

**National Recovery Plan for the
Dwarf Sedge
*Carex paupera***

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Australian Government

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Summary

The Dwarf Sedge *Carex paupera* is listed as Vulnerable under the Commonwealth *Environment Protection and Biodiversity Conservation Act* 1999, and is listed as Threatened under the Victorian *Flora and Fauna Guarantee Act* 1988. The species is endemic to the highlands of eastern Victoria, between Dargo and Mt Bogong, above 1200 m altitude. Major threats to populations include weed invasion, grazing, recreational activities including off-road vehicle use, and climate change. This national Recovery Plan for *C. paupera* 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 Dwarf Sedge *Carex paupera* is a loosely tufted, densely rhizomatous perennial sedge, growing to 15 cm tall, and forming closely packed swards. Leaves are linear, to 100 mm x 1 mm, more or less flat, and hairless. Cylindrical stems bear a short panicle, to 30 mm long, of pale green, chaffy flowers in dense clusters. Flowers are in cylindrical spikes to 5 mm long, with female flowers in the upper part of the spike and males in the lower part. Glumes are ovate, to 3 mm long and pale green. The fruit is a green, ellipsoid, sack-like capsule, to 4.5 mm x 2 mm, with longitudinal ribs, tapered at the top, and containing a yellow-brown, obovoid, flattened nut (description from DSE FIS and Walsh & Entwisle 1994). The extensively rhizomic growth habit of the plant makes it difficult to estimate numbers of individual plants. There is no detailed information on the biology of this species.

Some authors (eg. Walsh & Entwisle 1994; Willis 1970) have suggested *C. paupera* may be a high altitude, reduced form of the common and widespread *Carex inversa*. However, *C. paupera* and *C. inversa* have been observed growing together at Nunniong Plain, but not intergrading (N. Scarlett La Trobe University unpubl.), supporting recognition as *Carex paupera* as a distinct taxon. Plants of *C. paupera* grown in cultivation also maintain their distinct dwarf growth habit.

Distribution

Carex paupera is endemic to the highlands of eastern Victoria, between Dargo and Mt Bogong, at 1200–1760 m above sea level (Willis 1970; DSE FIS), within the Australian Alps bioregion (DEH 2000). Populations have been recorded on the Bogong High Plains near Mt Jim, the Mt Hotham area, and the Dargo High Plains (Walsh & Entwisle 1994).

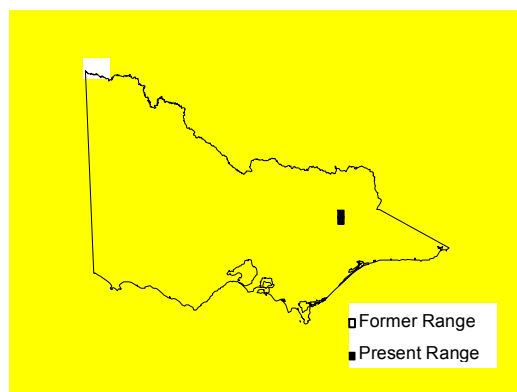


Figure 1. Distribution of *Carex paupera* in Victoria

Maps showing the detailed distribution of *C. paupera* 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

Eleven wild populations of *C. paupera* are known, from the following locations:

- Mt Jim, Bogong High Plains
- Big Nunniong Plain
- Omeo Plain
- King Spur
- Lankey Plain North
- Lankey Plain South
- Long Spur 1
- Long Spur 2
- Long Spur 3
- Long Spur 4
- JB Plain

Carex paupera reproduces vegetatively by rhizomes, and forms dense clumps, which makes it extremely difficult to estimate numbers of individual plants, especially of non-clonal individuals. The total area covered by the 11 populations is approximately 600 m². All sites are within the Alpine National Park, managed by Parks Victoria.

Habitat

Populations of *Carex paupera* occur in shallow depressions ('snow-pools') and other areas devoid of densely tussocking grasses such as track margins, on loamy soils over Tertiary basalt (Walsh & Entwisle 1994). These areas are typically within alpine and sub-alpine grassland and low herbland, between 1200–1800 m above sea level (Willis 1970; N. Scarlet VROTOP 1985; N. Walsh pers obs.). The snow-pools are water-filled for at least one month after snowmelt, but are dry in late summer. Associated species may include *Carex appressa*, *Carex gaudichaudiana*, *Carex hebes*, *Carpha alpina*, *Discaria pubescens*, *Euchiton involucreatus*, *Euchiton nitidulus*, *Glycine latrobeana*, *Lachnagrostis meionectes*, *Leptinella filicula*, *Poa costiniana*, *Poa hiemata*, *Poa pratensis*, *Pratia surrepens*, *Ranunculus millanii*, *Rytidosperma nivicola* and *Stackhousia pulvinaris*. 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 the past distribution or abundance of *Carex paupera*, it is not possible to determine if the species has suffered any decline in range and/or abundance. However, most populations face a range of current and potential threats. Given the very limited distribution of this species, combined with a total area of occupancy estimated at only about 600 m², the risk from stochastic events is probably high. The main threats to the species are summarised as follows:

Weed invasion: Common weeds include *Trifolium repens* and *Juncus effusus*, both of which are capable of forming closed swards in some areas and crowding out *C. paupera*.

Grazing: Grazing by cattle, rabbits and possibly feral horses poses a threat to some populations. Cattle grazing was permitted until recently, but, with the recent decision to cease cattle grazing in the Alpine National Park, any impact of this threat is now removed. Rabbit grazing also poses a threat to some populations. Competition and land degradation by feral Rabbits is listed under the EPBC Act as a Key Threatening Process.

Vehicular damage: Trailbikes or 4WDs can disturb habitat or destroy populations.

Recreational Use: The impacts of bushwalkers, camping and campfires may damage populations, but in some areas, the maintenance of a lower, more open sward appears to benefit *C. paupera*.

Climate change: Quite possibly the major threat faced by this and other threatened alpine species, climate change will result in increased air temperatures and decreased rainfall. This may impose an 'alpine squeeze' on many species restricted to alpine habitats.

Fire: The tendency for *C. paupera* to occur in wet sites in alpine locations suggests that the species is rarely subjected to fire. However the turf-like habit, extensive rhizome system and fire-behaviour of related species suggests some level of fire tolerance. The effects of the recent extensive fires in the Alpine National Park on populations of *C. paupera* are however unknown.

Table 1. Areas and populations under threat

Location	Threats
Mt Jim, Bogong High Plains	recreational use (trampling)
Big Nunniong Plain	vehicular damage
Omeo Plain	none apparent
King Spur	weed invasion, recreational use
Lankey Plain North	none apparent
Lankey Plain South	rabbit grazing, recreational use, vehicular damage (trailbikes)
Long Spur 1	recreational use (notably horse-riding), weed invasion
Long Spur 2	recreational use (notably horse-riding), vehicular damage, weed invasion
Long Spur 3	recreational use (notably horse-riding), rabbit grazing
Long Spur 4	recreational use (notably horse-riding), vehicular damage, rabbit grazing
JB Plain	recreational use (trampling), weed invasion
All populations	climate change, altered fire regimes

Recovery Information

Directions for recovery of *C. paupera* 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 *Carex paupera* 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 *Carex paupera* 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.
- 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	Clarify the taxonomy of populations to enable an accurate conservation status assessment. Responsibility: RBG	<ul style="list-style-type: none"> • Updated records on all State databases (FIS, VrotPop and Herbaria). • Revise taxonomic status of <i>Carex paupera</i>.
1.2	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	<ul style="list-style-type: none"> • Determination or update of conservation status for inclusion on state and national threatened species lists. • Target 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 relevant to community ecology and condition. Responsibility: DSE	<ul style="list-style-type: none"> • Requirements for completion of essential life history stages, recruitment and dispersal identified at known sites. • Identify habitat condition(s) under existing cattle grazing regimes. • 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	<ul style="list-style-type: none"> • Predictive model for potential habitat developed and tested.

Action	Description	Performance Criteria
Specific objective 3		
Manage threats to populations		
3.1	Identify disturbance regimes to maintain habitat. Responsibility: DSE	<ul style="list-style-type: none"> Determine the impact of the 2003 fires on <i>Carex paupera</i>.
3.2	Control threats from pest plants, animals, recreational impacts of high visitor numbers and camping by preventing access to hikers and campers where required and/or re-routing tracks, careful use of herbicides, fencing sites, and appropriate signage. Responsibility: PV	<ul style="list-style-type: none"> Measurable seedling recruitment/vegetative regeneration and reduction in plant mortality. Reduced rabbit numbers at Lankey Plain and Long Spur sites. Determine & implement fencing options for exclude cattle grazing where it is a threat. Encourage recreational users to use and stay on formed tracks.
Specific objective 4		
Identify key biological functions		
4.1	Evaluate current reproductive/regenerative status, seed bank status, by determining longevity, fecundity and recruitment levels. Responsibility: DSE	<ul style="list-style-type: none"> Seed bank/regenerative potential quantified for each population.
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	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> Population growth rates determined and Population Viability Analysis completed for important populations.

Action	Description	Performance Criteria
Specific objective 6		
Build community support for conservation		
6.1	Identify opportunities for community involvement in the conservation of <i>Carex paupera</i> .	<ul style="list-style-type: none"> • Presentation to community nature conservation groups.
Responsibility: DSE		

Abbreviations

DSE	Department of Sustainability and Environment
PV	Parks Victoria
RBG	Royal Botanic Gardens, Melbourne

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 competition from pest plants, inappropriate fire regimes and accidental destruction. 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 trials, 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 *C. paupera* 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 managers with information on the location, distribution, habitat and ecology of *C. paupera* 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 along tracks may need appropriate signposting or fencing. Surveys in potential habitat likely to be impacted by any development proposals (including walking trails and roadworks) will be required to avoid damage to or destruction of any currently unknown populations.

Affected interests

All populations of *Carex paupera* occur within the Alpine National park in Victoria, which is 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 *Carex paupera* 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 *Carex paupera*, 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. All populations of *Carex paupera* occur within the Alpine National Park, with management for biodiversity conservation a high priority in park management. A recent

Victorian Government policy has ended cattle grazing in the Alpine National Park. Minor works such as track realignment or fencing may be required to protect some populations, but these will not interfere with overall recreational activities within the park.

Acknowledgments

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Priority, Feasibility and Estimated Costs of Recovery Actions

Action	Description	Priority	Feasibility	Responsibility	Cost estimate					Total
					Year 1	Year 2	Year 3	Year 4	Year 5	
1	Conservation status									
1.1	Clarify taxonomy	1	100%	RBG	\$3000	\$	\$	\$	\$	\$3000
1.2	Collect baseline data	2	100%	DSE	\$6,000	\$0	\$0	\$0	\$0	\$6,000
2	Habitat requirements									
2.1	Survey known habitat	2	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	Manage threats									
3.1	Identify disturbance regimes	2	75%	DSE	\$0	\$15,000	\$0	\$0	\$0	\$15,000
3.2	Control threats	1	75%	DSE	\$10,000	\$10,000	\$10,000	\$5,000	\$5,000	\$40,000
4	Identify key biol. functions									
4.1	Evaluate reproductive status	3	75%	DSE	\$0	\$0	\$10,000	\$10,000	\$0	\$20,000
4.2	Seed germination	3	75%	DSE	\$0	\$0	\$10,000	\$10,000	\$0	\$20,000
5	Growth rates, pop. viability									
5.1	Conduct censusing	3	100%	DSE	\$6,000	\$6,000	\$6,000	\$6,000	\$6,000	\$30,000
5.2	Collate, analyse and report	3	100%	DSE	\$4,000	\$4,000	\$4,000	\$4,000	\$10,000	\$26,000
6	Education & communication									
6.1	Community extension	3	100%	DSE	\$6,000	\$6,000	\$6,000	\$6,000	\$6,000	\$30,000
Totals					\$52,000	\$63,000	\$58,000	\$53,000	\$39,000	\$268,000