National Recovery Plan for the Enfield Grevillea *Grevillea bedggoodiana*

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Summary

The Enfield Grevillea *Grevillea bedggoodiana* 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 about 150 km west of Melbourne, where about 37,000 plants occur in perhaps 60 wild populations. Main threats are Cinnamon Fungus *Phytophthora cinnamom*i and inappropriate fire regimes. This national Recovery Plan for *G. bedggoodiana* 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 Enfield Grevillea *Grevillea bedggoodiana* is a prostrate to decumbent spreading shrub 0.2– 1.0m x 1.0 m x 3.0 m with ovate to oblong, holly-like, 5–9-toothed leaves 10–35 mm wide and 20–70 mm long. The leaf lower lamina is covered by a tomentum of minute curly hairs. The inflorescences are terminal, compound, secund and erect to slightly decurved. The perianth and style are green, becoming dark pink at antithesis, and the outer surface is tomentose and the style glabrous. The pistils range from 12–16 mm long. The rachis is covered with long, weak hairs, and the ovary is stipitate with appressed hairs. The flowering period is October and November. The fruits are slightly tomentose with reddish dorsal ridges (description from Walsh & Entwisle 1996).

There have been no targeted biological or ecological studies of *Grevillea bedggoodiana*. As a result, little is known of its germination requirements or other methods of persistence. The species is known to re-shoot vigorously from lignotubers as well regenerate prolifically from soil-stored seed, mostly stored in underground chambers by ants (N Marriott pers. comm.).

Distribution

The Enfield Grevillea is endemic to Victoria where it is apparently confined to the Enfield and Smythsdale areas south-west of Ballarat (Walsh & Entwisle 1996), the Victorian Midlands IBRA bioregion (DEH 2000).



Figure 1. Distribution of Grevillea bedggoodiana in Victoria

Maps showing the detailed distribution of *G. bedggoodiana* 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

There are about 60 populations of *G. bedggoodiana* containing over 37,000 plants (DSE database). Important populations are here recognised as those populations with 1000 plants or more that occur in conservation reserves. This amounts to 11 populations with about 20,000 individuals, or 52% of all known individuals, all of which occur in Enfield State Park. A more

thorough assessment of the relative importance of sites, and comparison with other sites, is a recovery action. Important populations within Enfield State Park are:

Location	Numbers of plants
Staffordshire Reef Rd (1), commencing 1150 m E of intersection with Long Gully Rd	1900 plants recorded in 1997
Staffordshire Reef Rd (2), commencing 650 m E of intersection with Long Gully Rd	1010 plants recorded in 1997
Staffordshire Reef Rd (3), commencing 600 m W of intersection with Incolls Rd	>2000 plants recorded in 1998
Staffordshire Reef Rd (4), 900 m E of Long Gully / Staffordshire Reef Rd intersection	>1000 plants recorded in 1998
Staffordshire Reef Rd / Misery Creek Rd (1)	>2000 plants recorded in 1998
Staffordshire Reef Rd / Misery Creek Rd (2)	>1000 plants recorded in 1998
Staffordshire Reef Rd / Misery Creek Rd (3)	>1000 plants recorded in 1998
Misery Creek Rd North, south section	1040 plants recorded in 1997
Misery Creek Rd North, south section 5	1000 plants recorded in 1997
Misery Creek Rd North, south section 6	3825 plants recorded in 1997
Misery Creek Rd North, south section 7	3560 plants recorded in 1997

Habitat

Grevillea bedggoodiana occurs in eucalypt woodland on gravelly clay (Walsh & Entwisle 1996). Associated species may include *Eucalyptus dives, Eucalyptus baxteri*, *Gahnia radula, Dianella revoluta, Pultenaea gunnii, Epacris impressa* and *Lomandra filiformis.* 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:

Accidental introduction of Cinnamon Fungus (*Phytophthora cinnamomi***):** The greatest threat to *G. bedggoodiana* is accidental introduction of Cinnamon Fungus, to which it is extremely susceptible (N Marriott pers. comm.). This could be easily introduced on earth moving machinery used in logging operations and roading or even on vehicles such as 4WDs.

Inappropriate fire regimes: The response of *Grevillea bedggoodiana* to fire is unknown. Following fire this species may resprout, or new individuals may recruit from seed. Some species in association with this *G. bedggoodiana* (eg. *Platylobium obtusangulum, Eucalyptus baxteri*) respond well to fire. Appropriate fire intervals are expected to be about 10–15 years.

Recovery Information

Objectives

The **overall objective** of recovery is to minimise the probability of extinction of *Grevillea bedggoodiana* 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 bedggoodiana* are to:

- Acquire accurate information for conservation status assessments.
- Identify habitat that is critical, common or potential.
- Manage threats to populations.
- Identify key biological functions.
- Determine the growth rates and viability of populations.
- 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 area and extent of populations; (b) estimates of the number area and extent of populations are estimated as a substitute of	• D st	etermination or update of conservation status for inclusion on tate and national threatened species lists.			
	change.	• Ta	arget populations accurately mapped.			
	Responsibility: DSE					
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.	• R re	equirements for completion of essential life history stages, ecruitment and dispersal identified at known sites.			
	Responsibility: DSE	• H	labitat 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.	• Pi	redictive model for potential habitat developed and tested.			
	Responsibility: DSE					
Specific	objective 3					
Manage	threats to populations					
3.1	Identify disturbance regimes to maintain habitat.	• Pi	reparation of management prescriptions for ecological burning.			
	Responsibility: DSE					
3.2	Identify and as required, control threats from pest plants, animals, accidental	• A:	ssessment of current and potential threats to sites.			
	destruction via timber harvesting or road maintenance works, by preventing access, re-routing tracks, using broadscale application of herbicide, hand removal of weeds, fencing sites, caging plants and/or erecting appropriate conservation signage.	• M re	leasurable seedling recruitment/vegetative regeneration and a eduction in plant mortality.			
	Responsibility: PV					

Action	Description	Performance Criteria					
Specific objective 4							
Identify key biological functions							
4.1	Evaluate current reproductive/regenerative status by determining seed bank status and longevity, fecundity and recruitment.	 Seed bank/regenerative potential quantified for target populations. 					
	Responsibility: DSE						
4.2	Determine seed germination requirements by conducting laboratory and field trials aimed to identify key stimuli and determine stimuli for vegetative regeneration	Stimuli for recruitment/regeneration identified.					
	Responsibility: DSE	 Management strategies identified to maintain, enhance or restore processes fundamental to reproduction and survival. 					
Specific	Specific objective 5						
Determi	ne the growth rates and viability of populations						
5.1	Measure population trends and responses against recovery actions by collecting demographic information including recruitment and mortality, timing of life history	• Techniques for monitoring developed and implemented.					
	stages and morphological data.	Census data for target populations.					
	Responsibility: DSE						
5.2	Collate, analyse and report on census data and compare with management histories.	Population growth rates determined and Population Viability					
	Responsibility: DSE	Analysis completed for target populations.					
Specific objective 6							
Build community support for conservation							
6.1	Identify opportunities for community involvement in the conservation of Grevillea bedggoodiana.	• Presentation(s) to community nature conservation groups.					
	Responsibility: DSE						

Abbreviations

DSE: Department of Sustainability and Environment, Victoria

PV: Parks Victoria

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 bedggoodiana*. 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. via timber harvesting practices or road maintenance works), and inappropriate fire regimes. A range of strategies will be necessary to alleviate these threats including fire management and negotiating Special Protection Zones in State Forest.

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 bedggoodiana* 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. This species should not be grown anywhere within range of closely related taxa, eg. *Grevillea aquifolium* or *Grevillea dryophylla* otherwise hybrid seed will result.

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 bedggoodiana*, 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 bedggoodiana* fall under the jurisdiction of Parks Victoria and DSE (Forest Management), 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 bedggoodiana* 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 bedggoodiana, 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 Enfield Grevillea is confined largely to public land, including state park and state forest, and already has a high level of protection. Additional measures designed to protect and enhance populations will have negligible impact on current commercial and recreational activities on public land. Any populations on private land will be protected through negotiation with land owners.

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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									
1.2	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	Manage threats									
3.1	Identify disturbance regimes	1	75%	DSE	\$0	\$10,000	\$10,000	\$0	\$0	\$20,000
3.2	Control threats	1	75%	PV	\$10,000	\$8,000	\$8,000	\$4,000	\$4,000	\$34,000
4	Identify key biol. functions									
4.1	Evaluate reproductive status	3	75%	DSE	\$0	\$12,000	\$12,000	\$0	\$0	\$24,000
4.2	Seed germination	3	75%	DSE	\$0	\$10,000	\$10,000	\$0	\$0	\$20,000
5	Growth rates, pop. viability									
5.1	Conduct censusing	3	100%	DSE	\$15,000	\$15,000	\$15,000	\$15,000	\$15,000	\$75,000
5.2	Collate, analyse and report	3	100%	DSE	\$1,000	\$1,000	\$1,000	\$1,000	\$5,000	\$9,000
6	Education, communication									
6.1	Community extension	2	100%	DSE	\$6,000	\$6,000	\$6,000	\$6,000	\$6,000	\$30,000
	TOTAL				\$82,000	\$62,000	\$62,000	\$26,000	\$30,000	\$262,000