Arachnorchis concolor (Fitzg.) D.L. Jones & M.A. Clem. Crimson Spider-orchid

Conservation status:

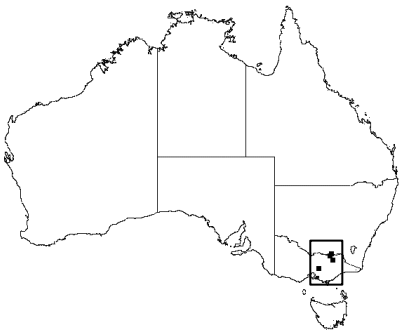
EPBC Act 1999:	V
IUCN (2000):	CR
NSW TSP Act 1995:	E
NRE (2000):	E

Distribution:

In New South Wales - IBRA (Thackway and Cresswell 1985) South Western Slopes Bioregion (Albury).

In Victoria - Victorian Northern Inland Slopes Bioregion (Beechworth, Chiltern). Additional populations are thought to occur in the Central Victorian Uplands (Broadford/Tyaak area). Records from the Goldfields Region in the Bendigo and Castlemaine areas are doubtful (D. Rouse, pers. comm.), as are those from the Cootamundra and Tumbaraumba areas in NSW (D. Jones, pers. comm.).

Specific details of known population localities (including GPS data) are held on DSE internal files.



Abundance:

<75 plants in the wild, in fewer than 10 populations. This species has often been confused with other taxa of similar appearance and its former abundance is not known. However, population sizes at extant sites are likely to have been at least double current numbers.

Habitat:

In New South Wales - occurs on granite slopes and ridges in open heathy regrowth Box woodland (usually *Eucalyptus blakeleyi, E. polyanthemos, E. macrorhyncha, E. albens*) on well drained gravelly or stony sand and clay loam. Critical habitat has not been determined.

In Victoria - occurs in Box-Ironbark open forests (usually *Eucalyptus goniocalyx* , *E. macrorhyncha*, *E. polyanthemos* , *E. sideroxylon*) on well drained gravelly or stony sand and clay loam. The understorey typically consists of scattered heathy shrubs and grasses such as *Brachlyoma ciliatum*, *Platylobium formosum*, *Dillwynia phylicoides* , *Hibbertia riparia*, and *Joycea pallida*. Critical habitat has not been determined.

Reservation status:

Reserved at Chiltern Box Ironbark National Park, Mt Pilot Multipurpose Park.

Management:

Parks Victoria (Central Region, Beechworth); Department of Natural Resources and Environment (Parks, Flora and Fauna, Forest Management, Wodonga); NSW National Parks and Wildlife Service (Queanbeyan); Albury City Council, NSW; Department of Land and Water Conservation, NSW.

Current and potential threats and their risk:

Current threats	**Perceived risk**
Weed invasion	Moderate to high – exotic annual grasses a potential threat in Vic and of concern in NSW.
Grazing/pest animals	High in Victoria – rabbit and kangaroo grazing. Low in NSW – pest animal numbers low.
Inappropriate fire regimes	High in NSW – frequent unplanned fires. Moderate in Vic – populations are close to towns and unplanned fires are possible.
Site disturbance	High in NSW – off road vehicles, close proximity to tracks, moderate seasonal disturbance by orchid enthusiasts. Moderate in Vic – close proximity to tracks.
Potential threats	**Perceived risk**
Reservation status	Reserved in Vic – Chiltern Box Ironbark NP; potential for reservation at Mt Pilot Regional Park subject to

	implementation of ECC recommendations. Unreserved in NSW - occurs on public land with uncertain land tenure.
Illegal collection	High in Vic and NSW–evidence of collection in the past; highly sought after by collectors.
Timber harvesting	High – occurs at one, possibly two sites in State Forest
Other disturbance	High – roadworks and soil dumping potentially occur on at least one steep unstable site close to road edge.

Recovery objectives:

Maintain and/or increase existing populations; protect and manage habitat.

Recovery actions undertaken:

- Regional recovery team established (NSW).
- Recovery Plan Prepared for New South Wales (TSCA NSW).
- Annual searches at various sites in Victoria and New South Wales since 1992.
- Monitoring of 5 populations in north-east Victoria since 1990 and in southern New South Wales since 2000.
- Fencing, weed control and fire management planning in (NSW) and at Chiltern Box-Ironbark National Park (Victoria).
- Hand pollination, seed collection.
- Preliminary fungal isolation and culture.
- All known sites were visited during preparation of the recovery plan.

Issues specific to recovery:

- A. concolor is highly sought after by collectors, so that site confidentiality is vital. Involvement from non government organisations and individuals will be limited to a small number of individuals with a proven track record in conservation (FOC, ABG).
- Taxonomic definition of the taxon is currently unclear with some confusion existing over its current and former distribution and population size. Populations in the Bendigo, Castlemaine, and Broadford areas need determination (referred to below as unconfirmed populations).
- The response of A. concolor to fire is not known, fire management should be undertaken with caution, especially in New South Wales where populations are vulnerable to frequent unplanned fires.
- A recovery plan for NSW populations of A. concolor has been prepared under NSW *TSCA 1995* (NSW NPWS 2001). Adoption of that plan by the Commonwealth minister for the Environment is required under the *EPBC Act 1999*. Actions and priorities from that plan have been incorporated here.

Overall recovery strategy:

Known and potential populations will be surveyed to determine population sizes and habitat requirements and to provide ecological knowledge necessary for management. Broadscale risk management will include fire planning, protection of populations from grazing and weed invasion, prevention of accidental damage, securing site tenure for conservation, and maintenance of site confidentiality. The population will be managed to promote seedling recruitment, using fine-scale habitat management techniques. Populations will be re-stocked using seed from cultivated plants. Recovery will be jointly managed by NSW NPWS, DSE and PV. Involvement from Albury Botanic Gardens and Friends of Chiltern will continue and biological research is strongly encouraged.

Consultation:

NSW NPWS (Threatened Species Unit, Queanbeyan); Parks Victoria (Central Victoria Region Beechworth); DSE NE (BNR Wodonga); Friends of Chiltern; Albury Botanic Gardens; NSW DLWC.

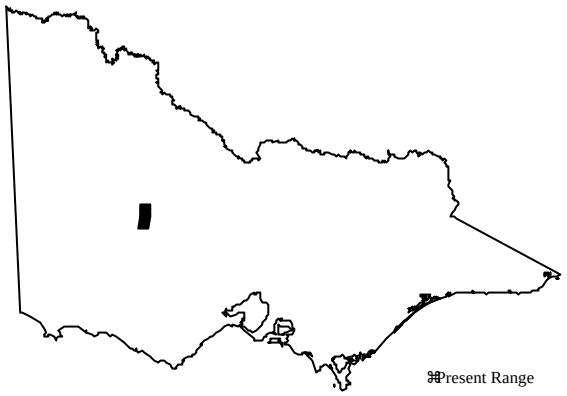
Action	*Chiltern (H)*	*Mt Pilot (H)*	*Beechworth (H)*	*Albury (H)*	*Unconfirmed populations (H)*
1. Determine current conservation status					
1.1 Clarify taxonomy	Completed	L	Completed	Completed	L
1.2 Acquire baseline population data	M	M	M	M	M
Responsibility	*DSE-BNR*	*CPBR, DSE-BNR*	*DSE-BNR*	*NSW NPWS NSW LWC*	*CPBR, DSE-BNR*
2. Investigate population biology					
2.1 Describe life history	M	M	M	M	M
2.2 Evaluate natural pollination levels and/or causes of pollinator limitation	M	M	M	M	M
2.3 Determine the effects of artificial pollination on growth survival and reproduction	M	N/A	M	M	N/A
2.4 Determine spatial distribution of mycorrhizal fungi	M	N/A	M	M	N/A
2.5 Determine optimal conditions for growth of mycorrhizal fungi *in-situ*	M	N/A	M	M	N/A
Responsibility	*DSE-BNR, Research Partner*	*DSE-BNR, Research Partner*	*DSE-BNR, Research Partner*	*DSE-BNR, Research Partner*	*DSE-BNR, Research Partner*
3. Determine habitat requirements of key populations					
3.1 Identify key populations	N/A	H	N/A	N/A	H
3.2 Conduct surveys	M	H	M	M	H
3.3 Identify ecological correlates of populations	M	M	M	M	M
3.4 Prepare habitat descriptions	M	M	M	M	M
Responsibility	*DSE-BNR*	*DSE-BNR, PV*	*DSE-BNR*	*NSW NPWS, NSW LWC*	*DSE-BNR*
4. Manage risks to populations					
4.1 Identify and implement strategies to control threats	H	H	H	H	H
4.2 Identify disturbance regimes to promote regeneration and recruitment	H	H	H	H	H
4.3 Protect key public land populations and habitat	N/A	H	H	N/A	H
4.4 Protect key private land populations and habitat	N/A	N/A	N/A	N/A	H (if applicable)
Responsibility	*PV, DSE-BNR*	*PV, DSE-BNR*	*DSE-BNR, Forests NE*	*NSW NPWS, NSW LWC*	*DSE-BNR*
5. Promote in-situ recruitment					
5.1 Prepare habitat for seedling recruitment	H	H	H	H	H
5.2 Re-stock populations with seed	H	H	H	H	H
Responsibility	*DSE-BNR, FOC*	*DSE-BNR, FOC*	*DSE-BNR*	*NSW NPWS, NSW LWC, ABG*	*DSE-BNR*
6. Measure population trends and responses against recovery actions					

6.1 Conduct annual censusing of populations	M	M	M	M	N/A
6.2 Collate, analyse and report on census data	M	M	M	M	N/A
6.3 Re-prioritise and adjust recovery actions and/or threat management	H	H	H	H	H
Responsibility	*PV*	*PV*	*DSE-BNR, Forests NE*	*NSW NPWS, NSW DLWC, ABG*	*DSE-BNR*
7. Increase populations ex-situ					
7.1 Hand pollinate plants	H	H	H	H	H
7.2 Establish a threatened orchid seed bank and determine seed viability	H	N/A	N/A	H	N/A
7.3 Establish a mycorrhizal fungi bank	H	N/A	N/A	H	N/A
7.4 Establish and maintain cultivated populations	H	N/A	N/A	H	N/A
7.5 Maintain a database of threatened orchid taxa in cultivation	L	N/A	N/A	L	N/A
Responsibility	*PV, FOC, RBG, DSE-BNR, NOGN*	*FOC, PV*	*DSE-BNR*	*NSW NPWS, NSW DLWC, ABG, KPBG*	*DSE-BNR*
8. Translocate cultivated plants					
8.1 Determine criteria for re-stocking/re-introduction	N/A	N/A	N/A	N/A	N/A
8.2 Evaluate site suitability	N/A	N/A	N/A	N/A	N/A
8.3 Determine long term cost-benefitsand feasibility of translocating plants	N/A	N/A	N/A	N/A	N/A
8.4 Prepare and implement translocation plans	N/A	N/A	N/A	N/A	N/A
8.5 Maintain translocated populations	N/A	N/A	N/A	N/A	N/A
Responsibility	*DSE-BNR*	*DSE-BNR*	*DSE-BNR*	*N/A*	*DSE-BNR*
9. Implement an education and communication strategy					
Prepare technical educational material on *in-situ* recovery techniques	L	L	L	N/A	L
Undertake community extension	L	L	L	L	L
Conduct workshops and symposia on *in-situ* recovery techniques	L	L	L	N/A	L
Encourage and support research by Higher Education Institutions and existing research partners	M	N/A	M	M	N/A
Responsibility	*PV, DSE-BNR, FOC, TSN, RP*	*PV, DSE-BNR, TSN*	*PV, DSE-BNR, FOC, TSN, RP*	*NSW NPWS, RP, ABG*	*DSE-BNR, TSN*
10. Consolidate recovery and extend networks					
10.1 Maintain the Threatened Orchid Recovery Team	Completed	Completed	Completed	N/A	Completed
10.2 Establish and facilitate regional Recovery Teams	L	L	L	L	L
10.3 Co-ordinate recovery and exchange knowledge with interstate agencies	L	L	L	L	L
Responsibility	*DSE-BNR, PV, FOC*	*DSE-BNR*	*DSE-BNR*	*NSW NPWS*	*DSE-BNR*

Arachnorchis cruciformis (D.L. Jones) D.L. Jones & M.A. Clem. (Red Cross Spider-orchid)

Conservation status: EPBC Act 1999: Not listed
IUCN (2000): E (preliminary assessment)
NRE (2000) Not listed

Distribution: *Endemic to Victoria* - Victorian Goldfields Bioregion (Stuart Mill area).
Specific details of population localities (including GPS data) are held on DSE internal files.



Abundance: <150 plants in the w ild, in 3 populations.

Habitat: Occurs in *Eucalyptus leucoxylon* - *E. microcarpa* - *E. goniocalyx* or *E. macrorhyncha* and occasionally *E. tricarpa* low open forest or woodland with a heathy understorey typically dominated by *Calytrix tetragona*, *Brachyloma ciliata*, *Astroloma conostephioides*, *A. humifusum*, *Hibbertia* sp. and *Leucopogon virgatus* on well drained grey-brown sandy loam. Critical habitat has not been determined, but currently occupies undisturbed, long unburnt forest at present, where litter has accumulated.

Reservation status: Reserved at Dalyenong Flora and Fauna Reserve and Stuart Mill Flora and Fauna Reserve.

Management: Parks Victoria (Central Region, Inglewood); Private Property.

Current and potential threats and their risk:

Current threats	**Perceived risk**
Weed invasion	Low at all sites.
Grazing/pest animals	Moderate to high –macropods and rabbits.
Inappropriate fire regimes	Low – sites are long unburnt, but response to fire is not known.
Site disturbance	Moderate – one site on private property may be vulnerable to damage by farm machinery.
Reservation status	Poor - inadequate legal protection in Flora and Fauna Reserves; one site is on private property.
Potential threats	**Perceived risk**
Illegal collection	Moderate – no evidence of collection in the past, but may be sought by collectors.
Other disturbance	High – increased grazing pressure from over abundant macropods may occur in the future; trampling by visitors to the sites will damage plants.

Recovery objectives: Maintain and/or increase existing population sizes; protect and manage habitat.

Recovery actions undertaken:

- Searches in immediate vicinity since 1999.
- Monitoring of 2 populations in 2001.
- Hand pollination at 1 site.
- Trial caging at 1 site.
- Sites were visited during preparation of the recovery plan.

Issues specific to recovery:

- *A. cruciformis* populations are vulnerable to damage from trampling, and site confidentiality is vital. Involvement from non government organisations and individuals will be limited to a small number of individuals with a proven track record in conservation (ANOS conservation group).
- Putative hybrids with *C*. sp. aff. *venusta* have been recorded and need determination.
- The response of *A. cruciformis* to fire is not known, fire should be excluded indefinitely.
- Current levels of grazing pressure need to be assessed and fencing extended to protect habitat where required.

Overall recovery strategy:

Known populations will be surveyed to determine population sizes and habitat requirements and to provide ecological knowledge necessary for management. Broadscale risk management will include fire planning, protection of populations from grazing and prevention of accidental damage, negotiating with landowner to conserve one population on private property, and maintenance of site confidentiality. The population will be managed to promote seedling recruitment, using fine-scale habitat management techniques. Populations will be re-stocked using seed from cultivated plants. Recovery will be jointly managed by DSE and PV. Involvement from ANOS conservation group will continue.

Consultation:

Parks Victoria (Central Victoria Region, Inglewood and Wodonga); DSE NE (BNR Bendigo); ANOS Conservation Group; landowner Stuart Mill.

Actions

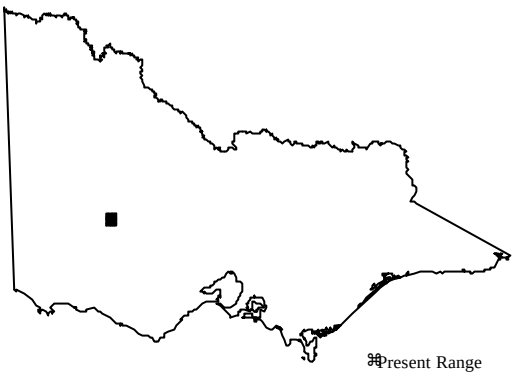
Action	Stuart Mill FFR (H)	Dalyenong FFR (H)	Stuart Mill PP (H)
1. Determine current conservation status			
1.1 Clarify taxonomy	Completed	Completed	Completed
1.2 Acquire baseline population data	M	M	M
Responsibility	CPBR, DSE-BNR	CPBR, DSE-BNR	CPBR, DSE-BNR
2. Investigate population biology			
2.1 Describe life history	M	M	M
2.2 Evaluate natural pollination levels and/or causes of pollinator limitation	M	M	M
2.3 Determine the effects of artificial pollination on growth survival and reproduction	M	M	M
2.4 Determine spatial distribution of mycorrhizal fungi	M	M	M
2.5 Determine optimal conditions for growth of mycorrhizal fungi *in-situ*	M	M	M
Responsibility	DSE-BNR	DSE-BNR	DSE-BNR
3. Determine habitat requirements of key populations			
3.1 Identify key populations	NA	NA	NA
3.2 Conduct surveys	H	H	H
3.3 Identify ecological correlates of populations	H	H	H
3.4 Prepare habitat descriptions	M	M	M
Responsibility	DSE-BNR	DSE-BNR	DSE-BNR
4. Manage risks to populations			
4.1 Identify and implement strategies to control threats	H	H	H
4.2 Identify disturbance regimes to promote regeneration and recruitment	H	H	H
4.3 Protect key public land populations and habitat	N/A	N/A	N/A
4.4 Protect key private land populations and habitat	N/A	N/A	H
Responsibility	PV (Inglewood), DSE-BNR	PV (Inglewood), DSE-BNR	DSE-BNR NW
5. Promote in-situ recruitment			
5.1 Prepare habitat for seedling recruitment	M	M	M
5.2 Re-stock populations with seed	M	M	M

Responsibility	DSE-BNR, ANOS	DSE-BNR, ANOS	DSE-BNR, ANOS
6. Measure population trends and responses against recovery actions			
6.1 Conduct annual censusing of populations	M	M	M
6.2 Collate, analyse and report on census data	M	M	M
6.3 Re-prioritise and adjust recovery actions and/or threat management	H	H	H
Responsibility	DSE-BNR, ANOS, PV (Inglewood)	DSE-BNR, ANOS, PV (Inglewood)	DSE-BNR, ANOS, PV (Inglewood)
7. Increase populations ex-situ			
7.1 Hand pollinate plants	M	M	M
7.2 Establish a threatened orchid seed bank and determine seed viability	M	M	M
7.3 Establish a mycorrhizal fungi bank	M	M	M
7.4 Establish and maintain cultivated populations	M	M	M
7.5 Maintain a database of threatened orchid taxa in cultivation	L	L	L
Responsibility	DSE-BNR, ANOS, RBG, NOGN	DSE-BNR, ANOS, RBG, NOGN	DSE-BNR, ANOS, RBG, NOGN
8. Translocate cultivated plants			
8.1 Determine criteria for re-stocking/re-introduction	N/A	N/A	N/A
8.2 Evaluate site suitability	N/A	N/A	N/A
8.3 Determine long term cost-benefits and feasibility of translocating plants	N/A	N/A	N/A
8.4 Prepare and implement translocation plans	N/A	N/A	N/A
8.5 Maintain translocated populations	N/A	N/A	N/A
Responsibility	N/A	N/A	N/A
9. Implement an education and communication strategy			
9.1 Prepare technical educational material on *in-situ* recovery techniques	L	L	L
9.2 Undertake community extension	L	L	L
9.3 Conduct workshops and symposia on *in-situ* recovery techniques	L	L	L
9.4 Encourage and support research by Higher Education Institutions and existing research partners	M	M	M
Responsibility	PV, DSE-BNR, TSN, RP	PV, DSE-BNR, TSN, RP	PV, DSE-BNR, TSN, RP
10. Consolidate recovery and extend networks			
10.1 Maintain the Threatened Orchid Recovery Team	L	L	N/A
10.2 Establish and facilitate regional Recovery Teams	L	L	L
10.3 Co-ordinate recovery and exchange knowledge with interstate agencies	N/A	N/A	N/A
Responsibility	DSE-BNR	DSE-BNR	DSE-BNR

Arachnorchis fulva (G.W. Carr) D.L. Jones & M.A. Clem. (Tawny Spider-orchid)

Conservation status: EPBC 1999: E
IUCN (2000): CR (preliminary assessment)
NRE (2000): E

Distribution: *Endemic to Victoria* – Goldfields Bioregion (Stawell area). No records exist to indicate a formerly more widespread range and likely to be naturally rare narrow endemic.
Specific details of population localities (including GPS data) are held on DSE internal files.



Abundance: <300-500 plants known in the wild, in 4 populations. Likely to have been more abundant with numbers in the thousands in the Stawell area, prior to landscape scale disturbance from gold exploration and mining.

Habitat: Grows on generally flat or gently sloping terrain in woodlands and open forest dominated by *Eucalyptus leucoxylon sens. lat*. and occasionally *E. tricarpa* with a heathy understorey on well drained gravelly clay loams. Critical habitat has not been determined, but may require disturbance.

Reservation status: Reserved at Three Jacks Flora Reserve, Germania Mine Bushland Reserve.

Management: Parks Victoria (West Victoria Region, Horsham).

Current and potential threats and their risk:

Current threats	**Perceived risk**
Weed invasion	Low – weeds are scarce at sites.
Grazing/pest animals	High - macropods and rabbits are common at all sites.
Inappropriate fire regimes	Unknown at present - sites are long unburnt and fire risk is low.
Site disturbance	High at Deep Lead - sites are subject to disturbance by illegal gold prospecting and rubbish dumping. Extremely high all sites-trampling by orchid enthusiasts.
Potential threats	**Perceived risk**
Reservation status	Inadequately reserved, but subject to ECC recommendations.
Illegal collection	High –likely to be sought by collectors.
Ecology/biology	High - conditions for seed recruitment and maintenance of pollinator and fungal activity unknown; attempts to germinate seed have been largely unsuccessful.

Recovery objectives: Maintain and/or increase existing population sizes; protect and manage habitat.

Recovery actions undertaken:

- Monitoring at 2 sites by Stawell Field Naturalists and RMIT University (Raleigh in prep.).
- Searches conducted annually by Stawell Field Naturalists.
- Research into polymorphism underway (Basist *et al*. 2001).
- Preliminary seed viability and germination trials undertaken (Basist *et al*. 2001; R. Raleigh in prep).
- Fungal isolation and cultivation trials undertaken (Raleigh *et al*. 2001; Raleigh in prep.).

- All sites were visited during recovery plan preparation.

Issues specific to recovery:

- The site at Deep Lead is well known to local and interstate orchid enthusiasts and is extremely vulnerable to damage from trampling during flowering. Visitor management, such as the installation of walking tracks to restrict walkers and signage, will be considered.
- Site confidentiality at other locations is vital. Involvement from non government organisations and individuals will be limited to a small number of individuals with a proven track record in its conservation (ANOS conservation group, Stawell Field Naturalists Club).
- One population at Deep Lead FR is close to tracks and vulnerable to damage from recreational vehicles.
- Effective management of illegal prospecting for gold at Deep Lead is urgently required.
- Kangaroo numbers at both reserves require assessment particularly in relation to loss of ground flora and soil disturbance. Alternatively, extensive fencing to protect populations will be required.
- Populations are polymorphic with flower characters that combine features of *A. fulva* and *C. reticulata*, both of which occur at Deep Lead (Backhouse and Jeanes 1995; Basist *et al*. 2001). However, early results from molecular analyses suggest that there are no differences between plants belonging to 5 groups based on petal and labellum coloration and all can be ascribed to *A. fulva* (Basist *et al*. 2001).

Overall recovery strategy:

Known populations will continue to be monitored. Risk management will include protection of populations from grazing and gold prospecting, and maintenance of site confidentiality. In particular, a strategy to manage high visitor numbers at Deep Lead will be negotiated with Parks Victoria. A wider range of seed will be collected and tested for viability and stored for use if required. Recovery will be jointly managed by DSE and PV. Involvement from ANOS conservation group and Stawell Field Naturalists will continue.

Consultation:

Parks Victoria (West Victoria Region, Horsham); DSE-BNR SW; ANOS Conservation Group; Stawell Field Naturalists Club.

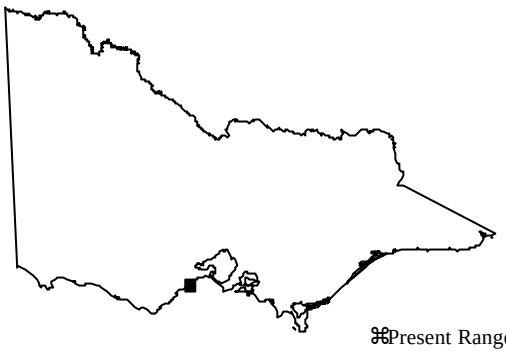
Action	**Deep Lead (H)**	**Three Jacks (H)**	**Germania Mine (L)**
1. Determine current conservation status			
1.1 Clarify taxonomy	Completed	Completed	Completed
1.2 Acquire baseline population data	M	M	M
Responsibility	DSE-BNR SW, SFN	DSE-BNR SW, SFN	DSE-BNR, ANOS
2. Investigate population biology			
2.1 Describe life history	N/A	N/A	N/A
2.2 Evaluate natural pollination levels and/or causes of pollinator limitation	M	M	M
2.3 Determine the effects of artificial pollination on growth survival and reproduction	M	M	M
2.4 Determine spatial distribution of mycorrhizal fungi	M	M	M
2.5 Determine optimal conditions for growth of mycorrhizal fungi *in-situ*	M	M	M
Responsibility	DSE-BNR, RP	DSE-BNR, RP	DSE-BNR, RP
3. Determine habitat requirements of key populations			
3.1 Identify key populations	N/A	N/A	N/A
3.2 Conduct surveys	M	M	M
3.3 Identify ecological correlates of populations	M	M	M
3.4 Prepare habitat descriptions	L	L	L
Responsibility	DSE-BNR	DSE-BNR	DSE-BNR
4. Manage risks to populations			
4.1 Identify and implement strategies to control threats	H	H	H
4.2 Identify disturbance regimes to promote regeneration and recruitment	H	H	H
4.3 Protect key public land populations and habitat	N/A	N/A	N/A
4.4 Protect key private land populations and habitat	N/A	N/A	N/A
Responsibility	PV (Horsham)	PV (Horsham)	PV (Horsham)
5. Promote in-situ recruitment			
5.1 Prepare habitat for seedling recruitment	M	M	M
5.2 Re-stock populations with seed	M	M	M
Responsibility	DSE-BNR	DSE-BNR	DSE-BNR

6. Measure population trends and responses against recovery actions			
6.1 Conduct annual censusing of populations	M	M	M
6.2 Collate, analyse and report on census data	M	M	M
6.3 Re-prioritise and adjust recovery actions and/or threat management	H	H	H
Responsibility	DSE-BNR, SFN	DSE-BNR, SFN	DSE-BNR, ANOS
7. Increase populations ex-situ			
7.1 Hand pollinate plants	M	M	M
7.2 Establish a threatened orchid seed bank and determine seed viability	M	M	M
7.3 Establish a mycorrhizal fungi bank	M	M	M
7.4 Establish and maintain cultivated populations	M	M	M
7.5 Maintain a database of threatened orchid taxa in cultivation	L	L	L
Responsibility	DSE-BNR, RBG, NOGN	DSE-BNR, RBG, NOGN	DSE-BNR, RBG, NOGN
8. Translocate cultivated plants			
8.1 Determine criteria for re-stocking/re-introduction	N/A	N/A	N/A
8.2 Evaluate site suitability	N/A	N/A	N/A
8.3 Determine long term cost-benefits and feasibility of translocating plants	N/A	N/A	N/A
8.4 Prepare and implement translocation plans	N/A	N/A	N/A
8.5 Maintain translocated populations	N/A	N/A	N/A
Responsibility	DSE-BNR	DSE-BNR	DSE-BNR
9. Implement an education and communication strategy			
9.1 Prepare technical educational material on *in-situ* recovery techniques	L	L	L
9.2 Undertake community extension	L	L	L
9.3 Conduct workshops and symposia on *in-situ* recovery techniques	L	L	L
9.4 Encourage and support research by Higher Education Institutions and existing research partners	M	M	M
Responsibility	PV (Horsham), DSE-BNR, TSN, RP	PV (Horsham), DSE-BNR, TSN, RP	PV (Horsham), DSE-BNR, TSN, RP
10. Consolidate recovery and extend networks			
10.1 Maintain the Threatened Orchid Recovery Team	L	L	L
10.2 Establish and facilitate regional Recovery Teams	L	L	L
10.3 Co-ordinate recovery and exchange knowledge with interstate agencies	N/A	N/A	N/A
Responsibility	DSE-BNR	DSE-BNR	DSE-BNR

Petalochilus maritimus (D.L. Jones) D.L. Jones & M.A. Clem. Angahook Petalochilus

Conservation status: EPBC Act 1999: Not listed
IUCN (2000): CR
NRE (2000): Not listed

Distribution: *Endemic to Victoria* - Victorian Otway Plain Bioregion (Anglesea).
Specific details of population localities (including GPS data) are held on DSE internal files.



Abundance: Approximately 200 - 250 plants in the wild, in 1 population.

Habitat: Occurs in *Eucalyptus obliqua* coastal woodland with a heathy understorey dominated by *Xanthorrhoea australis*, *Hibbertia sericea* and *Leptospermum myrsinoides* on well drained dark grey sandy loam. Critical habitat is yet to be determined, but is likely to include an open heathy understorey maintained by a suitable fire frequency.

Reservation status: Reserved at Angahook-Lorne State Park.

Management: Parks Victoria, (Victoria West Region, Lorne).

Current and potential threats:

Current threats	**Perceived risk**
Ecology/biology	High - conditions for maintenance of pollinator and fungal activity unknown; increased extinction risk due to single population.
Weed invasion	Moderate at present – Boneseed (*Chrysanthemoides monilifera*) and Sallow wattle (*Acacia longifolia* var. *longifolia*) occur within the park.
Grazing/pest animals	Low – macropods absent; rabbits in low numbers.
Reservation status	Inadequate – confined to an area subject to multiple use.
Potential threats	**Perceived risk**
Illegal collection	High - probably highly sought after by collectors.
Inappropriate fire regimes	Moderate – site has been burnt recently and fire planning is in prep. Some pressure from nearby residents to burn site in Spring during flowering.
Accidental damage	High – potential for trampling from recreational users including walkers and dogs.

Recovery objectives: Maintain and/or increase existing population size; establish one new population; protect and manage habitat.

Recovery actions undertaken:

- Annual searches within the area since 1999.

Issues specific to recovery:

- *P. maritimus* is probably highly sought after by collectors, so that site confidentiality is vital. Involvement from non government organisations and individuals will be limited to a small number of individuals with a demonstrated track record in conservation (Angair).

- *P. maritimus* responds well to fire and determination of a suitable fire regime is essential to promote flowering and probably seedling recruitment.
- *P. maritimus* is extremely vulnerable to site disturbance. Re-alignment of existing walking tracks is urgently required.
- Apparently suitable habitat exists in the area and searches are urgently required.
- The site was visited during preparation of the recovery plan.

Overall recovery strategy:

Broadscale risk management will include fire planning, protection of the population from accidental damage, and maintenance of site confidentiality. Searches of similar habitat within the Anglesea Heath area may uncover additional populations. The population will be managed to promote seedling recruitment, using fine-scale habitat management techniques. Populations will be re-stocked with seed collected *in-situ* and one additional population established using cultivated plants. Recovery will be jointly managed by DSE and PV. Involvement from Angair will continue.

Consultation:

Parks Victoria (Victoria West Region, Lorne); DSE-BNR SW (Colac); Friends of Angahook-Lorne State Park.

ACTIONS:

Action	**Angahook Lorne (H)**
1. Determine current conservation status	
1.1 Clarify taxonomy	N/A
1.2 Acquire baseline population data	M
Responsibility	DSE-BNR
2. Investigate population biology	
2.1 Describe life history	M
2.2 Evaluate natural pollination levels and/or causes of pollinator limitation	M
2.3 Determine the effects of artificial pollination on growth survival and reproduction	M
2.4 Determine spatial distribution of mycorrhizal fungi	M
2.5 Determine optimal conditions for growth of mycorrhizal fungi *in-situ*	M
Responsibility	DSE-BNR, RP
3. Determine habitat requirements of key populations	
3.1 Identify key populations	N/A
3.2 Conduct surveys	M
3.3 Identify ecological correlates of populations	M
3.4 Prepare habitat descriptions	M
Responsibility	DSE-BNR
4. Manage risks to populations	
4.1 Identify and implement strategies to control threats	H
4.2 Identify disturbance regimes to promote regeneration and recruitment	H
4.3 Protect key public land populations and habitat	N/A
4.4 Protect key private land populations and habitat	N/A
Responsibility	PV (Lorne), DSE-BNR
5. Promote in-situ recruitment	
5.1 Prepare habitat for seedling recruitment	M
5.2 Re-stock populations with seed	M
Responsibility	DSE-BNR, FAL
6. Measure population trends and responses against recovery actions	
6.1 Conduct annual censusing of populations	M
6.2 Collate, analyse and report on census data	M
6.3 Re-prioritise and adjust recovery actions and/or threat management	H
Responsibility	DSE-BNR, PV, FAL

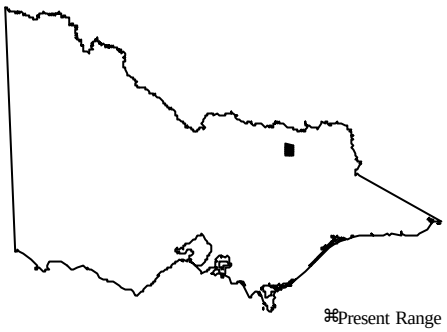
7. Increase populations ex-situ	
7.1 Hand pollinate plants	H
7.2 Establish a threatened orchid seed bank and determine seed viability	M
7.3 Establish a mycorrhizal fungi bank	M
7.4 Establish and maintain cultivated populations	M
7.5 Maintain a database of threatened orchid taxa in cultivation	L
Responsibility	DSE-BNR, FAL, RBG, NOGN
8. Translocate cultivated plants	
8.1 Determine criteria for re-stocking/re-introduction	M
8.2 Evaluate site suitability	H
8.3 Determine long term cost-benefits and feasibility of translocating plants	M
8.4 Prepare and implement translocation plans	H
8.5 Maintain translocated populations	H
Responsibility	DSE-BNR; RBG, FAL, PV
9. Implement an education and communication strategy	
9.1 Prepare technical educational material on *in-situ* recovery techniques	L
9.2 Undertake community extension	L
9.3 Conduct workshops and symposia on *in-situ* recovery techniques	L
9.4 Encourage and support research by Higher Education Institutions and existing research partners	N/A
Responsibility	DSE-BNR
10. Consolidate recovery and extend networks	
10.1 Maintain the Threatened Orchid Recovery Team	L
10.2 Establish and facilitate regional Recovery Teams	L
10.3 Co-ordinate recovery and exchange knowledge with interstate agencies	N/A
Responsibility	DSE-BNR

Arachnorchis pilotensis (D.L. Jones) D.L. Jones & M.A. Clem. (Mt Pilot Spider-orchid)

Conservation status:

EPBC Act 1999:	Not listed
IUCN (2000):	CR
NRE (2000):	Not listed

Distribution: *Endemic to Victoria* - Victorian Northern Inland Slopes Bioregion (Mt Pilot).
Specific details of population localities (including GPS data) are held on DSE internal files.



Abundance: <5 plants in the wild, in 2 populations. Unconfirmed reports exist of one additional, larger population.

Habitat: Occurs in *Eucalyptus polyanthemos - E. goniocalyx - Callitris endlicheri* grassy open forest on well drained dark grey-brown granitic loam. Critical habitat has not been determined, but is likely to consist of long unburnt woodland dominated by the above species on granite slopes.

Reservation status: Reserved at Mt Pilot Multipurpose Park.

Management: Parks Victoria, Central Victoria Region (Central Region, Beechworth).

Current and potential threats:

Current threats	**Perceived risk**
Ecology/biology	Limited or absent natural pollination; response to fire unknown; conditions for seed germination and maintenance of fungal activity unknown.
Weed invasion	Low at present– exotic annual grasses a potential threat.
Grazing/pest animals	High– rabbit and kangaroo grazing.
Reservation status	Inadequately reserved–potential for more effective reservation at Mt Pilot Regional Park subject to implementation of ECC recommendations, but multiple use of park likely to remain.
Potential threats	**Perceived risk**
Illegal collection	High- probably highly sought after by collectors.
Inappropriate fire regimes	Moderate– site is long unburnt, but unplanned fires are possible.
Accidental damage	High – potential for trampling from recreational users including rock climbers and walkers.

Recovery objectives: Maintain and/or increase existing populations; protect and manage habitat.

Recovery actions undertaken:

- Annual searches at various sites around Mt Pilot since 1999.

Issues specific to recovery:

- *A. pilotensis* is probably highly sought after by collectors, so that site confidentiality is vital. Involvement from non government organisations and individuals will be limited to a small number of individuals with a proven track record in its conservation (FOC).
- The response of *A. pilotensis* to fire is not known, and fire should be excluded indefinitely.
- The location of only one population, consisting of one or two plants, is known at present. One other larger population apparently exists, but its precise location is unknown.
- The extremely small total population size indicates that protection of existing plants is critical.

- Apparently suitable habitat exists in the area and searches are urgently required.
- The known site was visited during preparation of the recovery plan.

Overall recovery strategy:

Broadscale risk management will include fire planning, protection of populations from grazing and accidental damage, and maintenance of site confidentiality. Searches of similar habitat in the immediate vicinity of Mt Pilot may uncover additional populations. The population will be managed to promote seedling recruitment, using fine-scale habitat management techniques. Populations will be re-stocked using seed from cultivated plants. Recovery will be jointly managed by DSE and PV. Involvement from the Friends of Chiltern will continue.

Consultation:

Parks Victoria (Central Victoria Region); DSE NE (BNR Wodonga); Friends of Chiltern.

ACTIONS:

Action	Mt Pilot (H)	Additional site (M)
1. Determine current conservation status		
1.1 Clarify taxonomy	N/A	N/A
1.2 Acquire baseline population data	H	H
Responsibility	DSE-BNR, FOC	DSE-BNR, FOC
2. Investigate population biology		
2.1 Describe life history	H	H
2.2 Evaluate natural pollination levels and/or causes of pollinator limitation	M	M
2.3 Determine the effects of artificial pollination on growth survival and reproduction	N/A	N/A
2.4 Determine spatial distribution of mycorrhizal fungi	N/A	N/A
2.5 Determine optimal conditions for growth of mycorrhizal fungi *in-situ*	N/A	N/A
Responsibility	DSE-BNR, FOC	DSE-BNR, FOC
3. Determine habitat requirements of key populations		
3.1 Identify key populations	N/A	N/A
3.2 Conduct surveys	H	H
3.3 Identify ecological correlates of populations	H	H
3.4 Prepare habitat descriptions	H	H
Responsibility	DSE-BNR, FOC	DSE-BNR, FOC
4. Manage risks to populations		
4.1 Identify and implement strategies to control threats	H	H
4.2 Identify disturbance regimes to promote regeneration and recruitment	H	H
4.3 Protect key public land populations and habitat	H	H
4.4 Protect key private land populations and habitat	N/A	H
Responsibility	PV (Beechworth), DSE-BNR	PV (Beechworth), DSE-BNR
5. Promote in-situ recruitment		
5.1 Prepare habitat for seedling recruitment	H	H
5.2 Re-stock populations with seed	H	H
Responsibility	DSE-BNR, FOC	DSE-BNR, FOC
6. Measure population trends and responses against recovery actions		
6.1 Conduct annual censusing of populations	M	M
6.2 Collate, analyse and report on census data	M	M
6.3 Re-prioritise and adjust recovery actions and/or threat management	H	H
Responsibility	PV (Beechworth), DSE-BNR, FOC	PV (Beechworth), DSE-BNR, FOC
7. Increase populations ex-situ		
7.1 Hand pollinate plants	N/A	N/A

7.2 Establish a threatened orchid seed bank and determine seed viability	H	H
7.3 Establish a mycorrhizal fungi bank	H	H
7.4 Establish and maintain cultivated populations	H	H
7.5 Maintain a database of threatened orchid taxa in cultivation	L	L
Responsibility	FOC, RBG, DSE-BNR, NOGN	FOC, RBG, DSE-BNR,
8. Translocate cultivated plants		
8.1 Determine criteria for re-stocking/re-introduction	N/A	N/A
8.2 Evaluate site suitability	N/A	N/A
8.3 Determine long term cost-benefits and feasibility of translocating plants	N/A	N/A
8.4 Prepare and implement translocation plans	N/A	N/A
8.5 Maintain translocated populations	N/A	N/A
Responsibility	DSE-BNR	DSE-BNR
9. Implement an education and communication strategy		
9.1 Prepare technical educational material on *in-situ* recovery techniques	L	L
9.2 Undertake community extension	L	L
9.3 Conduct workshops and symposia on *in-situ* recovery techniques	L	L
9.4 Encourage and support research by Higher Education Institutions and existing research partners	N/A	N/A
Responsibility	DSE-BNR, TSN	DSE-BNR, TSN
10. Consolidate recovery and extend networks		
10.1 Maintain the Threatened Orchid Recovery Team	L	L
10.2 Establish and facilitate regional Recovery Teams	L	L
10.3 Co-ordinate recovery and exchange knowledge with interstate agencies	N/A	N/A
Responsibility	DSE-BNR	DSE-BNR

Arachnorchis sp. aff. *venusta* (Kilsyth South)
Kilsyth South Spider-orchid

Conservation status: EPBC Act 1999: CR
IUCN (2000): CR
DSE 2000: E

Distribution: *Endemic to Victoria* - Victorian Gippsland Plain Bioregion (Kilsyth). Specific details of population localities are held on DSE internal files. Considered to be a short-range endemic at present as no records exist to indicate a formerly more widespread distribution. However, searches through Herbarium material may reveal mis-identified specimens placed with *Arachnorchis venusta* or closely related taxa.

Abundance: Approximately 23 plants in the wild, in 1 population. Former abundance is unknown, but likely to have been at least twice current numbers at the existing site.

Habitat: Occurs in *Eucalyptus radiata* - *E. cephalocarpa* open forest with scattered *Exocarpos cupressiformis*, and a shrubby understorey of *Banksia marginata* and *Leptospermum continentale* somewhat modified by slashing. The ground layer is species rich, but mainly consists of *Chionochloa pallida*, *Patersonia fragilis*, *P. occidentalis*, *Thelionema caespitosum* and *Sphaerolobium minus*, with patches of exposed ground and a profuse orchid flora. Critical habitat is yet to be determined, but is likely to include an open heathy understorey maintained by suitable disturbance regime.

Reservation status: Not reserved.

Management: Private property.

Current and potential threats and their risk:

Current threats	**Perceived risk**
Ecology/biology	High - conditions for maintenance of pollinator and fungal activity unknown; increased extinction risk due to single population; response to fire unknown; signs of senescence have been recently observed in the population.
Weed invasion	Low – relatively weed free with only a few woody species confined to small areas at present (eg. *Pittosporum undulatum*, *Erica quadrangularis*) (Carr 1998).
Grazing/pest animals	Low – rabbit numbers are low.
Site access	High – access is denied to Maroondah Shire and DSE staff at present, so that implementation of *in-situ* recovery actions is not possible at present.
Reservation status	High - unreserved at present. Attempts to purchase the property by the Shire of Maroondah have been rejected.
Potential threats	**Perceived risk**
Illegal collection	Low at present - probably highly sought after by collectors, but access to property is difficult.
Inappropriate fire regimes	Low– site has not been burnt recently although response to fire is unknown.
Deliberate damage	Unknown – landowners are opposed to retention of nature conservation values, but have been informed of its legal status.

Recovery objectives: Establish a positive relationship with landowners to maintain existing population size and manage habitat.

Recovery actions undertaken:

- City of Maroondah have offered to purchase the property, but consider the current asking price too high.
- The site has been assessed for biological significance (Carr 1998).
- The site is included in shire planning overlays.

Issues specific to recovery:

- The site has been assessed as having State conservation significance and *A.* sp. aff. *venusta* (Kilsyth South) as being of national conservation significance (Carr 1998; EPBC Act 1999).
- The landowners have been refused permission to remove vegetation by the City of Maroondah and by the Victorian Civil and Administrative Appeals Tribunal (VCAAT).
- VCAAT has recommended that the property should be placed in public ownership.
- An acrimonious relationship has developed between the landowners and council as well as with DSE, and attempts to purchase the land have been unsuccessful.
- Access to the property is denied to Local and State Government staff.
- City of Maroondah is endeavouring to raise additional funds to assist with purchase.
- The property adjacent to the site was visited during preparation of the recovery plan.
- On ground recovery actions may not commence until year 2, pending the successful outcome of mediation.
- There is concern that population condition has deteriorated in 2001 (A. Brown, KES, pers. comm.).

Overall recovery strategy:

Development of a positive relationship with the landowners will be attempted through mediation. If access to the property is allowed, risk management will include protection of the population from accidental damage, and maintenance of site confidentiality. Searches of similar habitat within the Kilsyth area may uncover additional populations. If possible, the taxon will be formally described, and the population will be managed to promote seedling recruitment using fine-scale habitat management techniques. Populations will be re-stocked with seed collected *in-situ*. Recovery will be jointly managed by DSE and the City of Maroondah in consultation with landowners. Involvement from local naturalists will continue.

Consultation:

City of Maroondah; DSE-BNR PP (Box Hill); Geoff Carr (Ecology Australia Pty Ltd); A. Brown (Knox Environment Centre).

ACTIONS:

Action	***Kilsyth South***
1. Determine current conservation status	
1.1 Clarify taxonomy	L
1.2 Acquire baseline population data	M
Responsibility	Ecology Australia P/L, DSE-BNR
2. Investigate population biology	
2.1 Describe life history	M
2.2 Evaluate natural pollination levels and/or causes of pollinator limitation	M
2.3 Determine the effects of artificial pollination on growth survival and reproduction	N/A
2.4 Determine spatial distribution of mycorrhizal fungi	N/A
2.5 Determine optimal conditions for growth of mycorrhizal fungi *in-situ*	N/A
Responsibility	DSE-BNR
3. Determine habitat requirements of key populations	
3.1 Identify key populations	Completed
3.2 Conduct surveys	M
3.3 Identify ecological correlates of populations	M
3.4 Prepare habitat descriptions	L
Responsibility	DSE-BNR
4. Manage risks to populations	
4.1 Identify and implement strategies to control threats	H
4.2 Identify disturbance regimes to promote regeneration and recruitment	H
4.3 Protect key public land populations and habitat	N/A
4.4 Protect key private land populations and habitat	H (including mediation)
Responsibility	DSE-PP, City of Maroondah
5. Promote in-situ recruitment	

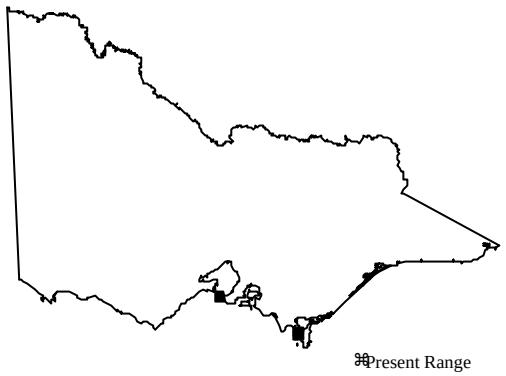
5.1 Prepare habitat for seedling recruitment	H
5.2 Re-stock populations with seed	H
Responsibility	DSE-BNR, KES/MEG
6. Measure population trends and responses against recovery actions	
6.1 Conduct annual censusing of populations	M
6.2 Collate, analyse and report on census data	M
6.3 Re-prioritise and adjust recovery actions and/or threat management	H
Responsibility	DSE-BNR, KES/MEG
7. Increase populations ex-situ	
7.1 Hand pollinate plants	H
7.2 Establish a threatened orchid seed bank and determine seed viability	H
7.3 Establish a mycorrhizal fungi bank	H
7.4 Establish and maintain cultivated populations	H
7.5 Maintain a database of threatened orchid taxa in cultivation	L
Responsibility	DSE-BNR, KES/MEG, RBG, NOGN
8. Translocate cultivated plants	
8.1 Determine criteria for re-stocking/re-introduction	Completed
8.2 Evaluate site suitability	N/A
8.3 Determine long term cost-benefits and feasibility of translocating plants	N/A
8.4 Prepare and implement translocation plans	N/A
8.5 Maintain translocated populations	N/A
Responsibility	DSE-BNR
9. Implement an education and communication strategy	
9.1 Prepare technical educational material on *in-situ* recovery techniques	L
9.2 Undertake community extension	L
9.3 Conduct workshops and symposia on *in-situ* recovery techniques	L
9.4 Encourage and support research by Higher Education Institutions and existing research partners	N/A
Responsibility	DSE-BNR
10. Consolidate recovery and extend networks	
10.1 Maintain the Threatened Orchid Recovery Team	L
10.2 Establish and facilitate regional Recovery Teams	L
10.3 Co-ordinate recovery and exchange knowledge with interstate agencies	N/A
Responsibility	DSE-BNR, KES/MEG, TSN

Corysanthes sp. aff diemenicus Coastal (Late Helmet-orchid)

Conservation status: EPBC Act 1999: Not listed
IUCN (2000): CR
NRE (2000): E

Distribution: *Endemic to Victoria* – Victorian Gippsland Plain Bioregion (Cape Schank, Mornington Peninsula National Park) and Wilsons Promontory Bioregion (Cotters Lake, Wilsons promontory National Park). Can be expected to occur in similar habitat in southern Victoria, but no records are yet available.

Specific details of population localities (including GPS data) are held on DSE internal files.



Abundance: < 500 plants, in 2 populations. Likely to be naturally rare, but more common prior to landscape scale disturbance particularly from weed invasion and clearing of Woolly Tea-tree scrub.

Habitat: Occurs in closed scrub dominated by *Leptospermum lanigerum*, typically associated with *Leucopogon parviflorus* in swamps and along water courses on moist, black, peaty alkaline soils overlying calcarenite. Understorey is relatively open, with a herbaceous ground layer which may include *Viola hederacea*, *Lobelia anceps*, *Selliera radicans* and *Geranium molle*. Critical habitat has not been determined, but likely to be restricted to alkaline soils and may require occasional creation of canopy gaps for regeneration.

Reservation status: Reserved at Wilsons Promontory National Park and Mornington Peninsula National Park.

Management: Parks Victoria (Victoria East Region, Tidal River; City and Bays Region, Rosebud).

Current and potential threats and their risk:

Current threats	**Perceived risk**
Weed invasion	Extremely high at MPNP- the known site is severely weed invaded (predominantly *Senecio angulatus*). Moderate at WPNP – *Hypochaeris radicata*, *Solanum* sp.
Grazing/pest animals	Low - populations are reasonably well protected from grazing.
Inappropriate fire regimes	Low at present - sites are protected from fire.
Site disturbance	Low - site at WPNP is close to a track and at some risk of damage from management vehicles.
Potential threats	**Perceived risk**
Reservation status	Adequately reserved.
Illegal collection	Low - no evidence of collection in the past.
Ecology/biology	High - conditions for seed recruitment and maintenance of pollinator and fungal activity unknown; increased extinction risk due to small population size at MPNP; response to fire unknown, but likely to require protection.

Recovery objectives: Maintain and/or increase existing population sizes; protect and manage habitat.

Recovery actions undertaken:

- Both sites were visited during recovery plan preparation.

Issues specific to recovery:

- The site at MPNP appears to have dried out somewhat, and plants have not been seen in recent years. Woolly Tea-trees are also showing signs of senescence and the site is significantly degraded by invasive pest plants, predominantly *Senecio angulatus* .
- Searches in similar habitat in the Mornington Peninsula are urgently required (eg. Buckleys Reserve, Balnarring).
- All PV staff at WPNP, including seasonal field staff, should be made aware of the site's location to prevent damage to plants.
- Some careful hand weeding may be required at WPNP.

Overall recovery strategy:

Searches for new populations to re-locate known populations will be conducted, and baseline data collected with assistance of Field Naturalists. Weed management will be investigated at MPNP in the immediate vicinity of the known population and strategies to maintain and regenerate habitat will be investigated. Risk management at WPNP will include site protection by ongoing track closure and inclusion on Environmental Information System. Recovery will be jointly managed by DSE and PV.

Consultation:

Parks Victoria (Victoria East Region, Tidal River; City and Bays Region, Rosebud); John Eichler (Melbourne Field Naturalists Club).

ACTIONS:

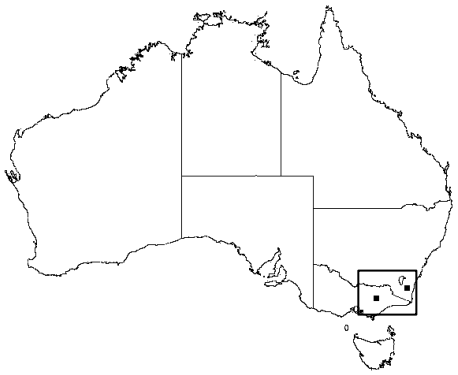
Action	Morrnington Peninsula NP (L)	Wilsons Promontory NP (H)
1. Determine current conservation status		
1.1 Clarify taxonomy	L	L
1.2 Acquire baseline population data	H	M
Responsibility	Centre for Plant Biodiversity Research Biology, Canberra, DSE-BNR	Centre for Plant Biodiversity Research Biology, Canberra, DSE-BNR
2. Investigate population biology		
2.1 Describe life history	H	H
2.2 Evaluate natural pollination levels and/or causes of pollinator limitation	M	M
2.3 Determine the effects of artificial pollination on growth survival and reproduction	N/A	N/A
2.4 Determine spatial distribution of mycorrhizal fungi	N/A	N/A
2.5 Determine optimal conditions for growth of mycorrhizal fungi *in-situ*	N/A	N/A
Responsibility	DSE-BNR	DSE-BNR
3. Determine habitat requirements of key populations		
3.1 Identify key populations	N/A	N/A
3.2 Conduct surveys	H	M
3.3 Identify ecological correlates of populations	H	M
3.4 Prepare habitat descriptions	M	M
Responsibility	DSE-BNR	DSE-BNR
4. Manage risks to populations		
4.1 Identify and implement strategies to control threats	H	H
4.2 Identify disturbance regimes to promote regeneration and recruitment	H	H
4.3 Protect key public land populations and habitat	N/A	N/A
4.4 Protect key private land populations and habitat	N/A	N/A
Responsibility	PV (Rosebud), DSE-BNR	PV (Tidal River), DSE-BNR
5. Promote in-situ recruitment		
5.1 Prepare habitat for seedling recruitment	H	H
5.2 Re-stock populations with seed	H	H
Responsibility	DSE-BNR	DSE-BNR
6. Measure population trends and responses against recovery actions		
6.1 Conduct annual censusing of populations	M	M

6.2 Collate, analyse and report on census data	M	M
6.3 Re-prioritise and adjust recovery actions and/or threat management	H	H
Responsibility	PV (Rosebud), DSE-BNR	PV (Tidal River), DSE-BNR
7. Increase populations ex-situ		
7.1 Hand pollinate plants	M	M
7.2 Establish a threatened orchid seed bank and determine seed viability	M	M
7.3 Establish a mycorrhizal fungi bank	M	M
7.4 Establish and maintain cultivated populations	M	M
7.5 Maintain a database of threatened orchid taxa in cultivation	L	L
Responsibility	DSE-BNR, RBG, NOGN	DSE-BNR, RBG, NOGN
8. Translocate cultivated plants		
8.1 Determine criteria for re-stocking/re-introduction	N/A	N/A
8.2 Evaluate site suitability	N/A	N/A
8.3 Determine long term cost-benefits and feasibility of translocating plants	N/A	N/A
8.4 Prepare and implement translocation plans	N/A	N/A
8.5 Maintain translocated populations	N/A	N/A
Responsibility	DSE-BNR	DSE-BNR
9. Implement an education and communication strategy		
9.1 Prepare technical educational material on *in-situ* recovery techniques	L	L
9.2 Undertake community extension	L	L
9.3 Conduct workshops and symposia on *in-situ* recovery techniques	L	L
9.4 Encourage and support research by Higher Education Institutions and existing research partners	N/A	N/A
Responsibility	DSE-BNR	DSE-BNR
10. Consolidate recovery and extend networks		
10.1 Maintain the Threatened Orchid Recovery Team	L	L
10.2 Establish and facilitate regional Recovery Teams	L	L
10.3 Co-ordinate recovery and exchange knowledge with interstate agencies	N/A	N/A
Responsibility	DSE-BNR, TSN	DSE-BNR, TSN

Diuris ochroma D.L. Jones
Pale Golden Moths

Conservation status:
EPBC Act 1999: V
IUCN (2000): V
NRE (2000): V
NSW TSC Act 1995:Not listed

Distribution:
Disjunct between Victoria and new South Wales
In Victoria **-** Highlands – Southern Fall Bioregion. Confined to a single site in the Wonnangatta Valley.
In New South Wales **–** South eastern Highlands (Wadbilliga, Kybean areas)
Specific details of population localities are held on DSE and PV internal files.



Abundance:
In Victoria - Thousands of plants known from approximately 6 populations. Former abundance is unknown but likely to have been naturally rare with a fluctuating population size.
In NSW – Estimated total population size of fewer than 500 plants known from 3 populations. Former abundance unknown.

Habitat:
In Victoria **-** Montane herbfield in silty clay to peaty soils (Jones 1994). Grows either on flats just above the river flood plain in gras sland/herbfield or on lower slopes in woodland with a herbaceous understorey.
In NSW – Moist areas in sub-alpine woodland above 1000 m asl.
Critical habitat has not been determined but may be require open herbaceous vegetation maintained by regular burning.

Reservation status:
Reserved in the Alpine National Park (Victoria). Possibly reserved in Wadbilliga NP (NSW).

Management:
Parks Victoria (Victoria East Region, Heyfield); NSW NPWS; Cooma – Monaro Shire Council.

Current and potential threats and their risk:

Current threats	**Perceived risk**
Weed invasion	Moderate – St Johns Wort (*Hypericum perforatum*) has been controlled by strategic burning but readily invades in the absence of fire. Unknown in NSW.
Grazing/pest animals	Low – some native animals but orchid populations are large enough to withstand current grazing pressure. Unknown in NSW.
Inappropriate fire regimes	Moderate – fires lit by vandals occur occasionally, but have not damaged populations to date. Unknown in NSW.
Site disturbance	Low – Wonnangatta Valley is accessible to off road vehicles but strategies to control visitors have been implemented with success. Probably high in NSW – grows in close proximity to narrow fire trails and public roads.
Reservation status	Reserved in Victoria. Reservation status uncertain in NSW.
Potential threats	**Perceived risk**
Illegal collection	Low – no evidence of collection in the past

Ecology/biology	Low in Victoria – Populations appear to be responding well to current management. Unknown in NSW.

Recovery objectives: Maintain existing populations; protect and manage habitat.

Recovery actions undertaken in Victoria:

- The site is regularly visited by PV staff.
- All sub-populations are monitored annually.
- Strategic ecological burning has restored *Themeda triandra* grassland in the general area and reduced the risk of weed invasion.

Issues specific to recovery in Victoria:

- The site in Victoria is not readily accessible during winter.
- In Victoria, the existing monitoring method should continue, populations mapped and included on PV GIS layers.
- Winter burns appear to be destroying soil stored *Hypericum perforatum* seed and seedlings, and hence appear to be an effective (requires confirmation).
- *D. ochroma* leaves probably sustain some damage from winter burns but maximum flowering tends to occur in the year following fire. A better understanding of its life history will clarify this.
- Grazing pressure may need to be assessed at the Victorian site.

Issues specific to recovery in NSW

- The status and distribution of NSW populations is poorly known. Recovery priorities, and feasibility of actions require further clarification in consultation with NSW NPWS, and are provisional until relevant information becomes available.
- Until the status of NSW populations are better understood, responsibilities for actions (other than those for which there is a statutory responsibility) rest primarily with DSE. DSE will consult with NPWS before undertaking any actions for this species in NSW. Once the status of NSW populations is adequately known and the species is listed under the NSW TSC Act, responsibility for recovery actions in NSW will be reviewed..

Overall recovery strategy:

Habitat will be managed at known sites to prevent accidental damage by vehicles and suppression of plants by over-abundant introduced herbs or native grasses; the response of the populations and their habitat will be monitored. Recovery will be jointly managed by DSE and PV. Community involvement will be sought.

Consultation:

Parks Victoria (East Victoria Region: Heyfield and Bairnsdale); DSE SE (Heyfield); D. Rouse (Centre for Plant Conservation Biology, Canberra).

ACTIONS:

Action	***Wonnangatta***	***NSW***
1. Determine current conservation status		
1.1 Clarify taxonomy	N/A	N/A
1.2 Acquire baseline population data	M	M
Responsibility	DSE-BNR, PV (Heyfield)	DSE-BNR, NPWS (pending negotiation)
2. Investigate population biology		
2.1 Describe life history	M	M
2.2 Evaluate natural pollination levels and/or causes of pollinator limitation	N/A	L
2.3 Determine the effects of artificial pollination on growth survival and reproduction	N/A	N/A
2.4 Determine spatial distribution of mycorrhizal fungi	N/A	N/A
2.5 Determine optimal conditions for growth of mycorrhizal fungi *in-situ*	N/A	N/A
Responsibility	DSE - BNR PV (Heyfield)	DSE-BNR, NPWS (pending negotiation)
3. Determine habitat requirements of key populations		
3.1 Identify key populations	N/A	H
3.2 Conduct surveys	M	M
3.3 Identify ecological correlates of populations	M	M
3.4 Prepare habitat descriptions	L	L

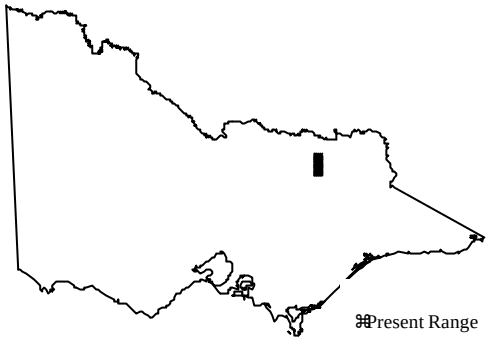
Responsibility	DSE-BNR, PV (Heyfield)	DSE-BNR, NPWS (pending negotiation)
4. Manage risks to populations		
4.1 Identify and implement strategies to control threats	H	M
4.2 Identify disturbance regimes to promote regeneration and recruitment	H	N/A
4.3 Protect key public land populations and habitat	N/A	M
4.4 Protect key private land populations and habitat	N/A	N/A
Responsibility	PV (Heyfield)	NPWS
5. Promote in-situ recruitment		
5.1 Prepare habitat for seedling recruitment	N/A	N/A
5.2 Re-stock populations with seed	N/A	N/A
Responsibility	DSE-BNR	N/A
6. Measure population trends and responses against recovery actions		
6.1 Conduct annual censusing of populations	M	M
6.2 Collate, analyse and report on census data	M	M
6.3 Re-prioritise and adjust recovery actions and/or threat management	H	H
Responsibility	DSE-BNR, PV (Heyfield)	DSE-BNR, NPWS (pending negotiation)
7. Increase populations ex-situ		
7.1 Hand pollinate plants	N/A	N/A
7.2 Establish a threatened orchid seed bank and determine seed viability	N/A	N/A
7.3 Establish a mycorrhizal fungi bank	N/A	N/A
7.4 Establish and maintain cultivated populations	N/A	N/A
7.5 Maintain a database of threatened orchid taxa in cultivation	N/A	N/A
Responsibility	DSE-BNR, PV (Heyfield), RBG	N/A
8. Translocate cultivated plants		
8.1 Determine criteria for re-stocking/re-introduction	N/A	N/A
8.2 Evaluate site suitability	N/A	N/A
8.3 Determine long term cost-benefits and feasibility of translocating plants	N/A	N/A
8.4 Prepare and implement translocation plans	N/A	N/A
8.5 Maintain translocated populations	N/A	N/A
Responsibility	DSE-BNR	N/A
9. Implement an education and communication strategy		
9.1 Prepare technical educational material on *in-situ* recovery techniques	L	N/A
9.2 Undertake community extension	L	L
9.3 Conduct workshops and symposia on *in-situ* recovery techniques	L	N/A
9.4 Encourage and support research by Higher Education Institutions and existing research partners	N/A	N/A
Responsibility	DSE-BNR	NPWS DSE
10. Consolidate recovery and extend networks		
10.1 Maintain the Threatened Orchid Recovery Team	L	N/A
10.2 Establish and facilitate regional Recovery Teams	L	L
10.3 Co-ordinate recovery and exchange knowledge with interstate agencies	L	L
Responsibility	DSE-BNR, TSN	DSE-BNR

Pterostylis sp. aff. *boormani* (Beechworth)
Beechworth Rustyhood

Conservation status:

EPBC Act 1999:	Not listed
IUCN (2000):	CR
NRE (2000):	Not listed

Distribution: *Endemic to Victoria* - Victorian Northern Inland Slopes Bioregion (Beechworth).
Specific details of population localities (including GPS data) are held on DSE internal files.



Abundance: < 50 plants in the wild, in 3 known populations.

Habitat: Occurs in *Eucalyptus goniocalyx* - *E. macrorhyncha* - *Callitris endlicheri* open forest or woodland with a sparse shrubby understorey and grassy ground layer, on well drained dark brown granitic loam. Critical habitat has not been determined.

Reservation status: Reserved at Beechworth Historic Park and Mt Pilot Multipurpose Park.

Management: Parks Victoria (Central Victoria Region, Beechworth).

Current and potential threats and their risk:

Current threats	**Perceived risk**
Ecology/biology	High - limited or absent natural pollination; conditions for maintenance of fungal activity unknown
Weed invasion	Low at present - exotic annual grasses a potential threat in Vic.
Grazing/pest animals	Moderate - rabbit and kangaroo grazing.
Inappropriate fire regimes	Unknown
Site disturbance	High - off road vehicles, close proximity to tracks, seasonal disturbance by orchid enthusiasts.
Potential threats	**Perceived risk**
Reservation status	Reserved, but with inadequate protection - Mt Pilot NP; Beechworth Historic Park.
Illegal collection	Low - no evidence of collection in the past; sites are not well known.

Recovery objectives: Maintain and/or increase existing populations; protect and manage habitat.

Recovery actions undertaken:

- Searches in the Beechworth area 2001.
- Monitoring of 2 populations commenced in 2001.
- Liaison with Parks Victoria and FOC.
- All known sites were visited during preparation of the recovery plan.

Issues specific to recovery:

- *P.* sp. aff. *boormanii* is highly vulnerable to accidental damage especially from orchid enthusiasts and photographers, so that site confidentiality is vital. Involvement from non government organisations and individuals will be limited to a small number of individuals with a proven track record in its conservation (FOC).

- Taxonomic definition of the taxon is currently unclear especially in relation to *P. boormanii* from New South Wales. Populations in need determination and the distribution of true *P. boormanii* clarified.
- The response of *P.* sp. aff. *boormanii* to fire is not known, fire management should be undertaken with caution.
- Although its reservation status will improve if Mt Pilot is upgraded to national park status, multiple use of the park is likely to continue and the threat of accidental damage may be ongoing.
- Searches in 2001 failed to re-locate the Chiltern Road population.

Overall recovery strategy:

Known and potential populations will be surveyed to determine population sizes and habitat requirements and to provide ecological knowledge necessary for management. Broadscale risk management will include track closure and/or realignment and maintenance of site confidentiality. Recruitment has been observed at one population (Fiddes Track). The Mt Pilot site will be managed to promote seedling recruitment, using fine-scale habitat management techniques. Populations will be re-stocked using seed from cultivated plants. Recovery will be jointly managed by DSE and PV. Friends of Chiltern will maintain their involvement.

Consultation:

Parks Victoria (Central Victoria Region, Beechworth); DSE NE (BNR Wodonga); Friends of Chiltern.

ACTIONS:

Action	Mt Pilot (H)	Fiddes Track (H)	Chiltern Road (M)
1. Determine current conservation status			
1.1 Clarify taxonomy	L	L	L
1.2 Acquire baseline population data	H	H	H
Responsibility	Centre for Plant Biodiversity Research, DSE-BNR, FOC, PV	Centre for Plant Biodiversity Research, DSE-BNR, FOC, PV	Centre for Plant Biodiversity Research, DSE-BNR, PV
2. Investigate population biology			
2.1 Describe life history	H	H	H
2.2 Evaluate natural pollination levels and/or causes of pollinator limitation	M	M	M
2.3 Determine the effects of artificial pollination on growth survival and reproduction	N/A	N/A	N/A
2.4 Determine spatial distribution of mycorrhizal fungi	N/A	N/A	N/A
2.5 Determine optimal conditions for growth of mycorrhizal fungi *in-situ*	N/A	N/A	N/A
Responsibility	DSE-BNR, FOC	DSE-BNR, FOC	DSE-BNR, FOC
3. Determine habitat requirements of key populations			
3.1 Identify key populations	N/A	N/A	N/A
3.2 Conduct surveys	H	H	H
3.3 Identify ecological correlates of populations	H	H	H
3.4 Prepare habitat descriptions	L	L	L
Responsibility	DSE-BNR	DSE-BNR	DSE-BNR
4. Manage risks to populations			
4.1 Identify and implement strategies to control threats	H	H	H
4.2 Identify disturbance regimes to promote regeneration and recruitment	H	H	H
4.3 Protect key public land populations and habitat	N/A	N/A	N/A
4.4 Protect key private land populations and habitat	N/A	N/A	N/A
Responsibility	PV, DSE-BNR	PV, DSE-BNR	PV, DSE-BNR
5. Promote in-situ recruitment			
5.1 Prepare habitat for seedling recruitment	M	M	M
5.2 Re-stock populations with seed	M	M	M
Responsibility	DSE-BNR, FOC, PV	DSE-BNR, FOC, PV	DSE-BNR, FOC, PV
6. Measure population trends and responses against recovery actions			

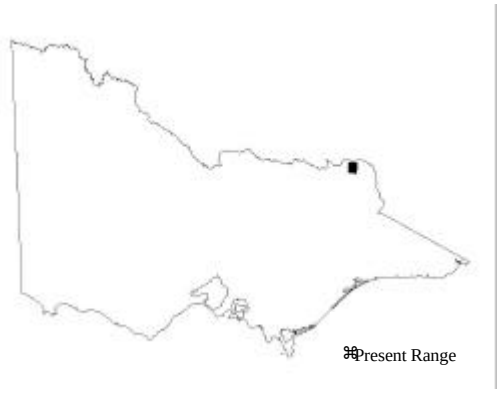
6.1 Conduct annual censusing of populations	M	M	M
6.2 Collate, analyse and report on census data	M	M	M
6.3 Re-prioritise and adjust recovery actions and/or threat management	H	H	H
Responsibility	PV, FOC, DSE-BNR	PV, FOC, DSE-BNR	PV, FOC, DSE-BNR
7. Increase populations ex-situ			
7.1 Hand pollinate plants	H	H	H
7.2 Establish a threatened orchid seed bank and determine seed viability	N/A	M	N/A
7.3 Establish a mycorrhizal fungi bank	N/A	M	N/A
7.4 Establish and maintain cultivated populations	N/A	M	N/A
7.5 Maintain a database of threatened orchid taxa in cultivation	N/A	L	N/A
Responsibility	FOC, DSE-BNR	FOC, RBG, DSE-BNR, NOGN	FOC, DSE-BNR
8. Translocate cultivated plants			
8.1 Determine criteria for re-stocking/re-introduction	N/A	N/A	N/A
8.2 Evaluat e site suitability	N/A	N/A	N/A
8.3 Determine long term cost-benefits and feasibility of translocating plants	N/A	N/A	N/A
8.4 Prepare and implement translocation plans	N/A	N/A	N/A
8.5 Maintain translocated populations	N/A	N/A	N/A
Responsibility	DSE-BNR	DSE-BNR	DSE-BNR
9. Implement an education and communication strategy			
9.1 Prepare technical educational material on *in-situ* recovery techniques	L	L	L
9.2 Undertake community extension	L	L	L
9.3 Conduct workshops and symposia on *in-situ* recovery techniques	L	L	L
9.4 Encourage and support research by Higher Education Institutions and existing research partners	N/A	N/A	N/A
Responsibility	DSE-BNR, TSN	DSE-BNR, TSN	DSE-BNR, TSN
10. Consolidate recovery and extend networks			
10.1 Maintain the Threatened Orchid Recovery Team	L	L	L
10.2 Establish and facilitate regional Recovery Teams	L	L	L
10.3 Co-ordinate recovery and exchange knowledge with interstate agencies	N/A	N/A	N/A
Responsibility	DSE-BNR	DSE-BNR	DSE-BNR

Prasophyllum sp. (Shelley)

Conservation status:
EPBC Act 1999: Not listed
IUCN (2000): CR
NRE (2000): E

Distribution: *Endemic to Victoria* - Victorian Northern Inland Slopes Bioregion (Burrowa-Pine Mountain area west of Corryong).

Specific details of population localities are held on DSE internal files.



Abundance: Fewer than 15 plants known from a single population. Former abundance is unknown, but likely to have been naturally rare with an extremely small population size.

Habitat: Winter-wet open riparian grassland within shrubby *Eucalyptus dives - E. viminalis forest.* Associated understorey species include *Acacia melanoxylon, Daviesia latifolia*, *Derwentia derwentiana*, *Platylobium formosum*, *Pimelea linifolia* subsp. *linifolia*. The ground layer typically includes *Gonocarpus serpyllifolius*, *Glycine microphylla*, *Stellaria pungens*, *Poa* sp., *Centaurea erythraea* and *Hypochaeris radicata*. Critical habitat has not been determined, but may require disturbed or open bare ground for recruitment.

Reservation status: Reserved at Pheasant Creek FFR.

Management: Parks Victoria, (Central Victoria Region: Tallangatta).

Current and potential threats and their risk:

Current threats	**Perceived risk**
Weed invasion	High - introduced grasses are abundant.
Grazing/pest animals	Likely to be high - rabbits are common.
Inappropriate fire regimes	Likely to be low - sites are long unburnt and plants are unlikely to rely on fire for regeneration.
Site disturbance	High - site is close to the road and vulnerable to damage from heavy vehicles and roadside management.
Potential threats	**Perceived risk**
Reservation status	Inadequately reserved.
Illegal collection	Low - no evidence of collection in the past.
Ecology/biology	High - conditions for seed recruitment and maintenance of pollinator and fungal activity unknown; increased extinction risk due to small population size.

Recovery objectives: Clarify taxonomy; maintain and/or increase existing population size; protect and manage habitat.

Recovery actions undertaken:

- The site was visited during recovery plan preparation.

Issues specific to recovery:

- There is doubt as to whether Victorian plants are *P. canaliculatum sens. strict.* or an undescribed species with affinities to *P. canaliculatum*. For the purposes of the recovery plan, the Victorian population is treated as a threatened short range endemic taxon, confined to the Pheasant Creek Flora and Fauna Reserve west of Corryong (D. Rouse, Centre for Plant Conservation Biology, Canberra).

Overall recovery strategy:

Taxonomy will be clarified and searches will be conducted at similar sites in north-east Victoria. Recovery actions will be revised if additional populations are discovered. Habitat will be managed at the known population to prevent accidental damage by vehicles and suppression of plants by over-abundant introduced grasses. Recovery will be jointly managed by DSE, and PV. Community involvement will be sought.

Consultation:

Parks Victoria (Central Victoria Region: Tallangatta); DSE NE (Wodonga); D. Rouse (Centre for Plant Conservation Biology, Canberra).

ACTIONS:

Action	***Pheasant Creek***
1. Determine current conservation status	
1.1 Clarify taxonomy	L
1.2 Acquire baseline population data	M
Responsibility	DSE-BNR, Centre for Plant Conservation Biology
2. Investigate population biology	
2.1 Describe life history	M
2.2 Evaluate natural pollination levels and/or causes of pollinator limitation	M
2.3 Determine the effects of artificial pollination on growth survival and reproduction	N/A
2.4 Determine spatial distribution of mycorrhizal fungi	N/A
2.5 Determine optimal conditions for growth of mycorrhizal fungi *in-situ*	N/A
Responsibility	DSE-BNR
3. Determine habitat requirements of key populations	
3.1 Identify key populations	N/A
3.2 Conduct surveys	H
3.3 Identify ecological correlates of populations	H
3.4 Prepare habitat descriptions	M
Responsibility	DSE-BNR
4. Manage risks to populations	
4.1 Identify and implement strategies to control threats	H
4.2 Identify disturbance regimes to promote regeneration and recruitment	H
4.3 Protect key public land populations and habitat	N/A
4.4 Protect key private land populations and habitat	N/A
Responsibility	PV (Tallangatta), DSE-BNR
5. Promote in-situ recruitment	
5.1 Prepare habitat for seedling recruitment	N/A
5.2 Re-stock populations with seed	N/A
Responsibility	PV (Tallangatta), DSE-BNR
6. Measure population trends and responses against recovery actions	
6.1 Conduct annual censusing of populations	M
6.2 Collate, analyse and report on census data	M
6.3 Re-prioritise and adjust recovery actions and/or threat management	H
Responsibility	DSE-BNR
7. Increase populations ex-situ	
7.1 Hand pollinate plants	N/A
7.2 Establish a threatened orchid seed bank and determine seed viability	M
7.3 Establish a mycorrhizal fungi bank	M

7.4 Establish and maintain cultivated populations	M
7.5 Maintain a database of threatened orchid taxa in cultivation	L
Responsibility	PV (Tallangatta), RBG, DSE-BNR
8. Translocate cultivated plants	
8.1 Determine criteria for re-stocking/re-introduction	Completed
8.2 Evaluate site suitability	N/A
8.3 Determine long term cost-benefits and feasibility of translocating plants	N/A
8.4 Prepare and implement translocation plans	N/A
8.5 Maintain translocated populations	N/A
Responsibility	DSE-BNR
9. Implement an education and communication strategy	
9.1 Prepare technical educational material on *in-situ* recovery techniques	L
9.2 Undertake community extension	L
9.3 Conduct workshops and symposia on *in-situ* recovery techniques	L
9.4 Encourage and support research by Higher Education Institutions and existing research partners	N/A
Responsibility	DSE-BNR
10. Consolidate recovery and extend networks	
10.1 Maintain the Threatened Orchid Recovery Team	L
10.2 Establish and facilitate regional Recovery Teams	L
10.3 Co-ordinate recovery and exchange knowledge with interstate agencies	N/A
Responsibility	DSE-BNR

Pterostylis despectans (Nicholls) M.A. Clem. & D.L. Jones Lowly Greenhood

Conservation status:

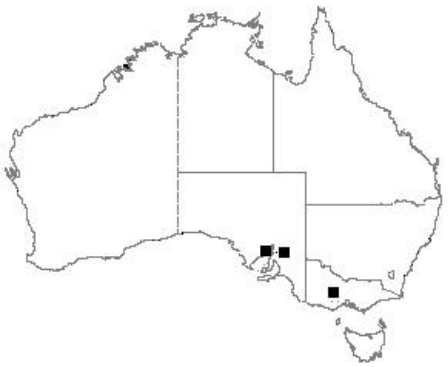
EPBC Act 1999:	E
IUCN (2000):	E (preliminary assessment)
NRE (2000):	E

Distribution: Disjunct between Victoria and South Australia.

In Victoria - Victorian Goldfields Bioregion (Maryborough–Talbot area). Not recorded from anywhere else in Victoria.

In South Australia - Northern Lofty Flora Region (Mt Bryan-Hallett-Yacka area).

Specific details of population localities (including GPS data) are held on DSE and EH internal files.



Abundance: *In Victoria* - <1,500 plants known in the wild, in 5 or 6 populations. Former abundance not known, but assumed to be many thousands across its natural range.

In South Australia - approximately 600 plants known in the wild, from 3 populations. Former abundance not known, but assumed to be many thousands across its natural range.

Habitat: *In Victoria* - grows primarily in open forest and woodlands dominated by *Eucalyptus leucoxylon sens. lat.* and *E. microcarpa*. Critical habitat has not been determined, but often favours open sites or slightly raised mossy areas.

In South Australia **-** *E. odorata* grassy woodland, occasionally with *E. leucoxylon*; on clay loam soil (Bickerton and Robertson 2000). May require open bare ground for seedling establishment.

Reservation status: Reserved at Paddys Ranges State Park.

Management: *In Victoria* - Parks Victoria (West Victoria Region, Maryborough); DSE Forests (Maryborough); Maryborough Rifle Club.

In South Australia - Private property.

Current and potential threats and their risk:

Current threats	**Perceived risk**
Weed invasion	Low in Vic. and SA.
Grazing/pest animals	High in Vic - sites are grazed by macropods and rabbits; plants are excavated by White-winged choughs. Low in SA.
Inappropriate fire regimes	Low at present - all sites have low fuel loads and fire risk is low; there is no evidence to suggest that regeneration is fire dependent, however plants at Maryborough Rifle Range failed to reappear after burning. In SA - low risk although the reduction in bare ground from lack of disturbance at one sitemay be precluding recruitment.
Site disturbance	Extremely high in Vic - all sites are vulnerable to damage from gold prospecting and recreational vehicles.
Timber harvesting	High - 4 sites are in State Forest.
Potential threats	**Perceived risk**
Reservation status	Inadequately reserved in Vic - occurs in one multipurpose park. Not reserved in SA.
Illegal collection	High - evidence of collection in the past.
Ecology/biology	Moderate - plants appear to be dependent on moss beds for recruitment in Vic; seed set is erratic and pollination poorly understood at all sites.

Recovery objectives: *In Victoria* - Maintain and/or increase existing population sizes; protect populations and sites; manage habitat.

In SA - Increase the abundance of *P. despectans*; maintain or increase its area of occupancy; minimise the loss of genetic variability.

Recovery actions undertaken:

- Extensive monitoring has been carried out by ANOS members at all known Victorian sites.
- The impact of pest animals has been determined by ANOS members.
- Searches have been conducted in the region by ANOS and Maryborough Field Naturalists Club (MFN).
- All known populations were visited during recovery plan preparation.
- Establishment of regional recovery team (EH).
- Preparation of Recovery Plan for *P. despectans* in South Australia (EH).
- Owner of 1 site in SA has agreed to fencing and will exclude stock for 5 years.
- 1 site on private property has been under a Heritage Agreement for > 40 years.
- *Calytrix tetragona* has been observed as potentially invasive at 1 site and hand thinning will begin in 2002.
- Track closure implemented at Paddys Ranges State Park.

Issues specific to recovery in Victoria:

- *P. despectans* populations are extremely vulnerable to damage from gold prospecting, vehicles and pest animals (White-winged choughs, kangaroos, rabbits).
- Most populations occur in State Forest, and Special Protection Zones are urgently required that address use of sites by gold prospectors.
- No plants were seen at Maryborough Rifle Range in 2001 (G. Cheers, pers. comm.).
- There appears to be extremely low rates of pollination in the Victorian population, including large populations.

Issues specific to recovery in South Australia:

- There appears to be extremely low rates of pollination in the population in SA.
- For recovery of South Australian populations refer to Bickerton and Robertson (2000).
- There is some disagreement between botanists as to whether Victorian and South Australian populations are the same taxon.

Overall recovery strategy:

In Victoria - Broadscale risk management will include negotiated management strategies, chiefly in relation to mitigation of threats to *P. despectans* habitat. Populations will be mapped and annual counts conducted; plants will be caged to prevent damage by White-winged choughs. One additional population will be established at a secure site. Recovery will be jointly managed by *DSE-BNR*, EH, DSE Forests and PV with involvement from ANOS.

In South Australia - Fence populations and conduct management trials in collaboration with landowners to examine the effect of grazing, soil crust and litter levels, weed invasion and hand pollination on population dynamics.

Consultation:

Vic - DSE Forests (Maryborough); Parks Victoria (Victoria West Region, Maryborough); ANOS Conservation Group (A. and M. Morton); Maryborough Field Naturalists Club (G. Cheers); SA – Department of Environment and Heritage (South Australian Parks and Wildlife).

ACTIONS:

Action	Paddys Ranges SP (Adelaide Lead) (H)	Daisy Hill SF (Bonney Jean Tk and Daisy Hill) (M)	Caralalup Tk (H)	Peacock/Scott Tk (M)	SA (L sites) (H)
1. Determine current conservation status					
1.1 Clarify taxonomy	N/A	N/A	N/A	N/A	N/A
1.2 Acquire baseline population data	M	M	M	M	Completed
Responsibility	DSE-BNR, ANOS	DSE-BNR, ANOS	DSE-BNR, ANOS	DSE-BNR, ANOS	EH
2. Investigate population biology					
2.1 Describe life history	M	M	M	M	M
2.2 Evaluate natural pollination levels and/or causes of pollinator limitation	M	M	M	M	N/A
2.3 Determine the effects of artificial pollination on growth survival and reproduction	M	M	M	M	N/A
2.4 Determine spatial distribution of mycorrhizal fungi	M	M	M	M	N/A
2.5 Determine optimal conditions for growth of mycorrhizal fungi *in-situ*	M	M	M	M	N/A
Responsibility	DSE-BNR, ANOS, RP	DSE-BNR, ANOS, RP	DSE-BNR, ANOS, RP	DSE-BNR, ANOS, RP	EH
3. Determine habitat requirements of key populations					
3.1 Identify key populations	N/A	N/A	N/A	N/A	N/A
3.2 Conduct surveys	M	M	M	M	M
3.3 Identify ecological correlates of populations	M	M	M	M	N/A
3.4 Prepare habitat descriptions	L	L	L	L	N/A
Responsibility	DSE-BNR	DSE-BNR	DSE-BNR	DSE-BNR	EH
4. Manage risks to populations					
4.1 Identify and implement strategies to control threats	H	H	H	H	H
4.2 Identify disturbance regimes to promote regeneration and recruitment	M	M	M	M	N/A
4.3 Protect key public land populations and habitat	H	H	H	H	N/A
4.4 Protect key private land populations and habitat	N/A	N/A	N/A	N/A	H
Responsibility	PV (Maryborough), DSE-BNR	DSE-Forests (Maryborough), DSE-BNR	DSE-Forests (Maryborough), DSE-BNR	DSE-Forests (Maryborough), DSE-BNR	EH
5. Promote in-situ recruitment					
5.1 Prepare habitat for seedling recruitment	H	H	N/A	H	M
5.2 Re-stock populations with seed	H	H	N/A	H	M

Responsibility	DSE-BNR, ANOS	DSE-BNR, ANOS	DSE-BNR	DSE-BNR, ANOS	EH
6. Measure population trends and responses against recovery actions					
6.1 Conduct annual censusing of populations	M	M	M	M	M
6.2 Collate, analyse and report on census data	M	M	M	M	M
6.3 Re-prioritise and adjust recovery actions and/or threat management	H	H	H	H	H
Responsibility	DSE-BNR, ANOS, PV (Maryborough)	DSE-BNR, ANOS, DSE-Forests (Maryborough),	DSE-BNR, ANOS, DSE-Forests (Maryborough),	DSE-BNR, ANOS, DSE-Forests (Maryborough),	EH
7. Increase populations ex-situ					
7.1 Hand pollinate plants	M	M	N/A	M	M
7.2 Establish a threatened orchid seed bank and determine seed viability	N/A	N/A	M	N/A	M
7.3 Establish a mycorrhizal fungi bank	N/A	N/A	M	N/A	M
7.4 Establish and maintain cultivated populations	N/A	N/A	M	N/A	M
7.5 Maintain a database of threatened orchid taxa in cultivation	N/A	N/A	L	N/A	N/A
Responsibility	DSE-BNR	DSE-BNR	DSE-BNR, RBG	DSE-BNR	EH
8. Translocate cultivated plants					
8.1 Determine criteria for re-stocking/re-introduction	M	N/A	N/A	N/A	N/A
8.2 Evaluat e site suitability	H	N/A	N/A	N/A	L
8.3 Determine long term cost -benefits and feasibility of translocating plants	M	N/A	N/A	N/A	N/A
8.4 Prepare and implement translocation plans	H	N/A	N/A	N/A	N/A
8.5 Maintain translocated populations	H	N/A	N/A	N/A	N/A
Responsibility	DSE-BNR, ANOS, PV (Maryborough)	DSE-BNR	DSE-BNR	DSE-BNR	EH
9. Implement an education and communication strategy					
9.1 Prepare technical educational material on *in-situ* recovery techniques	L	L	L	L	N/A
9.2 Undertake community extension	L	L	L	L	N/A
9.3 Conduct workshops and symposia on *in-situ* recovery techniques	L	L	L	L	N/A
9.4 Encourage and support research by Higher Education Institutions and existing research partners	L	L	L	L	N/A
Responsibility	DSE-BNR, RP, TSN	DSE-BNR, RP, T SN	DSE-BNR, RP, TSN	DSE-BNR, RP, TSN	EH
10. Consolidate recovery and extend networks					
10.1 Maintain the Threatened Orchid Recovery Team	L	L	L	L	N/A

10.2 Establish and facilitate regional Recovery Teams	L	L	L	L	L
10.3 Co-ordinate recovery and ex change knowledge with interstate agencies	L	L	L	L	L
Responsibility	DSE-BNR	DSE-BNR	DSE-BNR	DSE-BNR	EH

Prasophyllum fitzgeraldii R.S. Rogers et Maiden
Fitzgerald's Leek-orchid

Conservation status:

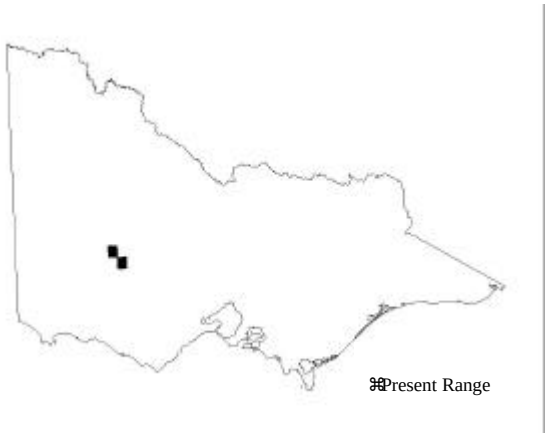
EPBC Act 1999:	Not listed
IUCN (2000):	V (preliminary assessment)
NRE (2000):	E

Distribution:

In Victoria – Goldfields Bioregion. Restricted to east and north-east of the Grampians (Halls Gap, Stawell and Rheola areas), with unconfirmed records from near Portland, Ballarat and Balmoral. Victorian populations of *P. fitzgeraldii* may be an undescribed species.

In South Australia - Currently understood to be reasonably widespread from the Eyre Peninsula to the Victorian border.

Specific details of population localities (including GPS data) are held on DSE and EH internal files.



Abundance:

<250 plants known in the wild in Victoria, from 3 key populations. Thousands of plants in South Australia. At the edge of its range in Victoria, but likely to have been more common prior to landscape scale disturbance from clearing, gold exploration and mining.

Habitat:

Occurs in woodland dominated by *Eucalyptus leucoxylon sens. lat.* with an open heathy understorey or in *E. baxteri* open forest on well drained sandy loam. Critical habitat has not been determined, but may require disturbed soil for recruitment.

Reservation status:

Reserved at Deep Lead Flora and Fauna Reserve, Three Jacks Flora Reserve, Arnold West FFR (Victoria). Padthaway CP, Gyp Gyp CP (South Australia).

Management:

Parks Victoria (Victoria West Region: Horsham, Central Victoria Region: Inglewood); Department of Environment and Heritage (SA).

Current and potential threats and their risk:

Current threats	**Perceived risk**
Weed invasion	Low in Vic. - weeds are scarce at sites.
Grazing/pest animals	High - macropods and rabbits are common at all Victorian sites.
Inappropriate fire regimes	Low at present - sites are long unburnt and fire risk is low.
Site disturbance	Low at Deep Lead - sites are subject to disturbance by illegal gold prospecting.
Reservation status	Inadequately reserved in Victoria, but subject to ECC implementation of ECC recommendations Adequately reserved in SA.
Potential threats	**Perceived risk**
Illegal collection	Low - no evidence of collection in the past.
Ecology/biology	Moderate in Vic - conditions for seed recruitment and maintenance of pollinator and fungal activity unknown; increased extinction risk due to small population sizes; response to fire unknown.

Recovery objectives:

Maintain and/or increase existing population sizes; protect and manage habitat.

Recovery actions undertaken:

- Monitoring at 2 sites by Stawell Field Naturalists.
- Searches conducted annually by Stawell Field Naturalists, and by Centre for Plant Conservation Biology, Canberra in 2001.
- All Victorian sites were visited during recovery plan preparation.

Issues specific to recovery:

- *P. fitzgeraldii* populations are vulnerable to damage from trampling in Victoria and site confidentiality is vital. Involvement from non government organisations and individuals will be limited to a small number of individuals with a proven track record in its conservation (ANOS conservation group, Stawell Field Naturalists Club).
- One population at Deep Lead FFR is close to tracks and vulnerable to damage from recreational vehicles.
- Kangaroo numbers at all reserves require assessment particularly in relation to loss of ground flora and soil disturbance. Further searches may prove more fruitful after protective measures have been implemented.
- There is some doubt as to whether Victorian plants are *P. fitzgeraldii sens. strict.* Or an undescribed species with affinities to *P. fitzgeraldii* and *P. lindleyanum*.
- Key populations for recovery actions all occur in Victoria.

Overall recovery strategy:

Known populations will be monitored. Risk management in the short term will include protection of populations from grazing and gold prospecting, and maintenance of site confidentiality. Populations will be managed to promote seedling recruitment, using fine-scale habitat management techniques and re-stocked using seed from cultivated plants. Recovery will be jointly managed by DSE and PV. Involvement from ANOS conservation group and Stawell Field Naturalists will continue.

Consultation:

Parks Victoria (Victoria Region West: Horsham; Central Victoria Region: Inglewood); DSE-BNR SW; ANOS Conservation Group; Stawell Field Naturalists Club; Department of Environment and Heritage, Adelaide.

ACTIONS:

Action	Deep Lead (M)	Three Jacks (H)	Arnold West (H)
1. Determine current conservation status			
1.1 Clarify taxonomy	L	L	L
1.2 Acquire baseline population data	M	M	M
Responsibility	DSE-BNR	DSE-BNR	DSE-BNR
2. Investigate population biology			
2.1 Describe life history	M	M	M
2.2 Evaluate natural pollination levels and/or causes of pollinator limitation	M	M	M
2.3 Determine the effects of artificial pollination on growth survival and reproduction	M	M	M
2.4 Determine spatial distribution of mycorrhizal fungi	M	M	M
2.5 Determine optimal conditions for growth of mycorrhizal fungi *in-situ*	M	M	M
Responsibility	DSE-BNR, RP	DSE-BNR, RP	DSE-BNR, RP
3. Determine habitat requirements of key populations			
3.1 Identify key populations	N/A	N/A	N/A
3.2 Conduct surveys	M	M	M
3.3 Identify ecological correlates of populations	M	M	M
3.4 Prepare habitat descriptions	L	L	L
Responsibility	DSE-BNR	DSE-BNR SW	DSE-BNR
4. Manage risks to populations			
4.1 Identify and implement strategies to control threats	H	H	H
4.2 Identify disturbance regimes to promote regeneration and recruitment	M	M	M
4.3 Protect key public land populations and habitat	N/A	N/A	N/A
4.4 Protect key private land populations and habitat	N/A	N/A	N/A

Responsibility	PV (Horsham), DSE-BNR	PV (Horsham), DSE-BNR	PV (Horsham), DSE-BNR
5. Promote in-situ recruitment			
5.1 Prepare habitat for seedling recruitment	M	M	M
5.2 Re-stock populations with seed	M	M	M
Responsibility	DSE-BNR, RP	DSE-BNR, RP	DSE-BNR, RP
6. Measure population trends and responses against recovery actions			
6.1 Conduct annual censusing of populations	M	M	M
6.2 Collate, analyse and report on census data	M	M	M
6.3 Re-prioritise and adjust recovery actions and/or threat management	H	H	H
Responsibility	DSE-BNR	DSE-BNR	DSE-BNR
7. Increase populations ex-situ			
7.1 Hand pollinate plants	M	M	M
7.2 Establish a threatened orchid seed bank and determine seed viability	N/A	M	N/A
7.3 Establish a mycorrhizal fungi bank	N/A	M	N/A
7.4 Establish and maintain cultivated populations	N/A	M	N/A
7.5 Maintain a database of threatened orchid taxa in cultivation	N/A	L	N/A
Responsibility	DSE-BNR	DSE-BNR, RBG	DSE-BNR, ANOS
8. Translocate cultivated plants			
8.1 Determine criteria for re-stocking/re-introduction	N/A	N/A	N/A
8.2 Evaluate site suitability	N/A	N/A	N/A
8.3 Determine long term cost-benefits and feasibility of translocating plants	N/A	N/A	N/A
8.4 Prepare and implement translocation plans	N/A	N/A	N/A
8.5 Maintain translocated populations	N/A	N/A	N/A
Responsibility	DSE-BNR	DSE-BNR	DSE-BNR
9. Implement an education and communication strategy			
9.1 Prepare technical educational material on *in-situ* recovery techniques	L	L	L
9.2 Undertake community extension	L	L	L
9.3 Conduct workshops and symposia on *in-situ* recovery techniques	L	L	L
9.4 Encourage and support research by Higher Education Institutions and existing research partners	M	M	M
Responsibility	DSE-BNR, RP	DSE-BNR, RP	DSE-BNR, RP
10. Consolidate recovery and extend networks			
10.1 Maintain the Threatened Orchid Recovery Team	L	L	L
10.2 Establish and facilitate regional Recovery Teams	L	L	L
10.3 Co-ordinate recovery and exchange knowledge with interstate agencies	N/A	N/A	N/A
Responsibility	DSE-BNR	DSE-BNR	DSE-BNR

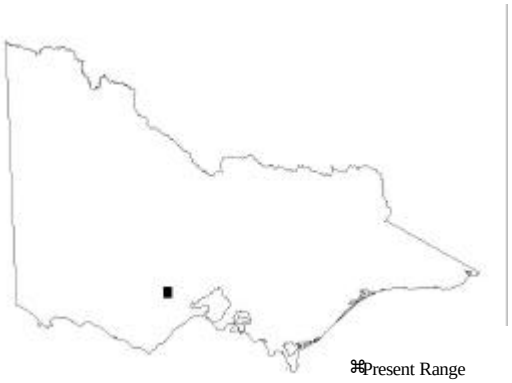
Prasophyllum fosteri D.L. Jones
Fosters Leek-orchid

Conservation status:

EPBC Act 1999:	Not listed
IUCN (2000):	CR
NRE (2000):	Not listed

Distribution: *Endemic to Victoria* – Victorian Volcanic Plain Bioregion (Shelford-Mt Mercer area), where known only from the type locality (Jones 2000). Likely to have been formerly more widespread on the western Basalt Plains in Victoria, prior to agricultural clearing.

Specific details of population locality (including GPS data) are held on DSE internal files.



Abundance: <20 plants known in the wild, in 1 population. Former abundance or number of populations not known, but likely to have been more abundant across its former range.

Habitat: Occurs in open species rich native grassland dominated by *Themeda triandra* with perennial herbs and lilies on poorly drained red-brown soil derived from basalt. Critical habitat has not been determined, but fire or other disturbance such as slashing is highly likely to promote flowering.

Reservation status: Not reserved.

Management: Golden Plains Shire.

Current and po tential threats and their risk:

Current threats	**Perceived risk**
Weed invasion	High - in particular *Phalaris aquatica*, *Romulea rosea*; and *Cuscuta dubia* invasion will occur without regular burning and/or spraying; exacerbated by soil disturbance.
Grazing/pest animals	Low - sites are not grazed at present and rabbits are scarce.
Inappropriate fire regimes	Low at present - sites require fire and are burnt annually.
Site disturbance	Extremely high - all sites are on roadsides or rail reserves adjacent to paddocks on private property and are subject to accidental damage from heavy machinery.
Reservation status	Not reserved.
Potential threats	**Perceived risk**
Illegal collection	Low - no evidence of collection in the past.
Ecology/biology	Moderate - conditions for maintenance of pollinator and fungal activity unknown; High – particularly vulnerable to extinction owing to extremely small population size.

Recovery objectives: Maintain and/or increase existing population sizes; protect sites and manage habitat.

Recovery actions undertaken:

- Fire ecology of Western Basalt Plains Grassland has been researched and is well understood in Western Basalt Plains Grassland (School of Botany, La Trobe University).
- A Public Authority Management Agreement (PAMA) is currently being prepared with the Golden Plains Shire, which will include the site (DSE).

- Recent (2000) ecological burn to recover *P. fosteri*.
- Population has been monitored since 2000.
- The known population was visited during recovery plan preparation.

Issues specific to recovery:

- The *P. fosteri* population is vulnerable to damage from heavy machinery. A Public Authority Management Agreement under the Victorian *Flora and Fauna Guarantee Act 1988* (FFG) is urgently required.
- Fire ecology has been researched and is well understood for Western Basalt Plains Grassland (School of Botany, La Trobe University).
- Habitat where *P. suaveolens* occurs is highly significant and listed as threatened under the Victorian *FFG Act 1988*. It is vital to continue the current fire regime of annual burning in order to preserve species diversity in vegetation where *P. fosteri* occurs, to maintain openness and suppress invasive exotic species such as *Phalaris aquatica*, *Romulea rosea* and *Cuscuta dubia*.
- Although the population is very small, recovery actions will focus on *in-situ* management rather than re-introduction. The site was not burnt for approximately 5 years prior to 2000 and population size is still to be accurately assessed.

Overall recovery strategy:

Broadscale risk management will include a negotiated PAMA with Local Government managers to undertake annual burning, weed management and protection of sites from damage caused by heavy machinery. Searches will be conducted at similar sites in the region in the spring following annual fuel reduction burning. Populations will be mapped and annual censusing carried out to determine their response to current management. Recovery will be jointly managed by DSE and Golden Plains Shire.

Consultation:

DSE SW (Ballarat); Golden Plains Shire; Dr J. Morgan (La Trobe University); John Arnott (Geelong Botanic Gardens).

ACTIONS:

Action	Mt Mercer-Shelford Rd (H)
1. Determine current conservation status	
1.1 Clarify taxonomy	N/A
1.2 Acquire baseline population data	M
Responsibility	DSE-BNR
2. Investigate population biology	
2.1 Describe life history	M
2.2 Evaluate natural pollination levels and/or causes of pollinator limitation	M
2.3 Determine the effects of artificial pollination on growth survival and reproduction	N/A
2.4 Determine spatial distribution of mycorrhizal fungi	N/A
2.5 Determine optimal conditions for growth of mycorrhizal fungi *in-situ*	N/A
Responsibility	DSE-BNR
3. Determine habitat requirements of key populations	
3.1 Identify key populations	N/A
3.2 Conduct surveys	H
3.3 Identify ecological correlates of populations	M
3.4 Prepare habitat descriptions	L
Responsibility	DSE-BNR
4. Manage risks to populations	
4.1 Identify and implement strategies to control threats	H
4.2 Identify disturbance regimes to promote regeneration and recruitment	N/A
4.3 Protect key public land populations and habitat	H
4.4 Protect key private land populations and habitat	N/A
Responsibility	DSE-BNR, Golden Plains Shire
5. Promote in-situ recruitment	
5.1 Prepare habitat for seedling recruitment	N/A
5.2 Re-stock populations with seed	N/A
Responsibility	DSE-BNR

6. Measure population trends and responses against recovery actions	
6.1 Conduct annual censusing of populations	M
6.2 Collate, analyse and report on census data	M
6.3 Re-prioritise and adjust recovery actions and/or threat management	H
Responsibility	DSE-BNR
7. Increase populations ex-situ	
7.1 Hand pollinate plants	M
7.2 Establish a threatened orchid seed bank and determine seed viability	M
7.3 Establish a mycorrhizal fungi bank	M
7.4 Establish and maintain cultivated populations	M
7.5 Maintain a database of threatened orchid taxa in cultivation	L
Responsibility	DSE-BNR, GBG, NOGN
8. Translocate cultivated plants	
8.1 Determine criteria for re-stocking/re-introduction	N/A
8.2 Evaluate site suitability	N/A
8.3 Determine long term cost-benefits and feasibility of translocating plants	N/A
8.4 Prepare and implement translocation plans	N/A
8.5 Maintain translocated populations	N/A
Responsibility	DSE-BNR
9. Implement an education and communication strategy	
9.1 Prepare technical educational material on *in-situ* recovery techniques	L
9.2 Undertake community extension	L
9.3 Conduct workshops and symposia on *in-situ* recovery techniques	L
9.4 Encourage and support research by Higher Education Institutions and existing research partners	N/A
Responsibility	DSE-BNR
10. Consolidate recovery and extend networks	
10.1 Maintain the Threatened Orchid Recovery Team	L
10.2 Establish and facilitate regional Recovery Teams	L
10.3 Co-ordinate recovery and exchange knowledge with interstate agencies	N/A
Responsibility	DSE-BNR

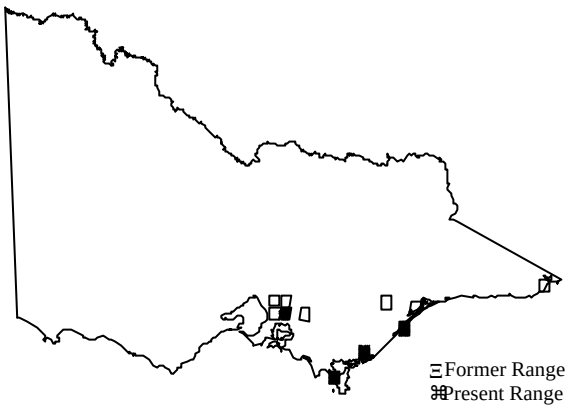
Prasophyllum sp. aff. *frenchii* 2
Maroon Leek-orchid

Conservation status:

EPBC Act 1999:	E
IUCN (2000):	E (preliminary assessment)
NRE (2000):	Not listed

Distribution: *Endemic to Victoria* – widespread across south-eastern Victoria between Clyde and Mallacoota. Existing records and current understanding of its taxonomy indicate that *P. frenchii* was formerly more widespread south-east of Melbourne in the Officer and Bairnsdale areas to Mallacoota in far East Gippsland.

Many records attributed to this species are incorrect determinations of similar taxa. Specific details of population localities (including GPS data) are held on DSE internal files.



Abundance: Approximately 250-750 plants known in the wild, in 5 main populations. Likely to have formerly numbered many thousands of plants in grasslands, grassy woodlands and heathlands in Gippsland and south-eastern Victoria, but now likely to be extinct east of Wilsons Promontory.

Habitat: Occurs in grassland or grassy woodland. Some sites were managed by frequent fire up until the late 1970s but are now generally degraded. Soils are sandy, or black clay loams, generally damp, but well drained, although some sites are seasonally waterlogged. Critical habitat has not been determined, but likely to require open conditions to promote flowering and recruitment, and adequate soil moisture.

Reservation status: Reserved at Wilsons Promontory National Park (Vic).

Management: Parks Victoria (Victoria East Region: Tidal River, Sale); DSE-BNR PP: Box Hill, DSE-BNR SE: Yarram); Freight Australia; Parkside Airfield Committee.

Current and po tential threats and their risk:

Current threats	**Perceived risk**
Weed invasion	High - Clyde (Watsonia, Blackberry).
Grazing/pest animals	Extremely high at WPNP – kangaroos, emus, wombats, hog deer and rabbits are abundant; Moderate at Golden Beach – kangaroos and rabbits; Low at other sites.
Inappropriate fire regimes	High at WPNP - site is long unburnt and habitat is severely degraded. Low at Golden Beach, Parkside Aerodrome - sites are regularly burnt. Moderate at Clyde - burning is irregular and site currently requires fire.
Site disturbance	Generally low at present.
Reservation status	Inadequately reserved.
Potential threats	**Perceived risk**
Herbicide spraying and site disturbance	High at Clyde -herbicides have been used in the past along the rail line; damage from heavy machinery and vehicles during works is possible. Low at other sites.
Illegal collection	Low - no evidence of collection in the past.

Woody shrub invasion	Low at Golden Beach -invasion of coastal shrubs in the absence of fire or grazing.

Recovery objectives: Maintain and/or increase existing population sizes; protect and manage habitat.

Recovery actions undertaken:

- Searches along the Melbourne to Bairnsdale rail reserve (Paget 1998; Bairnsdale and District Field Naturalists Club).
- Monitoring at Clyde by Holistic Ecology/DSE in 1998.
- Ecological burn at Clyde in 1999.
- Negotiations initiated in relation to site management with Parkside Airfield Committee.
- Ecological burning conducted regularly at Golden Beach.
- All sites were visited during recovery plan preparation.

Issues specific to recovery:

- *P. frenchii* has not been seen at Wilsons Promontory National Park in recent years. The site is severely degraded and urgent habitat management is required to control overgrazing and restore an appropriate fire regime.
- A negotiated management agreement will be put in place between DSE and Parkside Aerodrome Committee to ensure that timing of fuel reduction measures is in accordance with flowering and fruit development, and to obtain baseline population information.
- A Public Authority Management Agreement will be negotiated by DSE to ensure appropriate management of the population at Clyde and Packenham and to prevent accidental damage to plants.

Overall recovery strategy:

Risk management will include negotiated agreements with management authorities and landowners to protect populations from grazing and accidental damage where required, and implement appropriate fire regimes at all sites to promote flowering and recruitment, particularly in parks and reserves. Baseline information is urgently required. Seed will be collected and tested for viability and stored for use if required. Recovery will be jointly managed by DSE, PV, EH, and Parkside Airfield Committee. Involvement from volunteers will be encouraged.

Consultation:

Parks Victoria (Victoria East Region: Tidal River, Sale, Bairnsdale); DSE-BNR PP; DSE-BNR SE (Box Hill, Yarram); Parkside Airfield Committee.

ACTIONS:

Action	Clyde/Packenham (H)	Wilsons Promontory NP (L)	Golden Beach & Lake Reeve (M)	Parkside Aerodrome (H)
1. Determine current conservation status				
1.1 Clarify taxonomy	L	L	L	L
1.2 Acquire baseline population data	M	M	M	M
Responsibility	DSE-BNR, CPCB	DSE-BNR, CPCB	DSE-BNR, CPCB	DSE-BNR, CPCB
2. Investigate population biology				
2.1 Describe life history	M	M	M	M
2.2 Evaluate natural pollination levels and/or causes of pollinator limitation	M	M	M	M
2.3 Determine the effects of artificial pollination on growth survival and reproduction	N/A	N/A	N/A	N/A
2.4 Determine spatial distribution of mycorrhizal fungi	N/A	N/A	N/A	N/A
2.5 Determine optimal conditions for growth of mycorrhizal fungi *in-situ*	N/A	N/A	N/A	N/A
Responsibility	DSE-BNR	DSE-BNR	DSE-BNR	DSE-BNR
3. Determine habitat requirements of key populations				
3.1 Identify key populations	N/A	N/A	N/A	N/A
3.2 Conduct surveys	M	H	M	H
3.3 Identify ecological correlates of populations	M	M	M	M
3.4 Prepare habitat descriptions	L	L	L	L
Responsibility	DSE-BNR	DSE-BNR	DSE-BNR	DSE-BNR
4. Manage risks to populations				
4.1 Identify and implement strategies to control threats	H	H	H	H
4.2 Identify disturbance regimes to promote regeneration and recruitment	Completed	Completed	Completed	Completed
4.3 Protect key public land populations and habitat	H	H	H	N/A
4.4 Protect key private land populations and habitat	N/A	N/A	N/A	H
Responsibility	DSE-BNR PP	PV (Tidal River)	DSE-BNR SE, PV (Sale)	Parkside Airfield Committee, Shire of Wellington
5. Promote in-situ recruitment				
5.1 Prepare habitat for seedling recruitment	N/A	N/A	N/A	N/A
5.2 Re-stock populations with seed	N/A	N/A	N/A	N/A
Responsibility	DSE-BNR	DSE-BNR	DSE-BNR	DSE-BNR
6. Measure population trends and responses against recovery actions				

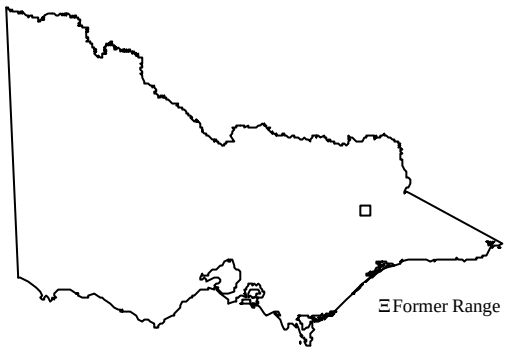
6.1 Conduct annual censusing of populations	M	M	M	M
6.2 Collate, analyse and report on census data	M	H	M	M
6.3 Re-prioritise and adjust recovery actions and/or threat management	M	H	M	M
Responsibility	DSE-BNR	PV (Tidal River), DSE-BNR	DSE-BNR, PV (Sale)	DSE-BNR
7. Increase populations ex-situ				
7.1 Hand pollinate plants	N/A	N/A	N/A	N/A
7.2 Establish a threatened orchid seed bank and determine seed viability	M	N/A	M	N/A
7.3 Establish a mycorrhizal fungi bank	M	N/A	M	N/A
7.4 Establish and maintain cultivated populations	M	N/A	M	N/A
7.5 Maintain a database of threatened orchid taxa in cultivation	L	N/A	L	N/A
Responsibility	DSE-BNR, RBG	DSE-BNR	DSE-BNR, RBG	DSE-BNR
8. Translocate cultivated plants				
8.1 Determine criteria for re-stocking/re-introduction	Completed	Completed	Completed	Completed
8.2 Evaluate site suitability	N/A	N/A	N/A	N/A
8.3 Determine long term cost-benefits and feasibility of translocating plants	N/A	N/A	N/A	N/A
8.4 Prepare and implement translocation plans	N/A	N/A	N/A	N/A
8.5 Maintain translocated populations	N/A	N/A	N/A	N/A
Responsibility	DSE-BNR	DSE-BNR	DSE-BNR	DSE-BNR
9. Implement an education and communication strategy				
9.1 Prepare technical educational material on *in-situ* recovery techniques	L	L	L	L
9.2 Undertake community extension	L	L	L	H
9.3 Conduct workshops and symposia on *in-situ* recovery techniques	L	L	L	L
9.4 Encourage and support research by Higher Education Institutions and existing research partners	N/A	N/A	N/A	N/A
Responsibility	DSE-BNR,	DSE-BNR	DSE-BNR -	DSE-BNR
10. Consolidate recovery and extend networks				
10.1 Maintain the Threatened Orchid Recovery Team	L	L	L	L
10.2 Establish and facilitate regional Recovery Teams	L	L	L	L
10.3 Co-ordinate recovery and exchange knowledge with interstate agencies	N/A	N/A	N/A	N/A
Responsibility	DSE-BNR, TSN	DSE-BNR, TSN	DSE-BNR, TSN	DSE-BNR, TSN

Prasophyllum morganii Nicholls
Mignonette Leek-orchid, Cobungra Leek-orchid, Dense Leek-orchid

Conservation status:

EPBC Act 1999:	V
IUCN (2000);	X
NRE (2000):	E

Distribution: *Endemic to Victoria* - Victorian Highlands - Northern Fall Bioregion, but known only from the type locality near Cobungra. No precise records exist to indicate its former distribution, but likely to have been a short-range endemic in the Omeo area.



Abundance: Probably extinct. Only known from a single population consisting of fewer than 15 plants at the type locality. No plants have been seen in recent years. No records exist to indicate its former distribution, but *P. morganii* is likely to have been naturally rare with an extremely small population size.

Habitat: *Eucalyptus pauciflora* subsp. *pauciflora* open forest at about 1,000 m above sea level (Backhouse and Jeanes 1995). Sunny side of a small ridge running down to Spring Creek. Soil is inclined to be clayey, with a little quartz and sandstone among it (Nicholls 1930). Critical habitat has not been determined.

Reservation status: Not reserved.

Management: Private property.

Current and potential threats:

Current threats	**Perceived risk**
Weed invasion	Likely to be high - habitat has been improved for pasture.
Grazing/pest animals	Extremely high - site is grazed by cattle.
Inappropriate fire regimes	Probably low at present.
Site disturbance	Extremely high - habitat altered by ring-barking trees.
Reservation status	Unreserved
Potential threats	**Perceived risk**
Illegal collection	Low - no evidence of collection in the past.
Ecology/biology	Moderate - conditions for maintenance of pollinator and fungal activity unknown; small population size.

Recovery objectives: Revise current conservation status to Extinct.

Recovery actions undertaken:

- Searches have been conducted in the past by a number of individuals.

Issues specific to recovery:

- There is strong evidence to indicate that *P. morganii* is extinct. Searches by J. Jeanes and a number of orchid society members, field naturalists and other enthusiasts over the last 10 years have failed to re-locate the known population or any other populations in the area.

Overall recovery strategy:

Revise the current conservation status to Extinct.

Consultation:

D. Rouse (Centre for Plant Biodiversity Research, Canberra).

ACTIONS:

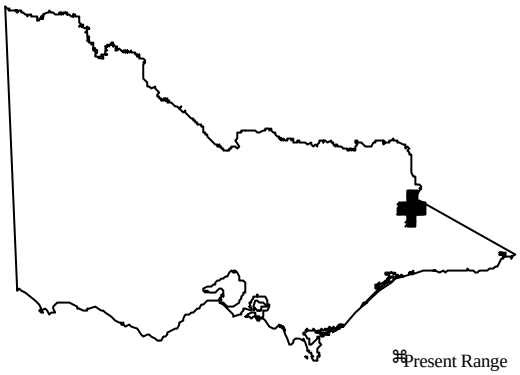
Action	***Cobungra***
1. Determine current conservation status	
1.1 Clarify taxonomy	Completed
1.2 Acquire baseline population data	Completed
Responsibility	DSE-BNR

Prasophyllum niphopedium D.L. Jones
Summer Leek-orchid

Conservation status: EPBC Act 1999: Not listed
IUCN (2000): E (preliminary assessment)
NRE (2000): Not listed

Distribution: *Endemic to Victoria* - Victorian Alps Bioregion (Mt Cobberas-Benambra area). Not recorded elsewhere, but may be more widespread throughout the Snowy Mountains Range in NSW and Victoria.

Specific details of population localities are held on DSE internal files.



Abundance: 200-500 plants known from 5 populations, however population sizes fluctuate from year to year (D. Rouse pers. comm.). Former abundance is unknown, but likely to have been naturally rare.

Habitat: On snow plains in grassy alpine heath dominated by *Hakea microcarpa*, *Epacris gunnii*, *E. brevifolia*, *Baeckea gunniana*, *Poa clivicola* and *P. sieberiana* var. *sieberiana*, usually near watercourses. Soils are dark brown organic loams, seasonally poorly drained. Critical habitat has not been determined, but populations occur above 1400m above sea level and plants are likely to require open habitat protected from feral horses.

Reservation status: Reserved in the Alpine National Park.

Management: Parks Victoria, (East Victoria Region, Omeo)

Current and potential threats and their risk:

Current threats	**Perceived risk**
Soil disturbance	High - pugging of soil by cattle, feral pigs and feral horses.
Grazing	High – feral horses and cattle are common in the area.
Inappropriate fire regimes	Likely to be low – sites are long unburnt and plants are unlikely to rely on fire for regeneration.
Site disturbance	Moderate– some sites are vulnerable to damage from off road vehicles.
Illegal collection	Low – no evidence of collection in the past.
Potential threats	**Perceived risk**
Weed invasion	Low – exotic grasses and opportunistic sedges may establish at the site with disturbance by cattle, feral pigs and feral horses.
Ecology/biology	Low - conditions for seed recruitment and maintenance of pollinator and fungal activity unknown; disturbance requirements are unknown.

Recovery objectives: Maintain and/or increase existing population size; protect and manage habitat.

Recovery actions undertaken:

- Parks Victoria is currently preparing a commercial contract for feral horse management.
- All sites were visited during preparation of the recovery plan.

Issues specific to recovery:

- Control of feral animals at the known sites is urgently required and methods to maintain open, undisturbed habitat should be investigated.

Overall recovery strategy:

Site condition and the extent and severity of disturbance from feral animals will be evaluated. Appropriate habitat management strategies will be implemented to prevent damage by vehicles, cattle, feral horses and feral pigs. Recovery will be jointly managed by DSE and PV. Community involvement will be sought if necessary.

Consultation:

Parks Victoria (Victoria East Region, Omeo); D. Rouse (Centre for Plant Conservation Biology, Canberra).

ACTIONS:

Action	Playgrounds (H)	Rocky Plain (M)	Cowombat Tk (M)	Forlorn Hope Plain (M)
1. Determine current conservation status				
1.1 Clarify taxonomy	N/A	N/A	N/A	N/A
1.2 Acquire baseline population data	M	M	M	M
Responsibility	Centre for Plant Conservation Biology, Canberra, DSE-BNR	Centre for Plant Conservation Biology, Canberra, DSE-BNR	Centre for Plant Conservation Biology, Canberra, DSE-BNR	Centre for Plant Conservation Biology, Canberra, DSE-BNR
2. Investigate population biology				
2.1 Describe life history	M	M	M	M
2.2 Evaluate natural pollination levels and/or causes of pollinator limitation	M	M	M	M
2.3 Determine the effects of artificial pollination on growth survival and reproduction	N/A	N/A	N/A	N/A
2.4 Determine spatial distribution of mycorrhizal fungi	N/A	N/A	N/A	N/A
2.5 Determine optimal conditions for growth of mycorrhizal fungi *in-situ*	N/A	N/A	N/A	N/A
Responsibility	DSE-BNR, PV (Omeo)	DSE-BNR, PV (Omeo)	DSE-BNR, PV (Omeo)	DSE-BNR, PV (Omeo)
3. Determine habitat requirements of key populations				
3.1 Identify key populations	N/A	N/A	N/A	N/A
3.2 Conduct surveys	M	M	M	M
3.3 Identify ecological correlates of populations	M	M	M	M
3.4 Prepare habitat descriptions	L	L	L	L
Responsibility	DSE-BNR, PV (Omeo)	DSE-BNR, PV (Omeo)	DSE-BNR, PV (Omeo)	DSE-BNR, PV (Omeo)
4. Manage risks to populations				
4.1 Identify and implement strategies to control threats	H	H	H	H
4.2 Identify disturbance regimes to promote regeneration and recruitment	M	M	M	M
4.3 Protect key public land populations and habitat	N/A	N/A	N/A	N/A
4.4 Protect key private land populations and habitat	N/A	N/A	N/A	N/A
Responsibility	DSE-BNR, PV (Omeo)	DSE-BNR, PV (Omeo)	DSE-BNR, PV (Omeo)	DSE-BNR, PV (Omeo)
5. Promote in-situ recruitment				
5.1 Prepare habitat for seedling recruitment	N/A	N/A	N/A	N/A
5.2 Re-stock populations with seed	N/A	N/A	N/A	N/A

Responsibility	DSE-BNR	DSE-BNR	DSE-BNR	DSE-BNR
6. Measure population trends and responses against recovery actions				
6.1 Conduct annual censusing of populations	M	M	M	M
6.2 Collate, analyse and report on census data	M	M	M	M
6.3 Re-prioritise and adjust recovery actions and/or threat management	H	H	H	H
Responsibility	DSE-BNR, PV (Omeo)	DSE-BNR, PV (Omeo)	DSE-BNR, PV (Omeo)	DSE-BNR, PV (Omeo)
7. Increase populations ex-situ				
7.1 Hand pollinate plants	N/A	N/A	N/A	N/A
7.2 Establish a threatened orchid seed bank and determine seed viability	N/A	N/A	N/A	N/A
7.3 Establish a mycorrhizal fungi bank	N/A	N/A	N/A	N/A
7.4 Establish and maintain cultivated populations	N/A	N/A	N/A	N/A
7.5 Maintain a database of threatened orchid taxa in cultivation	N/A	N/A	N/A	N/A
Responsibility	DSE-BNR	DSE-BNR	DSE-BNR	DSE-BNR
8. Translocate cultivated plants				
8.1 Determine criteria for re-stocking/re-introduction	N/A	N/A	N/A	N/A
8.2 Evaluate site suitability	N/A	N/A	N/A	N/A
8.3 Determine long term cost-benefits and feasibility of translocating plants	N/A	N/A	N/A	N/A
8.4 Prepare and implement translocation plans	N/A	N/A	N/A	N/A
8.5 Maintain translocated populations	N/A	N/A	N/A	N/A
Responsibility	DSE-BNR	DSE-BNR	DSE-BNR	DSE-BNR
9. Implement an education and communication strategy				
9.1 Prepare technical educational material on *in-situ* recovery techniques	L	L	L	L
9.2 Undertake community extension	L	L	L	L
9.3 Conduct workshops and symposia on *in-situ* recovery techniques	L	L	L	L
9.4 Encourage and support research by Higher Education Institutions and existing research partners	N/A	N/A	N/A	N/A
Responsibility	DSE-BNR	DSE-BNR	DSE-BNR	DSE-BNR
10. Consolidate recovery and extend networks				
10.1 Maintain the Threatened Orchid Recovery Team	L	L	L	L
10.2 Establish and facilitate regional Recovery Teams	L	L	L	L
10.3 Co-ordinate recovery and exchange knowledge with interstate agencies	N/A	N/A	N/A	N/A

Responsibility	DSE-BNR	DSE-BNR	DSE-BNR	DSE-BNR

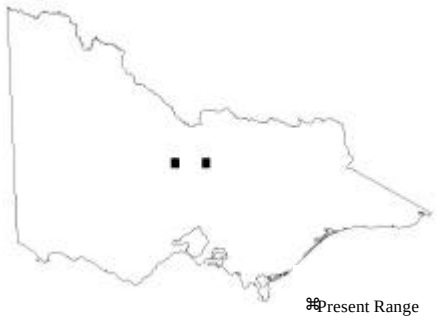
Prasophyllum sp. (Nagambie)
Swamp Leek-orchid

Conservation status:

EPBC Act 1999:	Not listed
IUCN (2000):	CR
NRE (2000):	Not listed

Distribution: *Endemic to Victoria* - Victorian Riverina Bioregion (Nagambie and possibly Murchison areas), and Victorian Goldfields (Bendigo area). *Prasophyllum* sp. (Nagambie) is currently known only from three populations, however, populations were likely to have been more widespread prior to habitat loss.

Specific details of population localities (including GPS data) are held on DSE internal files.



Abundance: Probably between 1,500-3,000 plants distributed within a number of sub-populations at Reedy Lake near Nagambie; fewer than 30 plants in one population near Bendigo; unconfirmed population thought to occur at Murchison. Former abundance is unknown, but likely to have been more widespread throughout River Red Gum - Yellow Box forest and Grey Box grassy woodlands throughout central Victoria, but confined to poorly drained clay soils.

Habitat: *Eucalyptus camaldulensis* - *E. microcarpa* grassy woodland on seasonally inundated brown clay gilgai soils. Critical habitat has not been determined, but appears be confined to raised areas with ample soil moisture during its emergent period.

Reservation status: Reserved at Reedy Lake Wildlife Reserve.

Management: Parks Victoria Central Region (Shepparton).

Current and potential threats and their risk:

Current threats	**Perceived risk**
Weed invasion	Low - Reedy Lake Moderate - private property at Bendigo. Unknown - Murchison.
Grazing	Moderate - Reedy Lake - kangaroos are common. Unknown - Bendigo and Murchison.
Inappropriate fire regimes	Likely to be low - sites are long unburnt, fire risk is low.
Site disturbance	High at all sites - Reedy Lake plants are vulnerable to damage from off road vehicles; Bendigo plants are vulnerable to habitat clearing and damage from farm machinery; Murchison plants may be vulnerable to golf course maintenance activities.
Reservation status	Inadequately reserved
Potential threats	**Perceived risk**
Illegal collection	Low - no evidence of collection in the past.

Recovery objectives: Clarify taxonomy; maintain existing population size; protect and manage habitat.

Recovery actions undertaken:

- 2 sites were visited during recovery plan preparation.

Issues specific to recovery:

- Populations at Bendigo and Murchison are in need of verification.

Overall recovery strategy:

Taxonomy will be clarified and habitat will be managed at the known population at Reedy Lake to prevent accidental damage by vehicles and to protect plants from kangaroo grazing. Searches will be undertaken at Bendigo and Murchison and appropriate protective measures implemented if required in consultation with landowners. Recovery will be jointly managed by DSE-BNR, PV and private landowners. Community involvement will be sought.

Consultation:

Parks Victoria (Central Victoria Region: Wodonga, Shepparton); DSE NW (Tatura).

ACTIONS:

Action	Reedy Lake (H)	Bendigo (M)	Murchison (M)
1. Determine current conservation status			
1.1 Clarify taxonomy	L	L	L
1.2 Acquire baseline population data	M	H	H
Responsibility	Centre for Plant Conservation Biology, DSE-BNR	Centre for Plant Conservation Biology, DSE-BNR	Centre for Plant Conservation Biology, DSE-BNR
2. Investigate population biology			
2.1 Describe life history	M	M	M
2.2 Evaluate natural pollination levels and/or causes of pollinator limitation	M	M	M
2.3 Determine the effects of artificial pollination on growth survival and reproduction	N/A	N/A	N/A
2.4 Determine spatial distribution of mycorrhizal fungi	N/A	N/A	N/A
2.5 Determine optimal conditions for growth of mycorrhizal fungi *in-situ*	N/A	N/A	N/A
Responsibility	DSE-BNR	DSE-BNR	DSE-BNR
3. Determine habitat requirements of key populations			
3.1 Identify key populations	N/A	H	H
3.2 Conduct surveys	L	H	H
3.3 Identify ecological correlates of populations	L	H	H
3.4 Prepare habitat descriptions	L	M	M
Responsibility	DSE-BNR	DSE-BNR	DSE-BNR
4. Manage risks to populations			
4.1 Identify and implement strategies to control threats	H	H	H
4.2 Identify disturbance regimes to promote regeneration and recruitment	M	M	M
4.3 Protect key public land populations and habitat	N/A	N/A	N/A
4.4 Protect key private land populations and habitat	N/A	H	H
Responsibility	PV (Shepparton)	DSE-BNR	DSE-BNR
5. Promote in-situ recruitment			
5.1 Prepare habitat for seedling recruitment	N/A	N/A	N/A
5.2 Re-stock populations with seed	N/A	N/A	N/A
Responsibility	DSE-BNR	DSE-BNR	DSE-BNR
6. Measure population trends and responses against recovery actions			
6.1 Conduct annual censusing of populations	M	M	M
6.2 Collate, analyse and report on census data	M	M	M
6.3 Re-prioritise and adjust recovery actions and/or threat management	H	H	H

Responsibility	PV (Shepparton), DSE-BNR	DSE-BNR	DSE-BNR
7. Increase populations ex-situ			
7.1 Hand pollinate plants	N/A	N/A	N/A
7.2 Establish a threatened orchid seed bank and determine seed viability	M	N/A	N/A
7.3 Establish a mycorrhizal fungi bank	M	N/A	N/A
7.4 Establish and maintain cultivated populations	M	N/A	N/A
7.5 Maintain a database of threatened orchid taxa in cultivation	L	N/A	N/A
Responsibility	DSE-BNR, RBG	DSE-BNR	DSE-BNR
8. Translocate cultivated plants			
8.1 Determine criteria for re-stocking/re-introduction	N/A	N/A	N/A
8.2 Evaluate site suitability	N/A	N/A	N/A
8.3 Determine long term cost-benefits and feasibility of translocating plants	N/A	N/A	N/A
8.4 Prepare and implement translocation plans	N/A	N/A	N/A
8.5 Maintain translocated populations	N/A	N/A	N/A
Responsibility	DSE-BNR	DSE-BNR	DSE-BNR
9. Implement an education and communication strategy			
9.1 Prepare technical educational material on *in-situ* recovery techniques	L	L	L
9.2 Undertake community extension	L	L	L
9.3 Conduct workshops and symposia on *in-situ* recovery techniques	L	L	L
9.4 Encourage and support research by Higher Education Institutions and existing research partners	N/A	N/A	N/A
Responsibility	DSE-BNR	DSE-BNR	DSE-BNR
10. Consolidate recovery and extend networks			
10.1 Maintain the Threatened Orchid Recovery Team	L	L	L
10.2 Establish and facilitate regional Recovery Teams	L	L	L
10.3 Co-ordinate recovery and exchange knowledge with interstate agencies	N/A	N/A	N/A
Responsibility	DSE-BNR	DSE-BNR	DSE-BNR

Prasophyllum suaveolens D.L. Jones & R.J. Bates (Fragrant Leek-orchid)
Prasophyllum sp. aff. *suaveolens* (Western Basalt Plains)

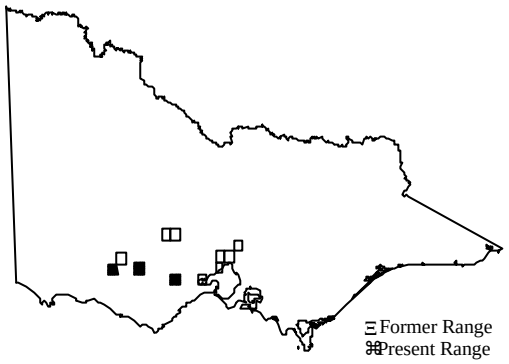
Conservation status:

EPBC Act 1999:	E
IUCN (2000):	CR
NRE (2000):	E

Distribution: *Endemic to Victoria* - Victorian Volcanic Plain Bioregion (Derrinallum, Wingeel, Ballarat, Streatham areas).

Formerly recorded, but now extinct west and southwest of Melbourne at Werribee, St Albans, Albion, Laverton, Lara, Tottenham and Merri Creek, and from near Creswick.

Specific details of population localities (including GPS data) are held on DSE internal files.



Abundance: <300 plants known in the wild, in 5 populations. Former abundance not known, but assumed to be many thousands across its natural range.

Habitat: Occurs in open species rich native grassland dominated by *Themeda triandra* with perennial herbs and lilies on poorly drained red-brown soil derived from basalt. Critical habitat has not been determined, but fire or other disturbance such as slashing is highly likely to promote flowering.

Reservation status: Not reserved.

Management: Shire of Moyne, Golden Plains Shire, Shire of Corangamite, Rural City of Ararat, Australian Rail Track Corporation, DSE-BNR SW.

Current and potential threats and their risk:

Current threats	**Perceived risk**
Weed invasion	High - in particular *Phalaris aquatica*, *Romulea rosea*; and *Cuscuta dubia* invasion will occur without regular burning and/or spraying; will be exacerbated by soil disturbance.
Grazing	Low - sites are not grazed at present and rabbits are scarce.
Inappropriate fire regimes	Low at present - sites require fire and are burnt annually.
Site disturbance	Extremely high - all sites are on roadsides or rail reserves adjacent to paddocks on private property and are subject to accidental damage from heavy machinery.
Reservation status	Not reserved.
Potential threats	**Perceived risk**
Illegal collection	Low - no evidence of collection in the past.
Ecology/biology	Moderate - conditions for maintenance of pollinator and fungal activity unknown; small population sizes.

Recovery objectives: Maintain and/or increase existing population sizes; protect sites and manage habitat.

Recovery actions undertaken:

- Grassland vegetation communities at Derrinallum and Vite Vite sites have been monitored since the late 1980s (School of Botany, La Trobe University).
- Fire ecology has been researched and is well understood for Western Basalt Plains Grassland (School of Botany, La Trobe University)
- Public Authority Management Agreements (PAMAs) are currently being negotiated with the Shire of Moyne and Golden Plains Shire which will include the sites near Woorndoo (DSE) and Wingeel.
- Ecological burns planned for Yalla Y Poora and volunteers will carry out weed control.
- Three sites are burnt annually (Derrinallum, Woorndoo, Wingeel).
- Ecological burning and weed control to recover *P. suaveolens* and *P.* sp. aff. *suaveolens* (see below) habitat have been carried out at Dowling Forest Cemetery.
- Plants have been monitored at Dowling Forest Cemetery and life histories determined.
- Management strategies have been negotiated at Dowling Forest Cemetery.
- All known populations were visited during recovery plan preparation.

Issues specific to recovery:

- Taxonomic clarification is urgently required for the *P. suaveolens* complex, which currently includes a number of populations in the Victorian Volcanic Plains Bioregion currently included under *P. suaveolens,* but likely to consist of two morphologically distinct entities which are broadly sympatric on the Western Basalt Plains. Both are included in the recovery plan. Other closely related taxa occur elsewhere in central and western Victoria (D. Rouse, Centre for Plant Biodiversity Research, pers. comm.).
- *P. suaveolens* and *P.* sp. aff. *suaveolens* populations are vulnerable to damage from heavy machinery. Public Authority Management Agreements under the Victorian *Flora and Fauna Guarantee Act 1988* (FFG) are urgently required for all roadside and rail reserve sites.
- Habitat where *P.* sp. aff. *suaveolens* and *P. suaveolens* occurs is highly significant and listed as threatened under the Victorian *FFG Act 1988* and some sites are National Estate listed. It is vital to continue the current fire regime of annual burning in order to preserve species diversity in vegetation where they occur, to maintain openness and suppress invasive exotic species such as *Phalaris aquatica*, *Romulea rosea* and *Cuscuta dubia*.
- La Trobe University have conducted applied research in site management since the 1980s at Derrinallum and Vite Vite and their continuing involvement should be encouraged. The contributions of local field naturalists should also be encouraged and supported in regard to site management at Yalla Y Poora.
- Yalla Y Poora land tenure is in need of resolution.

Overall recovery strategy:

Broadscale risk management will include negotiated PAMAs with Local Government and rail reserve managers to undertake annual burning, weed management and protection of sites from damage caused by heavy machinery. Searches will be conducted at similar sites in the region in the spring following annual fuel reduction burning. Populations will be mapped and annual censusing carried out to determine their response to current management. Recovery will be jointly managed by DSE with involvement from La Trobe University School of Botany and local field naturalists.

Consultation:

DSE SW (Ballarat, Colac, Warrnambool); Shire of Moyne, Shire of Corangamite, Rural City of Ararat; A. and M. Morton (Field Naturalists and ANOS members, Clunes), Parks Victoria (Victoria West Region, Beaufort); Dr J. Morgan (La Trobe University); John Arnott (Geelong Botanic Gardens).

ACTIONS:

Action	Woorndoo (H)	Wingeel (H)	Derrinallum (H)	Vite Vite (H)	Yalla Y Poora (H)	Dowling Forest Cemetery (H)
1. Determine current conservation status						
1.1 Clarify taxonomy	L	L	L	L	L	L
1.2 Acquire baseline population data	M	M	M	M	M	M
Responsibility	DSE-BNR, Centre for Plant Conservation Biology	DSE-BNR, Centre for Plant Conservation Biology	DSE-BNR, Centre for Plant Conservation Biology	DSE-BNR, Centre for Plant Conservation Biology	DSE-BNR, Centre for Plant Conservation Biology, ANOS	DSE-BNR, Centre for Plant Conservation Biology, ANOS
2. Investigate population biology						
2.1 Describe life history	M	M	M	M	M	M
2.2 Evaluate natural pollination levels and/or causes of pollinator limitation	M	M	M	M	M	M
2.3 Determine the effects of artificial pollination on growth survival and reproduction	N/A	N/A	N/A	N/A	N/A	N/A
2.4 Determine spatial distribution of mycorrhizal fungi	N/A	N/A	N/A	N/A	N/A	N/A
2.5 Determine optimal conditions for growth of mycorrhizal fungi *in-situ*	N/A	N/A	N/A	N/A	N/A	N/A
Responsibility	DSE-BNR SW	DSE-BNR	DSE-BNR	DSE-BNR	DSE-BNR	DSE-BNR
3. Determine habitat requirements of key populations						
3.1 Identify key populations	N/A	N/A	N/A	N/A	N/A	N/A
3.2 Conduct surveys	H	H	H	H	H	H
3.3 Identify ecological correlates of populations	M	M	M	M	M	M
3.4 Prepare habitat descriptions	L	L	L	L	L	L
Responsibility	DSE-BNR SW	DSE-BNR	DSE-BNR	DSE-BNR	DSE-BNR	DSE-BNR
4. Manage risks to populations						
4.1 Identify and implement strategies to control threats	H	H	H	H	H	H
4.2 Identify disturbance regimes to promote regeneration and recruitment	N/A	N/A	N/A	N/A	N/A	N/A
4.3 Protect key public land populations and habitat	H	H	H	H	H	H
4.4 Protect key private land populations and habitat	N/A	N/A	N/A	N/A	N/A	N/A
Responsibility	DSE-BNR SW, Shire of Moyne	DSE-BNR, Golden Plains Shire	DSE-BNR, Shire of Corangamite	DSE-BNR, Australian Rail Track Corporation	DSE-BNR SW, ANOS	DSE-BNR, ANOS, Dowling Forest Cemetery Trust
5. Promote in-situ recruitment						

5.1 Prepare habitat for seedling recruitment	N/A	N/A	N/A	N/A	N/A	N/A
5.2 Re-stock populations with seed	N/A	N/A	N/A	N/A	N/A	N/A
Responsibility	DSE-BNR	DSE-BNR	DSE-BNR	DSE-BNR	DSE-BNR	DSE-BNR
6. Measure population trends and responses against recovery actions						
6.1 Conduct annual censusing of populations	M	M	M	M	M	M
6.2 Collate, analyse and report on census data	M	M	M	M	M	M
6.3 Re-prioritise and adjust recovery actions and/or threat management	H	H	H	H	H	H
Responsibility	DSE-BNR SW	DSE-BNR	DSE-BNR	DSE-BNR	DSE-BNR, ANOS	DSE-BNR, ANOS
7. Increase populations ex-situ						
7.1 Hand pollinate plants	N/A	N/A	N/A	N/A	N/A	N/A
7.2 Establish a threatened orchid seed bank and determine seed viability	N/A	N/A	N/A	M	N/A	M
7.3 Establish a mycorrhizal fungi bank	N/A	N/A	N/A	M	N/A	M
7.4 Establish and maintain cultivated populations	N/A	N/A	N/A	M	N/A	M
7.5 Maintain a database of threatened orchid taxa in cultivation	N/A	N/A	N/A	L	N/A	L
Responsibility	DSE-BNR	DSE-BNR	DSE-BNR	DSE-BNR, GBG	DSE-BNR	DSE-BNR, GBG
8. Translocate cultivated plants						
8.1 Determine criteria for re-stocking/re-introduction	N/A	N/A	N/A	N/A	N/A	N/A
8.2 Evaluate site suitability	N/A	N/A	N/A	N/A	N/A	N/A
8.3 Determine long term cost-benefits and feasibility of translocating plants	N/A	N/A	N/A	N/A	N/A	N/A
8.4 Prepare and implement translocation plans	N/A	N/A	N/A	N/A	N/A	N/A
8.5 Maintain translocated populations	N/A	N/A	N/A	N/A	N/A	N/A
Responsibility	DSE-BNR	DSE-BNR	DSE-BNR	DSE-BNR	DSE-BNR	DSE-BNR
9. Implement an education and communication strategy						
9.1 Prepare technical educational material on *in-situ* recovery techniques	L	L	L	L	L	L
9.2 Undertake community extension	L	L	L	L	L	L
9.3 Conduct workshops and symposia on *in-situ* recovery techniques	L	L	L	L	L	L

9.4 Encourage and support research by Higher Education Institutions and existing research partners	N/A	N/A	N/A	N/A	N/A	N/A
Responsibility	DSE-BNR SW	DSE-BNR	DSE-BNR	DSE-BNR	DSE-BNR	DSE-BNR
10. Consolidate recovery and extend networks						
10.1 Maintain the Threatened Orchid Recovery Team	L	L	L	L	L	L
10.2 Establish and facilitate regional Recovery Teams	L	L	L	L	L	L
10.3 Co-ordinate recovery and exchange knowledge with interstate agencies	N/A	N/A	N/A	N/A	N/A	N/A
Responsibility	DSE-BNR	DSE-BNR	DSE-BNR	DSE-BNR	DSE-BNR	DSE-BNR

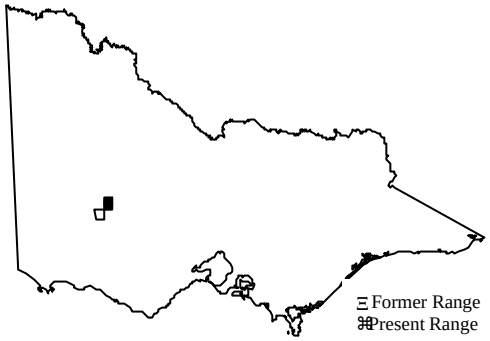
Prasophyllum subbisectum Nicholls
Pomonal leek-orchid

Conservation status:

EPBC Act 1999:	E
IUCN (2000):	CR
NRE (2000):	E

Distribution: *Endemic to Victoria* - Goldfields Bioregion (Stawell area). Formerly known from near Pomonal.

Specific details of population localities (including GPS data) are held on DSE internal files.



Abundance: <75 plants known in the wild, in 3 populations. Likely to be naturally rare, but more common prior to landscape scale disturbance from gold exploration and mining.

Habitat: Occurs in open forest dominated by *Eucalyptus tricarpa* - *E. macrorhynca* - *E. microcarpa*, with a healthy understorey typically consisting of *Ozothamnus obcordatum*, *Brachyloma ciliatum*, and *Calytrix tetragona* or *E. leucoxylon* - *E. goniocalyx* open forest on well drained sandy loam. Critical habitat has not been determined, but may require disturbance.

Reservation status: Reserved at Deep Lead Flora and Fauna Reserve, Three Jacks Flora Reserve.

Management: Parks Victoria (Victoria West Region, Horsham)

Current and potential threats and their risk:

Current threats	**Perceived risk**
Weed invasion	Low - weeds are scarce at sites.
Grazing	High - macropods and rabbits are common at all sites.
Inappropriate fire regimes	Low at present - sites are long unburnt and fire risk is low; otherwise unknown.
Site disturbance	Moderate at Deep Lead - sites may be vulnerable to disturbance by illegal gold prospecting.
Reservation status	Inadequately reserved, but subject to implementation of ECC recommendations.
Potential threats	**Perceived risk**
Illegal collection	Low - no evidence of collection in the past.
Ecology/biology	High - conditions for seed recruitment and maintenance of pollinator and fungal activity unknown; increased extinction risk due to small population sizes.

Recovery objectives: Maintain and/or increase existing population sizes; protect and manage habitat.

Recovery actions undertaken:

- Monitoring at 2 sites by Stawell Field Naturalists.
- Searches conducted annually by Stawell Field Naturalists and in 2001 by Centre for Plant Conservation Biology, Canberra.
- All sites were visited during recovery plan preparation.

Issues specific to recovery:

- *P. subbisectum* populations are vulnerable to damage from trampling and site confidentiality is vital. Involvement from non government organisations and individuals will be limited to a small number of individuals with a proven track record in its conservation (ANOS conservation group, Stawell Field Naturalists Club).

- One population at Deep Lead FFR is close to tracks and vulnerable to damage from recreational vehicles.
- Kangaroo numbers at both reserves require assessment particularly in relation to loss of ground flora and soil disturbance. Further searches may prove more fruitful after protective measures have been implemented.

Overall recovery strategy:

Known populations will be monitored. Risk management in the short term will include protection of populations from grazing and gold prospecting, and maintenance of site confidentiality. Populations will be managed to promote seedling recruitment, using fine-scale habitat management techniques and re-stocked using seed from cultivated plants. Recovery will be jointly managed by DSE and PV. Involvement from Stawell Field Naturalists will continue.

Consultation:

Parks Victoria (West Victoria Region, Horsham); DSE-BNR SW; Stawell Field Naturalists Club.

ACTIONS:

Action	Deep Lead (H)	Three Jacks (H)
1. Determine current conservation status		
1.1 Clarify taxonomy	N/A	N/A
1.2 Acquire baseline population data	M	M
Responsibility	DSE-BNR SW, SFN	DSE-BNR SW, SFN
2. Investigate population biology		
2.1 Describe life history	M	M
2.2 Evaluate natural pollination levels and/or causes of pollinator limitation	M	M
2.3 Determine the effects of artificial pollination on growth survival and reproduction	M	M
2.4 Determine spatial distribution of mycorrhizal fungi	M	M
2.5 Determine optimal conditions for growth of mycorrhizal fungi *in-situ*	M	M
Responsibility	DSE-BNR, RP	DSE-BNR, RP
3. Determine habitat requirements of key populations		
3.1 Identify key populations	N/A	N/A
3.2 Conduct surveys	H	H
3.3 Identify ecological correlates of populations	M	M
3.4 Prepare habitat descriptions	L	L
Responsibility	DSE-BNR SW	DSE-BNR SW
4. Manage risks to populations		
4.1 Identify and implement strategies to control threats	H	H
4.2 Identify disturbance regimes to promote regeneration and recruitment	H	H
4.3 Protect key public land populations and habitat	N/A	N/A
4.4 Protect key private land populations and habitat	N/A	N/A
Responsibility	PV (Horsham), DSE-BNR	PV (Horsham), DSE-BNR
5. Promote in-situ recruitment		
5.1 Prepare habitat for seedling recruitment	M	M
5.2 Re-stock populations with seed	M	M
Responsibility	DSE-BNR, RP	DSE-BNR, RP
6. Measure population trends and responses against recovery actions		
6.1 Conduct annual censusing of populations	M	M
6.2 Collate, analyse and report on census data	M	M
6.3 Re-prioritise and adjust recovery actions and/or threat management	H	H
Responsibility	DSE-BNR	DSE-BNR
7. Increase populations ex-situ		
7.1 Hand pollinate plants	M	M

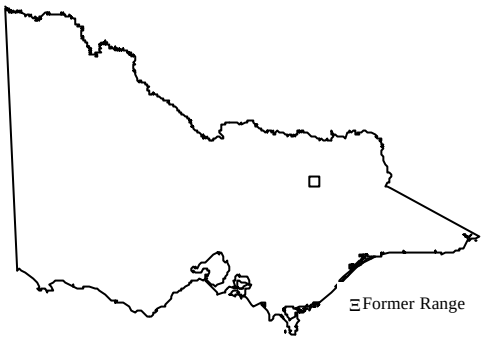
7.2 Establish a threatened orchid seed bank and determine seed viability	N/A	M
7.3 Establish a mycorrhizal fungi bank	N/A	M
7.4 Establish and maintain cultivated populations	N/A	M
7.5 Maintain a database of threatened orchid taxa in cultivation	N/A	L
Responsibility	DSE-BNR	DSE-BNR, GBG
8. Translocate cultivated plants		
8.1 Determine criteria for re-stocking/re-introduction	N/A	N/A
8.2 Evaluate site suitability	N/A	N/A
8.3 Determine long term cost-benefits and feasibility of translocating plants	N/A	N/A
8.4 Prepare and implement translocation plans	N/A	N/A
8.5 Maintain translocated populations	N/A	N/A
Responsibility	DSE-BNR	DSE-BNR
9. Implement an education and communication strategy		
9.1 Prepare technical educational material on *in-situ* recovery techniques	L	L
9.2 Undertake community extension	L	L
9.3 Conduct workshops and symposia on *in-situ* recovery techniques	L	L
9.4 Encourage and support research by Higher Education Institutions and existing research partners	M	M
Responsibility	DSE-BNR	DSE-BNR
10. Consolidate recovery and extend networks		
10.1 Maintain the Threatened Orchid Recovery Team	L	L
10.2 Establish and facilitate regional Recovery Teams	L	L
10.3 Co-ordinate recovery and exchange knowledge with interstate agencies	N/A	N/A
Responsibility	DSE-BNR	DSE-BNR

Prasophyllum suttonii R.S. Rogers et B. Rees
Buffalo Leek-orchid, Suttons Leek-orchid

Conservation status:

EPBC Act 1999:	Not listed
IUCN (2000):	X
NRE (2000):	X

Distribution: *Endemic to Victoria* - Victorian Alps Bioregion (confined to the Mt Buffalo Plateau). Specific population localities are unknown. No precise records exist to indicate its former distribution, but likely to have been a short-range endemic.



Abundance: Extinct. Former abundance is unknown, but likely to have been naturally rare with extremely small population size.

Habitat: Habitat is unknown.

Reservation status: Occurred at Mt Buffalo National Park.

Management: Parks Victoria (Central Victoria Region, Puckapunyal).

Current and potential threats: Unknown.

Recovery actions undertaken:

- Searches undertaken in January 2002.

Issues specific to recovery:

- The common and widespread taxon, referred to in most of the literature as *Prasophyllum suttonii*, was recently described as *P. alpestre* D.L. Jones (Jones 1998).
- Searches have failed to relocate the population, and re-discovery is highly unlikely.

Consultation:

Parks Victoria (Central Victoria Region, Wodonga).

ACTIONS:

Action	Mt Buffalo
1. Determine current conservation status	
1.1 Clarify taxonomy	Completed
1.2 Acquire baseline population data	N/A
Responsibility	DSE-BNR, ANOS

Thelymitra epipactoides F. Muell.
Metallic Sun-orchid

Conservation status:

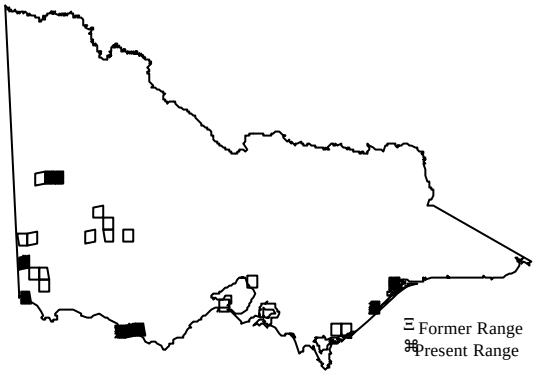
EPBC Act 1999:	E
IUCN (2000):	E (preliminary assessment)
NRE (2000):	E

Distribution:

In Victoria - widespread in coastal and hinterland areas west of Bairnsdale and extending well inland in the west (Backhouse and Jeanes 1995), but discontinuous with scattered populations throughout its range.

In South Australia - widespread from the Eyre Peninsula to the far south-east corner (Bates and Weber 1990). Distributional data are currently unavailable for South Australian populations.

Specific details of population localities (including GPS data) are held on DSE and EH internal files.



Abundance:

Between 500 and 3,000 plants in the wild, known with certainty from 8 main populations in Victoria. South Australian populations currently being assessed. Likely to have formerly numbered many thousands of plants in Victoria and South Australia prior to habitat destruction.

Habitat:

Grows primarily in mesic coastal heathlands, grasslands and woodlands, but also found in drier inland heathlands, open forests and woodlands. Substrates may be moist or dry sandy loams or loamy sands. Critical habitat has not been determined, but likely to require open conditions, which may be created by soil disturbance or fire, for recruitment.

Reservation status:

Victoria - Blond Bay State Game Reserve, Bay of Islands Coastal Park; Port Campbell National Park; Gippsland Lakes Coastal Park; Lake Mundi Game Reserve; Coastal Park; Kiata Flora Reserve. Also recorded from Grampians NP (Vic), but not recently seen.

South Australia - Recorded from a number of reserves including Mount Boothby CP; Wanilla CP; Messent CP; Big Heath CP; Coorong NP; Monarto CP; Penny West CP; Tailem Bend NFR.

Management:

Victoria - Parks Victoria (East Victoria Region, Sale; West Victoria Region, Nelson, Horsham); DSE-BNR SW (Portland, Horsham); DSE Forests SW; DSE-BNR SE (Yarram).

South Australia - South Australian National Parks and Wildlife (Department of Environment and Heritage); private landowners; South Australian Woods and Forests Department; Aboriginal Lands Trust.

Current and potential threats and their risk:

Current threats	Perceived risk
Weed invasion	Low in Vic - sites are generally in good condition. Low(?) in SA - no information is available at present.
Grazing	Low at most sites. *T. epipactoides* appears able to withstand moderate grazing pressure. High at Blond Bay GR - excessive browsing has significantly modified vegetation. SA - no information is available at present.
Inappropriate fire regimes	Low at most extant sites, but may have been more common where sites were burnt regularly in the past (eg. Billywing Rd, Grampians NP). SA - no information is available at present.
Site disturbance	Generally low at present. *T. epipactoides* requires open bare ground created by disturbance for recruitment. However, populations at Port Campbell NP are close to roads and occupy sites that have been

	subject to development proposals. Most other sites are protected and populations well known. Moderate in SA - some sites have been destroyed by heavy machinery.
Reservation status	Adequately reserved in Vic and SA Protected at two sites in SA under Heritage Agreements.
Potential threats	**Perceived risk**
Herbicide spraying and site disturbance	Low in Vic. SA - no information is available at present.
Illegal collection	Low - no evidence of collection in the past.
Woody shrub invasion	Moderate at Golden Beach and Gippsland Lakes CP - invasion of coastal shrubs may occur in the absence of fire or grazing. SA - no information is available at present.

Recovery objectives: Maintain and/or increase existing population sizes; protect and manage habitat.

Recovery actions undertaken:

- Research into ecology and pollination biology (Calder *et al*. 1989; Cropper and Calder 1990).
- Demographic censusing at Golden Beach and Port Campbell NP since 1991.
- Population sizes for most Victorian sites are included on VrotPop threatened flora database.
- Regular ecological burning carried out at Golden Beach.
- All Victorian sites were visited during recovery plan preparation.

Issues specific to recovery in Victoria:

- *T. epipactoides* has not been seen at Billywing Road, Grampians NP for a number of years, but is likely to be recoverable with restoration of an appropriate fire regime.
- Population sizes tend to fluctuate, but most populations appear to respond well to disturbance.
- A considerable amount of demographic census data exist for both eastern and western populations.
- Analysis of existing Victorian census data is urgently required to evaluate the response of the population to management activities in the last 10 years and so that existing management strategies can be assessed.

Issues specific to recovery in South Australia:

- The status and distribution of SA populations is poorly known and an assessment of the current size and extent of populations is urgently required. Recovery priorities and feasibility of actions, require further clarification in consultation with SA EH, and are provisional until relevant information becomes available.

- Until the status of SA populations are better understood, responsibilities for actions (other than those for which there is a statutory responsibility) rest primarily with DSE. DSE will consult with EH before undertaking any actions for this species in SA. Once the status of SA populations is adequately known, responsibility for recovery actions in SA will be reviewed.

Overall recovery strategy:

Risk management will include identifying appropriate disturbance regimes and management strategies to promote recruitment. Upgrading or modification of site protection is required at two sites. Analysis of existing census data form eastern and western Victoria will be used as a basis for management in addition to ecological surveys. Baseline information is required in SA. Involvement from volunteers will be encouraged.

Consultation:

Parks Victoria (East Victoria Region: Bairnsdale; West Victoria Region: Nelson, Warrnambool, Horsham, Dimboola); DSE-BNR SE (Yarram, Bairnsdale); DSE-BNR SW (Warrnambool, Horsham); South Australian Department of Environment and Heritage, Adelaide.

ACTIONS:

Action	Blond Bay, Golden Beach, Gippsland Lakes CP (H)	Lake Mundi (M)	Kiata (H)	Port Campbell NP, Bay of Islands NP, Lower Glenelg NP (H)	Grampians (L)	SA (M)
1. Determine current conservation status						
1.1 Clarify taxonomy	N/A	N/A	N/A	N/A	N/A	N/A
1.2 Acquire baseline population data	M	M	M	M	M	H
Responsibility	DSE-BNR	DSE-BNR	DSE-BNR	PV	PV	EH
2. Investigate population biology						
2.1 Describe life history	M	M	M	M	M	M
2.2 Evaluate natural pollination levels and/or causes of pollinator limitation	L	L	L	L	L	L
2.3 Determine the effects of artificial pollination on growth survival and reproduction	N/A	N/A	N/A	N/A	N/A	N/A
2.4 Determine spatial distribution of mycorrhizal fungi	N/A	N/A	N/A	N/A	N/A	N/A
2.5 Determine optimal conditions for growth of mycorrhizal fungi *in-situ*	N/A	N/A	N/A	N/A	N/A	N/A
Responsibility	DSE-BNR	DSE-BNR	DSE-BNR	DSE-BNR	DSE-BNR	DEH
3. Determine habitat requirements of key populations						
3.1 Identify key populations	N/A	N/A	N/A	N/A	N/A	H
3.2 Conduct surveys	M	M	M	M	M	H
3.3 Identify ecological correlates of populations	L	L	L	L	L	M
3.4 Prepare habitat descriptions	L	L	L	L	L	M
Responsibility	DSE-BNR	DSE-BNR	DSE-BNR	DSE-BNR	DSE-BNR	EH
4. Manage risks to populations						
4.1 Identify and implement strategies to control threats	H	H	H	H	H	H
4.2 Identify disturbance regimes to promote regeneration and recruitment	M	M	M	M	M	M
4.3 Protect key public land populations and habitat	Completed	Completed	Completed	Completed	Completed	H
4.4 Protect key private land populations and habitat	N/A	N/A	N/A	N/A	N/A	H
Responsibility	DSE-BNR, PV	DSE-BNR, PV	DSE-BNR, PV	DSE-BNR, PV	DSE-BNR, PV	EH
5. Promote in-situ recruitment						
5.1 Prepare habitat for seedling recruitment	N/A	N/A	N/A	N/A	N/A	N/A

5.2 Re-stock populations with seed	N/A	N/A	N/A	N/A	N/A	N/A
Responsibility	DSE-BNR, PV	DSE-BNR, PV	DSE-BNR, PV	DSE-BNR, PV	DSE-BNR, PV	EH
6. Measure population trends and responses against recovery actions						
6.1 Conduct annual censusing of populations	M	M	M	M	M	M
6.2 Collate, analyse and report on census data	M	M	M	M	M	M
6.3 Re-prioritise and adjust recovery actions and/or threat management	H	H	H	H	H	H
Responsibility	DSE-BNR	DSE-BNR	DSE-BNR, PV	DSE-BNR, PV	DSE-BNR, PV	EH
7. Increase populations ex-situ						
7.1 Hand pollinate plants	N/A	N/A	N/A	N/A	N/A	N/A
7.2 Establish a threatened orchid seed bank and determine seed viability	N/A	N/A	N/A	N/A	N/A	N/A
7.3 Establish a mycorrhizal fungi bank	N/A	N/A	N/A	N/A	N/A	N/A
7.4 Establish and maintain cultivated populations	N/A	N/A	N/A	N/A	N/A	N/A
7.5 Maintain a database of threatened orchid taxa in cultivation	N/A	N/A	N/A	N/A	N/A	N/A
Responsibility	DSE-BNR, PV	DSE-BNR, PV	DSE-BNR, PV	DSE-BNR, PV	DSE-BNR, PV	EH
8. Translocate cultivated plants						
8.1 Determine criteria for re-stocking/re-introduction	N/A	N/A	N/A	N/A	N/A	N/A
8.2 Evaluate site suitability	N/A	N/A	N/A	N/A	N/A	N/A
8.3 Determine long term cost -benefits and feasibility of translocating plants	N/A	N/A	N/A	N/A	N/A	N/A
8.4 Prepare and implement translocation plans	N/A	N/A	N/A	N/A	N/A	N/A
8.5 Maintain translocated populations	N/A	N/A	N/A	N/A	N/A	N/A
Responsibility	DSE-BNR	DSE-BNR	DSE-BNR	DSE-BNR	DSE-BNR	EH
9. Implement an education and communication strategy						
9.1 Prepare technical educational material on *in-situ* recovery techniques	L	L	L	L	L	N/A
9.2 Undertake community extension	L	L	L	L	L	L
9.3 Conduct workshops and symposia on *in-situ* recovery techniques	L	L	L	L	L	N/A
9.4 Encourage and support research by Higher Education Institutions and existing research partners	N/A	N/A	N/A	N/A	N/A	N/A

Responsibility	DSE-BNR	DSE-BNR	DSE-BNR	DSE-BNR	DSE-BNR	EH
10. Consolidate recovery and extend networks						
10.1 Maintain the Threatened Orchid Recovery Team	L	L	L	L	L	N/A
10.2 Establish and facilitate regional Recovery Teams	L	L	L	L	L	L
10.3 Co-ordinate recovery and exchange knowledge with interstate agencies	L	L	L	L	L	L
Responsibility	DSE-BNR	DSE-BNR	DSE-BNR	DSE-BNR	DSE-BNR	DSE-BNR

Thelymitra gregaria D.L. Jones & M.A. Clem.
Basalt Sun-orchid

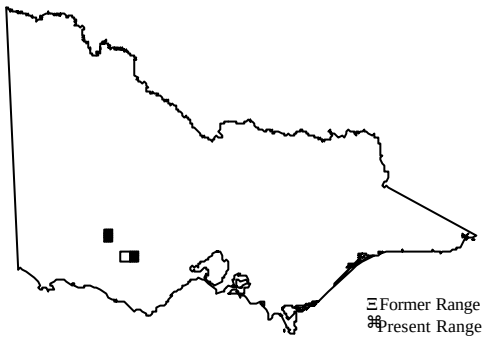
Conservation status:

EPBC Act 1999:	Not listed
IUCN (2000):	CR
NRE (2000):	E

Distribution: *Endemic to Victoria* - Victorian Volcanic Plain Bioregion (Derrinallum, Streatham, Woorndoo, Yalla Y Poora areas).

Formerly recorded, but now extinct at Darlington, and south-west of Melbourne at Werribee.

Specific details of population localities (including GPS data) are held on DSE internal files.



Abundance: <1500 plants known in the wild, in 5 populations. Former abundance not known, but assumed to be many thousands across its natural range.

Habitat: Occurs in open species rich native grassland dominated by *Themeda triandra* with perennial herbs and lilies on poorly drained red-brown soil derived from basalt. Critical habitat has not been determined, but fire or other disturbance such as slashing is highly likely to promote flowering.

Reservation status: Not reserved.

Management: Shire of Moyne, Shire of Corangamite, Rural City of Ararat, Australian Rail Track Corporation.

Current and potential threats and their risk:

Current threats	**Perceived risk**
Weed invasion	High - in particular *Phalaris aquatica*, *Romulea rosea*; and *Cuscuta dubia* invasion will occur without regular burning and/or spraying; will be exacerbated by soil disturbance.
Grazing/pest animals	Low - sites are not grazed at present and rabbits are scarce at most sites.
Inappropriate fire regimes	Low at present - sites require fire and are burnt annually.
Site disturbance	Extremely high - all sites are on roadsides or rail reserves adjacent to paddocks on private property and are subject to accidental damage from heavy machinery.
Reservation status	Not reserved.
Potential threats	**Perceived risk**
Illegal collection	Low - no evidence of collection in the past.
Ecology/biology	Moderate - conditions for maintenance of pollinator and fungal activity unknown.

Recovery objectives: Maintain and/or increase existing population sizes; protect sites and manage habitat.

Recovery actions undertaken:

- Grassland vegetation communities at Derrinallum and Vite Vite sites have been monitored since the late 1980s (School of Botany, La Trobe University)
- Fire ecology has been researched and is well understood for Western Basalt Plains Grassland (School of Botany, La Trobe University)

- A Public Authority Management Agreement (PAMA) is currently being prepared with the Shire of Moyne, which will include the site near Woorndoo (DSE).
- Ecological burns planned for Yalla Y Poora and volunteers will carry out weed control.
- 2 sites are burnt annually (Derrinallum, Woorndoo).
- All known populations were visited during recovery plan preparation.

Issues specific to recovery:

- *T. gregaria* populations are vulnerable to damage from heavy machinery. Public Authority Management Agreements under the Victorian *Flora and Fauna Guarantee Act 1988* (FFG) are urgently required for all roadside and rail reserve sites.
- Habitat where *T. gregaria* occurs is highly significant and listed as threatened under the Victorian *FFG Act 1988* and some sites are National Estate listed. It is vital to continue the current fire regime of annual burning in order to preserve species diversity in vegetation where *T. gregaria* occurs, to maintain openness and suppress invasive exotic species such as *Phalaris aquatica*, *Romulea rosea* and *Cuscuta dubia*.
- La Trobe University have conducted applied research in site management since the 1980s at Derrinallum and Vite Vite and their involvement should continue to be encouraged. Local Field Naturalists should also be encouraged to contribute to site management at Yalla Y Poora.
- Yalla Y Poora land tenure is in need of resolution.
- Weed control for *Phalaris aquatica* at Woorndoo.

Overall recovery strategy:

Broadscale risk management will include negotiated PAMAs with Local Government and rail reserve managers to undertake annual burning, weed management and protection of sites from damage caused by heavy machinery. Searches will be conducted at similar sites in the region in the spring following annual fuel reduction burning. Populations will be mapped and annual censusing carried out to determine their response to current management. Recovery will be jointly managed by DSE with involvement from La Trobe University School of Botany and local field naturalists.

Consultation:

DSE SW (Ballarat, Colac, Warrnambool); Shire of Moyne, Shire of Corangamite, Rural City of Ararat, Australian Rail Track Corporation; A. and M. Morton (Field Naturalists, Clunes), Parks Victoria (Victoria West Region, Beaufort); Dr J. Morgan (La Trobe University); John Arnott (Geelong Botanic Gardens).

ACTIONS:

Action	Woorndoo (H)	Derrinallum (H)	Vite Vite (H)	Yalla Y Poora (H)
1. Determine current conservation status				
1.1 Clarify taxonomy	N/A	N/A	N/A	N/A
1.2 Acquire baseline population data	M	M	M	M
Responsibility	DSE-BNR	DSE-BNR	DSE-BNR	DSE-BNR
2. Investigate population biology				
2.1 Describe life history	M	M	M	M
2.2 Evaluate natural pollination levels and/or causes of pollinator limitation	M	M	M	M
2.3 Determine the effects of artificial pollination on growth survival and reproduction	N/A	M	N/A	N/A
2.4 Determine spatial distribution of mycorrhizal fungi	N/A	N/A	N/A	N/A
2.5 Determine optimal conditions for growth of mycorrhizal fungi *in-situ*	N/A	N/A	N/A	N/A
Responsibility	DSE-BNR	DSE-BNR	DSE-BNR	DSE-BNR, Field Naturalists
3. Determine habitat requirements of key populations				
3.1 Identify key populations	N/A	N/A	N/A	N/A
3.2 Conduct surveys	H	H	H	H
3.3 Identify ecological correlates of populations	H	H	H	H
3.4 Prepare habitat descriptions	M	M	M	M
Responsibility	DSE-BNR	DSE-BNR	DSE-BNR	DSE-BNR
4. Manage risks to populations				
4.1 Identify and implement strategies to control threats	H	H	H	H
4.2 Identify disturbance regimes to promote regeneration and recruitment	H	H	H	H
4.3 Protect key public land populations and habitat	H	H	H	H
4.4 Protect key private land populations and habitat	N/A	N/A	N/A	N/A
Responsibility	DSE-BNR SW, Shire of Moyne	DSE-BNR SW, Shire of Corangamite	DSE-BNR SW, Australian Rail Track Corporation	DSE-BNR SW, PV
5. Promote in-situ recruitment				
5.1 Prepare habitat for seedling recruitment	N/A	N/A	N/A	N/A
5.2 Re-stock populations with seed	N/A	N/A	N/A	N/A
Responsibility	DSE-BNR	DSE-BNR	DSE-BNR	DSE-BNR
6. Measure population trends and responses against recovery actions				

6.1 Conduct annual censusing of populations	M	M	M	M
6.2 Collate, analyse and report on census data	M	M	M	M
6.3 Re-prioritise and adjust recovery actions and/or threat management	H	H	H	H
Responsibility	DSE-BNR	DSE-BNR	DSE-BNR	DSE-BNR
7. Increase populations ex-situ				
7.1 Hand pollinate plants	L	L	L	L
7.2 Establish a threatened orchid seed bank and determine seed viability	N/A	M	N/A	N/A
7.3 Establish a mycorrhizal fungi bank	N/A	M	N/A	N/A
7.4 Establish and maintain cultivated populations	N/A	M	N/A	N/A
7.5 Maintain a database of threatened orchid taxa in cultivation	N/A	L	N/A	N/A
Responsibility	DSE-BNR	DSE-BNR, GBG	DSE-BNR	DSE-BNR
8. Translocate cultivated plants				
8.1 Determine criteria for re-stocking/re-introduction	N/A	N/A	N/A	N/A
8.2 Evaluate site suitability	N/A	N/A	N/A	N/A
8.3 Determine long term cost-benefits and feasibility of translocating plants	N/A	N/A	N/A	N/A
8.4 Prepare and implement translocation plans	N/A	N/A	N/A	N/A
8.5 Maintain translocated populations	N/A	N/A	N/A	N/A
Responsibility	DSE-BNR	DSE-BNR	DSE-BNR	DSE-BNR
9. Implement an education and communication strategy				
9.1 Prepare technical educational material on *in-situ* recovery techniques	L	L	L	L
9.2 Undertake community extension	L	L	L	L
9.3 Conduct workshops and symposia on *in-situ* recovery techniques	L	L	L	L
9.4 Encourage and support research by Higher Education Institutions and existing research partners	N/A	N/A	N/A	N/A
Responsibility	DSE-BNR SW	DSE-BNR	DSE-BNR	DSE-BNR
10. Consolidate recovery and extend networks				
10.1 Maintain the Threatened Orchid Recovery Team	L	L	L	L
10.2 Establish and facilitate regional Recovery Teams	L	L	L	L
10.3 Co-ordinate recovery and exchange knowledge with interstate agencies	N/A	N/A	N/A	N/A
Responsibility	DSE-BNR	DSE-BNR	DSE-BNR	DSE-BNR

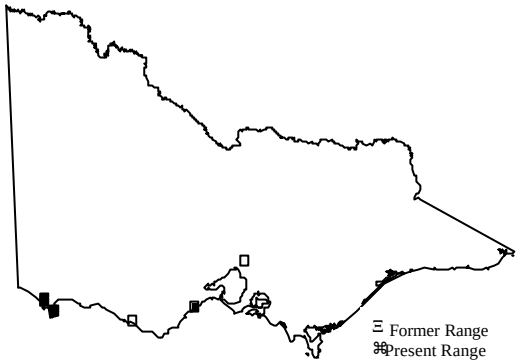
Thelymitra hiemalis D.L. Jones & M.A. Clem.
Winter Sun-orchid

Conservation status:

EPBC Act 1999:	Not listed
IUCN (2000):	CR
NRE (2000):	E

Distribution: *Endemic to Victoria* - Glenelg Plain Bioregion (Portland-Nelson area) to Otway Plain (Anglesea). Possibly occurs in South Australia, but no populations have been recorded to date. There are old, unconfirmed records from Blackburn, east of Melbourne and at the Port Campbell Rifle Range.

Specific details of population localities (including GPS data) are held on DSE internal files.



Abundance: <10 plants known in the wild, in 5 populations.

Habitat: Occurs in *Eucalyptus baxteri* or *E. willisii* woodland with an understorey typically dominated by heath species such as *Xanthorrhoea australis*, *Leptospermum myrsinoides*, *L. continentale*, *Acacia oxycedrus*, *Banksia marginata* or *Pteridium esculentum* on well drained dark grey loamy sand. Critical habitat has not been determined, but fire or other disturbance such as slashing is highly likely to promote flowering in *T. hiemalis*.

Reservation status: Reserved at Mt Richmond National Park, Lower Glenelg National Park, Angahook – Lorne State Park.

Management: Parks Victoria (Victoria West Region, Portland, Nelson, Lorne); Private Property

Current and potential threats and their risk:

Current threats	**Perceived risk**
Weed invasion	Low – *Pinus* wildings and Coast wattle invasion will occur without management; weeds are absent from other sites.
Grazing/pest animals	Low in parks at present, although individual plants would benefit from protection. High - private property.
Inappropriate fire regimes	High at present - sites are long unburnt (species is known to flower after fire).
Site disturbance	Moderate to High – one site is on private property and one other occurs adjacent to a fire break. The site and population at Anglesea is extremely vulnerable to trampling by enthusiasts
Reservation status	Adequately reserved.
Potential threats	**Perceived risk**
Illegal collection	Moderate - no evidence of collection in the past; but may be sought by collectors.
Ecology/biology	High - conditions for maintenance of pollinator and fungal activity unknown; increased extinction risk due to small population sizes.

Recovery objectives: Maintain and/or increase existing population sizes; protect and manage habitat.

Recovery actions undertaken:

- Searches within similar vegetation at a range of sites since 1999 (DSE, Portland Field Naturalists Club).
- Monitoring of 4 populations in 2001 (DSE, PV).

- Liaison with PV and landowner.
- Biomass reduction at one site by slashing.
- Fire planning at Lower Glenelg NP underway.
- All sites were visited during preparation of the recovery plan.

Issues specific to recovery:

- *T. hiemalis* populations are vulnerable to damage from trampling and site confidentiality is vital. Involvement from non government organisations and individuals will be limited to a small number of individuals with a proven track record in its conservation (ANOS conservation group, Angair Inc., Portland Field Naturalists Club).
- Disturbance is likely to be critical to survival. Preparation of ecological burn plans and their implementation at all PV sites are urgently needed.
- Regular communication with the owner of the Portland site is essential for recovery.

Overall recovery strategy:

Known populations will be monitored and searches will be conducted at similar sites in the region. Risk management in the short term will include reduction of biomass by slashing, protection of individual plants from grazing, and maintenance of site confidentiality. Ecological burn plans for existing and potential vegetation communities where *T. hiemalis* occurs on public land should be prepared and implemented, and post-fire searches conducted. The population will be managed to promote seedling recruitment, using fine-scale habitat management techniques. Populations will be re-stocked using seed from cultivated plants. Recovery will be jointly managed by DSE and PV. Involvement from ANOS conservation group and Portland Field Naturalists will continue.

Consultation:

Parks Victoria (West Victoria Region, Portland, Nelson, Lorne); DSE SW (Warrnambool); Landowner (Mr Ken Clark); ANOS Conservation Group; Portland Field Naturalists Club.

ACTIONS:

Action	Portland (L)	Mt Richmond (H)	Lower Glenelg NP (M)	Anglesea
1. Determine current conservation status				
1.1 Clarify taxonomy	N/A	N/A	N/A	N/A
1.2 Acquire baseline population data	N/A	N/A	N/A	N/A
Responsibility	DSE-BNR	DSE-BNR	DSE-BNR	DSE-BNR
2. Investigate population biology				
2.1 Describe life history	M	M	M	M
2.2 Evaluate natural pollination levels and/or causes of pollinator limitation	M	M	M	M
2.3 Determine the effects of artificial pollination on growth survival and reproduction	N/A	N/A	N/A	N/A
2.4 Determine spatial distribution of mycorrhizal fungi	N/A	N/A	N/A	N/A
2.5 Determine optimal conditions for growth of mycorrhizal fungi *in-situ*	N/A	N/A	N/A	N/A
Responsibility	DSE-BNR SW	DSE-BNR SW	DSE-BNR SW	DSE-BNR SW
3. Determine habitat requirements of key populations				
3.1 Identify key populations	N/A	N/A	N/A	N/A
3.2 Conduct surveys	N/A	H	H	H
3.3 Identify ecological correlates of populations	N/A	H	H	H
3.4 Prepare habitat descriptions	N/A	M	M	M
Responsibility	DSE-BNR SW	DSE-BNR SW	DSE-BNR SW	DSE-BNR SW
4. Manage risks to populations				
4.1 Identify and implement strategies to control threats	Completed	H	H	H
4.2 Identify disturbance regimes to promote regeneration and recruitment	M	M	M	M
4.3 Protect key public land populations and habitat	N/A	H	H	H
4.4 Protect key private land populations and habitat	H	N/A	N/A	N/A
Responsibility	DSE-BNR SW	PV (Portland)	PV (Nelson)	PV (Lorne)
5. Promote in-situ recruitment				
5.1 Prepare habitat for seedling recruitment	H	H	H	H
5.2 Re-stock populations with seed	H	H	H	H
Responsibility	DSE-BNR SW	DSE-BNR SW	DSE-BNR SW	DSE-BNR SW
6. Measure population trends and responses against recovery actions				

6.1 Conduct annual censusing of populations	M	M	M	M
6.2 Collate, analyse and report on census data	M	M	M	M
6.3 Re-prioritise and adjust recovery actions and/or threat management	H	H	H	H
Responsibility	DSE-BNR SW	DSE-BNR SW, PV (Portland), PFN	DSE-BNR SW, PV (Nelson), PFN	DSE-BNR SW, PV (Lorne)
7. Increase populations ex-situ				
7.1 Hand pollinate plants	H	H	H	H
7.2 Establish a threatened orchid seed bank and determine seed viability	N/A	M	M	M
7.3 Establish a mycorrhizal fungi bank	N/A	M	M	M
7.4 Establish and maintain cultivated populations	N/A	M	M	M
7.5 Maintain a database of threatened orchid taxa in cultivation	N/A	L	L	L
Responsibility	DSE-BNR SW	DSE-BNR SW, RBG	DSE-BNR SW, RBG	DSE-BNR SW, RBG
8. Translocate cultivated plants				
8.1 Determine criteria for re-stocking/re-introduction	N/A	N/A	N/A	N/A
8.2 Evaluate site suitability	N/A	N/A	N/A	N/A
8.3 Determine long term cost-benefits and feasibility of translocating plants	N/A	N/A	N/A	N/A
8.4 Prepare and implement translocation plans	N/A	N/A	N/A	N/A
8.5 Maintain translocated populations	N/A	N/A	N/A	N/A
Responsibility	DSE-BNR SW	DSE-BNR SW	DSE-BNR SW	DSE-BNR SW
9. Implement an education and communication strategy				
9.1 Prepare technical educational material on *in-situ* recovery techniques	L	L	L	L
9.2 Undertake community extension	L	L	L	L
9.3 Conduct workshops and symposia on *in-situ* recovery techniques	M	M	M	M
9.4 Encourage and support research by Higher Education Institutions and existing research partners	N/A	N/A	N/A	N/A
Responsibility	DSE-BNR SW	DSE-BNR SW	DSE-BNR SW	DSE-BNR SW
10. Consolidate recovery and extend networks				
10.1 Maintain the Threatened Orchid Recovery Team	L	L	L	L
10.2 Establish and facilitate regional Recovery Teams	L	L	L	L
10.3 Co-ordinate recovery and exchange knowledge with interstate agencies	N/A	N/A	N/A	N/A
Responsibility	DSE-BNR SW	DSE-BNR SW	DSE-BNR SW	DSE-BNR SW

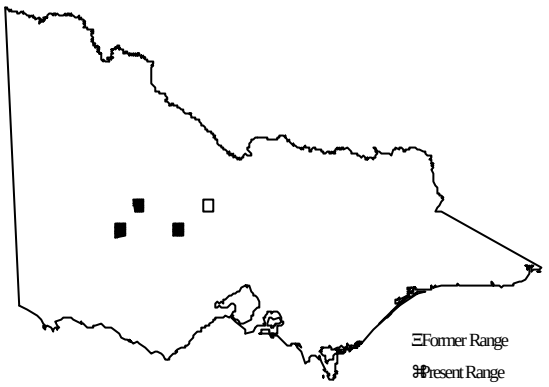
Thelymitra mackibbinii F. Muell.
Brilliant Sun-orchid

Conservation status:

EPBC Act 1999:	V
IUCN (2000):	CR
NRE (2000):	E

Distribution: *Endemic to Victoria* - Goldfields Bioregion (Stawell, St Arnaud and Maryborough areas). Formerly known from near Bendigo and also recorded from near Port Elliot, South Australia although the latter is highly likely to have been mis-identified.

Specific details of population localities (including GPS data) are held on DSE internal files.



Abundance: <30 plants known in the wild, in 3 populations. Likely to be naturally rare, but more common prior to landscape scale disturbance from gold exploration and mining.

Habitat: Occurs in open forest dominated by *Eucalyptus leucoxylon sens. lat.* and sometimes with *Allocasuarina verticillata*, with a heathy understorey typically consisting of *Acacia paradoxa*, *A. montana* and *Pultenaea largiflorens* on well drained light brown silt with quartz and lateritic lag deposits. Critical habitat has not been determined, but likely to require an undisturbed ground layer well covered by leaf litter.

Reservation status: Reserved at Mt Bolangum Flora and Fauna Reserve, Deep Lead Flora and Fauna Reserve, Paddys Ranges State Park.

Management: Parks Victoria (West Victoria Region, Maryborough, Horsham, Inglewood).

Current and potential threats and their risk:

Current threats	**Perceived risk**
Weed invasion	Low - weeds are scarce at sites.
Grazing/pest animals	Low - Mt Bolangum FFR at present. Moderate - macropods and rabbits at Paddys Ra. SP.
Inappropriate fire regimes	Low at present(?) - sites are long unburnt and fire risk is low, but may require fire.
Site disturbance	Moderate - sites are subject to disturbance by recreational vehicles.
Reservation status	Adequately reserved with implementation of ECC recommendations.
Potential threats	**Perceived risk**
Illegal collection	Moderate - no evidence of collection in the past, but may be sought by collectors.
Ecology/biology	High - conditions for maintenance of pollinator and fungal activity unknown; increased extinction risk due to small population sizes; response to fire unknown.

Recovery objectives: Maintain and/or increase existing population sizes; protect and manage habitat.

Recovery actions undertaken:

- Monitoring at 1 site by Stawell Field Naturalists.

- Searches conducted by ANOS members in 2001.
- All sites were visited during recovery plan preparation.

Issues specific to recovery:

- This taxon variously appears in the literature as a species or a hybrid. To date, no sound evidence has been presented to support its putative hybrid status, so it is prudent to treat it as a species until such evidence is forthcoming.
- *T. mackibbinii* populations are vulnerable to damage from trampling and site confidentiality is vital. Involvement from non government organisations and individuals will be limited to a small number of individuals with a proven track record in its conservation (ANOS conservation group, Stawell Field Naturalists Club).
- One population at Mt Bolangum FFR is close to tracks and extremely vulnerable to damage from recreational vehicles.
- The Paddys Ranges SP population has not been seen in recent years and kangaroo numbers require assessment particularly in relation to loss of ground flora and soil disturbance. Searches may prove more fruitful after protective measures have been implemented.

Overall recovery strategy:

Known populations will be monitored and searches will be conducted at similar sites in the region. Risk management in the short term will include protection of populations from grazing and vehicle damage, and maintenance of site confidentiality. Populations will be managed to promote seedling recruitment, using fine-scale habitat management techniques and re-stocked using seed from cultivated plants. Recovery will be jointly managed by DSE and PV. Involvement from ANOS conservation group and Stawell Field Naturalists will continue.

Consultation:

Parks Victoria (West Victoria Region, Maryborough, Horsham, Inglewood); ANOS Conservation Group; Stawell Field Naturalists Club.

ACTIONS:

Action	Paddys Ranges SP (L)	Mt Bolangum FFR (H)	Deep Lead (H)
1. Determine current conservation status			
1.1 Clarify taxonomy	N/A	N/A	N/A
1.2 Acquire baseline population data	M	M	M
Responsibility	DSE-BNR, RBG	DSE-BNR	DSE-BNR
2. Investigate population biology			
2.1 Describe life history	M	M	M
2.2 Evaluate natural pollination levels and/or causes of pollinator limitation	N/A	N/A	M
2.3 Determine the effects of artificial pollination on growth survival and reproduction	N/A	N/A	M
2.4 Determine spatial distribution of mycorrhizal fungi	M	M	M
2.5 Determine optimal conditions for growth of mycorrhizal fungi *in-situ*	M	M	M
Responsibility	DSE-BNR	DSE-BNR	DSE-BNR
3. Determine habitat requirements of key populations			
3.1 Identify key populations	H	N/A	N/A
3.2 Conduct surveys	H	H	H
3.3 Identify ecological correlates of populations	H	H	H
3.4 Prepare habitat descriptions	M	M	M
Responsibility	DSE-BNR	DSE-BNR	DSE-BNR
4. Manage risks to populations			
4.1 Identify and implement strategies to control threats	H	H	H
4.2 Identify disturbance regimes to promote regeneration and recruitment	H	H	H
4.3 Protect key public land populations and habitat	N/A	N/A	N/A
4.4 Protect key private land populations and habitat	N/A	N/A	N/A
Responsibility	PV (Maryborough)	PV (Inglewood)	PV (Horsham)
5. Promote in-situ recruitment			
5.1 Prepare habitat for seedling recruitment	H	H	H

5.2 Re-stock populations with seed	H	H	H
Responsibility	DSE-BNR	DSE-BNR	DSE-BNR
6. Measure population trends and responses against recovery actions			
6.1 Conduct annual censusing of populations	M	M	M
6.2 Collate, analyse and report on census data	M	M	M
6.3 Re-prioritise and adjust recovery actions and/or threat management	H	H	H
Responsibility	DSE-BNR, ANOS	DSE-BNR	DSE-BNR, SFN
7. Increase populations ex-situ			
7.1 Hand pollinate plants	H	H	H
7.2 Establish a threatened orchid seed bank and determine seed viability	N/A	N/A	H
7.3 Establish a mycorrhizal fungi bank	N/A	N/A	H
7.4 Establish and maintain cultivated populations	N/A	N/A	H
7.5 Maintain a database of threatened orchid taxa in cultivation	N/A	N/A	L
Responsibility	DSE-BNR	DSE-BNR	DSE-BNR, RBG, ANOS
8. Translocate cultivated plants			
8.1 Determine criteria for re-stocking/re-introduction	N/A	N/A	N/A
8.2 Evaluate site suitability	N/A	N/A	N/A
8.3 Determine long term cost-benefits and feasibility of translocating plants	N/A	N/A	N/A
8.4 Prepare and implement translocation plans	N/A	N/A	N/A
8.5 Maintain translocated populations	N/A	N/A	N/A
Responsibility	DSE-BNR	DSE-BNR	DSE-BNR
9. Implement an education and communication strategy			
9.1 Prepare technical educational material on *in-situ* recovery techniques	L	L	L
9.2 Undertake community extension	L	L	L
9.3 Conduct workshops and symposia on *in-situ* recovery techniques	L	L	L
9.4 Encourage and support research by Higher Education Institutions and existing research partners	M	M	M
Responsibility	DSE-BNR	DSE-BNR	DSE-BNR
10. Consolidate recovery and extend ne tworks			
10.1 Maintain the Threatened Orchid Recovery Team	L	L	L
10.2 Establish and facilitate regional Recovery Teams	L	L	L
10.3 Co-ordinate recovery and exchange knowledge with interstate agencies	N/A	N/A	N/A
Responsibility	DSE-BNR	DSE-BNR	DSE-BNR

Thelymitra arenaria Lindl.

Conservation status:

EPBC Act 1999:	Not listed
IUCN (2000):	Not threatened
NRE (2000):	Endangered

Distribution: Widespread throughout much of south-eastern Australia. Recorded for all Victorian Bioregions, except for the Murray Mallee, Lowan Mallee, Riverina and Highlands and Alps.

Specific details of population localities are being collated at RBG.

Abundance: Very common and widespread throughout much of south-eastern Australia in spite of massive habitat loss due to rural and urban development.

Habitat: Occurs in many habitat types including species rich native grassland, woodland, open forest and heathland.

Reservation status: Well represented in many biological reserves.

Management: Parks Victoria, DSE, various s hires and private property.

Current and potential threats and their risk: Not threatened at present.

Recovery actions undertaken:

- Preliminary data collation as part of a revision of *Thelymitra* (Jeanes, in prep.)

Issues specific to recovery:

- *T*. sp. aff *nuda* (Laverton) has recently been identified as *T*. *arenaria ms* and is highly likely to be common and widespread throughout its range in south-eastern Australia (Jeanes in prep.).

Consultation:

RBG (Melbourne).