Department of
Sustainability and
Environment

National Recovery Plan for the Snow Pratia *Lobelia gelida*

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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: Snow Pratia *Lobelia gelida*, by Neville Walsh.

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Summary

The Snow Pratia *Lobelia gelida* is listed as Vulnerable under the Commonwealth *Environment Protection and Biodiversity Conservation Act* 1999 (Listed as *Pratia gelida*) and Threatened under the Victorian *Flora and Fauna Guarantee Act* 1988 (Listed as *Pratia gelida*). The species is endemic to eastern Victoria, where there are 1,500–3,000 plants occurring in six wild populations. Threats to populations include weed invasion, trampling and climate change. This national Recovery Plan for *L. gelida* 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 Snow Pratia *Lobelia gelida* is a creeping, mat forming prostrate perennial herb often producing roots from stem nodes. Leaves are linear lanceolate to narrowly elliptic, to 18 mm long, with margins that are entire or slightly notched. Leaf bases narrow gradually and leaves attach alternately to stems directly or they may have petioles to 1 mm long. Leaf surfaces are smooth and glossy, with the upper surface darker green than the lower surface. Small white to faint lilac, fan-shaped flowers are produced at irregular intervals along the stems on pedicels 0.5–3 mm long. The five petals are 3–4 mm long and are united at the base into a tube c. 2 mm long, that is deeply slit along the upper side. The five calyx lobes are 1–1.8 mm long, while the five anthers are united into a tube, with the lower pair of anthers both tipped by a short bristle. Fruits are fleshy, nearly spherical and 1.5–2.5 mm long. Flowers appear in November and December, while fruits develop from January to April (description from Walsh & Entwisle 1999). The narrow shiny leaves distinguish *L. gelida* from other alpine or subalpine *Lobelia* species, particularly *L. surrepens* with which it often occurs. Virtually nothing is known of the biology or ecology of this species.

Distribution

Lobelia gelida is endemic to the highlands of eastern Victoria, where it is has been found in only two areas; Mt Buffalo and Mt Reynard in the South-eastern Highlands IBRA Bioregion (DEH 2000), at 1300–1700 m altitude.

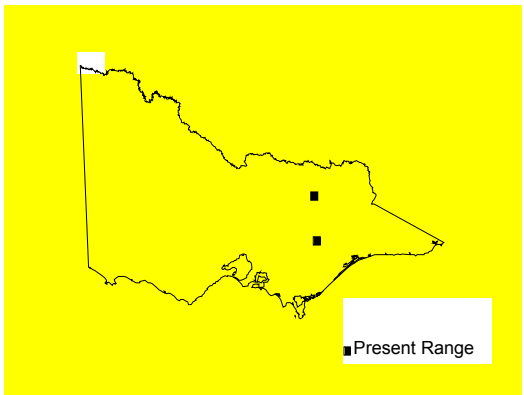

Figure 1. Distribution of *Lobelia gelida* in Victoria

Maps showing the detailed distribution of *Lobelia gelida* 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 Snow Pratia is known only from two widely separated locations in the alps of eastern Victoria. There are currently six known populations of *L. gelida*, containing 1500–3000 plants. Accurate estimations of abundance are difficult because plants are rhizomatous and mat forming, and it is often difficult distinguishing individual plants. All populations occur within the Alpine National Park or Mt Buffalo National Park. Population information is summarised as follows:

Alpine National Park (Wonnangatta-Moroka unit)

- Mt Reynard: plants occur in 17 ephemeral pools ranging in size from 2–20 m^2 within an area of 2 ha.

Mt Buffalo National Park

- Mt Buffalo, Hospice Plain: c. 1000 plants in numerous patches)
- Mt Buffalo, Bogong Plain: c. 10–50 plants.
- Mt Buffalo, Wirbill Plain: c. 500–1000 plants.
- Mt Buffalo, Blackfellows Plain: c. 10–50 plants in two patches.
- Mt Buffalo, Skeleton Gully: c. 20 plants.

Habitat

Lobelia gelida occurs in seasonally inundated depressions within grassland or heathland. At Mt Reynard, associated species include *Ranunculus millanii*, *Neopaxia australasica*, *Lachnagrostis meionectes* and the exotic *Acetosella vulgaris*. This population occurs on fine blackish silt soils that crack in summer, at 1680 m above sea level. The Mt Buffalo populations occur with *Poa costiniana*, *Poa phillipsiana*, *Richea continentis*, *Ranunculus graniticola*, *Empodisma minus*, *Pultenaea tenella*, *Epacris gunnii*, *Pratia surrepens*, *Celmisia pugioniformis*, *Isolepis montivaga* and/or with the moss *Polytrichum juniperinum*. These populations occur on silty alluvium peat soil, at altitudes of 1310–1510 m above sea level. Recovery actions include survey and mapping of habitat that will lead to the identification of habitat critical to the survival of the species.

Threats

As there is no information on past distribution or abundance of the Snow Pratia, and no evidence of any declines in existing populations, it is not possible to determine if the species has suffered any decline in range and/or abundance. Threats are generally rated as low, with populations most at risk from inadvertent damage. With its low, mat forming, rhizomatous habit, it is easily damaged by human trampling or herbivore grazing. Given the extremely limited distribution and very low numbers of plants, the risk from stochastic events is probably high. Climate change represents a substantial future risk. The main risks are summarised as follows:

Weed invasion: Weed invasion could have a major influence on survival of some populations. Notably, the grass *Agrostis capillaris* (Brown-top Bent) is growing in close proximity to the population at Blackfellows Plain. There is also the risk that visitors may introduce weed seeds (eg. such as *Cytisus scoparius* English Broom) from their shoes.

Trampling: Recreational hikers and cross country skiers regularly visit areas near some populations, and plants may be accidentally damaged through trampling.

Climate change: Increased temperatures and decreased rainfall expected with global warming may lead to long-term drying of sites, threatening this and many other alpine species. Loss of climatic habitat caused by anthropogenic emissions of greenhouse gases is listed as a Key Threatening Process under the EPBC Act. The effects of climate change potentially threaten all sites.

Specific threats to populations are summarised as follows:

- Mt Reynard: long-term drying of site; minor threat of trampling by hikers.

- Mt Buffalo, Hospice Plain: upper part of population is prone to covering by gravel during deluge conditions and run-off from Reservoir Track.
- Mt Buffalo, Bogong Plain: minor threat of trampling by hikers; potential threat of inadvertent damage through bridge repair or modification.
- Mt Buffalo, Wirbill Plain: minor threat of trampling by hikers.
- Mt Buffalo, Blackfellows Plain: weed invasion.
- Mt Buffalo, Skeleton Gully: no obvious threats, site is rarely visited.

Recovery Information

Overall Objective

The **overall objective** of recovery is to minimise the probability of extinction of *Lobelia gelida* 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 *Lobelia gelida* 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 target populations; (b) estimates of the number, size and structure of target 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. Survey should utilise existing PV monitoring data from the Hospice Plain, Bogong Plain, Blackfellows Plain and/or Skeleton Gully sites.
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**	• Predictive model for potential habitat developed and tested.
Specific objective 3		
Manage threats to populations		
3.1	Control threats from high visitor numbers by preventing access and re-routing tracks; control current or potential weeds using careful application of herbicide or manual removal; advise contractors of populations to avoid damage during track or other works. **Responsibility: PV**	• Measurable seedling recruitment/vegetative regeneration and a reduction in plant mortality at Mt Reynard and Mt Buffalo sites. • Re-route sections of the Black Wall walking track to avoid the Wirbill Plain population, and re-route i trail on Bogong Plain to avoid the Bogong Plain population (now possible as walking track bridge on Wirbill Plain and ski bridge on Bogong Plain were destroyed in the 2003 wildfire (A. Marion pers comm.). • Advise & supervise contractors working close to sites. • Develop site access and hygiene protocols. • Determine impact on populations from 2003 wildfire. Plants may not have been directly affected but there is some concern that sediment may wash into and smother sites, notably at Hospice Plain (N. Walsh pers. obs.).

Action	Description	Performance Criteria
Specific objective 4		
Identify key biological functions		
4.1	Evaluate current reproductive/regenerative status, seed bank status and longevity, fecundity and recruitment levels by conducting field based experimental trials. **Responsibility: DSE**	• Seed bank/regenerative potential quantified for target populations.
4.2	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 5		
Determine 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 stages and morphological data. **Responsibility: DSE**	• Techniques for monitoring developed and implemented. • Census data for target populations.
5.2	Collate, analyse and report on census data and compare with management histories. **Responsibility: DSE**	• Population growth rates determined and Population Viability Analysis completed for important populations.
Specific objective 6		
Establish populations in cultivation		
6.1	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. • At least 25 mature plants in cultivation.
6.2	Establish a seed bank and determine seed viability. **Responsibility: DSE**	• Seed from important populations in storage.
Specific objective 7		
Build community support for conservation		
7.1	Identify opportunities for community involvement in the conservation of *Lobelia gelida*. **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 *Lobelia gelida*. 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 (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 weed invasion and accidental destruction from recreational walkers, skiers and infrastructure works. A range of strategies will be necessary to alleviate these threats including restricting access, re-routing tracks, and supervising works contractors.

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 *Lobelia gelida* 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

Populations of *Lobelia gelida* fall under the jurisdiction of Parks Victoria, who have been contacted and have approved the actions outlined in this Recovery Plan, subject to the availability of sufficient funding.

Role and interests of indigenous people

Indigenous communities on whose traditional lands *Lobelia gelida* 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 *Lobelia gelida*, 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 within national parks which include biodiversity conservation as a high priority in management. Any protection measures for populations (such

as fencing or signposting) will have negligible impact on current commercial and recreational activities.

Acknowledgments

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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	1	75%	DSE	$20,000	$0	$0	$0	$0	**$20,000**
3	**Manage threats**									
3.1	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	2	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	**Establish pops. in cultivation**									
6.1	Establish cultivated plants	3	50%	DSE, RBG	$0	$6,000	$6,000	$6,000	$6,000	**$24,000**
6.2	Establish a seed bank	2	50%	DSE	$0	$4,000	$4,000	$4,000	$4,000	**$16,000**
7	**Education, communication**									
7.1	Community extension	2	100%	DSE	$6,000	$6,000	$6,000	$6,000	$6,000	**$30,000**
				TOTAL	**$82,000**	**$62,000**	**$62,000**	**$36,000**	**$40,000**	**$282,000**