire integrating its use with herbicide. Mechanical or hand removal techniques are not commonly used to control lantana in sloping hills.

Biological control is more common in Queensland. By comparison, grazing is a more prominent control technique in New South Wales. Approximately 10.5% of respondents do not control lantana in this area type, with a higher proportion of respondents in New South Wales indicating they do not control lantana in this area type.

Table 2.13. Control Type in Sloping Hills (Accessible)

Region	No Control	Herbicide	Mechanical or Hand Removal	Fire	Integrate (a)	Biological Control	Grazing	Responses
Hawkesbury-Nepean	0.0%	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	2
Hunter-Central Rivers	11.1%	77.8%	0.0%	22.2%	11.1%	0.0%	22.2%	9
Northern Rivers	21.8%	69.1%	0.0%	5.5%	1.8%	0.0%	16.4%	55
Southern Rivers	0.0%	91.7%	0.0%	0.0%	0.0%	0.0%	16.7%	12
Sydney Metro	0.0%	100.0%	0.0%	50.0%	50.0%	0.0%	0.0%	2
New South Wales	**16.5%**	**74.7%**	**0.0%**	**7.6%**	**3.8%**	**0.0%**	**16.5%**	**79**
Burdekin	5.0%	55.0%	5.0%	35.0%	10.0%	5.0%	20.0%	20
Burnett-Mary	8.8%	50.0%	13.2%	47.1%	16.2%	8.8%	14.7%	68
Cape York	0.0%	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	1
Condamine Alliance	4.2%	89.6%	8.3%	18.8%	18.8%	8.3%	8.3%	48
Fitzroy	14.7%	58.8%	8.8%	32.4%	17.6%	8.8%	8.8%	34
FNQ	2.9%	88.2%	2.9%	17.6%	11.8%	2.9%	8.8%	34
Mackay Whitsunday	8.1%	67.6%	2.7%	29.7%	10.8%	2.7%	8.1%	37
Northern Gulf	20.0%	80.0%	0.0%	20.0%	20.0%	0.0%	20.0%	5
SEQ Catchments	9.8%	77.9%	8.0%	17.2%	13.5%	5.5%	4.9%	163
Queensland	**9.0%**	**71.3%**	**6.9%**	**24.9%**	**12.8%**	**5.6%**	**8.4%**	**321**
Australia	**10.5%**	**72.0%**	**5.5%**	**21.5%**	**11.0%**	**4.5%**	**10.0%**	**400**

Note: Rows may not sum to 100% as control type was a multiple response question. (a) Integrate refers to the proportion of respondents that use two or more of herbicide, mechanical or hand removal and fire techniques in this area type.

2.3.1.5 Steep Areas (Relatively Inaccessible)

The most common control types in steep areas are herbicide (32.5%), mechanical or hand removal techniques (22.8%) and fire (22.8%), with approximately 15% of respondents reporting that they integrate the use of these techniques in this area type. Approximately 36.6% of respondents indicated that they do not control lantana in relatively inaccessible steep areas.

Mechanical or hand removal techniques are more prevalent in New South Wales for controlling lantana in steep areas, while herbicide, fire and biological control are more common in Queensland. A higher proportion of respondents in New South Wales indicated that they do not control lantana in this area type.

Table 2.14. Control Type in Steep Areas (Relatively Inaccessible)

Region	No Control	Herbicide	Mechanical or Hand Removal	Fire	Integrate (a)	Biological Control	Grazing	Responses
Hawkesbury-Nepean	16.7%	50.0%	83.3%	0.0%	50.0%	0.0%	0.0%	6
Hunter-Central Rivers	20.0%	40.0%	60.0%	20.0%	30.0%	0.0%	0.0%	10
Northern Rivers	50.7%	21.1%	29.6%	11.3%	9.9%	2.8%	5.6%	71
Southern Rivers	58.3%	16.7%	33.3%	16.7%	25.0%	0.0%	0.0%	12
Sydney Metro	0.0%	100.0%	100.0%	50.0%	100.0%	0.0%	0.0%	2
New South Wales	**46.5%**	**25.3%**	**36.4%**	**13.1%**	**17.2%**	**2.0%**	**4.0%**	**99**
Burdekin	31.8%	22.7%	0.0%	59.1%	13.6%	0.0%	4.5%	22
Burnett-Mary	28.6%	24.7%	26.0%	39.0%	16.9%	3.9%	11.7%	77
Cape York	0.0%	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	1
Condamine Alliance	27.1%	41.7%	12.5%	22.9%	16.7%	18.8%	6.3%	48
Fitzroy	36.8%	28.9%	10.5%	28.9%	10.5%	15.8%	2.6%	38
FNQ	31.7%	48.8%	12.2%	22.0%	14.6%	4.9%	2.4%	41
Mackay Whitsunday	27.3%	36.4%	4.5%	34.1%	6.8%	2.3%	4.5%	44
Northern Gulf	50.0%	50.0%	0.0%	25.0%	25.0%	0.0%	25.0%	4
SEQ Catchments	37.6%	34.8%	28.1%	18.5%	18.0%	3.9%	3.9%	178
Queensland	**34.0%**	**34.6%**	**18.8%**	**25.6%**	**14.0%**	**6.5%**	**5.1%**	**356**
Australia	**36.6%**	**32.5%**	**22.8%**	**22.8%**	**14.7%**	**5.5%**	**4.8%**	**456**

Note: Rows may not sum to 100% as control type was a multiple response question. (a) Integrate refers to the proportion of respondents that use two or more of herbicide, mechanical or hand removal and fire techniques in this area type.

2.3.1.6 Summary of Control Type by Area Type

Overall, herbicide and mechanical or hand removal techniques are the most common methods for controlling lantana in most areas of a property. Very few respondents indicated that they do not control lantana in productive areas of their land, however a high proportion indicated they do not control lantana in non-productive or less accessible areas.

In general, mechanical or hand removal techniques and grazing are more prominent control methods in New South Wales, while herbicide, fire and biological control are more prevalent in Queensland. The integration of herbicide, mechanical or hand removal and fire is more prevalent in New South Wales than in Queensland.

Table 2.15. Summary of Control Type by Area Type in Australia

Region	No Control	Herbicide	Mechanical or Hand Removal	Fire	Integrate (a)	Biological Control	Grazing	Responses
New South Wales								
Water Courses	16.6%	36.6%	68.3%	5.5%	24.8%	0.7%	6.2%	145
Pasture or Crops	2.2%	53.3%	71.1%	4.4%	33.3%	0.0%	26.7%	45
Natural Bushland	19.4%	47.2%	68.1%	6.9%	36.8%	1.4%	4.2%	144
Sloping Hills	16.5%	74.7%	0.0%	7.6%	3.8%	0.0%	16.5%	79
Steep Areas	46.5%	25.3%	36.4%	13.1%	17.2%	2.0%	4.0%	99
Queensland								
Water Courses	16.1%	45.4%	52.6%	16.3%	26.8%	5.0%	5.6%	504
Pasture or Crops	3.5%	61.5%	56.0%	8.0%	29.5%	5.0%	11.0%	200
Natural Bushland	20.6%	44.5%	52.1%	16.6%	28.7%	5.1%	3.6%	470
Sloping Hills	9.0%	71.3%	6.9%	24.9%	12.8%	5.6%	8.4%	321
Steep Areas	34.0%	34.6%	18.8%	25.6%	14.0%	6.5%	5.1%	356

Region	No Control	Herbicide	Mechanical or Hand Removal	Fire	Integrate (a)	Biological Control	Grazing	Responses
Australia								
Water Courses	16.2%	43.4%	56.2%	13.8%	26.3%	4.0%	5.7%	650
Pasture or Crops	3.3%	60.0%	58.8%	7.3%	30.2%	4.1%	13.9%	245
Natural Bushland	20.3%	45.1%	56.0%	14.3%	30.7%	4.2%	3.7%	616
Sloping Hills	10.5%	72.0%	5.5%	21.5%	11.0%	4.5%	10.0%	400
Steep Areas	36.6%	32.5%	22.8%	22.8%	14.7%	5.5%	4.8%	456

Note: Rows may not sum to 100% as control type was a multiple response question. (a) Integrate refers to the proportion of respondents that use two or more of herbicide, mechanical or hand removal and fire techniques in this area type.

2.4 Ongoing Control and Regrowth Management

2.4.1 Follow Up of Treated Sites (Q8)

The majority of respondents indicated that they follow up or monitor treated sites on an ongoing basis (84.8%), while only 6.2% never follow up or monitor treated sites. This is relatively consistent between Queensland and New South Wales, as well as between NRM Regions.

Table 2.16. Follow Up of Treated Sites by NRM Region

Region	Never	Once after treatment	Ongoing inspections at intervals	Responses
Hawkesbury-Nepean	0.0%	0.0%	100.0%	8
Hunter-Central Rivers	6.9%	3.4%	89.7%	29
Northern Rivers	8.3%	7.5%	84.2%	133
Southern Rivers	5.6%	0.0%	94.4%	18
Sydney Metro	0.0%	10.0%	90.0%	10
New South Wales	**6.6%**	**6.1%**	**87.2%**	**196**
Burdekin	0.0%	9.5%	90.5%	42
Burnett-Mary	8.9%	12.7%	78.3%	157
Cape York	0.0%	0.0%	100.0%	3
Condamine Alliance	3.1%	7.7%	89.2%	65
Fitzroy	5.0%	8.3%	86.7%	60
FNQ	1.5%	9.2%	89.2%	65
Mackay Whitsunday	3.4%	20.3%	76.3%	59
Northern Gulf	6.7%	13.3%	80.0%	15
SEQ Catchments	5.5%	5.8%	88.7%	362
Queensland	**5.9%**	**9.9%**	**84.2%**	**645**
Australia	**6.2%**	**9.0%**	**84.8%**	**843**

2.4.2 Method for Preventing Lantana Regrowth (Q9)

Follow up with herbicide (59.1%), continual removal by hand or slashing (56.3%) and revegetating with native plants (27.1%) are the most common methods for preventing lantana regrowth.

Continual removal by hand or slashing, revegetating with native plants and shading out new lantana infestations are relatively more prominent in New South Wales than in Queensland as an approach to preventing lantana regrowth, while following up with herbicide and preventing animal movement over an area to allow pasture to establish are relatively more common in Queensland.

Table 2.17. Method for Preventing Lantana Regrowth by NRM Region

Region	Do nothing	Revegetate with pasture	Revegetate with native plants	Shade out new lantana infestations	Continual removal by hand or slashing	Follow up with herbicide	Prevent animal movement over an area to allow pasture to establish	Other	Responses
Hawkesbury-Nepean	0.0%	0.0%	12.5%	0.0%	100.0%	25.0%	0.0%	0.0%	8
Hunter-Central Rivers	10.3%	13.8%	44.8%	17.2%	75.9%	44.8%	3.4%	0.0%	29
Northern Rivers	10.9%	16.8%	39.4%	15.3%	70.1%	51.8%	3.6%	7.3%	137
Southern Rivers	5.3%	15.8%	26.3%	0.0%	84.2%	57.9%	0.0%	5.3%	19
Sydney Metro	20.0%	0.0%	30.0%	0.0%	80.0%	30.0%	0.0%	0.0%	10
New South Wales	**10.4%**	**14.9%**	**37.8%**	**12.9%**	**73.6%**	**49.3%**	**3.0%**	**5.5%**	**201**
Burdekin	7.1%	16.7%	11.9%	2.4%	40.5%	76.2%	16.7%	2.4%	42
Burnett-Mary	14.4%	17.0%	23.5%	7.2%	51.6%	52.3%	4.6%	4.6%	153
Cape York	0.0%	33.3%	66.7%	33.3%	33.3%	100.0%	33.3%	0.0%	3
Condamine Alliance	7.6%	24.2%	7.6%	4.5%	28.8%	86.4%	19.7%	9.1%	66
Fitzroy	9.5%	25.4%	4.8%	1.6%	50.8%	71.4%	11.1%	3.2%	63
FNQ	7.4%	32.4%	11.8%	8.8%	48.5%	72.1%	13.2%	2.9%	68
Mackay Whitsunday	8.3%	20.0%	13.3%	5.0%	38.3%	78.3%	10.0%	3.3%	60
Northern Gulf	0.0%	13.3%	33.3%	20.0%	60.0%	53.3%	13.3%	0.0%	15
SEQ Catchments	9.1%	14.6%	35.6%	8.0%	60.5%	56.6%	6.4%	4.7%	362
Queensland	**10.8%**	**18.1%**	**23.8%**	**6.3%**	**50.8%**	**62.3%**	**8.3%**	**4.3%**	**648**
Australia	**10.7%**	**17.3%**	**27.1%**	**7.9%**	**56.3%**	**59.1%**	**7.1%**	**4.6%**	**851**

Note: Rows may not sum to 100% as prevention technique was a multiple response question.

2.5 Limitations of Adoption and Cost of Control

2.5.1 Limiting Factors for Adopting Control Methods (Q10)

Major limiting factors to adoption of control methods include time (74.3% of respondents), cost of control (49.0%) and terrain or accessibility (39.8%). Limiting factors do not vary significantly between New South Wales and Queensland, and are relatively consistent between NRM Regions.

Table 2.18. Limiting Factors for Adopting Control Methods by NRM Region

Region	Lantana is not considered a problem	Time	Cost	Safety considerations	Terrain or accessibility	Knowledge of management options	Other	Responses
Hawkesbury-Nepean	0.0%	62.5%	37.5%	37.5%	25.0%	0.0%	37.5%	8
Hunter-Central Rivers	10.3%	79.3%	34.5%	10.3%	20.7%	3.4%	17.2%	29
Northern Rivers	15.7%	80.6%	50.0%	7.5%	37.3%	9.7%	11.2%	134
Southern Rivers	5.3%	89.5%	68.4%	10.5%	52.6%	5.3%	10.5%	19
Sydney Metro	12.5%	100.0%	50.0%	0.0%	12.5%	0.0%	37.5%	8
New South Wales	**13.3%**	**81.1%**	**48.5%**	**8.7%**	**34.7%**	**7.7%**	**13.3%**	**196**

Region	Lantana is not considered a problem	Time	Cost	Safety considerations	Terrain or accessibility	Knowledge of management options	Other	Responses
Burdekin	11.9%	76.2%	76.2%	16.7%	40.5%	16.7%	4.8%	42
Burnett-Mary	25.8%	70.4%	43.4%	14.5%	35.2%	16.4%	7.5%	159
Cape York	0.0%	100.0%	66.7%	33.3%	0.0%	0.0%	33.3%	3
Condamine Alliance	3.3%	86.9%	67.2%	16.4%	50.8%	6.6%	1.6%	61
Fitzroy	4.6%	76.9%	60.0%	9.2%	53.8%	1.5%	9.2%	65
FNQ	16.1%	67.7%	51.6%	8.1%	48.4%	11.3%	8.1%	62
Mackay Whitsunday	13.6%	57.6%	57.6%	11.9%	55.9%	5.1%	3.4%	59
Northern Gulf	13.3%	66.7%	40.0%	6.7%	13.3%	20.0%	13.3%	15
SEQ Catchments	20.4%	74.2%	41.4%	13.9%	37.1%	12.7%	7.9%	353
Queensland	**17.7%**	**72.1%**	**49.0%**	**13.5%**	**41.2%**	**11.6%**	**7.5%**	**639**
Australia	**16.6%**	**74.3%**	**49.0%**	**12.4%**	**39.8%**	**10.6%**	**9.1%**	**837**

Note: Rows may not sum to 100% as limiting factors was a multiple response question.

2.5.2 Cost of Control by Control Type (Q11)

Respondents indicated that their average expenditure on control per annum is $3,981. Labour ($1,339) accounts for approximately one third of total expenditure, indicative of the labour intensiveness of controlling lantana infestations.

Average expenditure on control of lantana is higher in Queensland ($4,350) than in New South Wales ($2,765), with a considerably higher average expenditure on all sub-components in Queensland than in New South Wales, with the exception of labour which was relatively similar.

Average expenditure varies significantly between NRM Region, and is outlined in the table below.

Table 2.19. Average Annual Expenditure on Control by NRM Region

Region	Labour	Machinery [a]	Capital Costs [b]	Herbicide	Contractors	Other [c]	Total	Responses
Hawkesbury-Nepean	$0	$0	$0	$54	$0	$0	$54	1
Hunter-Central Rivers	$2,420	$2,375	$0	$598	$417	$318	$6,127	12
Northern Rivers	$953	$558	$21	$373	$191	$30	$2,125	78
Southern Rivers	$2,039	$267	$77	$134	$381	$69	$2,967	13
Sydney Metro	$2,683	$0	$0	$26	$1,667	$0	$4,376	6
New South Wales	**$1,327**	**$686**	**$24**	**$347**	**$317**	**$64**	**$2,765**	**110**
Burdekin	$1,620	$1,718	$280	$886	$1,197	$0	$5,700	30
Burnett-Mary	$1,287	$927	$19	$518	$381	$51	$3,183	75
Cape York	$67	$2,667	$0	$713	$0	$0	$3,447	3
Condamine Alliance	$2,346	$1,591	$711	$1,062	$1,229	$53	$6,990	47
Fitzroy	$1,802	$572	$487	$1,195	$2,304	$17	$6,377	27
FNQ	$1,241	$944	$466	$1,490	$146	$2	$4,289	42
Mackay Whitsunday	$1,959	$2,257	$1,174	$847	$2,174	$24	$8,433	34
Northern Gulf	$50	$1,333	$0	$374	$0	$0	$1,757	6
SEQ Catchments	$1,181	$755	$195	$442	$839	$275	$3,688	203
Queensland	**$1,342**	**$945**	**$346**	**$705**	**$841**	**$170**	**$4,350**	**362**
Australia	**$1,339**	**$885**	**$271**	**$622**	**$719**	**$146**	**$3,981**	**472**

Note: (a) Machinery includes expenditure on the running and repair of machinery as well as hiring and leasing of machinery. (b) Capital costs include the purchase of depreciable items such as machinery and other equipment. (c) Other includes expenditure items such as consumables, permits and other miscellaneous costs.

The average annual expenditure on control per hectare of property size is outlined in the table below. As can be seen, on a per hectare basis respondents in New South Wales and Queensland spend a relatively similar amount per hectare of property size ($3.90 compared to $4.03).

There is some variability between NRM Regions, however it must be noted that all regions reporting expenditure per hectare of above $10 had relatively few respondents, and as such caution should be applied in interpreting these results.

Table 2.20. Average Annual Expenditure on Control Per Hectare of Property by NRM Region

Region	Labour	Machinery (a)	Capital Costs (b)	Herbicide	Contractors	Other (c)	Total	Responses
Hawkesbury-Nepean	$0.00	$0.00	$0.00	$1.08	$0.00	$0.00	$1.08	1
Hunter-Central Rivers	$27.47	$27.00	$0.00	$6.71	$4.76	$3.63	$69.58	11
Northern Rivers	$1.00	$0.58	$0.02	$0.38	$0.20	$0.03	$2.22	75
Southern Rivers	$17.70	$2.67	$0.77	$1.34	$3.81	$0.69	$26.98	12
Sydney Metro	$29.27	$0.00	$0.00	$0.28	$18.18	$0.00	$47.74	6
New South Wales	**$1.86**	**$0.98**	**$0.03**	**$0.48**	**$0.46**	**$0.09**	**$3.90**	**105**
Burdekin	$0.61	$0.65	$0.11	$0.33	$0.45	$0.00	$2.15	30
Burnett-Mary	$1.66	$1.20	$0.02	$0.67	$0.49	$0.07	$4.11	75
Cape York	$0.00	$80.00	$0.00	$20.60	$0.00	$0.00	$100.60	2
Condamine Alliance	$2.93	$2.00	$0.89	$1.33	$1.54	$0.07	$8.77	46
Fitzroy	$0.44	$0.14	$0.12	$0.29	$0.56	$0.00	$1.55	26
FNQ	$1.51	$1.15	$0.57	$1.82	$0.18	$0.00	$5.23	42
Mackay Whitsunday	$0.78	$0.89	$0.46	$0.34	$0.86	$0.01	$3.34	34
Northern Gulf	$0.40	$32.00	$0.00	$8.65	$0.00	$0.00	$41.05	5
SEQ Catchments	$2.81	$1.81	$0.47	$1.06	$0.88	$0.37	$7.40	200
Queensland	**$1.34**	**$0.95**	**$0.35**	**$0.71**	**$0.58**	**$0.10**	**$4.03**	**356**
Australia	**$1.43**	**$0.96**	**$0.29**	**$0.67**	**$0.56**	**$0.10**	**$4.01**	**461**

Note: (a) Machinery includes expenditure on the running and repair of machinery as well as hiring and leasing of machinery. (b) Capital costs include the purchase of depreciable items such as machinery and other equipment. (c) Other includes expenditure items such as consumables, permits and other miscellaneous costs.

Respondents in New South Wales and Queensland also spend a relatively equivalent amount per hectare of infestation ($8.99 compared to $8.76)[5].

Table 2.21. Average Annual Expenditure on Control Per Hectare of Infestation by NRM Region

Region	Labour	Machinery (a)	Capital Costs (b)	Herbicide	Contractors	Other (c)	Total	Responses
Hawkesbury-Nepean	$0.00	$0.00	$0.00	$21.60	$0.00	$0.00	$21.60	1
Hunter-Central Rivers	$58.53	$57.53	$0.00	$14.31	$10.15	$7.74	$148.26	11
Northern Rivers	$2.29	$1.33	$0.05	$0.87	$0.47	$0.07	$5.08	74
Southern Rivers	$56.59	$8.55	$2.46	$4.28	$12.18	$2.21	$86.27	12
Sydney Metro	$82.88	$0.00	$0.00	$0.80	$51.48	$0.00	$135.16	6
New South Wales	**$4.27**	**$2.25**	**$0.08**	**$1.11**	**$1.06**	**$0.21**	**$8.99**	**104**

[5] The cost per hectare of infestation, which has been calculated using total cost divided by area of infestation, is subject to the relative accuracy of the assumed percent ranges applied in Section 2.2.1.

Region	Labour	Machinery [a]	Capital Costs [b]	Herbicide	Contractors	Other [c]	Total	Responses
Burdekin	$1.21	$1.29	$0.21	$0.66	$0.90	$0.00	$4.27	30
Burnett-Mary	$3.96	$2.85	$0.06	$1.59	$1.18	$0.16	$9.78	74
Cape York	$0.00	$213.33	$0.00	$54.93	$0.00	$0.00	$268.27	2
Condamine Alliance	$7.20	$4.90	$2.19	$3.27	$3.79	$0.16	$21.51	46
Fitzroy	$0.81	$0.25	$0.23	$0.52	$1.07	$0.01	$2.87	25
FNQ	$3.99	$3.03	$1.54	$4.77	$0.48	$0.01	$13.82	41
Mackay Whitsunday	$1.89	$2.18	$1.13	$0.82	$2.10	$0.02	$8.15	34
Northern Gulf	$2.14	$171.12	$0.00	$46.25	$0.00	$0.00	$219.51	5
SEQ Catchments	$6.49	$4.18	$1.09	$2.46	$2.04	$0.85	$17.11	198
Queensland	**$2.91**	**$2.06**	**$0.76**	**$1.53**	**$1.27**	**$0.22**	**$8.76**	**353**
Australia	**$3.14**	**$2.10**	**$0.65**	**$1.46**	**$1.23**	**$0.22**	**$8.80**	**457**

Note: (a) Machinery includes expenditure on the running and repair of machinery as well as hiring and leasing of machinery. (b) Capital costs include the purchase of depreciable items such as machinery and other equipment. (c) Other includes expenditure items such as consumables, permits and other miscellaneous costs.

2.6 Communication

2.6.1 Best Method For Communicating With People

The table below indicates that the preferred methods for communicating with landholders are fact sheets / brochures (77.3%), through NRM groups (40.2%), through extension or weeds officers (37.1%) or via the Internet (website, 31.5%).There are no significant differences in preferences between New South Wales and Queensland.

Table 2.22. Preferred Method for Communication by NRM Region

Region	Fact sheet/brochure	Field days or shows	Website	Word of mouth from neighbour	Magazine or journal article	Media	NRM Group	Extension Officer or Weeds Officer	Agricultural produce merchants	Other	Responses
Hawkesbury-Nepean	75.0%	25.0%	0.0%	0.0%	12.5%	12.5%	37.5%	25.0%	0.0%	25.0%	8
Hunter-Central Rivers	64.3%	28.6%	28.6%	0.0%	21.4%	25.0%	50.0%	32.1%	3.6%	7.1%	28
Northern Rivers	76.4%	32.9%	34.3%	5.0%	14.3%	25.0%	42.1%	39.3%	20.0%	8.6%	140
Southern Rivers	76.5%	23.5%	52.9%	5.9%	11.8%	11.8%	29.4%	29.4%	17.6%	11.8%	17
Sydney Metro	77.8%	22.2%	55.6%	0.0%	33.3%	22.2%	44.4%	22.2%	0.0%	33.3%	9
New South Wales	**75.0%**	**31.0%**	**34.5%**	**4.0%**	**16.0%**	**23.5%**	**42.5%**	**36.5%**	**16.0%**	**10.0%**	**200**
Burdekin	80.5%	36.6%	26.8%	9.8%	19.5%	12.2%	19.5%	39.0%	22.0%	2.4%	41
Burnett-Mary	75.2%	24.2%	21.0%	7.6%	17.8%	17.2%	43.9%	29.9%	12.7%	2.5%	157
Cape York	75.0%	25.0%	25.0%	0.0%	0.0%	25.0%	25.0%	75.0%	0.0%	0.0%	4
Condamine Alliance	71.4%	42.9%	22.2%	17.5%	17.5%	17.5%	55.6%	47.6%	28.6%	3.2%	63
Fitzroy	76.7%	26.7%	31.7%	10.0%	16.7%	21.7%	48.3%	46.7%	28.3%	3.3%	60
FNQ	79.7%	21.9%	20.3%	14.1%	6.3%	14.1%	26.6%	48.4%	17.2%	4.7%	64
Mackay Whitsunday	82.8%	24.1%	51.7%	6.9%	19.0%	19.0%	13.8%	43.1%	6.9%	1.7%	58
Northern Gulf	86.7%	26.7%	20.0%	20.0%	0.0%	20.0%	13.3%	53.3%	6.7%	0.0%	15
SEQ Catchments	77.8%	27.5%	31.7%	9.0%	16.6%	18.3%	46.9%	34.6%	13.8%	5.3%	356
Queensland	**77.9%**	**27.4%**	**30.4%**	**9.4%**	**15.5%**	**17.9%**	**39.5%**	**37.3%**	**15.5%**	**4.2%**	**638**
Australia	**77.3%**	**28.2%**	**31.5%**	**8.1%**	**15.6%**	**19.3%**	**40.2%**	**37.1%**	**15.6%**	**5.7%**	**840**

Note: Rows may not sum to 100% as preferred method for communication was a multiple response question.

2.7 Cross Tabulations

All data presented in the tables in the section below represent the percent breakdown of each row by the column heading. That is, the percent breakdowns sum across each row but not down each column. Please note, however, that rows will not always sum to 100% as many of the questions provide multiple response options (and thus may sum to more than 100%).

2.7.1 Infestation Extent and Spread by Property Type

2.7.1.1 Extent of Lantana by Property Size

A higher proportion of properties that are less than 100 hectares in size have less than 1% of the property infested with lantana (25.8%) than any other property size. Properties between 101 and 500 hectares in size also have a relatively lower spread of lantana than larger property sizes.

In general, smaller size properties have a lower proportion of land infested with lantana than larger properties. A contributing factor to this may be that the smaller area to manage may make it easier to manage weed infestations in terms of time requirements and costs than larger properties.

Table 2.23. Extent of Lantana by Property Size

Property Size	<1%	1%-10%	11%-25%	26%-50%	51%-75%	>75%	Responses
< 100 hectares	25.8%	12.5%	13.7%	18.9%	20.9%	8.2%	497
101-500 hectares	15.4%	17.0%	11.2%	28.2%	15.4%	12.8%	188
501-1,000 hectares	6.4%	2.1%	29.8%	23.4%	14.9%	23.4%	47
1,001-5,000 hectares	6.5%	9.7%	12.9%	38.7%	19.4%	12.9%	62
5,001 - 10,000 hectares	13.3%	3.3%	20.0%	13.3%	20.0%	30.0%	30
> 10,000 hectares	11.1%	5.6%	13.9%	30.6%	13.9%	25.0%	36
Total	*20.0%*	*12.1%*	*14.2%*	*22.9%*	*19.0%*	*11.9%*	*860*

Note: The percent ranges applied for extent of lantana are indicative and are based on departmental officer opinion.

2.7.1.2 Extent of Lantana by Land Use

Large infestations of lantana (greater than 50%) are relatively more common on land used for reserve / conservation purposes or pasture, although more than a quarter of all properties surveyed have lantana covering over 50% of the property for all land uses highlighting the invasive nature of the weed regardless of land use. This is relatively consistent between States.

Table 2.24. Extent of Lantana by Land Use

Land Use	<1%	1%-10%	11%-25%	26%-50%	51%-75%	>75%	Responses
Pasture - Grazing/ Intensive	17.8%	11.3%	13.1%	26.8%	17.6%	13.4%	426
Reserve/ Conservation	19.0%	10.8%	12.6%	22.7%	23.8%	11.2%	269
Forestry/ Agriculture	12.9%	14.4%	14.4%	30.3%	17.4%	10.6%	132
Vacant Land	31.6%	23.7%	2.6%	15.8%	10.5%	15.8%	38
Total	*18.6%*	*12.2%*	*13.0%*	*24.8%*	*19.3%*	*12.1%*	*730*

Note: The percent ranges applied for extent of lantana are indicative and are based on departmental officer opinion.

2.7.1.3 Spread of Lantana in Last Two Years by Property Size

Smaller property sizes (those less than 500 hectares in size) recorded a higher proportion of respondents indicating that the spread of lantana had decreased over the past two years rather than increased, while property sizes greater than 500 hectares recorded a higher proportion of respondents indicating an increase compared to a decrease.

Combined with smaller properties having a lower proportion of the property infested, this suggests that management of lantana is easier on small properties. This may indicate that for properties greater than 500 hectares management becomes difficult to achieve.

Table 2.25. Spread of Lantana in Last Two Years by Property Size

Property Size	Increased Spread	Decreased Spread	Little Change	Net Balance [(a)]	Responses
< 100 hectares	19.8%	42.7%	37.5%	-22.9%	459
101-500 hectares	30.5%	35.0%	34.5%	-4.5%	177
501-1,000 hectares	44.4%	22.2%	33.3%	22.2%	36
1,001-5,000 hectares	46.7%	15.0%	38.3%	31.7%	60
5,001 - 10,000 hectares	48.3%	6.9%	44.8%	41.4%	29
> 10,000 hectares	36.4%	12.1%	51.5%	24.2%	33
Total	*27.1%*	*35.4%*	*37.5%*	*-8.3%*	*794*

Notes: (a) Net Balance is the difference between the proportion of respondents indicating that the spread of lantana has decreased and the proportion of respondents indicating that the spread of lantana has increased. A negative value indicates that more respondents reported a decrease, and vice versa.

2.7.1.4 Spread of Lantana in Last Two Years by Land Use

A significantly larger proportion of respondents indicated that the spread of lantana in both vacant land and land used for reserve / conservation purposes decreased rather than increased. Conversely, a larger proportion of respondents indicated an increase in spread compared to a decrease in land used for pasture.

Table 2.26. Spread of Lantana in Last Two Years by Land Use

Land Use	Increased Spread	Decreased Spread	Little Change	Net Balance [(a)]	Responses
Pasture - Grazing/ Intensive	33.3%	31.1%	35.7%	2.2%	409
Reserve/ Conservation	20.4%	43.3%	36.3%	-22.9%	245
Forestry/ Agriculture	30.2%	33.3%	36.4%	-3.1%	129
Vacant Land	16.1%	48.4%	35.5%	-32.3%	31
Total	*27.8%*	*35.4%*	*36.7%*	*-7.6%*	*683*

Notes: (a) Net Balance is the difference between the proportion of respondents indicating that the spread of lantana has decreased and the proportion of respondents indicating that the spread of lantana has increased. A negative value indicates that more respondents reported a decrease, and vice versa.

2.7.1.5 Spread of Lantana in Last Two Years by Property Type and Land Use

Management of lantana on land used for pasture appears to be more effective the smaller the property size, with the net balance (difference between the proportion of respondents indicating an increase compared to a decrease) increasing as property size increases. This may indicate that for properties used for pasture, management of lantana becomes more difficult the larger the property size.

By comparison, management of lantana on land used for reserve / conservation purposes does not appear to be greatly affected by property size.

Table 2.27. Spread of Lantana in Last Two Years by Property Size and Land Use

Property Size by Land Use	Increased Spread	Decreased Spread	Little Change	Net Balance [(a)]	Responses
Pasture - Grazing/ Intensive					
< 100 hectares	23.6%	40.7%	35.7%	-17.1%	140
101-500 hectares	29.0%	38.4%	32.6%	-9.4%	138
501-1,000 hectares	50.0%	20.0%	30.0%	30.0%	30
1,001-5,000 hectares	49.1%	15.1%	35.8%	34.0%	53
5,001 - 10,000 hectares	50.0%	4.2%	45.8%	45.8%	24
> 10,000 hectares	50.0%	0.0%	50.0%	50.0%	16
Total	*33.4%*	*31.2%*	*35.4%*	*2.2%*	*401*

Property Size by Land Use	Increased Spread	Decreased Spread	Little Change	Net Balance [a]	Responses
Reserve/ Conservation					
< 100 hectares	18.5%	47.6%	33.9%	-29.1%	189
101-500 hectares	39.1%	26.1%	34.8%	13.0%	23
501-1,000 hectares	0.0%	33.3%	66.7%	-33.3%	3
1,001-5,000 hectares	28.6%	28.6%	42.9%	0.0%	7
5,001 - 10,000 hectares	40.0%	20.0%	40.0%	20.0%	5
> 10,000 hectares	15.4%	30.8%	53.8%	-15.4%	13
Total	*20.8%*	*43.3%*	*35.8%*	*-22.5%*	*240*

Notes: (a) Net Balance is the difference between the proportion of respondents indicating that the spread of lantana has decreased and the proportion of respondents indicating that the spread of lantana has increased. A negative value indicates that more respondents reported a decrease, and vice versa.

2.7.1.6 Spread of Lantana in Last Two Years by Colour Type

A larger proportion of respondents indicated that the spread of pink, pink-edged-red and other types of lantana decreased rather than increased. Conversely, a larger proportion of respondents indicated an increase in spread compared to a decrease in spread for white and orange lantana. An equal proportion of respondents indicated an increase and decrease in spread for red lantana.

Table 2.28. Spread of Lantana in Last Two Years by Colour

Colour	Increased Spread	Decreased Spread	Little Change	Net Balance [a]	Responses
Pink	25.1%	36.6%	38.4%	-11.5%	383
White	37.5%	32.5%	30.0%	5.0%	40
PER	24.5%	34.0%	41.5%	-9.6%	94
Red	43.8%	43.8%	12.5%	0.0%	16
Orange	30.4%	26.1%	43.5%	4.3%	23
Other Type [b]	11.1%	44.4%	44.4%	-33.3%	9
Total	*25.9%*	*36.7%*	*37.5%*	*-10.8%*	*499*

Notes: (a) Net Balance is the difference between the proportion of respondents indicating that the spread of lantana has decreased and the proportion of respondents indicating that the spread of lantana has increased. A negative value indicates that more respondents reported a decrease, and vice versa. (b) Other flower colour includes *lantana montevidensis* as well as some other, less common lantana flower varieties.

2.7.2 Control Technique by Property Type

2.7.2.1 Control Type by Property Size

The tables below outline the prevalence of various control techniques in different area types over six property size ranges. General findings from the tables are provided in the commentary below, highlighting the common themes for each control technique.

In general, the following can be noted regarding each control technique in relation to property size:

- Mechanical or hand removal techniques are generally more commonly utilised on small properties (less than 100 hectares and 101 to 500 hectares) rather than larger property sizes;
- Herbicide is generally more commonly used to control lantana on properties between 101 and 5,000 hectares in size, and is usually least common on small properties (less than 100 hectares in size);
- The use of fire to control lantana generally becomes more common as the size of the property increases;
- The reliance on biological control to control lantana is generally more prevalent on medium sized properties (between 501 and 5,000 hectares in size);

- Grazing is a more prevalent control technique for smaller properties in stock feed areas and pasture or crop areas. However, in other area types grazing is generally not commonly utilised to control lantana on smaller properties;

- Outside of in stock feed and pasture or crop areas, grazing is more commonly utilised to control lantana on medium sized properties (501 to 5,000 hectares); and

- Management decisions to not control lantana appear to be more heavily influenced by the type of area (particularly productive versus non-productive) than the size of the property.

Table 2.29. Control Type by Property Size Around Water Courses

Property Size	No Control	Herbicide	Mechanical or Hand Removal	Fire	Integrate [(a)]	Biological Control	Grazing	Responses
< 100 hectares	18.1%	34.4%	70.3%	5.6%	26.1%	1.2%	4.2%	337
101-500 hectares	10.7%	54.0%	44.0%	13.3%	22.7%	6.0%	6.0%	150
501-1,000 hectares	5.0%	70.0%	32.5%	22.5%	27.5%	12.5%	12.5%	40
1,001-5,000 hectares	16.3%	51.0%	36.7%	40.8%	34.7%	12.2%	14.3%	49
5,001 - 10,000 hectares	26.9%	53.8%	38.5%	26.9%	38.5%	0.0%	3.8%	26
> 10,000 hectares	26.7%	36.7%	36.7%	36.7%	23.3%	3.3%	3.3%	30
Total	*16.1%*	*43.5%*	*56.2%*	*13.6%*	*26.4%*	*4.0%*	*5.9%*	*632*

Note: Rows may not sum to 100% as control type was a multiple response question. (a) Integrate refers to the proportion of respondents that use two or more of herbicide, mechanical or hand removal and fire techniques in this area type.

Table 2.30. Control Type by Property Size in Pasture or Crop Areas

Property Size	No Control	Herbicide	Mechanical or Hand Removal	Fire	Integrate [(a)]	Biological Control	Grazing	Responses
< 100 hectares	3.0%	45.5%	74.3%	4.0%	29.7%	3.0%	16.8%	101
101-500 hectares	4.2%	72.2%	45.8%	6.9%	26.4%	4.2%	13.9%	72
501-1,000 hectares	0.0%	80.0%	25.0%	15.0%	20.0%	15.0%	20.0%	20
1,001-5,000 hectares	3.3%	56.7%	66.7%	13.3%	43.3%	3.3%	6.7%	30
5,001 - 10,000 hectares	12.5%	62.5%	37.5%	0.0%	12.5%	0.0%	0.0%	8
> 10,000 hectares	0.0%	75.0%	50.0%	12.5%	37.5%	0.0%	0.0%	8
Total	*3.3%*	*59.4%*	*58.6%*	*7.1%*	*29.3%*	*4.2%*	*13.8%*	*239*

Note: Rows may not sum to 100% as control type was a multiple response question. (a) Integrate refers to the proportion of respondents that use two or more of herbicide, mechanical or hand removal and fire techniques in this area type.

Table 2.31. Control Type by Property Size in Natural Bushland

Property Size	No Control	Herbicide	Mechanical or Hand Removal	Fire	Integrate [(a)]	Biological Control	Grazing	Responses
< 100 hectares	17.5%	43.6%	70.8%	3.9%	32.5%	1.7%	1.7%	360
101-500 hectares	27.2%	54.4%	38.4%	22.4%	32.8%	6.4%	5.6%	125
501-1,000 hectares	21.2%	60.6%	24.2%	18.2%	15.2%	9.1%	6.1%	33
1,001-5,000 hectares	20.0%	35.0%	27.5%	40.0%	27.5%	15.0%	12.5%	40
5,001 - 10,000 hectares	30.0%	35.0%	25.0%	30.0%	15.0%	5.0%	10.0%	20
> 10,000 hectares	16.0%	36.0%	36.0%	56.0%	28.0%	8.0%	4.0%	25
Total	*20.2%*	*45.6%*	*55.7%*	*13.9%*	*30.5%*	*4.3%*	*3.8%*	*603*

Note: Rows may not sum to 100% as control type was a multiple response question. (a) Integrate refers to the proportion of respondents that use two or more of herbicide, mechanical or hand removal and fire techniques in this area type.

Table 2.32. Control Type by Property Size in Sloping Hills (Accessible)

Property Size	No Control	Herbicide	Mechanical or Hand Removal	Fire	Integrate (a)	Biological Control	Grazing	Responses
< 100 hectares	10.3%	78.7%	4.0%	8.0%	5.2%	2.9%	10.3%	174
101-500 hectares	9.8%	72.3%	6.3%	27.7%	16.1%	4.5%	7.1%	112
501-1,000 hectares	0.0%	85.3%	11.8%	20.6%	17.6%	11.8%	8.8%	34
1,001-5,000 hectares	10.0%	60.0%	7.5%	45.0%	20.0%	7.5%	15.0%	40
5,001 - 10,000 hectares	20.0%	46.7%	0.0%	33.3%	6.7%	0.0%	13.3%	15
> 10,000 hectares	31.6%	26.3%	5.3%	52.6%	5.3%	5.3%	5.3%	19
Total	*10.7%*	*71.8%*	*5.6%*	*21.6%*	*10.9%*	*4.6%*	*9.6%*	*394*

Note: Rows may not sum to 100% as control type was a multiple response question. (a) Integrate refers to the proportion of respondents that use two or more of herbicide, mechanical or hand removal and fire techniques in this area type.

Table 2.33. Control Type by Property Size in Steep Areas (Relatively Inaccessible)

Property Size	No Control	Herbicide	Mechanical or Hand Removal	Fire	Integrate (a)	Biological Control	Grazing	Responses
< 100 hectares	40.4%	33.3%	37.9%	5.1%	16.7%	1.5%	2.5%	198
101-500 hectares	33.1%	36.2%	13.4%	32.3%	16.5%	7.9%	3.1%	127
501-1,000 hectares	18.2%	54.5%	15.2%	24.2%	15.2%	12.1%	9.1%	33
1,001-5,000 hectares	37.8%	24.4%	6.7%	40.0%	13.3%	15.6%	13.3%	45
5,001 - 10,000 hectares	50.0%	12.5%	0.0%	50.0%	0.0%	0.0%	6.3%	16
> 10,000 hectares	42.3%	7.7%	3.8%	57.7%	0.0%	3.8%	3.8%	26
Total	*36.9%*	*32.6%*	*22.7%*	*22.5%*	*14.6%*	*5.6%*	*4.5%*	*445*

Note: Rows may not sum to 100% as control type was a multiple response question. (a) Integrate refers to the proportion of respondents that use two or more of herbicide, mechanical or hand removal and fire techniques in this area type.

2.7.2.2 Control Type by Land Use

The tables below outline the prevalence of various control techniques in different area types over five land uses. General findings from the tables are provided in the commentary below, highlighting the common themes for each control technique.

In general, the following can be noted regarding each control technique in relation to land use:

- Mechanical or hand removal techniques are generally more commonly utilised in land used for reserve / conservation purposes, and generally less commonly utilised in land used for pasture or forestry / agriculture;
- Herbicide is generally more commonly used to control lantana in land used for pasture or forestry / agriculture, and generally less commonly utilised in land used for reserve / conservation purposes;
- Fire is primarily used to control lantana in land used for pasture or forestry / agriculture. It is also used in some areas of land used for reserve / conservation purposes and other uses, but is generally not used in vacant land;
- Biological control is used as a control for lantana primarily in land used for pasture or forestry / agriculture. It is also used in some areas of land used for reserve/ conservation purposes but is generally not utilised in land used for other purposes or vacant land;
- Grazing is generally a more prevalent control technique in land used for pasture or forestry / agriculture, and is seldom utilised in land used for reserve / conservation purposes;
- Management decisions to not control lantana generally varies considerably depending on the location of the infestation. For example, in stock feed areas and pasture or crop areas of land used for pasture or forestry / agriculture less than 2.5% of lantana infestations are not controlled, but in other area types over 20% of lantana infestations may not be controlled; and

- Over 10% of lantana infestations in all areas of land used for reserve / conservation purposes are not controlled.

Table 2.34. Control Type by Land Use Around Water Courses

Land Use	No Control	Herbicide	Mechanical or Hand Removal	Fire	Integrate (a)	Biological Control	Grazing	Responses
Pasture	14.1%	51.6%	44.9%	22.6%	29.0%	6.7%	10.6%	341
Reserve/ Conservation	18.0%	33.3%	73.2%	3.8%	27.3%	2.2%	3.3%	183
Forestry/ Agriculture	21.8%	48.5%	51.5%	14.9%	29.7%	5.9%	7.9%	101
Vacant Land	14.3%	28.6%	71.4%	4.8%	14.3%	0.0%	4.8%	21
Total	*16.2%*	*44.9%*	*54.0%*	*15.5%*	*27.4%*	*4.7%*	*6.8%*	*548*

Note: Rows may not sum to 100% as control type was a multiple response question. (a) Integrate refers to the proportion of respondents that use two or more of herbicide, mechanical or hand removal and fire techniques in this area type.

Table 2.35. Control Type by Land Use in Pasture or Crops

Land Use	No Control	Herbicide	Mechanical or Hand Removal	Fire	Integrate (a)	Biological Control	Grazing	Responses
Pasture	1.6%	63.9%	59.2%	8.4%	33.0%	5.2%	14.7%	191
Reserve/ Conservation	10.3%	31.0%	75.9%	0.0%	20.7%	0.0%	17.2%	29
Forestry/ Agriculture	0.0%	50.0%	76.0%	8.0%	32.0%	8.0%	16.0%	50
Vacant Land	0.0%	0.0%	100.0%	0.0%	0.0%	0.0%	50.0%	2
Total	*2.7%*	*58.7%*	*61.0%*	*8.1%*	*31.4%*	*4.5%*	*14.8%*	*223*

Note: Rows may not sum to 100% as control type was a multiple response question. (a) Integrate refers to the proportion of respondents that use two or more of herbicide, mechanical or hand removal and fire techniques in this area type.

Table 2.36. Control Type by Land Use in Natural Bushland

Land Use	No Control	Herbicide	Mechanical or Hand Removal	Fire	Integrate (a)	Biological Control	Grazing	Responses
Pasture	24.9%	46.5%	41.0%	22.0%	27.8%	7.7%	8.4%	273
Reserve/ Conservation	14.5%	46.3%	73.1%	11.5%	41.0%	2.6%	1.3%	227
Forestry/ Agriculture	30.3%	39.3%	44.9%	16.9%	22.5%	7.9%	6.7%	89
Vacant Land	23.8%	28.6%	57.1%	0.0%	4.8%	0.0%	0.0%	21
Total	*21.7%*	*44.8%*	*54.0%*	*16.6%*	*31.7%*	*5.1%*	*4.5%*	*511*

Note: Rows may not sum to 100% as control type was a multiple response question. (a) Integrate refers to the proportion of respondents that use two or more of herbicide, mechanical or hand removal and fire techniques in this area type.

Table 2.37. Control Type by Land Use in Sloping Hills (Accessible)

Land Use	No Control	Herbicide	Mechanical or Hand Removal	Fire	Integrate (a)	Biological Control	Grazing	Responses
Pasture	8.5%	70.6%	7.3%	27.0%	15.3%	6.0%	14.1%	248
Reserve/ Conservation	16.8%	65.3%	5.3%	16.8%	7.4%	3.2%	7.4%	95
Forestry/ Agriculture	11.9%	74.6%	9.0%	23.9%	19.4%	6.0%	14.9%	67
Vacant Land	30.0%	70.0%	0.0%	0.0%	0.0%	0.0%	0.0%	10
Total	*11.0%*	*70.3%*	*6.3%*	*23.3%*	*12.7%*	*5.2%*	*11.0%*	*347*

Note: Rows may not sum to 100% as control type was a multiple response question. (a) Integrate refers to the proportion of respondents that use two or more of herbicide, mechanical or hand removal and fire techniques in this area type.

Table 2.38. Control Type by Land Use in Steep Areas (Relatively Inaccessible)

Land Use	No Control	Herbicide	Mechanical or Hand Removal	Fire	Integrate (a)	Biological Control	Grazing	Responses
Pasture	33.6%	32.8%	16.2%	31.0%	15.5%	8.1%	7.4%	271
Reserve/ Conservation	44.0%	28.4%	31.9%	13.8%	14.7%	2.6%	1.7%	116
Forestry/ Agriculture	44.8%	34.5%	14.9%	19.5%	13.8%	5.7%	9.2%	87
Vacant Land	75.0%	12.5%	12.5%	0.0%	0.0%	0.0%	0.0%	16
Total	*38.2%*	*31.7%*	*20.4%*	*24.6%*	*15.1%*	*6.3%*	*5.0%*	*398*

Note: Rows may not sum to 100% as control type was a multiple response question. (a) Integrate refers to the proportion of respondents that use two or more of herbicide, mechanical or hand removal and fire techniques in this area type.

2.7.3 Control Technique by Infestation Extent and Spread

2.7.3.1 Control Type by Extent of Lantana

The tables below outline the prevalence of various control techniques in different area types over four ranges of extent of lantana. General findings from the tables are provided in the commentary below, highlighting the common themes for each control technique.

In general, the following can be noted regarding each control technique in relation to the extent of lantana infestations:

- Mechanical or hand removal techniques are generally more commonly utilised in very small infestations of lantana (less than 1%) and very large infestations of lantana (greater than 50%). It is expected that this finding is a result of control in very small infestations using manual techniques, while in larger infestations mechanical techniques would likely be implemented due to the greater economic efficiency;
- The use of herbicide to control lantana is relatively consistent between infestation sizes for all area types, indicating that the decision to use herbicide is likely driven by factors other than infestation size (such as size of property or land use);
- The use of fire to control lantana is considerably more common where lantana infestations are relatively inaccessible, such as in dense, relatively impenetrable infestations or steep areas;
- Biological control is considerably more common as a control technique in larger infestations. This may be partially due to biological control agents encountering difficulties establishing in small areas of infestation;
- The use of grazing as a control technique is highly variable by extent of lantana, perhaps indicating that infestation size does not have any significant bearing on the choice of grazing as a control type; and
- Lantana is seldom not controlled where infestation is small in size (less than 1%), but is considerably more common once it spreads beyond 1% of the property. This likely reflects the difficulties encountered in controlling lantana once it becomes established.

Table 2.39. Control Type by Extent of Lantana Around Water Courses

Extent	No Control	Herbicide	Mechanical or Hand Removal	Fire	Integrate [(a)]	Biological Control	Grazing	Responses
<1%	7.1%	39.8%	70.4%	9.2%	25.5%	2.0%	5.1%	98
1-10%	17.3%	48.0%	56.0%	6.7%	25.3%	1.3%	5.3%	75
11%-25%	13.2%	49.5%	47.3%	13.2%	22.0%	4.4%	2.2%	91
26%-50%	19.6%	42.4%	49.4%	15.8%	24.1%	3.8%	7.6%	158
51%-75%	20.6%	42.1%	58.7%	14.3%	30.2%	4.0%	4.0%	126
>75%	16.9%	37.1%	58.4%	21.3%	29.2%	9.0%	9.0%	89
Total	*16.3%*	*42.9%*	*56.2%*	*13.8%*	*26.1%*	*4.1%*	*5.7%*	*637*

Note: The percent ranges applied for extent of lantana are indicative and are based on departmental officer opinion. Rows may not sum to 100% as control type was a multiple response question. (a) Integrate refers to the proportion of respondents that use two or more of herbicide, mechanical or hand removal and fire techniques in this area type.

Table 2.40. Control Type by Extent of Lantana in Pasture or Crops

Extent	No Control	Herbicide	Mechanical or Hand Removal	Fire	Integrate [(a)]	Biological Control	Grazing	Responses
<1%	0.0%	70.0%	60.0%	6.7%	36.7%	0.0%	13.3%	30
1-10%	2.7%	56.8%	48.6%	5.4%	16.2%	0.0%	8.1%	37
11%-25%	4.2%	54.2%	50.0%	4.2%	12.5%	4.2%	0.0%	24
26%-50%	2.8%	54.9%	62.0%	8.5%	31.0%	4.2%	22.5%	71
51%-75%	0.0%	69.0%	71.4%	9.5%	47.6%	4.8%	14.3%	42
>75%	11.1%	52.8%	55.6%	8.3%	27.8%	11.1%	11.1%	36
Total	*3.3%*	*59.2%*	*59.2%*	*7.5%*	*30.0%*	*4.2%*	*13.8%*	*240*

Note: The percent ranges applied for extent of lantana are indicative and are based on departmental officer opinion. Rows may not sum to 100% as control type was a multiple response question. (a) Integrate refers to the proportion of respondents that use two or more of herbicide, mechanical or hand removal and fire techniques in this area type.

Table 2.41. Control Type by Extent of Lantana in Natural Bushland

Extent	No Control	Herbicide	Mechanical or Hand Removal	Fire	Integrate [(a)]	Biological Control	Grazing	Responses
<1%	10.3%	45.4%	67.0%	3.1%	27.8%	2.1%	3.1%	97
1-10%	20.3%	48.6%	56.8%	6.8%	28.4%	1.4%	4.1%	74
11%-25%	14.6%	47.6%	47.6%	18.3%	26.8%	3.7%	2.4%	82
26%-50%	27.5%	46.5%	47.2%	16.2%	29.6%	2.1%	5.6%	142
51%-75%	23.6%	42.5%	61.4%	15.7%	34.6%	5.5%	2.4%	127
>75%	20.7%	41.4%	57.5%	24.1%	35.6%	11.5%	4.6%	87
Total	*20.4%*	*45.2%*	*56.0%*	*14.3%*	*30.7%*	*4.3%*	*3.8%*	*609*

Note: The percent ranges applied for extent of lantana are indicative and are based on departmental officer opinion. Rows may not sum to 100% as control type was a multiple response question. (a) Integrate refers to the proportion of respondents that use two or more of herbicide, mechanical or hand removal and fire techniques in this area type.

Table 2.42. Control Type by Extent of Lantana in Sloping Hills (Accessible)

Extent	No Control	Herbicide	Mechanical or Hand Removal	Fire	Integrate [(a)]	Biological Control	Grazing	Responses
<1%	7.0%	79.1%	2.3%	14.0%	7.0%	2.3%	11.6%	43
1-10%	10.0%	84.0%	2.0%	14.0%	8.0%	2.0%	4.0%	50
11%-25%	8.5%	67.8%	5.1%	23.7%	6.8%	5.1%	8.5%	59
26%-50%	13.8%	69.7%	3.7%	25.7%	13.8%	1.8%	10.1%	109
51%-75%	5.8%	75.4%	8.7%	21.7%	14.5%	8.7%	13.0%	69
>75%	15.6%	60.9%	10.9%	25.0%	12.5%	7.8%	9.4%	64
Total	*10.7%*	*71.8%*	*5.6%*	*21.8%*	*11.2%*	*4.6%*	*9.6%*	*394*

Note: The percent ranges applied for extent of lantana are indicative and are based on departmental officer opinion. Rows may not sum to 100% as control type was a multiple response question. (a) Integrate refers to the proportion of respondents that use two or more of herbicide, mechanical or hand removal and fire techniques in this area type.

Table 2.43. Control Type by Extent of Lantana in Steep Areas (Relatively Inaccessible)

Extent	No Control	Herbicide	Mechanical or Hand Removal	Fire	Integrate [(a)]	Biological Control	Grazing	Responses
<1%	13.9%	52.8%	44.4%	16.7%	25.0%	0.0%	0.0%	36
1-10%	34.0%	34.0%	32.1%	20.8%	18.9%	3.8%	3.8%	53
11%-25%	22.7%	48.5%	16.7%	27.3%	16.7%	4.5%	4.5%	66
26%-50%	47.5%	26.2%	10.7%	24.6%	9.0%	4.1%	5.7%	122
51%-75%	43.3%	27.8%	25.8%	19.6%	14.4%	8.2%	3.1%	97
>75%	37.7%	22.1%	26.0%	24.7%	14.3%	9.1%	7.8%	77
Total	*37.0%*	*32.2%*	*22.6%*	*22.8%*	*14.6%*	*5.5%*	*4.7%*	*451*

Note: The percent ranges applied for extent of lantana are indicative and are based on departmental officer opinion. Rows may not sum to 100% as control type was a multiple response question. (a) Integrate refers to the proportion of respondents that use two or more of herbicide, mechanical or hand removal and fire techniques in this area type.

2.7.3.2 Control Type by Spread of Lantana in Last Two Years

The tables below outline the prevalence of various control techniques in different area types by the spread of lantana over the past two years. General findings from the tables

are provided in the commentary below, highlighting the common themes for each control technique.

In general, the following can be noted regarding each control technique in relation to the spread of lantana in the last two years:

- Mechanical or hand removal techniques have been highly successful in reducing the spread of lantana around water courses and fences / boundaries, and in unused clear land, natural bushland, fringe areas of forests and steep areas;
- Stockfeed areas, pasture or crop areas and sloping hills generally recorded an increase in the spread of lantana where mechanical or hand removal techniques were used;
- The use of herbicide to control lantana has generally been successful in reducing the spread of lantana around water courses and fences / boundaries, as well as in unused clear land, natural bushland, fringe areas of forests, sloping hills and steep areas;
- Stockfeed areas generally recorded an increase in the spread of lantana where herbicide was used;
- Both fire and biological control agents have generally been unsuccessful in reducing the spread of lantana;
- The use of grazing to control lantana has generally been successful in reducing the spread of lantana around water courses and in pasture and sloping hills;
- Stockfeed areas, unused clear land, natural bushland, fences / boundaries, easements and powerlines and steep areas generally recorded an increase in the spread of lantana where grazing was used; and
- Where lantana was not controlled it generally increased in spread.

Table 2.44. Control Type by Spread of Lantana in Last Two Years Around Water Courses

Control Type	Increased Spread	Decreased Spread	Little Change	Net Balance [a]	Responses
No Control	35.4%	14.6%	50.0%	20.8%	96
Herbicide	28.7%	38.8%	32.6%	-10.1%	258
Mechanical or Hand Removal	22.8%	43.8%	33.4%	-21.0%	338
Fire	44.3%	19.3%	36.4%	25.0%	88
Integrate [b]	36.0%	36.0%	28.0%	0.0%	25
Biological Control	29.4%	38.2%	32.4%	-8.8%	34
Grazing	30.1%	35.6%	34.4%	-5.5%	163
Total	*28.1%*	*36.3%*	*35.5%*	*-8.2%*	*597*

Notes: (a) Net Balance is the difference between the proportion of respondents indicating that the spread of lantana has decreased and the proportion of respondents indicating that the spread of lantana has increased. A negative value indicates that more respondents reported a decrease, and vice versa. (b) Integrate refers to the proportion of respondents that use two or more of herbicide, mechanical or hand removal and fire techniques in this area type.

Table 2.45. Control Type by Spread of Lantana in Last Two Years in Pasture or Crops

Control Type	Increased Spread	Decreased Spread	Little Change	Net Balance [a]	Responses
No Control	42.9%	28.6%	28.6%	14.3%	7
Herbicide	33.6%	34.3%	32.1%	-0.7%	134
Mechanical or Hand Removal	37.7%	32.6%	29.7%	5.1%	138
Fire	44.4%	27.8%	27.8%	16.7%	18
Integrate [b]	60.0%	20.0%	20.0%	40.0%	10
Biological Control	25.8%	32.3%	41.9%	-6.5%	31
Grazing	40.3%	36.1%	23.6%	4.2%	72
Total	*35.0%*	*31.4%*	*33.6%*	*3.5%*	*226*

Notes: (a) Net Balance is the difference between the proportion of respondents indicating that the spread of lantana has decreased and the proportion of respondents indicating that the spread of lantana has increased. A negative value indicates that more respondents reported a decrease, and vice versa. (b) Integrate refers to the proportion of respondents that use two or more of herbicide, mechanical or hand removal and fire techniques in this area type.

Table 2.46. Control Type by Spread of Lantana in Last Two Years in Natural Bushland

Control Type	Increased Spread	Decreased Spread	Little Change	Net Balance [a]	Responses
No Control	31.9%	25.7%	42.5%	6.2%	113
Herbicide	25.6%	45.6%	28.8%	-20.0%	250
Mechanical or Hand Removal	23.4%	46.1%	30.5%	-22.7%	321
Fire	38.8%	29.4%	31.8%	9.4%	85
Integrate [b]	34.6%	23.1%	42.3%	11.5%	26
Biological Control	36.4%	31.8%	31.8%	4.5%	22
Grazing	25.6%	47.2%	27.3%	-21.6%	176
Total	*27.5%*	*38.8%*	*33.7%*	*-11.3%*	*564*

Notes: (a) Net Balance is the difference between the proportion of respondents indicating that the spread of lantana has decreased and the proportion of respondents indicating that the spread of lantana has increased. A negative value indicates that more respondents reported a decrease, and vice versa. (b) Integrate refers to the proportion of respondents that use two or more of herbicide, mechanical or hand removal and fire techniques in this area type.

Table 2.47. Control Type by Spread of Lantana in Last Two Years in Sloping Hills (Accessible)

Control Type	Increased Spread	Decreased Spread	Little Change	Net Balance [a]	Responses
No Control	35.9%	20.5%	43.6%	15.4%	39
Herbicide	32.0%	42.5%	25.6%	-10.5%	266
Mechanical or Hand Removal	50.0%	13.6%	36.4%	36.4%	22
Fire	34.5%	33.3%	32.1%	1.2%	84
Integrate [b]	55.6%	16.7%	27.8%	38.9%	18
Biological Control	25.0%	44.4%	30.6%	-19.4%	36
Grazing	39.5%	46.5%	14.0%	-7.0%	43
Total	*32.6%*	*36.1%*	*31.3%*	*-3.5%*	*371*

Notes: (a) Net Balance is the difference between the proportion of respondents indicating that the spread of lantana has decreased and the proportion of respondents indicating that the spread of lantana has increased. A negative value indicates that more respondents reported a decrease, and vice versa. (b) Integrate refers to the proportion of respondents that use two or more of herbicide, mechanical or hand removal and fire techniques in this area type.

Table 2.48. Control Type by Spread of Lantana in Last Two Years in Steep Areas (Relatively Inaccessible)

Control Type	Increased Spread	Decreased Spread	Little Change	Net Balance [a]	Responses
No Control	38.1%	21.9%	40.0%	16.1%	155
Herbicide	23.3%	49.6%	27.1%	-26.3%	133
Mechanical or Hand Removal	25.0%	48.0%	27.0%	-23.0%	100
Fire	36.4%	31.3%	32.3%	5.1%	99
Integrate [b]	44.0%	20.0%	36.0%	24.0%	25
Biological Control	40.0%	30.0%	30.0%	10.0%	20
Grazing	23.1%	55.4%	21.5%	-32.3%	65
Total	*32.2%*	*34.0%*	*33.8%*	*-1.9%*	*423*

Notes: (a) Net Balance is the difference between the proportion of respondents indicating that the spread of lantana has decreased and the proportion of respondents indicating that the spread of lantana has increased. A negative value indicates that more respondents reported a decrease, and vice versa. (b) Integrate refers to the proportion of respondents that use two or more of herbicide, mechanical or hand removal and fire techniques in this area type.

2.7.4 Ongoing Management by Property Type

2.7.4.1 Follow Up of Treated Sites by Land Use

Respondents indicated they were more likely to follow up or monitor treated sites on an ongoing basis for land used for reserve / conservation purposes or pasture. Vacant land received the lowest level of follow up or monitoring after treatment.

Table 2.49. Follow Up of Treated Sites by Land Use

Land Use	Never	Once After Treatment	Ongoing Inspections at Intervals	Responses
Pasture - Grazing/ Intensive	4.6%	10.1%	85.3%	415
Reserve/ Conservation	6.6%	5.5%	87.9%	245
Forestry/ Agriculture	7.9%	10.3%	81.7%	129
Vacant Land	10.0%	12.5%	77.5%	31
Total	*6.0%*	*9.2%*	*84.8%*	*683*

2.7.4.2 Method for Preventing Lantana Regrowth by Property Size

In general, property managers indicated that they are more likely to implement some measure to prevent regrowth after treatment on smaller property sizes compared to larger property sizes.

Continual removal by hand or slashing and revegetation with native plants were considerably more common prevention techniques on properties of less than 100 hectares than other property sizes, while follow up with herbicide and revegetation with pasture were relatively more prominent for properties between 101 and 1,000 hectares in size.

Table 2.50. Method for Preventing Lantana Regrowth by Property Size

Property Size	Do nothing	Revegetate with pasture	Revegetate with native plants	Shade out new lantana infestations	Continual removal by hand or slashing	Follow up with herbicide	Prevent animal movement over an area to allow pasture to establish	Other	Responses
< 100 hectares	7.9%	10.8%	40.1%	11.4%	70.7%	49.9%	5.0%	3.5%	481
101-500 hectares	8.8%	33.1%	6.6%	3.9%	40.9%	77.3%	13.3%	3.3%	181
501-1,000 hectares	10.6%	23.4%	6.4%	2.1%	19.1%	83.0%	4.3%	6.4%	47
1,001-5,000 hectares	28.6%	23.2%	14.3%	1.8%	28.6%	64.3%	7.1%	10.7%	56
5,001 - 10,000 hectares	17.9%	14.3%	7.1%	0.0%	39.3%	53.6%	7.1%	7.1%	28
> 10,000 hectares	22.2%	8.3%	22.2%	8.3%	41.7%	63.9%	11.1%	8.3%	36
Total	*10.6%*	*17.2%*	*27.3%*	*8.1%*	*56.1%*	*59.5%*	*7.2%*	*4.5%*	*829*

Note: Rows may not sum to 100% as prevention technique was a multiple response question.

2.7.4.3 Method for Preventing Lantana Regrowth by Land Use

Revegetation with pasture and follow up with herbicide were considerably more prevalent techniques for preventing lantana regrowth after treatment on land used for pasture or forestry / agriculture than other land uses, while continual removal by hand or slashing and revegetation with native plants were relatively more common prevention techniques on properties used for reserve / conservation or other purposes and vacant land.

Table 2.51. Method for Preventing Lantana Regrowth by Land Use

Land Use	Do nothing	Revegetate with pasture	Revegetate with native plants	Shade out new lantana infestations	Continual removal by hand or slashing	Follow up with herbicide	Prevent animal movement over an area to allow pasture to establish	Other	Responses
Pasture - Grazing/ Intensive	10.8%	28.9%	10.1%	6.0%	46.7%	70.6%	12.8%	4.3%	415
Reserve/ Conservation	12.8%	7.0%	48.8%	12.0%	67.4%	43.0%	2.7%	7.4%	258
Forestry/ Agriculture	13.2%	30.2%	30.2%	17.8%	50.4%	65.9%	7.0%	1.6%	129
Vacant Land	15.0%	2.5%	30.0%	5.0%	65.0%	42.5%	0.0%	0.0%	40
Total	*11.3%*	*19.9%*	*24.8%*	*7.8%*	*54.7%*	*60.3%*	*7.9%*	*4.8%*	*707*

Note: Rows may not sum to 100% as prevention technique was a multiple response question.

2.7.4.4 Method for Preventing Lantana Regrowth by Property Size by Land Use

Revegetating with pasture is more prevalent on smaller properties used for pasture, with larger properties used for pasture reporting a higher likelihood of doing nothing to prevent lantana regrowth. Similarly, larger properties used for reserve / conservation purposes were more likely to do nothing to prevent lantana regrowth than smaller properties, which reported a higher proportion of revegetation with native plants.

Table 2.52. Method for Preventing Lantana Regrowth by Property Size and Land Use

Property Size by Land Use	Do nothing	Revegetate with pasture	Revegetate with native plants	Shade out new lantana infestations	Continual removal by hand or slashing	Follow up with herbicide	Prevent animal movement over an area to allow pasture to establish	Other	Responses
Pasture									
< 100 hectares	5.5%	25.3%	18.5%	12.3%	66.4%	63.7%	13.0%	3.4%	146
101-500 hectares	8.4%	37.8%	4.2%	3.5%	39.2%	81.1%	16.8%	2.8%	143
501-1,000 hectares	13.3%	30.0%	6.7%	3.3%	20.0%	80.0%	6.7%	6.7%	30
1,001-5,000 hectares	27.1%	22.9%	10.4%	0.0%	29.2%	66.7%	6.3%	8.3%	48
5,001 - 10,000 hectares	16.7%	16.7%	0.0%	0.0%	33.3%	50.0%	8.3%	8.3%	24
> 10,000 hectares	13.3%	20.0%	13.3%	6.7%	46.7%	73.3%	20.0%	6.7%	15
Total	*10.6%*	*29.1%*	*10.3%*	*6.2%*	*46.3%*	*70.9%*	*13.1%*	*4.4%*	*406*
Reserve/ Conservation									
< 100 hectares	9.2%	5.6%	55.4%	13.3%	74.9%	39.5%	3.1%	5.6%	195
101-500 hectares	12.5%	16.7%	33.3%	12.5%	50.0%	54.2%	4.2%	8.3%	24
501-1,000 hectares	20.0%	20.0%	20.0%	0.0%	60.0%	60.0%	0.0%	20.0%	5
1,001-5,000 hectares	50.0%	12.5%	25.0%	12.5%	25.0%	37.5%	0.0%	25.0%	8
5,001 - 10,000 hectares	25.0%	0.0%	25.0%	0.0%	50.0%	50.0%	0.0%	0.0%	4
> 10,000 hectares	35.7%	0.0%	28.6%	7.1%	28.6%	71.4%	0.0%	14.3%	14
Total	*12.8%*	*6.8%*	*49.6%*	*12.4%*	*67.6%*	*43.2%*	*2.8%*	*7.2%*	*250*

Note: Rows may not sum to 100% as prevention technique was a multiple response question.

2.7.5 Ongoing Management by Infestation Extent and Spread

2.7.5.1 Method for Preventing Lantana Regrowth by Extent of Lantana

In general, techniques for preventing regrowth of lantana after treatment are more common in larger infestations compared to very small infestations (less than 1%), with the exception of continual removal by hand or slashing.

Table 2.53. Method for Preventing Lantana Regrowth by Extent of Lantana

Extent	Do nothing	Revegetate with pasture	Revegetate with native plants	Shade out new lantana infestations	Continual removal by hand or slashing	Follow up with herbicide	Prevent animal movement over an area to allow pasture to establish	Other	Responses
<1%	13.8%	10.8%	19.8%	4.8%	59.3%	50.3%	2.4%	0.6%	167
1-10%	10.7%	15.5%	27.2%	6.8%	50.5%	57.3%	7.8%	3.9%	103
11%-25%	7.0%	14.0%	26.3%	9.6%	51.8%	64.0%	5.3%	5.3%	114
26%-50%	10.1%	23.2%	21.7%	6.6%	49.5%	67.7%	8.1%	5.6%	198
51%-75%	10.3%	15.4%	40.4%	12.8%	64.1%	55.8%	4.5%	5.1%	156
>75%	10.1%	25.3%	31.3%	6.1%	65.7%	60.6%	16.2%	8.1%	99
Total	*10.5%*	*17.3%*	*27.2%*	*7.8%*	*56.5%*	*59.4%*	*6.8%*	*4.5%*	*837*

Note: The percent ranges applied for extent of lantana are indicative and are based on departmental officer opinion. Rows may not sum to 100% as prevention technique was a multiple response question.

2.7.5.2 Method for Preventing Lantana Regrowth by Extent of Lantana by Land Use

Properties used for pasture were more likely to use methods such as revegetating with pasture and continual removal by hand or slashing to prevent lantana regrowth for larger lantana infestations compared to small infestations.

Larger properties used for reserve / conservation purposes reported a higher usage than smaller properties of methods such as revegetation with native plants and shading out new lantana infestations to prevent lantana regrowth.

Table 2.54. Method for Preventing Lantana Regrowth by Extent of Lantana and Land Use

Extent by Land Use	Do nothing	Revegetate with pasture	Revegetate with native plants	Shade out new lantana infestations	Continual removal by hand or slashing	Follow up with herbicide	Prevent animal movement over an area to allow pasture to establish	Other	Responses
Pasture									
<1%	11.8%	22.4%	5.3%	0.0%	47.4%	67.1%	3.9%	0.0%	76
1-10%	13.0%	26.1%	10.9%	6.5%	39.1%	69.6%	15.2%	4.3%	46
11%-25%	6.0%	20.0%	8.0%	6.0%	42.0%	72.0%	12.0%	4.0%	50
26%-50%	9.1%	32.7%	10.9%	8.2%	42.7%	76.4%	10.9%	5.5%	110
51%-75%	12.7%	28.2%	11.3%	5.6%	52.1%	69.0%	9.9%	5.6%	71
>75%	12.7%	41.8%	14.5%	9.1%	60.0%	67.3%	27.3%	7.3%	55
Total	*10.8%*	*28.9%*	*10.0%*	*5.9%*	*47.1%*	*70.8%*	*12.3%*	*4.4%*	*408*
Reserve/ Conservation									
<1%	16.7%	2.1%	33.3%	4.2%	70.8%	35.4%	2.1%	2.1%	48
1-10%	11.1%	3.7%	48.1%	0.0%	44.4%	48.1%	0.0%	7.4%	27
11%-25%	15.2%	6.1%	42.4%	18.2%	63.6%	45.5%	3.0%	6.1%	33
26%-50%	11.7%	10.0%	40.0%	10.0%	65.0%	53.3%	3.3%	8.3%	60
51%-75%	8.1%	9.7%	64.5%	21.0%	74.2%	35.5%	1.6%	6.5%	62
>75%	14.8%	7.4%	70.4%	14.8%	81.5%	44.4%	7.4%	18.5%	27
Total	*12.5%*	*7.0%*	*49.0%*	*12.1%*	*67.7%*	*43.2%*	*2.7%*	*7.4%*	*257*

Note: The percent ranges applied for extent of lantana are indicative and are based on departmental officer opinion. Rows may not sum to 100% as prevention technique was a multiple response question.

2.7.5.3 Method for Preventing Lantana Regrowth by Spread of Lantana

In general, the following can be noted relating to the effectiveness of each prevention technique in reducing the spread of lantana:

- Doing nothing after initial treatment generally resulted in an increase or little change in spread over the last two years;
- Revegetation (with either pasture or native plants), shading out new lantana infestations, continual removal by hand or slashing and follow up with herbicide were all effective follow up techniques in reducing spread; and
- Preventing animal movements over the treated area and other prevention techniques were generally not successful in reducing the spread of lantana after initial treatment.

Table 2.55. Method for Preventing Lantana Regrowth by Spread of Lantana

Prevention Technique	Increased Spread	Decreased Spread	Little Change	Net Balance [(a)]	Responses
Do Nothing	25.8%	11.2%	51.7%	14.6%	89
Revegetate With Pasture	26.4%	41.0%	31.3%	-14.6%	144
Revegetate With Native Plants	18.9%	48.5%	26.4%	-29.5%	227
Shade Out New Lantana Infestations	22.7%	50.0%	22.7%	-27.3%	66
Continual Removal by Hand or Slashing	23.6%	40.4%	30.6%	-16.8%	470
Follow Up With Herbicides	25.8%	34.1%	32.9%	-8.3%	493
Prevent Animal Movement Over Area	37.9%	34.5%	24.1%	3.4%	58
Other	34.2%	28.9%	31.6%	5.3%	38
Total	*25.0%*	*33.2%*	*34.6%*	*-8.2%*	*832*

Notes: (a) Net Balance is the difference between the proportion of respondents indicating that the spread of lantana has decreased and the proportion of respondents indicating that the spread of lantana has increased. A negative value indicates that more respondents reported a decrease, and vice versa.

2.7.6 Limitations of Adoption and Control Costs by Property Type

2.7.6.1 Limiting Factors for Adopting Control Methods by Land Use

Time and cost constraints are the major limiting factors to adopting control regardless of land use. Accessibility is also a contributing factor, particularly where land is used for pasture or forestry / agriculture, while the perception that lantana is not a problem is a prominent limiting factor to adoption of control methods in areas of vacant land.

Table 2.56. Limiting Factor For Adopting Control Methods by Land Use

Land Use	Lantana is not considered a problem	Time	Cost	Safety considerations	Terrain or accessibility	Knowledge of management options	Other	Responses
Pasture - Grazing/ Intensive	11.5%	77.1%	62.9%	17.3%	49.0%	11.0%	5.9%	410
Reserve/ Conservation	16.9%	76.7%	40.6%	11.2%	36.1%	11.6%	13.7%	249
Forestry/ Agriculture	23.1%	76.2%	53.8%	15.4%	45.4%	7.7%	10.0%	130
Vacant Land	40.0%	65.0%	32.5%	10.0%	25.0%	12.5%	7.5%	40
Total	*16.1%*	*75.8%*	*52.5%*	*13.8%*	*42.3%*	*10.5%*	*7.9%*	*695*

Note: Rows may not sum to 100% as limiting factor was a multiple response question.

2.7.6.2 Cost of Control by Property Size

Total costs of control generally increase in line with increases in property size, although the difference in control cost between the three largest property size categories is not as significant as the difference in cost between the three smallest property size categories. This indicates that there are scale efficiencies achieved in controlling lantana on larger properties, reflective of control costs that are relatively insensitive to land size due to their "lumpy" nature[6], in particular capital costs.

Dividing average total expenditure per property by the mid point of each property size range indicates that the average expenditure per hectare for each property size range is as follows:

- $29.99 per hectare in properties less than 100 hectares in size;
- $17.96 per hectare in properties between 101 and 500 hectares in size;
- $8.69 per hectare in properties between 501 and 1,000 hectares in size;
- $3.27 per hectare in properties between 1,001 and 5,000 hectares in size;
- $1.00 per hectare in properties between 5,001 and 10,000 hectares in size; and
- $0.72 per hectare in properties greater than 10,000 hectares in size.

[6] "Lumpy costs" are costs that involve purchases of whole units that are not readily divisible.

Table 2.57. Cost of Control by Property Size

Property Size	Labour	Machinery [a]	Capital Costs [b]	Herbicide	Contractors	Other [c]	Total	Responses
< 100 hectares	$644	$333	$66	$182	$139	$135	$1,500	256
101-500 hectares	$1,688	$1,393	$560	$1,136	$588	$24	$5,389	115
501-1,000 hectares	$1,793	$1,408	$714	$1,155	$1,252	$196	$6,519	28
1,001-5,000 hectares	$4,621	$2,348	$409	$1,797	$618	$6	$9,797	34
5,001 - 10,000 hectares	$1,482	$953	$168	$499	$4,353	$26	$7,481	17
> 10,000 hectares	$2,851	$3,167	$909	$1,154	$909	$9	$9,000	11

Note: (a) Machinery includes expenditure on the running and repair of machinery as well as hiring and leasing of machinery. (b) Capital costs include the purchase of depreciable items such as machinery and other equipment. (c) Other includes expenditure items such as consumables, permits and other miscellaneous costs.

2.7.6.3 Cost of Control by Land Use

Expenditure on controlling lantana was generally higher on infestations in properties used for primary production purposes such as pasture and forestry / agriculture, with considerably higher expenditure on machinery, capital costs, herbicide and contractors. Expenditure on controlling lantana in vacant land was significantly lower than other land uses.

Table 2.58. Cost of Control by Land Use

Land Use	Labour	Machinery [a]	Capital Costs [b]	Herbicide	Contractors	Other [c]	Total	Responses
Pasture	$1,449	$1,249	$391	$953	$816	$123	$4,981	269
Reserve/ Conservation	$1,466	$383	$51	$197	$207	$290	$2,595	127
Forestry/ Agriculture	$1,314	$1,170	$605	$643	$633	$324	$4,687	85
Vacant Land	$354	$75	$18	$42	$145	$0	$635	11

Note: (a) Machinery includes expenditure on the running and repair of machinery as well as hiring and leasing of machinery. (b) Capital costs include the purchase of depreciable items such as machinery and other equipment. (c) Other includes expenditure items such as consumables, permits and other miscellaneous costs.

2.7.7 Control Costs by Infestation Extent and Spread

2.7.7.1 Cost of Control by Extent of Lantana

Average expenditure on controlling lantana was lowest for properties with less than 1% of the property infested and highest where lantana infested greater than 75% of the property (largely due to significantly higher machinery costs)[7]. Control costs generally increased the larger the size of the infestation.

[7] The cost per hectare of infestation, which has been calculated using total cost divided by area of infestation, is subject to the relative accuracy of the assumed percent ranges applied in Section 2.2.1.

Table 2.59. Cost of Control by Extent of Lantana

Extent	Labour	Machinery [a]	Capital Costs [b]	Herbicide	Contractors	Other [c]	Total	Responses
<1%	$432	$181	$82	$199	$102	$7	$1,003	77
1-10%	$1,107	$424	$91	$647	$1,306	$1	$3,576	55
11%-25%	$1,116	$284	$24	$519	$323	$1	$2,268	67
26%-50%	$2,033	$1,202	$507	$685	$560	$58	$5,045	114
51%-75%	$1,223	$951	$322	$863	$1,176	$375	$4,910	91
>75%	$1,888	$2,192	$449	$783	$1,082	$441	$6,835	62

Notes: The percent ranges applied for extent of lantana are indicative and are based on departmental officer opinion. (a) Machinery includes expenditure on the running and repair of machinery as well as hiring and leasing of machinery. (b) Capital costs include the purchase of depreciable items such as machinery and other equipment. (c) Other includes expenditure items such as consumables, permits and other miscellaneous costs.

2.7.7.2 Cost of Control by Spread of Lantana in Last Two Years

Average expenditure on controlling lantana is highest for properties indicating an increase in spread of lantana, largely due to significantly higher machinery costs. With high machinery costs generally linked to very large infestations in pasture and forestry / agriculture properties, this is likely indicative of property managers attempting to limit the spread of established, dense lantana infestations into productive areas.

Average expenditure on controlling lantana was lowest for properties that reported a decrease in spread of lantana, likely a reflection that reducing the extent of lantana using current techniques is easiest in areas or properties with low levels of infestation.

Table 2.60. Cost of Control by Spread of Lantana in Last Two Years

Spread	Labour	Machinery [a]	Capital Costs [b]	Herbicide	Contractors	Other [c]	Total	Responses
Increased Spread	$1,941	$1,634	$441	$864	$901	$32	$5,812	120
Decreased Spread	$1,102	$675	$281	$636	$220	$188	$3,100	180
Little Change	$1,298	$565	$157	$446	$1,300	$214	$3,980	145

Note: (a) Machinery includes expenditure on the running and repair of machinery as well as hiring and leasing of machinery. (b) Capital costs include the purchase of depreciable items such as machinery and other equipment. (c) Other includes expenditure items such as consumables, permits and other miscellaneous costs.