Department of
Sustainability and
Environment

National Recovery Plan for the Leafy Nematolepis *Nematolepis frondosa*

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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 Leafy Nematolepis *Nematolepis frondosa* is listed as Vulnerable under the Commonwealth *Environment Protection and Biodiversity Conservation Act* 1999. The species is endemic to eastern Victoria, where a single population comprising about 3,100 plants occurs. This national Recovery Plan for *N. frondosa* 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 Leafy Nematolepis *Nematolepis frondosa* (previously known as *Phebalium frondosum*; see Wilson 1998) is a leafy conical shrub growing to 7 m tall, with braches that emerge horizontally or arch downward. Branchlets are strongly angled and rust coloured, or covered with small, silvery, membranous scales. Leaves are broadly elliptic, to 23 mm x 15 mm and lack a distinct midrib. The upper surface is hairless, glandular and often appears speckled white, while the lower surface is covered with silvery scales. Flowers are white and star-shaped, to 9 mm across, the five petals are ovate, hairless and sparsely glandular around the centre, the calyx is cup-like and hairless, to 2.5 mm long, with triangular lobes, while the stamens are slightly shorter than petals. Flowering occurs in winter and spring and winter. Seeds are oblong and black, about 3 mm long, and slightly keeled dorsally (description from Walsh & Albrecht 1988; Walsh & Entwisle 1999).

There have been no specific ecological or biological studies of *Nematolepis frondosa*. Nothing is known of its autecological characteristics, such as fire behaviour, longevity of plants soil-stored seed, and pollination biology. The single known population is largely even-aged and relatively large, but disturbance at the site tends to promote more or less continuous recruitment.

Distribution

Nematolepis frondosa is endemic to eastern Victoria, where it is restricted to the upper slopes of Mt Elizabeth, between Bruthen and Ensay, in the South Eastern Highlands IBRA Bioregion (DEH 2000).

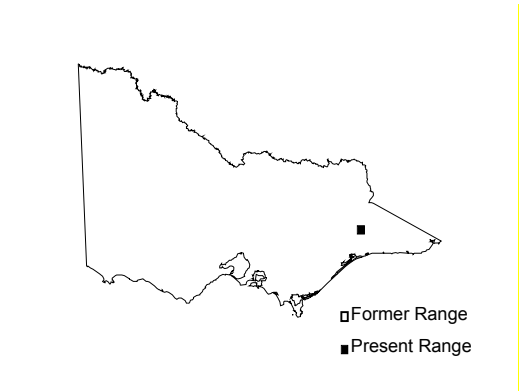

Figure 1. Distribution of *Nematolepis frondosa* in Victoria

Maps showing the detailed distribution of *N. frondosa* 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.

Habitat

Nematolepis frondosa occurs from 820–960 m altitude on Mt Elizabeth, and grows in varied habitat ranging from low rock outcrop scrub near the mountain summit, to tall open forest dominated by *Eucalyptus regnans* at the lower altitudinal range. Associated species within the rock outcrop scrub include *Kunzea ericoides*, *Pomaderris aspera, Pomaderris prunifolia* and *Ozothamnus cuneifolius*. Tall open forest sites on lower slopes contain *Acacia dealbata*, *Olearia lirata*, *Prostanthera walteri* and *Zieria arborescens.* Topography varies from flat to moderately steep on south, southwesterly, north, northwesterly and westerly aspects. Soils vary from skeletal at the summit population, to deep mountain loams, on rhyolitic or granodiorite parent material (Walsh & Albrecht 1988). Recovery actions include survey and mapping of habitat that will lead to the identification of habitat critical to the survival of the species.

Population Information

The single population of *Nematolepis frondosa* contains about 3,100 plants, occurring in three discrete groups (sub-populations) containing 2,000 plants, 1,000 plants and 100 plants. All plants occur in State Forest on Mt Elizabeth.

Threats

Nematolepis frondosa is known only from one very small area in East Gippsland. As there is no information on past distribution or abundance, 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. Given the extremely limited distribution and low numbers of plants, the risk from stochastic events is probably high. Fires occurring at intervals less than five years are likely to destroy plants before they are old enough to produce seed to replenish the soil seedbank, and reduce likelihood of further recruitment or regeneration. Areas adjacent to the lower altitude sub-populations have been recently logged. Sites containing *N. frondosa* occur in a ‘Special Feature Zone’, but gazettal of a proposed reserve to cover the sites has not yet occurred.

Recovery Information

Overall Objective

The **overall objective** of recovery is to minimise the probability of extinction of *Nematolepis frondosa* 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 *Nematolepis frondosa* 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 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 surveys including (a) identification of the area and extent of population; (b) estimates of the number, size and structure of population and (c) inference or estimation of population change. **Responsibility: DSE**	• Determination or update of conservation status for inclusion on state and national threatened species lists. • Population 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 survival 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. • Conduct searches for *N. frondosa* around Mt Elizabeth.
Specific objective 3		
Ensure that all populations and their habitat are legally protected		
3.1	Protect population on public land. **Responsibility: DSE**	• Mt Elizabeth site protected within Nature Conservation Reserve.
Specific objective 4		
Manage threats to populations		
4.1	Identify disturbance regimes to maintain habitat. **Responsibility: DSE**	• Preparation of management prescriptions for ecological burning at the Mt Elizabeth site.
4.2	Control threats from logging using increased buffer zones. **Responsibility: DSE**	• Measurable seedling recruitment/vegetative regeneration and a reduction in plant mortality at the Mt Elizabeth site. • Designate and maintain buffer zones at least c. 30 m from the 'gully head' sub-population.

Action	Description	Performance Criteria
Specific objective 5		
Identify key biological functions		
5.1	Evaluate current reproductive/regenerative status, seed bank status and longevity, fecundity and recruitment. **Responsibility: DSE**	• Seed bank/regenerative potential quantified.
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. • Census data collected.
6.2	Collate, analyse and report on census data and compare with management histories. **Responsibility: DSE**	• Population growth rates determined; Population Viability Analysis
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. • At least 30 mature plants in cultivation with representative genotypes from each of the known populations
7.2	Establish a seed bank and determine seed viability. **Responsibility: DSE**	• Long-term storage facility identified. • Seed from target populations in storage.
Specific objective 8		
Build community support for conservation		
8.1	Identify opportunities for community involvement in the conservation of *N. frondosa*. **Responsibility: DSE**	• Presentation 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 *Nematolepis frondosa*. 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 accidental destruction, notably via logging practices, and inappropriate fire regimes. A range of strategies will be necessary to alleviate these threats including designation of wider logging buffer zones around plants, and fire management.

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 *Nematolepis frondosa* 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.

To reduce the likelihood of unforseen development activities negatively impacting upon *Nematolepis frondosa*, the threatened flora team should provide information on 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

The known population of *Nematolepis frondosa* falls 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 *Nematolepis frondosa* 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 *Nematolepis frondosa*, including the nationally rare *Hibbertia hermannifolia* and *Prostanthera walteri*, but also 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 single known population of *N. frondosa* occurs on public land, and protection measures proposed in this Plan will have minimal, if any, effect on current recreational and commercial activities in the area.

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**									
1.1	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	**Legal protection of habitat**									
3.1	Protect public land habitat	1	75%	DSE	$0	$2,000	$0	$0	$0	**$2,000**
4	**Manage threats**									
4.1	Identify disturbance regimes	2	75%	DSE	$0	$10,000	$10,000	$0	$0	**$20,000**
4.2	Control threats	1	75%	DSE	$10,000	$8,000	$8,000	$4,000	$4,000	**$34,000**
5	**Identify key biol. functions**									
5.1	Evaluate reproductive status	3	75%	DSE	$0	$12,000	$12,000	$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	$1,000	$1,000	$1,000	$1,000	$5,000	**$9,000**
7	**Establish pops. in cultivation**									
7.1	Establish cultivated plants	3	50%	DSE, RBG	$0	$6,000	$6,000	$6,000	$6,000	**$24,000**
7.2	Establish a seed bank	3	50%	DSE	$0	$4,000	$4,000	$4,000	$4,000	**$16,000**
8	**Education, communication**									
8.1	Community extension		100%	DSE	$6,000	$6,000	$6,000	$6,000	$6,000	**$30,000**
				TOTAL	**$82,000**	**$82,000**	**$72,000**	**$36,000**	**$40,000**	**$304,000**