Department of Sustainability and Environment

National Recovery Plan for the Wrinkled Cassinia *Cassinia rugata*

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Australian Government

Victoria
The Place To Be

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This is a Recovery Plan prepared under the Commonwealth *Environment Protection and Biodiversity Conservation Act* 1999, with the assistance of funding provided by the Australian Government.

This Recovery Plan has been developed with the involvement and cooperation of a range of stakeholders, but individual stakeholders have not necessarily committed to undertaking specific actions. The attainment of objectives and the provision of funds may be subject to budgetary and other constraints affecting the parties involved. Proposed actions may be subject to modification over the life of the plan due to changes in knowledge.

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Summary

The Wrinkled Cassinia *Cassinia rugata* is listed as Vulnerable under the Commonwealth *Environment Protection and Biodiversity Conservation Act* 1999and Threatened under the Victorian *Flora and Fauna Guarantee Act* 1988. The species is endemic to a small area in south-western Victoria, where there are approximately 40 plants known in six wild populations. Major threats to populations include weed invasion, grazing and lack of regeneration, road-widening and altered fire regimes. This national Recovery Plan for *C. rugata* details the species' distribution and biology, conservation status, threats, and recovery objectives and actions necessary to ensure its long-term survival.

Species Information

Description

The Wrinkled Cassinia *Cassinia rugata* is a spreading to erect shrub growing to about 3 m tall. Branchlets are sticky to touch and have mixed cottony and bristly hairs. Leaves are oblong to narrow elliptic, 8–25 mm long and 1.5–4.5 mm wide, having short hairs with coarse, thickened bases above and dense cottonly hairs on the underside (except on the midrib). Leaf margins are rolled under, but not enough to obscure the lower surface. Flowers appear from February to April and are clustered in groups of 4–7 small, cream, ovoid heads to 2.5 mm across, surrounded by narrow, somewhat wrinkled, white to cream bracts. Individual florets are conical, white, and 4–5 mm long (description from Walsh 1990 and Walsh & Entwisle 1999). No recruitment has been observed in the field, but seed is viable, with plants being germinated at the Royal Botanic gardens, Melbourne in 1989 (Walsh 1990). Stimulus for germination is unknown, but is probably linked to events such as fire that remove most of the shading vegetation. There have been no studies of the ecology or biology of *Cassinia rugata*.

Distribution

Cassinia rugata is confined to the Portland region of south-west Victoria, in the upper catchments of the Surrey and Fitzroy Rivers (Walsh 1990), in the IBRA Victorian Volcanic Plain Bioregion (DEH 2000).

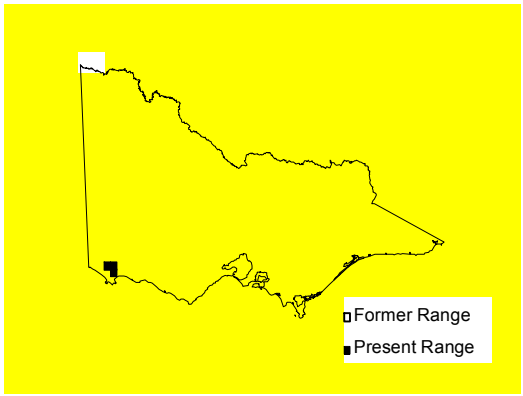

Figure 1. Distribution of *Cassinia rugata* in Victoria

Maps showing the detailed distribution of *C. rugata* are available from the Department of Sustainability Flora Information System (FIS). The FIS is a state-wide repository for flora grid and site distribution data, photographs and text descriptions. This information is available on request in a variety of formats for natural resource management purposes.

Population information

Cassinia rugata is currently known from six populations, with a total of only 42 plants seen in recent years. Population location and size is summarised as follows:

Table 1. Location and size of populations

Location	Size
Roadside, Jennings Rd, SW of Heywood (Shire of Glenelg)	about 100 plants seen in 1990; none seen in 2002 (N. Walsh unpubl.)
Roadside, Sinclair Settlement Rd, W of Yeramba(Shire of Glenelg)	two plants seen in 1990 and 1992; none seen in 2002 (N. Walsh unpubl.)
Roadside, Corduroy Ck north, WNW of Heywood(Shire of Glenelg)	about 20 plants seen in 1988; 15 plants seen in 2001 (A. Pritchard DSE pers. comm.)
Drumborg Fitzroy River Reserve	1 plant seen in 2002 (N. Walsh unpubl.)
Boundary Rd (1), Cobboboonee State Forest (DSE)	14 plants seen in 2002 (N. Walsh unpubl.)
Boundary Rd (2), Cobboboonee State Forest (DSE)	11 plants seen in 2001 (A. Pritchard DSE pers. comm.)

It is likely that some population numbers are underestimates. The two Boundary Rd sites are bordered by extensive bushland to the west that is likely to contain more plants. Other sites are bounded by farmland and there is little likelihood of additional plants nearby. The two sites where no plant were seen in recent surveys were within very thick, almost impenetrable vegetation, unlikely to support many individuals. A previous estimate of 500 plants at the Water Reserve on Hedditchs Rd is almost certainly the result of mis-identification.

Habitat

Cassinia rugata is found in damp, low open forest or dense heathy scrub. Open forest sites are generally dominated by *Eucalyptus ovata* (Swamp Gum). Understorey species include *Gahnia trifida* (Coast Saw-sedge), *Hakea decurrens* (Bushy Needlewood), *Olearia glandulosa,* (Swamp Daisy-bush), *Acacia melanoxylon* (Blackwood), *Melaleuca squarrosa* (Scented Paperbark), *Leptospermum continentale* (Prickly Tea-tree), *Allocasuarina paludosa* (Scrub Sheoak) and *Leptospermum lanigerum* (Woolly Tea-tree). Heathy scrub sites may be associated with *Allocasuarina paludosa* (Scrub Sheoak), *Leptospermum continentale* (Prickly Tea-tree), *Leptospermum lanigerum* (Woolly Tea-tree), *Melaleuca squarrosa* (Scented Paperbark), *Melaleuca gibbosa* (Slender Honey-myrtle), *Ozothamnus ferrugineus* (Tree Everlasting), and *Hakea nodosa* (Yellow Hakea). Recovery actions include survey and mapping of habitat that will lead to the identification of habitat critical to the survival of the species.

Threats

As there is very little information on the past distribution or abundance of *Cassinia rugata*, it is very difficult to determine if the species has suffered any decline in range and/or abundance. At least 120 plants were seen in just two populations in 1988–1990, but whether this represents a real decline or reflects a change in survey methodology is not known. Given the very limited distribution and low total number of plants, the risk from stochastic events is probably high. There are no populations in conservation reserves, and all face a range of current and potential threats, which are summarised as follows:

Inappropriate fire regimes: Long fire-free intervals may cause vegetation to become extremely dense and unsuitable for *Cassinia rugata*, especially through limited recruitment, which appears to be a problem at several sites. However, appropriate fire regimes for this species are unknown.

Road works: Road works such as grading and slashing along road margins are a threat to roadside populations.

Weed invasion: Phalaris (*Phalaris aquatica*), Blackberry (*Rubus fruticosus* species aggregate) and a range of pasture grasses heavily invade or are a dominant component of some sites. *Rubus fruticosus* is a weed of National Significance.

Altered hydrology: Plants along roadsides may be affected by run-off from roads and culverts, while other sites may be affected by increased run-off from irrigation, or drying out of sites through extensive tree plantations, especially Blue Gums.

Table 2. Populations and threats

Population	Threats
Jennings Rd	lack of recruitment, possibly through lack of fire; potentially altered hydrology from road and culvert runoff
Sinclair Settlement Rd	weed invasion; road works; altered hydrology through irrigation and/or blue gum plantation dropping water tables
Corduroy Ck	weed invasion; road works
Drumborg Fitzroy River Reserve	weed invasion; grazing; lack of recruitment
Boundary Rd (1)	road works; lack of recruitment possibly due to lack of fire
Boundary Rd (2)	road works; lack of recruitment possibly due to lack of fire

Recovery Information

Directions for recovery of *C. rugata* include habitat conservation, restoration and management, combined with an understanding of the species' ecological and biological requirements. To achieve this, recovery actions are primarily structured to (i) acquire baseline data, (ii) assess habitat condition including ecological and biological function, (iii) protect populations to maintain or improve population growth and (iv) to engage the community in recovery actions.

Objectives

The **overall objective** of recovery is to minimise the probability of extinction of *Cassinia rugata* in the wild and to increase the probability of important populations becoming self-sustaining in the long term.

Within the life span of this Recovery Plan, the **specific objectives** of recovery for *Cassinia rugata* are to:

- Acquire accurate information for conservation status assessments.
- Identify habitat that is critical, common or potential.
- Ensure that all populations and their habitat are protected and managed appropriately.
- Manage threats to populations.
- Identify key biological functions
- Determine the growth rates and viability of populations.
- Establish populations in cultivation.
- Establish cultivated plants in the wild.
- Build community support for conservation.

Program Implementation

The Recovery Plan will run for five years from the time of implementation and will be managed by the Department of Sustainability and Environment. A Threatened Flora Recovery Team, consisting of scientists, land managers and field naturalists will be established to oversee threatened flora recovery in Victoria in general. Technical, scientific, habitat management or education components of the Recovery Plan will be referred to specialist sub-committees on research, *in situ* management, community education and cultivation. Regional Recovery Teams will be responsible for preparing work plans and monitoring progress toward recovery.

Program Evaluation

The Recovery Team will be responsible for annual assessments of progress towards recovery. This Recovery Plan will be reviewed within five years of the date of adoption.

Recovery Actions and Performance Criteria

Action	Description	Performance Criteria
Specific objective 1		
Acquire accurate information for conservation status assessments		
1.1	Acquire baseline population data by conducting detailed field and desk top surveys including (a) identification of the area and extent of populations; (b) estimates of the number, size and structure of populations and (c) estimation of population change. **Responsibility: DSE**	• Determination or update of conservation status for inclusion on state and national threatened species lists. • Target populations accurately mapped.
Specific objective 2		
Identify habitat that is critical, common or potential		
2.1	Accurately survey known habitat and collect floristic and environmental information describing community ecology and condition. **Responsibility: DSE**	• Requirements for completion of essential life history stages, recruitment and dispersal identified at known sites. • Habitat critical to the survival of the species is mapped.
2.2	Identify and survey potential habitat, using ecological and bioclimatic information indicating habitat preference. **Responsibility: DSE**	• Predictive model for potential habitat developed and tested.
Specific objective 3		
Ensure that all populations and their habitat are legally protected		
3.1	Protect populations on public land. **Responsibility: DSE**	• Negotiate Public Authority Management Agreements under the *FFG Act* 1988 at Jennings Rd, Sinclair Settlement Rd and Corduroy Ck north sites. • Negotiate Special Protection Zones in State Forest at Boundary Rd (1 and 2), Cobboboonee Forest.
3.2	Protect populations on private property. **Responsibility: DSE**	• Initiate private land management agreements in consultation with private land owners under the *Victorian Conservation Trust Act* 1972, *The Conservation, Forests and Lands Act* 1987 and the *Wildlife Act* 1975 at Water Reserve, Hedditchs Rd.

Action	Description	Performance Criteria
Specific objective 4 **Manage threats to populations**		
4.1	Identify disturbance regimes to maintain habitat. **Responsibility: DSE**	• Preparation of management prescriptions for ecological burning at Jennings Rd, Sinclair Settlement Rd, Corduroy Ck north and Boundary Rd (1 and 2) sites.
4.2	Control threats from pest plants using broadscale application of herbicide/hand removal of weeds, and erecting conservation signage. **Responsibility: DSE**	• Measurable seedling recruitment/vegetative regeneration and a reduction in plant mortality at Jennings Rd, Sinclair Settlement Rd, Corduroy Ck north and Boundary Rd (1 and 2) sites. • Erect conservation signs to inform road works contractors of this species at Jennings Rd, Sinclair Settlement Rd, Corduroy Ck north and Boundary Rd (1 and 2) sites.
Specific objective 5 **Identify key biological functions**		
5.1	Evaluate current reproductive/regenerative status, seed bank status, by determining longevity, fecundity and recruitment levels. **Responsibility: DSE**	• Seed bank/regenerative potential quantified for each population.
5.2	Determine seed germination requirements by conducting laboratory and field trials aimed to identify key stimuli and determine stimuli for vegetative regeneration. **Responsibility: DSE**	• Stimuli for recruitment/regeneration identified. • Management strategies identified to maintain, enhance or restore processes fundamental to reproduction and survival.
Specific objective 6 **Determine the growth rates and viability of populations**		
6.1	Measure population trends and responses against recovery actions by collecting demographic information including recruitment and mortality, timing of life history stages and morphological data. **Responsibility: DSE**	• Techniques for monitoring developed and implemented. • Census data for target populations.
6.2	Collate, analyse and report on census data and compare with management histories. **Responsibility: DSE**	• Population growth rates determined and Population Viability Analysis completed for important populations.

Action	Description	Performance Criteria
Specific objective 7		
Establish populations in cultivation		
7.1	Establish cultivated plants *ex situ* for inclusion in living collections to safeguard against any unforeseen destruction of wild populations. **Responsibility: DSE, RBG**	• Development of effective propagation and cultivation techniques. • At least 100 mature plants in cultivation with representative genotypes from each of the known populations.
7.2	Establish a seed bank and determine seed viability. **Responsibility: DSE**	• Long-term storage facility identified. • Seed from target populations in storage.
Specific objective 8		
Establish cultivated plants in the wild		
8.1	Select and evaluate suitable translocation site(s) that are ecologically and biologically suitable, have secure land tenure and are managed appropriately. **Responsibility: DSE**	• Criteria for site suitability identified and site(s) selected. • Preparation of translocation plan.
8.2	Establish a population of cultivated plants. **Responsibility: DSE, RBG**	• 80 plants in cultivation that are disease free and vigorous.
8.3	Prepare site(s) to achieve maximum survival of translocated plants and implement translocation plan. **Responsibility: DSE, RBG**	• Development of successful translocation techniques.
8.4	Maintain and monitor translocated plants. **Responsibility: DSE, RBG**	• At least 30% survival of translocated plants.
Specific objective 9		
Build community support for conservation		
9.1	Identify opportunities for community involvement in the conservation of *Cassinia rugata*. **Responsibility: DSE**	• Presentation(s) to community nature conservation groups.

Abbreviations

DSE Department of Sustainability and Environment
RBG Royal Botanic Gardens, Melbourne

Management Practices

Management practices that will aid recovery

On-ground site management will aim to mitigate threatening processes to prevent declines and create conditions for maintenance or increase of population size. Major threats requiring management include accidental destruction especially from roadworks, competition from pest plants, inappropriate fire regimes and altered hydrology. A range of strategies will be necessary to alleviate these threats including weed control, fire management, fencing, and control of pest animals. In addition, some *ex situ* conservation measures including seed storage and germination trails, will be required. Addressing major knowledge gaps is also required, especially determining the mechanisms underlying recruitment and regeneration. Successful *in situ* population management will be founded on understanding the relationships between *C. rugata* and associated flora, and its response to environmental processes. These are directly linked to biological function and are thus vital to recovery. Demographic censusing will be necessary to gather life history information and to monitor the success of particular management actions. Surveys of known and potential habitat should continue to better define the distributions and size of populations. Providing information to land owners, managers and the broader community in the region will increase awareness of the species, provide for increased protection of existing populations, an increased likelihood on new populations being found, and reducing the risk of inadvertent damage occurring.

Management practices that will avoid significant adverse impacts

Providing land owners and managers with information on the location, distribution, habitat and ecology of *C. rugata* will help to protect existing populations from inadvertent damage, and raising general awareness that may result in the location of any new populations. Populations occurring in potentially high-risk locations such as roadsides may need appropriate signposting. Negotiation with landowners with populations or suitable habitat on their properties will be required for protection of populations. Surveys in potential habitat likely to be impacted by any development proposals (including roadworks) will be required to avoid damage to or destruction of any currently unknown populations. Identification and protection of current and potential habitat such as through planning scheme overlays and restrictions on clearance of native vegetation is a high priority.

Affected interests

Populations of *Cassinia rugata* fall under the jurisdiction of the Shire of Glenelg and DSE, have approved the actions outlined in this Recovery Plan.

Role and interests of indigenous people

Indigenous communities on whose traditional lands *Cassinia rugata* occurs will be advised, through the relevant DSE Regional Indigenous Facilitator, of the preparation of this Recovery Plan and invited to provide comments if so desired. Indigenous communities will be invited to be involved in the implementation of the Recovery Plan.

Benefits to other species/ecological communities

The Recovery Plan includes a number of potential biodiversity benefits for other species and vegetation communities in Victoria, particularly those of lowland swampy habitats that have been selectively modified for agriculture by drainage and vegetation clearance. Principally, this will be through the protection and management of habitat. The adoption of broad-scale management techniques and collection of baseline data will also benefit a number of other plant species growing in association with *Cassinia rugata*, particularly those species with similar life forms and/or flowering responses.

The Recovery Plan will also provide an important public education role as threatened flora have the potential to act as 'flagship species' for highlighting broader nature conservation and biodiversity issues such as land clearing, grazing, weed invasions and habitat degradation.

Social and economic impacts

The implementation of this Recovery Plan is unlikely to cause significant adverse social and economic impacts. Most populations occur either on public land (state forest) under the jurisdiction of DSE or roadsides under the jurisdiction of the Shire of Glenelg. Protection of populations on private land will be achieved through negotiation with land owners.

Acknowledgments

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Priority, Feasibility and Estimated Costs of Recovery Actions

Action	*Description*	*Priority*	*Feasibility*	*Responsibility*	*Cost estimate*					
					Year 1	Year 2	Year 3	Year 4	Year 5	**Total**
1	**Conservation status**									
1.1	Collect baseline data	1	100%	DSE	$6,000	$0	$0	$0	$0	**$6,000**
2	**Habitat requirements**									
2.1	Survey known habitat	1	100%	DSE	$10,000	$0	$0	$0	$0	**$10,000**
2.2	Identify, survey potential habitat	1	75%	DSE	$10,000	$0	$0	$0	$0	**$10,000**
3	**Legal protection of habitat**									
3.1	Protect public land habitat	1	75%	DSE	$0	$20,000	$20,000	$0	$0	**$40,000**
3.2	Protect private land habitat	2	50%	DSE	$0	$20,000	$20,000	$0	$0	**$40,000**
4	**Manage threats**									
4.1	Identify disturbance regimes	1	75%	DSE	$0	$15,000	$0	$0	$0	**$15,000**
4.2	Control threats	1	75%	DSE	$10,000	$10,000	$10,000	$5,000	$5,000	**$40,000**
5	**Identify key biol. functions**									
5.1	Evaluate reproductive status	3	75%	DSE	$0	$0	$10,000	$10,000	$0	**$20,000**
5.2	Seed germination	3	75%	DSE	$0	$0	$10,000	$10,000	$0	**$20,000**
6	**Growth rates, pop. viability**									
6.1	Conduct censusing	2	100%	DSE	$6,000	$6,000	$6,000	$6,000	$6,000	**$30,000**
6.2	Collate, analyse and report	2	100%	DSE	$4,000	$4,000	$4,000	$4,000	$10,000	**$26,000**
7	**Establish pops. in cultivation**									
7.1	Establish cultivated plants	3	50%	DSE, RBG	$0	$6,000	$6,000	$6,000	$6,000	**$24,000**
7.2	Establish a seed bank	3	50%	DSE	$0	$4,000	$4,000	$4,000	$4,000	**$16,000**

Action	*Description*	*Priority*	*Feasibility*	*Responsibility*	*Cost estimate*					
					Year 1	Year 2	Year 3	Year 4	Year 5	**Total**
8	**Establish pops. in the wild**									
8.1	Select sites	3	100%	DSE	$0	$6,000	$6,000	$6,000	$6,000	**$24,000**
8.2	Cultivate plants for translocation	3	50%	DSE, RBG	$0	$10,000	$10,000	$10,000	$5,000	**$35,000**
8.3	Prepare site(s), implement plan	3	50%	DSE, RBG	$0	$0	$30,000	$30,000	$10,000	**$70,000**
8.4	Maintain and monitor	3	50%	DSE, RBG	$0	$0	$0	$4,000	$4,000	**$8,000**
9	**Education, communication**									
9.1	Community extension	3	100%	DSE	$6,000	$6,000	$6,000	$6,000	$6,000	**$30,000**
				TOTAL	**$52,000**	**$107,000**	**$142,000**	**$101,000**	**$62,000**	**$464,000**