

WEEDS OF NATIONAL SIGNIFICANCE

RUBBER VINE

(Cryptostegia grandiflora)

Strategic Plan

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Supporting information about the National Weeds Strategy, Weeds of National Significance and progress to date may be found at www.weeds.org.au where links and downloads provide contact details for all species, their management committees and copies of the strategy.

This strategy was developed under the leadership of the Dept of Natural Resources, Queensland with full cooperation of all the States, Territories and Commonwealth of Australia.

Comments and constructive criticism are welcomed as an aid to improving the process and future revisions of this strategy.

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EXECUTIVE SUMMARY

Rubber vine (*Cryptostegia grandiflora*) is one of northern Australia's worst weeds. It is a perennial vine that aggressively colonizes native vegetation to form thickets and it impacts on river ecosystems. It costs primary production over \$18.3 million per annum by decreasing pasture production and hindering mustering. The environmental impacts of this species are significant it has the potential to destroy all deciduous vine thickets in north Queensland.

Large infestations of rubber vine occur along the river systems of southern Cape York, the Queensland Gulf country, Burdekin River, around Rockhampton and the Burnett River. It has potential to infest large areas of Northern Territory and Western Australia. This strategy was developed after extensive community consultation.

The major challenges for rubber vine are early detection of new infestations, managing extensive infestations and the uptake of management practices that compliment bio-control including fire and chemical methods.

The vision of the strategy is that:

Rubber vine is confined and its impacts reduced to a minimum.

The strategy aims to deliver four desired outcomes:

1 Rubber vine is prevented from spreading.

- Prohibit propagation, cultivation and sale, across Australia
- Manage *C. madagascariensis*
- Maintain detection and eradication mechanisms
- Maintain a national containment line
- Use enforcement as a management tool.

2 The adverse impacts of established rubber vine infestations are minimised.

- Foster regional and local containment planning
- Promote the integration of rubber vine management
- Identify economic impacts, incentives and disincentives
- Refine and adopt best practice management
- Improve integrated management practices.

3 National commitment to rubber vine is maintained.

- Adopt community approach to planning and management
- Maximise the availability and use of resources
- Develop maps of rubber vine.

4 Rubber vine management is co-ordinated at a national level.

- Manage implementation of the plan
- Monitor implementation of the plan
- Coordinate communication about the plan.

The extent to which these outcomes are met will be evaluated as part of a five-year cycle of review and will determine the success of this strategic plan.

THE CHALLENGE

Rubber vine (*Cryptostegia grandiflora*) is one of Australia's worst weeds. It has received national attention because of its impacts in northeastern Australia, forming impenetrable thickets, smothering native vegetation and hindering primary production.

Rubber vine is a woody climber, native to Madagascar, which is now relatively widespread across the tropical regions of the world. Imported into Queensland as an ornamental in the 1860's this plant was also touted as a source of rubber during the 1940's. It has gone on to become a major weed. It is known to densely infest 700,000 hectares in tropical and subtropical Queensland while it has been found across 34 million hectares. Most of northern Australia, from the Pilbara in Western Australia to northern New South Wales appears to be climatically suitable for rubber vine and must be considered as potentially under threat from this weed. There is urgency to prevent the weed spreading to the Carpentaria coast and Arnhem Land regions of the Northern Territory and to control small infestations in Western Australia.

Annual costs to the grazing industry are estimated at \$18.13 million per year due to decreases in carrying capacity and increases in management costs. The environmental costs are immense, with the potential to destroy many unique ecosystems such as gallery forest and dry rainforest.

Rubber vine impacts on: four vulnerable animal species, thirteen threatened plant communities, one Ramsar site, thirteen important wetlands and a total of forty eight reserve areas in Queensland.

Unless effective and efficient management is implemented and maintained, rubber vine will continue to impact adversely on biological diversity, agriculture, tourism, other industries and Aboriginal land use across northern Australia.

Prevention of spread is difficult as wind, water and man easily and rapidly disperse rubber vine. Large new infestations can rapidly arise and once established the economic and control costs are very high. Early detection and control is therefore required to stop new infestations before they establish. Progress has been made on control of rubber vine. It can be managed with a combination of fire, biological control, mechanical and chemical measures. Costs may be significant, however, when measured against land value. The rubber vine rust appears to be having significant impacts on the species. Funding is required to effectively extend the outcomes of the integrated control research to land managers.

Implementation of the Rubber Vine Strategic Plan will result in containing the spread of rubber vine and minimising the impact of established infestations to Australia.

1 BACKGROUND

Rubber vine is a weed of national significance because it is a twining vine, smothering vegetation with impacts on native ecosystems, primary industries and tourism. Large infestations of rubber vine are currently only found in Queensland: however, it poses a risk to a large part of northern Australia.

Rubber vine is quite distinct from most other plants although it may be confused with *Cryptostegia madagascariensis*, a close relative. In Madagascar these two species have been shown to hybridise. This species has also been classed as a weed in Western Australia. The genus has no native members, *Gymnanthera* is the closest genus

1.1 The biology of rubber vine

Rubber vine, *Cryptostegia grandiflora*, is a self supporting, scrambling, many-stemmed vine that grows to 2 metres tall with long trailing whips. A milky sap oozes from stems, leaves and seedpods when cut or broken. Leaves are dark green and glossy, 6-10 cm long, 3-5 cm wide and in opposite pairs. Roots have been found at a depth of 13 meters in mine shafts. Roots of seedlings are twice as long as shoots.

The growth form of rubber vine differs depending on the surrounding conditions. In most locations it forms dense canopies of overlapping plants with long whips. It can form towers to the height of the native trees (30 metres). The plants are freestanding shrubs in the absence of other vegetation.

Flowers are large and showy, with five white to light purple petals in a funnel shape. The seedpods are rigid, 10-12 cm long, 3-4 cm wide and grow in pairs at the end of a short stalk. Seed numbers range from 340-840 per pod. Each seed has a tuft of long white silky hairs. In a reasonably dense infestation of rubber vine, potential seed production is over eight million seeds per hectare per annum. Over 95% of seeds are viable. Most seed will germinate or perish within a year of release. Availability of soil moisture is often the main factor controlling seed germination (Fig. 1).

The major method of pod dispersal is water. Investigations have shown that pods will float in salt water for up to 40 days before becoming waterlogged. Seeds of waterlogged pods retain 60% viability. This suggests a risk

of pod dispersal by floods and tidal flow. Wind is the primary mechanism for spreading seed. Although 85-90% of seed lands close to the parent plant, some may be spread significant distances by storms.

1.2 History of spread

Rubber vine is a native of southwest Madagascar. The exact date of the introduction of rubber vine into Australia is not known, but it was prior to or around 1875. Rubber vine was used as an ornamental in mining towns of north Queensland and quickly became naturalised. By 1917 there were major infestations around Rockhampton, Charters Towers and Georgetown. Efforts were made to grow rubber vine during the Second World War as a rubber source and although this was not successfully developed it may have lead to further spread.

Rubber vine has been recorded across 34.6 million hectares, or 20% of Queensland (Chippendale 1991). It is distributed from Gatton in the south to Longreach and Blackall in the southwest, to the coast in the east and Point Parker in the northwest (Appendix 1). The core distribution is 700,000 hectares along the river systems of southern Cape York, the Queensland Gulf country, Burdekin region, Burnett River and around Rockhampton.

Two infestations of rubber vine have been found in Western Australia: Koolan Island (1992) and south of Kununurra (1997). This species has also been found growing in a garden near Geraldton. Although no plants have been recorded in the Northern Territory, surveys confirm that rubber vine is growing 90km from the border.

River & Creek Infestations

The heaviest infestations of rubber vine occur along rivers and creeks, completely choking the river edge. In some areas it forms impenetrable barriers up to 400 m wide on each side of riverbanks. The species will then aggressively and invade open woodlands and pastures.

The potential distribution of rubber vine in Australia has been predicted using CLIMEX from the ecoclimatic characteristics of its

native distribution in Madagascar (Figure 2). Most of tropical north Australia is sufficiently suited to rubber vine to suggest that an

extensive area, 32,000-160,000 km², may be under threat of invasion from rubber vine.

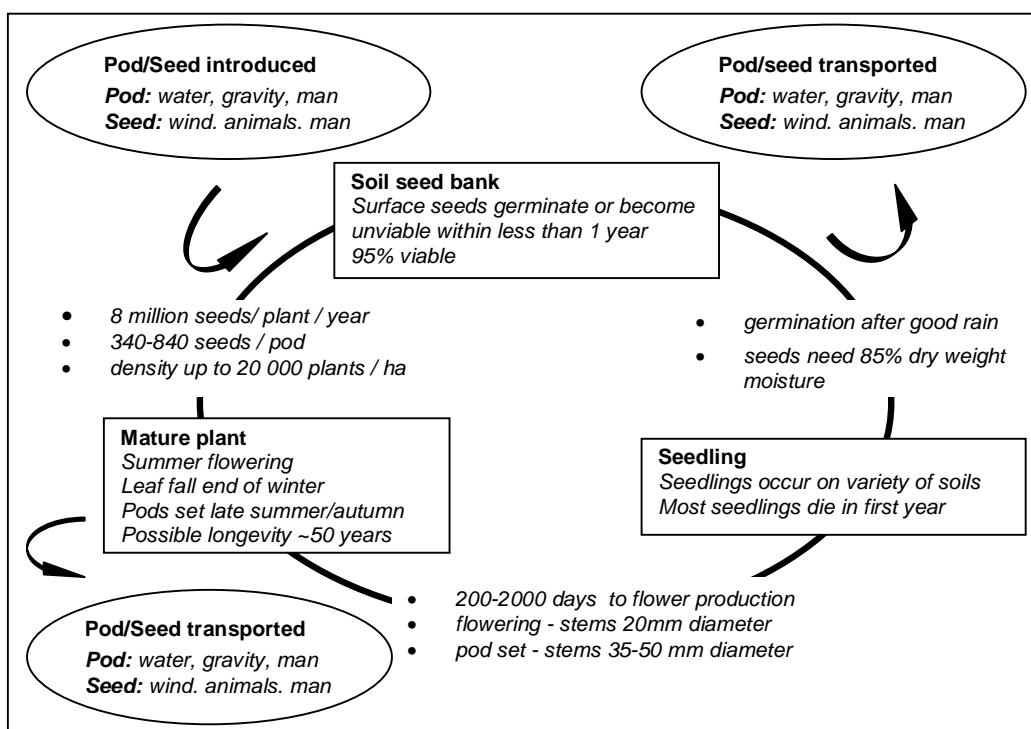


Figure 1. The life cycle of rubber vine.

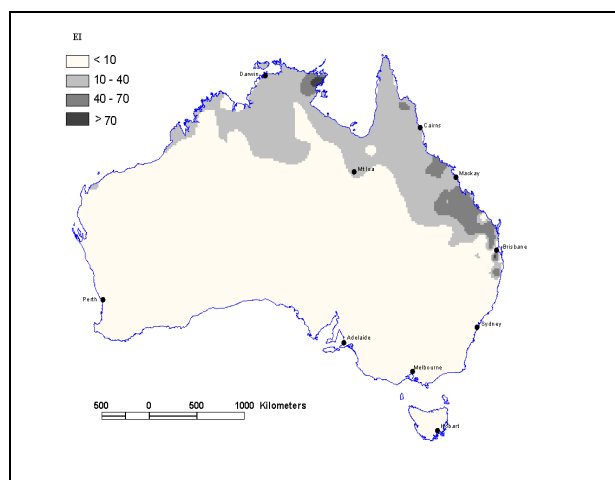


Figure 2. Potential distribution of rubber vine (Data is splined from a CLIMEX prediction. EI = Ecoclimatic index: EI<10 potential for permanent population low, EI>70 potential extremely high).

1.3 A weed of national significance

Rubber vine's current impacts can be summarised as follows:

Environmental:

- Threatens: 4 vulnerable animal species, 13 plant communities, 1 Ramsar wetland, 13 wetlands and 48 reserve areas in Queensland (QPWS pers. comm.)
- Extremely aggressive invader of woodlands. It is a vigorous climber which

will smother and kill plants and shade out the ground layer

- Potential to destroy all deciduous vine thickets in north Queensland, leading to the loss of unique ecosystems. The Big Mitchell Creek gallery forest infestation led to the disappearance of the rufous owl (*Ninox rufa*), and bower's shrike thrush (*Colluricincla boeri*)
- Increased soil erosion due to loss of grasses and other ground cover species
- Changes to water flow and watercourses.

Primary Production:

- Estimated cost in terms of lost beef production in north Queensland due to loss of pasture in excess of \$18 million per year
- Increased difficulty and expense of mustering stock
- Increased fencing costs to keep cattle out of dense rubber vine areas
- Impedes access of stock to water
- Decreased property values.

Tourism:

Potential to seriously threaten the World Heritage areas of northern Queensland and the Northern Territory. The Undarra Volcanic National Park was affected when rubber vine covered the entrance of the volcanic lava tubes, thus decreasing the appeal of this attraction.

1.4 Legislative controls

Rubber vine has declared status in 3 states.

- Queensland: Plants are to be destroyed (P2 area) or populations to be reduced (P3 area).
- Northern Territory: Class C- introduction of species is prohibited.
- Western Australia: P1/P2 - must not be introduced and eradicated if found.

Rubber vine is not declared in other states, and so may be grown, traded or distributed from these states. National declaration would be required to ensure this does not occur.

This species is not currently regulated by Commonwealth agencies. The Australian Quarantine and Inspection Service (AQIS) which prohibits the introduction of weed species does not regulate rubber vine importation. The Environment Protection and Biodiversity Conservation Act 1999 overseen by Environment Australia (EA) may result in rubber vine becoming a key threatening process or its listing in regulations controlling non-native species.

1.5 Control to date

Rubber vine was declared a noxious plant in Queensland in 1955, but despite extensive control efforts the weed is well established and further control efforts must be considered from the perspective of the weed being a long-term problem. Research to develop integrated control has been conducted over a long period by QDNR, and recently by the CSIRO.

Fire together with biological, chemical, and mechanical methods can be used in an integrated control program for rubber vine, and all may be effective in particular situations (Mackey *et al.* 1996). Fire is the most effective management tool, where invasion is still under way. Caution may be required in riparian zones to minimise impacts on the ecology. The economics of using fire in open areas is improved by the impacts of the rust.

Biological control is the most cost-effective method for managing dense areas (see box). The leaf rust, *Maravalia cryptostegiae*, released in 1995 is having significant impacts on plants. The rubber vine moth, *Euclasta gigantalis*, also released in 1995 is more prevalent in the dry season. It appears to have been affected by parasitism from two flies and a microsporidian disease. It has, however, been responsible for extensive defoliation in some seasons.

In all states, the control of a declared plant is the responsibility of the landholder and many landholders are actively attempting to combat this species.

SWEEP

The desire to prevent spread lead QDNR to commence a strategic control program for rubber vine. The Strategic Weed Eradication and Education Program (SWEEP) has spent \$2.7M on control of outlying (or strategic) infestations from 1995/96 to 1998/99. These infestations covered 40% of the infested area (generally small or low-density infestations). The program operates in partnership with landholders and local governments, 20% of funds supplied by landholders, and assists with initial control work where there is a wide community benefit. A rubber vine containment line (RVCL) was established in 1999. All infestations outside the line are targets for eradication, while inside the line integrated control to minimize impact is proposed.

Rubber vine rust having an impact

Imported rust is significantly affecting rubber vine across Queensland. *Maravalia cryptostegiae*, the rubber vine rust, is a Madagascan fungus that parasitizes the leaves of the host, rubber vine. Released as a biological control agent in 1995 by QDNR it rapidly spread from release sites covering 20km in two months. By 1996 most infestations across northern Queensland demonstrated rust infections.

Studies in 1999 indicate that impacts of the rust include reductions in:

- pod numbers - 85%
- above ground biomass - 74%
- plant height - 42%
- leaf cover - 73%
- flower production - 48%

- the onset of flowering is also delayed as are other developmental stages of the plant.

The constant defoliation of rubber vine results in reduced ground cover that enables forbs and grasses to grow underneath the rubber vine canopy. The increased grass growth provides fuel to carry fires up to the trunks of rubber vine plants and the defoliated leaves provide fuel for fire management. Reduced seed production should also lessen seedling establishment and therefore slow the rate of new infestations.

1.6 Principles underlying the plan

This plan is based on the recognition and acceptance of the National Weeds Strategy principles:

- Weed management is an essential and integral part of the sustainable management of natural resources and the environment, and requires an integrated, multidisciplinary approach.
- Prevention and early intervention are the most cost-effective techniques that can be employed against weeds.
- Successful weed management requires a coordinated national approach, which involves all levels of government in establishing appropriate legislative, educational and coordination frameworks in partnership with industry, landholders and the community.
- The primary responsibility for weed management rests with landholders/land managers but collective action is necessary where the problem transcends the capacity of the individual landholder/land manager to address it adequately.

1.7 Process Followed

The National Rubber Vine Strategy is the product of a stakeholder workshop held in

Scope Scale	Natural Resource Management	Pest Management	Weed Species Management
National	National Strategy for Conservation of Australia's Biological Diversity National Strategy for Ecological Sustainable Development	National Weeds Strategy	Rubber Vine Strategic Plan
State	Qld Biodiversity and Natural Resource Management Strategy Forest Policy, River, Estuary and Wetland policies	Queensland Weed Strategy Northern Territory Weed Management Strategy WA Weeds Strategy	Queensland Rubber Vine Management Plan
Regional	Regional NRM Plans	Regional Pest Management Strategies	Rubber Vine Containment Line
Catchment	Catchment Management Strategies	ICM Pest Management Strategies	
Local	Landcare and Roadside Conservation Plans	Local Government Pest Management Plans (Qld.)	
Property	Property Management Plans	Property Pest Management Plans	

Charters Towers in March 1999. This workshop revised and updated a strategy first drafted in November 1997.

The draft document was the basis of a Commonwealth Natural Heritage Trust project proposal in 1997/98. This project funded work on the containment line, extension and the development of an adaptive management research program. The strategy takes in account feedback from over 40 stakeholders who commented on drafts and input from the management group.

The Rubber Vine Management Group (RVMG) was formed after a meeting in Charters Towers in March 1999. Its membership consists of representatives of industry, landcare, local government, conservation, landholders, government agencies and researchers. The group's mission is "Minimise the impacts rubber vine has on the environment, to achieve sustainable levels of primary production and conserve or enhance the biodiversity of these areas". This group will oversee the implementation of the national strategy.

1.8 Relevance to other strategies

The Rubber Vine Strategic Plan has been established to provide a framework for coordinated management of the weed across the country. To date infestations of this weed are limited to Queensland but rubber vine has the potential to spread to other states. The strategy is linked to other national and state resource plans, strategies and groups already involved in rubber vine management at regional and local levels.

2 STRATEGIC PLAN

VISION

Rubber vine is confined and its impacts reduced to a minimum.

2.1 Prevent spread

Desired outcome

Rubber vine is prevented from spreading.

Background

Rubber vine's current distribution is the product of its wide use as a garden plant across Queensland over the last century. Once rubber vine occurs in an area it is hard to control its spread to other areas as its pods and seeds are spread by natural means. It is important therefore to prevent further plantings of this species, as this is one mode of spread that can be controlled. Rubber vine is still sold as an ornamental in southern States. Although rubber vine doesn't have weed potential in southern states, it could easily be transported to northern Australia by southern gardeners.

Cryptostegia madagascariensis is a close relative to rubber vine. Several naturalised populations of this species have been removed from the Kimberley in Western Australia. In Madagascar these two species have been shown to hybridise, which could result in the production of a third weedy form in Australia. This species is currently used in the ornamental plant trade as a climber. Continued sale could lead to its substitution for rubber vine in the trade or failure to eradicate rubber vine through confused identification. This species is already declared in Western Australia.

A key component of preventing the impacts of rubber vine is early detection of plants in

areas outside the RVCL. Vast areas of Australia are at risk from pod or seed spread. It is important that areas at risk are prioritised and regular surveys are carried out. An example is a helicopter survey carried out in north-west Queensland in 1998-99. The surveys showed that rubber vine had spread west of the known infestations. Aerial control of these populations moved the front of rubber vine away from the Northern Territory border. Assistance is needed from the industries and communities of northern Australia to prevent spread and to detect new infestations. A range of education activities, brochures, and activities will be required, to increase awareness. When new infestations are detected in Queensland, QDNR has the resources to respond, but this needs to be maintained and be available in other States.

The RVCL has been established and currently defines two areas of densely established rubber vine (Appendix 1). All rubber vine outside the RVCL is targeted for removal in the long term. Small infestations found in Western Australia are currently being eradicated.

Rubber vine should be declared under legislation to prevent its trade and distribution in all States and where necessary to support control of new or strategic other infestations. This authority must be available to ensure that the goal of preventing spread is achieved, although, it is recognised that enforcement should be a last resort. The primary emphasis of the plan is on encouraging landholders, through involvement to develop ownership of the issues and consequent outcomes (Strategy 2.2.2)

Strategy	Actions	Responsibility	Rank
2.1.1 Prohibit propagation, cultivation and sale across Australia	Declare rubber vine to prohibit propagation, trade and distribution in all States and Territories	Legislative agency in each State and Territory, nursery industry, EA	1
2.1.2 Manage <i>C. madagascariensis</i>	Declare <i>C. madagascariensis</i> in all States/Territories to prohibit trade and distribution	Legislative agency in each State and Territory	1
	Manage <i>C. madagascariensis</i> in the same way as <i>C. grandiflora</i> ; eradication outside the containment line, containment within.	State agencies, nursery industry	2

Strategy	Actions	Responsibility	Rank
2.1.3 Maintain detection and eradication mechanisms	Implement annual surveys of high risk areas	State/ federal agencies, RVMG, local government.	1
	Implement education and awareness activities specific to: mining, tourism, defence, grazing industries, environmentally significant areas, nurseries in southern Australia, community groups, government staff, and regular communications for the general public	State/ federal agencies, local government, industry/community groups, RVMG	2
	Establish a state-based procedure for receiving and responding to reports of new infestations (including voucher specimens in state herbaria) and maintain an early eradication capacity	State agencies, local government, EA	3
2.1.4 Maintain a national containment line	Regularly review containment boundaries and make available to the public	QDNR, RVMG	1
	Provide criteria for determining areas inside and outside the containment line	QDNR, RVMG	1
	Eradicate rubber vine outside the boundaries:	QDNR, AGWA, NTDPIF	1
	(A) Initial control (B) Follow-up	Landholders & local government	1
2.1.5 Use enforcement as a management tool	Manage eradication using project planning on an appropriate scale, incorporating long term landholder responsibilities into each project	State agencies, local government	1
	Utilise support available from co-operative landholders in encouraging others to meet their eradication responsibilities	QDNR, local governments, LCMC and Landcare groups	2
	Utilise enforcement with all landholders where necessary to ensure control aimed at eradication is achieved	State agencies, local government	3
	Provide enforcement skills to shires		

2.2 Reduce the impact

Desired outcome

The adverse impacts of rubber vine infestations are reduced.

Background

In the regions of established rubber vine (Appendix 1), there are rivers, creeks and large areas of woodlands that are still free of rubber vine or have sparse populations. A preventative approach is necessary to protect those areas that are free or almost free of rubber vine. This needs to be tackled locally on an appropriate basis (e.g. sub-catchment). Furthermore, any opportunities for coordinating activities to minimise the impact of established rubber vine should be planned and implemented regionally or locally, provided consistency is maintained with larger scale plans (e.g. catchment plans).

Rubber vine and other weed management should not be considered in isolation from other management activities on a property, region or catchment. Attention should be given to the total requirements of landscape restoration rather than for weed control *per se*. Rubber vine is often one of several weeds in the area. Therefore, rubber vine

management should be considered along with control and management of other weeds. Further, weed management should be considered as part of property management planning and coordinated with other activities in order to maximize the benefits of control and seasonal fluctuations.

Many major populations of rubber vine are found on large pastoral properties, characterized by low productivity per unit area, and a large number of national parks, reserves and state controlled lands. Control costs in the range of \$300-400 per hectare are unacceptable over large areas when typical Gulf country land is worth \$15-25 per hectare but can be justified where there is significant prevention value. Landholders receive no benefits from rubber vine, but the cost of control and time taken are disincentives to control. All stakeholders should consider that not containing rubber vine would result in their grandchildren inheriting a less productive and less bio-diverse landscape.

A wide range of control options is available for rubber vine, including fire, biological, physical and chemical control. The effectiveness of these methods needs continuous dissemination to landholders. At

the same time input from landholders on the practicality of control methods in local situations is essential to refine best practice management for rubber vine.

rubber vine. The combination of rust and fire is one such combination. There is still potential to improve the effectiveness of specific control methods for some sites. The long term impacts of the biological control agents still needs monitoring.

Integrated control has the potential to provide the most cost effective long-term control of

Strategy	Actions	Responsibility	Rank
2.2.1 Foster regional and local containment planning	Incorporate rubber vine management in: landholder level property or sub-catchment plans local government pest management plans Regional Natural Resource and catchment strategies	QDNR, catchment and regional strategy groups, local government	1
	Promote the establishment of clean areas within the regions of established rubber vine within the plans	As above	2
	Develop and resource management plans for Government lands consistent with other plans	State and federal agencies	2
2.2.2 Promote the integration of rubber vine management	Promote integrated weed management to maximize benefits of rubber vine control (while also monitoring associated costs)	QDNR, industry groups	1
	Survey the health of landscape and ecosystems and use as an indicator of success of rubber vine management including reduction of impacts on threatened ecosystems	QEPA, community groups, QDNR, EA	2
	Incorporate rubber vine management within the context of overall weed management in the property planning	Landholders	2
	Develop a weed module for use in property planning	State agencies, AFF-A	3
2.2.3 Identify economic impacts, incentives and disincentives	Determine the benefits and costs of rubber vine control for best practice management to the community	QDNR, landholders	1
	Update data on economic impact of rubber vine to the whole community, including landholder inputs	QDNR, industry groups	1
	Review, document and distribute to all stakeholders information on current and potential incentives and disincentives	QDNR, RVMG	2
	Potential "net" benefit of incentives Impacts on land values/ rates Forms of assistance available		
	Facilitate removal of identified disincentives	QDNR, RVMG	2
2.2.4 Refine and adopt best practice management	Assess the economics of rubber vine management at different spatial scales (property, sub-catchment, catchment, regional), including data on the assessment of SWEEP	QDNR, local government	2
	Publish current best practice options for rubber vine management	QDNR, RVMG	1
	Develop and implement extension and communication plans addressing established rubber vine management	QDNR, RVMG	1
	Use adaptive management to refine and extend best practice for different regions and types of infestations using various methods (biological, chemical, physical and fire)	QDNR, Landholder groups, RVMG	2
	Establish best practice demonstration sites	QDNR, Landcare	2

Strategy	Actions	Responsibility	Rank
2.2.5 Improve integrated management practices	Assess the spread and impacts of the rubber vine rust and moth to maximise their effectiveness in integrated management	QDNR	1
	Assess impacts of rubber vine and rubber vine management practices on land sustainability (including biodiversity and water quality)	QDNR, QEPA, QPWS, community groups	1
	Investigate the vegetation and climatic attributes necessary to maximise the effectiveness of fire on rubber vine	QDNR, CSIRO	1
	Investigate low environmental impact control methods for riparian areas	QDNR	2

2.3 Harness national management

Desired outcome

National commitment to rubber vine is maintained.

Background

Rubber vine infestations cover a large area of northern Australia therefore management of this weed requires a coordinated community approach. The major planning processes currently operating are the development of regional, catchment and, in Queensland, local government pest management plans. These processes involve wide community consultation and thus are a means of gaining community commitment while incorporating rubber vine management into a wider framework. Reducing the impact of rubber vine is an integral part of land sustainability, including management of natural vegetation, other aspects of biodiversity, tourism and Aboriginal land values. Projects addressing these issues should include weeds.

The resources required preventing rubber vine spread and minimising the impact of established infestations in the long term are enormous. There is a need to ensure that all available resources are utilised and that all achievements and actions are documented as a measure of progress and success. Approaches for funding should be coordinated to maximise potential success. Using a project management approach will assist in achieving efficiencies and co-

ordination. SWEEP projects have already demonstrated that government supervised projects, including landholder contributions, can reduce infestations. These programs, however, are expensive and require on-going landholder commitment to follow-up control actions. The barter days developed by the Upper Landsborough Landcare Group for prickly acacia control demonstrate that programs do not have to be government managed.

Information on the distribution of rubber vine, including where control works have been completed, is critical to support planning and decision-making. The degree of detail required would vary with the scale and purpose of the planning e.g. planning in eradication areas with scattered plants requires knowledge down to single plant level. QDNR has a GIS based information system, PestInfo, which is being implemented and evaluated for community group use in Queensland. It will collate existing data on the present and historical distribution of rubber vine and act as a means of tracking eradication efforts. This information should be available on a local government or catchment basis. It is also desirable to have records of all sites across Australia where rubber vine has been detected and the action taken. Other methods of obtaining data, such as remote sensing and aerial techniques need to be developed and applied. Collection of landholder mapping data will significantly add to the current data set.

Strategy	Actions	Responsibility	Rank
2.3.1 Adopt a community approach to planning and management	Facilitate landholder involvement in the catchment, natural resource and local government pest management planning processes	State agencies	1
	Provide a map of catchments and regions at risk of rubber vine invasion, including the impact of climate change	UQ, QDNR	1
	Incorporate rubber vine prevention and control into the regional, catchment and local government plans for all at risk areas	Community groups, Local Government	2

Strategy	Actions	Responsibility	Rank
2.3.2 Maximise the availability and use of resources	Include stakeholder consultation in all project development (both ways between government and community)	All stakeholders	1
	Maintain the QDNR SWEEP program as a catalyst and co-ordinator for resources from participating stakeholders	QDNR	1
	Develop projects which access all appropriate components of NHT and other funding programs	QDNR, RVMG	1
	Market the rubber vine strategy and co-ordinate a planned approach to all funding sources	Project leader, RVMG	1
	Establish priorities for major components of rubber vine management	RVMG, Government agencies	1
	Utilise a project management process for all government and community activities - link to 2.4.3	All Stakeholders	2
	Document and promote project mechanisms	Project coordinator	3
2.3.3 Develop maps of rubber vine	Complete the implementation of PestInfo in Queensland and develop maps at required scales, including information on land use and ecosystems	QDNR, local government	1
	Import data from other states into PestInfo	QDNR and AGWA	1
	Develop and implement a procedure for using community group/landholder input to mapping	QDNR, local government, RVMG	1
	Determine use of current and new techniques for mapping distribution and density of new and unrecorded infestations	CSIRO, QDNR	2

2.4 Co-ordinate management

Desired Outcome

Rubber vine management is co-ordinated at a national level.

Background

To ensure that weeds of national significance are effectively managed the National Weeds Strategy outlines the need for the development, implementation and evaluation of a management program for each species.

The planning process outlined in the National Weed Strategy required:

- The involvement of all stakeholders in developing and implementing the plan.
- The integration of the plan with other existing, relevant land management programs at all levels.

- The suitability, availability, requirements for, and integration of all available tools for control and awareness.
- The utilization of coordinated community action as the delivery mechanism for implementation wherever appropriate.
- The determination of an appropriate funding mechanism for the plan, including identification of the beneficiaries and their relative capacity to pay.
- The establishment of performance objectives and methods for their evaluation.

This plan addresses these issues and will provide a useful tool in the ongoing coordinated management of rubber vine in Australia.

Strategy	Actions	Responsibility	Rank
2.4.1 Manage implementation of the plan	Establish and maintain a rubber vine steering group, a management group and a project coordinator	QDNR, RVMG	1
2.4.2 Monitor implementation of the plan	Collate strategic plan milestones and report on progress annually to NWSEC, stakeholders and funding groups	Project coordinator	1
	Evaluate projects on outcomes not outputs	All Stakeholders	1
2.4.3 Coordinate communication about the plan	Conduct communication activities to ensure awareness of the strategic plan, opportunities and achievements Ensure linkages with other plans to maximise awareness	Project coordinator	1

3 MONITORING AND EVALUATION

This strategic plan is subject to a 5-year review. The Rubber Vine Management Group as a component of its quarterly meetings will monitor the implementation of the plan. Annual reports will be forwarded to the NWSEC and made available to interest groups in a cost efficient manner, possibly a web page. Monitoring will include review of actions outlined and undertaken by groups implementing plans:

- State weed strategies
- Queensland local government pest management plans
- State of the Environment Reporting processes
- Catchment management plans
- Project plans developed from strategic plan

A set of performance indicators for the plan includes the actions listed below.

- National declaration of rubber vine
- Increased awareness of rubber vine as a weed of national significance
- Clear understanding of the social, economic and environmental impacts of rubber vine
- Increased delivery of extension material specific to target groups and sites
- Increases in surveys for isolated infestations
- Decrease the area of rubber vine outside/inside the RVCL resulting in realignment/reduction in the RVCL area
- Eradication of all isolated infestations
- Increased resources for on-ground actions
- Increased action on rubber vine at all levels- property, catchment and regional
- Progress on removal of disincentives for control of rubber vine
- Increased awareness of best management practices including the use of fire, biological controls and chemicals
- Increased activity controlling rubber vine in conservation areas and on state lands

4 STAKEHOLDER RESPONSIBILITIES

Private landholders

To control rubber vine on their own lands.

- Property management plans include rubber vine
- Implement best practice management
- Eradicate small or strategic infestations
- To be aware of the potential for rubber vine to spread onto their own lands
- Follow good hygiene practices e.g. monitor creek lines for new infestations
- Be able to identify rubber vine.

Local Governments (Queensland)

To ensure impacts of rubber vine are kept to a minimum in the local government area.

- Administering and enforcing the provisions of the *Rural Land Protection Act*, including notices
- Ensuring that pest management plans include strategic rubber vine control activities
- Liaising with DNR and community groups to undertake strategic rubber vine control
- Ensuring that strategic rubber vine control is undertaken on all lands under Council control
- Ensuring that all private landholders engage in strategic rubber vine control as necessary.

Utility companies

- Develop protocols and washdown facilities
- Become involved in local government pest management plans.

Agribusiness Industry / Research and Development Corporations

- Support research on the species
- Endorse and implement protocols to prevent the spread of rubber vine
- Act as conduits for information to producer groups.

Department of Natural Resources

- Continue to research efficient, effective, appropriate control techniques
- Provide extension and education services to all stakeholders on the impacts of rubber vine
- Develop best practice management under adaptive management programs
- Support local government enforcement of controls of rubber vine under the Act

- Liaise with community and industry groups and local governments to coordinate control
- Facilitate and coordinate integrated rubber vine eradication in areas outside the RVCL

Other Government Departments in Queensland

- Assist in development of codes of practice and ensure uptake by departmental staff.
- Ensure rubber vine control is undertaken on all State managed lands.

Government agencies in other States and Territories.

- Ensure awareness and early detection programs are put in place
- Eradicate isolated infestations when found
- Declare rubber vine in all states.

Federal government departments and corporations

- To ensure quarantine controls on entry of rubber vine (AQIS)
- To ensure uptake by Departmental staff to restrict movement of weeds (agencies that manage land and travel on non-government land)
- To ensure rubber vine control is undertaken on all Federally managed lands (Defence, Environment Australia and other Commonwealth departments / corporations that manage land).
- Oversee and manage federal funds including National Heritage Trust and National Weed Program (EA, Agriculture, Forestry and Fisheries – Australia)

5 ADDITIONAL READING

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Mackey AP, Carsten K, James P, March N, Noble K, Palmer B, Vitelli J & Vitelli M 1996 Rubber Vine in Queensland. Pest Status Review Series. Department of Natural Resources Queensland

Tomley AJ 1998 *Cryptostegia grandiflora* Roxb. Ex. R.Br. The Biology of Australian Weeds, Vol 2. (edited by Panetta FD, Groves RH and Shepherd RCH). Published by RG and FJ Richardson. Melbourne

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6 GLOSSARY

AGWA	Agriculture Western Australia
AFF-A	Agriculture, Fisheries, Forestry - Australia
CLIMEX	Simulation modeling system developed by CSIRO
CSIRO	Commonwealth Scientific and Industrial Research Organisation
EA	Environment Australia
GIS	Geographical Information System
ICM	Integrated Catchment Management
LCMC	Landcare and Catchment Management Committee (Queensland)
NHT	Natural Heritage Trust
NSWAg	New South Wales Agriculture
NRM	Natural Resource Management
NTDPIF	Northern Territory Department of Primary Industries and Fisheries
NWP	National Weed Program
NWSEC	National Weed Strategy Executive Committee
PestInfo	GIS based information system
QA	Quality Assurance
QDNR	Queensland Department of Natural Resources
QDPI	Queensland Department of Primary Industries
QEPA	Queensland Environmental Protection Agency
QPWS	Queensland Parks and Wildlife Service
RVCL	Rubber Vine Containment Line
RVMG	Rubber Vine Management Group
SWEEP	Strategic Weed Eradication and Education Program
UQ	University of Queensland
WONS	Weed of National Significance

Appendix 1 Map of Rubber Vine Containment Line

