Department of
Sustainability and
Environment

National Recovery Plan for the Colquhoun Grevillea *Grevillea celata*

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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 Colquhoun Grevillea *Grevillea celata* is listed as Vulnerable under the Commonwealth *Environment Protection and Biodiversity Conservation Act* 1999, and is protected (but not listed) under the Victorian *Flora and Fauna Guarantee Act* 1988 (all Victorian Grevilleas are protected). The species is endemic to a small area in East Gippsland, where about 1,500 plants occur in nine wild populations. Main threats are inappropriate fire regimes and road works. This Recovery Plan for *G. celata* 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 Colquhoun Grevillea *Grevillea celata* an erect and open, to low and dense, root-suckering shrub growing to 1.8 m tall. The leaves are elliptic, alternate, to 44 mm x 18 mm, hairy, grey-green above, the lower surface almost white and densely hairy. The leaf margins are curved under, sometimes almost obscuring the lower surface. Flowers appear from July to February and are red and yellow with curved tubes about 12 mm long, hairy outside, densely hairy inside, splitting into four petals to release a red, hairy style to 25 mm long. Fruit is a leathery, hairy capsule with longitudinal ridges, which splits to release winged seeds (description from Molyneux 1995; Walsh & Entwisle 1996).

Grevillea celata is very similar to *Grevillea chrysophaea*, which does not root-sucker and lacks red coloration on the perianth (Walsh & Entwisle 1996). *Grevillea alpina* is also similar, but it also does not root-sucker, has a more prominent tongue-like nectary and usually a shorter pistil (10–20.5 mm versus 18–25 mm long in *G. celata*) (Walsh & Entwisle 1996).

Distribution

Grevillea celata is endemic to Victoria, where it occurs in the Colquhoun State Forest in central eastern Gippsland, east and south of Bruthen (Molyneux 1995), in the South East Corner IBRA Bioregion (DEH 2000). The total range of all known populations is about 11 km.

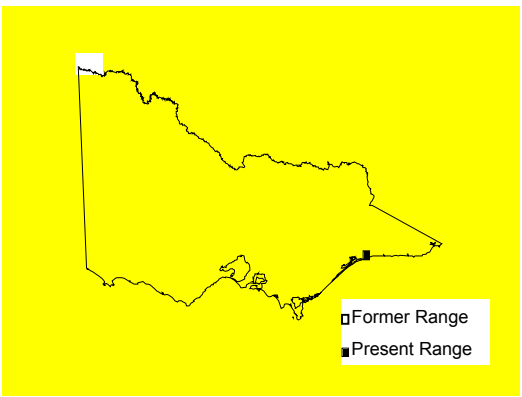

Figure 1. Distribution of *Grevillea celata* in Victoria

Maps showing the detailed distribution of *G. celatqa* are available from the Department of Sustainability and Environment Flora Information System (DSE-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

Nine populations of *Grevillea celata* are known, containing up to 1,500 plants, and occur in the following locations:

- Colquhoun State Forest:
    - Reformatory Rd: 60–175 plants
    - Watershed Rd: about 40 plants
    - Dead Horse Creek Rd: 80–175 plants
    - Lyles Break: about 30 plants
    - Stony Creek 1: about 750 plants
    - Stony Creek 2: about 375 plants
    - Lambourne Break: 25 plants
    - Lambourne Break A: 1 plant
    - Lambourne Break B: 5–28 plants

Habitat

Populations of *Grevillea celata* occur in heathy open forest with an overstorey of *Eucalyptus consideniana*, *Eucalyptus cypellocarpa*, *Eucalyptus globoidea*, *Eucalyptus macrorhyncha, Eucalyptus sieberi* or *Eucalyptus obliqua*. Associated species include *Acacia genistifolia*, *Acacia myrtifolia*, *Acacia terminalis*, *Banksia marginata*, *Bossiaea obcordata*, *Cassinia longifolia*, *Epacris impressa*, *Hibbertia sericea*, *Hibbertia obtusifolia*, *Lomatia ilicifolia*, *Monotoca scoparia*, *Patersonia glabrata*, *Platylobium formosum*, *Pteridium esculentum*, *Pultenaea retusa*, *Stypandra glauca*, *Tetratheca pilosa* and *Xanthorrhoea minor.* A good indicator species is *Bossiaea obcordata,* which is almost always present with *Grevillea celata*. *Bossiaea obcordata* is otherwise scattered throughout the forest, although not uniformly.

Grevillea celata occurs on red siliceous or pale granitic sands (Walsh & Entwisle 1996), or gravelly clay-loams (N. Walsh pers obs.). The species appears absent from the black, humic Tertiary sands that often abut the preferred soils (Molyneux 1995). Terrain tends to be flat or with a slight northerly aspect. Populations occur from c. 140–300 m above sea level. Recovery actions include survey and mapping of habitat that will lead to the identification of habitat critical to the survival of the species.

Threats

There is little information on the former distribution of *G. celata*, so it is not certain if there has been any decline in range. Previous assessments have indicated a population estimate of over 2,300 plants, but the reliability of early counts is in some question as it difficult to pick individual plants due to the ability of the species to regenerate from root suckers. While it is uncertain if there has been any decline in abundance, many plants occur in highly vulnerable situations such as roadsides, where they may be at risk. Major threats to the species are summarised as follows:

I**nappropriate fire regimes:** Fire appears to be the critical factor for *Grevillea celata*. In many parts of its range, cool fuel reduction burns appear to be very frequent, resulting in high densities of fire-promoted species such as Bracken *Pteridium esculentum*. *Grevillea celata* appears to respond slowly following fire, and juveniles may be severely browsed by native herbivores. For these reasons it tends to be confined to roadsides where high light levels prevail. The few populations that occur in bush burnt less frequently hold the best representatives. A 10-year fire cycle may be most appropriate for *Grevillea celata*, as anything less may lead to a dense cover of *Pteridium esculentum*, which *G. celata* does not appear to be able to tolerate, and will not provide suitable habitat.

Road Works: Road works and slashing are a potential threat to populations on roadsides, especially if done too frequently for plants to reach maturity and reproduce.

Browsing: Some plants exhibit damage by macropod and on occasions severe insect predation.

Locations and main threats are summarised as follows:

- Reformatory Rd: inappropriate fire regime, road works.
- Watershed Rd: inappropriate fire regime, possibly native herbivore browsing or insect attack.
- Dead Horse Creek Rd: inappropriate fire regime.
- Lyles Break: inappropriate fire regime.
- Stony Creek 1: Grazing by native herbivores, insect attack and inappropriate fire regimes.
- Stony Creek 2: Road works, vegetation clearance.
- Lambourne Break: Road works, inappropriate burning regimes.
- Lambourne Break A: Road works.
- Lambourne Break B: Inappropriate fire regimes.

Recovery Information

Overall Objective

The **overall objective** of recovery is to minimise the probability of extinction of *Grevillea celata* 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 *Grevillea celata* 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 Special Protection Zones in State Forest at Reformatory Rd, Watershed Rd, Dead Horse Creek Rd and Lyles Break sites.
Specific objective 4		
Manage threats to populations		
4.1	Identify disturbance regimes to maintain habitat. **Responsibility: DSE**	• Preparation of management prescriptions for ecological burning.
4.2	Control threats from pest plants, animals, predators, using broadscale application of herbicide or hand removal of weeds, and installation of appropriate signage. **Responsibility: DSE**	• Measurable seedling recruitment/vegetative regeneration and a reduction in plant mortality. • Installation of appropriate conservation signage.

Action	Description	Performance Criteria
Specific objective 5		
Identify key biological functions		
5.1	Evaluate current reproductive/regenerative status, seed bank status and longevity, fecundity and recruitment levels. **Responsibility: DSE**	• Seed bank/regenerative potential quantified for target populations.
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 regenerative processes fundamental to 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.
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 50 mature plants in cultivation. Some plants have already been cultivated at RBG.
7.2	Establish a seed bank and determine seed viability. **Responsibility: DSE**	• Long-term storage facility identified. • Seed from important populations in storage.

Action	Description	Performance Criteria
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 minimum population size of cultivated plants. **Responsibility: DSE, RBG**	• 30 number of plants in cultivation.
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**	• 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 *Grevillea celata*. **Responsibility: DSE**	• Presentation(s) to community nature conservation groups.

Abbreviations

DSE: Department of Sustainability and Environment, Victoria

RBG: Royal Botanic Gardens, Melbourne

Management Practices

The philosophy of the strategy for recovery is habitat conservation, restoration and management combined with an understanding of the ecological and biological requirements of *Grevillea celata*. The emphasis is on using knowledge to better implement *in situ* management techniques that protect populations and promote regeneration and recruitment. 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.

On-ground site management will aim to mitigate threatening processes and thereby ensure against extinction. Major threats requiring management include accidental destruction during road works, competition from pest plants, inappropriate fire regimes and grazing by native herbivores. A range of strategies will be necessary to alleviate these threats including weed control, fire management, and signage.

Broadscale protection measures applicable to all populations include legal protection of sites, habitat retention and liaison with land managers including private landholders. In addition, searches of known and potential habitat should continue to better define the distributions and size of populations.

The Recovery Plan also advocates strategies to fill some of the major gaps in our knowledge to date. These include an understanding of the mechanisms underlying recruitment and regeneration. Successful *in situ* population management will be founded on understanding the relationships between *Grevillea celata* 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.

In addition to the above, *ex situ* conservation measures will be required and will include seed storage and plant cultivation. Cultivating *ex situ* populations will also aim to increase the amount of seed available for reintroduction to sites. Translocation of cultivated plants will be considered as there is a high chance of success and secure site(s) exist.

Community participation in recovery actions will be sought, particularly in regard to recovery team membership and implementation of on-ground works.

To reduce the likelihood of unforseen development activities negatively impacting upon *Grevillea celata*, the threatened flora team should seek relevant information on it's distribution, ecology and/or habitat to relevant land managers. Such increased awareness should allow new populations to be found if they exist, and improve the likelihood of adequate searches being made during environmental impact assessments.

Affected interests

Populations of *Grevillea celata* occur under the jurisdiction of DSE (Forest Management), who have been contacted and have approved the actions outlined in this Recovery Plan subject to the availability of sufficient funding.

Role and interests of indigenous people

Indigenous communities on whose traditional lands *Grevillea celata* 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. 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 *Grevillea celata*, 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. The Colquhoun Grevillea is confined to public land, and additional measures designed to protect and enhance populations will have negligible impact on current commercial and recreational activities on public land.

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	$10,000	$0	$0	$0	$0	**$10,000**
2	**Habitat requirements**									
2.1	Survey known habitat	1	100%	DSE	$20,000	$0	$0	$0	$0	**$20,000**
2.2	Identify, survey potential habitat	1	75%	DSE	$20,000	$0	$0	$0	$0	**$20,000**
3	**Legal protection of habitat**									
3.1	Protect public land habitat	1	75%	DSE	$0	$10,000	$0	$0	$0	**$10,000**
4	**Manage threats**									
4.1	Identify disturbance regimes	1	75%	DSE	$0	$10,000	$10,000	$0	$0	**$20,000**
4.2	Control threats	2	75%	DSE	$10,000	$8,000	$8,000	$4,000	$4,000	**$34,000**
5	**Identify key biol.l functions**									
5.1	Evaluate reproductive status	3	75%	DSE	$0	$12,000	$12,000	$0	$0	**$24,000**
5.2	Seed germination	3	75%	DSE	$0	$10,000	$10,000	$0	$0	**$20,000**
6	**Growth rates, pop. viability**									
6.1	Conduct censusing	3	100%	DSE	$15,000	$15,000	$15,000	$15,000	$15,000	**$75,000**
6.2	Collate, analyse and report	3	100%	DSE	$1,000	$1,000	$1,000	$1,000	$5,000	**$9,000**
7	**Establish pops. in cultivation**									
7.1	Establish cultivated plants	3	80%	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**
8	**Establish pops. in the wild**									
8.1	Select sites	3	100%	DSE	$0	$8,000	$0	$0	$0	**$8,000**
8.2	Cultivate plants for translocation	3	50%	DSE, RBG	$0	$10,000	$10,000	$10,000	$10,000	**$40,000**
8.3	Prepare site(s), implement plan	3	50%	DSE, RBG	$0	$10,000	$10,000	$10,000	$0	**$30,000**
8.4	Maintain and monitor	3	50%	DSE	$0	$0	$10,000	$10,000	$10,000	**$30,000**
9	**Education, communication**									
9.1	Community extension	3	100%	DSE	$6,000	$6,000	$6,000	$6,000	$6,000	**$30,000**
				TOTAL	**$82,000**	**$110,000**	**$102,000**	**$66,000**	**$60,000**	**$420,000**