

National Recovery Plan for the Wrinkled Buttons *Leiocarpa gatesii*

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Australian Government

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Summary

The Wrinkled Buttons *Leiocarpa gatesii* is listed as Vulnerable under the Commonwealth *Environment Protection and Biodiversity Conservation Act* 1999 and Threatened under the Victorian *Flora and Fauna Guarantee Act* 1988. The species is endemic to the Anglesea-Lorne region of south-western Victoria, where there are 5,000–15,000 plants remaining in 10–15 wild populations. Major threats to populations include weed invasion, road works and altered fire regimes. This national Recovery Plan for *L. gatesii* 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 Buttons *Leiocarpa gatesii* (formerly *Leptorhynchos gatesii*) is a slender perennial (occasionally annual) herb growing to 30 cm tall, with narrow leaves along white cottony stems. Leaves are alternate, narrow, and blunt, to about 20 mm x 5 mm, dark green and more or less hairless above, white and densely hairy below. The plant bears yellow button-like flower heads to 20 mm across, consisting of numerous small, tubular florets, and surrounded by overlapping rows of narrow brown bracts covered with white hairs. Flower heads are borne singly at the ends of the stems, and appear from December to April (rarely to July). Fruit is a hairless, non-beaked achene (description from Leigh *et al.* 1984; Mueck 1997; NRE 2001; Walsh & Entwisle 1999). This species is distinguished from other species of *Leiocarpa* by the bell-shaped flower heads with wrinkled bracts that increase in size from the outer to the inner bracts (Wilson 2001).

Longevity of seeds and plants is not documented. However, observations suggest that *L. gatesii* may produce long-lived seed, and plants may live for as long as 13 years (NRE 1999). Recruitment of *L. gatesii* has been observed after fire and soil disturbance, such as along graded tracks, suggesting that this species is a post-disturbance ephemeral (NRE 1999). Its initial discovery in 1921 followed fires that occurred in the area in 1919. Several new populations were discovered in the years following an extensive wildfire in the area in 1983 (SAC 1996). Recruitment has also been observed following other physical disturbance such as track works, a possible explanation for the plants' frequent occurrence on roadsides (M. McDonald & L. Mernane pers. comm).

Distribution

Leiocarpa gatesii is endemic to Victoria, where it is confined to a small area between Anglesea and Lorne, south-west of Melbourne (Walsh & Entwisle 1999), in the South East Coastal Plain IBRA Bioregion (EA 2000).

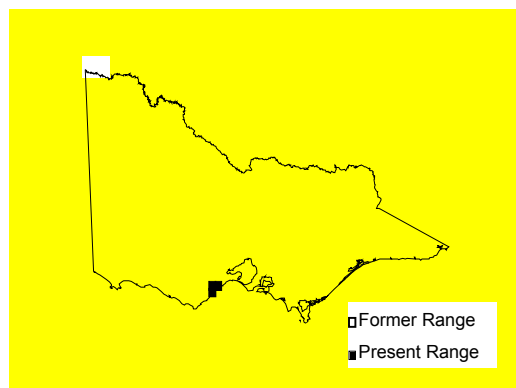


Figure 1. Distribution of *Leiocarpa gatesii* in Victoria

Maps showing the detailed distribution of *Acacia caerulescens* 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.

Habitat

Leiocarpa gatesii occurs in Damp Forest and Lowland Forest (sensu DNRE 1997), often on drier hillsides, with overstorey species in *Eucalyptus aromaphloia* (Scentbark) and *Eucalyptus tricarpa* (Red Ironbark), and an understorey of *Acacia verniciflua*, *Gahnia radula* and *Pultenaea daphnoides* (NRE 1999). Recovery actions include survey and mapping of habitat that will lead to the identification of habitat critical to the survival of the species.

Population Information

Leiocarpa gatesii was first discovered in 1921 by A.C.F. Gates near Lorne (Leigh *et al.* 1984; DNRE 1999). However, it was not seen for many years after and was presumed extinct, until its rediscovery by Mary White in 1984, following the extensive wildfire in the area in February 1983 (White 1984). Since then, *L. gatesii* has been found in at least 15 sites within the Lorne/Anglesea area. In 1997, more than 12,000 plants were estimated in nine populations, mostly near Lorne, in Angahook–Lorne State Park or in nearby State Forest (Mueck 1997; NRE 2001). Eleven sites have been seen in the last few years, but five sites have not been seen for more than 10 years. Current populations occur in the following locations:

Location	Size
Angahook–Lorne State Park	
Moggs Creek Track (Sheet 9 <i>sensu</i> Mueck 1997)	10 000 plants
Coal-Mine Creek Track (Sheet 8 <i>sensu</i> Mueck 1997) (O. Carter pers. obs. 2002)	>100 plants
Gentle Annie Track A (Sheet 3 <i>sensu</i> Mueck 1997)	>15 plants
Gentle Annie Track B (Sheet 4 <i>sensu</i> Mueck 1997)	>500 plants
Wonwondah Falls Tk ('Hendersons' Tk). 200m from Sharps Tk (First seen 1996 and confirmed by O. Carter pers. obs 2002)	>300 plants
Powerline easement adjacent to the Deans Marsh Lorne Road A (Sheet 5 <i>sensu</i> Mueck 1997)	>1000 plants
Powerline easement adjacent to the Deans Marsh Lorne Road B (Sheet 6 <i>sensu</i> Mueck 1997)	~500 plants
Powerline easement adjacent to the Deans Marsh Lorne Road C (Sheet 7 <i>sensu</i> Mueck 1997)	5 plants
Otway State Forest	
Seaview Rd A (Sheet 1 <i>sensu</i> Mueck 1997)	~50 plants
Seaview Rd B (Sheet 2 <i>sensu</i> Mueck 1997)	100–200 plants

Threats

It is likely that *Leiocarpa gatesii* has always been restricted to the Lorne/Anglesea area, and that abundance has fluctuated greatly, depending on fire frequency and heterogeneity across the landscape. In the years following hot summer fires, seed germinates and plants grow. As the surrounding vegetation regenerates, plant numbers decline and populations may be 'lost', surviving in the soil seed bank until the next major disturbance event, such as a fire, stimulates mass germination again. Whether there has been any real decline in range and abundance since European settlement is difficult to judge, although current populations do face a range of threats, which are summarised as follows:

Altered fire regimes: Fire frequency, intensity and season may have important effects on long-term survival of this species at all sites (SAC 1996). Lack of fire since 1983 has led to possible declines in abundance at some sites (DCE 1992). Populations discovered in recent years have tended to be where soil has been disturbed, such as during track maintenance. Controlled burns are difficult to implement in many areas where this species has been found, partly due to steep hillslopes and proximity to residential areas (L. Mernane pers. comm). As a result, fires may be less frequent than is needed for long-term survival. Slashing or soil disturbance during trackworks has previously caused accidental proliferation of some populations, but in future should only be done where there is some level of confidence in the expected recruitment or regeneration.

Weed invasion: *Leiocarpa gatesii* is often present along road and track sides in fairly open vegetation which is susceptible to weed invasion, especially by *Anthoxanthum odoratum*. Dumping of garden waste is the likely cause of extensive weed invasion along the Powerline Easement sites, adjacent to the Deans Marsh-Lorne Rd.

Road works: Although track works appear to have triggered germination of *L. gatesii* at some locations, continued physical disturbance may damage established individuals, or spread weeds. For example, road maintenance works destroyed part of the Seaview Rd population in 1997 (Mueck 1997). Conversely, track maintenance and widening may also help the species by removing competition.

Vehicle movement: Recreational vehicles such as trailbikes and 4WDs are active in the area, and may disturb some populations.

Location	Threats
Angahook–Lorne State Park	
Moggs Creek Track	weed invasion
Coal-Mine Creek Track	specific threats not known
Gentle Annie Track A	road works
Gentle Annie Track B	road works, weed invasion
Wonwondah Falls Tk ('Hendersons' Tk)	specific threats not known
Powerline easement A	weed invasion, rubbish dumping
Powerline easement B	weed invasion, rubbish dumping
Powerline easement C	weed invasion, rubbish dumping
Otway State Forest	
Seaview Rd A	road works, weed invasion
Seaview Rd B	road works, weed invasion

Recovery Information

Overall Objective

The **overall objective** of recovery is to minimise the probability of extinction of *Leiocarpa gatesii* 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 *Leiocarpa gatesii* 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.
- 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 its adoption.

Recovery actions and performance criteria

Action	Description	Performance Criteria
Specific objective 1		
Acquire accurate information for conservation status assessments		
1.1	<p>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) inference or estimation of population change.</p> <p>Responsibility: DSE</p>	<ul style="list-style-type: none"> • Determination or update of conservation status for inclusion on state and national threatened species lists. • Review all known sites to make sure there is no duplication (eg. due to different GPS readings). • Updated records on all State databases (FIS, VrotPop, Biosites and Herbaria).
Specific objective 2		
Identify habitat that is critical, common or potential		
2.1	<p>Accurately survey known habitat and collect floristic and environmental information describing community ecology and condition.</p> <p>Responsibility: DSE</p>	<ul style="list-style-type: none"> • Quantify essential life history stages, and mechanisms for recruitment and dispersal identified at known sites. • Determine Habitat critical to the survival of the species and important populations are mapped .
2.2	<p>Identify and survey potential habitat, using ecological, historical and anecdotal information indicating habitat preference.</p> <p>Responsibility: DSE</p>	<ul style="list-style-type: none"> • Sites of potential habitat identified and surveyed, including unconfirmed records: at Big Hill Tk (Mueck 1997), Clark Spur Tk (Mueck 1997), Lorne Golf Course, and Bruce Waller's (PV) property.
Specific objective 3		
Ensure that all populations and their habitat are legally protected		
3.1	<p>Negotiate Special Protection Zones in State Forest.</p> <p>Responsibility: DSE / Surf Coast Shire</p>	<ul style="list-style-type: none"> • Establish a Special Protection Zone for <i>Leiocarpa gatesii</i> at Seaview Rd–Otway State Forest A and B, within State Forest.
3.2	<p>Initiate private land management agreements in consultation with private land owners under the <i>Victorian Conservation Trust Act 1972</i>, <i>The Conservation, Forests and Lands Act 1987</i> and the <i>Wildlife Act 1975</i> at the powerline easement adjacent to the Deans Marsh Lorne Road A, B, and C sites.</p> <p>Responsibility: DSE</p>	<ul style="list-style-type: none"> • Establish a private land protected area network for threatened taxa the powerline easement adjacent to the Deans Marsh Lorne Road A, B, and C sites.

Action	Description	Performance Criteria
Specific objective 4		
Manage threats to populations		
4.1	Identify disturbance regimes to maintain habitat. Responsibility: DSE	<ul style="list-style-type: none"> Preparation of management prescriptions for ecological burning at the Coalmine Creek population. Preparation of management prescriptions for ecological slashing within areas of 4 selected sites.
4.2	Control accidental damage and threats from pest plants by preventing access/re-routing tracks, herbicide application, hand removal of weeds, fencing and signage. Responsibility: PV	<ul style="list-style-type: none"> Measurable seedling recruitment/vegetative regeneration, and a measurable reduction in plant mortality at Moggs Creek Track, Coal-Mine Creek Track, Gentle Annie Track A & B, and Wonwondah Falls Track.
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	<ul style="list-style-type: none"> Seed bank/regenerative potential quantified for targeted populations. Determine longevity of seed in soil. Identify pollinator(s) of <i>Leiocarpa gatesii</i> and any threats to those (eg. European Bees).
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	<ul style="list-style-type: none"> Stimuli for recruitment/regeneration identified. Management strategies identified to maintain, enhance or restore regenerative 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	<ul style="list-style-type: none"> Techniques for monitoring developed and implemented.

- 6.2 Collate, analyse and report on census data and compare with management histories. • Growth rates determined and Population Viability Analysis completed for targeted populations.

Responsibility: DSE

Action	Description	Performance Criteria
Specific objective 7		
Establish populations in cultivation		
7.1	Establish cultivated plants <i>ex situ</i> for inclusion in living collections to safeguard against any unforeseen destruction of wild populations. Responsibility: DSE, RBG	<ul style="list-style-type: none"> • Development of effective propagation and cultivation techniques. • At least 50 mature plants in cultivation selected from a variety of populations to represent the geographic (and genetic) range of the species.
7.2	Establish a seed bank and determine seed viability. Responsibility: DSE	<ul style="list-style-type: none"> • Seed from important populations in long term storage. • Long-term storage facility identified.
Specific objective 8		
Build community support for conservation		
8.1	Identify opportunities for community involvement in the conservation of <i>Leiocarpa gatesii</i> . Responsibility: DSE	<ul style="list-style-type: none"> • Presentations to community nature conservation groups.

ABBREVIATIONS

DSE: Department of Sustainability and Environment, Victoria
PV: Parks 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 *Leiocarpa gatesii*. 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 inappropriate track works, competition from pest plants, and inappropriate fire regimes. A range of strategies will be necessary to alleviate these threats including weed control, fire management, fencing 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 *Leiocarpa gatesii* 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.

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 unforeseen development activities negatively impacting upon *Leiocarpa gatesii*, the threatened flora team should seek relevant information on its 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

Actions associated with the recovery of *Leiocarpa gatesii* are unlikely to affect any existing industry or private party. Almost all populations fall under the jurisdiction of Parks Victoria, the Department of Sustainability and Environment and the Surf Coast Shire. The above management agencies have been contacted and have approved the actions as outlined in this Recovery Plan subject to the availability of sufficient funding.

Role and interests of indigenous people

Indigenous communities on whose traditional lands *Leiocarpa gatesii* 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 *Leiocarpa gatesii*, 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. All populations occur on public land in either State park or State Forest, and any protection measures such as fencing or signposting will cause minimal interference with current commercial and recreational activities.

Acknowledgments

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Bibliography

- DCE 1992. *Management Plan for the Otway Forest Management Area*. Department of Conservation and Environment, Victoria.
- DEH 2000. *Revision of the Interim Biogeographic Regionalisation of Australia (IBRA) and the Development of Version 5.1. - Summary Report*. Department of the Environment and Heritage, Canberra.
- Leigh, J., Boden, R. and Briggs, J. 1984. *Extinct and endangered plants of Australia*. McMillan, South Melbourne.
- Mueck, S.G. 1997. *Survey and recommendations for the protection of Wrinkled Buttons (Leptorhynchus gatesii) between Lorne and Airey's Inlet*. Draft Report prepared for Parks Victoria.
- NRE 1997. *Central Highlands Comprehensive Regional Assessment Report: Biodiversity Assessment*. Commonwealth and Victorian Regional Forest Agreement Steering Committee, Department of Natural Resources and Environment, East Melbourne.
- NRE 1999. *Flora and Fauna Guarantee Action Statement No. 98: Wrinkled Buttons, Leptorhynchus gatesii*. Department of Natural Resources and Environment, Melbourne.
- SAC 1996. *Nomination for Listing under the Flora and Fauna Guarantee Act 1988: Leptorhynchus gatesii – Wrinkled Buttons (H.B. Williamson) J.W. Willis*. Nomination No. 415. Scientific Advisory Committee, Melbourne.
- Walsh, N.G. and Entwisle, T.J. 1999. *Flora of Victoria, Vol 4: Dicotyledons: Cornaceae to Asteraceae*. Inkata Press, Melbourne.
- White, M.D. 1984. A plant thought to be extinct is found in a healthy state: Rediscovery of *Leptorhynchus gatesii*. *Geelong Naturalist* 21(2): 31.
- Wilson, P.G. 2001. *Leiocarpa*, a new Australian genus of the Asteraceae tribe Gnaphalieae. *Nuytsia* 13(3): 595–605.

Priority, Feasibility and Estimated Costs of Recovery Actions

Action	Description	Priority	Feasibility	Responsibility	Cost estimate					Total
					Year 1	Year 2	Year 3	Year 4	Year 5	
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	2	75%	DSE	\$20,000	\$0	\$0	\$0	\$0	\$20,000
3	Legal protection of habitat									
3.1	Protect public land habitat	3	75%	DSE/Surf Coast S	\$0	\$10,000	\$10,000	\$0	\$0	\$20,000
4	Manage threats									
4.1	Identify disturbance regimes	1	75%	DSE	\$0	\$10,000	\$10,000	\$0	\$0	\$20,000
4.2	Control threats	1	75%	PV	\$10,000	\$8,000	\$8,000	\$4,000	\$4,000	\$34,000
5	Identify key biol. functions									
5.1	Evaluate reproductive status	3	75%	DSE	\$0	\$12,000	\$12,000	\$0	\$0	\$24,000
5.2	Seed germination	2	75%	DSE	\$0	\$10,000	\$10,000	\$0	\$0	\$20,000
6	Growth rates, pop. viability									
6.1	Conduct censusing	2	100%	DSE	\$15,000	\$15,000	\$15,000	\$15,000	\$15,000	\$75,000
6.2	Collate, analyse and report	2	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	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
8	Education, communication									
8.1	Community extension	1	100%	DSE	\$6,000	\$6,000	\$6,000	\$6,000	\$6,000	\$30,000
				TOTAL	\$82,000	\$82,000	\$82,000	\$36,000	\$40,000	\$322,000