Department of Sustainability and Environment

National Recovery Plan For The Limestone Blue Wattle *Acacia caerulescens*

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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 Limestone Blue Wattle *Acacia caerulescens* (also known as the Buchan Blue Wattle or simply 'Buchan Blue' is listed as Vulnerable under the Australian Government *Environment Protection and Biodiversity Conservation Act* 1999 and Threatened under the Victorian Government *Flora and Fauna Guarantee Act* 1988. The species is endemic to East Gippsland in Victoria, where there are approximately 1700 plants in 15 wild populations. Major threats to populations include weed invasion, grazing and lack of regeneration, road-widening and altered fire regimes. This national Recovery Plan for *A. caerulescens* 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 Limestone Blue Wattle *Acacia caerulescens* is a more or less pyramidal tree growing to 15 m tall, with obovate to oblanceolate, usually asymmetric, blue-green phyllodes ('leaves') 40–80 mm long and 15–30 mm wide (Maslin & Court 1989; Walsh & Entwisle 1996). Phyllodes have a gland 5–25 mm above the pulvinus (swelling at base of phyllode) connected by a fine, oblique vein (Walsh & Entwisle 1996). Flowers appear in November–December and are clustered into globular, pale yellow heads, to 6 mm wide, that are arranged in short racemes or panicles arising from the leaf axils (DNRE 2001). Fruit is a more or less straight, oblong pod 50–120 mm long and 12–22 mm wide, sometimes constricted between the seeds (Walsh & Entwisle 1996; DNRE 2001). Seed germinates following disturbance such as fire or roadworks. Plants are apparently long-lived, with no evidence of any senescing trees present in surveys in 2002 (N. Walsh unpubl.).

This species is most similar to *Acacia obliquinervia*, which has less glaucous, often longer phyllodes with the gland 0-12 mm above the pulvinus, lacks an associated fine, oblique vein extending to the pulvinus, and has bright yellow flower heads (Maslin & Court 1989). It is much more widespread than *A. caerulescens*, and occurs at higher altitudes (Walsh & Entwisle 1996).

Distribution

Acacia caerulescens is endemic to eastern Victoria, in an area bounded by Buchan, Lake Tyers and Bairnsdale (Walsh & Entwisle 1996), within the South East Corner IBRA Bioregion (EA 2000), where it is restricted to limestone soils (Maslin & Court 1989; Fig. 1). The 15 known populations occur in a variety of geographic situations, often close to rivers, lakes and roads. The species is sometimes grown in cultivation in Victoria (Tame 1992), and extensive planting has occurred within the Buchan Caves Reserve, away from natural populations in the reserve.

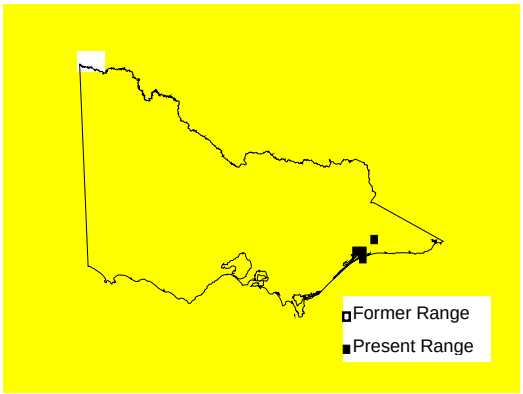

Figure 1. Distribution of *Acacia caerulescens* in Victoria

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.

Population Information

The 15 known populations of *Acacia caerulescens*, containing a total of about 1700 plants (N. Walsh, unpubl.), occur in the following locations:

Roadsides (Shire of East Gippsland)

- Tambo Upper Rd cutting, 3.5 km from Swan Reach: Road cutting (mostly E of road) on Tambo Upper Rd, 3.5 km from Princess Hwy (11 plants)
- Ostler Rd above Stony Creek: Ostler Rd, 200 m N from Toorloo Arm Rd at Casey Creek crossing (6 plants)
- Toorloo Arm Rd, E of Toorloo Arm: Toorloo Arm Rd (eastern portion) 1.5 km W from Hwy 1 (above Stony Creek) at ~1.5 km NE from bridge at Stony Creek (~60 plants)

Roadsides (VicRoads)

- Buchan – Gelantipy Rd: 3.5 - 4.5 km N (by road) of Buchan at Buchan River bridge – both sides of road (~600 plants). A private landholder has planted 30–40 plants on their land adjoining this population.
- Princess Highway at Toorloo Arm: Beside Princes Hwy on SW side of bridge at Toorloo Arm (Stony Creek) (40 plants W of bridge; ~100 plants E of bridge). Several plants were lost in the 1980s due to major road works at the Princes Hwy crossing over Toorloo Arm (Maslin & Court 1989).

Buchan Caves Reserve (Parks Victoria)

- Fairy Cave entrance: beside path from carpark to Fairy Cave entrance (~175 plants); one plant near entrance to Royal Cave.
- The Bluff/Moon Hill: ~1 km NNW from Buchan PO on west bank of Buchan River – signposted reserve (450 plants).
- Pyramid Cave (size unknown).
- Swimming pool area (~100 plants). An artificial population established as a result of revegetation projects since the mid 1990s.

Lake Tyers Forest Park (Parks Victoria)

- Lake Tyers, Happy Valley Track: at end of Happy Valley Track (~2.5 km W of Tyers House Rd) Nowa Nowa arm of Lake Tyers (eastern shore) mostly S of track (18 plants).
- Lake Tyers, Camerons Arm #1 Track: eastern shore of Lake Tyers at end of Cameron Arm #1 Track (~50 plants).
- Lake Tyers, Camerons Arm #2 Track: eastern shore of Lake Tyers, Nowa Nowa arm, at end of Camerons Arm #2 Track (off Tyers House Rd) (~50 plants).

Shire of East Gippsland and Private

Tambo River below Tambo Upper: W bank of Tambo River bend centred on 3.5 km NNW from Princes Highway bridge at Swan Reach (~50 plants plus ~10 in downstream private property stand ~1 km away on E side of river).

Private Land

- Calulu 1: N bank of Mitchell River, just downstream of confluence with Prospect Ck, extending slightly up Prospect Creek (<30 plants).
- Calulu 2: NW bank of Mitchell River at +/- right angle bend, 9.9 km WNW from Princes Highway bridge over Mitchell River at Bairnsdale (<20 plants).

- North Arm, Lakes Entrance: East bank of Mississippi Creek, ~300 m N of its opening into North Arm, Lakes Entrance (~30 plants).

Habitat

Acacia caerulescens occurs in a range of vegetation types, all with the common characteristic of underlying limestone geology. In some areas *Acacia caerulescens* occurs on clay over limestone in *Eucalyptus* woodland and forest (Walsh & Entwisle 1996). *Acacia caerulescens* is also found in *Pomaderris oraria* subsp *calcicola* shrubland and *Eucalyptus bosistoana* open forest and sub-coastal shrublands. Some key associated species include *Dodonaea viscosa*, *Acacia implexa, Hymenanthera dentata, Solanum aviculare, Clematis glycinoides, Rhagodia candolleana, and Bedfordia arborescens*. In some instances vegetation merges towards *Acmena smithii* warm temperate rainforest. Populations at Buchan are associated with *Eucalyptus melliodora*, *Acacia falciformis* and *Themeda triandra*, forming a grassy woodland (Maslin & Court 1989). Recovery actions include survey and mapping of habitat that will lead to the identification of habitat critical to the survival of the species.

Threats

The Limestone Blue Wattle was almost certainly more widespread and abundant within the region where it currently occurs, but populations have been fragmented and depleted historically by land clearance for settlement and agriculture (Maslin & Court 1989). This decline may be continuing, with as many as 10 populations with locality data recorded on the DSE FIS database not being relocated in recent years. The main threats to the species are summarised as follows:

Weed invasion: Many sites containing *A. caerulescens*, especially those along rivers and roadsides, are subject to severe weed invasion. Notable weeds include *Asparagus asparagoides*, *Vinca major*, *Verbascum thapsus* subsp *thapsus*, *Marrubium vulgare and Rubus fruticosus* species; *A. asparagoides* and *Rubus* species. are Weeds of National Significance. Competition from weeds may be reducing seedling recruitment at several population sites.

Grazing: Several populations on both public and private land are suffering grazing pressure from high numbers of kangaroos and rabbits, resulting in little or no natural regeneration occurring.

Roadworks: During the late 1980s, major road widening operations between Buchan and Murrindal apparently significantly reduced or destroyed several roadside populations of *A. caerulescens*. Several populations occur along roadsides, and may be at risk from future roadworks eg. Tambo Upper Road cutting site. Significantly though, soil disturbance from roadworks may create conditions suitable for seed germination and seedling establishment, which has apparently occurred in one population on the Buchan-Gelantipy Rd.

Population fragmentation: Remaining populations of *A. caerulescens* are mostly small and now quite isolated from one another, and ecological processes important to the survival of the species may not be operable in the long-term.

Inappropriate fire regimes: Fire frequency may be important to survival of *A. caerulescens*. Too frequent fires may be killing plants before they reach seed production age, and too infrequent fires may not permit sufficient recruitment to replace senescing plants. The role of fire in germination of *A. caerulescens* seed is not known, but, as many other *Acacia* species require fire for regeneration, fire may be important for this species as well.

Land clearing: Land clearing was almost certainly the cause of a major decline in the species, but the extent of this historical loss is not known, as the species was only described as new in 1989. The few populations on private land are most at risk from future land clearing.

Trampling: Trampling of seedlings by walkers is a minor problem at one or two populations, which may be reducing recruitment.

Areas and populations under threat

Table 1. Populations and major threats

Population	Threats
Roadsides (Shire of East Gippsland)	
Tambo Upper Rd cutting, 3.5 km from Swan Reach	weed invasion, roadworks
Ostler Rd above Stony Creek	(lack of recruitment, small patch size, marginal habitat, weed invasion). No existing conservation measures.
Toorloo Arm Rd, E of Toorloo Arm	weed invasion, lack of recruitment
Vic Roads	
Buchan-Gelantipy Rd	weed invasion, roadworks (road works, weed invasion) Note, this population was burnt a few years ago leading to increases in numbers of individuals post-fire..
Princess Highway at Toorloo Arm	human trampling
Buchan Caves Reserve	
Fairy Cave entrance	weed invasion, grazing, trampling
The Bluff/Moon Hill	weed invasion, grazing, inappropriate fire regimes
Pyramid Cave	weed invasion, grazing, inappropriate fire regimes
Lake Tyers Forest Park	
Happy Valley Track	no threats apparent
Camerons Arm #1 Track	weed invasion, trampling
Camerons Arm #2 Track	trampling
Shire of East Gippsland and Private Land	
Tambo River below Tambo Upper	weed invasion, including spreading populations of *Populus alba* and *Populus nigra*, lack of recruitment). erosion
Private Land	
Calulu 1	weed invasion, grazing
Calulu 2	weed invasion
North Arm, Lakes Entrance	threats not known

Recovery Information

Directions for recovery of *A. caerulescens* include habitat conservation, restoration and management, combined with an understanding of the species' ecological and biological requirements. 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.

Overall Objective

The **overall objective** of recovery is to minimise the probability of extinction of *Acacia caerulescens* 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 *Acacia caerulescens* 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 Objectives, 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. • Targeted 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**	• Sites of potential habitat identified and surveyed.
Specific objective 3		
Ensure that all populations and their habitat are protected and managed appropriately		
3.1	Protect populations on public land. **Responsibility: DSE**	• A public land protected area network established for threatened taxa within the Shire of East Gippsland.
3.2	Protect populations on private property. **Responsibility: DSE**	• Sites identified that may be suitable for establishment of a private land protected area network for threatened taxa. • Identify sites for conservation oriented agreements between DSE and private land holders (eg. Trust for Nature covenants)

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 Toorloo Arm Rd, E of Toorloo Arm sites and others if feasible.
4.2	Control threats from pest plants, animals, predators and trampling by preventing access, using broadscale application of herbicide, hand removal of weeds, fencing sites, and/or caging plants. **Responsibility: DSE, PV**	• Measurable seedling recruitment and a reduction in plant mortality at Buchan Caves Reserve (Fairy Cave entrance) and Toorloo Arm Rd, E of Toorloo Arm Buchan-Gelantipy Rd and the 3 Lake Tyers sites.
Specific objective 5		
Identify key biological functions		
5.1	Evaluate current reproductive/regenerative status, seed bank status, by determining longevity, fecundity and recruitment levels. **Responsibility: DSE**	• Seed bank/regenerative potential quantified for each population.
5.2	Determine seed germination requirements by conducting laboratory and field trials aimed to identify key stimuli. **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. • Census data collected.
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 targeted populations.
Specific objective 7		
Establish populations in cultivation		
7.1	Establish a seed bank and determine seed viability. **Responsibility: DSE**	• Seed from important populations in storage. • Long-term storage facility identified.

Action	Description	Performance Criteria
Specific objective 8		
Re-establish populations in the wild		
8.1	Encourage and support community-based replanting programs for *Acacia caerulescens*. **Responsibility: DSE, PV, East Gippsland CMA**	• Five secure, viable (>100 indiviuals) established
Specific objective 9		
Engage the community in recovery		
9.1	Ensure that information and advice about the recovery of *Acacia caerulescens* has been provided to land managers, landholders, local government authorities and Catchment Management Authorities. **Responsibility: DSE**	• all relevant authorities and land managers are aware of the species and its management needs
9.2	Involve community groups and volunteers in recovery activities. **Responsibility: DSE**	• opportunities for involvement identified, promoted and supported

Abbreviations

DSE Department of Sustainability and Environment, Victoria

PV Parks Victoria

Management Practices

Management practices that will aid recovery

On-ground site management will aim to mitigate threatening processes to prevent declines and create conditions for maintenance or increase of population size. Major threats requiring management include accidental destruction, competition from pest plants, inappropriate fire regimes and grazing by pest animals. A range of strategies will be necessary to alleviate these threats including weed control, fire management, fencing, and control of pest animals. In addition, some *ex situ* conservation measures including seed storage and germination trails, will be required. Addressing major knowledge gaps is also required, especially determining the mechanisms underlying recruitment and regeneration. Successful *in situ* population management will be founded on understanding the relationships between *A. caerulescens* 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. Surveys of known and potential habitat should continue to better define the distributions and size of populations. Providing information to land owners, managers and the broader community in the region will increase awareness of the species, provide for increased protection of existing populations, an increased likelihood on new populations being found, and reducing the risk of inadvertent damage occurring.

Management practices that will avoid significant adverse impacts

Providing land owners and managers with information on the location, distribution, habitat and ecology of *A. caerulescens* will help to protect existing populations from inadvertent damage, and raising general awareness that may result in the location of any new populations. Populations occurring in potentially high-risk locations such as roadsides may need appropriate signposting. Negotiation with landowners with populations or suitable habitat on their properties will be required for protection of populations. Surveys in potential habitat likely to be impacted by any development proposals (including roadworks) will be required to avoid damage to or destruction of any currently unknown populations. Identification and protection of current and potential habitat such as through planning scheme overlays and restrictions on clearance of native vegetation is a high priority.

Biodiversity Benefits

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 *A. caerulescens*, 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.

Affected Interests

Most populations of *A. caerulescens* occur on land under the jurisdiction of the Shire of East Gippsland or Parks Victoria, with three small populations occurring on private land. The Shire of East Gippsland and Parks Victoria have been contacted and have approved the actions outlined in this recovery plan subject to availability of sufficient funding.

Role and interests of Indigenous people

Indigenous communities on whose traditional lands *A. caerulescens* 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.

Social and economic impacts

The implementation of this Recovery Plan will not cause significant adverse social and economic impacts. Most populations occur on public land, either crown land reserved for various public purposes, or on road reserves, managed by a variety of local and State government agencies. Protection of these populations has been negotiated with the relevant land manager. Protection of the few populations on private land will be achieved through voluntary agreements with landowners.

Acknowledgments

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Priority, Feasibility and Estimated Costs of Recovery Actions

					Year 1	Year 2	Year 3	Year 4	Year 5	Total
1	**Conservation status**									
1.1	Collect baseline data	2	100%	DSE	**$6,000**	**$0**	**$0**	**$0**	**$0**	**$6,000**
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	2	75%	DSE	**$10,000**	**$0**	**$0**	**$0**	**$0**	**$10,000**
3	**Protection of habitat**									
3.1	Protect public land habitat	1	75%	DSE	**$0**	**$5,000**	**$0**	**$0**	**$0**	**$5,000**
3.2	Protect private land habitat	1	50%	DSE	**$0**	**$5,000**	**$0**	**$0**	**$0**	**$5,000**
4	**Manage threats**									
4.1	Identify disturbance regimes	2	75%	DSE	**$0**	**$15,000**	**$0**	**$0**	**$0**	**$15,000**
4.2	Control threats	1	75%	DSE, PV	**$10,000**	**$5,000**	**$5,000**	**$5,000**	**$5,000**	**$25,000**
5	**Identify key biological functions**									
5.1	Evaluate reproductive status	3	75%	DSE	**$0**	**$0**	**$10,000**	**$10,000**	**$0**	**$20,000**
5.2	Seed germination	3	75%	DSE	**$0**	**$0**	**$10,000**	**$10,000**	**$0**	**$20,000**
6	**Growth rates, pop. viability**									
6.1	Conduct censusing	2	100%	DSE	**$6,000**	**$6,000**	**$6,000**	**$6,000**	**$6,000**	**$30,000**
6.2	Collate, analyse and report	2	100%	DSE	**$4,000**	**$4,000**	**$4,000**	**$4,000**	**$10,000**	**$26,000**
7	**Cultivation**									
7.1	Establish a seed bank	2	50%	DSE	**$4,000**	**$4,000**	**$4,000**	**$4,000**	**$4,000**	**$20,000**
8	**Re-establishment**									
8.1	Re-establishment	2	75%	DSE, PV	**$0**	**$5,000**	**$10,000**	**$5,000**	**$5,000**	**$25,000**
9	**Community involvement**									
9.1	Awareness	1	100%	DSE	**$5,000**	**$0**	**$0**	**$0**	**$0**	**$5,000**
9.2	Community involvement	1	100%	DSE	**$6,000**	**$6,000**	**$6,000**	**$6,000**	**$6,000**	**$30,000**
				TOTAL	**$61,000**	**$55,000**	**$55,000**	**$50,000**	**$36,000**	**$257,000**