Department of
Sustainability and
Environment

National Recovery Plan for the Grampians Bitter-pea *Daviesia laevis*

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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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Cover photograph: Grampians Bitter-pea *Daviesia laevis* by Andrew Pritchard.

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Summary

The Grampians Bitter-pea *Daviesia laevis* is listed as Vulnerable under the Commonwealth *Environment Protection and Biodiversity Conservation Act* 1999 and Threatened under the Victorian Government *Flora and Fauna Guarantee Act* 1988. The species is endemic to western Victoria, between the Grampians and Mt Cole, where it is currently known from just three populations containing about 30 plants. Major threats include altered fire regimes and accidental damage due to low population size. This national Recovery Plan for *D. laevis* 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 Grampians Bitter-pea *Daviesia laevis* is a perennial, slender, erect shrub growing to a height of 2–4 m. It typically has smooth, relatively glaucous, arching branches that possess ascending to arching angular-terete branchlets. The phyllodes (modified leaves) are grey-green, slightly flexible and leathery, linear to narrow-elliptic and pointed at the end, have entire margins and a prominent midrib, and are attached to a stalk-like base 2–10 mm long. A series of 5–15 evenly spaced, tiny pea-flowers is attached by s short (1.5–4 mm long) pedicel to a peduncle 2–10 mm long, and form the basis of 1–3 inflorescences per axil. The inflorescence rachis is 20–30 mm long. Flowers consist of a mostly orange-yellow coloured corolla and a brownish-red marked, orange-yellow, depressed-ovate standard. Flowering occurs from October to November. Fruits appear in January and are straw to light-brown in colouring, strongly compressed, obliquely triangular to broadly triangular and 7–10 mm long and 5–6 mm wide. The compressed ovoid seeds are red-brown with black mottling and are about 3 mm long, 2 mm broad and 1 mm thick (description from Crisp 1991; Walsh & Entwisle 1996). The biology and ecology of *D. laevis* are essentially unknown. Herbarium records indicate that the species is generally found in low numbers. There is a suggestion that it regenerates well after fire, although seedlings were found at Langi Ghiran in 2004 in areas without recent fire activity (S. Kelly DSE pers. obs.).

Distribution

Daviesia laevis occurs in the Grampians, Mount Cole and Black Ranges in western Victoria, in the Victorian Midlands IBRA Bioregion (DEH 2000). Populations were recorded from the Grampians at Mount Cassell, Grevillea Creek, Lake Wartook Rd, Mt William, Stoney Creek Track, Mt Difficult Range, Long Gully Creek and Bovine Creek; Mt Cole State Park; Langi Ghiran State Park; Mt Buangor State Park and the Black Range State Park. The most recent records are from Mt Cole (1991), Mt Langi Ghiran (2004) and the Grampians National Park at Bovine Creek (2004).

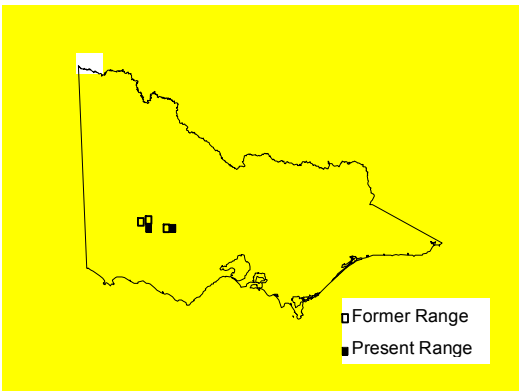

Figure 1. Former and current distribution of *Daviesia laevis* in Victoria

Maps showing the detailed distribution of *D. laevis* 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

Daviesia laevis was until recently though to be extinct. However, surveys in 2004 located the species at three sites:

- Mt Langi Ghiran (Langi Ghiran State Park, managed by Parks Victoria): About 30 plants, including at least 8 seedlings.
- Bovine Creek (Grampians National Park, managed by Parks Victoria): one adult plant.
- Silverband Falls Road (Grampians National Park, managed by Parks Victoria): one seedling, recorded near the site of a previously observed adult plant that is no longer present.

The current status of other previously recorded populations is unknown.

Habitat

Few reports exist of *Daviesia laevis* habitat. The species was initially described by Crisp (1991) and its habitat defined as occurring in protected montane sites such as gullies on sandstone or granite skeletal or sandy soils sometimes amongst boulders alongside creeks. *Eucalyptus obliqua* and *Eucalyptus alaticaulis* were reported as being the dominant species in an open forest, with *D. laevis* occurring along the borders of the forest and the adjacent *Leptospermum, Melaleuca* and *Gahnia* thicket. At Langi Ghiran State Park, plants are typically located in southern facing granite outcrops, sparsely distributed and often amongst boulders, at 800–900 m altitude. Overstorey species include *E. obliqua*, *Eucalyptus goniocalyx* and (rarely) *Eucalyptus pauciflora*, the shrub layer includes *Acacia melanoxylon*, *Acacia oxycedrus* and *Acacia paradoxa* while ground covers include *Olearia* species, *Poa sieberiana*, *Lomandra longifolia* and *Microlaena stipoides* species. Recovery actions will include survey and mapping of habitat that will lead to the identification of habitat critical to the survival of the species.

Threats

The Grampians Bitter-Pea is an enigmatic species that was apparently present in low numbers over the last 20 years. Recent searches in most historical locations failed to locate the species, although this may be due to a lack of complete site data, rather than evidence of a substantial decline. Crisp (1991) suggested that frequent burning at Mount Cole State Forest may have led to the decline of populations there, while intense browsing by macropods has been observed in this area (F. Coates DSE pers. comm.). At Langi Ghiran State Park there is evidence of browsing of seedlings by macropods, which may be limiting successful recruitment (S. Kelly pers. obs.). The effects of fire are unknown, but appropriate regimes should be investigated as it may promote recruitment. Seedlings were found at a site that has not been burnt for several years, but may have established due to some other localised disturbance. Competition from other species is a potential threat. Seed predation by birds (possibly Crimson Rosella) has been observed, and there appears to be very little seed entering the soil seed bank each year (A. Pritchard DSE pers. comm.). The two plants currently known in the Grampians are at risk from low population size. The seedling at Silverband Falls Road is almost adjacent to the carpark, thus is at risk from accidental human and vehicle damage.

Recovery Information

The initial focus of this Recovery Plan is to organise protection for the three extant populations of *D. laevis*, plus attempt to locate other extant populations.

Overall Objective

The **overall objective** of recovery is to minimise the probability of extinction of *Daviesia laevis* 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 *Daviesia laevis* 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.
- 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. • Identify target populations.
Specific objective 2		
Identify habitat that is critical, common or potential		
2.1	Accurately survey known habitat and collect floristic and environmental information relevant to 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. **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	Negotiate Special Protection Zones in State Forest. **Responsibility: DSE**	• Establish a public land protected area network at sites (if species found and if action required) within the Mount Cole State Forest.
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 once determined **Responsibility: PV/DSE**	• Measurable seedling recruitment/vegetative regeneration at all known sites. • A measurable reduction in plant mortality at all known sites.

Action	Description	Performance Criteria
Specific objective 5 **Identify key biological functions**		
5.1	Evaluate current reproductive potential by determining seed bank status and longevity, fecundity and recruitment. **Responsibility: DSE**	• Seed bank potential quantified at target populations.
5.2	Determine seed germination requirements by conducting laboratory and field trials aimed to identify key stimuli. **Responsibility: DSE**	• Stimuli for recruitment identified at target populations. • 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. • Annual 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 target 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: RBG**	• Development of effective propagation and cultivation techniques. • At least 25 mature plants in cultivation.
7.2	Establish a long-term seed bank and determine seed viability. **Responsibility: DSE**	• Long-term storage facility identified. • Seed from target populations in long term storage.

Action	Description	Performance Criteria
Specific objective 8		
Establish cultivated plants in the wild		
8.1	Prepare site(s) to achieve maximum survival of translocated plants and implement translocation plan. **Responsibility: DSE/PV**	• Development of successful translocation techniques.
8.2	Maintain and monitor translocated plants. **Responsibility: DSE/PV**	• At least 40% survival of translocated plants.
Specific objective 9		
Build community support for conservation		
9.1	Identify opportunities for community involvement in the conservation of *Daviesia laevis*. **Responsibility: DSE**	• Presentations to community nature conservation groups.

Abbreviations

DSE: Department of Sustainabiltiy 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 *D. laevis*. 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 potential threats requiring management include accidental destruction, and inappropriate fire regimes. A range of strategies will be necessary to alleviate these threats including, fire management, and preventing access to recreational users or erecting appropriate conservation 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 *D. laevis* 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.

Affected interests

Parks Victoria and the Department of Sustainability and Environment will be the major agencies involved in the implementation of the *Daviesia laevis* Recovery Plan, while the Royal Botanic Gardens will also be involved in *ex situ* conservation if required. All the agencies above have been notified and are aware of their involvement.

Role and interests of indigenous people

Indigenous communities on whose traditional lands *Daviesia laevis* 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. As the species has only been reported from National Parks and State Forest, the Recovery Plan may highlight the importance of protecting threatened species in reserved areas.

Social and economic impacts

The implementation of this Recovery Plan will not cause any significant adverse social and economic impacts. The Grampians Bitter-pea is currently known only from public land, including a national park and a state park, and protection measures will have minimal if any impact on current recreational and commercial activities at the sites.

Acknowledgments

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- Stawell Field Naturalists Club: Thelma Argall, Ian McCann
- Friends of the Grampians Gariwerd: Lyn Munro
- Parks Victoria: Graham Parkes, Jill Read, Mike Stevens

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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	$6,000	$0	$0	$0	**$12,000**
2	**Habitat requirements**									
2.1	Survey known habitat	1	100%	DSE	$6,000	$6,000	$3,000	$0	$0	**$15,000**
2.2	Identify, survey potential habitat	1	75%	DSE	$0	$20,000	$10,000	$0	$0	**$30,000**
3	**Legal protection of habitat**									
3.1	Protect public land habitat	1	25%	DSE	$0	$0	$0	$5,000	$5,000	**$10,000**
4	**Manage threats**									
4.1	Identify disturbance regimes	1	50%	DSE	$0	$0	$10,000	$10,000	$0	**$20,000**
4.2	Control threats	1	25%	PV / DSE	$0	$0	$0	$5,000	$5,000	**$10,000**
5	**Identify key biol. functions**									
5.1	Evaluate reproductive status	1	75%	DSE	$0	$0	$10,000	$10,000	$0	**$20,000**
5.2	Seed germination	1	75%	DSE	$0	$0	$10,000	$10,000	$0	**$20,000**
6	**Growth rates, pop. viability**									
6.1	Conduct censusing	1	100%	DSE	$6,000	$6,000	$6,000	$6,000	$6,000	**$30,000**
6.2	Collate, analyse and report	1	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%	RBG	$0	$0	$15,000	$15,000	$17,000	**$47,000**
7.2	Establish a seed bank	3	50%	DSE	$4,000	$4,000	$4,000	$4,000	$4,000	**$20,000**
8	**Establish pops in the wild**									
8.1	Prepare site(s), implement plan	3	50%	DSE / PV	$0	$0	$10,000	$20,000	$20,000	**$50,000**
8.2	Maintain and monitor	3	50%	DSE / PV	$0	$0	$20,000	$20,000	$20,000	**$60,000**
9	**Education & communication**									
9.1	Community extension	2	100%	PV / DSE	$6,000	$6,000	$6,000	$6,000	$6,000	**$30,000**
					$40,000	**$60,000**	**$116,000**	**$131,000**	**$101,000**	**$448,000**