

Review of the *Threatened Species Conservation Act* Flora Schedules: Recommendations to the Scientific Committee.

Final Summary Report December 2002

Prepared by Patricia Hogbin

1.0 Overview

55 taxa had their conservation status reviewed and 5 additional taxa were assessed (Table 1). Of these 55 taxa reviewed, 10 were found to be eligible for a change in conservation status, while 2 may need re-assessment once further information is available. All 5 additional taxa assessed require listing.

Changes to conservation status arose due to;

- increased knowledge of the taxon, particularly greater knowledge of a taxons distribution and population size as a result of targeted surveys,
- changes to the actual status of a taxon, particularly declines in total population size and geographic distribution due to continuing threats,
- the qualitative nature of previous assessment techniques, rather than any changes in knowledge of the species or its status.

2.0 Methodology

The review process included an assessment of conservation status for each species using two internationally accepted risk assessment schemes; the IUCN Red List Criteria Version 3.1 (2000)¹ and the Endangered Flora Network (EFN) modified IUCN criteria².

A range of information was utilised during assessment under these schemes, including;

- parameters related to the distribution of the species, including; linear geographic range, extent of occurrence, and area of occupancy;
- population sizes across all known locations;
- perceived threats;
- rates of declines (differentiating between past, present or future, and inferred, recorded or predicted);
- population structure and fragmentation;
- ecological responses to disturbances.

This information was gathered from a range of sources including; Recovery Plans, unpublished reports, the scientific literature, herbaria, survey data, and personal communications. Given that much information relating to threatened plant species is unpublished, information was sought directly from a range of experts.

¹ IUCN (2000) IUCN Red List Categories, Version 3.1. Prepared by the IUCN Species Survival Commission. IUCN, Gland, Switzerland and Cambridge, U.K.

² Keith, D.A., Chalson, J.M. & Auld, T.D. (1997) Assessing the status of threatened plants: a new methodology and an application to the vascular flora of New South Wales. Final Report to Environment Australia, Endangered Species Program Project No. 450.

Keith, D. A. (1998) An evaluation and modification of World Conservation Union Red List Criteria for classification of extinction risk in vascular plants. *Conservation Biology* 12(5), 1076-1090

Keith, D.A., Auld, T.D., Ooi, M.K.J. & Mackenzie, B.D.E. (2000) Sensitivity analyses of decision rules in World Conservation Union (IUCN) Red List criteria using Australian plants. *Biological Conservation* 94, 311-319.

Table 1. Taxa that have had a review of their conservation status completed to date, including their current conservation status under the *Threatened Species Conservation Act 1995* and their status determined by the review. Categories for status as determined by the review include: CR = Critically Endangered, EN = Endangered, VU = Vulnerable and NT = Near Threatened³ (following IUCN 2001).

Species	Review Status	Current TSC Status	Changes recommended
<i>Acacia pubescens</i> (Vent.) R. Br.	CR/NT	V	-
<i>Acacia pycnostachya</i> F. Muell.	VU	V	-
<i>Acacia ruppilii</i> Maiden & E. Betche	CR	E	-
<i>Allocasuarina portuensis</i> L. Johnson	CR	E	-
<i>Almaleea cambagei</i> (Maiden & E. Betche) Crisp & P. Weston	EN	E	-
<i>Amphibromus fluitans</i> Kirk	VU	V	-
<i>Angiopteris evecta</i> Hoffm.	CR	E	-
<i>Bertya</i> sp. A Cobar-Coolabah (Cunningham & Milthorpe s.n., 2/8/73)	CR	VU	Upgrade
<i>Boronia granitica</i> Maiden & E. Betche	VU	E	Downgrade
<i>Boronia repanda</i> (F. Muell. ex E. Betche) Maiden & E. Betche	CR	E	-
<i>Caladenia arenaria</i> Fitzg.	EN	E	-
<i>Caladenia tessellata</i> Fitzg.	CR	V	Upgrade
<i>Carex raleighii</i> Nelves	EN	E	-
<i>Darwinia biflora</i> (Cheel) B. Briggs	VU	VU	-
<i>Dillwynia tenuifolia</i> Sieber ex DC.	VU	V	-
<i>Diuris aequalis</i> F. Muell. ex Fitzg.	CR	V	Upgrade
<i>Elaeocarpus</i> sp. Rocky Creek (G. Read AQ 562114)	EN	E	-
<i>Epacris hamiltonii</i> Maiden & E. Betche	EN	E	-
<i>Eriocaulon carsonii</i> F. Muell.	CR	E	-
<i>Eucalyptus recurva</i> Crisp	CR	E	-
<i>Gentiana bredboensis</i> L. Adams	CR	V	Upgrade
<i>Grevillea acanthifolia</i> subsp. <i>paludosa</i> Makinson & Albrecht	CR	E	-
<i>Grevillea caleyi</i> R. Br.	EN	E	-
<i>Grevillea kennedyana</i> F. Muell.	VU	V	-
<i>Grevillea masonii</i> P. Olde & N. Marriott	EN	E	-
<i>Grevillea obtusiflora</i> R. Br. (2 subsp.)	EN & CR	E	-
<i>Grevillea wilkinsonii</i> R. Makinson	CR	E	-
<i>Hakea pulvinifera</i> L. Johnson	CR	E	-
<i>Haloragodendron lucasii</i> (Maiden & E. Betche) Orch.	CR	E	-
<i>Leionema lachnaeoides</i> (A.Cunn.) Paul G. Wilson	CR	E	-
<i>Micromyrtus minutiflora</i> (F. Muell.) Benth.	EN	V	Upgrade
<i>Persoonia glaucescens</i> Sieber ex Spreng.	EN	V	Upgrade
<i>Persoonia mollis</i> subsp. <i>maxima</i> Krauss & L. Johnson	EN	E	-
<i>Pimelea venosa</i> Threlfall	CR	E	-
<i>Plinthanthesis rodwayi</i> (C.E. Hubb.) S.T. Blake	CR	V	Upgrade
<i>Prostanthera junonis</i> B.J. Conn	EN	E	-
<i>Pterostylis</i> sp. Botany Bay (A. Bishop J221/1 13)	CR	E	-
<i>Pultenaea humilis</i> Benth. ex Hook. f.	EN/VU	Not listed	Proposed for Listing
<i>Pultenaea maritima</i> de Kok	VU	Not listed	Proposed for Listing
<i>Pultenaea parrisiae</i> subsp. <i>elusa</i> J.D. Briggs & Crisp	CR	E	-
<i>Rytidosperma pumilum</i> (Kirk) Linder	VU	V	-
<i>Senecio garlandii</i> F. Muell. ex Belcher	VU-NT	V	Consider

³ Taxa that qualify as Low Risk under the assessment schemes are referred to as either Near Threatened or Least Concern following the IUCN V3.1 2001 Guidelines. The IUCN definitions of these terms follow:

Near Threatened: A taxon is Near Threatened when it has been evaluated against the criteria but does not qualify for Critically Endangered, Endangered or Vulnerable now, but is close to qualifying for or is likely to qualify for a threatened category in the near future.

Least Concern: A taxon is Least Concern when it has been evaluated against the criteria but does not qualify for Critically Endangered, Endangered or Vulnerable. Widespread and abundant taxa are included in this category.

<i>Solanum armourense</i> A.R. Bean	CR-EN	Not listed	Proposed for Listing
<i>Solanum celatum</i> A.R. Bean	CR-EN	Not listed	Proposed for Listing
<i>Solanum limitare</i> A.R. Bean	CR-EN	Not listed	Proposed for Listing
<i>Tetradthea glandulosa</i> Smith	VU-NT	V	Re-assess later
<i>Tetradthea juncea</i> Smith	VU	V	-
<i>Trachymene saniculifolia</i> Stapf	CR	E	-
<i>Triplarina nowraensis</i> A.R. Bean	EN	E	
<i>Zieria adenophora</i> Blakely	CR	E	-
<i>Zieria buxijugum</i> J. Briggs & J.A. Armstrong ms	CR	E	-
<i>Zieria citriodora</i> J.A. Armstrong ms	CR	V	Upgrade
<i>Zieria formosa</i> J. Briggs & J.A. Armstrong ms	CR	E	-
<i>Zieria floydii</i> J.A. Armstrong	CR	E	-
<i>Zieria granulata</i> (F. Muell.) C. Moore ex Benth.	EN	E	-
<i>Zieria involucrata</i> R. Br. Ex Benth.	EN	V	Upgrade
<i>Zieria lasiocaulis</i> J.A. Armstrong ms	EN	E	-
<i>Zieria parrisiae</i> J. Briggs & J.A. Armstrong ms	CR	E	-
<i>Zieria prostrata</i> J.A. Armstrong ms	CR	E	-

3.0 Brief summary of outcomes of review

Following is a summary of the outcomes of the review since January 2002, including an outline of the factors influencing the conservation status of each taxon. Table 2 depicts a summary of the EFN Modified IUCN Red List Criteria (1998) assessment for each species.

Table 2. Summary of the EFN Modified IUCN Red List Criteria (1998) assessment for taxa reviewed to date. P = pessimistic assessment, B = Best estimate, and O = Optimistic assessment.

Taxon	EFN Modified IUCN Red List Criteria (1998)																				
	Overall			Rule A			Rule B			Rule C			Rule D			Rule E			Rule F		
	P	B	O	P	B	O	P	B	O	P	B	O	P	B	O	P	B	O	P	B	O
<i>Acacia pubescens</i>	CR	LR	LR	LR	LR	LR	LR	LR	LR	CR	LR	LR	EN	LR	LR	DD	DD	DD	LR	LR	LR
<i>Acacia pycnostachya</i>	VU	VU	VU	DD	DD	DD	LR	LR	LR	LR	LR	LR	LR	LR	LR	DD	DD	DD	VU	VU	VU
<i>Acacia ruppii</i>	CR	CR	CR	DD	DD	DD	EN	EN	VU	LR	LR	LR	LR	LR	LR	DD	DD	DD	CR	CR	CR
<i>Allocasuarina portuensis</i>	CR	CR	CR	CR	CR	CR	CR	CR	CR	CR	CR	CR	CR	CR	CR	DD	DD	DD	VU	VU	VU
<i>Almaleea cambagei</i>	EN	EN	VU	DD	DD	DD	EN	EN	LR	EN	EN	LR	LR	LR	LR	DD	DD	DD	EN	VU	VU
<i>Amphibromus fluitans</i>	VU	VU	VU	VU	VU	VU	LR	LR	LR	DD	DD	DD	LR	LR	LR	DD	DD	DD	VU	VU	VU
<i>Angiopteris evecta Hoffm.</i>	CR	CR	CR	DD	DD	DD	CR	CR	CR	CR	CR	CR	CR	CR	CR	DD	DD	DD	CR	CR	CR
<i>Bertya</i> sp. A Cobar-Coolabah	CR	CR	CR	DD	DD	DD	LR	LR	LR	LR	LR	LR	VU	VU	VU	DD	DD	DD	CR	CR	CR
<i>Boronia granitica</i>	VU	VU	VU	DD	DD	DD	VU	VU	VU	VU	LR	LR	LR	LR	LR	DD	DD	DD	VU	VU	VU
<i>Boronia repanda</i>	CR	CR	CR	DD	DD	DD	CR	CR	CR	CR	CR	DD	CR	CR	VU	DD	DD	DD	CR	CR	CR
<i>Caladenia arenaria</i>	EN	EN	EN	EN	EN	EN	LR	LR	LR	EN	EN	EN	LR	LR	LR	DD	DD	DD	EN	EN	EN
<i>Caladenia tessellata</i>	CR	CR	CR	DD	DD	DD	CR	CR	CR	CR	CR	CR	CR	CR	EN	DD	DD	DD	EN	EN	EN
<i>Carex raleighii</i>	EN	VU	VU	DD	DD	DD	LR	LR	LR	LR	LR	LR	EN	VU	LR	DD	DD	DD	VU	VU	VU
<i>Darwinia biflora</i>	VU	VU	VU	DD	DD	DD	VU	VU	VU	LR	LR	LR	LR	LR	LR	DD	DD	DD	LR	LR	LR
<i>Dillwynia tenuifolia</i>	VU	VU	VU	DD	DD	DD	VU	VU	VU	LR	LR	LR	LR	LR	LR	DD	DD	DD	DD	DD	DD
<i>Diuris aequalis</i>	CR	CR	VU	DD	DD	DD	EN	EN	LR	CR	CR	LR	EN	EN	VU	DD	DD	DD	VU	VU	VU
<i>Elaeocarpus</i> sp. Rocky Creek	EN	EN	EN	DD	DD	DD	EN	EN	EN	EN	EN	EN	EN	EN	EN	DD	DD	DD	VU	VU	VU
<i>Epacris hamiltonii</i>	EN	EN	VU	DD	DD	DD	EN	EN	LR	EN	EN	LR	VU	VU	LR	DD	DD	DD	VU	VU	VU
<i>Eriocaulon carsonii</i>	CR	CR	CR	DD	DD	DD	CR	CR	CR	EN	EN	VU	VU	VU	VU	DD	DD	DD	VU	VU	VU
<i>Eucalyptus recurva</i>	CR	CR	CR	DD	DD	DD	CR	CR	CR	CR	CR	CR	CR	CR	CR	DD	DD	DD	EN	EN	EN
<i>Gentiana bredboensis</i>	CR	CR	CR	DD	DD	DD	CR	CR	CR	CR	CR	CR	EN	EN	EN	DD	DD	DD	CR	CR	CR
<i>Grevillea acanthifolia</i> subsp. <i>paludosa</i>	CR	CR	CR	DD	DD	DD	LR	LR	LR	LR	LR	CR	CR	CR	CR	DD	DD	DD	VU	VU	VU
<i>Grevillea caleyi</i>	EN	EN	EN	VU	VU	VU	EN	EN	EN	EN	EN	EN	LR	LR	LR	EN	LR	LR	VU	VU	VU
<i>Grevillea kennedyana</i>	VU	VU	LR	DD	DD	DD	VU	VU	LR	VU	LR	LR	LR	LR	LR	DD	DD	DD	VU	VU	LR
<i>Grevillea masonii</i>	EN	EN	EN	DD	DD	DD	EN	EN	EN	EN	EN	EN	VU	VU	VU	DD	DD	DD	VU	VU	VU
<i>Grevillea obtusiflora</i> (incl. both subsp.)	EN	EN	EN	DD	DD	DD	EN	EN	EN	EN	EN	VU	VU	VU	VU	DD	DD	DD	VU	VU	VU
<i>Grevillea obtusiflora</i> subsp. <i>fecunda</i>	CR	CR	CR	DD	DD	DD	CR	CR	CR	EN	EN	EN	VU	VU	VU	DD	DD	DD	VU	VU	VU
<i>Grevillea obtusiflora</i> subsp. <i>obtusiflora</i>	EN	EN	EN	DD	DD	DD	EN	EN	EN	EN	EN	EN	VU	VU	VU	DD	DD	DD	EN	EN	EN
<i>Grevillea wilkinsonii</i>	CR	CR	CR	DD	DD	DD	CR	CR	CR	EN	EN	EN	VU	VU	VU	DD	DD	DD	CR	VU	VU
<i>Hakea pulvinifera</i>	CR	CR	EN	DD	DD	DD	CR	CR	LR	CR	CR	LR	EN	EN	EN	DD	DD	DD	CR	CR	VU
<i>Haloragodendron lucasii</i>	CR	CR	CR	DD	DD	DD	EN	EN	EN	CR	CR	CR	CR	CR	CR	DD	DD	DD	VU	VU	VU
<i>Leionema lachnaeoides</i>	CR	CR	EN	DD	DD	DD	CR	CR	EN	EN	EN	EN	VU	VU	VU	DD	DD	DD	VU	VU	VU
<i>Micromyrtus minutiflora</i>	EN	EN	EN	DD	DD	DD	EN	EN	EN	EN	VU	VU	LR	LR	LR	DD	DD	DD	VU	VU	VU
<i>Persoonia glaucescens</i>	EN	EN	EN	DD	DD	DD	VU	VU	VU	EN	EN	EN	VU	LR	LR	DD	DD	DD	VU	VU	VU
<i>Persoonia mollis</i> subsp. <i>maxima</i>	EN	EN	EN	DD	DD	DD	EN	EN	EN	EN	EN	EN	VU	VU	VU	DD	DD	DD	VU	VU	VU
<i>Pimelea venosa</i>	CR	EN	VU	CR	EN	LR	CR	VU	LR	CR	DD	DD	CR	VU	VU	DD	DD	DD	CR	VU	VU
<i>Plinthanthesis rodwayi</i>	CR	CR	CR	CR	CR	CR	CR	CR	CR	CR	CR	CR	CR	CR	CR	DD	DD	DD	VU	VU	VU
<i>Prostanthera junonis</i>	EN	EN	EN	DD	DD	DD	EN	EN	EN	EN	VU	VU	LR	LR	LR	DD	DD	DD	VU	VU	VU
<i>Pterostylis</i> sp. 15 (Botany Bay)	CR	CR	EN	DD	DD	DD	CR	CR	LR	CR	CR	LR	EN	EN	EN	DD	DD	DD	VU	VU	VU
<i>Pultenaea humilis</i>	EN	EN	VU	DD	DD	DD	LR	LR	LR	LR	LR	LR	EN	EN	VU	DD	DD	DD	VU	VU	VU
<i>Pultenaea maritima</i>	VU	VU	DD	DD	DD	DD	VU	VU	LR	DD	DD	DD	LR	LR	LR	DD	DD	DD	DD	DD	DD
<i>Pultenaea parrisiae</i> ssp. <i>elusa</i>	CR	CR	CR	DD	DD	DD	EN	EN	LR	CR	CR	LR	CR	CR	CR	DD	DD	DD	CR	CR	EN
<i>Rytidosperma pumilum</i>	VU	VU	VU	DD	DD	DD	DD	DD	DD	DD	DD	DD	VU	VU	VU	DD	DD	DD	VU	VU	VU

<i>Senecio garlandii</i>	VU LR	VU LR	LR	VU DD	VU DD	DD	LR	LR	LR	LR	LR	LR	LR	LR	LR	DD	DD	DD	LR	LR	LR
<i>Solanum armourense</i>	CR EN	CR EN	CR EN	DD	DD	DD	EN	EN	EN	CR EN	CR EN	CR EN	VU	VU	VU	DD	DD	DD	VU	VU	VU
<i>Solanum celatum</i>	CR EN	CR EN	CR EN	DD	DD	DD	VU	LR	LR	CR EN	CR EN	CR EN	DD	DD	DD	DD	DD	DD	DD	DD	DD
<i>Solanum limitare</i>	CR EN	CR EN	CR EN	DD	DD	DD	VU	VU	VU	CR EN	CR EN	CR EN	DD	DD	DD	DD	DD	DD	VU	VU	VU
<i>Tetradthea juncea</i>	VU	VU	VU	DD	DD	DD	VU	VU	VU	VU	VU	VU	LR	LR	LR	DD	DD	DD	DD	DD	DD
<i>Tetradthea glandulosa</i>	VU LR	VU LR	VU LR	DD	DD	DD	LR	LR	LR	VU LR	VU LR	VU LR	LR	LR	LR	DD	DD	DD	LR	LR	LR
<i>Trachymene saniculifolia</i>	CR	CR	CR	DD	DD	DD	CR	CR	CR	EN	EN	EN	VU	VU	VU	DD	DD	DD	VU	VU	VU
<i>Triplarina nowraensis</i>	EN	EN	EN	DD	DD	DD	EN	EN	EN	LR	LR	LR	LR	LR	LR	DD	DD	DD	VU	VU	VU
<i>Zieria adenophora</i>	CR	CR	CR	DD	DD	DD	CR	CR	LR	CR	CR	LR	EN	EN	EN	DD	DD	DD	CR	CR	CR
<i>Zieria buxijugum</i>	CR	CR	CR	DD	DD	DD	CR	CR	LR	CR	CR	LR	CR	CR	CR	DD	DD	DD	CR	CR	CR
<i>Zieria citriodora</i>	CR	CR	CR	DD	DD	DD	CR	CR	CR	EN	EN	EN	VU	VU	VU	DD	DD	DD	CR	VU	VU
<i>Zieria floydii</i>	CR	EN	EN	DD	DD	DD	CR	EN	LR	CR	EN	LR	EN	EN	EN	DD	DD	DD	VU	VU	VU
<i>Zieria formosa</i>	CR	CR	CR	DD	DD	DD	EN	EN	EN	CR	CR	CR	CR	CR	CR	DD	DD	DD	CR	CR	CR
<i>Zieria granulata</i>	EN	EN	EN	DD	DD	DD	EN	EN	EN	VU	VU	VU	LR	LR	LR	DD	DD	DD	EN	VU	VU
<i>Zieria involucrata</i>	EN	EN	VU	VU	VU	VU	EN	EN	VU	VU	VU	VU	LR	LR	LR	DD	DD	DD	VU	VU	VU
<i>Zieria lasiocaulis</i>	EN	EN	EN	DD	DD	DD	EN	EN	EN	LR	LR	LR	VU	VU	LR	DD	DD	DD	VU	VU	VU
<i>Zieria parrisiae</i>	CR	CR	CR	DD	DD	DD	CR	CR	CR	CR	CR	CR	CR	CR	CR	DD	DD	DD	CR	CR	CR
<i>Zieria prostrata</i>	CR	CR	VU	DD	DD	DD	CR	CR	LR	EN	EN	LR	VU	VU	VU	DD	DD	DD	VU	VU	VU

Acacia pubescens

The review process found that the shrub *Acacia pubescens* (Vent.) R.Br. is most likely appropriately listed as VULNERABLE. *Acacia pubescens* is a clonal species and the resultant uncertainty regarding population size means the species' conservation status was assessed as between Critically Endangered and Low Risk.

1. *Acacia pubescens* is a NSW endemic restricted to the Sydney area.
2. The species is known from approximately 115 highly fragmented population across an area of approximately 2600km².
3. The total population size can potentially be as low as approximately 140 individuals or as high as approximately 10500 individuals, depending upon the degree of clonality.
4. A total of only 3 ½ populations are protected within conservation reserves (Scheyville National Park and Windsor Downs Nature Reserve).
5. The species is threatened by loss of habitat due to clearing for urban development, habitat degradation through weed invasion, rubbish dumping, and track creation.

Acacia pycnostachya

The review process found that the tree *Acacia pycnostachya* F. Muell. is appropriately listed as VULNERABLE.

1. *Acacia pycnostachya* is a NSW endemic restricted to the upper northern tablelands of NSW between Bolivia Hill and the Queensland border, where it is known from only three populations occurring among granite outcrops.
2. The total population size is estimated to be greater than 30 000 individuals. The majority of the two largest populations occur within conservation reserves.
3. The unreserved population occurs on private property and is threatened by clearing and grazing.

Acacia ruppii

The review process found that the shrub *Acacia ruppii* Maiden & E. Betche is appropriately listed as ENDANGERED.

1. *Acacia ruppii* is a NSW endemic restricted to the Grafton-Coledale area in the north of the state.
2. This review considers *A. ruppii* as distinct from *A. torringtonensis* (following *The Flora of NSW*), however some botanists consider these taxa to be conspecific under the name *A. ruppii*.
3. The species is known from at least 12 populations across a range of land tenures including; crown land, private property, road verges, Banyabba State Forest and the conservation reserves: Banyabba Nature Reserve and Fortis Creek National Park. The species may also occur in Mount Neville Nature Reserve.
4. The total number of individuals is estimated to be in the tens of thousands. However, the majority of individuals are restricted to a single population in Banyabba State Forest.
5. Threats to the species include (i) habitat loss due to clearing and road maintenance, and (ii) an inappropriate fire regime.

Allocasuarina portuensis

The review process found that the dioecious slender shrub *Allocasuarina portuensis* L. Johnson is appropriately listed as ENDANGERED.

1. The NSW endemic *A. portuensis* is known from only a single population within Sydney Harbour National Park.
2. The single population has declined from only 10 individuals in 1986 to only a single female surviving in 2002 (excluding re-introduced individuals).

3. The single population is threatened by; low recruitment (male plants have been reintroduced into the population), an inappropriate fire regime, weed invasion, habitat degradation due to recreational use, and possible contamination by landfill.

Almaleea cambagei

The review process found that the erect shrub *Almaleea cambagei* (Maiden & E. Betche) Crisp & P. Weston is appropriately listed as ENDANGERED.

1. Within NSW, *A. cambagei* is known only from the Torrington area in the north of the state. The species also occurs in southern Queensland in the Wallangarra district.
2. The species is known from fewer than 15 populations and has a highly restricted distribution with an extent of occurrence of approximately 88km².
3. *Almaleea cambagei* occurs within swamps and along drainage lines. The majority of populations occur within Torrington State Recreation Area with a few populations potentially occurring in the adjacent agricultural lands.
4. Threats to *A. cambagei* include grazing by domestic stock, clearing for grazing, possible future mining activities, and habitat degradation associated with recreational fossicking and camping.

Amphibromus fluitans

The review process found that the aquatic grass *Amphibromus fluitans* Kirk is appropriately listed as VULNERABLE.

1. *Amphibromus fluitans* occurs within New South Wales, Victoria and New Zealand. Within NSW, the species is primarily restricted to several localities along the Murray River in the south of the state from Albury west to Moira State Forest near Deniliquin. There is one disjunct population at the headwaters of Wollondilly river near Crookwell, and a second disjunct population, now thought to be extinct, has also been recorded along the Murrumbidgee River near Narrandera.
2. *Amphibromus fluitans* occupies the shallow water of relatively permanent riverside swamps and is currently known from seven wetlands within NSW. The total number of individuals within NSW is unknown given the difficulty associated with estimating population size. Estimates for each site range from 10's to 1000's of individuals.
3. No populations are known to occur within any conservation reserves.
4. Given that *A. fluitans* occurs within riverside wetlands, it is dependent upon spring flooding of the rivers. Alteration of water flow regimes, eg. for irrigation purposes, poses a considerable threat. Grazing and trampling by stock also threaten the species.

Angiopteris evecta

The review process found that the giant fern *Angiopteris evecta* Hoffm. is appropriately listed as ENDANGERED.

1. Only a single individual of *Angiopteris evecta* is known to occur in NSW.
2. The species also occurs elsewhere in Australia within the Northern Territory and Queensland and also occurs in Malaysia, Polynesia and New Guinea.
3. The single NSW individual occurs on private property and is threatened by fire, weed invasion, collection, and excessive site visitation.

Bertya sp. A Cobar-Coolabah

The review process found that the slender shrub or small tree *Bertya sp. A Cobar-Coolabah* (Cunningham & Milthorpe s.n., 2/8/73) requires upgrading from Vulnerable to ENDANGERED.

1. The NSW endemic *Bertya sp. A Cobar-Coolabah* is known from only five populations. Three populations occur in the north east of the state in the Grafton area and two occur in the north west of the state in the Cobar-Coolabah area.
2. The majority of individuals are restricted to a single population supporting greater than 5 million plants. The remaining four populations support less than 1000 individuals in total.

3. Given that the species occurs in two disjunct geographic locations, the species possesses a relatively large linear range of over 650km and an extent of occurrence of approximately 23600km².
4. Only one population, supporting less than 20 individuals, occurs within a conservation reserve (Gibraltar Range National Park). Of the remaining populations, three occur within state forest and one on private property.
5. Continuing declines in the number populations are predicted given that at least one population has been lost to extinction since the 1980's and two of the extant populations appear to be senescent, exhibiting no obvious recruitment.
6. *Bertya sp.* A Cobar-Coolabah is threatened by grazing, inappropriate disturbance regimes and clearing.

Boronia granitica

The review process found that the shrub *Boronia granitica* Maiden & E. Betche requires downgrading from Endangered to VULNERABLE.

1. *Boronia granitica* occurs in southern Queensland and reaches its southern limit in New South Wales. In New South Wales, it is restricted to the New England Tablelands from near Armidale north to the Torrington district.
2. In NSW, the species is known from seven locations, with an extent of occurrence of less than 900 km². Only two of these locations are protected within conservation reserves.
3. Recent surveys have found that the total population size is much larger than previously believed, with total population size estimated to be greater than 4000 individuals. Total population size can be variable given that adult plants are killed by fire.
4. Many populations are threatened by grazing and inappropriate fire regimes and at least two locations are potentially threatened by habitat destruction through clearing and mining activities.

Boronia repanda

The review process found that the small shrub *Boronia repanda* (F. Muell. ex E. Betche) Maiden & E. Betche is appropriately listed as ENDANGERED.

1. Within NSW, *B. repanda* is known from only one collection pre 1900 from the Maryland area north of Tenterfield near the Queensland border. The species also occurs at a number of locations in adjacent areas of Queensland near Stanthorpe.
2. The original label lists the location as "Maryland, between NSW and Queensland". There have been claims that there is a possibility that the collection may have been collected in Queensland as Maryland Station apparently extended at that time across the border into Queensland. Whether the collection came from NSW or Queensland can not be confirmed given the ambiguous collection location.
3. *Boronia repanda* has not been relocated in NSW for over 100 years. However, the species does not meet the requirements for extinct in NSW, despite not being located during the preceding 50 years, given that there has not been searching of known and likely habitat. The only survey conducted to date was a survey in the mid 1990's for suitable habitat along roadsides in the Maryland area.

Caladenia arenaria

The review process found that the terrestrial orchid *Caladenia arenaria* Fitzg. is appropriately listed as ENDANGERED.

1. *Caladenia arenaria* is a NSW endemic currently known to occur at only five locations between Yarranjerry State Forest in the north, and Urana in the south. The species historically had a much larger geographic distribution. At least two populations have become locally extinct since 1990.
2. The total number of individuals is estimated to be approximately 2000.
3. No populations are known to occur within conservation reserves.

4. Threats to the species include: (i) clearing of habitat, (ii) habitat degradation caused by weed invasion and heavy grazing, and (iii) illegal collection.

Caladenia tessellata

The review process found that the terrestrial orchid *Caladenia tessellata* Fitzg. requires upgrading from Vulnerable to ENDANGERED.

1. Within NSW, *C. tessellata* occurs in two disjunct areas; near Braidwood on the Southern Tablelands and in the Wyong area on the Central Coast. The species also occurs in Victoria.
2. *Caladenia tessellata* is currently known from only four small and isolated populations within NSW, with total population size estimated to be fewer than 50 individuals. The species possesses a combined area of occupancy of less than 1ha.
3. The species is not known to occur within any conservation reserves.
4. There are continuing declines in the number of individuals and in the number of populations, with at least two populations lost to extinction since the 1980's and at least 14 populations in the Sydney and South Coast areas not seen since the mid 1900's.
5. Due to small population size, *C. tessellata* is susceptible to catastrophic events and localised extinction. The species is also threatened by pedestrian activity and habitat degradation.

Carex raleighii

The review process found that the perennial herb *Carex raleighii* Nelmes is appropriately listed as ENDANGERED.

1. Within NSW, *C. raleighii* is currently known from only three locations within Kosciusko National Park. The species was also known in the 1950s from at least two other locations within or near Kosciusko National Park. The species is also known to occur in Victoria and the ACT.
2. It is difficult to obtain an accurate estimate of the number of individuals given that the species is rhizomatous, inconspicuous and may not flower every year. Based on current knowledge, total population size is likely to be at least 220 individuals.
3. There appear to be no major threats to this species. However, given the apparent preference of this species for areas adjacent to creeks and rivers, disturbance from recreational activities such as fishing could potentially cause minor habitat disturbance.
4. It is anticipated this species will be the subject of targeted surveys in 2003 if funds allow. If further targeted survey for this species reveals population size to be larger than 250 individuals, the species' conservation status needs to be reassessed.

Darwinia biflora

The review process found that the small shrub *Darwinia biflora* (Cheel) B. Briggs is appropriately listed as VULNERABLE.

1. *Darwinia biflora* is a NSW endemic restricted to the northern and north-western suburbs of Sydney, from Maroota to North Ryde.
2. The species is known from approximately 130 highly fragmented sites across an area of approximately 600km².
3. The total number of individuals, while variable given that adult plants are killed by fire, is likely to be greater than 10 000.
4. 21 of the 130 known sites are known to occur within conservation reserves (Marramarra National Park (NP), Kuring-gai Chase NP, Lane Cove NP, Mougamarra Nature Reserve) and an additional 24 sites are known to occur within Berowra Valley Regional Park.

5. Threats to the species include habitat loss due to clearing for residential and commercial development and habitat degradation through clearing for power line maintenance, track creation, weed invasion and inappropriate fire regimes.

Dillwynia tenuifolia

The review process found that the low spreading shrub *Dillwynia tenuifolia* Sieber ex DC. is appropriately listed as VULNERABLE

1. *Dillwynia tenuifolia* is a NSW endemic, with a core distribution in western Sydney, with several disjunct populations in the lower Blue Mountains and the lower Hunter region.
2. *Dillwynia tenuifolia* is known from at least 35 populations, with total population size estimated to be in the order of millions of individuals.
3. The species possesses a restricted distribution with an extent of occurrence of less than 1700km².
4. *Dillwynia tenuifolia* occurs within a number of conservation reserves including Agnes Banks Nature Reserve (NR), Scheyville National Park (NP), Blue Mountains NP, Yengo NP, Windsor Downs NR, Castlereagh NR and Mulgoa NR.
5. Clearing for urban, agricultural and mining activities remains a threat to this species at many locations in the western Sydney region. Other threats impacting individual populations include weed invasion, disturbance from tracks and trail bike activities, rubbish dumping, regular slashing and road widening.

Diurus aequalis

The review process found that the terrestrial orchid *Diurus aequalis* F. Muell. ex Fitzg. requires upgrading from Vulnerable to ENDANGERED.

1. *Diurus aequalis* is a NSW endemic restricted to fewer than 20 small and fragmented populations between Braidwood and the Blue Mountains in the central and southern tablelands of NSW. The species previously occurred in the Liverpool area but has not been located here in over 100 years.
2. The total population size is estimated to be fewer than 250 individuals, with no population containing more than 50 individuals.
3. Only three populations, containing a total of fewer than 50 individuals, are protected within a conservation reserve (Kanangra-Boyd National Park). The remaining populations are restricted to remnant vegetation along roadsides and within agricultural lands.
4. The species is threatened by loss of habitat and continuing declines in habitat quality due to grazing and road maintenance.

***Elaeocarpus* sp. Rocky Creek**

The review process found that the small tree *Elaeocarpus* sp. Rocky Creek (G. Read AQ 562114) is appropriately listed as ENDANGERED.

1. *Elaeocarpus* sp. Rocky Creek is a NSW endemic restricted to the southern edge of the Mt Warning caldera north of Lismore in north-eastern NSW.
2. The species is known from only eight small sub-populations across a restricted geographic area. The total number of mature individuals is approximately 140.
3. Only 2.5 populations occur within conservation reserves (Nightcap National Park, Mount Jerusalem National Park and Snows Gully Nature Reserve). The remaining populations occur within Whian Whian State Forest and a single individual occurs on Council land managed as water catchment for Rocky Creek dam.
4. Threats to the species include: (i) logging operations, (ii) low recruitment and (iii) fungal pathogens.

Epacris hamiltonii

The review process found that the shrub *Epacris hamiltonii* Maiden & E. Betche is appropriately listed as ENDANGERED.

1. *Epacris hamiltonii* is a NSW endemic restricted to the Blue Mountains area of NSW, where it occurs on or adjacent to sandstone cliffs alongside perennial creeks.
2. The species is known from only five populations, with an extent of occurrence of less than 10km².
3. The total population size is estimated to be fewer than 1200 individuals.
4. The majority of individuals occur within the Blue Mountains National Park, however these individuals are still threatened by habitat degradation, primarily through potential weed infestation.

Eriocaulon carsonii

The review process found that the shrub *Eriocaulon carsonii* F. Muell. is appropriately listed as ENDANGERED.

1. *Eriocaulon carsonii* is a forb endemic to a small number of mound springs on the edge of the Great Artesian Basin.
2. Within NSW the species is known from only a single population across an area of less than 2 ha within Peery National Park in the west of the state.
3. The total number of individuals fluctuates over time and has never been recorded to be greater than 3000.
4. Although the single population occurs within a National Park, it is still threatened by; trampling by feral herbivores, disturbance by pigs, and habitat alteration arising from excessive spring water usage.

Eucalyptus recurva

The review process found that the mallee *Eucalyptus recurva* Crisp is appropriately listed as ENDANGERED.

1. *Eucalyptus recurva* is a NSW endemic restricted to only 4 stands in on the southern Tablelands of NSW in the Mongarlowe-Windelama area north of Braidwood. Each of the 4 sites may contain as few as one genetic individual.
2. None of the 4 stands occur within a conservation reserve.
3. The species sets very few seeds and exhibits low seedling vigour. The chance of recruitment of new individuals in the field is considered low.
4. Habitat degradation via vehicular damage, soil compaction and potential development activities are threatening this species. The species is also highly susceptible to both demographic and environmental stochasticity given the small number of individuals and that few sites exist. The species' low level of genetic diversity, and the resultant apparent inbreeding depression, may also threaten the species in the long term given that new recruits are unlikely.

Gentiana bredboensis

The review process found that the annual or possibly biennial herb *Gentiana bredboensis* L. Adams requires upgrading from Vulnerable to ENDANGERED.

1. The NSW endemic *Gentiana bredboensis* is known from only a single population SSE of Jerangle in the Monaro Region on the southern tablelands.
2. The single population supports less than 200 individuals and occupies a very restricted area.
3. No populations are known to occur within a conservation reserve, with the single known population occurring on private property.
4. A nearby sub-population on an adjacent private property has apparently become locally extinct in recent years.

5. *Gentiana bredboensis* is threatened by an inappropriate disturbance regime, habitat clearing, excessive grazing, fertiliser use and sowing of exotic pasture species. Given that the species is known only from a single location it is also threatened by demographic and environmental stochasticity.

Grevillea acanthifolia* subsp. *paludosa

The review process found that the spreading to erect shrub *Grevillea acanthifolia* subsp. *paludosa* Makinson & Albrecht is appropriately listed as ENDANGERED.

1. *Grevillea acanthifolia* subsp. *paludosa* is a NSW endemic restricted to the Nalbaugh Plateau in the southern tablelands.
2. The species has a highly restricted distribution and is known from only a single location within Nalbaugh National Park.
3. The species also has a small population size, with less than 50 mature individuals recorded.
4. The species may be threatened by an inappropriate fire regime, and given that it is known from only a single location is threatened by demographic and environmental stochasticity.

Grevillea caleyi

The review process found that the shrub *Grevillea caleyi* R. Br. is appropriately listed as ENDANGERED.

1. *Grevillea caleyi* is a NSW endemic restricted to the Terry Hills area, approximately 20km north of Sydney.
2. The species is known from only 18 small and fragmented sites across an area of approximately 28 km². The total number of individuals varies greatly over time in response to fire. Adult plants are killed by fire. There is estimated to be a population size of less than 5000 plants.
3. Only one site is entirely protected within a conservation reserve (Ku-ring-gai Chase National Park) and three sites occur in part within conservation reserves (Ku-ring-gai Chase NP and Garigal NP). These sites are subject to a range of edge effects. The remaining sites occur primarily along road-verges and in small pockets of remnant vegetation among urban development.
4. The main threats to *G. caleyi* are loss and degradation of habitat. An estimated 85% of the habitat of *G. caleyi* has already been lost through urbanisation. Habitat degradation occurs via weed invasion and rubbish dumping. The species is also threatened by inappropriate fire regimes in relation to a limited ability to produce viable seeds that successfully reach a dormant soil seedbank.

Grevillea kennedyana

The review process found that the erect rhizomatous shrub *Grevillea kennedyana* F. Muell. is currently appropriately listed as VULNERABLE.

1. *Grevillea kennedyana* is currently known from four broad localities in the extreme northwest of NSW and adjacent areas of Queensland.
2. While the exact number of individuals is difficult to determine due to the clonal nature of the species, within NSW, the total number of individuals is estimated to be at least 10000. The species possesses an extent of occurrence of approximately 800km² and an area of occupancy of approximately 1800ha.
3. Three of the four locations are protected within Sturt National Park, with the fourth location occurring within an adjacent private property.
4. The species is potentially threatened by; (i) low levels of sexual recruitment given that the species exhibits low seed set and reproduces primarily via rhizomes, and (ii) grazing/browsing pressure from native herbivores, rabbits, goats, and domestic stock within the private property.
5. Currently, research is evaluating the impacts of browsing on adult survival and recruitment. If low recruitment and browsing/grazing pressures are found not to threaten the species, then the conservation status of *Grevillea kennedyana* may need to be reassessed.

Grevillea masonii

The review process found that the lignotuberous shrub *Grevillea masonii* P.Olde & N.Marriott is appropriately listed as ENDANGERED.

1. *Grevillea masonii* is a NSW endemic restricted to between Grafton and Casino in the north-east of the state.
2. The species is currently known from 10 populations, with the total number of mature individuals estimated at approximately 500.
3. Only a single population occurs within a conservation reserve (Fortis Creek National Park). The remaining populations occur along road-verges, on private property, or in State Forest.
4. A range of activities threaten the species including: road-verge maintenance, clearing for agriculture, trampling by grazing animals, and forestry activities.

***Grevillea obtusiflora* (including both subsp.)**

The review process found that the shrub *Grevillea obtusiflora* R. Br. is appropriately listed as ENDANGERED.

1. *Grevillea obtusiflora* is a NSW endemic restricted to the Rylstone and Lithgow regions of the central tablelands of NSW.
2. The species is known from only five populations, with an extent of occurrence of less than 13 km².
3. Only one population occurs within a conservation reserve (Gardens of Stone National Park), within the remaining populations occurring within State Forest, along road verges, or on private property.
4. The total population size is estimated to be fewer than 2000 individuals, with the majority of individuals occurring within three of the five populations.
5. The species is threatened by clearing associated with agriculture, inappropriate fire regimes and roadside management activities.

Grevillea wilkinsonii

The review process found that the shrub *Grevillea wilkinsonii* R. Makinson is appropriately listed as ENDANGERED.

1. *Grevillea wilkinsonii* is a NSW endemic restricted to a 4.5 km stretch of land adjacent to the Goobarragandra River, east of Tunit on the southern tablelands of NSW.
2. The total population size is estimated to be fewer than 400 individuals, with the majority of individuals occurring within a single population. None of the known populations occur within conservation reserves.
3. The total population is severely fragmented due to clearing of vegetation and grazing by domestic stock. Alterations to the habitat via grazing and weed infestation combined with changes to the natural flooding regime for the species is likely to impact on survival and recruitment in the species.

Hakea pulvinifera

The review process found that the clonal shrub *Hakea pulvinifera* L. Johnson is appropriately listed as ENDANGERED.

1. *Hakea pulvinifera* is a NSW endemic restricted to a single population on a rocky hillside below Keepit Dam near Gunnedah.
2. The total population size is estimated to be fewer than 250 individuals and could be as low as one individual given that the entire population may comprise a single clone.
3. The single population does not occur within a conservation reserve and is threatened by: competition with *Callitris glaucophylla*, trampling by humans and stock, browsing by herbivores and potential soil borne pathogens.

Haloragodendron lucasii

The review process found that the erect shrub *Haloragodendron lucasii* (Maiden & E. Bêche) Orch. is appropriately listed as ENDANGERED.

1. *Haloragodendron lucasii* is a NSW endemic restricted to only nine sites in the Hornsby-Gordon area of the northern suburbs of Sydney. The species possesses a highly restricted geographic distribution, with a linear range of only 10km.
2. An undescribed species of *Haloragodendron* restricted to the Blue mountains is similar to *H. lucasii*, but is considered to be a different taxon.
3. The pollen of *Haloragodendron lucasii* is mostly sterile and the species has not been observed to set seed despite over five years of intensive monitoring. The species is highly clonal, with each site supporting only a few genets. Given the high degree of clonality it has been estimated that <20 individuals exist across the nine sites.
4. A number of sites occur within Ku-ring-gai Chase National Park and a single site occurs in part within Garrigal National Park.
5. *Haloragodendron lucasii* is threatened by the loss of habitat to urbanisation and weed invasion and may be threatened in the long-term by its inability to set fruit. Given the low number of genetic individuals and its restricted geographic range, the species may also be threatened by environmental stochasticity.

Leionema lachnaeoides

The review process found that the shrub *Leionema lachnaeoides* (A. Cunn.) Paul G. Wilson is appropriately listed as ENDANGERED.

1. *Leionema lachnaeoides* is a NSW endemic known from only 10 populations that occur on cliff tops in the Megalong and Jamison Valleys in the Blue Mountains.
2. The total number of individuals is estimated to be fewer than 450, with the species occupying an area of less than 1 ha. The total population is severely fragmented, with all but one population containing fewer than 100 individuals.
3. Only one of the known populations occurs within a conservation reserve (Blue Mountains National Park).
4. The species is threatened by habitat degradation via weed invasion and up-slope disturbance.

Micromyrtus minutiflora

The review process found that the small shrub *Micromyrtus minutiflora* (F. Muell.) Benth. requires upgrading from Vulnerable to ENDANGERED.

1. *Micromyrtus minutiflora* is a NSW endemic restricted to the western part of the Cumberland Plain, western Sydney.
2. The species has a highly restricted distribution, with a linear range of only 17 km and an extent of occurrence of approximately 150km².
3. The total number of individuals is estimated to be at least 1800. Only a single population of uncertain size (most likely low hundreds) is protected within a conservation reserve (Castlereagh Nature Reserve).
4. The existing populations are highly fragmented due to the clearing of habitat for agricultural and urban development and are threatened by further clearing, frequent fire and habitat degradation. Various activities are contributing to habitat degradation including; illegal rubbish dumping, weed invasion, arson, grazing and trail bike riding.

Persoonia glaucescens

The review process found that the shrub *Persoonia glaucescens* Sieber ex Spreng. requires upgrading from Vulnerable to ENDANGERED.

1. The NSW endemic *Persoonia glaucescens* is restricted to the Southern Highlands between Picton and Berrima.

2. *Persoonia glaucescens* is currently known from 16 fragmented populations, with total population size, while variable given that adult plants are killed by fire, estimated to be approximately 850 individuals. The species possesses an extent of occurrence of approximately 550km² and an area of occupancy of approximately 200ha.
3. Only 2 populations, supporting a total of approximately 50 individuals, occur within a conservation reserve (Natti National Park).
4. Habitat destruction and degradation threaten this species. Many of the populations occur within remnant vegetation along road verges and are threatened by road maintenance activities. In addition, intensive recreational vehicle use and rubbish dumping threaten many populations. Given that the species is a fire-sensitive obligate seeder, it is also threatened by inappropriate fire regimes. Other potential threats include; low seed viability and seedling herbivory.

Persoonia mollis* subsp. *maxima

The review process found that the shrub *Persoonia mollis* subsp. *maxima* Krauss & L. Johnson is appropriately listed as ENDANGERED.

1. *Persoonia mollis* subsp. *maxima* is a NSW endemic restricted to three populations within the Hornsby Heights -Mt Colah – Mt Ku-ring-gai area north of Sydney, where it occurs in deep gullies or on the steep upper hillsides of narrow gullies.
2. The total number of individuals, while variable given that adult plants are killed by fire, is estimated to be approximately 540. The species occupies a restricted area with an extent of occurrence of only 24km².
3. Only one of the known populations occurs within a conservation reserve (Ku-ring-gai Chase National Park).
4. The species is threatened by inappropriate fire regimes, habitat degradation through weed invasion, rubbish dumping and urban run-off, and habitat loss through development and easement maintenance.

Pimelea venosa

The review process found that the densely hairy erect shrub *Pimelea venosa* Threlfall is appropriately listed as ENDANGERED.

1. Past records of the NSW endemic *Pimelea venosa* indicate that its range is restricted to the granite country between Deepwater and Bluff Rock near Tenterfield. The species has only ever been recorded at two locations; Bolivia Hill and Bluff Rock.
2. The most recent sighting of this species was in 1996. Subsequent targeted surveys of known and possible habitat have failed to relocate any individuals.
3. With the recent gazettal of Bolivia Hill Nature Reserve, one site where the species was recorded previously now occurs within a conservation reserve. The second site occurs adjacent to the western boundary of the Reserve.
4. Habitat degradation, primarily by vehicular damage, threaten *P. venosa*. Vehicular damage was proposed as a possible cause of the demise of the last known extant individual. All past known collections occurred along roads, tracks or rail easements.

Plinthanthesis rodwayi

The review process found that the perennial grass *Plinthanthesis rodwayi* (C.E. Hubb) S.T. Blake requires upgrading from Vulnerable to ENDANGERED.

1. *Plinthanthesis rodwayi* is a NSW endemic, which was known from only two mountaintops within Budawang National Park (Mt Budawang and Mt Currockbilly) in the 1930's – 1970's.
2. The species has not been relocated at these sites in recent years despite thorough surveys, and despite the species being noted as locally frequent in the late 1970s.
3. Although the exact cause of decline is unknown, proposed causes include: gross change in vegetation structure, grazing by macropods and a decrease in fire frequency.

Prostanthera junonis

The review process found that the shrub *Prostanthera junonis* B.J. Conn is appropriately listed as ENDANGERED.

1. *Prostanthera junonis* is a NSW endemic restricted to the Somersby area near Gosford on the central coast of NSW.
2. The species is currently known from 12 populations, with an extent of occurrence of less than 50 km². The total number of mature individuals has been estimated to be between two and four thousand.
3. Only three of these populations are protected within a conservation reserve (Brisbane Water National Park), with the majority of the remaining populations occurring on private property.
4. The species is threatened by habitat loss through clearing for development, an inappropriate disturbance regime, habitat degradation and fragmentation.

***Pterostylis* sp. Botany Bay**

The review process found that the terrestrial orchid *Pterostylis* sp. Botany Bay (A. Bishop J221/1 13) is appropriately listed as ENDANGERED.

1. *Pterostylis* sp. Botany Bay is a NSW endemic known only from a single small population at Kurnell Peninsula in Botany Bay National Park in Southern Sydney, NSW.
2. The total number of individuals is estimated to be approximately 65, with the species occupying an area of less than 1 ha.
3. The species is threatened by inappropriate fire regimes and habitat degradation related to unrestricted access.

Pultenaea humilis

The review process found that the erect to prostrate rhizomatous shrub *Pultenaea humilis* Benth. ex Hook. f. is eligible for listing as VULNERABLE.

1. *Pultenaea humilis* occurs in New South Wales, Victoria and Tasmania. Within NSW, the species is known from only a single location within Murraguldrie State Forest, SSE of Wagga Wagga.
2. The single population supports only a few hundred mature individuals.
3. The single population within Murraguldrie State Forest occurs within an area set aside as a flora reserve (Murraguldrie Flora Reserve No 179).
4. Given that the only known NSW population occurs adjacent to a fire trail it is potentially threatened by fire control activities. The single population is also potentially threatened by the demographic and environmental stochasticity associated with such a restricted distribution and small population size.

Pultenaea maritima

The review process found that the prostrate shrub *Pultenaea maritima* de Kok is eligible for listing as VULNERABLE.

1. *Pultenaea maritima* occurs in New South Wales and Queensland and is restricted to grasslands on exposed coastal headlands. Within NSW, the species has been recorded from Newcastle north to Byron Bay.
2. The species was only recently described and was previously considered a prostrate maritime form of *Pultenaea villosa*.
3. The species has been recorded at 16 headlands. The number of individuals at each of these sites is unknown. Five sites occur within conservation reserves (Moonee Beach Nature Reserve and Hat Head National Park).
4. The species is threatened by habitat degradation, given that many of the headlands supporting *Pultenaea maritima* are highly weed infested (particularly by Bitou Bush) and are subject to high levels of recreation activities.

Pultenaea parrisiae* ssp. *elusa

The review process found that the sub-shrub *Pultenaea parrisiae* ssp. *elusa* J.D. Briggs & Crisp is appropriately listed as ENDANGERED.

1. *Pultenaea parrisiae* ssp. *elusa* is a NSW endemic known only from two specimens collected in 1938 from Penrose and Wingello, in the southeast of the NSW central tablelands.
2. No current locations for the species are known. If the taxon still occurs within the Penrose-Wingello area, its extent of occurrence is likely to be less than 5 km².
3. Most of the swamp habitat where this species could occur is on privately property and continues to be degraded through various farming practices such as the grazing of domestic stock.
4. This subshrub is inconspicuous and targeted survey of likely swamp habitat is required.

Rytidosperma pumilum

The review process found that the grass *Rytidosperma pumilum* (Kirk) Linder is appropriately listed as VULNERABLE.

1. Within Australia, *Rytidosperma pumilum* is known from only a single population within Kosciuszko National Park. The species also occurs in New Zealand.
2. The single population occurs within a fieldmark vegetation community and is restricted to the exposed ridges and summits of and between two mountaintops. The population covers an area of approximately 3 ha and supports at least 5000 individuals.
3. The species is threatened by demographic and environmental stochasticity due to its restricted geographic and ecological distribution.

Senecio garlandii

The review process found that the perennial herb or subshrub *Senecio garlandii* F. Muell. ex Belcher currently has a conservation status of borderline VULNERABLE and NEAR THREATENED.

1. Within NSW, *Senecio garlandii* is currently known from 17 populations between Wyalong and Albury on the Central and South Western Slopes. The species has also recently been re-discovered in Victoria, where a single population of 11 individuals occurs north of Beechworth.
2. The total number of individuals within NSW is estimated to be greater than 72500. Six of the 17 populations, supporting approximately 80% of the total number of individuals, occur within conservation reserves.
3. The species possesses a linear range of approximately 210 km, an extent of occurrence of approximately 9900 km², and an area of occupancy of approximately 63 ha.
4. There appear to be no major threats to this species. The species is generally restricted to the upper slopes of the steeper and more rugged ranges and thus occupies habitat unlikely to be developed. However, there are a number of smaller populations on private property that may eventually be affected by rural subdivision.

Solanum armourense

The review process found that the recently described shrub *Solanum armourense* A.R. Bean is eligible for listing as ENDANGERED.

1. *Solanum armourense* is a NSW endemic confined to a relatively small area south-west of Sydney, from Mt Armour within Blue Mountains National Park south to the Wombeyan area.
2. The species grows amongst other shrubs in eucalypt woodland, on steep rocky hillsides with shallow soil and has been recorded from only four locations. Despite recent survey of the species habitat, only two mature individuals were found at a single location.
3. Three of the four locations occur within Blue Mountains National Park.

4. *Solanum armourense* is a fire sensitive obligate seeder and is thus potentially threatened by inappropriate fire regimes. Populations outside Blue Mountains National Park are also potentially threatened by habitat destruction.

Solanum celatum

The review process found that the recently described shrub *Solanum celatum* A.R. Bean is eligible for listing as ENDANGERED.

1. *Solanum celatum* is a NSW endemic recorded from a restricted area from Wollongong to just south of Nowra, and west to Bungonia.
2. The majority of records are historical, with a recent survey of many sites locating only a single plant within Macquarie Pass National Park, SW of Wollongong. Excluding confirmed local extinctions, the species possesses a linear range of approximately 80 km and an extent of occurrence of approximately 1967 km². However it is possible that the species is currently much more geographically restricted.
3. Much of the area of occurrence of *Solanum celatum* has been cleared or grossly altered, and any uncleared areas are often swathed in dense patches of *Lantana camara*. The species is thus threatened by habitat destruction through clearing for agricultural or urban development and is also threatened by habitat degradation, primarily by invasion of *Lantana camara*. Given that *S. celatum* is a fire sensitive obligate seeder it is also potentially threatened by inappropriate fire regimes.

Solanum limitare

The review process found that the recently described shrub *Solanum limitare* A.R. Bean is eligible for listing as ENDANGERED.

1. The shrub *Solanum limitare* occurs from the Bunya Mountains in southern Queensland south to Kyogle and Urbenville in northern NSW.
2. The species has been recorded from six locations within NSW. However, the majority of these records are pre-1974, with only one population relocated in recent times. The single known population supports only a single individual.
3. Assuming the six locations support extant populations, the species possesses a linear range of approximately 60 km and an extent of occurrence of approximately 1517 km². The species' current geographic range in NSW is likely to be considerably less. Based on current information it is difficult to confirm local extinction of any of these populations given the vagueness of original collection locations.
4. At least two of the historical collections were collected from land that is now a conservation reserve (Border Ranges National Park).
5. All populations are threatened by weed invasion, particularly by *Lantana camara*. Those populations on private property are also threatened by habitat destruction.

Tetradlea glandulosa

The review process found that the small shrub *Tetradlea glandulosa* Smith currently has a conservation status that is borderline VULNERABLE to NEAR THREATENED. The actual status will depend on the demographic implications of the reported low levels of sexual recruitment in the species.

1. The NSW endemic *T. glandulosa* is restricted to the Central Coast Botanical Division. The species' distribution ranges from Sampsons Pass (adjacent to Yengo National Park) in the north, to West Pymble (Lane Cove National Park) in the south, and west to Upper Colo (Wollemi National Park). There are historical collections of *T. glandulosa* further south to Manly, Willoughby and Mosman, however these sub-populations are no longer extant.
2. The exact number of mature reproducing plants is uncertain. Approximately 11100 plants exist across less than 200 populations. The species possesses a linear range of approximately 65km and an extent of occurrence of approximately 2086km².
3. *Tetradlea glandulosa* occurs within a number of conservation reserve boundaries including; Berowra Valley Regional Park, Cattai National Park (NP), Dharug NP, Garigal NP, Ku-ring-gai Chase NP, Lane Cove NP, Marramarra NP, and Muogamarra Nature Reserve.

4. One of the main threats to *T. glandulosa* is habitat loss through clearing, primarily for urban development. The species is also threatened by; habitat fragmentation and degradation arising from weed invasion and rubbish dumping; fire control activities; and may also be threatened by low levels of sexual recruitment.

Tetratheca juncea

The review process found that the shrub *Tetratheca juncea* Smith is appropriately listed as VULNERABLE.

1. *Tetratheca juncea* is a NSW endemic known from approximately 240 highly fragmented locations on the central coast of NSW, with 83% of locations supporting fewer than 50 individuals.
2. The total number of individuals is estimated to be close to 10 000, with the species possessing an extent of occurrence of approximately 1800 km².
3. Only one population occurs within a conservation reserve (Awabakal Nature Reserve). The remaining populations are threatened by further fragmentation and habitat loss due to clearing for urban and agricultural development.

Trachymene saniculifolia

The review process found that the prostrate, rhizomatous, perennial herb *Trachymene saniculifolia* Stapf is appropriately listed as ENDANGERED.

1. Within Australia, *Trachymene saniculifolia* occurs only along the banks of the Boyd River in the Kanangra Boyd National Park, west of Sydney. An occurrence of the species in the highlands of Papua New Guinea, may be a different taxon.
2. The species has an extremely restricted distribution, with only two populations 4km apart. The total number of individuals is estimated to be approximately 400.
3. The larger of the two populations is bisected by a heavily used camping ground and access road, and thus the plants may be threatened by human disturbance.

Triplarina nowraensis

The review process found that the erect shrub *Triplarina nowraensis* A.R. Bean is appropriately listed as ENDANGERED.

1. *Triplarina nowraensis* is a NSW endemic known from only five populations within the Nowra area on the south coast of NSW.
2. Two of the five populations are partly reserved within Bamarang Nature Reserve and *Triplarina* Nature Reserve, both of which were gazetted as Nature Reserves in 2001. The remaining individuals occur on a mixture of private property and crown land.
3. The total number of individuals is estimated to be at least 63 000, with 90% of the total population restricted to only three locations.
4. The species is threatened directly by clearing for development and habitat degradation. Given that the species grows along creek lines, it is also potentially threatened by the indirect impacts of nearby developments (including a waste disposal facility and proposed roads and residential developments) through increased sedimentation, nutrient input and the spread of weed species.

Zieria adenophora

The review process found that the sub-shrub *Zieria adenophora* Blakely is appropriately listed as ENDANGERED.

1. *Zieria adenophora* is a NSW endemic known only from a single small population near Araluen in the southern Tablelands of NSW.
2. The total number of individuals is estimated to be approximately 56, with the species possessing an extent of occurrence of less than 1 km².
3. The species is threatened by trampling and habitat degradation through soil disturbance and the removal of associated vegetation by goats and wallabies.

Zieria buxijugum

The review process found that the sub-shrub *Zieria buxijugum* J. Briggs & J.A. Armstrong ms is appropriately listed as ENDANGERED.

1. *Zieria buxijugum* is a NSW endemic known only from a single small population on private property near Pambula on the far south coast of NSW.
2. The total number of individuals is estimated to be approximately 32, with the species occupying an area of less than 1 ha.
3. The species is threatened by heavy grazing by swamp wallabies as well as demographic and environmental stochasticity.

Zieria citriodora

The review process found that the shrub *Zieria citriodora* J.A. Armstrong ms requires upgrading from Vulnerable to ENDANGERED.

1. Within NSW, *Zieria citriodora* is known from only two populations in Coutegany district in the southern tablelands of NSW. The species is also known from four populations in northeastern Victoria.
2. The total population size is estimated to be fewer than 600 individuals, with the species possessing an extent of occurrence of only 3.4 km².
3. Neither population occurs within a conservation reserve. The highly erodable habitat is vulnerable to degradation through grazing and trail bike riding. The species is also threatened by clearing.

Zieria floydii

The review process found that erect shrub *Zieria floydii* J.A. Armstrong is appropriately listed as ENDANGERED.

1. *Zieria floydii* is a NSW endemic restricted to only two locations within Guy Fawkes River National Park in northern NSW.
2. The total number of individuals is estimated to be less than 100, with one population supporting fewer than 20 individuals and the second supporting greater than 50.
3. Although the total population occurs within a conservation reserve, the species is threatened by an inappropriate fire regime. The largest of the two populations occurs on the reserve boundary and is in an area that may be subject to regular hazard reduction burns. Given the restricted distribution of the species and small population size, the species is also threatened by demographic and environmental stochasticity.

Zieria formosa

The review process found that the dense shrub *Zieria formosa* J. Briggs & J.A. Armstrong ms is appropriately listed as ENDANGERED.

1. *Zieria formosa* is a NSW endemic restricted to a single population near Pambula on the far south coast.
2. The total population size estimated to be only 38 individuals, with the population occupying an area of less than 1 ha.
3. The single population does not occur within a conservation reserve and is threatened by habitat degradation due to subdivision of the surrounding land.

Zieria granulata

The review process found that the shrub *Zieria granulata* (F. Muell.) C. Moore ex Benth. is appropriately listed as ENDANGERED.

1. *Zieria granulata* is a NSW endemic restricted to 21 highly fragmented populations within the Illawarra region, south of Sydney.

2. The total population size estimated to be less than 9000 individuals.
3. The species occupies a restricted geographic area, with a linear range of only 21km and an extent of occurrence of less than 200km².
4. Only a single small population occurs within a conservation reserve (Budderoo National Park). The remaining populations are threatened by clearing for urban or agricultural development, and habitat degradation due to weed invasion and grazing.

Zieria involucreta

The review process found that the shrub *Zieria involucreta* R. Br. ex Benth. requires upgrading from Vulnerable to ENDANGERED.

1. *Zieria involucreta* is a NSW endemic restricted to less than 20 populations within the Sydney region between Yengo National Park in the north and Marramarra National Park in the south. The species also occurred in the Katoomba district, at least until the 1980's.
2. The total population size is estimated to be approximately 3000 individuals.
3. The species occupies a restricted geographic area, with a linear range of only 47km and an extent of occurrence of less than 130km².
4. At least six populations occur within conservation reserves (Yengo National Park, Wollemi National Park, and Marramarra NP) and an additional three populations occur within Parr State Recreation Area.
5. The species is threatened by an inappropriate fire regime, weed invasion, and populations outside of reserves are threatened by clearing for urban development.

Zieria lasiocaulis

The review process found that the tall shrub or small tree *Zieria lasiocaulis* J.A. Armstrong ms is appropriately listed as ENDANGERED.

1. *Zieria lasiocaulis* is a NSW endemic known only from Willi Willi National Park, northwest of Port Macquarie on the mid-north coast of NSW.
2. The species is known from fewer than 10 populations and possesses a restricted geographic distribution, with a linear range of approximately 10km and an extent of occurrence of approximately 19km².
3. The total population size is estimated to be approximately 20000 individuals, however 90% of these individuals are restricted to a single population.
4. Given that the species appears to germinate in response to physical disturbance, it is threatened by inappropriate disturbance regimes. Road and track construction and maintenance also potentially threaten the species.

Zieria parrisiae

The review process found that the shrub *Zieria parrisiae* J. Briggs & J.A. Armstrong ms is appropriately listed as ENDANGERED.

1. *Zieria parrisiae* is restricted to a single population near Pambula on the far south coast of NSW.
2. The total population size estimated to be only 36 individuals, with the population occupying an area of approximately 3 ha.
3. The single population does not occur within a conservation reserve.
4. The species is threatened by grazing by swamp wallabies as well as demographic and environmental stochasticity.

Zieria prostrata

The review process found that the prostrate shrub *Zieria prostrata* J.A. Armstrong ms is appropriately listed as ENDANGERED.

1. *Zieria prostrata* is restricted to four coastal headlands near Coffs Harbour on the north coast of NSW.
2. The total population size estimated to be fewer than 1500 individuals, with the four populations occupying an area of less than 1 ha. in total.
3. All four populations occur within the Mooney Beach Nature Reserve.
4. The species is threatened by habitat degradation through weed invasion and pedestrian activity and also potentially by changes to the disturbance regime.