

3. Lantana Aware Survey (2006)

3.1 Property Details

3.1.1 Property Size (Q3)

Over three quarters of properties surveyed were relatively 500 hectares or less in size, with approximately two thirds of the properties surveyed less than 100 hectares. The average property size was 998.6 hectares.

New South Wales had a higher average property size of 1,436.8 hectares, with relatively fewer properties less than 100 hectares in size and a higher proportion of properties between 101 and 1,000 hectares. Property size of respondents was particularly higher in the Northern Rivers, with an average property size of 2,735.3 hectares reported.

Queensland recorded a lower average property size of 876.2 hectares, driven by a relatively larger proportion of properties less than 100 hectares in size (68.1%). SEQ Catchments recorded the smallest properties on average (85.4 hectares), followed by Condamine Alliance and Burnett-Mary at around 375 hectares. By comparison, Fitzroy and FNQ recorded average property sizes of over 4,000 hectares, although this result may be biased by a relatively smaller sample size.

Table 3.1. 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	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	33.2	7
Hunter-Central Rivers	58.1%	29.0%	3.2%	6.5%	3.2%	0.0%	488.4	31
Northern Rivers	58.5%	22.0%	12.2%	4.9%	0.0%	2.4%	2,735.3	41
Southern Rivers	83.3%	16.7%	0.0%	0.0%	0.0%	0.0%	59.7	12
New South Wales	63.6%	23.9%	6.8%	3.4%	1.1%	1.1%	1,436.8	88
Burdekin	53.8%	30.8%	0.0%	7.7%	0.0%	7.7%	1,291.0	13
Burnett-Mary	70.7%	14.1%	5.4%	8.7%	1.1%	0.0%	378.7	92
Condamine Alliance	23.3%	63.3%	6.7%	6.7%	0.0%	0.0%	373.1	30
Fitzroy	35.5%	6.5%	12.9%	19.4%	9.7%	16.1%	4,222.9	31
FNQ	73.3%	13.3%	0.0%	0.0%	6.7%	6.7%	4,408.4	15
Mackay Whitsunday	65.0%	20.0%	0.0%	5.0%	5.0%	5.0%	1,153.2	20
SEQ Catchments	78.5%	18.2%	1.7%	1.7%	0.0%	0.0%	85.4	181
Queensland	68.1%	17.9%	3.9%	6.2%	1.6%	2.3%	876.2	307
Australia	67.0%	19.1%	4.5%	5.8%	1.5%	2.0%	998.6	397

3.1.2 Land Use (Q6)

Conservation and primary production were the most common land uses, with 61.6% and 55.1% of all respondents indicating that part of their property was used for these purposes, respectively. Only 5.8% of respondents indicated that there was no main use of the property.

Primary production was more common in New South Wales (72.2%) than in Queensland (50.3%), while conservation was more common in Queensland (63.5%) than in New South Wales (54.4%).

Table 3.2. Land Use by NRM Region

Region	Primary Production	Conservation	Recreation	No main use	Responses
Hawkesbury-Nepean	37.5%	75.0%	0.0%	0.0%	8
Hunter-Central Rivers	74.2%	61.3%	19.4%	6.5%	31
Northern Rivers	81.0%	47.6%	19.0%	2.4%	42
Southern Rivers	66.7%	50.0%	8.3%	0.0%	12
New South Wales	72.2%	54.4%	17.8%	3.3%	90
Burdekin	76.9%	38.5%	7.7%	0.0%	13
Burnett-Mary	48.3%	75.3%	21.3%	2.2%	89
Condamine Alliance	90.0%	36.7%	10.0%	0.0%	30
Fitzroy	71.0%	29.0%	3.2%	12.9%	31
FNQ	46.7%	100.0%	26.7%	0.0%	15
Mackay Whitsunday	60.0%	60.0%	0.0%	0.0%	20
SEQ Catchments	38.6%	71.0%	19.9%	8.0%	176
Queensland	50.3%	63.5%	15.8%	6.6%	304
Australia	55.1%	61.6%	16.4%	5.8%	396

Notes: (a) Rows may not sum to 100% as land use was a multiple response question. (b) The category of "other" has been removed from this table as responses were sporadic. The most common use specified under "other" was for domestic / residential purposes.

3.2 Infestation Details

3.2.1 Length of Time Lantana Present on Property (Q2)

Respondents indicated that lantana has been present on their property for approximately 38 years on average. The NRM Regions of Condamine Alliance and Burdekin in Queensland and the Northern Rivers in New South Wales reported the highest average length of time that lantana has been present on properties.

Table 3.3. Years Lantana on Property by NRM Region

Region	Average No. of Years on Property	Responses	Unsure
Hawkesbury-Nepean	35.8	5	3
Hunter-Central Rivers	33.6	16	15
Northern Rivers	47.5	25	17
Southern Rivers	35.3	6	6
New South Wales	41.5	50	40
Burdekin	48.0	5	9
Burnett-Mary	32.0	48	43
Condamine Alliance	53.8	21	9
Fitzroy	33.7	15	16
FNQ	25.3	11	4
Mackay Whitsunday	36.3	11	8
SEQ Catchments	35.3	93	88
Queensland	36.7	159	150
Australia	37.8	211	190

3.2.2 Extent of Lantana (Q4)

The majority (56.2%) of respondents indicated they had less than 10% of their property infested with lantana, with:

- Over one third of respondents indicating that lantana was present on between 1% and 10% of their property;
- 10.2% of respondents indicating they had less than 1% of their property infested by lantana; and
- 8.4% of respondents indicating that there was no lantana on their property.

A significant proportion of respondents also indicated there was between 11% and 25% of their property infested by lantana (21.0%) and between 26% and 50% (14.1%).

Infestation extent was relatively similar between New South Wales and Queensland respondents.

Table 3.4. Extent of Lantana by NRM Region

Region	0%	<1%	1-10%	11%-25%	26%-50%	51%-75%	>75%	Responses
Hawkesbury-Nepean	0.0%	50.0%	25.0%	25.0%	0.0%	0.0%	0.0%	8
Hunter-Central Rivers	3.4%	13.8%	37.9%	24.1%	10.3%	10.3%	0.0%	29
Northern Rivers	7.0%	2.3%	46.5%	16.3%	16.3%	4.7%	7.0%	43
Southern Rivers	0.0%	9.1%	36.4%	36.4%	9.1%	9.1%	0.0%	11
New South Wales	4.5%	12.5%	40.9%	20.5%	12.5%	6.8%	2.3%	88
Burdekin	0.0%	15.4%	15.4%	38.5%	23.1%	7.7%	0.0%	13
Burnett-Mary	6.8%	6.8%	44.3%	23.9%	12.5%	4.5%	1.1%	88
Condamine Alliance	3.4%	10.3%	27.6%	24.1%	27.6%	6.9%	0.0%	29
Fitzroy	10.3%	3.4%	37.9%	24.1%	10.3%	13.8%	0.0%	29
FNQ	21.4%	21.4%	42.9%	14.3%	0.0%	0.0%	0.0%	14
Mackay Whitsunday	5.0%	10.0%	25.0%	20.0%	35.0%	5.0%	0.0%	20
SEQ Catchments	10.2%	12.5%	34.7%	21.6%	14.2%	4.5%	2.3%	176
Queensland	9.6%	9.6%	36.2%	21.3%	14.6%	6.0%	2.7%	301
Australia	8.4%	10.2%	37.6%	21.0%	14.1%	6.1%	2.6%	391

Respondents indicated that the average proportion of property infested was approximately 18%, equating to an estimated average infestation size of 183.4 hectares.

Table 3.5. Size of Infestation by NRM Region

Region	Average Proportion of Property Infested	Number of Responses	Average Size of Infestation (Ha)	Responses
Hawkesbury-Nepean	6.8%	8	3.7	7
Hunter-Central Rivers	16.4%	29	108.1	29
Northern Rivers	20.3%	43	1,065.1	41
Southern Rivers	17.8%	11	14.9	11
New South Wales	16.8%	88	536.3	85
Burdekin	21.7%	13	174.3	13
Burnett-Mary	16.5%	88	83.8	88
Condamine Alliance	20.8%	29	77.6	29
Fitzroy	19.7%	29	315.8	29
FNQ	4.5%	14	65.5	14
Mackay Whitsunday	22.0%	20	167.6	20
SEQ Catchments	17.0%	176	13.2	172
Queensland	18.3%	301	82.8	295
Australia	17.9%	391	183.4	382

3.2.3 Spread of Lantana in Past Year (Q5)

On average, 7.5% more respondents indicated that the lantana infestation on their property decreased in the past year (35.7%) rather than increased (28.2%), while 36.2% of respondents indicated the lantana infestation remained relatively unchanged in size.

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 15.6% compared to 5.5%), which may be a reflection of legislative requirements in New South Wales.

Table 3.6. Spread of Lantana in Past Year by NRM Region

Region	Increased	Decreased	About the same	Net Balance ^(a)	Responses
Hawkesbury-Nepean	12.5%	37.5%	50.0%	-25.0%	8
Hunter-Central Rivers	10.0%	50.0%	40.0%	-40.0%	30
Northern Rivers	32.6%	27.9%	39.5%	4.7%	43
Southern Rivers	33.3%	41.7%	25.0%	-8.3%	12
New South Wales	22.2%	37.8%	40.0%	-15.6%	90
Burdekin	57.1%	21.4%	21.4%	35.7%	14
Burnett-Mary	31.1%	28.9%	40.0%	2.2%	90
Condamine Alliance	36.7%	43.3%	20.0%	-6.7%	30
Fitzroy	53.3%	26.7%	20.0%	26.7%	30
FNQ	35.7%	28.6%	35.7%	7.1%	14
Mackay Whitsunday	55.0%	30.0%	15.0%	25.0%	20
SEQ Catchments	20.9%	43.4%	35.7%	-22.5%	182
Queensland	29.8%	35.3%	35.0%	-5.5%	309
Australia	28.2%	35.7%	36.2%	-7.5%	401

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.

3.2.4 Additional Production Area if No Lantana Present (Q7)

On average, respondents indicated that if lantana were not present on their property then they would have an additional 13.0% of their total property area available for productive purposes. This proportion was higher in Queensland (14.1%) than in New South Wales (9.8%), with the NRM Regions of Condamine Alliance, Burdekin and Mackay Whitsunday all reporting expected increases in productive land area of around 20% were lantana not present.

Analysis of infestation size against expected increase in productive area indicates that approximately 55.9% of lantana infestations are on productive land, with a higher proportion in Queensland (65.7%) than in New South Wales (51.6%).

Table 3.7. Additional Production Area if No Lantana Present by NRM Region

Region	Average % Increase in Production Area	Number of Responses	Average % of Infested Area on Productive Land ^(a)	Responses
Hawkesbury-Nepean	6.5%	4	99.9%	3
Hunter-Central Rivers	9.2%	21	69.3%	21
Northern Rivers	13.3%	28	50.7%	27
Southern Rivers	6.8%	6	41.3%	6
New South Wales	9.8%	57	51.6%	55
Burdekin	19.6%	8	94.0%	8
Burnett-Mary	11.5%	45	48.3%	45
Condamine Alliance	21.5%	26	89.8%	26
Fitzroy	12.3%	18	75.8%	18
FNQ	3.0%	5	5.7%	5
Mackay Whitsunday	19.3%	15	69.0%	15
SEQ Catchments	14.4%	83	84.5%	82
Queensland	14.1%	160	65.7%	157
Australia	13.0%	217	55.9%	212

Notes: (a) The average percent of infested area on productive land has been calculated using a weighted average of total productive area recovered (in ha) divided by a weighted average of total infestation size (in ha) for the 212 respondents providing answers to all relevant questions.

3.3 Impact of Lantana

3.3.1 Impact of Lantana on Property (Q1)

Over 60% of respondents indicated that lantana was having either a significant or major impact on their property, while a further 20.7% indicated that lantana was having a minor impact. Only 4.8% of respondents indicated that lantana had no impact.

Lantana was generally reported as having slightly greater impacts in New South Wales than in Queensland.

Table 3.8. Impact of Lantana by NRM Region

Region	Significant impacts	Major impacts	Minor impacts	Small impacts	No impacts	Responses
Hawkesbury-Nepean	25.0%	25.0%	12.5%	37.5%	0.0%	8
Hunter-Central Rivers	31.0%	41.4%	13.8%	13.8%	0.0%	29
Northern Rivers	34.9%	34.9%	20.9%	7.0%	2.3%	43
Southern Rivers	25.0%	41.7%	25.0%	8.3%	0.0%	12
New South Wales	31.5%	34.8%	19.1%	13.5%	1.1%	89
Burdekin	38.5%	30.8%	7.7%	23.1%	0.0%	13
Burnett-Mary	26.7%	28.9%	20.0%	17.8%	6.7%	90
Condamine Alliance	43.3%	36.7%	16.7%	3.3%	0.0%	30
Fitzroy	48.4%	19.4%	22.6%	9.7%	0.0%	31
FNQ	28.6%	21.4%	42.9%	7.1%	0.0%	14
Mackay Whitsunday	38.9%	33.3%	11.1%	16.7%	0.0%	18
SEQ Catchments	22.9%	24.6%	25.7%	17.7%	9.1%	175
Queensland	28.2%	29.2%	21.3%	15.3%	6.0%	301
Australia	29.1%	30.4%	20.7%	15.1%	4.8%	392

3.3.2 Types of Impacts of Lantana (Q9)

Lantana was commonly reported to impact on property by invading native vegetation / riparian areas (74.0%) and increasing weed control costs (71.8%). Other major impacts reported included:

- Competition for native fauna (51.1%);
- Clogging of fences, etc (45.8%); and
- Invasion of grazing areas (41.0%).

Invasion of grazing areas was more commonly reported as an issue in New South Wales (49.4%) than in Queensland (38.7%), as was increased mustering costs (13.5% versus 7.9%) and clogging of fences, etc (50.6% versus 44.4%).

Table 3.9. Type of Impacts of Lantana by NRM Region

Region	Death of Stock	Increased Mustering Costs	Increased Weed Control Costs	Clogging of Fences, etc	Invasion of Grazing Areas	Invasion of Native Vegetation	Competition for Native Fauna	Responses
Hawkesbury-Nepean	0.0%	0.0%	71.4%	57.1%	14.3%	57.1%	57.1%	7
Hunter-Central Rivers	9.7%	16.1%	61.3%	58.1%	38.7%	71.0%	48.4%	31
Northern Rivers	11.9%	16.7%	78.6%	54.8%	54.8%	73.8%	45.2%	42
Southern Rivers	0.0%	0.0%	83.3%	25.0%	75.0%	91.7%	41.7%	12
New South Wales	9.0%	13.5%	71.9%	50.6%	49.4%	75.3%	48.3%	89

Region	Death of Stock	Increased Mustering Costs	Increased Weed Control Costs	Clogging of Fences, etc	Invasion of Grazing Areas	Invasion of Native Vegetation	Competition for Native Fauna	Responses
Burdekin	28.6%	14.3%	92.9%	50.0%	57.1%	64.3%	57.1%	14
Burnett-Mary	5.6%	10.0%	64.4%	41.1%	35.6%	78.9%	51.1%	90
Condamine Alliance	10.3%	3.4%	93.1%	65.5%	72.4%	51.7%	24.1%	29
Fitzroy	32.3%	16.1%	87.1%	54.8%	64.5%	54.8%	25.8%	31
FNQ	6.7%	0.0%	60.0%	40.0%	6.7%	100.0%	66.7%	15
Mackay Whitsunday	15.0%	15.0%	85.0%	65.0%	50.0%	60.0%	65.0%	20
SEQ Catchments	1.2%	2.3%	69.9%	40.5%	31.2%	79.2%	61.3%	173
Queensland	9.6%	7.9%	71.9%	44.4%	38.7%	73.5%	51.7%	302
Australia	9.4%	9.2%	71.8%	45.8%	41.0%	74.0%	51.1%	393

Notes: (a) Rows may not sum to 100% as type of impact was a multiple response question.

3.4 Control and Management Efforts

3.4.1 Average Time Spent Controlling Lantana (Q10)

Over 50% of respondents indicated that they spend less than half a day controlling or managing lantana infestations per week, with a further 20.3% indicating they spend approximately half a day per week controlling lantana on average. Approximately 10% of respondents spend 2 days or more per week controlling / managing lantana infestations.

On average, respondents spent approximately three quarters of a day per week controlling / managing lantana infestations, which equates to approximately 3 – 3.5 days per month.

Table 3.10. Time Spent Controlling Lantana by NRM Region

Region	5 days or greater per week	3-4 days per week	2 days per week	1 day per week	0.5 day per week	< 0.5 day per week	Average days per week	Responses
Hawkesbury-Nepean	0.0%	0.0%	0.0%	28.6%	14.3%	57.1%	0.50	7
Hunter-Central Rivers	3.2%	3.2%	6.5%	22.6%	12.9%	51.6%	0.84	31
Northern Rivers	4.7%	2.3%	2.3%	32.6%	25.6%	32.6%	0.92	43
Southern Rivers	9.1%	0.0%	0.0%	0.0%	27.3%	63.6%	0.80	11
New South Wales	3.4%	2.2%	3.4%	24.7%	21.3%	44.9%	0.80	89
Burdekin	0.0%	0.0%	14.3%	7.1%	42.9%	35.7%	0.66	14
Burnett-Mary	1.2%	1.2%	5.9%	10.6%	22.4%	58.8%	0.59	85
Condamine Alliance	7.4%	7.4%	7.4%	18.5%	33.3%	25.9%	1.23	27
Fitzroy	3.7%	11.1%	14.8%	18.5%	11.1%	40.7%	1.23	27
FNQ	0.0%	0.0%	6.7%	6.7%	13.3%	73.3%	0.45	15
Mackay Whitsunday	5.0%	0.0%	10.0%	0.0%	20.0%	65.0%	0.74	20
SEQ Catchments	1.1%	3.4%	2.9%	13.8%	23.6%	55.2%	0.64	174
Queensland	2.7%	3.1%	6.8%	12.2%	20.3%	54.9%	0.75	295
Australia	2.8%	2.8%	6.0%	15.0%	20.5%	52.8%	0.76	386

3.4.2 Time Taken for Lantana to Infest Remaining Productive Land if Current Management Practices Ceased (Q11)

Approximately one third of respondents indicated that if they ceased their management practices lantana would infest the remaining productive land with 2 to 5 years. Another third of respondents indicated it would take between 6 to 10 years, while 11.3% indicated it would take less than two years. On average respondents indicated it would take approximately 7.5 years for lantana to infest the remaining productive land on their property if they ceased current management practices.

Respondents in New South Wales indicated a slighter longer period for lantana to infest remaining productive land if current management practices were ceased, with an average of 8.5 years, while Queensland was slightly lower at 7.1 years on average.

Table 3.11. Time Taken for Lantana to Infest Remaining Productive Land by NRM Region

Region	<2 years	2-5 years	6-10 years	11-20 years	>20 years	Average (years)	Responses
Hawkesbury-Nepean	0.0%	0.0%	57.1%	28.6%	14.3%	12.1	7
Hunter-Central Rivers	9.7%	32.3%	35.5%	12.9%	9.7%	8.2	31
Northern Rivers	12.2%	31.7%	34.1%	19.5%	2.4%	7.3	41
Southern Rivers	0.0%	18.2%	45.5%	9.1%	27.3%	12.2	11
New South Wales	9.2%	29.9%	35.6%	16.1%	9.2%	8.5	87
Burdekin	15.4%	23.1%	38.5%	15.4%	7.7%	8.1	13
Burnett-Mary	13.3%	34.9%	42.2%	6.0%	3.6%	6.3	83
Condamine Alliance	3.3%	46.7%	20.0%	26.7%	3.3%	8.0	30
Fitzroy	14.3%	42.9%	25.0%	3.6%	14.3%	7.6	28
FNQ	7.7%	61.5%	15.4%	7.7%	7.7%	6.5	13
Mackay Whitsunday	10.5%	26.3%	57.9%	0.0%	5.3%	6.7	19
SEQ Catchments	11.0%	38.2%	33.5%	9.8%	7.5%	7.3	173
Queensland	12.1%	39.3%	32.1%	9.3%	7.2%	7.1	290
Australia	11.3%	36.9%	33.0%	10.8%	7.9%	7.5	379

3.4.3 Preferred Herbicides (Q13)

Round Up was the most commonly used herbicide, with 70.2% of respondents indicating its use. Grazon was also used relatively extensively (28.5%), particularly in New South Wales where 42.2% of respondents reported using this herbicide. Other major herbicides in terms of usage included DP 600 (23.8%) and Brushoff / Round Up (19.4%). Approximately 13.2% of respondents indicated they do not use herbicides to control lantana.

Table 3.12. Herbicides Used

Herbicide	% of Respondents Using Herbicide
New South Wales	
Round Up	75.6%
Grazon	42.2%
Grazon/2,4-D mix	7.8%
DP 600	16.7%
Brushoff/Round Up	27.8%
Starane	0.0%
Access	2.2%
2,4-D amine	5.6%
Other	7.8%
None	7.8%
<i>Total Number of Respondents</i>	<i>90</i>
Queensland	
Round Up	68.5%
Grazon	24.8%
Grazon/2,4-D mix	4.5%
DP 600	26.0%
Brushoff/Round Up	16.7%
Starane	11.9%
Access	7.4%
2,4-D amine	12.2%
Other	11.6%
None	14.8%
<i>Total Number of Respondents</i>	<i>311</i>

Herbicide	% of Respondents Using Herbicide
Australia	
Round Up	70.2%
Grazon	28.5%
Grazon/2,4-D mix	5.2%
DP 600	23.8%
Brushoff/Round Up	19.4%
Starane	9.4%
Access	6.2%
2,4-D amine	10.7%
Other	10.7%
None	13.2%
<i>Total Number of Respondents</i>	<i>403</i>

Note: This was a multiple response question and as such may not add to 100%.

3.4.4 Satisfaction with Results of Control Effort (Q16)

Over three quarters of respondents indicated that they were satisfied with the results of their control effort, with New South Wales and Queensland recording relatively similar responses.

The NRM Regions of Hawkesbury-Nepean, Fitzroy, SEQ Catchments and Southern Rivers all recorded 80% or more of respondents indicating satisfaction with results. Conversely, Burdekin and Mackay Whitsunday were the only NRM Regions recording more respondents indicating they were not satisfied with the results of their control efforts than were satisfied.

Table 3.13. Satisfied with Results of Control Effort by NRM Region

Region	Yes	No	Responses
Hawkesbury-Nepean	100.0%	0.0%	7
Hunter-Central Rivers	65.5%	34.5%	29
Northern Rivers	79.5%	20.5%	39
Southern Rivers	80.0%	20.0%	10
New South Wales	74.4%	25.6%	82
Burdekin	42.9%	57.1%	14
Burnett-Mary	76.3%	23.8%	80
Condamine Alliance	72.4%	27.6%	29
Fitzroy	86.7%	13.3%	30
FNQ	76.9%	23.1%	13
Mackay Whitsunday	45.0%	55.0%	20
SEQ Catchments	83.3%	16.7%	174
Queensland	76.7%	23.3%	288
Australia	76.1%	23.9%	372

3.4.5 Statements Regarding Control Effort (Q12)

The following rating scale was used to identify preferences for a list of statements regarding control efforts.

1. Definitely yes / agree
2. Yes / agree
3. Sometimes
4. No (or not always) / disagree
5. Definitely no / disagree

The average preference of respondents has been calculated and is outlined in the table below. As can be seen, respondents most strongly agree with the following statements:

- Follow up is essential to ensure initial control efforts are not lost;
- If better outcomes can be achieved, I am willing to change my practices; and

- Ornamental lantana should be removed from public plantings.

Conversely, respondents most strongly disagree (or agree the least) with the following statements:

- I find it difficult to access information about the control of lantana; and
- Bio-control is the only solution to control lantana on my property.

Table 3.14. Preferences for Statements Regarding Control Effort

Statement	Weighted Average Response	Responses
New South Wales		
Cost savings can be achieved by integrating lantana controls	2.1	81
Property value depreciates because of lantana invasion	2.1	91
Herbicide is the best solution to controlling lantana	2.4	91
Pest planning will assist my efforts to control weeds	2.5	83
Follow up is essential to ensure initial control efforts are not lost	1.2	90
A positive return on investment can be achieved for controlling lantana	2.2	89
Using more than one method of controlling lantana works better	2.0	87
Ornamental lantana should be removed from public plantings	1.5	88
I find it difficult to access information about the control of lantana	3.7	88
Bio-control is the only solution to control lantana on my property	3.6	84
Information about best management practices is useful to improve practices	1.7	91
If better outcomes can be achieved, I am willing to change my practices	1.4	91
Queensland		
Cost savings can be achieved by integrating lantana controls	2.1	274
Property value depreciates because of lantana invasion	1.9	298
Herbicide is the best solution to controlling lantana	2.8	298
Pest planning will assist my efforts to control weeds	2.4	269
Follow up is essential to ensure initial control efforts are not lost	1.2	305
A positive return on investment can be achieved for controlling lantana	2.1	281
Using more than one method of controlling lantana works better	1.9	293
Ornamental lantana should be removed from public plantings	1.5	301
I find it difficult to access information about the control of lantana	3.8	291
Bio-control is the only solution to control lantana on my property	3.6	289
Information about best management practices is useful to improve practices	1.7	297
If better outcomes can be achieved, I am willing to change my practices	1.4	297
Australia		
Cost savings can be achieved by integrating lantana controls	2.1	357
Property value depreciates because of lantana invasion	1.9	391
Herbicide is the best solution to controlling lantana	2.7	391
Pest planning will assist my efforts to control weeds	2.4	354
Follow up is essential to ensure initial control efforts are not lost	1.2	397
A positive return on investment can be achieved for controlling lantana	2.1	372
Using more than one method of controlling lantana works better	1.9	381
Ornamental lantana should be removed from public plantings	1.5	391
I find it difficult to access information about the control of lantana	3.8	381
Bio-control is the only solution to control lantana on my property	3.6	375
Information about best management practices is useful to improve practices	1.7	390
If better outcomes can be achieved, I am willing to change my practices	1.4	390

3.5 Limitations of Adoption and Cost of Control

3.5.1 Cost of Control (Q15)

Respondents indicated that their average expenditure on control per annum is \$7,017.80. Labour accounts for approximately 44% of total expenditure (\$3,092.37), indicative of the labour intensiveness of controlling lantana infestations. Expenditure on capital costs (\$1,156.95) and machinery (\$1,143.17) are also relatively high.

Expenditure on control was reported as slightly lower in New South Wales (\$6,261.68) than in Queensland (\$7,282.35), with relatively lower labour and machinery costs. The NRM Regions of Fitzroy (\$21,158.96), Mackay Whitsunday (\$17,591.88) and Condamine Alliance (\$12,863.63) recorded the highest average expenditure on control.

Table 3.15. Average Annual Expenditure on Control by NRM Region

Region	Labour	Machinery ^(a)	Capital Costs ^(b)	Herbicide	Contractors	Other ^(c)	Total	Responses
Hawkesbury-Nepean	\$2,018.75	\$150.00	\$37.50	\$203.75	\$2,375.00	\$93.75	\$4,878.75	8
Hunter-Central Rivers	\$2,325.00	\$664.62	\$109.62	\$546.54	\$1,103.85	\$112.69	\$4,862.31	26
Northern Rivers	\$3,566.94	\$763.28	\$146.39	\$1,015.42	\$377.50	\$109.44	\$5,978.97	36
Southern Rivers	\$1,356.25	\$202.08	\$5,833.33	\$221.67	\$448.33	\$250.00	\$8,311.67	12
New South Wales	\$2,613.10	\$666.87	\$1,494.30	\$683.61	\$668.73	\$135.06	\$6,261.68	79
Burdekin	\$2,095.45	\$1,346.36	\$54.55	\$1,150.00	\$1,545.45	\$92.73	\$6,284.55	11
Burnett-Mary	\$2,359.26	\$612.84	\$390.68	\$297.89	\$387.57	\$128.74	\$4,176.97	74
Condamine Alliance	\$5,586.46	\$1,238.33	\$3,958.42	\$1,163.79	\$433.33	\$483.29	\$12,863.63	24
Fitzroy	\$8,242.17	\$5,325.21	\$1,433.08	\$3,028.83	\$2,541.67	\$588.00	\$21,158.96	24
FNQ	\$2,086.36	\$510.18	\$45.45	\$388.64	\$636.36	\$368.18	\$4,035.18	11
Mackay Whitsunday	\$6,105.88	\$5,680.59	\$35.29	\$2,084.71	\$3,005.88	\$679.53	\$17,591.88	17
SEQ Catchments	\$2,069.22	\$362.54	\$1,095.03	\$304.02	\$400.61	\$85.99	\$4,317.40	151
Queensland	\$3,254.34	\$1,297.63	\$1,055.38	\$816.00	\$649.29	\$209.71	\$7,282.35	251
Australia	\$3,092.37	\$1,143.17	\$1,156.95	\$781.93	\$651.97	\$191.41	\$7,017.80	331

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 (\$32.70 per hectare) spend considerably more than in Queensland (\$8.00 per hectare). This is influenced by the higher proportion of small sized properties in New South Wales, with control costs largely insensitive to property size.

Table 3.16. 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	\$69.52	\$5.17	\$1.29	\$7.02	\$81.79	\$3.23	\$168.02	8
Hunter-Central Rivers	\$14.15	\$4.04	\$0.67	\$3.33	\$6.72	\$0.69	\$29.59	26
Northern Rivers	\$10.97	\$2.35	\$0.45	\$3.12	\$1.16	\$0.34	\$18.39	36
Southern Rivers	\$22.70	\$3.38	\$97.64	\$3.71	\$7.50	\$4.18	\$139.12	12
New South Wales	\$13.65	\$3.48	\$7.80	\$3.57	\$3.49	\$0.71	\$32.70	79
Burdekin	\$23.21	\$14.91	\$0.60	\$12.74	\$17.12	\$1.03	\$69.62	11
Burnett-Mary	\$6.32	\$1.64	\$1.05	\$0.80	\$1.04	\$0.34	\$11.19	74
Condamine Alliance	\$14.31	\$3.17	\$10.14	\$2.98	\$1.11	\$1.24	\$32.95	24
Fitzroy	\$1.68	\$1.08	\$0.29	\$0.62	\$0.52	\$0.12	\$4.30	24
FNQ	\$0.35	\$0.09	\$0.01	\$0.06	\$0.11	\$0.06	\$0.67	11
Mackay Whitsunday	\$5.22	\$4.86	\$0.03	\$1.78	\$2.57	\$0.58	\$15.04	17
SEQ Catchments	\$31.52	\$5.52	\$16.68	\$4.63	\$6.10	\$1.31	\$65.76	151
Queensland	\$3.57	\$1.42	\$1.16	\$0.90	\$0.71	\$0.23	\$8.00	251
Australia	\$4.20	\$1.55	\$1.57	\$1.06	\$0.89	\$0.26	\$9.53	331

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.

On a per hectare of infestation basis, respondents in New South Wales spend approximately twice as much on control as respondents in Queensland. This may be a reflection of the different legislative requirements between the States.

Table 3.17. 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	\$621.35	\$46.17	\$11.54	\$62.71	\$731.00	\$28.86	\$1,501.62	8
Hunter-Central Rivers	\$178.36	\$50.99	\$8.41	\$41.93	\$84.68	\$8.65	\$373.01	26
Northern Rivers	\$35.64	\$7.63	\$1.46	\$10.14	\$3.77	\$1.09	\$59.73	36
Southern Rivers	\$99.33	\$14.80	\$427.24	\$16.24	\$32.84	\$18.31	\$608.76	12
New South Wales	\$75.77	\$19.34	\$43.33	\$19.82	\$19.39	\$3.92	\$181.56	79
Burdekin	\$112.56	\$72.32	\$2.93	\$61.77	\$83.02	\$4.98	\$337.58	11
Burnett-Mary	\$26.24	\$6.82	\$4.35	\$3.31	\$4.31	\$1.43	\$46.46	74
Condamine Alliance	\$67.88	\$15.05	\$48.10	\$14.14	\$5.27	\$5.87	\$156.31	24
Fitzroy	\$25.20	\$16.28	\$4.38	\$9.26	\$7.77	\$1.80	\$64.68	24
FNQ	\$26.10	\$6.38	\$0.57	\$4.86	\$7.96	\$4.61	\$50.48	11
Mackay Whitsunday	\$31.94	\$29.72	\$0.18	\$10.91	\$15.72	\$3.55	\$92.03	17
SEQ Catchments	\$182.22	\$31.93	\$96.43	\$26.77	\$35.28	\$7.57	\$380.20	151
Queensland	\$41.12	\$16.40	\$13.33	\$10.31	\$8.20	\$2.65	\$92.01	251
Australia	\$45.31	\$16.75	\$16.95	\$11.46	\$9.55	\$2.80	\$102.83	331

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.

3.5.2 Incentives for Encouraging Improved Lantana Control (Q17)

The majority of respondents indicated that incentives such as financial packages or herbicide assistance (67.7%) and new biological control agents (59.9%) would encourage an improved lantana control effort. Conversely, incentives such as a reduction in the decrease in property value (or increase in property value) and fuel assistance and tax rebates received little support as an incentive for encouraging improved control efforts.

Table 3.18. What Incentives Would Encourage Improved Lantana Control

Incentive	% of Respondents Indicating in the Affirmative
Financial packages or herbicide assistance	67.7%
New biological control agents	59.9%
Better available information and practices	30.7%
Fuel assistance or tax rebates	25.5%
Decreased property value (either increase or decrease)	16.7%
Other	21.4%
<i>Total Number of Respondents</i>	<i>384</i>

Note: This was a multiple response question and as such may not add to 100%.

3.5.3 Factors Preventing Lantana Control (Q18)

Nearly three quarters of respondents indicated that the main factor preventing them from undertaking lantana control was a lack of available time. Other key factor preventing adoption of control methods included density or access restrictions (47.5%), costs of control (34.1%), persistence of lantana (32.0%) and seasonal timing (27.8%).

Table 3.19. What Factors Prevent the Undertaking of Lantana Control

Factor	% of Respondents Indicating in the Affirmative
Available time	74.5%
Density or access restricted	47.5%
Costs of control	34.1%
Persistence of lantana	32.0%
Seasonal timing	27.8%
No incentives available	14.2%
Permits for clearing or fire difficult to obtain	7.6%
None of the above	8.9%
Other	13.6%
<i>Total Number of Respondents</i>	<i>381</i>

3.6 Cross Tabulations

3.6.1 Infestation Extent and Spread by Property Type

3.6.1.1 Extent of Lantana by Property Size

Not including properties greater than 5,000 hectares in size due to low response rates, properties less than 100 hectares in size have the highest proportion of respondents reporting less than 1% of the property infested (20.8%), as well as the highest proportion of respondents with less than 10% of the property infested (57.7%) of all property size. 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.

Properties between 101 and 500 hectares in size had a larger proportion of respondents indicating between 26% and 50% of the property infested than any other property size.

Table 3.20. Extent of Lantana by Property Size

Property Size	0%	<1%	1%-10%	11%-25%	26%-50%	51%-75%	>75%	Responses
< 100 hectares	9.4%	11.4%	36.9%	20.0%	12.9%	6.7%	2.7%	255
101-500 hectares	5.3%	6.7%	37.3%	22.7%	21.3%	5.3%	1.3%	75
501-1,000 hectares	0.0%	11.1%	44.4%	27.8%	11.1%	5.6%	0.0%	18
1,001-5,000 hectares	0.0%	5.0%	45.0%	30.0%	5.0%	5.0%	10.0%	20
5,001 - 10,000 hectares	16.7%	0.0%	66.7%	0.0%	16.7%	0.0%	0.0%	6
> 10,000 hectares	25.0%	12.5%	25.0%	12.5%	25.0%	0.0%	0.0%	8
<i>Total</i>	<i>8.1%</i>	<i>9.9%</i>	<i>38.0%</i>	<i>20.9%</i>	<i>14.4%</i>	<i>6.0%</i>	<i>2.6%</i>	<i>382</i>

3.6.1.2 Extent of Lantana by Land Use

Properties used for conservation purposes had a slightly larger proportion of respondents indicating less than 1% of the property as infested than either primary production or recreation purposes, although was below the proportion reported for properties with no main use. Overall, there was little difference in extent of lantana between properties used for primary production or conservation, while land used for recreation reported a significantly higher than average proportion of properties with 11% - 25% infested and land with no main use had a significantly higher than average proportion of properties with 51% - 75% infested.

Table 3.21. Extent of Lantana by Land Use

Land Use	0%	<1%	1%-10%	11%-25%	26%-50%	51%-75%	>75%	Responses
Primary Production	7.1%	8.1%	38.9%	23.7%	15.6%	4.7%	1.9%	211
Conservation	8.5%	11.1%	35.3%	21.3%	14.0%	6.8%	3.0%	235
Recreation	1.6%	12.7%	34.9%	30.2%	15.9%	1.6%	3.2%	63
No main use	8.7%	13.0%	39.1%	13.0%	4.3%	17.4%	4.3%	23
<i>Total</i>	<i>7.6%</i>	<i>10.2%</i>	<i>37.5%</i>	<i>21.5%</i>	<i>14.2%</i>	<i>6.3%</i>	<i>2.6%</i>	<i>381</i>

3.6.1.3 Spread of Lantana by Property Size

Smaller property sizes (those less than 500 hectares in size) have a considerably higher proportion of respondents indicating that the spread of lantana has decreased over the past two years rather than increased. Conversely, all other property sizes reported a positive net balance, or more properties with an increase in spread of lantana rather than decrease.

Combined with smaller properties having a lower proportion of the property infested, this suggests that management of lantana is easier on small properties.

Table 3.22. Spread of Lantana by Property Size

Property Size	Increased Spread	Decreased Spread	Little Change	Net Balance ^(a)	Responses
< 100 hectares	24.5%	35.6%	39.8%	-11.1%	261
101-500 hectares	25.3%	42.7%	32.0%	-17.3%	75
501-1,000 hectares	38.9%	33.3%	27.8%	5.6%	18
1,001-5,000 hectares	63.6%	9.1%	27.3%	54.5%	22
5,001 - 10,000 hectares	33.3%	16.7%	50.0%	16.7%	6
> 10,000 hectares	62.5%	37.5%	0.0%	25.0%	8
<i>Total</i>	<i>28.5%</i>	<i>35.1%</i>	<i>36.4%</i>	<i>-6.7%</i>	<i>390</i>

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.

3.6.1.4 Spread of Lantana by Land Use

Land used for conservation and recreation purposes recorded significantly larger proportions of respondents indicating the spread of lantana had decreased rather than increased in the past year. There was a relatively even share of respondents indicating an increase and decrease in spread for land used for primary production, while land with no main use had a higher proportion of respondents indicating an increase in spread rather than decrease.

Table 3.23. Spread of Lantana by Land Use

Land Use	Increased Spread	Decreased Spread	Little Change	Net Balance ^(a)	Responses
Primary Production	30.6%	31.0%	38.4%	-0.5%	216
Conservation	25.3%	39.0%	35.7%	-13.7%	241
Recreation	23.4%	35.9%	40.6%	-12.5%	64
No main use	31.8%	18.2%	50.0%	13.6%	22
<i>Total</i>	<i>28.9%</i>	<i>35.0%</i>	<i>36.1%</i>	<i>-6.1%</i>	<i>391</i>

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.

3.6.1.5 Spread of Lantana by Property Type and Land Use

Smaller properties for both land used for primary production and conservation purposes reported a larger proportion of respondents indicating a decrease in spread rather than increase compared to larger property sizes.

Table 3.24. Spread of Lantana by Property Size and Land Use

Property Size by Land Use	Increased Spread	Decreased Spread	Little Change	Net Balance ^(a)	Responses
Primary Production					
< 100 hectares	24.0%	25.0%	51.0%	-1.0%	96
101-500 hectares	24.6%	46.2%	29.2%	-21.5%	65
501-1,000 hectares	41.2%	29.4%	29.4%	11.8%	17
1,001-5,000 hectares	63.2%	10.5%	26.3%	52.6%	19
5,001 - 10,000 hectares	33.3%	16.7%	50.0%	16.7%	6
> 10,000 hectares	57.1%	42.9%	0.0%	14.3%	7
<i>Total</i>	<i>30.5%</i>	<i>31.0%</i>	<i>38.6%</i>	<i>-0.5%</i>	<i>210</i>
Conservation					
< 100 hectares	25.4%	37.6%	37.0%	-12.2%	189
101-500 hectares	14.3%	46.4%	39.3%	-32.1%	28
501-1,000 hectares	33.3%	50.0%	16.7%	-16.7%	6
1,001-5,000 hectares	50.0%	16.7%	33.3%	33.3%	6
5,001 - 10,000 hectares	66.7%	0.0%	33.3%	66.7%	3
> 10,000 hectares	33.3%	66.7%	0.0%	-33.3%	3
<i>Total</i>	<i>25.5%</i>	<i>38.3%</i>	<i>36.2%</i>	<i>-12.8%</i>	<i>235</i>

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.

3.6.2 Impact of Lantana by Property Type

3.6.2.1 Types of Impacts of Lantana by Land Use

The following negative impacts of lantana were more commonly reported in properties used for primary production than other property types:

- Death of stock;
- Increased mustering costs;
- Increased weed control costs;
- Clogging of fences, etc; and
- Invasion of grazing areas.

By comparison, land used for conservation and recreation reported higher incidences of impacts such as invasion of native vegetation / riparian areas and competition for native fauna.

Table 3.25. Type of Impacts of Lantana by Land Use

Land Use	Death of Stock	Increased Mustering Costs	Increased Weed Control Costs	Clogging of Fences, etc	Invasion of Grazing Areas	Invasion of Native Vegetation	Competition for Native Fauna	Other	Responses
Primary Production	16.6%	16.1%	82.9%	57.1%	65.9%	59.9%	30.9%	3.7%	217
Conservation	3.7%	4.6%	63.9%	41.5%	24.5%	85.5%	62.7%	9.1%	241
Recreation	3.1%	4.6%	70.8%	47.7%	30.8%	83.1%	53.8%	9.2%	65
No main use	0.0%	4.3%	56.5%	34.8%	21.7%	69.6%	65.2%	17.4%	23
<i>Total</i>	<i>9.2%</i>	<i>8.9%</i>	<i>71.2%</i>	<i>45.9%</i>	<i>40.6%</i>	<i>73.0%</i>	<i>50.0%</i>	<i>7.7%</i>	<i>392</i>

Notes: (a) Rows may not sum to 100% as type of impact was a multiple response question.

3.6.3 Control and Management Effort by Property Type

3.6.3.1 Average Time Spent Controlling Lantana by Property Size

In general, the time spent controlling lantana increases in line with the size of the property, with considerably higher proportions of respondents indicating they spend:

- Less than half a day on average in smaller property sizes; and
- Five days or more on average in larger property sizes.

Table 3.26. Time Spent Controlling Lantana by Property Size

Property Size	5 days or greater per week	3-4 days per week	2 days per week	1 day per week	0.5 day per week	< 0.5 day per week	Average days per week	Responses
< 100 hectares	0.8%	2.0%	3.1%	12.9%	19.9%	61.3%	0.56	256
101-500 hectares	5.6%	5.6%	15.5%	16.9%	22.5%	33.8%	1.18	71
501-1,000 hectares	0.0%	5.6%	0.0%	16.7%	22.2%	55.6%	0.61	18
1,001-5,000 hectares	15.0%	5.0%	15.0%	25.0%	10.0%	30.0%	1.68	20
5,001 - 10,000 hectares	16.7%	0.0%	0.0%	16.7%	33.3%	33.3%	1.33	6
> 10,000 hectares	16.7%	0.0%	16.7%	16.7%	16.7%	33.3%	1.58	6
<i>Total</i>	<i>2.9%</i>	<i>2.9%</i>	<i>6.1%</i>	<i>14.6%</i>	<i>20.2%</i>	<i>53.3%</i>	<i>0.76</i>	<i>377</i>

3.6.3.2 Average Time Spent Controlling Lantana by Land Use

Properties used for primary production reported the most time spent controlling lantana on average (almost 1 day per week), while land with no main use had the lowest (around half a day per week). Land used for conservation and recreation purposes reported around 0.7 days per week spent controlling lantana on average.

Table 3.27. Time Spent Controlling Lantana by Land Use

Land Use	5 days or greater per week	3-4 days per week	2 days per week	1 day per week	0.5 day per week	< 0.5 day per week	Average days per week	Responses
Primary Production	4.9%	3.4%	8.9%	17.2%	20.2%	45.3%	0.96	203
Conservation	2.1%	3.0%	4.3%	15.0%	19.7%	56.0%	0.70	234
Recreation	3.1%	0.0%	6.2%	16.9%	21.5%	52.3%	0.70	65
No main use	0.0%	4.3%	0.0%	13.0%	13.0%	69.6%	0.52	23
<i>Total</i>	<i>2.9%</i>	<i>2.9%</i>	<i>5.9%</i>	<i>15.5%</i>	<i>20.5%</i>	<i>52.3%</i>	<i>0.77</i>	<i>375</i>

3.6.3.3 Average Time Spent Controlling Lantana by Property Size and Land Use

In general, the time spent controlling lantana increases in line with the size of the property for both land used for primary production and conservation.

Table 3.28. Time Spent Controlling Lantana by Property Size and Land Use

Extent by Land Use	5 days or greater per week	3-4 days per week	2 days per week	1 day per week	0.5 day per week	< 0.5 day per week	Average days per week	Responses
Primary Production								
< 100 hectares	1.1%	1.1%	5.4%	14.0%	18.3%	60.2%	0.59	93
101-500 hectares	6.6%	6.6%	14.8%	16.4%	23.0%	32.8%	1.25	61
501-1,000 hectares	0.0%	5.9%	0.0%	17.6%	17.6%	58.8%	0.62	17
1,001-5,000 hectares	17.6%	5.9%	17.6%	29.4%	11.8%	17.6%	1.93	17
5,001 - 10,000 hectares	16.7%	0.0%	0.0%	16.7%	33.3%	33.3%	1.33	6
> 10,000 hectares	20.0%	0.0%	20.0%	20.0%	20.0%	20.0%	1.85	5
<i>Total</i>	<i>5.0%</i>	<i>3.5%</i>	<i>9.0%</i>	<i>16.6%</i>	<i>19.6%</i>	<i>46.2%</i>	<i>0.96</i>	<i>199</i>
Conservation								
< 100 hectares	0.5%	2.7%	2.2%	13.1%	20.8%	60.7%	0.56	183
101-500 hectares	6.9%	6.9%	20.7%	20.7%	13.8%	31.0%	1.39	29
501-1,000 hectares	0.0%	0.0%	0.0%	33.3%	16.7%	50.0%	0.54	6
1,001-5,000 hectares	16.7%	0.0%	0.0%	33.3%	0.0%	50.0%	1.38	6
5,001 - 10,000 hectares	33.3%	0.0%	0.0%	0.0%	33.3%	33.3%	2.08	3
> 10,000 hectares	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	0.25	1
<i>Total</i>	<i>2.2%</i>	<i>3.1%</i>	<i>4.4%</i>	<i>14.9%</i>	<i>19.3%</i>	<i>56.1%</i>	<i>0.70</i>	<i>228</i>

3.6.3.4 Time Taken for Lantana to Infest Remaining Productive Land by Property Size

The time taken for lantana to infest the remaining productive land if current control efforts ceased generally increases as the size of the property increases, reflecting the greater area to cover on larger properties.

Table 3.29. Time Taken for Lantana to Infest Remaining Productive Land by Property Size

Property Size	<2 years	2-5 years	6-10 years	11-20 years	>20 years	Average (years)	Responses
< 100 hectares	10.9%	37.2%	36.0%	8.1%	7.7%	7.25	247
101-500 hectares	8.3%	40.3%	31.9%	13.9%	5.6%	7.36	72
501-1,000 hectares	27.8%	22.2%	22.2%	22.2%	5.6%	7.44	18
1,001-5,000 hectares	15.0%	30.0%	25.0%	20.0%	10.0%	8.58	20
5,001 - 10,000 hectares	0.0%	33.3%	33.3%	0.0%	33.3%	12.00	6
> 10,000 hectares	14.3%	28.6%	14.3%	14.3%	28.6%	11.50	7
<i>Total</i>	<i>11.4%</i>	<i>36.5%</i>	<i>33.5%</i>	<i>10.5%</i>	<i>8.1%</i>	<i>7.51</i>	<i>370</i>

3.6.3.5 Time Taken for Lantana to Infest Remaining Productive Land by Land Use

The average time taken for lantana to infest the remaining productive land if current control efforts ceased is relatively similar across all land uses, indicating that lantana is considered to be equally invasive in all land types.

Table 3.30. Time Taken for Lantana to Infest Remaining Productive Land by Land Use

Land Use	<2 years	2-5 years	6-10 years	11-20 years	>20 years	Average (years)	Responses
Primary Production	11.7%	35.4%	32.5%	15.0%	5.3%	7.39	206
Conservation	13.1%	37.1%	33.2%	7.4%	9.2%	7.33	229
Recreation	13.1%	39.3%	26.2%	13.1%	8.2%	7.49	61
No main use	9.5%	42.9%	33.3%	4.8%	9.5%	7.19	21
<i>Total</i>	<i>11.4%</i>	<i>36.7%</i>	<i>33.2%</i>	<i>10.9%</i>	<i>7.9%</i>	<i>7.49</i>	<i>368</i>

3.6.3.6 Time Taken for Lantana to Infest Remaining Productive Land by Property Size and Land Use

In general, the time taken for lantana to infest the remaining productive land if current control efforts ceased increases as the size of the property increases for both land used for primary production and conservation.

Table 3.31. Time Taken for Lantana to Infest Remaining Productive Land by Property Size and Land Use

Extent by Land Use	<2 years	2-5 years	6-10 years	11-20 years	>20 years	Average (years)	Responses
Primary Production							
< 100 hectares	12.0%	32.6%	40.2%	13.0%	2.2%	6.78	92
101-500 hectares	6.3%	42.9%	30.2%	15.9%	4.8%	7.40	63
501-1,000 hectares	23.5%	23.5%	23.5%	23.5%	5.9%	7.82	17
1,001-5,000 hectares	17.6%	35.3%	23.5%	17.6%	5.9%	7.29	17
5,001 - 10,000 hectares	0.0%	33.3%	33.3%	0.0%	33.3%	12.00	6
> 10,000 hectares	14.3%	28.6%	14.3%	14.3%	28.6%	11.50	7
<i>Total</i>	<i>11.4%</i>	<i>35.1%</i>	<i>33.2%</i>	<i>14.9%</i>	<i>5.4%</i>	<i>7.42</i>	<i>202</i>
Conservation							
< 100 hectares	12.4%	36.5%	36.0%	6.7%	8.4%	7.22	178
101-500 hectares	14.3%	46.4%	28.6%	3.6%	7.1%	6.23	28
501-1,000 hectares	33.3%	16.7%	16.7%	33.3%	0.0%	7.17	6
1,001-5,000 hectares	33.3%	0.0%	33.3%	16.7%	16.7%	9.50	6
5,001 - 10,000 hectares	0.0%	66.7%	0.0%	0.0%	33.3%	10.67	3
> 10,000 hectares	0.0%	0.0%	0.0%	0.0%	100.0%	25.00	2
<i>Total</i>	<i>13.5%</i>	<i>36.3%</i>	<i>33.6%</i>	<i>7.2%</i>	<i>9.4%</i>	<i>7.36</i>	<i>223</i>

3.6.4 Control and Management Effort by Infestation Extent and Spread

3.6.4.1 Average Time Spent Controlling Lantana by Extent of Lantana

The average time spent controlling lantana generally increases as the extent of lantana increases, with properties having less than 1% infested reporting over 75% of respondents spending less than half a day per week on control while infestations of over 50% reported over 25% of respondents spending greater than two days per week on control.

Table 3.32. Time Spent Controlling Lantana by Extent

Extent	5 days or greater per week	3-4 days per week	2 days per week	1 day per week	0.5 day per week	< 0.5 day per week	Average days per week	Responses
0%	0.0%	0.0%	3.3%	3.3%	3.3%	90.0%	0.34	30
<1%	0.0%	0.0%	0.0%	10.5%	10.5%	78.9%	0.36	38
1-10%	0.0%	1.4%	3.5%	13.4%	25.4%	56.3%	0.52	142
11%-25%	6.1%	2.4%	6.1%	15.9%	26.8%	42.7%	0.94	82
26%-50%	7.8%	5.9%	9.8%	25.5%	19.6%	31.4%	1.26	51
51%-75%	0.0%	14.3%	14.3%	28.6%	9.5%	33.3%	1.20	21
>75%	20.0%	10.0%	20.0%	10.0%	20.0%	20.0%	2.10	10
Total	2.9%	2.9%	5.6%	15.2%	20.6%	52.7%	0.76	374

3.6.4.2 Time Taken for Lantana to Infest Remaining Productive Land by Extent of Lantana

The average time taken for lantana to infest the remaining productive land if current control efforts ceased generally decreases as the extent of lantana increases, with properties having less than 1% infested reporting an average of around 10 years and properties with over 50% infested reporting around 5 years on average.

Table 3.33. Time Taken for Lantana to Infest Remaining Productive Land by Extent

Extent	<2 years	2-5 years	6-10 years	11-20 years	>20 years	Average (years)	Responses
0%	0.0%	29.0%	38.7%	16.1%	16.1%	10.37	31
<1%	8.3%	25.0%	36.1%	13.9%	16.7%	9.92	36
1-10%	11.0%	34.6%	33.1%	13.2%	8.1%	7.81	136
11%-25%	14.3%	36.4%	36.4%	9.1%	3.9%	6.48	77
26%-50%	11.8%	43.1%	33.3%	7.8%	3.9%	6.28	51
51%-75%	17.4%	60.9%	17.4%	0.0%	4.3%	4.70	23
>75%	40.0%	30.0%	20.0%	0.0%	10.0%	5.45	10
Total	11.8%	36.3%	33.2%	10.7%	8.0%	7.48	364

3.6.5 Control Costs by Property Type

3.6.5.1 Cost of Control by Property Size

Total costs of control generally increase in line with increases in property size up to around 1,000 hectares, but then is relatively consistent across larger property sizes with the exception of greater than 10,000 hectares (which is largely influenced by the limited number of responses in this size category). Expenditure items such as capital costs and machinery are highly variable across property sizes, while labour and herbicide costs generally increase in line with property size.

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:

- \$191.01 per hectare in properties less than 100 hectares in size;
- \$44.45 per hectare in properties between 101 and 500 hectares in size;
- \$22.71 per hectare in properties between 501 and 1,000 hectares in size;

- \$6.36 per hectare in properties between 1,001 and 5,000 hectares in size;
- \$1.75 per hectare in properties between 5,001 and 10,000 hectares in size; and
- \$1.96 per hectare in properties greater than 10,000 hectares in size.

Table 3.34. Cost of Control by Property Size

Property Size	Labour	Machinery ^(a)	Capital Costs ^(b)	Herbicide	Contractors	Other ^(c)	Total	Responses
< 100 hectares	\$1,863.55	\$433.67	\$1,238.07	\$249.06	\$331.53	\$103.05	\$4,218.92	230
101-500 hectares	\$4,533.17	\$2,001.85	\$558.37	\$1,604.58	\$905.93	\$319.58	\$9,923.47	59
501-1,000 hectares	\$6,760.00	\$3,525.00	\$3,900.00	\$2,166.40	\$330.00	\$275.00	\$16,956.40	10
1,001-5,000 hectares	\$9,318.75	\$1,627.25	\$322.00	\$2,381.44	\$737.50	\$167.63	\$14,554.56	16
5,001 - 10,000 hectares	\$4,600.00	\$1,675.00	\$0.00	\$2,450.00	\$3,750.00	\$825.00	\$13,300.00	4
> 10,000 hectares	\$14,400.00	\$15,050.00	\$3,500.00	\$6,116.67	\$8,333.33	\$1,966.67	\$49,366.67	6

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.

3.6.5.2 Cost of Control by Land Use

Expenditure on controlling lantana was generally higher on infestations in properties used for primary production purposes, with considerably higher expenditure on labour, machinery, capital costs (with the exception of recreation uses), herbicide and contractors. Expenditure on controlling lantana in land with no main use was significantly lower than other land uses.

Table 3.35. Cost of Control by Land Use

Land Use	Labour	Machinery ^(a)	Capital Costs ^(b)	Herbicide	Contractors	Other ^(c)	Total	Responses
Primary Production	\$3,292.58	\$1,581.77	\$1,539.75	\$1,100.28	\$669.04	\$222.85	\$8,406.27	218
Conservation	\$2,214.41	\$533.46	\$687.40	\$402.17	\$291.11	\$115.98	\$4,244.53	244
Recreation	\$2,320.00	\$578.12	\$1,865.69	\$212.23	\$507.23	\$161.08	\$5,644.35	65
No main use	\$639.13	\$93.48	\$67.39	\$141.74	\$226.09	\$24.35	\$1,192.17	23

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.

3.6.6 Control Costs by Infestation Extent and Spread

3.6.6.1 Cost of Control by Extent of Lantana

In line with time spent on control, average expenditure on controlling lantana generally increased in line with the size of the property, with labour, machinery and capital costs the most significantly impacted by property size.

Table 3.36. Cost of Control by Extent of Lantana

Extent	Labour	Machinery ^(a)	Capital Costs ^(b)	Herbicide	Contractors	Other ^(c)	Total	Responses
0%	\$410.76	\$43.03	\$3.79	\$54.09	\$349.70	\$21.58	\$882.94	33
<1%	\$717.38	\$82.80	\$15.00	\$114.25	\$145.25	\$43.25	\$1,117.93	40
1-10%	\$1,733.33	\$467.25	\$525.03	\$515.78	\$373.07	\$128.46	\$3,742.93	147
11%-25%	\$3,991.91	\$1,453.78	\$1,135.93	\$1,176.05	\$261.95	\$231.77	\$8,251.39	82
26%-50%	\$4,108.64	\$2,219.09	\$1,647.27	\$987.62	\$1,564.18	\$338.51	\$10,865.31	55
51%-75%	\$4,514.58	\$1,241.67	\$583.33	\$640.88	\$312.50	\$103.33	\$7,396.29	24
>75%	\$4,867.50	\$3,070.00	\$7,030.00	\$270.00	\$1,860.00	\$78.00	\$17,175.50	10

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.

3.6.6.2 Cost of Control by Spread of Lantana

Average expenditure on controlling lantana was highest for properties indicating a decrease in spread of lantana, largely due to significantly higher machinery and herbicide costs.

Average expenditure on controlling lantana is also considerably higher for properties that reported an increase in spread of lantana than properties that reported little or no change, with higher average expenditure on labour, machinery, capital items and herbicide on these properties.

Table 3.37. Cost of Control by Spread of Lantana

Spread	Labour	Machinery ^(a)	Capital Costs ^(b)	Herbicide	Contractors	Other ^(c)	Total	Responses
Increased Spread	\$2,964.16	\$976.51	\$918.69	\$543.30	\$430.97	\$146.87	\$5,980.50	113
Decreased Spread	\$2,988.37	\$1,321.83	\$1,189.57	\$1,025.38	\$753.30	\$209.42	\$7,487.87	143
Little Change	\$1,745.26	\$530.76	\$743.66	\$315.16	\$354.34	\$112.79	\$3,801.97	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.

4. Summary of Main Findings

4.1 Impacts of Lantana

- The majority of land managers believe that lantana has either a significant or major impact on their property.
- Lantana is most commonly reported to impact on property by invading native vegetation / riparian areas and increasing weed control costs.

4.2 Control Method Preferences

- A high proportion of land managers do not control lantana in non-productive areas of their land.
- Survey results suggest that manual removal techniques are more commonly utilised on small lantana infestations, largely reflecting the time intensiveness of manual removal, while mechanical control techniques are more common for larger infestations where these techniques are more economical.
- Herbicide is generally more commonly used to control lantana infestations in readily accessible areas of land used for primary production purposes.
- Fire is more commonly utilised to control lantana infestations in difficult to access areas of large primary production properties.
- Grazing is generally used as a control technique where it is not economical to employ other methods.
- Land managers are more likely to follow up or monitor treated sites on an ongoing basis in land used for conservation or primary production purposes.
- Measures to prevent regrowth after treatment are more commonly undertaken on smaller properties, likely reflecting the lower cost and time requirements and differences in land manager attitudes between small and large properties.
- Revegetation with pasture and follow up with herbicide are considerably more prevalent techniques for preventing lantana regrowth in productive land, while continual removal by hand or slashing and revegetation with native plants are relatively more common prevention techniques in land used for conservation purposes.

4.3 Factors Limiting Adoption Control

- Major limiting factors to adoption of control methods include lack of available time, density or access restrictions and costs of control.
- Land managers indicated that incentives such as financial packages, herbicide assistance and new biological control agents would encourage them to improve their lantana control effort.

4.4 Control Costs

- In general, the time spent controlling lantana increases in line with the size of the property, and is higher for land used for primary production purposes.

- Total costs of control generally increase in line with increases in property size, although at a decreasing rate, reflecting the “lumpy” nature⁸ of expenditure items such as capital costs and machinery.
- The average cost of control almost doubled between 2003 and 2006, with labour expenses almost tripling over this period. This increase in expenditure is likely a reflection of both increasing labour and input costs, as well as an increase in control efforts.

4.5 Effectiveness of Control

- Over three quarters of land managers are satisfied with the results of their control effort.
- Management of lantana is easier and more effective on smaller sized properties, as evidenced by smaller properties generally reporting a lower extent of infestation and higher proportions of respondents indicating that the spread of lantana has been decreasing.
- Overall, management of lantana appears to be effectively reducing the spread of lantana, with a higher proportion of respondents indicating the spread of lantana is decreasing rather than increasing in both the 2003 and 2006 surveys.
- The extent of lantana appears to be receding more rapidly in land used for recreation and conservation purposes than in primary production land, as indicated by a comparatively larger proportion of respondents reporting a decrease rather than increase in spread. This may be a reflection that lantana is more invasive in disturbed areas.
- The following can be noted relating to the effectiveness of regrowth prevention techniques in reducing the spread of lantana:
 - Revegetation (with either pasture or native plants), shading out new lantana infestations, continual removal by hand or slashing and follow up with herbicide were generally associated with a decrease in spread of lantana; and
 - Preventing animal movements over the treated area and other prevention techniques were generally associated with an increase in spread of lantana.

⁸ “Lumpy costs” are costs that involve purchases of whole units that are not readily divisible.

References

CRC for Australian Weed Management (2003). Weed Management Guide: Lantana – *Lantana camara*. CRC for Australian Weed Management, University of Adelaide.