

REGIONAL WEED MANAGEMENT PLAN

1.1	PLAN TITLE: SILVERLEAF NIGHTSHADE CONTROL & MANAGEMENT IN THE NEW ENGLAND AND NORTH WEST REGIONS OF NSW
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1.2 PLAN PROPONENTS	
Regional Weeds Advisory Committee:	Northern Inland Weeds Advisory Committee
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Signature: Chairman	Date: Submitted 30 Oct 2004

1.3 NAME OF PLANT(S)	WONS	NO
Botanical name(s): <i>Solanum elaeagnifolium</i>		Silverleaf Nightshade (SLN)

1.4 PLAN PERIOD (not to exceed five years)		
Starting date: 1 st July 2005	Completion date:	30 th June 2010

1.5 AREA OF OPERATION

This plan covers the area of the Northern Inland Weeds Advisory Committee (NIWAC) as indicated in the *attached map*. This is an area of approximately 100 000 km² extending from the Liverpool Range in the south, to the Queensland border in the north, east to the New England tablelands and west to Moree Plains and Narrabri shires.

- 1.6 AIM - TO MINIMISE THE SPREAD OF SILVERLEAF NIGHTSHADE.**
- 1.7 OBJECTIVES**
1. Prevent new infestations from establishing on private and public land.
 2. Reduce existing infestations on public land by at least one infestation category by 2010.
 3. Contain existing infestations on private property to their current extent and severity (*Desired outcome: infestations do not cover any more land and plant density remains static*).
 4. Improve the ability of landholders to identify SLN and differentiate it from similar species.

2. STAKEHOLDERS

2.1 Signatories - organisations committed to the objectives/performance measures of this plan

- Gunnedah Shire Council (GSC);
- Liverpool Plains Shire Council (LPSC);
- Moree Plains Shire Council (MPSC);
- Moree Rural Lands Protection Board (MRLPB);
- Narrabri Shire Council (NSC);
- Northern Slopes
- North West Weeds (NWW) - incorporating Gwydir and Inverell Shires;
- Tamworth Regional Council (TRC); and
- Upper Hunter Weeds Authority (UHWA).

All of these organisations, apart from the Upper Hunter Weeds Authority, are within the NIWAC area. These stakeholders contributed to the plan via a regional planning workshop and were given various opportunities for input. Not all of these stakeholders necessarily have SLN in their area. Those that do not currently have it are involved in the plan because they are committed to keeping their area free of SLN.

2.2 Other stakeholders - interested parties consulted as part of this planning process.

All LCAs and RLPBs in the NIWAC region were invited to participate in this planning process and to be listed as stakeholders. State Forests and the Department of Environment and Conservation (formerly National Parks and Wildlife Service) were also consulted. Those organisations not listed as stakeholders are not included either because they don't have SLN in their area and/or don't consider it to be a potential problem.

3. BACKGROUND & JUSTIFICATION

3.1 Plan justification - reason for this plan

SLN is still fairly limited in our region and there is a strong belief that it is important to take appropriate steps to restrict further spread. This plan is also a continuation of the original plan submitted in 2000. Despite the progress that has been made through the implementation of that plan, early identification is still a problem for many land managers. This regional plan will provide a continued focus for SLN in the region and will facilitate essential ongoing control and management.

3.1.1 Description of the problem

Current and potential impact of the problem

The current impact is largely contained and infestations are regularly sprayed. However, in the North West Weeds area, where SLN infests waterways, the potential impact is huge. This is a major concern for high value agricultural land and the cotton industry centred on Moree in the lower Gwydir catchment.

Why it is important that this weed is controlled?

The fact that SLN is reasonably limited in the region, combined with the potential impacts and extent, highlights the need to control it. Once established, SLN is extremely difficult to control. It competes aggressively with both winter and summer crops and pastures and is spread by both seed and root pieces; all parts of the plant are capable of forming root buds.

3.2 Do nothing scenario

Failure to control SLN now will ultimately increase control costs and economic loss in the future. For this reason, doing nothing is not considered an option.

3.3 Distribution of infestations - where it occurs.

Organisation	Distribution of infestations
Gunnedah Shire	There are a few heavy infestations but these have changed little over the last 13 years.
Liverpool Plains Shire Council	Very limited, not really an issue.
Moree Plains Shire	Infestations are limited to an area about 17 kms south of Moree, adjacent to the Newell Highway, on Tycannah Creek. Infestations are not necessarily spreading but more are now being identified now that this site has been highlighted.
Narrabri Shire	Limited to one infestation south of Boggabri, near Glencoe, and small pockets on the Wean and Manilla Roads.
North West Weeds	Between 60 and 80 infested, particularly around Nullamanna where problems have persisted for the last 40 to 50 years. Other hot spots include Reserve and Myall Creeks with plants spreading along watercourses including the Gwydir River.
Tamworth Regional Council	Isolated infestations only near Werris Creek, Tamworth and north of Manilla.
Upper Hunter Weeds Authority	Mainly around Parkville with small, isolated patches between Aberdeen and Muswellbrook.

3.4 Biology

SLN is a shrubby perennial herb to 60 cm tall with oblong, silvery-green felted **leaves** and tiny scattered spines resembling straight needlepoints. The **flowers** produced in summer are shaped like a five pointed star up to 2.5 cm across, pale mauve with erect yellow stamens 7-8 mm long. The **fruit** is a globular golden-yellow berry about 1 cm diameter containing 20-100 seeds.

SLN is often mistaken for *Quena*, one of the harmless native *Solanum* species. These all have smaller anthers, 4-5 cm long. *Solanum coactiliferum* can be recognised by its four-pointed flowers and curved spines. *Solanum esuriale* is an herbaceous perennial with grey-green leaves and often lacks spines.

The weed is semi-dormant in winter and grows during spring and summer, using water reserves from deep in the soil.

3.5 Method and rate of spread

Method of spread

SLN can regenerate repeatedly from underground and survive drought. Cultivation will spread it across a paddock as root fragments. Root pieces as small as 1cm long has been known to produce new plants. Mature fruit remain attached to dead plants which break off at ground level and are blown by strong winds. Seeds are viable after passing through birds and other animals. The main source of infestations is through contaminated seed, agricultural machinery and floodwaters.

Current rate of spread

Infestations in Narrabri Shire have basically remained static for the last five years as have those in Gunnedah Shire. However, SLN is slowly spreading along waterways in Gwydir Shire and is currently moving down the Gwydir River. Any trend towards contract harvesting could potentially see an increase in the rate of spread.

3.6 Species management

Unfortunately, the SLN plant has no real weaknesses or an “Achilles heel”. It has an extensive root system, (2-3 m long), is easily spread by cultivation and is not affected by grazing. Some of the following management options may be appropriate.

Competition - Strong, competitive crops or pastures will give some control.

Cultivation - ineffective as it aids the spread from root pieces

Chemical options - Chemical control for SLN includes Picloram + 2, 4-D (Tordon 75 ® D), Glyphosate 360g/L (various trade names), Fluroxypyr (various trade names) and 2, 4-D amine 500 g/l (Various trade names.)

3.7 Key land managers

Given that SLN is spread very effectively by farm machinery, cultivation and floodwaters, the success of this plan will hinge on the coordinated efforts of many land managers.

Local Control Authorities - have a responsibility to control infestations on LCA land, conduct extension activities, inspect private properties and record details of SLN infestations and coordinate the efforts of other stakeholders.

Local Councils - Councils also have a responsibility to minimise the spread of weed seed through routine operations such as slashing, grading and road construction. These efforts need to be integrated with the work of the Weeds Officers.

Graziers - Control and management on private land is ultimately the responsibility of land managers.

Northern Inland Weeds Advisory Committee (NIWAC) - the regional weeds committee will be responsible for developing policy and encouraging all LCAs and RLPBs to adopt this policy. They will also provide a focus for coordination and annual review and monitoring of proposed actions.

4. REGULATORY SITUATION

4.1 Current declaration

SLN is currently declared as a W2 weed in Gunnedah, Moree and Narrabri Shires and the area covered by the Central Northern County Council. It is declared as a W3 weed in Tenterfield Shire and Gwydir and Inverell Shires.

4.2 Declaration changes

There are no declaration changes but it should be noted that the Central Northern County and North West Weeds County Councils were disbanded on 1st July 2004. We are assuming that the new LCAs, namely Liverpool Plains Shire Council (based on the former Quirindi Shire Council boundary), Gwydir Shire Council (incorporating the former shires of Bingara and Yallaroi) Tamworth Regional Council (incorporating the former shires of Barraba, Manilla, Nundle, Parry and Tamworth City Council) and Inverell Shire Council (which formerly operated under the North West Weeds County Council) will adopt the declarations of the organisations that were formerly part of.

5 CONSIDERATIONS & OPPORTUNITIES.

5.1 Financial support to carry out the plan

All stakeholders listed in this plan will contribute a significant proportion of their own funds towards implementing this regional plan. Department of Primary Industries noxious grant funding will also be accessed. However, given the limited nature of these funds, it is expected that this will only account for a small percentage of total expenditure to implement this plan.

The Action Plan section of this plan indicates the funding source for specific actions.

5.2 Links to other strategies

This Plan forms part of the NIWAC **Regional Strategy** and, through it, is linked to the State Weeds Strategy. Many of the activities in this plan, and underlying principles, reflect those in the **State Weeds Strategy**.

The inspection and extension activities associated with this plan will—in the main—be combined with the normal LCA inspection and coordination program. Some extension activities, particularly those that relate to more than one weed, will be addressed through the Regional Strategy.

5.3 Barriers and contingencies

Barriers restrict what can be done and how. Identifying these barriers is the first step to overcoming them. The main barriers to managing SLN are:

- B1** *Difficulty in early positive identification* - even experienced people have difficulty in identifying;
- B2** *Lack of follow up treatment for infestations;*
- B3** *Difficulty in controlling infestations along watercourses; and*
- B4** *No effective means of controlling established infestations.*

5.4 Contingency plans - what if scenarios

ACTION PLAN

FURTHER EXPLANATION OF OBJECTIVES AND HOW THEY MEET THE SMART CRITERIA

OBJECTIVE 1 Prevent new infestations from establishing on private and public land (*Desired outcome: no new infestations*)

OBJECTIVE 2 Reduce existing infestations on public land by at least one infestation category by 2010.

- This objective is *specific* - it basically means improving the SLN problem on public land by either reducing the density of the infestation and/or the area infested.
- This objective is *measurable* - see note below
- This is *achievable and realistic* - Public land managers should be able to minimise the spread of root fragments and other plant material through the adoption of certain protocols. Public land managers also have a responsibility to demonstrate sound land management.

OBJECTIVE 3 Contain existing infestations on private property to their current extent and severity. (*Desired outcome: infestations do not cover any more land and plant density remains static*)

- This is *specific* - it relates only to private property and basically means maintaining the status quo for infestations on these properties
- This objective is *measurable* - see note below
- This is seen as an *achievable and realistic* objective given the method of spread and the difficulty of controlling the plant once it has established.

Objectives 1, 2 and 3 are all measurable. All LCAs in the NIWAC region have a standard approach for recording infestations on private property. This involves recording the number of hectares infested and the infestation category. The infestation category is based on the severity/degree of infestation, expressed as either 1 (scattered individual plants) 2 (scattered patches with isolated plants) or 3 (large, dense infestations) and the extent/% of property infested, is expressed as either High (over 20% of the property infested) Medium (5 - 20% of the property infested), Low (1-5% of the property infested), Rare/Isolated (less than 1% of the property infested) or Not Found. The attached table explains these categories and shows the relevance of this approach for monitoring outcomes.

- **Improve the ability of landholders to identify SLN and differentiate it from similar species.**

Identification is considered to be a major barrier to achieving the aims and objectives of this plan. Although this could also be a strategy it has been included as an objective to ensure that it is highlighted through the regional plan. Any awareness objective is always hard to measure and this is no exception. Ultimately this objective could be measured by the changes in the number of infestations found.

CONTROL AND MANAGEMENT STRATEGY

RELATED OBJECTIVES:

Reduce the density of existing infestations on public land by at least one infestation category by 2010.

Contain existing infestations on private property to their current extent and severity.

Controlling smaller, light infestations and limiting them to their current extent and density should reduce the amount of plant material from which new plants can regenerate. The focus for heavier infestations should be on containment - basically to minimise the impact of these infestations.

				While not included in the DPI format for regional plans these columns are included so every stakeholder can look at the plan and know exactly what they are expected to do and when by			
NO	ACTION (WHAT)	PERFORMANCE INDICATOR	BY WHOM	WHERE	WHEN	PRIORITY	\$ SOURCE
1.	Maintain buffer zones between clean and infested areas to minimise spread	No further spread of infestations	LCAs and RLPBS	Between infested and clean areas	Ongoing	HIGHLY DESIRABLE	
2.	Control SLN on identified roadsides.	All infestations of roadsides sprayed annually and new infestations controlled within two years of outbreak.	Relevant LCAs	Marginal and rare/isolated	Annually	ESSENTIAL	DPI group project funds LCA funds
3.	Develop/adopt roadside management principles to minimise the spread through activities such as road maintenance and construction.	Principles adopted as policy by all Councils and LCAs in the NIWAC region	Policy developed and promoted through NIWAC and adopted by LCAs and councils	All areas		HIGHLY DESIRABLE	Council funds

EXTENSION & AWARENESS STRATEGY

Related objectives:

Improve the ability of landholders to identify SLN and differentiate it from similar species.

The difficulty in identifying SLN is a specific barrier to the implementation of this regional plan. The similarities between this plant and other common members of the solanum species has helped SLN to become well established through inaccurate identification. Increasing awareness is also important because the plant is poisonous to stock, especially cattle.

While not included in the DPI format for regional plans these columns are included so every stakeholder can look at the plan and know exactly what they are expected to do and when by

NO	ACTION (WHAT)	PERFORMANCE INDICATOR	BY WHOM	WHERE	WHEN	PRIORITY	\$ SOURCE
4.	Promote the importance of ongoing treatment for effective management and control of SLN	2 extension activities per LCA annually.	LCAs	All areas	Ongoing	HIGHLY DESIRABLE	LCA funds
5.	Promote the features of SLN that differentiate it from other similar looking plants.	2 extension activities per LCA annually.	LCAs	All areas	Ongoing	HIGHLY DESIRABLE	LCA funds
6.	Target machinery re sellers, landholders and contract operators about the importance of machinery hygiene to limit spread	All machinery sellers and contract operators visited/targeted annually.	LCAs	All areas	Ongoing	HIGHLY DESIRABLE	LCA funds

SURVEILLANCE AND MONITORING STRATEGY

Related objectives:

Prevent new infestations from establishing on private and public land (*Desired outcome: no new infestations*)

Surveillance is important to gain a better understanding of the extent and impact of the problem, to monitor any changes in the situation, identify any new outbreaks and allow for early intervention. Without this feedback it is impossible to know if the situation is improving or getting worse and to decide how to best direct resources to meet the plan aims and objectives. Because the majority of SLN occurs on the slopes and plains, where the areas are much bigger than on the adjoining tablelands, the pure size of each LCA will limit the amount of properties, roads and public land that can be inspected and treated every year.

				While not included in the DPI format for regional plans these columns are included so every stakeholder can look at the plan and know exactly what they are expected to do and when by			
NO	ACTION (WHAT)	PERFORMANCE INDICATOR	BY WHOM	WHERE	WHEN	PRIORITY	\$ SOURCE
7.	Identify and map current infestations on private land.	All properties inspected at least every five years.	LCAs based on property inspections	All private land in all LCAs	Ongoing	ESSENTIAL	DPI Inspection grants Council funds
8.	Identify and map infestations on all roads, TSRS and other areas of public land.	All roads inspected twice annually.	Public land managers	all public land, all levels of infestation	Annually between March & October	ESSENTIAL	DPI group project funds LCA & RLPB funds
9.	Reinspect properties with major infestations.	Infested properties inspected annually.	LCA inspectors		Annually btwn March & October	HIGHLY DESIRABLE	DPI Inspection grants Council funds
10.	Prepare an annual infestation report.	Annual infestation report prepared.	All stakeholders	All areas	June annually	HIGHLY DESIRABLE	Individual organisations

7. MONITORING & REVIEW PROCESSES

Each stakeholder will be required to report against performance indicators at least annually. Stakeholders will also be required to provide regular updates on the infestations in their area, using a format that is endorsed by NIWAC. These reports will include details of spraying activity and results from inspections including the number of properties inspected, number of infested, the hectares infested and the type of infestations.

Individual reports will be collated into an annual regional infestation report. This regional report will be used to monitor outcomes and to assess if the weed problem has improved or worsened. An example of the annual infestation report is included on page 18. These annual reports will be prepared by either the plan author/lead organisation or the Regional Plan Coordinator.

Stakeholders will also be encouraged to use NIWAC meetings to report on any regionally significant issues.

8. BENEFITS

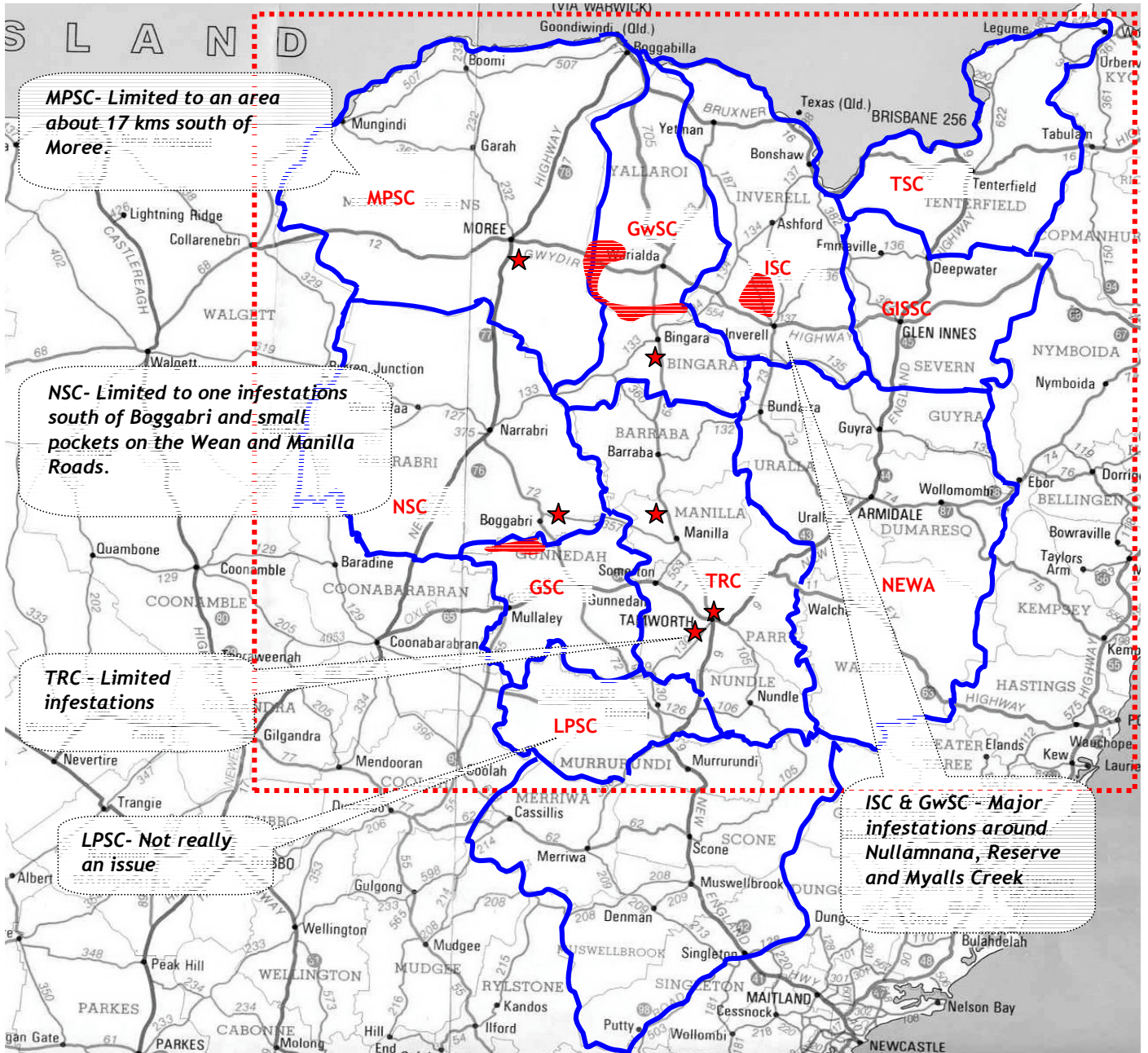
Implementation of this plan will:

- Improve coordination and control between public land managers. This will reduce the long term financial commitment for control and also reduce losses through yield reduction;
- Reduce the risk of stock poisoning from eating SLN;
- Improve the health and diversity of natural ecosystems including native pastures and the riparian zone; and
- Prevent new areas from becoming infested.

9 RESOURCES

- Australian Animal and Plant Control Commission of South Australia (2000) Weed identification Notes - Silverleaf Nightshade
- Namoi Gwydir and New England Noxious Plants Advisory Committee (2000) Original SLN plan
- NSW Agriculture (2004) Noxious and Environmental weed control handbook, 2004-2005, A guide to control in non crop, aquatic and bushland situations.





**NIWAC REGIONAL WEED MANAGEMENT PLAN
SILVERLEAF NIGHTSHADE (UPDATED OCTOBER 2004)**



Note: Infestations not to scale. This map is intended to provide an overview of the location of infestations in the region.

KEY

CODE

	LCA Boundaries		NIWAC regional boundary
GIMC	Glen Innes Severn Shire Council	NSC	Narrabri Shire Council
GSC	Gunnedah Shire Council	NEWA	New England Weeds Authority
GwSC	Gwydir Shire Council	TRC	Tamworth Regional Council
ISC	Inverell Shire Council	TSC	Tenterfield Shire Council
LPSC	Liverpool Plains Shire Council	UHWA	Upper Hunter Weeds Authority
MPSC	Moree Plains Shire Council		
			Larger Infestation - not to scale

**ANNUAL INFESTATION REPORT - SILVERLEAF NIGHTSHADE
JULY 2004**

Number of properties with infestations and hectares infested by infestation category																												
Number of private properties with infestations																									PUBLIC LAND INFESTED			
HIGH (H)						MEDIUM (M)						LOW (L)						Less than 1% of property infested		TOTALS H + M + L +R/I all categories								
More than 20% of property infested						Between 5 and 20% of property infested						Between 1 and 5% of property infested						R/I		No		Ha						
H1		H2		H3		M1		M2		M3		L1		L2		L3								L				
No	Ha	No	Ha	No	Ha	No	Ha	No	Ha	No	Ha	No	Ha	No	Ha	No	Ha	No	Ha	No	Ha	No	Ha	No	Ha	km	Ha	
GSC			3	2000			2	1000														51	500	56	3500			
MPSC													10	150	3	75									13	225		
NSC																						15		15	0			
NWW					10	4000					28	14000			38	10000								76	28000	100	300	
MRLPB																			1	60				1	60			
TOTALS	0	0	3	2000	10	4000	2	1000	0	0	28	1400	0	10	150	41	1007	5	0	0	1	60	66	500	161	31785	100	300

This table shows the number of infestations and their infestation category for each LCA and RLPB participating in this plan. The attached matrix explains the categories.

These figures are based on information provided by each organisation. LCA figures are gathered during property inspections.

These figures can be used to monitor changes in:

- The number of properties infested (in total, by infestation category and by organisation/area) ;and
- The number of hectares infested (total, by infestation category and by organisation).

**NIWAC INFESTATION MATRIX
USED TO CLASSIFY WEED INFESTATIONS**

			EXTENT				
			Estimated % of total property area (hectares) infested.				
			HIGH	MEDIUM	LOW	RARE/ISOLATED	NOT FOUND
			Over 20 % of the property infested with either one or all of the degrees of infestation	Between 5% and 20% of the property infested with either one or all degrees of infestation	Between 1 and 5% of the property infested with either one or all degrees of infestation	Less than 1% of the area of the property infested with Class 1 or Class 2, or a mixture of the two.	Not found
SEVERITY OR DEGREE	Scattered individual plants	1	H1	M1	L1	R1	NF
	Scattered patches with isolated plants interspersed	2	H2	M2	L2	R2	
	Large, dense infestations	3	H3	M3	L3		