Department of Sustainability and Environment

National Recovery Plan for the Harsh Nematolepis *Nematolepis squamea* subspecies *coriacea*

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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: Harsh Nematolepis *Nematolepis squamea* subspecies *coriacea*, by John Eichler.

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Summary

The Harsh Nematolepis *Nematolepis squamea* subspecies *coriacea* is listed as Vulnerable under the Commonwealth *Environment Protection and Biodiversity Conservation Act* 1999. The species is endemic to Victoria, where it is known from two widely separated locations in the eastern highlands, containing 1,100–1,600 plants. Main threats include damage by feral deer, weed invasion and road maintenance. This national Recovery Plan for the Harsh Nematolepis 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 Harsh Nematolepis *Nematolepis squamea* subspecies *coriacea* (formally *Phebalium squameum* subspecies *coriaceum*) is a small shrub growing to 4 m tall (more usually to 1 m tall), with smooth or glandular branches. Leaves are ovate to elliptic, 18–30 mm long and 6–10 mm wide, stiff and leathery with a rounded apex, the upper surface dark glossy green, smooth and hairless, the lower surface scaly covered with small, silvery, membranous scales. Inflorescences arise from the leaf axils, with 1–20 small, starry white flowers with yellow anthers. The calyx is cup-like, to 3 mm long with triangular lobes, hairless and with glandular dots, and the ovary is hairless. Fruiting follicles (up to 5) are slightly spreading and about 3 mm high (description from Walsh & Entwisle 1999; Wilson 1998). There have been no targeted studies of the ecology or biology of the Harsh Nematolepis.

Distribution

The Harsh Nematolepis is endemic to Victoria, where it is known from two widely-separated locations in the eastern highlands, one in the upper Wonnangatta River catchment and the second in the Snowy River valley near Wulgulmerang, from 870–1350 m altitude (Walsh & Entwisle 1999), in the Australian Alps and South East Corner IBRA Bioregions (DEH 2000).

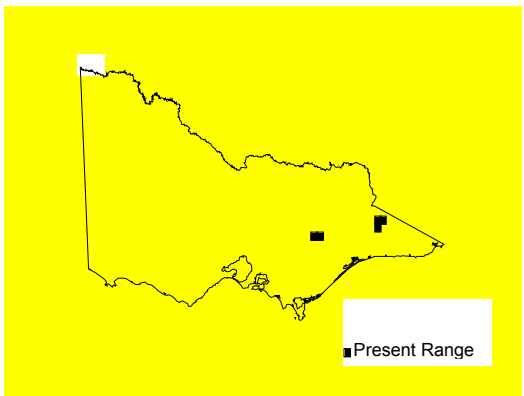

Figure 1. Distribution of the *Nematolepis squamea* subsp. *coriacea* in Victoria

Maps showing the detailed distribution of the Harsh Nematolepis 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

Two populations of Harsh Nematolepis are currently known:

1. St Helena Spur in the Snowy River National Park, at about 870 m altitude, containing about 600 mostly mature plants.
2. Neilson Crag (The Watchtower) in the Alpine National Park, at about 1,350 m altitude, containing 500–1,000 plants.

A third population may exist, as there is a 1969 record from Wulgulmerang Creek 'upstream from the falls'. Although this site has not been able to be relocated since, is likely to still contain plants (N. Walsh pers. obs.).

Habitat

The Harsh Nematolepis occurs in rocky outcrop sparse shrubland. The St Helena Spur population grows on skeletal Snowy River volcanics / Boundary Creek conglomerate soils. Topography falls away steeply north to north-easterly and the plants are highly exposed, although protected from most wildfires by flanking cliffs. Associated species include *Acrotriche leucocarpa*, *Astrotricha* sp. 4, *Dianella* sp. aff. *tasmanica*, *Eucalyptus elata*, *Eucalyptus sieberi*, *Ozothamnus conditus*, *Ozothamnus obcordatus* and *Podolobium alpestre*. The Neilson Crag population grows on skeletal soils derived from metamorphosed sandstone. Topography varies from flat to steep north and westerly facing slopes. Associated species there include *Brachyloma daphnoides*, *Crowea exalata*, *Epacris impressa*, *Eucalyptus pauciflora*, *Eucalyptus glaucescens and Grevillea miqueliana* subsp*. moroka*. Topography at the lower (St Helena Spur) site tends to fall steeply north-north-easterly and the plants are highly exposed, but would be rarely burnt due to the protection offered by flanking cliffs. 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 Harsh Nematolepis is known only from two very small areas in eastern Victoria. As there is no information on past distribution or abundance (other than a record from 1969 that has not been located recently), and no evidence of any declines in existing populations, it is not possible to determine if the taxon has suffered any decline in range and/or abundance. Threats are generally rated as low. Both populations contain reasonably high numbers of plants, occur in remote areas in national parks, and appear reasonably secure, even from inadvertent damage. Some vegetation clearing and soil disturbance from wildfire control work near the Neilson Crag population occurred in 1993, and the disturbed areas have been rehabilitated and are regenerating. This disturbance appears to have had no long-term effect on the population, as at least 500 plants were observed at the site in 2005 (R. Incoll, DSE pers. comm.). A nearby vehicle track has been closed, offering better protection to this population. Although with an extremely limited area of occupancy, the separation of the two populations reduces the risk from stochastic events. Inappropriate fire regimes may pose the greatest threat, as fire intervals of less than eight years would mean plants do not reach reproductive maturity. Both populations appear to be even-aged, but both are in areas unlikely to be burnt in more than decadal cycles and therefore probably safe. Site topography and population separation mean that it is highly unlikely that all plants would be burnt in a single wildfire event. It is not known how the St Helena Spur population fared after the extensive wildfires in eastern Victoria in early 2003.

Recovery Information

Overall Objective

The **overall objective** of recovery is to minimise the probability of extinction of the Harsh Nematolepis 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 the Harsh Nematolepis 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 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**	• Determination or update of conservation status for inclusion on state and national threatened species lists. • 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**	• 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**	• Determine impact of wildfire on populations.
Specific objective 4		
Identify key biological functions		
4.1	Evaluate current reproductive/regenerative status, seed bank status and longevity, fecundity and recruitment levels. **Responsibility: DSE**	• Seed bank/regenerative potential quantified for target population. • Post fire recruitment quantified for the Neilson Crag site.
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.

Action	Description	Performance Criteria
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 collected for both 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 both 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. • Increase existing *ex situ* collection to at least 25 mature plants (St Helena Spur plants in cultivation at RBG).
6.2	Establish a seed bank and determine seed viability. **Responsibility: DSE**	• Seed from a representative sample of plants from both populations in storage.
Specific objective 7		
Build community support for conservation		
7.1	Identify opportunities for community involvement in the conservation of Harsh Nematolepis. **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 the Harsh Nematolepis. 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 (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 inappropriate fire regimes. A range of strategies will be necessary to alleviate these threats including 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 the species 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 the Harsh Nematolepis, 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

All populations of Harsh Nematolepis occur in national parks managed by Parks Victoria, who 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 Harsh Nematolepis 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 squamea* subsp. *coriacea*, 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 will not cause significant adverse social and economic impacts. The species occurs in remote locations within national parks, where nature conservation is already a high management priority. Any protection measures required will not impact on current recreational or commercial activities in the areas.

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	**Manage threats**									
3.1	Identify disturbance regimes	2	75%	DSE	$0	$10,000	$10,000	$0	$0	**$20,000**
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	**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	3	100%	DSE	$6,000	$6,000	$6,000	$6,000	$6,000	**$30,000**
				TOTAL	**$72,000**	**$64,000**	**$64,000**	**$32,000**	**$36,000**	**$268,000**