Department of
Sustainability and
Environment

National Recovery Plan for the Ben Major Grevillea *Grevillea floripendula*

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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: Ben Major Grevillea *Grevillea floripendula*, by John Eichler.

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Summary

The Ben Major Grevillea *Grevillea floripendula* 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 a small area in central western Victoria, where about 4,000 plants occur in 21 wild populations. Main threats include inappropriate fire regimes, weed invasion, timber harvesting and firewood collection, and road works. This national Recovery Plan for *G. floripendula* 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 Ben Major Grevillea *Grevillea floripendula* is a prostrate to decumbent to spreading shrub, growing up to 1.0 m tall. The leaves are pinnatisect to pinnatifid, 20–65 mm long and 15–40 mm wide, and with 5–9 lobes, although occasionally some are simple, lacking lobes and ending in a single spine. The upper surface is bright to dull green, glabrous or slightly hairy with shortly recurved margins, while the lower surface is light green with a sparse covering of curly to wavy hairs. The conflorescences are 30–55 mm long, terminal, usually pendulous, secund. Peduncles are slender, wiry, glabrous or mildly pubescent, while the rachis is pubescent. The external surface of the perianth is green to mauve and covered loosely with silky to woolly hairs, while the internal surface is mauve to maroon or blackish in colour. The pistil is 13–16 mm long, pale yellow, green-yellow, or pink to red, while the ovary is stipitate and densely villous, the style hairy at the base, and the pollen presenter oblique. The fruit has longitudinal brown bands and is covered in small silky hairs (description from Walsh & Entwisle 1996). It is distinguished from the related *Grevillea steiglitziana* and *Grevillea dryophylla* by its slender, wiry and glabrous peduncles (Walsh & Entwisle 1996).

Olde & Marriott (1995) identified two forms:

Ben Major form: This form has a sprawling, mostly prostrate habit, the leaves are shallowly divided and the flowers have a red tinge. It is restricted to Ben Major State Forest.

Musical Gully form: This form grows to 1m tall and is more shrubby, the leaves are more deeply divided and flowers are variable in colour.

Little is known of the biology of the species. It appears to be an obligate seed regenerator, with new individuals appearing after fire, although recruitment in years between fires has also been observed, suggesting some other disturbance event may also cue germination (J. Downe pers. obs.). The species is likely to be pollinated by honeyeaters.

Distribution

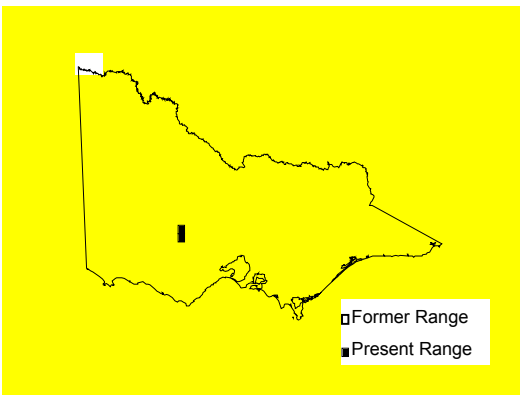

Figure 1. Distribution of the *Grevillea floripendula* in Victoria

Grevillea floripendula is endemic to Victoria, where it is restricted to a small area north of Beaufort (approximately 160 km west of Melbourne), from Waterloo to Ben Major Forest (Walsh & Entwisle 1996), in the Victorian Midlands IBRA Bioregion (DEH 2000).

Maps showing the detailed distribution of *G. floripendula* 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

Grevillea floripendula occurs in about 21 populations with a total of about 4,000 plants. Information on major populations (1997 data) is summarised as follows:

Ben Major Flora Reserve

Big Hill Rd 1: c. 375 plants, including many seedlings.

Big Hill Rd 2: c. 750 plants, including many seedlings.

Amphitheatre Rd: c. 175 plants, including many seedlings.

Grevillea Track: c. 175 plants.

Roadsides (Shire of Pyrenees)

Wildlife Rd: c. 750 plants, including many seedlings.

Sheisa Lane: c. 750 plants, with some seedlings observed.

Other populations tend to occur on roadsides and/or contain fewer plants (ie. four populations contain 175 plants and eleven populations contain less than 50 plants). Some of these sites may be important and their condition and likelihood of persistence will be determined with the implementation of this Recovery Plan.

Habitat

Populations of *Grevillea floripendula* occur in dry open-forest, on shallow quartzitic soils (Walsh & Entwisle 1996). Associated overstorey species include *Eucalyptus goniocalyx, Eucalyptus aromaphloia* and/or *Eucalyptus macrorhyncha*. *Daviesia leptophylla, Dianella revoluta, Epacris impressa, Joycea pallida, Lomandra sororia* and/or *Poa sieberiana* var. *sieberiana* are associated in lower strata. 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 and abundance of *G. bedggoodiana*, so it is not certain if there has been any decline. The main threats to the species are summarised as follows:

Inappropriate fire regimes: Important populations of *Grevillea floripendula* tend to occur in largely intact vegetation, where inappropriate fire regimes are likely to be the major threat. Sites lacking recruitment tend to be those unburnt for more than 10 years, so an appropriate fire interval for *Grevillea floripendula* is expected to be around 8-10 years.

Weed invasion: Sites with low abundance of *Grevillea floripendula* tend to be on infrequently burnt roadsides that are heavily weed infested.

Timber harvesting & firewood collection: Disturbance associated with timber harvesting and firewood collection poses a threat to some populations.

Road works: Many populations occur close to roads and tracks, and may be prone to physical damage from grading or other track maintenance. However, certain grading methods may actually facilitate resprouting of some plants.

Defoliation by insects: Plants in some populations demonstrate high levels of leaf damage and defoliation, apparently by the Grevillea Leaf Miner (N. Marriott pers. comm.).

Gold prospecting: Amateur gold prospecting in the area is common, and trampling of plants is apparent in some areas.

Recovery Information

Overall Objective

The **overall objective** of recovery is to minimise the probability of extinction of *Grevillea floripendula* 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 floripendula* 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	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 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 that may indicate 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 Wildlife Rd and Sheisa Lane sites.

Action	Description	Performance Criteria
Specific objective 4 **Manage threats to populations**		
4.1	Identify disturbance regimes to maintain habitat. **Responsibility: DSE, PV**	• Preparation of management prescriptions for ecological burning at Ben Major Flora Reserve (ie. Big Hill Rd 1, Big Hill Rd 2, Amphitheatre Rd and Grevillea Track), and Wildlife Rd and Sheisa Lane sites.
4.2	Control threats from pest plants using application of herbicide or hand removal of weeds, and from accidental damage from road works by fencing sites and erecting appropriate conservation signage. **Responsibility: PV, Shire of Pyrenees**	• Measurable seedling recruitment/vegetative regeneration and a measurable reduction in plant mortality at Ben Major Flora Reserve (ie. Big Hill Rd 1, Big Hill Rd 2, Amphitheatre Rd and Grevillea Track), and Wildlife Rd and Sheisa Lane sites.
Specific objective 5 **Identify key biological functions**		
5.1	Evaluate current reproductive/regenerative status by determining 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 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. • Biannual 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.

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. Unfortunately plants tend to be short lived in cultivation unless grafted on to hardy compatible rootstocks (N Marriott pers comm.). • At least 25 mature plants in cultivation.
7.2	Establish a seed bank and determine seed viability. **Responsibility: DSE**	• Long-term storage facility identified. • Seed from important populations in storage.
Specific objective 8		
Build community support for conservation		
8.1	Identify opportunities for community involvement in the conservation of *Grevillea floripendula*. **Responsibility: DSE**	• Presentation(s) 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 *Grevillea floripendula*. 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 (eg. from road 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 and fencing.

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 floripendula* 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. However due to the potential for Grevillea to hybridise with closely related taxa, it is essential that seed taken from *ex situ* sites be assessed for genetic purity.

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 floripendula*, 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

Population locations are managed by Parks Victoria, DSE and the Shire of Pyrenees, who have been contacted and have approved the actions outlined in this Recovery Plan.

Role and interests of indigenous people

Indigenous communities on whose traditional lands *Grevillea floripendula* 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 floripendula, 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. Populations occur on public land, either in State Forest or on roadsides, and conservation measures will have negligible impact on current recreation and commercial activities.

Acknowledgments

The authors would like to thank Fiona Coates, Matt White, Andy Arnold and Gary Backhouse (all DSE), Clint Chandler (Parks Victoria), Neil R. Marriott (Trust for Nature) and John Eichler for their contributions to this Recovery Plan.

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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	$15,000	$0	$0	$0	$0	**$15,000**
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	$0	$20,000	$0	$0	$0	**$20,000**
3	**Legal protection of habitat**									
3.1	Protect public land habitat	1	75%	DSE	$0	$0	$10,000	$0	$0	**$10,000**
4	**Manage threats**									
4.1	Identify disturbance regimes	1	75%	DSE, PV	$0	$20,000	$20,000	$0	$0	**$40,000**
4.2	Control threats	2	75%	PV, Pyrenees S	$15,000	$15,000	$15,000	$10,000	$5,000	**$60,000**
5	**Identify key biol. functions**									
5.1	Evaluate reproductive status	2	75%	DSE	$12,000	$12,000	$0	$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	3	100%	DSE	$15,000	$15,000	$15,000	$15,000	$15,000	**$75,000**
6.2	Collate, analyse and report	3	100%	DSE	$2,000	$2,000	$2,000	$2,000	$5,000	**$13,000**
7	**Establish pops in cultivation**									
7.1	Establish cultivated plants	3	50%	DSE, RBG	$0	$0	$10,000	$10,000	$10,000	**$30,000**
7.2	Establish a seed bank	2	50%	DSE	$4,000	$4,000	$4,000	$4,000	$4,000	**$20,000**
8	**Education, communication**									
8.1	Community extension	3	100%	DSE	$6,000	$6,000	$6,000	$6,000	$6,000	**$30,000**
	TOTAL				$79,000	$104,000	$92,000	$47,000	$45,000	$367,000