Department of
Sustainability and
Environment

National Recovery Plan for the Shiny Nematolepis *Nematolepis wilsonii*

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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: Shiny Nematolepis *Nematolepis wilsonii*, by Judy Downe. The photo to the right depicts ringbarking damage by deer.

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Summary

The Shiny Nematolepis *Nematolepis wilsonii* 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 (under the name *Phebalium wilsonii*). The species is endemic to the Central Highlands of Victoria, where there is a single wild population containing about 500 plants. Main threats include damage by feral deer, weed invasion and road maintenance. This national Recovery Plan for *N. wilsonii* 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 Shiny Nematolepis *Nematolepis wilsonii* is a shrub or small tree growing to 10 m tall, with mottled bark and branchlets covered in small protuberances. Leaves are narrowly elliptic to lanceolate, 30–80 mm long and 5–15 mm wide, the upper surface glossy and smooth, the lower surface covered with silvery scales. Inflorescences arise from the leaf axils, with 1–9 small, starry white flowers with yellow anthers and scaly pedicels and petals. Flowering occurs during spring (description from Walsh & Albrecht 1988; Walsh & Entwisle 1999). *Nematolepis wilsonii* was formerly known as the Shiny Phebalium *Phebalium wilsonii* (Walsh & Entwisle 1999).

Virtually nothing is known of its ecological requirements. The species apparently grows in the ecotone between old-growth, wet Mountain Ash forest *Eucalyptus regnans* and Cool Temperate Rainforest dominated by Myrtle Beech *Nothofagus cunninghamii*. It has been suggested that, like other ecotonal species that occur at the rainforest-sclerophyll forest interface, Shiny Nematolepis might be adapted to recurrent natural disturbance such as wildfire (D. Cameron DSE unpubl.). This is supported by the profuse regeneration from seed along the disturbed margins of a fire access track that bisects the population, and by the absence of successful seedling establishment in the undisturbed forest. As well as recruiting by seed, the species perhaps survives wildfire by resprouting from perennating buds protected on underground lignotubers, as do Musk Daisy-bush *Olearia argophylla* and Blanket-leaf *Bedfordia arborescens* (two co-occurring species), and Forest Phebalium *Phebalium squamulosum* (Gill 1981).

Distribution

Nematolepis wilsonii is endemic to Victoria, where it is now known from a single population near Marysville, in the O'Shannassy River catchment (upper Yarra River) in the Yarra Ranges National Park, at 720 m altitude, in the South Eastern Highlands IBRA Bioregion. The species was first collected in 1892 from the Woods Point area, but this record has not been substantiated since, and there may have been some confusion regarding the correct locality at which the 1892 collection was made.

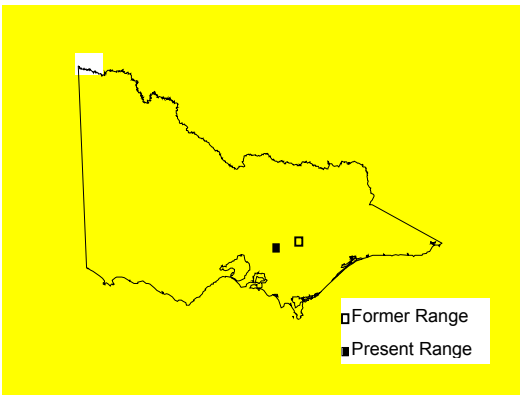

Figure 1. Former and current distribution of the *Nematolepis wilsonii* in Victoria

Maps showing the detailed distribution of *Nematolepis wilsonii* 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 wilsonii is an understorey component in Cool Temperate Mixed Forest between old-growth wet forest, dominated by Mountain Ash and Cool Temperate Rainforest dominated by Myrtle Beech, growing on deep, well-structured gradational soils derived from granite. 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 known population of *Nematolepis wilsonii* contains about 500 plants, including numerous seedlings, scattered over an area of about 5 ha (Walsh & Albrecht 1988). The population occurs in the Yarra Ranges National Park, in a proclaimed water catchment area, managed by Parks Victoria and Melbourne Water. The catchment is recognised as an 'essentially natural catchment' (LCC 1991) and has been included under the Commonwealth *Heritage Rivers Act* 1992. At least part of the population extends into the Deep Creek Reference Area and its associated buffer, which is proclaimed under the *Reference Areas Act* 1978 (LCC 1994).

Threats

The Shiny Nematolepis is known only from one site in the Central Highlands. If the location of the 1892 Woods Point collection is correct, the range of the species has probably diminished, as there are no recent records from Woods Point or at any locations between Woods Point and the current site. The causes for the presumed decline of *N. wilsonii* were speculated to be alteration of the area by wildfire, settlement and gold prospecting (Walsh & Albrecht 1988). However, there is some doubt about the veracity of the Woods Point collection. As there is no other 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. Response to wildfire is unknown. Given the extremely limited distribution and very low numbers of plants, the risk from stochastic events such as wildfire and disease is probably high. Main threats are summarised as follows:

Damage by feral deer: The greatest threat is the damage caused by the introduced Sambar Deer *Cervis unicolor*. Deer use the trees to remove the velvet on their antlers, leading to the loss of cambium from the trunk and effectively ringbarking trees. Trampling by deer has also been observed and is likely to threaten the population by inhibiting regeneration. Anecdotal evidence suggests an expansion of the feral deer population throughout the eastern highlands, which may place even more pressure on the Shiny Nematolepis population.

Weed invasion: Weed invasion currently occurs on disturbed sites such as road verges, where *Hypochoeris radicata* may be a threat to regeneration.

Road maintenance: A small road bisects the population, and roadside slashing may promote recruitment of *N. wilsonii*, however different vegetation removal regimes may lead to direct damage to plants, facilitate weed invasion or the spread of Myrtle Wilt disease.

Recovery Information

Directions for recovery of *N. wilsonii* 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. A plan to

fence half the *Nematolepis wilsonii* site will be developed and implemented. The feasibility of constructing a fence may depend upon site features such as slope and vegetation density. Any fence should extend past the population to measure possible increases in population size as a result of deer exclusion. Fencing will include slashed and un-slashed vegetation and be combined with a regular censusing program. Data collected will then be analysed to determine the effects of deer activity and slashing. Searching activities will be conducted as part of the recovery for this species possibly with the assistance of other community groups. The Field Naturalists Club of Victoria has expressed interest in providing assistance in these survey activities. Such cooperative activities will also help raise awareness of the conservation issues relating to the species and its habitat. One plant is currently growing in the RBG. *Ex situ* conservation in the form of cultivation and germplasm storage will take place in order to protect the species from stochastic events. Further data collection and analysis that describes the autecological characteristics of Shiny Nematolepis, such as fire behaviour, longevity of plants, fecundity and seed bank dynamics, is a high priority.

Overall Objective

The **overall objective** of recovery is to minimise the probability of extinction of *Nematolepis wilsonii* 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 wilsonii* 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.
- 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 populations; (b) estimates of the number, size and structure of populations and (c) inference or estimation of population change. **Responsibility: DSE, PV**	• Determination or update of conservation status for inclusion on state and national threatened species lists.
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, PV**	• Requirements for completion of essential life history stages, recruitment and dispersal identified.
2.2	Identify and survey potential habitat, using ecological and bioclimatic information indicating habitat preference. **Responsibility: DSE**	• Surveys undertaken with the assistance of community groups. • Predictive model for potential habitat developed and tested.
Specific objective 3		
Manage threats to populations		
3.1	Identify disturbance regimes to maintain habitat. **Responsibility: DSE**	• Preparation of management prescriptions for ecological biomass reduction (if required) at Yarra Ranges National Park.
3.2	Control threats from pest animals and disease by erecting deer-proof fencing and ensuring no damage whatsoever occurs to Myrtle Beech trees (*Nothofagus cunninghamii*). **Responsibility: PV, DSE**	• Measurable seedling recruitment. • A measurable reduction in plant mortality at Yarra Ranges National Park. • Negotiate options for fencing some or all of the single known population, with PV and Melbourne Water.

Action	Description	Performance Criteria
Specific objective 4		
Identify key biological functions		
4.1	Evaluate current reproductive and regenerative status, seed bank status and longevity, fecundity and recruitment levels. **Responsibility: DSE**	• Seed bank and regenerative potential quantified for target population.
4.2	Determine seed germination and vegetative regeneration requirements by conducting field trials aimed at identifying key stimuli. **Responsibility: DSE**	• Stimuli for recruitment and 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 & responses against recovery actions by collecting demographic information including recruitment, mortality, life history and morphology. **Responsibility: DSE**	• Techniques for monitoring developed and implemented. • Census data for population.
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 population.
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: RBG**	• Development of effective propagation and cultivation techniques. • At least 10 mature plants in cultivation.
6.2	Establish a seed bank and determine seed viability. **Responsibility: DSE**	• Long-term storage facility identified. • Seed from target population in storage (if viable seed available).
Specific objective 7		
Build community support for conservation		
7.1	Identify opportunities for community involvement in the conservation of *N. wilsonii*. **Responsibility: DSE**	• Liaison with community nature conservation groups. • Searches conducted with assistance of field naturalist groups.

Abbreviations: DSE: Department of Sustainability and Environment, Victoria; MW: Melbourne Water; 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 *N. wilsonii*. 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, competition from pest plants and grazing by pest animals. A range of strategies will be necessary to alleviate these threats based on analysis of data collected during recovery.

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 *N. wilsonii* 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, searches of known and potential habitat should continue to better define the distributions and size of populations.

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

Parks Victoria and Melbourne Water have been contacted during the compilation of this Recovery Plan and have approved recovery actions, subject to availability of sufficient funding. No other individuals or organisations will be affected.

Role and interests of indigenous people

Indigenous communities on whose traditional lands *N. wilsonii* 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

This 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 *N. wilsonii*.

This 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 will have no significant adverse social and economic impacts. The one known population is within the Yarra Ranges National Park, and also within the O'Shannassy River catchment, a water catchment for which a permit is required to enter. Part of the population is in a reference area, a status which status confers further protection

from deliberate and inadvertent interference. Therefore, there is no recreational or commercial activity affected by protection of the species.

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	2	100%	DSE, PV	$6,000	$0	$0	$0	$0	**$6,000**
2	**Habitat requirements**									
2.1	Survey known habitat	2	100%	DSE, PV	$10,000	$0	$0	$0	$0	**$10,000**
2.2	Identify, survey potential habitat	2	100%	DSE	$6,000	$0	$0	$0	$0	**$6,000**
3	**Manage threats**									
3.1	Identify disturbance regimes	2	50%	DSE	$5,000	$0	$0	$0	$0	**$5,000**
3.2	Control threats	1	75%	PV, DSE	$0	$20,000	$10,000	$5,000	$5000	**$40,000**
4	**Identify key biol. functions**									
4.1	Evaluate reproductive status	2	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	2	100%	DSE	$15,000	$15,000	$15,000	$15,000	$15,000	**$75,000**
5.2	Collate, analyse and report	2	100%	DSE	$1,000	$1,000	$1,000	$1,000	$5,000	**$9,000**
6	**Establish pops. in cultivation**									
6.1	Establish cultivated plants	1	75%	RBG	$0	$6,000	$6,000	$6,000	$6,000	**$24,000**
6.2	Establish a seed bank	1	25%	DSE	$0	$4,000	$4,000	$4,000	$4,000	**$16,000**
7	**Education, communication**									
7.1	Community extension	3	100%	DSE	$6,000	$6,000	$6,000	$6,000	$6,000	**$30,000**
				TOTAL	**$49,000**	**$74,000**	**$64,000**	**$37,000**	**$41,000**	**$265,000**