

Final Determinations

2001

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Determinations relating to the listing of threatened species, populations, ecological communities and key threatening processes in the Schedules of the *Threatened Species Conservation Act, 1995*

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FOREWORD

The NSW Scientific Committee was established in 1996 following the enactment of the Threatened Species Conservation Act (the Act).

The Scientific Committee is an independent committee and consists of 10 members appointed by the Minister for the Environment. The organisations currently represented on the Committee are:

Australian Museum	National Parks and Wildlife Service
CSIRO	NSW Agriculture
Department of Land and Water Conservation	Royal Botanic Gardens
Ecological Society of Australia	University of NSW
Entomological Society of Australia	

The Threatened Species Conservation Act includes, in Schedules 1, 2 and 3, lists of endangered, vulnerable and extinct species, endangered populations, endangered ecological communities and key threatening processes. One of the Committee's functions is to consider nominations or proposals to amend the Schedules by:

- listing or removing species as endangered, vulnerable or extinct;
- considering changes to the status of species listed as endangered, vulnerable or extinct;
- listing or removing or amending populations and ecological communities as endangered;
- listing or removing or amending key threatening processes.

The Act details the criteria for listing species, populations, communities and key threatening processes as well as the procedure for listing, delisting or amending the Schedules.

Nominations for listing, delisting or amendments to the Schedules may be made by any person, or the Committee may act on its own initiative. Following receipt and review of a nomination, the Committee considers whether additional information is required from the nominator or other sources such as research scientists, Government agencies and other organisations. The Committee may seek comment or further information from these sources.

When the Committee decides to accept a nomination, the Committee makes a Preliminary Determination either to support or not to support the nomination. This Determination is placed on public exhibition for comment. Notices regarding the Preliminary Determination and its public display are placed in the Government Gazette and the Government Notices section of the Sydney Morning Herald (Friday edition) and, where appropriate, local newspapers. The Preliminary Determination is placed on display at the Head Office and Area Offices of the National Parks and Wildlife Service (NPWS). Copies of Determinations on public display may also be obtained from the Committee's Executive Officer or from the NPWS website www.npws.nsw.gov.au.

Following consideration of all submissions received during the exhibition period, the Committee makes a Final Determination on whether to accept or reject the nomination. When the Committee decides to accept and support a nomination a Notice is placed in the Government Gazette advising of the Committee's Determination and the amendment of the Schedules of the Threatened Species Conservation Act. A Notice advising of the Committee's Final Determination

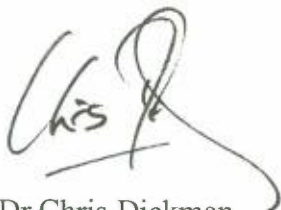
is also placed in newspapers and the Final Determination is placed on public display for information. Similarly, where the Committee rejects a nomination, Notices are also placed in the Government Gazette and newspapers.

The Act also provides for the Provisional Listing of Endangered Species on an Emergency Basis. Upon the publication of a Notice advising that a species has been provisionally listed, the Schedule is taken to have been amended by the insertion of that species. As soon as practicable thereafter, the Committee must review the status of a provisionally listed species. Where the Committee supports the continued listing of that species in the Schedules of the Act, the public exhibition and assessment process, as outlined above for other nominations, is undertaken.

The Act also contains provision for the Committee to reject nominations if relevant information is not provided or if they fall outside the Committee's terms of reference. In this case there is no public notification of the rejection. A number of nominations received by the Committee have been rejected for these reasons.

This document contains the Final Determinations and Provisional Listing Determinations made by the Committee in 2001 and includes the gazettal date on which the species, population, community or key threatening process was added to the Schedules of the Act. Where a species was previously provisionally listed, a statement indicating the date of the Provisional Listing Determination is included at the bottom of the Final Determination for the species. Final Determinations in which the Scientific Committee rejected a proposal are also included with the exception of those Determinations which have been superseded by another Final Determination.

If you would like further information regarding the Committee and its Determinations, please contact the Committee's Executive Officer, Suzanne Chate on (02) 9585 6940.

A handwritten signature in black ink, appearing to read 'Chris Dickman', with a stylized flourish extending from the end.

Dr Chris Dickman
Chairperson

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NSW Scientific Committee : final
determinations 2001

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SPECIES

NSW SCIENTIFIC COMMITTEE

Final Determination

The Scientific Committee, established by the Threatened Species Conservation Act, has made a Final Determination to list *Acacia atrox* Kodela ms, a tall shrub, as an ENDANGERED SPECIES on Part 1 of Schedule 1 of the Act. Listing is provided for by Part 2 of the Act.

The Scientific Committee has found that:

1. *Acacia atrox* Kodela ms previously known as *Acacia* sp. 'Myall Creek' (Miller s.n. 25 May 2000), is a newly discovered species, recognised by taxonomists at the NSW National Herbarium
2. *Acacia atrox* Kodela ms is a dense, much branched shrub 0.5–1.5 (–2) m high (potentially becoming taller since there is an older plant to 4 m high); main stem less than 10 cm d.b.h, sometimes twisted; spreading by suckering. *Bark* grey-brown, becoming dark grey and vertically fissured with age. *Branchlets* terete, pale green and slightly pruinose to pale yellowish green when dry, occasionally with a pinkish tinge on young stems, sometimes becoming encrusted with a brownish to blackish material with age, glabrous, with very low rounded ridges; axillary branchlets and phyllode clusters borne in a pair of partly overlapping, caducous bracts (which usually leave fine scars on the stem when shed). *Phyllodes* sessile, patent to slightly inclined, very narrowly linear, more or less straight, more or less quadrangular in section (to more or less terete), with a yellow vein at each angle and a less prominent vein in between these (more or less 8-veined altogether, however, the intermediate veins are often incomplete not reaching the apex, obscure, wrinkle-like or not apparent), (1.5–) 2–4 (–4.5) cm long, 1–1.2 (–1.3) mm wide, rigid, light green (dry), glabrous, gradually tapered towards a pungent-pointed apex (the fine tip orange-brown and 1.5–3.5 mm long), abruptly broadened or splayed at base 2–5.5 mm wide (leaving an oval-obovate scar on branchlet when lost), with a small orbicular gland on upper vein/margin near or to 3 mm above base and often a second minute gland c. 1/3–2/3 from base; galls with a shape that is hakea fruit-like are commonly formed within some phyllodes. *Inflorescences* normally paired (often one of the peduncles missing) or sometimes single on a rudimentary raceme axis to 1 mm long in phyllode axils (often appearing simple); peduncles 5–21 mm long, glabrous; bracts one either side at base of the peduncle pair originally enclosing the undeveloped inflorescences, deeply convex, more or less broadly ovate, often with a split or minor lobe/peak about midway below either side of the apex, to 2 mm long, sparsely ciliolate, often caducous; heads globular, c. 17–25-flowered, 5–7 mm diam. (dry), cream-coloured to pale yellow. *Bracteoles* more or less obovate to broadly spatulate, 0.9–1.1 mm long, ciliolate, the claw also with scattered minute hairs on outer surface especially along midrib. *Flowers* 5-merous; calyx cupular, 0.8–1.2 mm long, dissected ¼ (–1/3) or less, with minute hyaline-white hairs at base and often scattered on tube or concentrated along ribs, ciliolate along the obtuse to broadly rounded sepal apices; corolla dissected 1/3–1/2 or more, probably splitting with age, glabrous, the petals 1.5–1.9 mm long, acute, often purplish in upper half; ovary glabrous to white-puberulous. Pods not seen, possibly rarely, if ever, produced. *Acacia atrox* Kodela ms has some affinities with *Acacia carneorum* that occurs in far western NSW. Unlike *Acacia atrox* Kodela ms, *A. carneorum* does not have a splayed phyllode base, has

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hairy branchlets and phyllodes especially when young and has simple inflorescences of yellow to bright golden-yellow flower-heads.

3. *Acacia atrox* Kodela ms is known only from a single location South of Delungra, West of Inverell and grows on basalt derived soil.
4. *Acacia atrox* Kodela ms is not known to occur in any New South Wales National Parks and Wildlife Service conservation reserve.
5. An immediate threat to the survival of *Acacia atrox* Kodela ms is clearing for pasture improvement. Its very small and localised extent, potential to be grazed, and potential changes in fire regimes leave it threatened by stochastic processes. The risk of extinction is high due to low population numbers.
6. In view of 3, 4 and 5 above the Scientific Committee is of the opinion that *Acacia atrox* Kodela ms is likely to become extinct in nature in New South Wales unless the circumstances and factors threatening its survival and evolutionary development cease to operate.

Dr Chris Dickman
Chairperson
Scientific Committee

Reference:

Kodela, P. G. *Acacia atrox* (Fabaceae: Mimosoideae), a rare species from the North Western Slopes, New South Wales. Submitted for publication in *Telopea*, Dec. 2000.

*A Determination to provisionally list this species
under its former name of Acacia sp. "Myall Creek"
as an endangered species was gazetted on:*

25/08/00

Gazetted: 13/07/01

NSW SCIENTIFIC COMMITTEE

Final Determination

The Scientific Committee, established by the Threatened Species Conservation Act, has made a Final Determination to list the grass *Alexfloydia repens* B. K. Simon as an ENDANGERED SPECIES on Part 1 of Schedule 1 of the Act. Listing of Endangered Species is provided for by Part 2 of the Act.

The Scientific Committee has found that:

1. *Alexfloydia repens* B.K. Simon (Poaceae) is a grass described by Simon in 1992 (Simon, B.K. 1992. Studies in Australian grasses 6. *Alexfloydia*, *Cliffordiochloa* and *Dallwatsonia*, three new panicoid grass genera from Eastern Australia. *Austrobaileya* 3, 669-681.)
2. *Alexfloydia repens* is a creeping grass described as: "Plants stoloniferous, sparingly branched, terminated by a solitary inflorescence, 3-4-noded. Internodes shorter than the associated leaf sheaths. Sheaths compressed. Ligule a fringe of hairs. Leaf blades flat, linear, glabrous, smooth, with smooth margins and a prominent white midrib. Inflorescence a panicle of 3-6 spikelets and a short main axis, smooth. Pedicels not distinctly angled, smooth, straight. Disarticulation at the base of the spikelet. Callus not differentiated and not prolonged into a stipe. Spikelets adaxial (with the lower glume facing the pedicel), laterally compressed, elliptic in outline. Glumes unequal, chortaceous, smooth: lower glumes ovate, 5-7 nerved, glabrous, acute; upper glume long, elliptic, 9-nerved, rounded on the back. Rachilla not pronounced between the glumes. Lower floret male, anthers 3: lemma elliptic, 9-nerved, chortaceous, glabrous, acute; palea elliptic, 2-nerved. Upper floret perfect: lemma oblong, obscurely 5-nerved, glabrous, yellow, firmly membranous or thinly cartilaginous, striate, acute; palea oblong, with texture similar to lemma, entire, smooth. Lodicules 2, free, membranous, anthers 3. (from Simon, B.K. 1992)."
3. *Alexfloydia repens* is the sole food plant for the hesperiid butterfly *Ocybadistes knightorum*, (Sands, D.P.A. 1997. *Alexfloydia repens* Simon: a food plant for *Ocybadistes knightorum* Lambkin and Donaldson (Lepidoptera: Hesperiiidae) and their conservation significance. *Australian Entomologist* 24(3), 117-118). The larvae of this butterfly are monophagous and distribution is restricted to *Alexfloydia repens* sites.
4. *Alexfloydia repens* is currently known from less than ten locations in a small area south of Coffs Harbour and individual patches are small. Only one location is within a conservation reserve (Bongil Bongil National Park).
5. *Alexfloydia repens* has been recorded in the understorey of *Casuarina glauca* forest and along the uppermost fringe of mangroves.
6. The habitat of *Alexfloydia repens* is at risk from the pressures of increasing urbanisation, including residential expansion, road and track construction and invasion by weeds. Several of the locations are subject to stock grazing.

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7. In view of the restricted distribution, specialised habitat, low population sizes and the threats to habitat the Scientific Committee is of the opinion that *Alexfloydia repens* is likely to become extinct in nature in New South Wales unless the circumstances and factors threatening its survival or evolutionary development cease to operate.

Dr Chris Dickman
Chairperson
Scientific Committee

Gazetted: 13/07/01

NSW SCIENTIFIC COMMITTEE

Final Determination

The Scientific Committee, established by the Threatened Species Conservation Act, has made a Final Determination to list the shrub *Astrotricha cordata* A. Bean as an ENDANGERED SPECIES on Part 1 of Schedule 1 of the Act. Listing of Endangered Species is provided for by Part 2 of the Act.

The Scientific Committee has found that:

1. *Astrotricha cordata* (Araliaceae), is described by Henwood and Makinson in Harden, G.J. (1992) *Flora of NSW* Vol 3, University of New South Wales Press, Sydney as:
“Erect shrub to 3 m high, branches lacking or few and strongly ascending, branchlets woolly to floccose. Leaves deciduous at fruiting stage; lamina cordate to ovate, sometimes more or less peltate, 12-30 cm long, 7-20 cm wide; apex acute to acuminate or rarely obtuse; margins entire; upper surface smooth; lower surface with a dense sometimes floccose indumentum; petiole 7-23 cm long. Inflorescence up to 1.2 m long, glabrescent and sometimes nearly glabrous; flowers and usually peduncles deep purple beneath the indumentum. Petals purple. Fruit winged. Flowers spring.”
2. *Astrotricha cordata* occurs in dry sclerophyll communities on exposed rocky summits and ridgetops, cliff edges, and rocky slopes in the Mt Belmore and Mt Neville area, Grafton District of north-eastern NSW. The populations are located in the Mt Belmore State Forest or the Mt Neville Nature Reserve.
3. *Astrotricha cordata* is restricted to 4 to 5 populations occurring quite close to each other in a relatively small area of about 120 sq. km. The total number of known plants fluctuates and is estimated to be less than 1000 individuals. The species is quite short-lived (2-4 years).
4. *Astrotricha cordata* is threatened by an inappropriate fire regime, track construction and maintenance, and possible damage should logging operations occur in the area.
5. In view of 2, 3 and 4 above the Scientific Committee is of the opinion that the shrub *Astrotricha cordata* is likely to become extinct in nature in NSW unless the circumstances and factors threatening its survival or evolutionary development cease to operate.

Dr Chris Dickman
Chairperson
Scientific Committee

Gazetted: 05/10/01

NSW SCIENTIFIC COMMITTEE

Final Determination

The Scientific Committee, established by the Threatened Species Conservation Act, has made a Final Determination to list *Babingtonia silvestris* A.R. Bean, a shrub, as an ENDANGERED SPECIES on Part 1 of Schedule 1 of the Threatened Species Conservation Act. The listing of Endangered Species is provided for by Part 2 of the Act.

The Scientific Committee has found that:

1. *Babingtonia silvestris* (Myrtaceae), has been described by A.R. Bean in 1997. The following description has been taken in full from the journal *Austrobaileya* 4(4), pg 641.
"Shrub to 2.5 m high. Bark grey, finely lined or grooved, to slightly fibrous, furrowed. Stem flanges grey, flat, not winged, not warty, entire. Leaves ovate to elliptic, 3.0-4.5 mm long, 1.5-3.3 mm wide, straight, flat, obtuse, not keeled, entire; oil glands visible on lower surface, scattered; midrib not or faintly visible; petiole 0.6-1.0 mm long. Inflorescence axillary, 1 - flowered, rarely 3-flowered; peduncle 1.2-2.5 mm long; pedicels 2.7-4.0 mm long; bracteoles 2, ovate, c. 2.5 x 1.2 mm, persistent, obtuse. Hypanthium smooth, obconical, 2.2-2.8 mm long, fused to the ovary except at top. Sepals compound; inner lobe obtuse, c. 0.3 x 1.0 mm, thin, margins entire; outer lobe acuminate, 1.3-1.7 mm long, thick, erect or spreading. Corolla white, up to 8 mm across; petals orbicular to elliptic, 1.5-2.3 x 2.0-2.4 mm, margins fimbriate; oil glands present. Stamens 8-10, none opposite the petals, stamens opposite sepals slightly shorter than remainder; filaments terete, c. 0.8 mm long, geniculate, with brown connective gland fused to upper part of filament at bend; anthers adnate, c. 0.3 mm long, dehiscent by short divergent slits; anther loculi fused. Style c. 0.2 mm long, set into a pit; stigma broadly capitate. Ovary 3-locular; floral disc concave; ovules 7-8 per loculus, arranged in two longitudinal rows on placenta. Fruit hemispherical, 2.0-2.5 x 4.5-5.0 mm; valves triangular, woody, exserted. Seeds cuboid, with flat sides and rounded backs, c. 1 mm long, minutely reticulate, brown; hilum terminal". It apparently flowers sporadically over several months of the year (Bean pers. obs.).
2. *Babingtonia silvestris* has been recorded from a few scattered localities from the Dorrigo District on the north coast of NSW, north to Girraween National Park in southern Queensland. This narrow distribution represents a geographic range of approximately 190 km. It grows amongst granite or rhyolite rock outcrops in mixed shrublands with species such as *Eucalyptus prava*, *Leptospermum brevipes*, *Leucopogon melaleucooides* and *Lepidosperma laterale* (Bean 1997).
3. Within NSW there are 3 populations of *Babingtonia silvestris*. One population has been estimated to support between 100-150 individuals, whilst the population size of the other two localities is unknown they are thought to be no larger than the type population in Queensland which has 55-75 plants (Bean 1997).
4. Two of the three populations in NSW are reserved in Dorrigo National Park and Mount Neville Nature Reserve. The third population is in State Forest.

NSW SCIENTIFIC COMMITTEE

5. *Babingtonia silvestris* is at risk due to the impact of chance events on low population numbers. Populations may also be threatened by activities associated with road and track construction and maintenance. One population is subject to physical disturbance by visitors. High fire frequency may also be a threat to the species.
6. In view of 3, 4, and 5 above the Scientific Committee is of the opinion that *Babingtonia silvestris* is likely to become extinct in nature in New South Wales unless the circumstances and factors threatening its survival or evolutionary development cease to operate.

Associate Professor Paul Adam
Deputy Chairperson
Scientific Committee

Gazetted: 27/04/01

NSW SCIENTIFIC COMMITTEE

Final Determination

The Scientific Committee, established by the Threatened Species Conservation Act, has made a Final Determination to list the fern *Belvisia mucronata* (Fée) Copel. as an ENDANGERED SPECIES on Part 1 of Schedule 1 of the Act. The listing of Endangered Species is provided for by Part 2 of the Act.

The Scientific Committee has found that:

1. *Belvisia mucronata* (Fée) Copel. (Polypodiaceae) was first described in *Genera Filicum* (1947) by E. B. Copeland.
2. *Belvisia mucronata* has been described in *Flora of NSW*, Vol. 1, page 40, edited by Harden (1990) (Uni. of NSW Press) as: rhizome densely covered with dark, clathrate, acuminate scales. Fronds usually to 45 cm long; stipe relatively short, 1-5 cm long; lamina dark green, simple or sometimes 2-forked at the apex; veins obscure, densely reticulate. Apical portion of the fertile frond 10-25 cm long. Usually found forming small clumps on trees or rocks in rainforest.
3. The species is cosmopolitan, occurring in NSW, Queensland, Asia, Malesia and the Pacific. In NSW it is restricted to the far north coast, reaching its southern distributional limit at a site north east of Grafton.
4. The species is currently known from five locations within NSW. None of these occurs within a conservation reserve. The species occurs at low densities at all known locations.
5. Targeted searches for the species failed to detect any new locations.
6. Threats include frequent fire regimes and activities associated with forestry operations. Low population sizes also make the species vulnerable to stochastic events.
7. In view of 3, 4, 5 & 6 above the Scientific Committee is of the opinion that the species is likely to become extinct in nature in NSW unless the circumstances and factors threatening its survival or evolutionary development cease to operate

Dr Chris Dickman
Chairperson
Scientific Committee

Gazetted: 30/11/01

NSW SCIENTIFIC COMMITTEE

Final Determination

The Scientific Committee, established by the Threatened Species Conservation Act, has made a Final Determination to list the perennial daisy *Brachyscome ascendens* G.L. Davis, as an ENDANGERED SPECIES on Part 1 of Schedule 1 of the Threatened Species Conservation Act. Listing of Endangered Species is provided for by Part 2 of the Act.

The Scientific Committee has found that:

1. *Brachyscome ascendens* G.L. Davis (ASTERACEAE), is described in the *Flora of south-eastern Queensland* by Stanley and Ross (1986), from which the following is taken in full.

"*Brachyscome ascendens* G.L. Davis is an ascending perennial up to c. 30 cm tall, glandular and septate hairy. Cauline leaves more or less sessile; blades cuneate, dentate to pinnatifid with 2-8 acute lobes or teeth, up to ca 2.8 cm X 0.8 cm. Involucres ca 5-9 mm wide, involucral bracts ca 4.5 mm X 1.5 mm; ray florets lavender, rays ca 4 mm long; disc florets yellow. Achenes broad, oblong, flat, ca 2 mm X 1.3 mm, body tuberculate in centre, laterally expanded into irregular thickened lobes, appearing wing-like; pappus less than 0.5 mm long but relatively conspicuous". (Stanley & Ross, 1986). There is also a description and illustration of the species in Salkin, Thomlinson, Armstrong, Courtney and Schaumann (1995) *Australian Brachyscomes*, Australian Daisy Study Group.

2. *Brachyscome ascendens* is currently known from one location in NSW in the Border Ranges National Park of northern NSW. It is recorded as rare in south eastern Queensland. It grows in montane shrubland on escarpment cliffs in skeletal rocky soils of basic igneous geology. It occurs with *Eucalyptus campanulata*, *Pomaderris* species, *Xanthorrhoea* species, and a scattered ground cover of *Themeda australis*.
3. There are thought to be 40-50 plants at the only known site in New South Wales though there may be more that are inaccessible on steep cliff faces below the escarpment.
4. *Brachyscome ascendens* is primarily at risk due to its extremely restricted distribution and low population numbers. This predisposes the species to stochastic events. It is threatened by weed invasion from *Ageratina riparia* (Mist Flower) and *Ageratina adenophora* (Crofton Weed). Disturbance associated with road and track construction and maintenance, and inadvertent damage incurred via recreational pressures such as trampling by bushwalkers and other visitors to the site, are also potential threats.
5. In view of 3, and 4 above the Scientific Committee is of the opinion that *Brachyscome ascendens* is likely to become extinct in nature unless the circumstances and factors threatening its survival or evolutionary development cease to operate.

Dr Chris Dickman
Chairperson
Scientific Committee

Gazetted: 13/07/01

NSW SCIENTIFIC COMMITTEE

Final Determination

The Scientific Committee, established by the Threatened Species Conservation Act, has made a Final Determination to list the Mountain Pygmy-possum, *Burramys parvus* Broom 1896, as an ENDANGERED SPECIES on Part 1 of Schedule 1 of the Act and, as a consequence, to omit reference to that species as a Vulnerable Species on Schedule 2 of the Act. Listing is provided for by Part 2 of the Act.

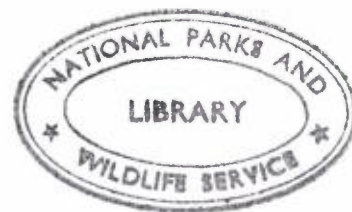
The Scientific Committee has found that:

1. The Mountain Pygmy-possum, *Burramys parvus*, is a predominantly terrestrial marsupial that has a highly restricted distribution in south-east New South Wales and north-eastern Victoria. The Mountain Pygmy-possum is the only Australian mammal limited in its distribution to alpine and sub-alpine regions and in NSW it occurs in Kosciuszko National Park at altitudes above 1600m.
2. The preferred habitat of the Mountain Pygmy-possum is boulderfield-heath, formed below mountain peaks or in gullies by periglacial weathering processes. During winter, the boulderfield-heath creates a sub-nivean space that has a relatively humid and warm microclimate compared to the above snow environment. In the absence of boulderfields, pygmy-possums will occupy areas where there is Mountain Plum-pine, *Podocarpus lawrencei*, heath growing over rocks. Suitable habitat patches are often small and isolated, with up to 3km between some boulderfields (Mansergh and Broome 1994). However, there is considerable movement of pygmy-possums between patches, mainly by males and juveniles.
3. In 1986, the extent of Mountain Pygmy-possum habitat in NSW was assessed from aerial photographs and estimated to be approximately 8km² (Caughley 1986). A better understanding of Mountain Pygmy-possum habitat requirements has been determined over the past 3 years. Preferred habitat is now believed to cover an extent of less than 4km² in NSW, and may support fewer than 500 adults (Broome *et al.*, in prep.).
4. The Mountain Pygmy-possum is threatened in NSW by the loss, degradation and fragmentation of habitat. Two of the four main sub-populations are located within ski resort areas. Past management practices by the resorts have led to direct loss of habitat and alteration of vegetation. Winter activities such as snow grooming may directly affect Mountain Pygmy-possums by compacting the sub-nivean space and disturbing pygmy-possums during hibernation. Fragmentation of habitat by roads and resort buildings affects recruitment to the population, particularly by inhibiting the dispersal of male and juvenile individuals between habitat patches.
5. Predation by the Red Fox *Vulpes vulpes*, and Feral Cat *Felis catus*, threatens the survival of the species. The abundance of these exotic predators is enhanced by the presence of ski resorts, as both species scavenge refuse during winter (Bubela 1995).

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6. The Mountain Pygmy-possum does not occur below the winter snowline and its range has decreased over geological time with the retreating snowline. Survival and recruitment of NSW Mountain Pygmy-possums is highly dependent on the duration of snow cover. Survival and recruitment is low during years of very short or very long snow cover (Broome, in prep.). There is evidence of a decline over the last 30 years (1970-1996) in the number of snow events, (days on which snow falls), and a suggested shortening of the snow season, which is correlated with warming regional temperatures (Davis 1998). Given that the extent and duration of snow cover is likely to decrease with the predicted effects of global warming (Whetton et al. 1996, Whetton 1998), the Mountain Pygmy-possum population is likely to continue declining in the foreseeable future.
7. Mountain Pygmy-possums are also threatened in NSW by the likelihood of increased competition with and predation by other alpine and sub-alpine small mammals as snow cover duration and extent declines. The principal food for Mountain Pygmy-possums is Bogong moths and the seeds and fruit of the Mountain Plum-pine. These food items are also likely to decrease in abundance due to global warming. *Podocarpus lawrencei* and several other alpine plant species are fire-sensitive and alteration to the local fire regime such as increased frequency of burning would affect Mountain Pygmy-possum habitat.
8. In view of the above points, the Scientific Committee is of the opinion that the Mountain Pygmy-possum is likely to become extinct in nature in NSW unless the circumstances and factors threatening its survival or evolutionary development cease to operate.

Dr Chris Dickman
Chairperson
Scientific Committee



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Gazetted: 16/03/01

NSW SCIENTIFIC COMMITTEE

Determination for provisional listing of an endangered species on an emergency basis

The Scientific Committee, established by the Threatened Species Conservation Act, has made a Determination for the provisional listing on an emergency basis of *Capparis canescens* Banks ex DC. a small tree, as an ENDANGERED SPECIES on Part 1 of Schedule 1 of the Act. Provisional listing is provided for by Part 2 of the Act.

The Scientific Committee has found that:

1. *Capparis canescens* is a small tree in the family Capparaceae. The following description is taken from the *Flora of south-eastern Queensland* Vol.1, Stanley & Ross, 1983:

"Small tree, indumentum of very dense short appressed hairs, more or less thorny. Mature leaves with petioles 1.75-4cm long; blades more or less elliptic, ovate or broadly ovate, apex acute to obtuse, sometimes mucronate, base cuneate to obtuse, 4.5-10cm x 2.5-6cm. Flowers up to 4 together, usually axillary, on peduncles 3-9.5cm long, buds prominently 4-ridged; petals white, sometimes pink-tinged, ca 3cm long. Fruits more or less globose, 2.5-7.5 cm diameter, on stipes 6-9 cm long."
2. *Capparis canescens* occurs in the Darling Downs of Queensland and has been recently confirmed as occurring on the northwestern slopes of NSW.
3. In NSW *Capparis canescens* was known from a single population about 10 km east of the Bruxner Highway turnoff to Texas (Queensland), about 20 km NNW of Bonshaw and 50 km north of Ashford. This population has recently been cleared by roadworks. The Committee is unaware of any surveys of known or likely habitat which would assist in determining whether this species meets the criteria for listing as a species presumed extinct.
4. The single known population of *Capparis canescens* consisted of two individuals of mature age producing fruit and flowers regularly. Both individuals were less than 4 m tall. The population was near the roadway of the Bruxner Highway (within 10 m of the edge of the pavement)
5. Threats to the survival of *Capparis canescens* include its very small and localised extent, road widening or realignment, inappropriate grazing pressure, unsuitable fire regimes, and cleaning-up and removal of roadside vegetation.
6. In view of the above the Scientific Committee is of the opinion that *Capparis canescens* is likely to become extinct in nature in NSW unless the circumstances and factors threatening its survival or evolutionary development cease to operate.

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7. The Scientific Committee is of the opinion that, although not previously known to have existed in New South Wales, *Capparis canescens*, is believed on current knowledge to be indigenous to New South Wales, and the species is not currently listed in Part 1 of Schedule 1. Consequently the species is eligible for provisional listing on an emergency basis as an endangered species.

Associate Professor Paul Adam
Deputy Chairperson
Scientific Committee

Reference

Stanley, T.D. & Ross E.M. (1983) Flora of South-eastern Queensland. Queensland Herbarium/DPI Queensland, Brisbane.

Gazetted: 21/12/01

NSW SCIENTIFIC COMMITTEE

Final Determination

The Scientific Committee, established by the Threatened Species Conservation Act, has made a Final Determination to list the Loggerhead Turtle, *Caretta caretta* (Linnaeus, 1758), as an ENDANGERED SPECIES on Part 1 of Schedule 1 of the Act and, as a consequence, to omit reference to that species as a Vulnerable Species on Schedule 2 of the Act. Listing is provided for by Part 2 of the Act.

The Scientific Committee has found that:

1. The Loggerhead Turtle is a marine reptile that occurs from north-east New South Wales to Queensland, the Northern Territory and south to Shark Bay in Western Australia. In Australia, the species breeds in south-east Queensland and on the mid-west coast of Western Australia, with breeding infrequent in NSW.
2. The Loggerhead Turtle is a relatively long-lived animal (>50 years). There is a long period between hatching and sexual maturity (8–15 years) and egg-laying can be non-annual. This means there can be a long delay between when a threatening process starts and a measurable change in the population size.
3. Factors threatening Loggerhead Turtles include: increased predation on nests by introduced predators such as pigs and foxes; disturbance of nesting sites and feeding grounds by human activities; mortality from commercial fishing activities such as pelagic long-lines and drift-nets; shark netting and prawn and mollusc trawling.
4. C. J. Limpus and D. Reimer (1994 - The loggerhead turtle, *Caretta caretta*, in Queensland: a population in decline. In *Proceedings of the Australian Marine Turtle Conservation Workshop*. Environment Australia, Canberra. Pp. 39-59) have demonstrated that the number of adult Loggerhead Turtles has declined by as much as 80%. Further, predictive population modelling of Loggerhead Turtle populations indicates a high risk of the species declining to extinction in eastern Australia in the near future.
5. The national status of Loggerhead Turtles under the Commonwealth Environment Protection and Biodiversity Conservation Act 1999 has recently been changed from Vulnerable to Endangered.
6. In view of points 2 to 5, the Scientific Committee is of the opinion that the Loggerhead Turtle, *Caretta caretta* (Linnaeus, 1758), is likely to become extinct in nature in New South Wales unless the circumstances and factors threatening its survival or evolutionary development cease to operate.

Dr Chris Dickman
Chairperson
Scientific Committee

Gazetted: 05/10/01

NSW SCIENTIFIC COMMITTEE

Final Determination

The Scientific Committee, established by the Threatened Species Conservation Act, has made a Final Determination to list the Eastern Pygmy-possum *Cercartetus nanus* (Desmarest, 1818) as a VULNERABLE SPECIES on Schedule 2 of that Act. Listing of vulnerable species is provided for by Part 2 of the Act.

The Scientific Committee found that:

1. The Eastern Pygmy-possum *Cercartetus nanus* (Desmarest, 1818) is a small arboreal marsupial that is distributed in the south-eastern corner of mainland Australia and in Tasmania. In New South Wales the species is found in coastal areas and at higher elevation in the south, but north of Newcastle at higher elevation only. Pygmy-possums are agile climbers that feed mostly on the pollen and nectar from banksias, eucalypts and understorey plants and will also eat insects, seeds and fruit.
2. Although the Eastern Pygmy-possum is broadly distributed, recent studies have shown that within this range the species appears to be patchily distributed and its overall abundance is low.
3. Despite a large number of intensive trapping programs undertaken in the eastern forests and woodlands of New South Wales in recent years, only a small number of captures (154) have resulted from a total trapping effort of 315,000 Elliott trap-nights and 57,000 pitfall trap-nights (Bowen and Goldingay 2000).
4. Other detection techniques such as spotlighting, predator scat analysis, hair tubes and trapping in trees have produced similar low rates of detection. Capture rates are highest for installed nest-boxes and traps set in flowering banksias. This may reflect a habitat preference or a more successful trapping method.
5. From these and more recent studies (A. Tulloch, pers. comm.) there were only six, localities where more than 10 observations of Pygmy-possums have been made. These were the Pilliga area, New England Tablelands, Barren Grounds Nature Reserve-Budderoo National Park, Royal and Heathcote National Parks, Kioloa State Forest and the Eden area.
6. The factors threatening the survival of the Eastern Pygmy-possum include isolated sub-populations with little opportunity for dispersal which increases the risk of local extinction, clearing that results in habitat loss and fragmentation, inappropriate fire regimes that remove nectar-producing understorey plants, the loss of nest sites due to past intensive forestry and firewood collection, and predation by foxes and cats.

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7. In view of 2, 3, 4, 5 and 6 above, the Scientific Committee is of the opinion that the Eastern Pygmy-possum *Cercartetus nanus* is likely to become endangered unless the circumstances and factors threatening its survival or evolutionary development cease to operate, and is therefore eligible for listing as a vulnerable species.

Associate Professor Paul Adam
Deputy Chairperson
Scientific Committee

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Gazetted: 08/06/01

NSW SCIENTIFIC COMMITTEE

Final Determination

The Scientific Committee, established by the Threatened Species Conservation Act, has made a Final Determination to list the terrestrial orchid *Chiloglottis platyptera* D.L. Jones as a VULNERABLE SPECIES on Schedule 2 of the Act. Listing of vulnerable species is provided for by Part 2 of the Act.

The Scientific Committee has found that:

1. *Chiloglottis platyptera* D.L. Jones (Orchidaceae) has been described in *Flora of New South Wales* Volume 4 by D.L. Jones as "Terrestrial herb. Leaves 2. Flowers narrow, 10-12 mm long, greenish brown with a black labellum callus. Dorsal sepal spatulate, 12.5-13.5 mm long, 3-3.2 mm wide; osmophore c. 0.5 mm long. Lateral sepals recurved, 7-10 mm long, c. 1 mm wide, divergent; osmophore c. 0.7 mm long, dark red. Petals oblanceolate, 9.5-10.5 mm long, c. 3 mm wide, reflexed. Labellum obovate, 9-10 mm long, 8-8.5 mm wide, the upper surface covered with a shiny, black callus. Column broadly winged. Flowers Sept.-Nov. Grows among grass in tall forest: north from Barrington Tops."
2. The species is currently known from some 10 locations spread across some 300km, including Barrington Tops, Oxley Wild Rivers and Ben Halls Gap National Parks, Tomalla Nature Reserve, Nundle, Riamukka and Butterleaf State Forests. *Chiloglottis platyptera* is endemic to the Northern Tablelands Botanical Region of NSW. Population sizes, where known, are less than 100.
3. The main threats to this species are invasion of weeds such as *Cytisus scoparius*, disturbance by feral pigs, adverse impacts of roadworks and timber harvesting, and collection of plants. Small populations are at risk from stochastic events.
4. In view of 2 & 3 above, the Scientific Committee is of the opinion that *Chiloglottis platyptera* is likely to become endangered unless the circumstances and factors threatening its survival or evolutionary development cease to operate, and is therefore eligible for listing as a vulnerable species.

Dr Chris Dickman
Chairperson
Scientific Committee

Gazetted: 09/02/01

NSW SCIENTIFIC COMMITTEE

Final Determination

The Scientific Committee, established by the Threatened Species Conservation Act, has made a Final Determination to list the Brown Treecreeper (eastern subspecies) *Climacteris picumnus victoriae* (Mathews, 1912), as a VULNERABLE SPECIES on Schedule 2 of the Act. Listing of Vulnerable Species is provided for by Part 2 of the Act.

The Scientific Committee found that:

1. The eastern subspecies of the Brown Treecreeper *Climacteris picumnus victoriae* is distributed through central NSW on the western side of the Great Dividing Range and sparsely scattered to the east of the Divide in drier areas such as the Cumberland Plain of Western Sydney, and in parts of the Hunter, Clarence, Richmond and Snowy River valleys.
2. The western boundary of the range of *Climacteris picumnus victoriae* runs approximately through Wagga Wagga, Temora, Forbes, Dubbo and Inverell and along this line the subspecies intergrades with the arid zone subspecies of Brown Treecreeper *Climacteris picumnus picumnus* (Schodde and Mason 1999).
3. The Brown Treecreeper is a medium-sized insectivorous bird that occupies eucalypt woodlands, particularly open woodland lacking a dense understorey. It is sedentary and nests in tree hollows within permanent territories, breeding in pairs or communally in small groups (Noske 1991). Birds forage on tree trunks and on the ground amongst leaf litter and on fallen logs for ants, beetles and larvae (Noske 1979).
4. The broad range of the Brown Treecreeper has not changed but it is now extinct in parts of its range. Declines in populations have been recorded from the Cumberland Plain (Hoskin 1991; Keast 1995; Egan *et al.* 1997), the New England Tablelands (Barrett *et al.* 1994), the Inverell district (Baldwin 1975), from Munghorn Gap Nature Reserve near Mudgee, and from travelling stock routes in the Parkes district (N. Schrader, unpublished). Reid (1999) identified the Brown Treecreeper as a 'decliner' in a review of bird species' status in the NSW sheep-wheatbelt.
5. Brown treecreepers are threatened by clearance and the fragmentation of the woodland habitat including removal of dead timber. Increased isolation decreases treecreeper vagility and increases the vulnerability of populations to extinction as a result of stochastic events. This species appears unable to maintain viable populations in remnants less than 200ha and its abundance decreases as remnant size decreases (Barrett *et al.* 1994). Fragmentation also leads to a skewed sex ratio in Brown Treecreeper populations because female birds are unable to disperse to isolated remnants, increasing the chance of local extinctions (Walters *et al.* 1999).

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6. Habitat degradation, including loss of hollow bearing trees, threatens Brown Treecreeper populations. Grazing by stock in woodland areas leads to a decrease the diversity of ground-dwelling invertebrates (Bromham *et al.* 1999) decreasing the availability of food for the birds. In addition, Brown Treecreepers are likely to be threatened by such factors as increased competition with aggressive honeyeater species and increased levels of nest predation that are a consequence of fragmentation of habitat (Major *et al.* 1998).
7. In view of the above points, the Scientific Committee is of the opinion that the sub-species of the Brown Treecreeper (eastern subspecies) *Climacteris picumnus victoriae*, is likely to become endangered unless the circumstances and factors threatening its survival or evolutionary development cease to operate, and is therefore eligible for listing as a vulnerable species.

Dr Chris Dickman
Chairperson
Scientific Committee

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Gazetted: 26/10/01

NSW SCIENTIFIC COMMITTEE

Final Determination

The Scientific Committee, established by the Threatened Species Conservation Act, has made a Final Determination to list the sedge *Cyperus semifertilis* S.T. Blake as an ENDANGERED SPECIES on Part 1 of Schedule 1 of the Act. Listing of Endangered Species is provided for by Part 2 of the Act.

The Scientific Committee has found that:

1. *Cyperus semifertilis* (CYPERACEAE), is a slender sedge first described in 1949 from a collection from Queensland. The following description is taken from the *Flora of south-eastern Queensland* Vol.3, by Stanley & Ross:

"Perennial with horizontally creeping rhizome; stems slender, erect, triquetrous, scabrous, 30-55 cm tall, *ca* 1 mm thick. Leaves longer than stem, flat or revolute, 1.5-4 mm wide. Inflorescences simple, with 1-3 unequal rays each up to 5 cm long or rarely reduced to single spike, involucre bracts 2 or 3, lower longer than inflorescences; spikes ovoid with 1-6 digitate spreading spikelets; spikelets linear in outline, acuminate, 0.6-1.4(-2) cm X 0.12-0.25 cm, rachilla straight, wingless; glumes 1.6-1.7 mm long, lower glumes green, upper pale brown; stamens 3; stigmas 3. Nuts brown, ellipsoid, trigonous, sides flat or convex, somewhat longer than glume".
2. *Cyperus semifertilis* occurs on the north coast of NSW (Wilson pers. comm.) and in south east Queensland. In NSW it is currently known from only one location in the Mullumbimby area where it was growing in open forest of *Eucalyptus acmenoides* with an open understorey.
3. The number of known plants of *Cyperus semifertilis* is low and is estimated to be about 50 individuals.
4. The known population is on freehold land. Threats at this location are unknown. *Cyperus semifertilis* is at risk of extinction due to its restricted distribution and very low population numbers.
5. In view of 2, 3 and 4 above the Scientific Committee is of the opinion that *Cyperus semifertilis* is likely to become extinct in nature in NSW unless the circumstances and factors threatening its survival or evolutionary development cease to operate.

Dr Chris Dickman
Chairperson
Scientific Committee

Gazetted: 13/07/01

NSW SCIENTIFIC COMMITTEE

Final Determination

The Scientific Committee, established by the Threatened Species Conservation Act, has made a Final Determination to list the Antipodean Albatross *Diomedea antipodensis* Robertson & Warham 1992, as a VULNERABLE SPECIES on Schedule 2 of the Act. Listing of Vulnerable Species is provided for by Part 2 of the Act.

The Scientific Committee found that:

1. The Antipodean Albatross is a large Albatross; breeding is confined to New Zealand. The majority of birds breed on Antipodes Island, with a small number of pairs breeding on Campbell Island. The species ranges across the southern Pacific Ocean, east to the coast of Chile and west to eastern Australia. The species is listed as Vulnerable under the Commonwealth Environment Protection and Biodiversity Conservation (EPBC) Act 1999.
2. The Antipodean Albatross breeds biennially. Egg laying begins in January (Antipodes Island) and February (Campbell Island), and chicks usually fledge the following year in January and March (Gales 1998).
3. Forage for the Antipodean Albatross is extremely patchy, both spatially and temporally, and individuals traverse great distances in search of food. The Antipodean Albatross regularly occurs in small numbers off the New South Wales south coast from Green Cape to Newcastle during winter where they feed on cuttlefish (H. Battam, pers. comm.; Blakers *et al.* 1984 included within Wandering Albatross *Diomedea exulans*). Although representing a small proportion of its total foraging area, potential forage in NSW waters is nonetheless considered significant for the species.
4. The annual breeding population of the Antipodean Albatross is relatively small and has been estimated at 5,154 pairs (Gales 1998). Occasional surveys of the Campbell Island population (representing only a small percentage of the total population) since the 1960s demonstrates it has remained stable for several decades (Gales 1998). The Antipodes Island population has been poorly recorded in the past.
5. The Antipodean Albatross is threatened by longline fishing. 'Incidental catch (or bycatch) of seabirds during oceanic longline fishing operations' is a Commonwealth listed Key Threatening Process (EPBC Act 1999). The species was confirmed as bycatch during a study of tuna longline fishing in New Zealand waters between 1988 and 1992 (Murray *et al.* 1993). The substantial threat posed by longline fishing is exacerbated by the species' small breeding population and the low reproductive potential of individuals. Further, the dependence of Antipodean Albatrosses on only two breeding locations increases their vulnerability to local extinction via stochastic events.
6. Within NSW waters, potential threats are the loss of the southern cuttlefish populations, illegal longline fishing and oil spills.

NSW SCIENTIFIC COMMITTEE

7. In view of the above points, the Scientific Committee is of the opinion that the Antipodean Albatross *Diomedea antipodensis*, is likely to become endangered unless the circumstances and factors threatening its survival or evolutionary development cease to operate, and is therefore eligible for listing as a vulnerable species.

Dr Chris Dickman
Chairperson
Scientific Committee

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Gazetted: 05/10/01

NSW SCIENTIFIC COMMITTEE

Final Determination

The Scientific Committee, established by the Threatened Species Conservation Act, has made a Final Determination to list Gibson's Albatross *Diomedea gibsoni* Robertson & Warham 1992, as a VULNERABLE SPECIES on Schedule 2 of the Act. Listing of Vulnerable Species is provided for by Part 2 of the Act.

The Scientific Committee has found that:

1. Gibson's Albatross is a large albatross; breeding is restricted to New Zealand. It is known only to breed on three islands, Adams, Disappointment and Auckland, in the sub-Antarctic Auckland Island group (Gales 1998, Walker & Elliot 1999). The species is listed as Vulnerable under the Commonwealth Environment Protection and Biodiversity Conservation (EPBC) Act 1999.
2. Gibson's Albatross breeds biennially. Most eggs are laid in December and January. Chicks fledge the following year in January and February (Gales 1998).
3. Forage for Gibson's Albatross is extremely patchy, both spatially and temporally, and individuals traverse great distances in search of food. Gibson's Albatross regularly occurs off the NSW coast usually between Green Cape and Newcastle (H. Battam, pers. comm.; Blakers *et al.* 1984 included within Wandering Albatross *Diomedea exulans*). Although representing a small proportion of its total foraging area, potential forage in NSW waters during the winter is nonetheless considered significant for the species.
4. The annual breeding population of the Gibson's Albatross is relatively small and has been estimated at 6,077 pairs (Gales 1998). Unfortunately, attempts to compare past numbers with the recent estimate are confounded by inconsistent survey techniques and by the recent taxonomic separation of Gibson's Albatross from the Wandering Albatross *Diomedea exulans*.
5. Satellite tracking studies have shown that foraging areas used by males and females are mutually exclusive. Females frequent the Tasman Sea in the vicinity of 40°S, whereas males disperse to lower latitudes or moved north-east into the mid-Pacific Ocean (Elliot *et al.* 1995).
6. The principal threat to Gibson's Albatross is mortality via longline fishing. 'Incidental catch (or bycatch) of seabirds during oceanic longline fishing operations' is a Commonwealth listed Key Threatening Process (EPBC Act 1999). Gibson's Albatross was a significant bycatch species in the tuna longline fishery operating off New Zealand in a study conducted between 1988 and 1992 (Murray *et al.* 1993). Individuals are also known to be killed on tuna longline hooks in Australian waters (Gales 1998). Further, the breeding success of Gibson's Albatross is potentially limited by cats and pigs introduced onto the largest of the breeding islands (Walker & Elliot 1999).

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7. Within NSW waters, potential threats are the loss of the southern cuttlefish populations, illegal longline fishing and oil spills.
8. Threats to Gibson's Albatross are exacerbated by the species' small breeding population and the low reproductive potential of individuals. The dependence of Gibson's Albatross on three islands within the Auckland Island group for breeding increases their vulnerability to local extinction via stochastic events.
9. In view of the above points, the Scientific Committee is of the opinion that Gibson's Albatross *Diomedea gibsoni* is likely to become endangered unless the circumstances and factors threatening its survival or evolutionary development cease to operate, and is therefore eligible for listing as a vulnerable species.

Dr Chris Dickman
Chairperson
Scientific Committee

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Gazettal date: 05/10/01

NSW SCIENTIFIC COMMITTEE

Final Determination

The Scientific Committee, established by the Threatened Species Conservation Act, has made a Final Determination to list *Diuris* sp. (Oaklands, D.L Jones 5380), an orchid, as an ENDANGERED SPECIES on Part 1 of Schedule 1 of the Act. Listing is provided by Part 2 of the Act

The Scientific Committee has found that:

1. *Diuris* sp. (Oaklands, D.L Jones 5380) (Orchidaceae) is found in southern NSW and has recently been distinguished from *Diuris fragrantissima* occurring in Victoria by D.L. Jones. Jones states *Diuris* sp. (Oaklands, D.L Jones 5380) is "allied to *Diuris fragrantissima* but much more robust with larger leaves; scape to 50 cm tall cf. 20 cm; flowers up to 9 per scape cf. 6; flowers slightly fragrant cf. intensely fragrant with a strong spicy scent; longer lateral sepals; and, a larger column; significant habitat differences." *Diuris* sp. (Oaklands, D.L Jones 5380) is referred to as the NSW population of *Diuris fragrantissima* in Tony Bishop's book *Field Guide to the Orchids of NSW and Victoria* (University of NSW Press, 1996).

A full description of *Diuris* sp. (Oaklands, D.L Jones 5380) is given as an attachment.

2. *Diuris* sp. (Oaklands, D.L Jones 5380) is currently known from the Oaklands-Urana region of southern NSW growing in *Callitris glaucophylla* woodland, either among dense grass in flat areas with associated Eucalypts or amongst sparse grass and forbs on low sandhills. Soils are mostly sandy loam.
3. There are thought to be 6-7 populations of *Diuris* sp. (Oaklands, D.L Jones 5380). Population numbers are low (20-150 plants) in four of the populations where estimates have been made.
4. *Diuris* sp. (Oaklands, D.L Jones 5380) occurs in a largely agricultural area with some plants occurring on a roadside, and no population is protected in a formal conservation reserve. *Diuris* sp. (Oaklands, D.L Jones 5380) may be threatened from road maintenance activities, and is at risk due to the impact of chance events on low population numbers and the low number of individuals in each population.
5. In view of 3, and 4 above the Scientific Committee is of the opinion that *Diuris* sp. (Oaklands, D.L Jones 5380) is likely to become extinct in nature in New South Wales unless the circumstances and factors threatening its survival or evolutionary development cease to operate.

Dr Chris Dickman
Chairperson
Scientific Committee

NSW SCIENTIFIC COMMITTEE

Description of Diuris sp. (Oaklands, D.L Jones 5380) taken from Jones ms

Tuberous terrestrial *herb* growing singly in loose scattered groups. *Tubers* more or less obovoid, bilobed to palmate, 15-35 mm long, 10-25 mm wide, fleshy, brown. *Leaves* basal, lax, 2-3, linear to linear-lanceolate, 15-35 cm long, 5-9 mm wide, convolute, green; base sheathing; apex acute to acuminate. *Scape* 30-50 cm tall, stout, 3-9-flowered. *Sterile bracts* 2, narrowly ovate-lanceolate, 4-12 cm long, 5-9 mm wide, acute to acuminate, closely sheathing; lowest bract sometimes extended and leaf-like. *Fertile bracts* narrowly ovate-lanceolate, 3-7 cm long, 2-5 mm wide, acute to acuminate, closely sheathing. *Pedicels* 10-45 mm long, very slender. *Ovaries* obovoid, 4-8 mm long, 2-4 mm wide. *Flowers* porrect, c. 25-35 mm diam., slightly fragrant, whitish, mauve or purple, often marbled and striped with darker markings, the labellum usually darker than the rest and often with prominent interrupted striae. *Dorsal sepal* porrect in the proximal half then obliquely erect, ovate to ovate-elliptic, 10-20 mm long, 8-12 mm wide; apex broadly obtuse to apiculate. *Lateral sepals* obliquely deflexed, narrowly linear, 4-12 cm long, 2-4 mm wide, more or less parallel; margins involute; apex asymmetrically acute to acuminate. *Petals* erect, slightly divergent; lamina narrowly to broadly ovate to elliptic, 6-16 mm long, 6-10 mm wide, tapered basally into the claw; apex obtuse; claw 4-10 mm long, curved, green to brownish, widest near the apex, tapered to the base. *Labellum* 10-15 mm long, obliquely decurved, deeply 3-lobed; lateral lobes erect, oblong-cuneate, 3-6 mm long, 1-3 mm wide, shallowly curved; outer margins entire to slightly irregular; mid-lobe transversely ovate-reniform to flabelliform, 10-15 mm long, 8-15 mm wide, with a central longitudinal fold; margins slightly irregular; apex obtusely apiculate. *Labellum callus* glabrous, whitish marked with mauve or purple, well-developed on the labellum base and on the basal part of the mid-lobe, consisting of 2 raised divergent ridges which incurve slightly at the apex, with an ill-defined central tapered ridge extending well onto the mid-lobe. *Column* porrect from the end of the ovary, 5.5-6 mm long, 4-4.5 mm wide. *Column wings* more or less lanceolate, c. 6 mm long, c. 1.5 mm wide, irregularly toothed. *Anther* narrowly ovate, c. 5.5 mm long, c. 2.8 mm wide, brownish purple. *Pollinarium* c. 4.5 mm long, c. 2.4 mm wide; *viscidium* elliptic, c. 1 mm long; *pollinia* clavate, c. 4 mm long, white, mealy. *Stigma* broadly cordate, c. 2.5 mm long, c. 4 mm wide. *Capsules* ovoid to obovoid, 8-11 mm long, 4-6 mm wide, erect. Flowering period November-December.

Gazetted: 09/02/01

NSW SCIENTIFIC COMMITTEE

Final Determination

The Scientific Committee, established by the Threatened Species Conservation Act, has made a Final Determination to list *Dodonaea stenozyga* F.Muell., an erect rounded shrub, as an ENDANGERED SPECIES on Part 1 of Schedule 1 of the Act. The listing of endangered species is provided for by Part 2 of the Act.

The Scientific Committee has found that:

1. *Dodonaea stenozyga* is an erect rounded shrub to 1.5 m in the family Sapindaceae. A description is provided in *Flora of Australia* volume 25 *Melianthaceae to Simaroubaceae* Australian Government Publishing Service, Canberra (1985), pp 143-144: "Dioecious erect, rounded shrub to 1.5 m. Leaves paripinnate, sometimes terminated by a small tooth or lobe, including petiole 1-3.8 cm long; leaflets 2-6, rarely to 10, linear, terete or concave or channelled above, falcate or sometimes more or less flat & straight, obtuse, often recurved, entire, 8-13.5 mm long, rarely to 25 mm, 0.5-2 mm wide, glabrous; petiole 9.5-20 mm long, rarely to 24 mm. Flowers usually paired or 3-together, rarely solitary; pedicels 4-8.5 mm long. Sepals 4, oblong-lanceolate to ovate, 1.5-3.2 mm long, caducous. Stamens 7 or 8. Ovary glabrous. Capsule 4-winged, broadly elliptic or broadly obovate in lateral view, 8.5-14.5 mm long, 10-17 mm wide, glabrous; wings 3-6.5 mm wide, coriaceous; dehiscence septifragal." "Widespread in southern Australia from southern W.A. to western Vic. A shrub of semi-arid mallee scrub or open eucalypt woodland."
2. The type specimen collected by J. Dallachy & T.H. Goodwin, prior to 1859 is labelled *Darling River N.S.W.* and the species was presumed to be extinct in New South Wales.
3. An occurrence of *Dodonaea stenozyga* was recently discovered in New South Wales, north-west of Wentworth.
4. *Dodonaea stenozyga* occurs in semi arid mallee scrub or open eucalypt woodland from Western Australia to north-western Victoria. In New South Wales the only recent record is from Nanya Station, north-west of Wentworth, in *Eucalyptus oleosa* shrubland on a sandy swale.
5. *Dodonaea stenozyga* has not been recorded elsewhere in New South Wales despite extensive vegetation survey within the Scotia area, which includes Nanya and which includes a large area of apparently suitable habitat. (Westbrooke, Miller & Kerr 1998, The vegetation of the Scotia 1:100 000 map sheet, western New South Wales. *Cunninghamia* 5(3): 665-684.)
6. *Dodonaea stenozyga* is not known to occur in any New South Wales National Parks and Wildlife Service conservation reserve.
7. Threats to the survival of *Dodonaea stenozyga* include its very small and localised extent, grazing by goats, the increase in grazing rates resulting from expansion of reticulated water,

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potential changes in fire regimes and potential sand mining. The risk of extinction is high due to low population numbers.

8. In view of the above the Scientific Committee is of the opinion that *Dodonaea stenozyga* is likely to become extinct in nature in New South Wales unless the circumstances and factors threatening its survival or evolutionary development cease to operate.

Dr Chris Dickman
Chairperson
Scientific Committee



*A Determination to provisionally list this species
as an endangered species was gazetted on:*

14/07/00

Gazetted: 23/02/01

NSW SCIENTIFIC COMMITTEE

Determination for provisional listing of an endangered species on an emergency basis

The Scientific Committee, established by the Threatened Species Conservation Act, has made a Determination for the provisional listing, on an emergency basis, of the tree, *Eidothea* sp. 'Nightcap Range' (P.H. Weston 2469) as an ENDANGERED SPECIES on Part 1 of Schedule 1 of the Act. Provisional listing is provided for by Part 2 of the Act.

The Scientific Committee found that:

1. *Eidothea* sp. 'Nightcap Range' (P.H. Weston 2469) (Proteaceae), is a recently discovered species endemic to New South Wales.
2. *Eidothea* sp. 'Nightcap Range' (P.H. Weston 2469) is currently being described. A description of the species from Dr P. Weston of the Royal Botanic Gardens Sydney is:

Rainforest trees 15-40 m high, with one main trunk to 70 cm diameter at breast height, but often with up to 40 smaller subsidiary shoots with stems 0.5-10 cm diameter, branching from the base. Bark grey, compact. Trichomes simple. Shoots composed of a succession of repeated growth units, each consisting of a basal false internode and a terminal false whorl of leaves; false internodes bearing several, uncrowded, spirally inserted scale leaves or their scars; false whorls bearing several crowded, spirally inserted leaves. Branchlets glabrous. Leaves simple, elliptical to obovate, shortly petiolate, with spinose-acuminate tip, the undersurface paler than the upper surface, glabrous; venation brochidodromous, more prominent on the upper leaf surface than the lower but with primary to quarternary veins prominently raised on both surfaces when dried. Juvenile leaves (plants 1-1.5 m high) in false whorls of 3-5, with spinose-dentate margins, 8-14 cm long, 2-4 cm wide; petiole 4-8 mm long. Leaves of basal subsidiary shoots in false whorls of 5-17, elliptical to obovate, with spinose-dentate margins in basal false whorls, becoming entire in more distal false whorls, 9-18 cm long, 2.3-5.4 cm wide; petiole 4-11 mm long; marginal spines 1.5-4 mm long; apical spine 3-6 mm long. Adult leaves in false whorls of 4-7, entire, (2.5-)8-13.5 cm long, (0.7-)1.7-4.2 cm wide; petiole (3-)5-10 mm long; apical spine 1-4.5 mm long. Inflorescence a lateral, axillary or ramiflorous, shortly pedunculate capitulum with a central, ebracteate, bisexual flower surrounded by a whorl of 6-10 bracteate male flowers; peduncle 6-7 mm long. Flowers actinomorphic, 4-merous, creamy white when fresh; bisexual and male flowers of equal size. Tepals free except for a short, basal tube, valvate, approximately oblong in shape but slightly constricted at the tip of the basal tube and narrowing abruptly to an acute tip, c. 8.5 mm long, glabrous externally, with long trichomes at base but otherwise glabrous internally. Stamens free or the filaments slightly adnate to the base of the tepals; filaments filiform, weak, not supporting the anthers; anthers narrow-oblong, latrorsely dehiscent via longitudinal slits, without terminal appendages, pendulous, 3.2-3.8 mm long; pollen grains triporate. Hypogynous glands absent. Ovary shortly stipitate (merely narrowed towards the base), with ascending hairs in alternitetalous positions; style tip not modified as a pollen presenter; ovule 1, orthotropous, pendulous. Fruit indehiscent, with internal,

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longitudinal ribs, pyriform, 2.7-3.3 cm long, 2.2-3.0 cm diameter, green, turning creamy yellow.

3. *Eidothea* sp. 'Nightcap Range' (P.H. Weston 2469) is known from a very limited area in the Nightcap range. Only a small number of trees are currently known to exist.
4. Threats to *Eidothea* sp. 'Nightcap Range' (P.H. Weston 2469) include disturbance from roads and proposed logging activities adjacent to the habitat of the species. Further, the species' very small population size leaves it vulnerable to stochastic events.
5. In view of the above points, the Scientific Committee is of the opinion that *Eidothea* sp. 'Nightcap Range' (P.H. Weston 2469) is likely to become extinct in nature in New South Wales unless the circumstances and factors threatening its survival cease to operate.
6. The Committee is of the opinion that *Eidothea* sp. 'Nightcap Range' (P.H. Weston 2469), although not previously known to have existed in New South Wales, is believed on current knowledge to be indigenous to New South Wales and the species is not listed in Part 1 of Schedule 1 of the Act. Consequently the species is eligible for provisional listing on an emergency basis.

Dr Chris Dickman
Chairperson
Scientific Committee

Gazetted: 30/03/01

NSW SCIENTIFIC COMMITTEE

Final Determination

The Scientific Committee, established by the Threatened Species Conservation Act, has made a Final Determination to list the tree, *Eucalyptus corticosa* L.A.S. Johnson, as a VULNERABLE SPECIES on Schedule 2 of the Act. The listing of Vulnerable Species is provided for by Part 2 of the Act.

The Scientific Committee has found that:

1. *Eucalyptus corticosa* is described as follows: HABIT: Tree to 20 m high; bark persistent on trunk and larger branches, grey-brown to red-brown, thick, fibrous-flaky to shortly fibrous, smooth above, grey to grey-brown, shedding in short ribbons. LEAVES: Juvenile leaves disjunct, linear to narrow-lanceolate, dull grey-green. Adult leaves disjunct, narrow-lanceolate to lanceolate, 6-12 cm long, 1-2 cm wide, grey-green, dull, concolorous. FLOWERS: Umbellasters 7-flowered; peduncle terete or 4-angled, 4-6 mm long; pedicels terete, 1-3 mm long. Buds ovoid or shortly fusiform, 4-6 mm long, 3-4 mm diam., scar present; calyptra conical, shorter than to as long as and as wide as hypanthium. FRUIT: Fruit hemispherical to campanulate, 4-6 mm long, 4-6 mm diam.; disc raised; valves exserted. (page 108 in G. J. Harden, *Flora of New South Wales Volume 2*, UNSW Press 1991).
2. *Eucalyptus corticosa* is only known from a restricted area, over about 20 square kilometres, near Mount Coricudgy in the Rylstone area.
3. *Eucalyptus corticosa* occurs on a restricted area of sandy soils, on low slope erosional terraces associated with the upper reaches of the Cudgegong River. It may be locally frequent, and is often associated with *Eucalyptus rossii* in this habitat.
4. It has been recorded from Coricudgy State Forest, but has not been recorded from nearby areas of Wollemi National Park.
5. Threats to this species include fragmentation of the population by clearing for farming expansion, road widening and grazing, and altered fire regimes.
6. In view of its restricted distribution, its absence from conservation reserves, and the threat of ongoing reduction of the population, the Scientific Committee is of the opinion that *Eucalyptus corticosa* is likely to become endangered unless the circumstances and factors threatening its survival or evolutionary development cease to operate and therefore is eligible to be listed as a Vulnerable Species.

Dr Chris Dickman
Chairperson
Scientific Committee

Gazetted: 30/11/01

NSW SCIENTIFIC COMMITTEE

Final Determination

The Scientific Committee, established by the Threatened Species Conservation Act, has made a Final Determination to list the terrestrial orchid *Genoplesium insignis* D. L. Jones as an ENDANGERED SPECIES on Part 1 of Schedule 1 of the Act. The Listing of Endangered Species is provided for by Part 2 of the Act.

The Scientific Committee has found that:

1. *Genoplesium insignis* (Orchidaceae) is a newly described terrestrial orchid species (D. L. Jones, 2001, Six new species and a new combination in *Genoplesium* (Orchidaceae) from Eastern Australia. The Orchadian Vol. 13, No. 7, pp. 293-307). *G. insignis* is described as: Terrestrial tuberous herb. Leaf terete, 6-15 cm long, c. 0.15 cm wide, dark green; base reddish; lamina sheathing the scape or distally free, subulate, 10-15 mm long, 1.5-2 mm wide, ending 5-20 mm below the first flower. Inflorescence 9-18 cm tall, bearing 5-12 flowers in a moderately dense spike 15-25 mm long. Flowers porrect, c. 5 mm diam., dark purple to dark reddish purple with a dark reddish-purple labellum; lateral sepals obliquely erect. Floral bracts closely sheathing, transversely ovate-oblong, c. 0.8 mm long, c. 1.5 mm wide, broadly obtuse. Ovary linear-obovoid, c. 3.5 mm long, asymmetrically arcuate. Dorsal sepal cucullate, ovate-lanceolate to elliptic-lanceolate, 5-5.5 mm long, c. 2.5 mm wide, deeply concave; margins entire; apex long-acuminate to attenuate-apiculate. Lateral sepals narrowly linear-lanceolate, 6.5-7 mm long, c. 1.2 mm wide, not gibbous at the base, more or less parallel; distal margins involute; apex subacute. Petals widely spreading, narrowly ovate-lanceolate, 4.5-5 mm long, c. 1 mm wide; margins entire; apex long-acuminate. Labellum hinged by a short claw, porrect, mobile in a breeze; lamina obovate-elliptic, c. 4 mm long, c. 1.8 mm wide, fleshy, sharply recurved at the base and the apex; margins with short to long (0.3-1 mm long), coarse, spreading purple cilia; apex long-acuminate; callus occupying less than half the area of the ventral surface of the lamina, extending to within 1 mm of the labellum apex, dark purplish-black, colluviate, thickest and broadest just above the base then drawn out and tapered to an obtuse apex. Column c. 2.8 mm long, c. 1.4 mm wide, purplish to reddish. Column foot ligulate, c. 0.7 mm long, the apex incurved. Column wings very shallowly notched; lobes slightly unequal, not divergent; posterior lobe slightly longer, linear, paler, obtuse, entire; anterior lobe slightly shorter, broadly deltate, dark purplish, obtuse, curved, the anterior margins densely and irregularly ciliate, with cilia to c. 0.5 mm long. Anther c. 1 mm long, with a filiform rostrum c. 0.6 mm long. Pollinarium c. 1 mm long; pollinia c. 0.9 mm long, yellow, coarsely granular; caudicle vestigial; viscidium c. 0.2 mm wide. Stigma ovate-elliptic, c. 1 mm long, c. 0.6 mm wide. Capsules not seen.
2. *Genoplesium insignis* is known only from three localities between Charmhaven and Wyong. It grows in patches of *Themeda australis* amongst shrubs and sedges in heathland and forest (Jones 2001).
3. Fewer than twenty plants are known from the three known localities.

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4. Threats to the species are loss of habitat through development, road and track maintenance and off road driving by 4WDs and trail bikes. Populations may also be at risk due to the small numbers of plants. This predisposes the species to declines via stochastic events.
5. In view of 2, 3 and 4 above the Scientific Committee is of the opinion that *Genoplesium insignis* is likely to become extinct in nature in New South Wales unless the circumstances and factors threatening its survival or evolutionary development cease to operate, and is therefore eligible for listing as an endangered species.

Dr Chris Dickman
Chairperson
Scientific Committee

Gazetted: 05/10/01

NSW SCIENTIFIC COMMITTEE

Final Determination

The Scientific Committee, established by the Threatened Species Conservation Act, has made a Final Determination to list the terrestrial orchid *Genoplesium vernale* D. L. Jones as a VULNERABLE SPECIES on Schedule 2 of that Act. Listing of Vulnerable Species is provided for by Part 2 of the Act.

The Scientific Committee previously made a Preliminary Determination for this species under the name of *Genoplesium vernalis*.

The Scientific Committee has found that:

1. *Genoplesium vernale* (Orchidaceae) is a newly described terrestrial orchid species (D. L. Jones, 2001, Six new species and a new combination in *Genoplesium* (Orchidaceae) from eastern Australia. The Orchadian (2001) Vol. 13, No. 7 pp. 293-307. *G. vernale* is described as: Terrestrial tuberous herb. Leaf 10-18 cm long, 0.15-0.3 cm wide, terete, dark green, reddish at the base; lamina closely sheathing throughout, 10-15 mm long, 2-3 mm wide, oblanceolate-subulate, ending 5-20 mm below the first flower. Inflorescence 15-25 cm tall, bearing 10-25 flowers in a densely crowded spike 2-4 cm long. Flowers 3.5-4.5 mm diam., dark purplish black, porrect to semi-nodding; lateral sepals obliquely erect. Ovary linear-obovoid, to c. 2.6 mm long, slightly curved, green. Dorsal sepal cucullate, broadly ovate when flattened, 3-3.5 mm long, 2-2.3 mm wide, concave; margins with minute glandular cilia, apex acuminate. Lateral sepals nearly parallel, narrowly oblong-lanceolate, 4-4.5 mm long, 1.2-1.3 mm wide, base gibbous, margins entire, distal margins involute, apex narrowly and bluntly acute, sometimes a vestigial gland present. Petals porrect to spreading, narrowly ovate-lanceolate, c. 3 mm long, c. 12 mm wide, margins with minute glandular cilia, apex long-acuminate. Labellum attached by a short claw to the apex of the column foot; lamina narrowly oblong-elliptic, 2.5-2.8 mm long, 1.2-1.5 mm wide, shallowly curved throughout, suddenly contracted to an apiculate apex, externally papillate, margins denticulate, distal margins slightly irregular, with minute glandular cilia. Callus extending nearly to the labellum apex, occupying most of the ventral surface of the lamina, oblong, sometimes constricted above the middle, fleshy, dark purple to brownish black, base yellow, surface colluviate, apex entire. Column c. 2 mm long, c. 1.8 mm wide. Wings lobed about halfway to the base, the lobes not divergent; posterior lobe linear, whitish, obtuse; anterior lobe ovate-lanceolate, dark red, acute, the margins irregularly denticulate. Anther c. 0.8 mm long, with a linear to filiform rostrum about 0.3 mm long. Stigma broadly elliptic, c. 0.5 mm long, c. 0.5 mm wide. Pollinarium c. 1 mm long; pollinia c. 0.8 mm long, yellow, granular, caudicle ligulate, c. 0.15 mm long; viscidium c. 0.2 mm wide. Capsules erect, narrowly obovoid, 4-5 mm long, c. 0.3 mm wide.
2. *Genoplesium vernale* is restricted to a narrow geographic range from near Mogo to west of Ulladulla. It occurs in dry sclerophyll forest.

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3. Recent surveys during 2000 have found the species at some 28 locations, although several of these are only separated by distances of less than 300 m. The number of populations known is likely to be less than 20. The abundance, above ground, at known sites is small and ranges from 1 to 139. Sites are known from the following NPWS reserves: Budawang National Park, Morton National Park and Murramarang National Park.
4. Threats to the species are generally localised and include construction and maintenance of roads, forestry tracks and utility easements. There has been some clearing of habitat in the past and at a number of sites future logging may be a threat. Populations may also be at risk due to the small numbers of plants. This predisposes the species to declines via stochastic events.
5. In view of 2, 3 and 4 above the Scientific Committee is of the opinion that *Genoplesium vernale* is likely to become endangered unless the circumstances and factors threatening its survival or evolutionary development cease to operate, and is therefore eligible for listing as a vulnerable species.

Dr Chris Dickman
Chairperson
Scientific Committee

Gazetted: 05/10/01

NSW SCIENTIFIC COMMITTEE

Final Determination

The Scientific Committee, established by the Threatened Species Conservation Act, has made a Final Determination to list the terrestrial orchid *Geodorum densiflorum* (Lam.) Schltr. as an ENDANGERED SPECIES on Part 1 of Schedule 1 of the Act. Listing of endangered species is provided for by Part 2 of the Act.

The Scientific Committee has found that:

1. *Geodorum densiflorum* (Lam.) Schltr. (ORCHIDACEAE), is a terrestrial herb, dormant during winter, with pseudobulbs buried or half buried, depressed globose. Leaves 3-5; petiole 2-8 cm long; lamina ovate to lanceolate, 15-35 cm long, 4-8 cm wide, with 3 prominent ribs and 4 less prominent longitudinal veins. Inflorescence 15-30 cm long, 8-20-flowered; peduncle basally erect but recurved through 180 degrees just below the rachis, straightening in fruit; pedicel plus ovary 5-10 mm long. Flowers not widely opening. Sepals and lateral petals 11-18 mm long, 2.5-5 mm wide, white to deep pink. Labellum 10-15 mm long, 6-8 mm wide, pink with red to purple veins. Flowers Dec.-Jan. Synonyms are *G. pictum* (R. Br.) Lindl., and *G. neocaledonicum* Kraenz. (Weston in Harden, 1993, Flora of NSW Vol. 4, University of NSW Press).
2. *Geodorum densiflorum* grows in dry sclerophyll forest, often on coastal sand, at lower altitudes, north from the Macleay River on the north coast of NSW (Weston in Harden, 1993). *G. densiflorum* is a widespread species in Queensland, the Northern Territory and overseas (P. Weston pers. comm.). Bishop (1996, Field Guide to the Orchids of New South Wales and Victoria. University of NSW Press) refers to this taxon as *Geodorum neocaledonicum* (Pink Nodding Orchid) growing in open eucalypt forest and heathland, favouring sandy soils, often on grassy hillsides in loose colonies.
3. There are thought to be fewer than 10 populations of *Geodorum densiflorum* in NSW. The largest known population has been estimated to have about 200 plants, with other populations thought to be smaller in plant numbers. One population is reserved in Cudgen Nature Reserve, and one has been recorded from Bundjalung National Park, but the status of the Bundjalung population is unknown.
4. *Geodorum densiflorum* is threatened by urban development, and weeds such as bitou bush. Trampling is also a threat to this species as one population is situated beside a walking track and another population is at a site frequented by picnickers and fisherfolk.

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5. In view of 3, and 4 above the Scientific Committee is of the opinion that *Geodorum densiflorum* is likely to become extinct in nature unless the circumstances and factors threatening its survival or evolutionary development cease to operate.

Dr Chris Dickman
Chairperson
Scientific Committee

Gazetted: 13/07/01

NSW SCIENTIFIC COMMITTEE

Final Determination

The Scientific Committee, established by the Threatened Species Conservation Act, has made a Final Determination to list *Grevillea divaricata* R.Br., a shrub as an ENDANGERED SPECIES on Part 1 of Schedule 1 of the Act. Listing is provided for by Part 2 of the Act.

The Scientific Committee has found that:

1. *Grevillea divaricata* R.Br. (Proteaceae) is described in the *Flora of Australia. Volume 17A. Proteaceae 2, Grevillea.* by Makinson (2000), from which the following is taken in full.

“Low shrub to 740 cm tall. Leaves entire, well spaced along branchlets, spreading, linear, often gently curved, 0.8-1.3 cm long, 0.5-0.6 mm wide; margins revolute; upper surface scabrid; lower surface enclosed including midvein and 1-grooved, or rarely slightly exposed near leaf base. Conflorescence terminal, simple to 3-branched; unit conflorescence a decurved 1-4 flowered loose cluster, opening uncertain; floral rachis 2-6 mm long, glabrous. Flowers acroscopic. Flower colour: not known, probably red or red and cream. Perianth glabrous outside, bearded inside. Pistil c. 16 mm long; ovary shortly stipitate, glabrous or with a few ascending hairs ventrally on basal half; stipe swollen, c. 0.5 mm long, ventrally tomentose; style glabrous, slightly exserted from late bud; pollen-presenter lateral. Fruit and seed not known”.

2. *Grevillea divaricata* has been considered as representing a depauperate plant of *G. rosmarinifolia*, however, re-examination of the types indicates that while very closely related, it should be recognised as distinct (Makinson 2000). The differences between *G. divaricata* and *G. rosmarinifolia* are described in Makinson (2000).
3. *Grevillea divaricata* is only known from the Type collection made north of Bathurst. It was last collected in 1823.
4. In view of 2 and 3 above the Scientific Committee is of the opinion that *Grevillea divaricata* is likely to become extinct in nature in NSW unless the circumstances and factors threatening its survival or evolutionary development cease to operate.

Associate Professor Paul Adam
Deputy Chairperson
Scientific Committee

Gazetted: 15/06/01

NSW SCIENTIFIC COMMITTEE

Final Determination

The Scientific Committee, established by the Threatened Species Conservation Act, has made a Final Determination to list the tree, *Grevillea hilliana* F. Muell. as an ENDANGERED SPECIES on Part 1 of Schedule 1 of the Act. Listing of Endangered Species is provided for by Part 2 of the Act.

The Scientific Committee has found that:

1. *Grevillea hilliana* (Proteaceae), is a tree 8-30 m high. The following description is taken in full from Makinson in Harden, G.J, Hardin, D.W. and Godden, D.C. (eds) 2000, *Proteaceae of NSW*, p 149, UNSW Press. "Juvenile and intermediate leaves pinnatifid or pinnatisect with 3-10 lobes, rarely undivided or more divided, mostly 25-40 cm long and 15-30 cm wide; lobes more or less linear to lanceolate, 8-25 cm long, 10-50 mm wide; lower surface silky. Adult leaves either simple and lanceolate to oblong-elliptic, 9-24 cm long, 15-60 mm wide, or sometimes 4-6-lobed; lobes oblong to ovate, 6-12 cm long, 2-4 cm wide, margins recurved, lower surface silky. Conflorescences sometimes few-branched, 8-22 cm long, branches many-flowered, cylindrical. Perianth white to pale green, silky outside, glabrous or pubescent inside. Gynoecium 13-16 mm long, stipitate, glabrous; style white to pale green, pollen presenter very oblique. Follicle glabrous. Flowers mainly May-July." *Grevillea hilliana* is also known locally as White Yiel Yiel or White Silky Oak.
2. *Grevillea hilliana* grows in subtropical rainforest, often on basic igneous substrates. It is found north of Brunswick Heads on the north coast of NSW and in Queensland (Makinson in Harden *et al.* 2000). The only populations currently known in NSW are in the areas of Brunswick Heads and Tweed Heads, in small remnant areas of vegetation.
3. The number of known plants of *Grevillea hilliana* is low and is estimated to be less than 100 mature individuals.
4. *Grevillea hilliana* is only reserved in the Brunswick Heads Nature Reserve where a few trees are known. The other few known remaining areas are on private land and these are threatened with loss of habitat through land clearing. *Grevillea hilliana* is at risk of extinction in New South Wales due to its restricted distribution and very low population numbers.
5. In view of 2, 3 and 4 above the Scientific Committee is of the opinion that *Grevillea hilliana* is likely to become extinct in nature in NSW unless the circumstances and factors threatening its survival or evolutionary development cease to operate.

Dr Chris Dickman
Chairperson
Scientific Committee

Gazetted: 13/07/01

NSW SCIENTIFIC COMMITTEE

Final Determination

The Scientific Committee, established by the Threatened Species Conservation Act, has made a Final Determination to list the low spreading shrub, *Hibbertia superans* Toelken as an ENDANGERED SPECIES on Part 1 of Schedule 1 of the Act and, as a consequence, to omit reference to a population of *Hibbertia incana* (Lindley) Toelken in the Local Government Area of Baulkham Hills as an ENDANGERED POPULATION on Part 2 of Schedule 1 of the Act. Listing is provided for by Part 2 of the Act.

The Scientific Committee has found that:

1. *Hibbertia superans* (Dilleniaceae), has been newly described by Toelken (2000), Notes on *Hibbertia* (Dilleniaceae) 3. *H. sericea* and associated species. *J. Adelaide Bot. Gard.* 19: 1-54. It is a 'low spreading shrub to 0.3 m high, with few to many, weak twisted stems and branches, villous when young, becoming tomentose with longer hairs more or less wearing off. Vestiture on all parts consisting of more or less long silky over a dense layer of usually short stiffly erect simple hairs, but particularly on the branches and the undersurface of leaves there are often some scattered stellate hairs with 2-3 (-5) equal erect branches (cf. variation below). Leaves (none modified into hypsophylloids) with axillary hair tuft below flowers 1-1.2 mm long; petiole 0-0.2 mm long; lamina linear, rarely linear-elliptic, (5.6-)7.5-10 (-12.3) x 0.9-1.2(-1.4) mm, acute, often becoming obtuse, scarcely constricted into petiole, slightly broadened central vein usually raised to same level as revolute margins and continued (0.4-0.6 mm wide in the middle) into the apex, with undersurface not visible, villous over or becoming tomentose above and below. Flowers single, sessile to slightly stalked, terminal on main branches or rarely on short shoot, younger ones freely overtopping older ones; bracts linear, 8.3-9.5 x 1.0-1.3 mm, like leaves with distinct central vein, villous sometimes becoming tomentose. Calyx not accrescent; outer calyx lobes linear-lanceolate, acute, with slender central vein and recurved margins in upper third, (6.8-) 7.5-9 (9.8) x 1.5-1.6 mm, much longer than inner ones, outside villous over or becoming tomentose, inside at least upper half like outside; inner calyx lobes oblong- elliptic to -obovate, obtuse to rounded, 4.2-6.5 (-7.6) x 1.9-2.7 mm, outside villous over more or less appressed pubescent, inside rarely with a few appressed hairs towards the apex. Petals broadly obovate, 5.5-6.7 mm long, emarginate. Stamens 6-9, subequal; filaments basally connate, but often some more than others; anthers narrowly oblong, (1.4-) 1.6-1.8 mm long, dehiscent mainly by lateral slits. Pistils 2; ovaries laterally compressed, each with 4 ovules; style from outer apex of ovary, curved outwards and around the cluster of stamens to end at the apex of the outer anthers. Fruit villous with very dense erect simple hairs. Seeds oblong-obovoid, often oblique, 1.5-1.7 x 1.1-1.4 mm, fleshy aril expanding into a scarcely lobed sheath adpressed to the base of seed, often to one side of base of seed. Flowering: July-Dec'.
2. *Hibbertia superans* is part of the *H. sericea* complex as published in the Flora of NSW. (Harden & Everett in Harden, G.J. (ed.) 1990, Flora of New South Wales Vol. 1, pp. 302-303, University of NSW Press, Kensington). It includes the population of *H. incana* occurring in Baulkham Hills Shire and listed as an endangered population in Part 2 of Schedule 1 of the Threatened Species Conservation Act.

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3. *Hibbertia superans* grows in ridgetop woodlands. The species occurs from Castle Hill to South Maroota in the northern outskirts of Sydney, where there are some 14 currently known sites, and at one locality at Mt Boss, inland from Kempsey. The largest known population has been estimated to have about 400 plants. No populations are known from a formal conservation reserve.
4. Most occurrences are in or near Shale/Sandstone Transition Forest and are often associated with other threatened flora including *Pimelea curviflora* var. *curviflora*, *Darwinia biflora*, *Epacris purpurascens* var. *purpurascens*, *Leucopogon fletcheri* subsp. *fletcheri*, *Acacia bynoeana*, *Eucalyptus* sp. *Cattai* and *Persoonia hirsuta*. These plants tend to be very strongly associated due to their habitat requirements and restricted distribution.
5. *Hibbertia superans* is threatened by clearing for urban and rural residential development, disturbances to its habitat, weed invasion and road and rail maintenance.
6. In view of 3, 4 and 5 above the Scientific Committee is of the opinion that *Hibbertia superans* is likely to become extinct in nature in NSW unless the circumstances and factors threatening its survival or evolutionary development cease to operate.

Dr Chris Dickman
Chairperson
Scientific Committee

Gazetted: 05/10/01

NSW SCIENTIFIC COMMITTEE

Determination for provisional listing of an endangered species on an emergency basis

The Scientific Committee, established by the Threatened Species Conservation Act, has made a Determination for the provisional listing, on an emergency basis, of the shrub, *Lasiopetalum behrii* F. Muell., as an ENDANGERED SPECIES on Part 1 of Schedule 1 of that Act. Provisional listing is provided for by Part 2 of the Act.

The Scientific Committee has found that:

1. *Lasiopetalum behrii* F. Muell. (Sterculiaceae), is a recently discovered species in New South Wales (Harden, G.J. & Murray, L.J. 2000, *Supplement to Flora of New South Wales Volume 1*, University of NSW Press). The species is known also from north-west Victoria and South Australia.
2. *Lasiopetalum behrii* is a 'shrub to 1.5 m high. Leaves narrow-oblong to narrow-elliptic, or rarely ovate, 4-9 cm long, 0.5-3 cm wide, more or less glabrous above and rusty tomentose below, with main vein and secondary veins visible; margins more or less recurved. Petiole 3-10 mm long. Cymes mostly 2-8 flowered; bracteoles 3, stellate-hairy, 2-3 mm long; calyx lobes 5-8 mm long, the inner surface pink and glabrous or with a few scattered hairs, the outer surface white and densely stellate-hairy; petals 1-1.5 mm long, red -brown; anthers c. 2 mm long, red-brown; style glabrous. Capsule 4-8 mm diam., densely hairy. Flowers late winter to spring.' (Harden & Murray 2000). It occurs in mallee areas, chiefly on sand-ridges.
3. In New South Wales, *Lasiopetalum behrii* is known from a single location near Pooncarie, in the South Far Western Plains of New South Wales (Clements, A.M., Rodd, T., Moore, R.J., Crane, A.G. and Simpson, J. 2000, Surveys of areas having potentially high botanical diversity near Pooncarie, South Far West Plains. *Cunninghamia* 6, 611-643.) It occurs in mallee and red dune/swale country (Harden & Murray 2000). The species is not known to occur in any New South Wales conservation reserve.
4. Threats to *Lasiopetalum behrii* include clearing of vegetation for agriculture, grazing, competition with exotic plants and mineral sands exploration and mining. Further, the species' very small and localized extent in NSW leaves it vulnerable to stochastic events.
5. In view of the above points, the Scientific Committee is of the opinion that *Lasiopetalum behrii* is likely to become extinct in nature in New South Wales unless the circumstances and factors threatening its survival cease to operate.

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6. The Scientific Committee is of the opinion that *Lasiopetalum behrii*, although not previously known to have existed in New South Wales, is believed on current knowledge to be indigenous to New South Wales and the species is not listed in Part 1 of Schedule 1 of the Act. Consequently the species is eligible for provisional listing on an emergency basis.

Dr Chris Dickman
Chairperson
Scientific Committee

Gazetted: 23/02/01

NSW SCIENTIFIC COMMITTEE

Final Determination

The Scientific Committee, established by the Threatened Species Conservation Act, has made a Final Determination to list *Lepiderema pulchella* Radlk., a tree, as a VULNERABLE SPECIES on Schedule 2 of the Threatened Species Conservation Act. The listing of vulnerable species is provided for by Part 2 of the Act.

The Scientific Committee has found that:

1. *Lepiderema pulchella* Radlk (Sapindaceae) is a rainforest tree. It is described by Harden (in Harden; G.1991 Flora of New South Wales Vol. 2. UNSW Press Sydney, page 294) as:
“Tree to 15m high, branchlets, leaves and peduncles glabrous. Leaves 7-15cm long, leaflets 4-14, narrow-elliptic to lanceolate, more or less falcate, 2.5-8cm long 10-25mm wide, apex bluntly acuminate, base attenuate and asymmetric, margins undulate and entire (sometimes coarsely toothed on juveniles), both surfaces glabrous, upper surface light green and glossy; petiole 15-25mm long, petiolules 1-3mm long. Panicles axillary 5-10cm long; pedicels 3-5mm long. Flowers 2-3mm long; yellow-orange. Capsule globose to 3-lobed, 8-10mm diameter, shortly attenuate at base, brown; seeds dark brown, c.5mm long; aril basal, yellow. Fruit ripe December.”
2. *Lepiderema pulchella* occurs in lowland subtropical rainforest and in New South Wales is largely confined to infertile metasediments in the Tweed Valley.
3. There are few populations of mature trees in conservation reserves, and the number of adult trees in individual sites is small, mostly less than 20.
4. The majority of known populations are on private land.
5. Ongoing threats include weed invasion and clearing.
6. In view of 2, 3 4 and 5 above the Scientific Committee is of the opinion that *Lepiderema pulchella* is likely to become endangered unless the factors threatening its survival or evolutionary development cease to operate and is eligible for listing as a vulnerable species on Schedule 2 of the Act.

Associate Professor Paul Adam
Deputy Chairperson
Scientific Committee

Gazetted: 15/06/01

NSW SCIENTIFIC COMMITTEE

Final Determination

The Scientific Committee, established by the Threatened Species Conservation Act, has made a Final Determination to list the Southern Giant Petrel *Macronectes giganteus* (Gmelin 1789), as an ENDANGERED SPECIES on Part 1 of Schedule 1 of the Act. Listing of Endangered Species is provided for by Part 2 of the Act.

The Scientific Committee found that:

1. The Southern Giant Petrel *Macronectes giganteus*, is a large seabird of length 85-100cm and wingspan 150-210cm. The species is sexually dimorphic, with males larger than females. Within populations, two colour morphs occur: the most common is the dark morph with a white head and neck, and a dark grey-brown body; and a white morph with scattered black feathers. The species is listed as Endangered under the Commonwealth Environment Protection and Biodiversity Conservation Act 1999.
2. The Southern Giant Petrel has a circumpolar pelagic range from Antarctica to approximately 20°S and is a common visitor off the entire length of the New South Wales coast (H. Battam, pers. comm.; Blakers *et al.* 1984). Over summer, the species nests in small colonies amongst open vegetation on Antarctic and subantarctic islands, including Macquarie and Heard Islands and in Australian Antarctic territory. A single chick is raised and although breeding occurs annually, approximately 30% of the potential breeding population does not nest (Voisin 1988).
3. The Southern Giant Petrel is an opportunistic scavenger and predator. The species regularly attends fishing vessels and scavenges animal carcasses on land. Southern Giant Petrels are also an active predator of cephalopods and euphausiids, as well as smaller birds (particularly penguins) both at land and at sea. Although representing a small proportion of its total foraging area, potential forage in NSW waters during the winter is nonetheless considered significant for the species.
4. The current global population of Southern Giant Petrels was recently estimated to be 31,358 breeding pairs (Patterson *et al.*, in press). This estimate represents a population reduction of approximately 17% from a previous estimate of 38 000 pairs (Hunter 1985). Further, the estimated 5,000 breeding pairs in Australian territory represents a reduction of approximately 50% since the middle of the last century (Marchant and Higgins 1990).
5. A significant threat to Southern Giant Petrels is mortality via longline fishing. 'Incidental catch (or bycatch) of seabirds during oceanic longline fishing operations' is a Commonwealth listed Key Threatening Process under the Environment Protection and Biodiversity Conservation Act 1999. Among other pelagic bird species, the listing identifies Southern Giant Petrels to be adversely affected by longline fishing.
6. On their breeding islands, Southern Giant Petrels are threatened by predation from Feral Cats and Black Rats, and by habitat degradation from introduced Caribou, Sheep and Rabbits. On

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some breeding islands, e.g. on the Falkland Islands, hunting has caused substantial decreases or local extinctions, (Elliot 1957; Williams 1984).

7. Within NSW waters, potential threats are the loss of the southern cuttlefish populations, illegal longline fishing and oil spills.
8. Environmental changes potentially exacerbate the impact of threats to the Southern Giant Petrel. A recent southerly shift in the Antarctic Polar Frontal Zone has resulted in increased sea and air temperatures and may have altered upwelling patterns and hence marine prey availability (Patterson *et al.*, in press.).
9. In view of the above points, the Scientific Committee is of the opinion that the Southern Giant Petrel *Macronectes giganteus*, is likely to become extinct in nature in New South Wales unless the circumstances and factors threatening its survival or evolutionary development cease to operate.

Dr Chris Dickman
Chairperson
Scientific Committee

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Gazetted: 05/10/01

NSW SCIENTIFIC COMMITTEE

Final Determination

The Scientific Committee, established by the Threatened Species Conservation Act, has made a Final Determination to list *Maundia triglochinos* F. Muell., a herb as a VULNERABLE SPECIES on Schedule 2 of the Threatened Species Conservation Act. The listing of Vulnerable Species is provided for by Part 2 of the Act.

The Scientific Committee has found that:

1. *Maundia triglochinos* F. Muell. (Juncaginaceae), is an erect rhizomatous perennial herb. It is described by Jacobs 1993 (in Harden, G.(ed). Flora of New South Wales. Vol. 4. page 19. UNSW Press, Sydney) as: Perennial with rhizomes c.5mm thick and emergent tufts of leaves arising along their length. Leaves triangular in cross section, to 80cm long, 5-10mm wide. Inflorescence to 10cm long and 2.5cm wide. Carpels 6-8mm long, sessile, each with a spreading beak. Flowers during warmer months. Grows in swamps or shallow fresh water on heavy clay.
2. *Maundia triglochinos* is a monotypic genus. *Maundia triglochinos* is almost restricted in its distribution to coastal New South Wales, extending into southern Queensland.
3. There are historic records of *Maundia triglochinos* in the Sydney region, but the current southern limit is near Wyong. Former sites in Sydney are either no longer wetlands or have been greatly disturbed.
4. *Maundia triglochinos* occurs in permanent swamps and wetlands on the central and north coasts of New South Wales; although locally common at individual sites the number of known locations is small and these are highly scattered. The habitats in which it grows are vulnerable to filling, changes in hydrology, water quality and weed invasion.
5. In view of the historic contraction in range, and the vulnerability of the remaining habitat to change the Scientific Committee is of the opinion that *Maundia triglochinos* is likely to become endangered unless the circumstances and factors threatening its survival or evolutionary development cease to operate and therefore is eligible to be listed as a Vulnerable Species.

Associate Professor Paul Adam
Deputy Chairperson
Scientific Committee

Gazetted: 15/06/01

NSW SCIENTIFIC COMMITTEE

Final Determination

The Scientific Committee, established by the Threatened Species Conservation Act, has made a Final Determination to list the Hooded Robin (south-eastern form) *Melanodryas cucullata cucullata* (Latham 1802), as a VULNERABLE SPECIES on Schedule 2 of the Act. Listing of Vulnerable Species is provided for by Part 2 of the Act.

The Scientific Committee found that:

1. The south-eastern form of the Hooded Robin *Melanodryas cucullata cucullata*, is distributed throughout south-eastern Australia, from Central Queensland, to Spencer Gulf, South Australia. This form of the Hooded Robin occurs throughout NSW except for the north-west of the state where it inter-grades with the smaller northern form of the Hooded Robin *M. cucullata picata* (Schodde & Mason 1999).
2. They occupy a wide range of Eucalypt woodlands, *Acacia* shrublands and open forests (Blakers *et al.* 1984). In temperate woodlands, the species favours open areas adjoining large woodland blocks, with areas of dead timber and sparse shrub cover (Fitri and Ford 1997). In semi-arid western NSW, the species favours open woodlands of Belah, Rosewood, Mulga and Cypress.
3. Hooded Robins live in small family groups of pairs or trios, and build cup-shaped nests. Home ranges are relatively large, and averaged 18ha for birds from the New England Tableland (Fitri and Ford 1997). The species feeds on the ground by pouncing on insects, and forages in areas with a mix of bare ground, ground cover and litter (Blakers *et al.* 1984, H. Recher, pers. comm).
4. The Hooded Robin has declined significantly in range and population. Declines have been reported from the following areas: the Cumberland Plain, Western Sydney (Hoskin 1991) with Keast (1995) reporting the species to be extinct from the area and Egan *et al.* (1997) recording a local extinction near Scheyville; the New England Tableland (Barrett *et al.* 1994; Fitri and Ford 1997); the central west around Orange area (Heron 1973); the area bounded by Parkes, Tottenham and Condobolin (N. Schrader, unpubl.); and from around Inverell (Baldwin 1975). Fisher (1997) predicted Hooded Robins would decline from the Bathurst area if current land management practices continued. Reid (1999) identified the species as a 'decliner' in a review of bird status in the NSW sheep-wheatbelt.
5. The Hooded Robin is threatened by clearance and fragmentation of habitat including removal of dead timber. The species appears unable to survive in remnants smaller than 100-200ha (Egan *et al.* 1997; N. Schrader, unpubl.). Isolation of populations in small remnants increases vulnerability to local extinction as a result of stochastic events and can decrease their genetic viability in the long term. Low population densities and relatively large home ranges also exacerbate their vulnerability within a highly fragmented and predominantly cleared landscape.

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6. Habitat degradation by stock grazing and weed invasion may reduce food resources for the species. Further, the breeding success of Hooded Robins may be reduced by increased populations of nest predators such as Pied Currawongs and Australian Ravens (Major *et al.* 1996).
7. In view of the above points, the Scientific Committee is of the opinion that the Hooded Robin (south-eastern form) *Melanodryas cucullata cucullata*, is likely to become endangered unless the circumstances and factors threatening its survival or evolutionary development cease to operate, and is therefore eligible for listing as a vulnerable species.

Dr Chris Dickman
Chairperson
Scientific Committee

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Gazetted: 26/10/01

NSW SCIENTIFIC COMMITTEE

Final Determination

The Scientific Committee, established by the Threatened Species Conservation Act, has made a Final Determination to list the Black-chinned Honeyeater (eastern subspecies) *Melithreptus gularis gularis* (Gould 1837), as a VULNERABLE SPECIES on Schedule 2 of the Act. Listing of Vulnerable Species is provided for by Part 2 of the Act.

The Scientific Committee found that:

1. The eastern form of the Black-chinned Honeyeater is found predominantly west of the Great Dividing Range in a narrow belt through NSW into southern Queensland, and south into Victoria and South Australia where it occupies eucalypt woodlands within an approximate annual rainfall range of 400-700mm (Blakers *et al.* 1984). In NSW, the species is mainly found in woodlands containing box-ironbark associations and River Red Gum. Black-chinned Honeyeaters are also known from drier coastal woodlands of the Cumberland Plain, Western Sydney and in the Hunter, Richmond and Clarence Valleys.
2. The Black-chinned Honeyeater is a medium-sized green and white passerine bird with a black head. The species builds compact, cup-shaped nests and feeds on arthropods, nectar and leop from eucalypt foliage and bark (Blakers *et al.* 1984).
3. Black-chinned Honeyeaters were widely distributed and occurred naturally at low densities. Black-chinned Honeyeaters were recorded at densities ranging between 0.02 to 0.26 per hectare in box-ironbark forests in Victoria (Traill 1995) and in northern NSW at 0.28 per hectare (Oliver *et al.* 1999).
4. The Black-chinned Honeyeater has declined in numbers and is no longer found in parts of its range. For example, population declines have been reported from the Cumberland Plain, Western Sydney (Hoskin 1991; Keast 1995; Egan *et al.* 1997) and the species was absent throughout a survey of 195 remnants near Forbes (Major *et al.* 1998). Incidental reports also show a decline in the occurrence of birds with the species now only occasionally recorded at a site near Moree where once they were regular, and an apparent 10 year absence from a once regular recording site near Wagga Wagga. The species does not persist in remnants less than 200 ha in area. Reid (1999) identified the species as a 'decliner' in a review of bird species' status in the NSW sheep-wheatbelt.
5. Black-chinned Honeyeaters are threatened by clearance and the fragmentation of woodland habitat. Reductions in remnant habitat size leads to the isolation of honeyeater populations which increases their vulnerability to extinction from stochastic events, and decreases their genetic viability in the long term. As the species occurs at low densities and is only found in relatively large remnants, this further exacerbates the species vulnerability.
6. Black-chinned Honeyeaters are likely to experience high levels of competition from aggressive honeyeater species such as Noisy Miners or White-plumed Honeyeaters, both of which occur at high densities in small remnants of Red Gum and box-ironbark associations.

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In addition, increased nest predation is expected from increasing populations of predators such as Pied Currawongs and Australian Ravens, particularly in small remnants (Major *et al.* 1998).

7. In view of the above points, the Scientific Committee is of the opinion that the sub-species of the Black-chinned Honeyeater (eastern subspecies) *Melithreptus gularis gularis*, is likely to become endangered unless the circumstances and factors threatening its survival or evolutionary development cease to operate, and is therefore eligible for listing as a vulnerable species.

Dr Chris Dickman
Chairperson
Scientific Committee

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Gazetted: 26/10/01

NSW SCIENTIFIC COMMITTEE

Final Determination

The Scientific Committee, established by the Threatened Species Conservation Act, has made a Final Determination to list the beetle *Nurus atlas* Castelnau, 1867 as an ENDANGERED SPECIES on Part 1 of Schedule 1 of the Act. Listing of endangered species is provided for by Part 2 of the Act.

The Scientific Committee has found that:

1. *Nurus atlas* is a large, black, flightless, heavily built, predacious ground beetle from the family Carabidae.
2. *Nurus atlas* appears to have been confined to heavily timbered areas east of the Great Dividing Range on the north coast of NSW (including the "Big Scrub"). Prior to the clearing of the "Big Scrub" rainforest, *Nurus atlas* is thought to have had an extensive distribution in this region. There are many collection records of *Nurus atlas* from the 19th and early 20th centuries (B. P. Moore pers. comm.).
3. *Nurus atlas* had not been collected for many years and was thought to be extinct until 1973 when it was re-discovered by G. Monteith in Victoria Park, near Lismore. The only other known locations are near Lismore and Alstonville (G. Monteith pers. comm.).
4. The survival of this species is threatened by an extremely restricted distribution, clearing of rainforest remnants, removal of fallen timber and ground cover and collecting activities.
5. In view of 1, 2, 3 and 4 above, the Scientific Committee is of the opinion that the numbers of *Nurus atlas* have been reduced to such a critical level and its habitats have been so drastically reduced, that it is in immediate danger of extinction.

Dr Chris Dickman
Chairperson
Scientific Committee

Gazetted: 16/03/01

NSW SCIENTIFIC COMMITTEE

Final Determination

The Scientific Committee, established by the Threatened Species Conservation Act, has made a Final Determination to list the beetle *Nurus brevis* Motschulsky, 1865 as an ENDANGERED SPECIES on Part 1 of Schedule 1 of the Act. Listing of endangered species is provided for by Part 2 of the Act.

The Scientific Committee has found that:

1. *Nurus brevis* (Coleoptera: Carabidae) is a large (up to 5cm in length), predatory ground beetle. It is flightless, heavily built and black with metallic green reflections.
2. *Nurus brevis* appears to have been confined to heavily timbered areas east of the Great Dividing Range on the north coast of NSW, including the "Big Scrub". Prior to the clearing of the "Big Scrub" rainforest, *Nurus brevis* is thought to have been relatively common. There are many collection records of *Nurus brevis* from the 19th and early 20th centuries.
3. The biology of *Nurus brevis* has not yet been studied in detail, but it is known that the beetles live in burrows and that the females nurture the young at the bottom of the burrow.
4. *Nurus brevis* had not been collected for many years and was thought to be extinct until 1972, when *Nurus brevis* was re-discovered by G. Monteith at Rotary Park, Lismore. However, by the early 1990s this population had declined and latest data indicate that *Nurus brevis* is extinct in Rotary Park (G. Williams, G. Carruthers, pers. comms). This population formed the basis of a nomination of Rotary Park to the Register of the National Estate (Carruthers, 1993, Greenslade, 1994). There are now only two known populations of *Nurus brevis*, both of which are near Mallanganee and are very isolated (G. Monteith, C. Reid pers. comms).
5. The survival of this species is currently threatened by an extremely restricted distribution, clearing of rainforest remnants, removal of fallen timber and ground cover, and beetle collecting activities.
6. In view of 1, 2, 3, 4 and 5 above, the Scientific Committee is of the opinion that the numbers of *Nurus brevis* Motschulsky, 1865 have been reduced to such a critical level and its habitats have been so drastically reduced, that it is in immediate danger of extinction.

Dr Chris Dickman
Chairperson
Scientific Committee

References

- Carruthers, G. (1993) - Nomination of Rotary Park, Lismore to the Register of the National Estate.
- Greenslade, P. (1994) - Heritage listing of invertebrate sites. *Memoirs of the Queensland Museum* 36 (1): 67 - 76. Gazetted: 16/03/01

NSW SCIENTIFIC COMMITTEE

Final Determination

The Scientific Committee, established by the Threatened Species Conservation Act, has made a Final Determination to list *Pericryptodrilus nanus* Jamieson 1977, an earthworm, as an ENDANGERED SPECIES on Part 1 of Schedule 1 of that Act. Listing is provided for by Part 2 of the Act.

The Scientific Committee has found that:

1. *Pericryptodrilus nanus* was first described by B. Jamieson in 1977, from Mount Gower Ridge, Mount Gower, Lord Howe Island.
2. *Pericryptodrilus nanus*, which is found on Lord Howe Island, was described in the Records of the Australian Museum 1977 vol 30:272-308 Figs. 1-7 by Jamieson 1977 as: Length 25-32 mm. Width (mid-clitellar) 1.0-1.5 mm. Segments 111-123. Prostomium broadly epilobous. First dorsal pore 6/7 or 10/11. Setae perichaetine, >30 per setiger. Nephropores 3 straight series on each side. Clitellum annular, in segments 1/2 XIII, XIV- XVI. Small slit-like combined male and prostatic pores a pair in XVIII approximately in *b* on prominent papillae. Accessory genital markings 2 midventral presetal circular glandular areas, with indistinct porelike centres, one in XX, the other in XXI. Female pore unpaired, midventral, anteriorly on XIV. Spermathecal pores 2 pairs, in 7/8 and 8/9, between the third and fourth setal rows. Dorsal blood vessel single. Hearts 3 pairs, in X-XII. A rudimentary gizzard in segment V; calciferous glands at least extramurally absent; intestine commencing in XVI. Three subspherical slightly bilobed nephridial bladders present on each side per segment, those in the tenth setal lines large, the others (above and below) small. The nephridia of the intermediate series each with a preseptal funnel near the nerve cord; no funnels demonstrable for the dorsal and ventral series. Pharyngeal, or other enteronephric nephridia, and tufted nephridia absent. Testes and funnels in X and XI; seminal vesicles in IX and XII. Ovaries and oviducal funnels in XIII. Large multiloculate ovisacs in XIV. Prostates thickly tubular, in XVIII and extending into XIX; ducts median, slender; vas deferens joining each gland at its junction with the duct. Penial setae absent. Spermathecae in VIII and IX; each with a subspherical ampulla, conical, and a large clavate inseminated lateral diverticulum which joins the duct at midlength; the diverticulum with or without a subsidiary less well developed or knoblike diverticulum of similar width at its base or all simple. This earthworm can be easily distinguished from all other earthworms on the island by the presence of the median accessory genital markings and three rows of nephridiopores.
3. *Pericryptodrilus nanus* is restricted to Mount Gower, Lord Howe Island, New South Wales. Sampling at many other sites at Lord Howe Island specifically for earthworms, has failed to extend the range of this species. The species is known from 10 specimens, lodged in the Australian Museum. They were all collected from the ridge of Mount Gower in deep leaf litter in moist environments close to streams.

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4. *Pericryptodrilus nanus* requires a constant moist environment for survival. Disturbance to its leaf litter habitat, in particular trampling and camping, resulting in changes to the micro environment is likely to adversely affect the species.
5. Exotic earthworms have displaced native species in many areas in Australia because disturbance and modification of the habitat favours them over native species. (The highly deleterious effects of introduced earthworms on leaf litter, with accompanying devegetation, has recently been documented for North America, <http://www.academicpress.com/insight/08082000/grapha.htm>. Exotic species are already present on Lord Howe Island around the settlement including *Allobophora caliginosa*, and *Amyntas diffringens* (later synonymized with *A. corticis*) (Jamieson, 1977 and Australian Museum collections), and the spread of these species or introductions of others could have deleterious impacts on *Pericryptodrilus nanus*.)
6. In view of 3, 4 and 5 above the Scientific Committee is of the opinion that this species is likely to become extinct in nature in New South Wales unless the circumstances and factors threatening its survival or evolutionary development cease to operate.

Dr Chris Dickman
Chairperson
Scientific Committee

Gazetted: 16/03/01

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10. In view of the small size of existing remnants, and the threat of further clearing, disturbance and degradation, the Scientific Committee is of the opinion that Kurri Sand Swamp Woodland in the Sydney Basin Bioregion is likely to become extinct in nature unless factors threatening its survival or evolutionary development cease to operate and that listing as an endangered ecological community is warranted.

Associate Professor Paul Adam
Deputy Chairperson
Scientific Committee

References

NSW National Parks and Wildlife Service (2000). Vegetation Survey, Classification and Mapping. Lower Hunter and Central Coast Region. National Parks and Wildlife Service, Sydney

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<i>Dianella revoluta</i> var <i>revoluta</i>	<i>Dillwynia retorta</i>
<i>Entolasia stricta</i>	<i>Eucalyptus agglomerata</i>
<i>Eucalyptus capitellata</i>	<i>Eucalyptus fibrosa</i>
<i>Eucalyptus parramattensis</i> subsp <i>decadens</i>	<i>Eucalyptus signata</i>
<i>Eucalyptus sparsifolia</i>	<i>Grevillea linearifolia</i>
<i>Grevillea montana</i>	<i>Haemodorum planifolium</i>
<i>Hakea dactyloides</i>	<i>Hovea linearis</i>
<i>Jacksonia scoparia</i>	<i>Lambertia formosa</i>
<i>Leptospermum polygalifolium</i>	<i>Leucopogon ericoides</i>
<i>Leucopogon virgatus</i>	<i>Lissanthe strigosa</i>
<i>Lomandra longifolia</i>	<i>Macrozamia flexuosa</i>
<i>Melaleuca decora</i>	<i>Melaleuca nodosa</i>
<i>Melaleuca sieberi</i>	<i>Melaleuca thymifolia</i>
<i>Patersonia sericea</i>	<i>Persoonia levis</i>
<i>Persoonia linearis</i>	<i>Phebalium squamulosum</i>
<i>Pimelea linifolia</i>	<i>Ptilothrix deusta</i>
<i>Themeda australis</i>	<i>Xanthorrhoea glauca</i>

4. Kurri Sand Swamp Woodland is or has been known to occur in the Kurri Kurri – Cessnock area in the lower Hunter Valley, in the local government area of Cessnock, but may occur elsewhere.
5. Kurri Sand Swamp Woodland includes vegetation described in NSW National Parks and Wildlife Service – (2000)
6. Disturbed remnants are considered to form part of the community including remnants where the vegetation would respond to assisted natural regeneration such as where the natural soil and associated seedbank is still at least partially intact.
7. Kurri Sand Swamp Woodland has been fragmented and is subject to weed invasion and ongoing disturbances. Threats include increased urbanisation, transport and utility corridors, industrial development, changes to drainage conditions, weed invasion, rubbish dumping and inappropriate fire regimes.
8. The only known occurrence of Kurri Sand Swamp Woodland reported from conservation areas is in the Lower Hunter National Park.
9. Plant species of conservation significance occurring in Kurri Sand Swamp Woodland are *Eucalyptus parramattensis* subsp. *decadens* and *Grevillea parviflora* subsp. *parviflora*, both listed as Vulnerable under Schedule 2.

NSW SCIENTIFIC COMMITTEE

Final Determination

The Scientific Committee, established by the Threatened Species Conservation Act, has made a Final Determination to list the Kurri Sand Swamp Woodland in the Sydney Basin Bioregion as an ENDANGERED ECOLOGICAL COMMUNITY on Part 3 of Schedule 1 of the Act. The listing of Endangered Ecological Communities is provided for by Part 2 of the Act.

The Scientific Committee has found that:

1. Kurri Sand Swamp Woodland is the name given to the ecological community that occurs on soils developed over poorly-drained Tertiary sand deposits that blanket Permian sediments around Kurri Kurri. All sites are within the Sydney Basin Bioregion.
2. Kurri Sand Swamp Woodland generally ranges from low open-woodland to low woodland and open scrub. There is generally a low open canopy rarely exceeding 15 m in height, with *Eucalyptus parramattensis* subsp. *decadens*, *Angophora bakeri* and occasionally *Eucalyptus signata* and *Eucalyptus sparsifolia*. The shrubby stratum is typified by *Melaleuca nodosa*, *Banksia spinulosa*, *Dillwynia retorta*, *Jacksonia scoparia*, *Hakea dactyloides*, *Acacia ulicifolia* and *Lambertia formosa* and merges into the ground layer. The ground layer has grasses and low shrubs such as *Entolasia stricta*, *Pimelea linifolia*, *Lissanthe strigosa* and *Melaleuca thymifolia*. A considerable number of ground orchid species have been recorded in the area.
3. Kurri Sand Swamp Woodland is a low open-woodland to low woodland and open scrub characterised by the assemblage of species listed below. While some of the species listed below may be widespread and may occur elsewhere, it is the following distinct assemblage that is recognised as the Kurri Sand Swamp Woodland ecological community.

The total species flora and fauna list for the community is considerably larger than the assemblage of species shown below, with many species present in only one or two sites or in very small quantity. In any particular site not all of the assemblage listed may be present. At any one time, seeds of some species may only be present in the soil seed bank with no above-ground individuals present. The species composition of the site will be influenced by the size of the site, recent rainfall or drought conditions and by its recent disturbance history. The community includes vertebrates and invertebrates in both soil and vegetation, many of which are poorly known.

Acacia elongata
Acacia ulicifolia
Anisopogon avenaceus
Baeckea diosmifolia
Bossiaea rhombifolia
Cyathochaeta diandra

Acacia myrtifolia
Angophora bakeri
Aristida vagans
Banksia spinulosa
Conospermum ericifolium
Dampiera stricta

NSW SCIENTIFIC COMMITTEE

10. The only Artesian Springs that are within a reserve are at Peery Lake in Peery National Park. However, presence in the conservation reserve will not protect the ecological community from the threat of alteration of flows as the unsustainable extraction of artesian water occurs outside the reserve, yet may influence all mound springs within the region.
11. In view of the above, the Scientific Committee is of the opinion that the Artesian Springs Ecological Community in New South Wales is likely to become extinct in nature unless factors threatening its survival or evolutionary development cease to operate.

Associate Professor Paul Adam
Deputy Chairperson
Scientific Committee

References

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- Ponder, W.F. (1986) Mound Springs of the Great Artesian Basin. pp 403-420 In de Deckker, P. and Williams W.D. (Eds), *Limnology in Australia*. CSIRO, Melbourne and W. Junk, The Hague.
- Ponder, W.F. (1999) Box 4.5, Mound Springs. p 50 In Boulton, A.J. and Brock, M.A. *Australian Freshwater Ecology: processes and management*. Glen Eagles Publishing, Adelaide.
- Sattler, P.S. and Williams, R.D. (1999) *The Conservation Status of Queensland's Bioregional Ecosystems*. Queensland Environmental Protection Agency, Brisbane.



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NSW SCIENTIFIC COMMITTEE

3. The total species list of the community is considerably larger than that given in 2 (above), with many species present in only one or two sites or in very small quantity. In any particular site only a small component of the assemblage listed in 2 may be present. At any one time, seeds of some species may only be present in the soil seed bank with no above-ground individuals present. The species composition of the site will be influenced by the size of the site, its disturbance history and the water status of each spring.
4. The ecological community is naturally rare. The springs are characterised by mounds of sediment and salts deposited as water evaporates (Ponder 1986, 1999) or may be depressions. Unique aquatic invertebrate, vertebrate and plant communities occupy the springs. Where artesian water emerges at the surface through fault lines in the overlying rock, mounds form from salts and sediments as the water evaporates. These occur at the edges of the Great Artesian Basin. Most occur in Queensland and South Australia and a few occur in the Mulga Lands, Darling Riverine Plains and Cobar Peneplain Bioregions of New South Wales.
5. The "community of native species dependent on natural discharge of groundwater from the Great Artesian Basin" is listed as an Endangered Ecological Community under the Commonwealth's Environment Protection and Biodiversity Act, 1999.
6. The Artesian Springs Ecological Community is described by Pickard (1992) and by Sattler and Williams (1999) for Queensland. Approximately 45 sets of springs occur in north western NSW. Some 30 still have permanent seeps or slight flows of artesian water (Pickard 1992).
7. Systematic surveys of Artesian Springs fauna are limited in NSW. In Queensland and South Australia, the springs are described as supporting unique aquatic invertebrates and vertebrates. Many unique freshwater snails and fishes (desert gobies) have been collected from mound springs and have been recorded nowhere else. Many species occur in one spring only (Ponder 1986, 1999).
8. Flora studies at Peery Lake have found that the only known population of *Schoenoplectus pungens* in far western NSW occurs at Peery Lakes Springs (Bowen and Pressey 1993). The endangered species of perennial forb, *Eriocaulon carsonii* (Salt Pipewort) has been recorded at several springs at Peery Lake.
9. Major threats to Artesian Springs Ecological Community are trampling and grazing by stock and feral animals such as pigs, goats and rabbits, alteration of flow or unsustainable extraction of water from artesian bores reducing flows to the mound springs. A number of springs have dried in the past 100 years due to falling water pressure caused by over-extraction. This has probably caused the extinction of undescribed species of aquatic invertebrates (Ponder 1986, 1999).

NSW SCIENTIFIC COMMITTEE

Final Determination

The Scientific Committee, established by the Threatened Species Conservation Act, has made a Final Determination to list the Artesian Springs Ecological Community as an ENDANGERED ECOLOGICAL COMMUNITY on Part 3 of Schedule 1 of the Act. The listing of Endangered Ecological Communities is provided for by Part 2 of the Act.

The Scientific Committee has found that:

1. The Artesian Springs Ecological Community is the name given to the ecological community that is naturally restricted to artesian springs at the southern and western margins of the Great Artesian Basin in north western NSW.
2. The vegetation within the community frequently consists of sedges or similar vegetation (Pickard 1992). Trees and shrubs may be adjacent to, or nearby, the springs. Plant assemblages differ between springs. As the springs have been a focus for domestic and feral animals for nearly 150 years, the flora has become less specifically related to the permanent water and more typical of a heavily disturbed area (Pickard 1992). A number of exotic species also occur in the community. The Artesian Springs Ecological Community is variable as each individual spring varies in shape, water flow, topographic and geographic location. In general, the Artesian Springs are characterised by a suite of plant species generally associated with water (Pickard 1992):

Abutilon otocarpum
Alternanthera denticulata
Atriplex spp.
Calandrinia ptychosperma
Centipeda thespidioides
Chenopodium cristatum
Chloris pectinata
Cyperus difformis
Cyperus iria
Cyperus squarrosus
Diplachne fusca
Einadia nutans subsp. *nutans*
Eremophila deserti
Eucalyptus largiflorens
Geijera parviflora
Marsilea spp.
Oxalis sp.
Portulaca oleracea
Sclerostegia sp.
Sporobolus caroli
Stemodia florulenta
Trianthema triquetra

Acacia victoriae
Alternanthera angustifolia
Boerhavia coccinea
Centipeda minima
Chamaesyce drummondii
Chenopodium melanocarpum
Cyperus bulbosus
Cyperus gymnocaulos
Cyperus laevigatus
Dactyloctenium radulans
Dodonaea viscosa subsp. *angustissima*
Eragrostis spp.
Eremophila sturtii
Eucalyptus populnea
Glinus lotoides
Myoporum montanum
Pimelea microcephala subsp. *microcephala*
Sclerolaena spp.
Solanum esuriale
Sporobolus mitchellii
Swainsona spp.

ECOLOGICAL COMMUNITY

NSW SCIENTIFIC COMMITTEE

8. Broad-toothed Rats have small litters, low fecundity and a slow growth rate. Threats include predation by the fox and cat, the invasion of weeds into areas of suitable habitat, competition from other rodents and herbivores such as the rabbit that open up areas of otherwise protected runways in grasslands. Climate change is a long-term threat also, due to the loss of suitable habitat.
9. In view of the points 2 - 8 above, the Scientific Committee is of the opinion that the numbers of the Broad-toothed Rat, *Mastacomys fuscus* Thomas, population at Barrington Tops in the Local Government Areas of Gloucester, Scone and Dungog have been reduced to such a critical level, that it is in immediate danger of extinction, it is not a population of a species already listed on Schedule 1, and it is of significant conservation value. Consequently, the Committee considers that the population is eligible for listing as an Endangered Population on Part 2 of Schedule 1 of the Act.

Dr Chris Dickman
Chairperson
Scientific Committee

Gazetted: 13/07/01

NSW SCIENTIFIC COMMITTEE

Final Determination

The Scientific Committee, established by the Threatened Species Conservation Act, has made a Final Determination to list the Broad-toothed Rat, *Mastacomys fuscus* Thomas, population at Barrington Tops in the Local Government Areas of Gloucester, Scone and Dungog as an ENDANGERED POPULATION on Part 2 of Schedule 1 of the Act. Listing of Endangered Populations is provided for by Part 2 of the Act.

The Scientific Committee has found that:

1. The Broad-toothed Rat, *Mastacomys fuscus* Thomas is not listed as an Endangered Species on Part 1 of Schedule 1 of the Act, and thus populations of the Broad-toothed Rat are eligible for listing as endangered populations on Part 2 of Schedule 1 of the Act.
2. In New South Wales the Broad-toothed Rat is known from five disjunct populations. The largest population is in Kosciuszko National Park. The Barrington Tops population is of significant conservation value as it is the second largest in New South Wales.
3. The Broad-toothed Rat is a small ground-dwelling mammal of about 100-140g. It is an uncommon animal, found in alpine and sub-alpine heathlands and open eucalypt woodlands in areas that are characterised by high rainfall, a cool summer, and a cool to cold winter. Today, these habitats are restricted and fossil records indicate the Broad-toothed Rat formerly had a more extensive distribution.
4. The species appears to be restricted to patches where there is a dense ground cover of grasses, sedges and shrubs. Runways are constructed under the vegetation and large well-insulated nests of grass are built under logs and the undergrowth. In winter habitats may be covered by snow, but the animals frequent the space below the shrubs and grass tussocks.
5. The diet is specialised and consists mainly of grasses with some seeds and the leaves of shrubs. Because of the low quality of its food, an individual consumes 50-70% of its body weight in fresh vegetable matter each day. Breeding is seasonal with births occurring between December and March and the species has a mean litter size of 1.9.
6. Home ranges of females are about 1600m² in favoured habitat and they may overlap. Dispersing individuals may move across marginal areas of low vegetation cover, so they are capable of recolonising habitats when they become locally available.
7. At Barrington Tops, recent trapping, pellet searches and the examination of fox scats revealed that the Broad-toothed Rat is not as common as it was 10-15 years ago. Also, an increase in numbers of, and competition with the sympatric Swamp Rat *Rattus lutreolus*, appears to be restricting the habitat usage of the Broad-toothed Rat.

NSW SCIENTIFIC COMMITTEE

Final Determination

The Scientific Committee, established by the Threatened Species Conservation Act, has made a Final Determination to list a population of the subshrub *Lespedeza juncea* subsp. *sericea* (Thunb.) Steenis in the Wollongong Local Government Area as an ENDANGERED POPULATION on Part 2 of Schedule 1 of the Act. Listing of Endangered Populations is provided for by Part 2 of the Act.

The Scientific Committee has found that:

1. *Lespedeza juncea* subsp. *sericea* (Family Fabaceae) is an erect or decumbent subshrub 60-120 cm high (Gardner and James 1991 in Flora of New South Wales Volume 2, ed. G.J. Harden, University of New South Wales Press, Kensington).
2. *Lespedeza juncea* subsp. *sericea* is not listed on Schedule 1 of the Act, so that populations are eligible for listing.
3. *Lespedeza juncea* subsp. *sericea* occurs in woodlands and grasslands on the coast, tablelands and western slopes of NSW. It also occurs in Queensland and Victoria. An isolated population of *Lespedeza juncea* subsp. *sericea* occurs in the southern Illawarra area, south of Dapto in the Wollongong Local Government Area. The population is disjunct from other remnant populations in western Sydney, the far South Coast and the Southern Tablelands. This population in the Illawarra is of regional conservation significance as the last known population in the Illawarra area.
4. The habitat of *Lespedeza juncea* subsp. *sericea* in the Wollongong Local Government Area has been severely reduced by clearing and grazing. Only one extant location is known and this is a small roadside population of about 200 plants that only occurs over a 100 m by 5 m strip of remnant vegetation. The population is threatened by further habitat loss, rubbish dumping and invasion of exotic weeds.
5. In view of 2,3, & 4 above, the Scientific Committee is of the opinion that the population of *Lespedeza juncea* subsp. *sericea* in the Wollongong Local Government Area is eligible to be listed as an endangered population because its habitat has been so drastically reduced that it is in immediate danger of extinction and it is not a population of a species already listed in Schedule 1 and it is otherwise of significant conservation value.

Associate Professor Paul Adam
Deputy Chairperson
Scientific Committee

Gazetted: 15/06/01

NSW SCIENTIFIC COMMITTEE

Final Determination

The Scientific Committee, established by the Threatened Species Conservation Act, has made a Final Determination to list the population of *Glycine clandestina* (broad leaf form) (R. Pullen 13342) in Nambucca Local Government Area as an ENDANGERED POPULATION on Part 2 of Schedule 1 of the Act. Listing of endangered populations is provided for by Part 2 of the Act.

This population was referred to as *Glycine* sp. "Scotts Head" (R. Pullen 13342) in the Scientific Committee's Preliminary Determination. The Committee has decided that *Glycine clandestina* (broad leaf form) is a more appropriate name for this variant.

The Scientific Committee has found that:

1. A distinctive population of the legume *Glycine clandestina* Wendl. occurs in coastal grassland at Scotts Head in the Nambucca Local Government Area. The form differs from the more widespread local form of *Glycine clandestina* in possessing broadly elliptical, instead of linear narrowly lanceolate, leaflets which have a dense clothing of white hairs on the subaxial surface. This form breeds true and is genetically distinct although within the broad variation of the *Glycine clandestina* complex.
2. This form has not been found elsewhere on the North Coast.
3. The coastal grassland habitat at Scotts Head has been reduced in extent by past development and is at risk of invasion by *Chrysanthemoides monilifera* (bitou bush) and from further development.
4. The Scientific Committee is of the opinion that the population of *Glycine clandestina* (broad leaf form) (R. Pullen 13342) in the Nambucca Local Government Area is eligible to be listed as an Endangered Population because its habitat has been so drastically reduced that it is in immediate danger of extinction and, it is not a population of a species already listed in Schedule 1 and, it is or is likely to be genetically distinct.

Dr Chris Dickman
Chairperson
Scientific Committee

Gazetted: 16/03/01

NSW SCIENTIFIC COMMITTEE

Final Determination

The Scientific Committee, established by the Threatened Species Conservation Act, has made a Final Determination to list the population of the shrub *Chorizema parviflorum* Benth. in the Wollongong and Shellharbour Local Government Areas as an ENDANGERED POPULATION on Part 2 of Schedule 1 of the Act. Listing of Endangered Populations is provided for by Part 2 of the Act.

The Scientific Committee has found that:

1. *Chorizema parviflorum* (Fabaceae) is an erect or ascending shrub to 50cm cm high with a stout rootstock (B. Wiecek 1991 in Flora of New South Wales Volume 2, ed. G.J. Harden, University of New South Wales Press, Kensington).
2. *Chorizema parviflorum* is not listed on Schedule 1 of the Act, so that populations are eligible for listing.
3. *Chorizema parviflorum* occurs in heaths and sclerophyll woodlands and forests on heavy soils in coastal NSW and Queensland. A population of *Chorizema parviflorum* occurs in the southern Illawarra area, in the Wollongong and Shellharbour Local Government Areas. This population is of significant conservation value as the last known population in the Illawarra area. This population is disjunct from other remnant populations in western and southwestern Sydney and from two isolated occurrences on the south coast. There is a record of one individual in a tiny fragment of remnant vegetation on the coast at Austinmer in the northern Illawarra, but recent searches have failed to relocate the species at this site.
4. The habitat of *Chorizema parviflorum* in the Wollongong and Shellharbour LGAs has been severely reduced by clearing and grazing. Only a small number of remnant sites remain, with few plants known from each. The population is threatened by further habitat loss, rubbish dumping, invasion of exotic weeds, track maintenance, power line maintenance and high fire frequency.
5. In view of 2, 3, & 4 above, the Scientific Committee is of the opinion that the population of *Chorizema parviflorum* in the Wollongong and Shellharbour Local Government Areas is eligible to be listed as an endangered population because its habitat has been so drastically reduced that it is in immediate danger of extinction and it is not a population of a species already listed in Schedule 1 and it is otherwise of significant conservation value.

Dr Chris Dickman
Chairperson
Scientific Committee

Gazetted: 05/10/01

NSW SCIENTIFIC COMMITTEE

8. In view of the points 3, 4, 5, 6 and 7 above, the Scientific Committee is of the opinion that the numbers of the Gang-gang Cockatoo, *Callocephalon fimbriatum* (Grant), population in the Hornsby and Ku-ring-gai Local Government Areas have been reduced to such a critical level, and its habitat has been so drastically reduced, that it is in immediate danger of extinction, it is not a population of a species already listed on Schedule 1, and it is of significant conservation value. Consequently, the Committee considers that the population is eligible for listing as an Endangered Population on Part 2 of Schedule 1 of the Act.

Dr Chris Dickman
Chairperson
Scientific Committee

Gazetted: 23/02/01

NSW SCIENTIFIC COMMITTEE

Final Determination

The Scientific Committee, established by the Threatened Species Conservation Act, has made a Final Determination to list the Gang-gang Cockatoo, *Callocephalon fimbriatum* (Grant), population in the Hornsby and Ku-ring-gai Local Government Areas as an ENDANGERED POPULATION on Part 2 of Schedule 1 of the Act. Listing of Endangered Populations is provided for by Part 2 of the Act.

The Scientific Committee has found that:

1. The Gang-gang Cockatoo, *Callocephalon fimbriatum* (Grant), is not listed as an Endangered Species on Part 1 of Schedule 1 of the Act, and thus populations of the Gang-gang Cockatoo are eligible for listing as endangered populations on Part 2 of Schedule 1 of the Act.
2. The Gang-gang Cockatoo is a relatively small, dark grey cockatoo. Both sexes have crests; the male is distinguished from the female by its bright red head. The species occurs in a variety of forest and woodland habitats and occasionally in more open areas in south-eastern New South Wales and Victoria.
3. Gang-gang Cockatoos were once widespread and numerous in Sydney and surrounding areas, but have been greatly reduced in recent years by loss of habitat.
4. A population of Gang-gang Cockatoos persists in the Hornsby and Ku-ring-gai Local Government Areas. This population is bounded by Beecroft – Cheltenham in the west, Epping – North Epping in the south, Turramurra – South Turramurra in the east, and Thornleigh – Wahroonga to the north. The population encompasses, but is not restricted to, Pennant Hills Park and parts of Lane Cove National Park. Individual birds are likely on occasion to move across the population boundary.
5. The maximum population is estimated to be between 18 and 40 pairs. Birds have been observed nesting in hollows in large, old trees, and breeding has been documented at least since 1994. The species shows strong nest site fidelity.
6. The population used to extend across Baulkham Hills, Castle Hill, Cherrybrook and Dural, but due to initial clearing for farmland and more recently to urban releases and road construction, the habitat of the population has been greatly reduced. Loss of habitat, particularly core food and breeding trees, continues to be a major threat to the population. Other threats include competition for nest hollows with other species.
7. The Gang-gang Cockatoo population in the Hornsby and Ku-ring-gai Local Government Areas is of significant conservation value as it is the last known breeding population of the species in the Sydney Metropolitan area.

POPULATION

NSW SCIENTIFIC COMMITTEE

6. In view of the above points, the Scientific Committee is of the opinion that the Diamond Firetail, *Stagonopleura guttata*, is likely to become endangered unless the circumstances and factors threatening its survival or evolutionary development cease to operate, and is therefore eligible for listing as a vulnerable species.

Dr Chris Dickman
Chairperson
Scientific Committee

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Gazetted: 26/10/01

NSW SCIENTIFIC COMMITTEE

Final Determination

The Scientific Committee, established by the Threatened Species Conservation Act, has made a Final Determination to list the Diamond Firetail *Stagonopleura guttata* (Shaw 1796), as a VULNERABLE SPECIES on Schedule 2 of the Act. Listing of Vulnerable Species is provided for by Part 2 of the Act.

The Scientific Committee found that:

1. The Diamond Firetail is distributed through central and eastern NSW, extending north into southern and central Queensland and south through Victoria to the Eyre Peninsula, South Australia. In NSW, the species occurs predominantly west of the Great Dividing Range, although populations are known from drier coastal areas such as the Cumberland Plain of western Sydney and the Hunter, Clarence, Richmond and Snowy River valleys (Blakers *et al.* 1984, Schodde & Mason 1999).
2. The Diamond Firetail is a brightly coloured finch that occupies eucalypt woodlands, forests and mallee where there is a grassy understorey. Firetails build bottle-shaped nests in trees and bushes, and forage on the ground, largely for grass seeds and other plant material, but also for insects (Blakers *et al.* 1984, Read 1994).
3. The Diamond Firetail has disappeared from parts of its former range and has declined in numbers in many areas. Declines have been recorded on the Cumberland Plain, western Sydney (Hoskin 1991; Keast 1995) with a local extinction near Scheyville (Egan *et al.* 1997). On the New England Tableland, declines in populations are apparent (Barrett *et al.* 1994) and the species has become extinct within Imbota Nature Reserve and surrounds (H. Ford, pers. comm.). Reid (1999) identified the species as a 'decliner' in a review of bird status in the NSW sheep-wheatbelt; and Fisher (1997) predicted that Diamond Firetails would significantly decline from the Bathurst District if current trends in land management persisted.
4. The Diamond Firetail is threatened by clearance and fragmentation of habitat. Isolation and reductions in remnant area inhibit dispersal and increase their vulnerability to local extinction via stochastic events. Small, isolated populations also lose their long term genetic viability (Barrett *et al.* 1994). Further, Diamond Firetail populations appear unable to persist in areas which lack remnants of native vegetation larger than 200ha (N. Schrader, pers. comm.).
5. Habitat degradation, particularly overgrazing of the grass understorey, threatens the granivorous Diamond Firetail. In addition, an increased abundance of predators such as Pied Currawongs and Australian Ravens may increase nest predation in fragmented woodland remnants (Major *et al.* 1996).

NSW SCIENTIFIC COMMITTEE

Final Determination

The Scientific Committee, established by the Threatened Species Conservation Act, has made a Final Determination to list the shrub *Sophora tomentosa* L. as an ENDANGERED SPECIES on Part 1 of Schedule 1 of the Act. Listing is provided for by Part 2 of the Act.

The Scientific Committee has found that:

1. *Sophora tomentosa* L. is a coastal shrub in the Fabaceae. It is described by Harden, G.J. 1991 *Sophora* in Flora of New South Wales, Vol. 2. UNSW Press. Page 403 as "Shrub or small tree to 5m high. Leaves 10-20cm long; leaflets usually 11-17, ovate to more or less circular, 20-40mm long, 10-30mm wide, apex obtuse or retuse, margins entire, greyish to white tomentose; petiole 10-30mm long; lateral petiolules 2-4mm long. Racemes 10-15cm long; pedicels 5-7mm long. Calyx c. 6mm long. Corolla 20-25mm long, pale yellow. Pod moniliform, indehiscent, 10-18cm long, up to 14mm diam., tomentose, strongly constricted between seeds; seeds 5-10, c. 6mm long. Flowers winter."
2. *Sophora tomentosa* L. occurs on recent sands on frontal coastal dunes. Historic records suggest it was a fairly common plant from Port Stephens northwards. Populations previously recorded from Tweed Heads, Coffs Harbour and Iluka are now thought to be extinct. The currently known southern limit of distribution is at Old Bar, near Taree. The largest known population at Port Macquarie is estimated at up to 500 plants, other populations are of less than 20 plants.
3. *Sophora tomentosa* L. is threatened by displacement by the invasive bitou bush (*Chrysanthemoides monilifera* subsp. *rotundata*), clearance of vegetation and recreational use of beaches and foredunes.
4. In view of the historic decline in distribution and abundance, the low population size and the threats in 3 above the Scientific Committee is of the opinion that *Sophora tomentosa* L. is likely to become extinct in nature in New South Wales unless the circumstances and factors threatening its survival or evolutionary development cease to operate.

Associate Professor Paul Adam
Deputy Chairperson
Scientific Committee

Gazetted: 15/06/01

NSW SCIENTIFIC COMMITTEE

Final Determination

The Scientific Committee, established by the Threatened Species Conservation Act, has made a Final Determination to list the epiphytic orchid *Sarcochilus dilatatus* F. Muell. as an ENDANGERED SPECIES on Part 1 of Schedule 1 of the Act. Listing of endangered species is provided for by Part 2 of the Act.

The Scientific Committee has found that:

1. *Sarcochilus dilatatus* F. Muell. (Orchidaceae) is described in *Flora of New South Wales* Volume 4 by P. H. Weston as "Semi-pendent epiphyte, usually with 1 shoot; stems 0.7-3 cm long. Leaves asymmetrically narrow-obovate to narrow-elliptic, 3-6 cm long, 4-10 mm wide, lightly channelled, sometimes spotted. Inflorescence 1.5-7 cm long, 2-12 flowered, semi-pendent; rachis shorter to longer than peduncle; pedicel plus ovary 2-4 mm long. Flowers not campanulate; dorsiventral dimension of flower conspicuously greater than lateral dimension. Sepals and lateral petals narrow-oblong, often markedly dilated near the tip, green to deep brown. Labellum 2-4 mm long, about half as long as dorsal sepal, glabrous; lateral lobes almost semicircular. Column c. 1 mm long, about half as long as column foot, set almost at right angles to it. Flowers Sept.-Oct. Grows on trees in rainforest; coastal ranges to c. 400 m alt., north of the Richmond R., rare."
2. The species occurs in Queensland and New South Wales. In NSW, the only recent record is from a single location in the far northeast of the State (Steenbeeke 1999). It is not known from a formal conservation reserve. A favoured host plant is *Araucaria cunninghamii* (Hoop Pine).
3. Threats to the species include collecting, loss of host plants, changes to land use and possibly fire.
4. In view of 2 & 3 above the Scientific Committee is of the opinion that the species is likely to become extinct in nature in NSW unless the circumstances and factors threatening its survival or evolutionary development cease to operate.

Dr Chris Dickman
Chairperson
Scientific Committee

Reference

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Gazetted: 09/02/01

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6. In view of the above points, the Scientific Committee is of the opinion that the Speckled Warbler *Pyrrholaemus sagittata*, is likely to become endangered unless the circumstances and factors threatening its survival or evolutionary development cease to operate, and is therefore eligible for listing as a vulnerable species.

Dr Chris Dickman
Chairperson
Scientific Committee

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Gazetted: 26/10/01

NSW SCIENTIFIC COMMITTEE

Final Determination

The Scientific Committee, established by the Threatened Species Conservation Act, has made a Final Determination to list the Speckled Warbler *Pyrrholaemus sagittata* (Latham 1802), as a VULNERABLE SPECIES on Schedule 2 of that Act. Listing of Vulnerable Species is provided for by Part 2 of the Act.

The Scientific Committee found that:

1. The Speckled Warbler is distributed from south-eastern Queensland, through central and eastern NSW to Victoria. In NSW, Speckled Warblers occupy eucalypt and cypress woodlands on the slopes west of the Great Dividing Range, with an extension of range into the cypress woodlands of the northern Riverina. Populations also occur in drier coastal areas such as the Cumberland Plain, Western Sydney and the Hunter and Snowy River valleys (Blakers *et al.* 1984, Schodde & Mason 1999).
2. Speckled Warblers inhabit woodlands with a grassy understorey, often on ridges or gullies. The species is sedentary, living in pairs or trios and nests on the ground in grass tussocks, dense litter and fallen branches. They forage on the ground and in the understorey for arthropods and seeds (Ford *et al.* 1986). Home ranges vary from 6-12 hectares.
3. The Speckled Warbler has declined in numbers from large parts of its range. Declines have been reported from the Cumberland Plain (Hoskin 1991; Keast 1995; Egan *et al.* 1997), the New England Tableland (Barrett *et al.* 1994), and from around Parkes (N. Schrader, unpubl.). Fisher (1997) predicted Speckled Warblers would become extinct in the Bathurst area if current land management practices were not reversed. Further, Reid (1999) identified the species as a 'decliner' in a review of bird status in the NSW sheep-wheatbelt.
4. The Speckled Warbler is threatened by clearance and fragmentation of habitat including removal of dead timber. Barrett *et al.* (1994) found that the species decreased in abundance as woodland area decreased, and it appears to be extinct in districts where no fragments larger than 100ha remain. Isolation of Speckled Warbler populations in small remnants increases their vulnerability to local extinction as a result of stochastic events and decreases their genetic viability in the long term. Low population densities and relatively large home range requirements also would exacerbate their vulnerability to habitat loss.
5. The preferred foraging habitat of Speckled Warbler is areas with a combination of open grassy patches, leaf litter and shrub cover. This habitat is susceptible to degradation by stock and weed invasion. Nesting on the ground also makes them vulnerable to predation from exotic mammalian predators such as foxes and cats.

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of about 50°, inner basal margins incurved, ciliate; apex obtuse; mid-section c. 3 mm long, dark brown; apical lobe linear, c. 1.2 mm long. Anther c. 1.2 mm long, obtuse. Pollinia linear, 1.8-2 mm long, yellow, mealy. Stigma elliptical-scutiform, 4-4.5 mm long, c. 2 mm wide, raised, situated just below the column wings. Capsule not seen.

3. The species is endemic to the New England Tablelands, occurring on soil derived from granite and basalt. It is known from three locations between Wongwibindi and Hernani. One location is reserved within Guy Fawkes River National Park.
4. The risk of extinction is high due to low population numbers and it is also threatened by cattle grazing and trampling. Road maintenance may also adversely impact populations at some locations.
5. In view of 3 & 4 above the Scientific Committee is of the opinion that the species is likely to become extinct in nature in NSW unless the circumstances and factors threatening its survival or evolutionary development cease to operate.

Dr Chris Dickman
Chairperson
Scientific Committee

Reference

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Gazetted: 05/10/01

NSW SCIENTIFIC COMMITTEE

Final Determination

The Scientific Committee, established by the Threatened Species Conservation Act, has made a Final Determination to list the terrestrial orchid, *Pterostylis metcalfei* D.L. Jones as an ENDANGERED SPECIES on Part 1 of Schedule 1 of the Threatened Species Conservation Act. Listing of Endangered Species is provided for by Part 2 of the Act.

The Scientific Committee has found that:

1. *Pterostylis metcalfei* D.L. Jones (Orchidaceae) was first described in 1997 and was previously known as *Pterostylis* sp. aff. *russellii* (New England) (Bishop 1996, Field Guide to the Orchids of New South Wales and Victoria. University of NSW Press) and also treated as a pale green and white form of *Pterostylis decurva* (Metcalf 1987).
2. *Pterostylis metcalfei* has been described by Jones (1997) (The Orchadian, Vol. 12, No. 6) as: tuberous terrestrial herb growing in small to large colonies. Sterile and fertile plants dimorphic. Rosette separate; leaves 3-5; lamina ovate to oblong-ovate, 9-30 mm long, 7-20 mm wide, dark green, entire; apex obtuse to shortly apiculate; petioles 4-12 mm long, narrowly winged. Flowering parts 10-30 cm tall. Scape slender, wiry, smooth. Cauline leaves 4-6, lanceolate to linear-lanceolate, 15-30 mm long, 4-7 mm wide, erecto-patent, dark green; margins entire; apex acuminate; lowest cauline leaf reduced and closely sheathing. Ovary narrowly oblong-obovoid, 7-9 mm long, green, smooth. Flower solitary, 23-28 mm long, translucent white, striped and suffused with dark green, darkest towards the apex of the galea; galea gibbous at the base then erect before curving forwards; apex of the dorsal sepal decurved. Dorsal sepal 40-52 mm long, 16-20 mm wide, inflated at the base, constricted near the middle, slightly enlarged above the middle before tapering suddenly to a filiform point 7-14 mm long, translucent white with green stripes and suffusions, darker towards the apex. Lateral sepals erect, tightly embracing the galea; sinus protruding in a shallow bulge when viewed from the side, the upper margins horizontal or slightly raised centrally with a central notch when viewed from the front; conjoined part 12-16 mm long, 8-12 mm wide, narrowed to c. 3 mm across at the base, translucent white heavily suffused and lined with green; upper margins dark green and involute, suddenly tapered into free points; free points 22-30 mm long, linear-filiform, involute, erect, held high above the galea, parallel. Petals obliquely lanceolate, 22-32 mm long, 4-6 mm wide, strongly falcate, tapered distally, subacute to acute, central part white, anterior part bright green, distal part darker green or slightly brownish green; flange broadly obtuse, c. 1.5 mm across, flat. Labellum hinged on a basal ligulate claw c. 4 mm long, c. 1.5 mm wide, erect, suddenly curved forwards in the distal third, the distal third protruding prominently through the sinus in the set position; apex of the labellum sometimes touching the galea; lamina broadly oblong-lanceolate to oblong-elliptic, 13.5-17 mm long, 2.5-3.5 mm wide, brown or brownish white, distal third dark brown, brown or greenish brown towards the base; apex obtuse; basal appendage 4-5 mm long, narrow-linear, recurved at right angles just above the middle; apex shortly penicillate. Column 15-17 mm long, bent away from the ovary at about 60° then erect or incurved, green and brown. Column wings oblong-rectangular, c. 8 mm long; basal lobe c. 3 mm long, c. 1.5 mm wide, at an angle

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*NOTE: The publication 'Proceedings of a Workshop to Assess the Status of the Grey-headed Flying Fox' is available on the Australasian Bat Society Web Page at the following address: - <http://batcall.csu.edu.au/batcall/abs/home.htm>

Gazetted: 4/05/01

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decline in the numbers of animals using several camps (reductions of 31% to 94% have been recorded at five camps, Eby 2000; Hall 2000; Parry-Jones; P.Eby pers. comm.). It has also been estimated that the population will continue to decrease by at least 20% in the next three generations given the continuation of the current rate of habitat loss and culling (Martin 2000).

7. The main threat to Grey-headed Flying-foxes in NSW is clearing or modification of native vegetation. This removes appropriate camp habitat and limits the availability of natural food resources, particularly winter-spring feeding habitat in north-eastern NSW. The urbanisation of the coastal plains of south-eastern Queensland and northern NSW has seen the removal of annually-reliable winter feeding sites, and this threatening process continues (Catterall *et al.* 1997; Pressey and Griffith 1992; P. Clarke, unpublished data). In N.S.W less than 15% of potentially suitable forest for the Grey-headed Flying-fox occurs in conservation reserves; only 5% of roost sites are similarly reserved (Hall and Richards 2000).
8. The use of non-destructive deterrents, such as netting and noise generators, to limit flying-fox damage to fruit crops is not universal in the horticultural industry. While licences are issued to cull limited numbers of Grey-headed Flying-foxes, uncontrolled culling using destructive methods such as shooting and electrocution occurs and large numbers of bats are culled (Vardon and Tidemann 1995; Richards 2000). The impact of destructive methods has not been measured but is likely to be greatest in those years when natural food is scarce. Also, culling has a disproportionate impact on lactating and pregnant females (Parry-Jones 1993).
9. The species is also threatened by direct harassment via shooting at roosts, the destruction of camps and by being possible carriers for viral pathogens (Lunney and Moon 1997; Tidemann 1999).
10. Grey-headed Flying-foxes face potential competition and hybridisation from Black Flying-foxes, *Pteropus alecto*, as this species is extending its range south into northern NSW (Webb and Tidemann 1995). Colonisation of northern NSW may be assisted by the flexible reproduction of *P. alecto* and dispersal from largely intact northern habitats (Vardon and Tidemann 2000) into more fragmented habitat in the south.
11. In view of the above points, the Scientific Committee is of the opinion that the Grey-headed Flying-fox, *Pteropus poliocephalus*, is likely to become endangered unless the circumstances and factors threatening its survival or evolutionary development cease to operate, and is therefore eligible for listing as a Vulnerable species.

Dr Chris Dickman
Chairperson
Scientific Committee

NSW SCIENTIFIC COMMITTEE

Final Determination

The Scientific Committee, established by the Threatened Species Conservation Act, has made a Final Determination to list the Grey-headed Flying-fox, *Pteropus poliocephalus* Temminck 1825, as a VULNERABLE SPECIES on Schedule 2 of the Act. Listing of Vulnerable species is provided for by Part 2 of the Act.

The Scientific Committee has found that:

1. The Grey-headed Flying-fox occurs primarily along the eastern coastal plain from Bundaberg in Queensland, through NSW and south to eastern Victoria. A colony has also established in Melbourne (FFG SAC 2001). Small numbers may occur as far west as Warrnambool (Menkhorst 1995). Regular movements are made over the Great Dividing Range to the western slopes of NSW and Queensland.
2. This species is a canopy-feeding frugivore, blossom-eater and nectarivore of rainforests, open forests, woodlands, *Melaleuca* swamps and *Banksia* woodlands. As such, it plays an important ecosystem function by providing a means of seed dispersal and pollination for many indigenous tree species (Eby 1996; Pallin 2000). Grey-headed Flying-foxes also feed on introduced trees including commercial fruit crops.
3. Grey-headed Flying-foxes are relatively long-lived mammals, with the average age of reproductive animals being between six and 10 years. They have a low rate of recruitment as sexual maturity is reached after at least two to three years and generally only one offspring is produced each year (Martin *et al.* 1996).
4. Grey-headed Flying-foxes congregate in large numbers at roosting sites (camps) that may be found in rainforest patches, *Melaleuca* stands, mangroves, riparian woodland or modified vegetation in urban areas. Individuals generally exhibit a high fidelity to traditional camps and return annually to give birth and rear offspring (Lunney and Moon 1997; Augee and Ford 1999). They forage opportunistically, often at distances up to 30 km from camps, and occasionally up to 60–70 km per night, in response to patchy food resources (Augee and Ford 1999; Tidemann 1999).
5. Grey-headed Flying-foxes show a regular pattern of seasonal movement. Much of the population concentrates in May and June in northern NSW and Queensland where animals exploit winter-flowering trees such as Swamp Mahogany *Eucalyptus robusta*, Forest Red Gum *E. tereticornis* and Paperbark *Melaleuca quinquenervia* (Eby *et al.* 1999; P. Birt and L. Hall, pers. comm.). Food availability, particularly nectar flow from flowering gums, varies between places and from year to year.
6. Historically, Grey-headed Flying-foxes had a greater range in Australia and numbers were estimated as being in the “many millions” (Ratcliffe 1932). Counts of flying foxes over the past decade suggest that the national population may have declined by up to 30% (Birt 2000; Richards 2000). Regular visits to flying-fox camps during this period have shown a marked

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6. The Grey-crowned Babbler is threatened by clearance and the fragmentation of habitat including removal of dead timber. The species occupies woodlands on fertile soils of plains and undulating terrain. Therefore, Grey-crowned Babbler habitat has been disproportionately cleared for agriculture. Isolation of populations in scattered remnants is exacerbated by the apparent reluctance of birds to traverse tracts of cleared land. As reduced family groups, these isolated small populations are vulnerable to extinction via stochastic events and to loss of genetic viability in the long term.
7. Habitat degradation threatens Grey-crowned Babblers, particularly as a result of weed invasion and grazing by stock. In addition, it is likely that increased abundance of competitors, such as Noisy Miners, and nest predators, including the Pied Currawong and Australian Raven (Major *et al.* 1996) threaten Babbler foraging efficiency and breeding success.
8. In view of the above points, the Scientific Committee is of the opinion that the Grey-crowned Babbler (eastern subspecies) *Pomatostomus temporalis temporalis*, is likely to become endangered unless the circumstances and factors threatening its survival or evolutionary development cease to operate, and is therefore eligible for listing as a vulnerable species.

Dr Chris Dickman
Chairperson
Scientific Committee

References

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Gazetted: 26/10/01

NSW SCIENTIFIC COMMITTEE

Final Determination

The Scientific Committee, established by the Threatened Species Conservation Act, has made a Final Determination to list the Grey-crowned Babbler (eastern subspecies), *Pomatostomus temporalis temporalis* (Vigors and Horsfield, 1827), as a VULNERABLE SPECIES on Schedule 2 of the Act. Listing of Vulnerable Species is provided for by Part 2 of the Act.

The Scientific Committee found that:

1. The eastern form of the Grey-crowned Babbler *Pomatostomus temporalis temporalis*, formerly ranged throughout eastern Australia from South Australia, through Victoria and broadly through NSW and central Queensland up into southern New Guinea. The Grey-crowned Babbler is now extinct in South Australia, coastal Victoria and the ACT. In NSW, the Grey-crowned Babbler occurs on the western slopes and plains but was less common at the higher altitudes of the tablelands. Isolated populations are known from coastal woodlands on the North Coast, in the Hunter Valley and from the South Coast near Nowra (Blakers *et al.* 1984, Schodde & Mason 1999).
2. Grey-crowned Babblers occupy open woodlands dominated by mature eucalypts, with regenerating trees, tall shrubs, and an intact ground cover of grass and forbs. The species builds conspicuous dome-shaped nests and breeds co-operatively in sedentary family groups of 2-13 birds (Davidson and Robinson 1992). Grey-crowned Babblers are insectivorous and forage in leaf litter and on bark of trees.
3. The Grey-crowned Babbler has declined in numbers and disappeared from large parts of its range. The species is extinct in the Orange area (Heron 1973) and possibly also from around Bathurst, where A. Fisher (pers.comm.) has made no record of the species in a study of almost 300 sites. Recent surveys (A. Overs, unpubl.) show a decline in the number of family groups that remain in the southern portion of its range, such that approximately five groups remain in Boorowa Shire, less than 10 around Wagga Wagga, and less than 30 groups in the shires of Young, Junee and Harden. A survey of 96 woodland sites in Holbrook Shire revealed only four groups (S. Collard, unpubl.). Further, the species has apparently disappeared from the Shires of Gundagai, Gunning, Yass and Yarrowlunla.
4. There are probably no Grey-crowned Babblers left on the New England Tableland (H. Ford, pers. comm.) and they are now very uncommon in the Hunter Valley with most family groups reduced to two or four members (P. Cowper, pers. comm.)
5. In southern NSW, the size of Grey-crowned Babbler family groups is also reduced. In a three year study of 15 family groups near West Wyalong, the mean number of birds in each group was four (A. Overs, unpubl.). Such groups are much smaller than those recorded further north near Peak Hill, where groups averaged 8-13 birds (A. Overs, unpubl.). The impact of reduced family groups on breeding success is unknown, although it is likely to be detrimental.

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7. In view of 3, 4, 5 & 6 above the Scientific Committee is of the opinion that the species is likely to become extinct in nature in New South Wales unless the circumstances and factors threatening its survival or evolutionary development cease to operate.

Dr Chris Dickman
Chairperson
Scientific Committee



Gazetted: 09/02/01

NSW SCIENTIFIC COMMITTEE

Final Determination

The Scientific Committee, established by the Threatened Species Conservation Act, has made a Final Determination to list the shrub *Pomaderris adnata* N.G. Walsh & F. Coates as an ENDANGERED SPECIES on Part 1 of Schedule 1 of the Threatened Species Conservation Act. Listing of endangered species is provided for by Part 2 of the Act.

The Scientific Committee has found that:

1. *Pomaderris adnata* N.G. Walsh & F. Coates was first described in 1997 (Walsh, N.G. and Coates, F., 1997, New taxa, new combinations and an infrageneric classification in *Pomaderris* (Rhamnaceae). *Muelleria* 10: 27-56).
2. The following description is taken from Harden and Murray (2000), Supplement to Flora of NSW Volume 1. Spreading shrub 1-2 m high, new growth pubescent with greyish stellate hairs. Leaves narrow-elliptic to elliptic, or oblanceolate, 1.5-3 cm long, 3-8 mm wide, margins recurved and entire to more or less sinuate; upper surface glabrous; lower surface pubescent with greyish stellate hairs, secondary veins apparent with sparse, appressed greyish or yellow to rusty simple hairs and greyish stellate hairs. Flowers pale yellow, in short axillary cymes forming narrow terminal or axillary panicles. Sepals not persistent in fruit. Petals usually present on most flowers. Capsule and ovary stellate hairy, capsule immersed for about half of its length in the tomentose hypanthium. Grows in heathy woodland and dry sclerophyll forest.
3. *Pomaderris adnata* may be distinguished from other similar *Pomaderris* species in the area by having petals, by the absence of simple hairs on the stems and by the short, sparse and appressed hairs on the midrib and larger lateral veins on the underside of the leaf surface.
4. The species is only known from one population of less than ten plants on the Illawarra escarpment, north of Wollongong. At this site *P. adnata* occurs in *Eucalyptus sieberi* / *Corymbia gummifera* forest with occasional *Hakea salicifolia* and an understorey of *Acacia suaveolens*, *Hakea dactyloides*, *Lambertia formosa*, *Leptospermum trinervium*, *Banksia spinulosa* var. *spinulosa*, *Leucopogon lanceolatus*, *Lomatia silaifolia*. Herbs include *Lomandra longifolia*, *L. obliqua*, *L. sp.*, *Entolasia stricta*, *Billardiera scandens*, *Smilax glycyphylla*, *Dianella sp.* and *Patersonia sp.*
5. Despite searches in the area, no other locations have been found.
6. Possible threats include dumping, road verge maintenance activities, and weed invasion. Due to the small population size and very limited extent the species is susceptible to catastrophic events.

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Final Determination

The Scientific Committee, established by the Threatened Species Conservation Act, has made a Final Determination to list the McKies Stringybark/Blackbutt Open Forest in the Nandewar and New England Tableland Bioregions as an ENDANGERED ECOLOGICAL COMMUNITY on Part 3 of Schedule 1 of the Act. The listing of Endangered Ecological Communities is provided for by Part 2 of the Act.

The Scientific Committee has found that:

1. McKies Stringybark/Blackbutt Open Forest is the name given to the plant community that is characterised by the following assemblage of species:

<i>Acacia buxifolia</i>	<i>Acacia filicifolia</i>	<i>Acacia neriifolia</i>
<i>Angophora floribunda</i>	<i>Austrodanthonia eriantha</i>	<i>Austrostipa rudis</i>
<i>Brachyloma daphnoides</i> subsp. <i>glabrum</i>	<i>Callitris endlicheri</i>	<i>Calotis cuneifolia</i>
<i>Cassinia uncata</i>	<i>Cheilanthes sieberi</i> subsp. <i>sieberi</i>	<i>Clematis glycinoides</i>
<i>Desmodium varians</i>	<i>Dianella revoluta</i>	<i>Dichondra repens</i>
<i>Digitaria breviglumis</i>	<i>Echinopogon caespitosus</i>	<i>Echinopogon ovatus</i>
<i>Eucalyptus andrewsii</i>	<i>Eucalyptus banksii</i>	<i>Eucalyptus crebra</i>
<i>Eucalyptus mckieana</i>	<i>Eucalyptus melliodora</i>	<i>Eucalyptus stannicola</i>
<i>Euchiton sphaericus</i>	<i>Gahnia aspera</i>	<i>Galium gaudichaudii</i>
<i>Glycine clandestina</i>	<i>Hardenbergia violacea</i>	<i>Hibbertia acicularis</i>
<i>Hibbertia obtusifolia</i>	<i>Hybanthus monopetalus</i>	<i>Hypericum gramineum</i>
<i>Imperata cylindrica</i>	<i>Indigofera australis</i>	<i>Lagenifera stipitata</i>
<i>Lepidosperma laterale</i>	<i>Leptospermum brevipes</i>	<i>Leucopogon biflorus</i>
<i>Leucopogon lanceolatus</i>	<i>Leucopogon muticus</i>	<i>Lissanthe strigosa</i>
<i>Melichrus urceolatus</i>	<i>Microlaena stipoides</i>	<i>Monotoca scoparia</i>
<i>Myoporum montanum</i>	<i>Olearia elliptica</i>	<i>Opercularia aspera</i>
<i>Persoonia cornifolia</i>	<i>Pomaderris angustifolia</i>	<i>Pomax umbellata</i>
<i>Poranthera microphylla</i>	<i>Pteridium esculentum</i>	<i>Styphelia triflora</i>
<i>Vernonia cinerea</i>	<i>Veronica calycina</i>	<i>Viola betonicifolia</i>

2. The total species list of the community is considerably larger than that given in 1 (above), with many species present in only one or two sites or in very small quantity. In any particular site not all of the assemblage listed in 1 may be present. At any one time, seeds of some species may only be present in the soil seed bank with no above-ground individuals present. The species composition of the site will be influenced by the size of the site, local conditions (eg. topography & rainfall) and by its recent disturbance history. The number of species and the above-ground composition of species will change with time since fire, and may also change in response to changes in fire frequency.

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3. Characteristic tree species include *Eucalyptus andrewsii*, *E. mckieana* and *Callitris endlicheri*. The community is found on lateritic soils in low lying areas on hill slopes and open depressions.
4. The McKies Stringybark/Blackbutt Open Forest Community has a restricted distribution occurring between Clayton Chase in the north and areas south of Gilgai. It is currently known from Inverell LGA, but may occur in Guyra and Uralla and possibly other LGAs. These areas are included in the Nandewar and New England Tableland Bioregions.
5. The vegetation over much of the area supporting this community is severely fragmented. Many examples of the community occur on private property although small patches occur in Kings Plains National Park (J.T. Hunter 1999, Vegetation and floristics of Kings Plains National Park, Unpublished report to NSW National Parks and Wildlife Service) and on the boundary of Severn River Nature Reserve.
6. Many current stands of the McKies Stringybark/Blackbutt Open Forest Community exist as narrow remnants on roadsides and travelling stock routes. These remnants occur as narrow linear patches, and are subject to weed invasion and the possibility of being further reduced by road widening. Weeds occur throughout the community. Other substantial stands are fragmented as a result of fenceline and trail clearing. Clearing and fragmentation are continuing threats as a result of further subdivision, fenceline and trail work and maintenance of paddocks. Selective logging has occurred in some northern stands.
7. In view of the size and fragmented nature of existing remnants, the continuing threat of further fragmentation, clearing and other threatening processes, the Scientific Committee is of the opinion that the McKies Stringybark/Blackbutt Open Forest in the Nandewar and New England Tableland Bioregions is likely to become extinct in nature in New South Wales unless the circumstances and factors threatening its survival or evolutionary development cease to operate and is eligible for listing as an endangered ecological community.

Dr Chris Dickman
Chairperson
Scientific Committee

Gazetted: 09/02/01

NSW SCIENTIFIC COMMITTEE

Final Determination

The Scientific Committee, established by the Threatened Species Conservation Act, has made a Final Determination to list the Mount Gibraltar Forest in the Sydney Basin Bioregion, as an ENDANGERED ECOLOGICAL COMMUNITY on Part 3 of Schedule 1 of the Act. Listing of Endangered Ecological Communities is provided for by Part 2 of the Act.

The Scientific Committee has found that:

1. Mount Gibraltar Forest in the Sydney Basin Bioregion is the name given to the plant community characterised by the species assemblage listed in 2 below. All sites are within the Sydney Basin Bioregion. The community is described in Fisher, Ryan & Lembit (1995).
2. Mount Gibraltar Forest is characterised by the following assemblage:

<i>Acacia melanoxylon</i>	<i>Adiantum aethiopicum</i>
<i>Blechnum cartilagineum</i>	<i>Cyathea australis</i>
<i>Cymbopogon refractus</i>	<i>Dianella caerulea</i>
<i>Dichondra repens</i>	<i>Doodia aspera</i>
<i>Eucalyptus fastigata</i>	<i>Eucalyptus piperita</i>
<i>Eucalyptus radiata</i>	<i>Eucalyptus smithii</i>
<i>Eucalyptus viminalis</i>	<i>Eustrephus latifolius</i>
<i>Exocarpos cupressiformis</i>	<i>Hedycarya angustifolia</i>
<i>Leptospermum brevipes</i>	<i>Leptospermum polygalifolium</i>
<i>Leucopogon lanceolatus</i>	<i>Lomandra longifolia</i>
<i>Melaleuca hypericifolia</i>	<i>Notelaea venosa</i>
<i>Oreomyrrhis eriopoda</i>	<i>Pittosporum undulatum</i>
<i>Polyscias sambucifolia</i>	<i>Pteridium esculentum</i>
<i>Senecio linearis</i>	<i>Stypandra glauca</i>
<i>Themeda australis</i>	<i>Tylophora barbata</i>

- 3 The total species list of the flora and fauna of the community is considerably larger than that given in 2 (above), with many species present in only one or two sites or in very small quantity. The community includes invertebrates, many of which are poorly known, as well as vertebrates. In any particular site not all of the assemblage listed above may be present. At any one time, seeds of some plant species may only be present in the soil seed bank with no above-ground individuals present. Invertebrate species may be restricted to soils or canopy trees and shrubs, for example. The species composition of the site will be influenced by the size of the site and by its recent disturbance history. The number of species and the above-ground composition of species will change with time since fire, and may also change in response to changes in fire frequency.

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- 4 Mount Gibraltar Forest includes vegetation ranging from open-forest to woodland and scrub depending on aspect, soil conditions and previous clearing and disturbance. Typical trees include *Eucalyptus radiata*, *Eucalyptus piperita* and *Eucalyptus smithii*, on the upper slopes, and *Eucalyptus radiata*, *Eucalyptus piperita*, *Eucalyptus fastigata* and *Eucalyptus viminalis* on the deeper soils on the southern side.
- 5 Understorey species in the open-forest are predominantly herbaceous and grassy and include *Stypandra glauca*, *Dianella caerulea*, *Dichondra repens*, *Themeda australis*, *Blechnum cartilagineum*, *Adiantum aethiopicum*, *Tylophora barbata*, *Oreomyrrhis eriopoda*, *Cymbopogon refractus*, *Senecio linearis*, *Polyscias sambucifolia*, *Exocarpos cupressiformis*, *Leucopogon lanceolatus* and *Lomandra longifolia*. The tall forest is dominated by ferns such as *Blechnum cartilagineum*, *Doodia aspera*, *Pteridium esculentum*, and twiners such as *Eustrephus latifolius* and *Tylophora barbata*. There may be small patches of rainforest species such as *Acacia melanoxylon*, *Hedycarya angustifolia*, *Notelaea venosa*, *Pittosporum undulatum* and *Cyathea australis*. Scrub with *Melaleuca hypericifolia*, *Leptospermum brevipes* and *Leptospermum polygalifolium* may occur on exfoliating rock on exposed sites.
- 6 Mount Gibraltar Forest is found on clay soils derived from a microsyenite volcanic intrusion associated with Mount Gibraltar near Bowral, but may also have occurred on nearby mountains such as Mount Jellore, Mount Flora, Mount Misery and Cockatoo Hill depending on the extent of microsyenite. It is referred to in Fisher, Ryan & Lembit (1995)
- 7 Mount Gibraltar Forest is or has been known to occur in the Wingecarribee Local Government Area, but may occur elsewhere in the Sydney Basin Bioregion.
- 8 Disturbed Mount Gibraltar Forest remnants are considered to form part of the community including where the vegetation would respond to assisted natural regeneration, such as where the natural soil and associated seedbank is still at least partially intact.
- 9 Mount Gibraltar Forest has been cleared for agriculture and rural development. Remnants are mostly small isolated pockets.
- 10 Mount Gibraltar Forest has not been reported from any NPWS reserves.
- 11 Much of the remaining area of Mount Gibraltar Forest is largely isolated from other areas of bushland. Ongoing threats to the remnants include exotic weed invasion such as *Hedera*, *Lonicera*, *Ilex*, *Berberis*, *Pyracantha* and *Genista*, pressure from adjacent urban development (including dogs, cats, rubbish dumping, noise, trampling and vehicles), inappropriate fire regimes and disturbances associated with communication tower infrastructure (including clearing, movement of machinery, weed introduction, dumping of rubbish).

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- 12 In view of the restricted distribution of this community, the ongoing threats to the remnants and its inadequate representation within conservation reserves, the Scientific Committee is of the opinion that Mount Gibraltar Forest in the Sydney Basin Bioregion is likely to become extinct in nature in New South Wales unless the circumstances and factors threatening its survival or evolutionary development cease to operate and that the community is eligible for listing as an endangered ecological community.

Dr Chris Dickman
Chairperson
Scientific Committee

References

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Gazetted: 16/03/01

NSW SCIENTIFIC COMMITTEE

Final Determination

The Scientific Committee, established by the Threatened Species Conservation Act, has made a Final Determination to list the Mt Canobolas *Xanthoparmelia* Lichen Community as an ENDANGERED ECOLOGICAL COMMUNITY on Part 3 of Schedule 1 of the Act. Listing of Endangered Ecological Communities is provided for by Part 2 of the Act.

The Scientific Committee has found that:

1. Mt Canobolas *Xanthoparmelia* Lichen Community is the name given to the community of foliose lichens of the genus *Xanthoparmelia* (F. Parmeliaceae: Ascomycotina) characterised by the species assemblage listed in 2, below. The community occurs at Mt Canobolas in central-western New South Wales.
2. Mt Canobolas *Xanthoparmelia* Lichen Community is characterised by the following assemblage:

Cladia fuliginosa

Xanthoparmelia digitiformis

Xanthoparmelia metastrigosa

Xanthoparmelia neorimalis

Xanthoparmelia tasmanica

Xanthoparmelia canobolasensis

Xanthoparmelia metaclystoides

Xanthoparmelia multipartita

Xanthoparmelia sulcifera

Xanthoparmelia canobolasensis and *X. metastrigosa* are known only from Mt Canobolas, and *X. sulcifera* and *C. fuliginosa* are each known from only one other locality in New South Wales.

3. The total species list for the community is likely to be considerably larger than that given in 2, above. It is likely, for example, that microfauna and many species of invertebrates are associated with the lichens, but these have not been studied.
4. Mt Canobolas *Xanthoparmelia* Lichen Community occurs on rock faces and soils of the Mt Canobolas Tertiary volcanic complex. The Mt Canobolas complex consists mostly of trachyte and alkali rhyolite, with smaller outcroppings of other Tertiary rocks.
5. Mt Canobolas *Xanthoparmelia* Lichen Community is threatened by road and drainage works, and collection of bushrock. Tourist visitation of the slopes and summit of Mt Canobolas increases risks of trampling and disturbance to the community. There is also potential for loss of lichen habitat from increased urban encroachment and rural development such as vineyards and orchards on the north and east flanks of Mt Canobolas. Part of the Community occurs within the Mt Canobolas State Recreation Area, but this affords only limited protection of the community from the listed threats.

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6. In view of the above the Scientific Committee is of the opinion that the Mt Canobolas *Xanthoparmelia* Lichen Community is likely to become extinct in nature in New South Wales unless the circumstances and factors threatening its survival or evolutionary development cease to operate and that listing as an endangered ecological community is warranted.

Dr Chris Dickman
Chairperson
Scientific Committee

Gazetted: 05/10/01

NSW SCIENTIFIC COMMITTEE

Final Determination

The Scientific Committee, established by the Threatened Species Conservation Act, has made a Final Determination to list the Native Vegetation on Cracking Clay Soils of the Liverpool Plains as an ENDANGERED ECOLOGICAL COMMUNITY on Part 3 of Schedule 1 of the Act. The listing of Endangered Ecological Communities is provided for by Part 2 of the Act.

The Scientific Committee has found that:

1. Native Vegetation on Cracking Clay Soils of the Liverpool Plains is characterised by the assemblage of species discussed in paragraphs 3 to 5. The community occurs on cracking clay soils (vertisols - including soils referred to as Black Earth) and is within the Liverpool Plains Catchment. The Mooki River, Coxs Creek and their tributaries drain this catchment into the Namoi River. This catchment occurs in the Brigalow Belt South and Nandewar Bioregions.
2. Native Vegetation on Cracking Clay Soils of the Liverpool Plains is generally grasslands which are often dominated by *Austrostipa aristiglumis*, *Dichanthium sericeum* or *Panicum queenslandicum* but can include shrubs and trees which are generally sparse but may be locally common.
3. Native Vegetation on Cracking Clay Soils of the Liverpool Plains is characterised by the following assemblage of species.

<i>Acacia pendula</i>	<i>Angophora floribunda</i>
<i>Aristida leptopoda</i>	<i>Asperula conferta</i>
<i>Austrostipa aristiglumis</i>	<i>Austrodanthonia bipartita</i>
<i>Carex inversa</i>	<i>Cullen tenax</i>
<i>Daucus glochidiatus</i>	<i>Dichanthium sericeum</i>
<i>Elymus scaber</i> var. <i>plurinervis</i>	<i>Enteropogon acicularis</i>
<i>Eucalyptus conica</i>	<i>Eucalyptus melliodora</i>
<i>Eucalyptus populnea</i> subsp. <i>bimbil</i>	<i>Eulalia aurea</i>
<i>Geranium solanderi</i>	<i>Glycine latifolia</i>
<i>Haloragis heterophylla</i> / <i>H. aspera</i> intergrades	<i>Juncus subglaucus</i>
<i>Leptorhynchos panaetioides</i>	<i>Marsilea drummondii</i>
<i>Mentha satureioides</i>	<i>Neptunia gracilis</i>
<i>Panicum buncei</i>	<i>Panicum queenslandicum</i>
<i>Rhynchosia minima</i>	<i>Sclerolaena muricata</i>
<i>Sida trichopoda</i>	<i>Themeda avenacea</i>
<i>Vittadinia cuneata</i>	<i>Wahlenbergia communis</i>

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4. The total flora list for the community is considerably larger than that given above, with many species present in only one or two sites or in very small quantity. In any particular site not all of the assemblage listed above will be present. At any one time, seeds of some species may only be present in the soil seed bank with no above-ground individuals present. The species composition of the site will be influenced by the size of the site, recent rainfall or drought conditions and by its disturbance history. The community is an important habitat for a diverse fauna (vertebrate and invertebrates), but detailed fauna records are not available.
5. In wetter locations the Native Vegetation on Cracking Clay Soils of the Liverpool Plains may contain a number of species that are not common in drier areas. Such species include *Agrostis avenacea*, *Cyperus* spp., *Eleocharis* spp., *Juncus* spp., *Rumex dumosus* and *Rumex tenax*. Tree species such as *Eucalyptus melliodora*, *Eucalyptus populnea* subsp. *bimbil*, *Eucalyptus conica* and *Angophora floribunda* and shrub species such as *Acacia pendula* may be scattered to locally common in the Native Vegetation on Cracking Clay Soils of the Liverpool Plains.
6. Native Vegetation on Cracking Clay Soils of the Liverpool Plains is known to occur in the Coonabarabran, Gunnedah, Murrurundi, Narrabri, Parry and Quirindi Local Government Areas. This community occurs over an altitude range (above sea level) varying from 750 m in the south to 210 m in the north. Change in altitude is gradual and areas often remain waterlogged for some time after heavy rainfall or floods.
7. Native Vegetation on Cracking Clay Soils of the Liverpool Plains has largely been modified as a result of cropping, grazing and alteration of disturbance regimes. Salinity is also considered to be an increasing problem to this vegetation. Erosion, particularly of recently cultivated areas, following flooding results in deposition of soil over native vegetation and movement of plant propagules both native and exotic. Saline perched water tables are also left closer to the surface after removal of surface soil and this affects recolonisation of these areas by native species.
8. Native Vegetation on Cracking Clay Soils of the Liverpool Plains now occupies only a small proportion of its original range. Sim and Unwin (1983) reported that by 1978 approximately 85% of the Black Earth Alluvial Plains Land System of the Liverpool Plains was under cultivation and this proportion has increased further.
9. Most of the surviving remnants of this community are found on travelling stock routes through the plains. These may be wide but if next to roads they are often used by diverted traffic while roadworks are being carried out.
10. Invasion by exotic species is also a threat to this community. The most common weeds are *Ammi majus* and *Aster subulatus* but thistles, annual grasses and exotic legumes may also be locally common. A few weeds such as *Phalaris paradoxa*, *Myagrimum perfoliatum* and *Scorzonera laciniata* are generally only found on clay soils, including vertosols.

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11. Native Vegetation on Cracking Clay Soils of the Liverpool Plains is not known to be conserved in any area managed by the National Parks and Wildlife Service.
12. In view of the small area of most existing remnants, and the threat of further clearing, disturbance and degradation, the Scientific Committee is of the opinion that Native Vegetation on Cracking Clay Soils of the Liverpool Plains is likely to become extinct in nature in NSW unless factors threatening its survival or evolutionary development cease to operate.

Dr Chris Dickman
Chairperson
Scientific Committee

Reference

Sim, I & Unwin, N. (1983) The natural grasslands of the Liverpool Plains New South Wales. Report based on research by J.A. Duggin and P.N. Allison. Department of Environment and Planning, Sydney.

Gazetted: 26/10/01

NSW SCIENTIFIC COMMITTEE

Final Determination

The Scientific Committee, established by the Threatened Species Conservation Act, has made a Final Determination to list the Robertson Basalt Tall Open-forest in the Sydney Basin Bioregion, as an ENDANGERED ECOLOGICAL COMMUNITY on Part 3 of Schedule 1 of the Act. Listing of Endangered Ecological Communities is provided for by Part 2 of the Act.

The Scientific Committee has found that:

1. Robertson Basalt Tall Open-forest in the Sydney Basin Bioregion is the name given to the ecological community characterised by the species assemblage listed in 2 below. The community occurs on high nutrient soils in high rainfall areas of the Southern Highlands. All sites are within the Sydney Basin Bioregion.
2. Robertson Basalt Tall Open-forest is characterised by the following assemblage:

Acacia mearnsii
Acronychia oblongifolia
Australina pusilla
Clematis aristata
Desmodium varians
Eucalyptus elata
Eucalyptus radiata
Eucalyptus viminalis
Galium propinquum
Geranium homeanum
Hymenanthera dentata
Marsdenia rostrata
Notelaea venosa
Parsonsia straminea
Pimelea ligustrina
Plantago debilis
Polyscias sambucifolia
Rubus parvifolius
Senecio linearifolius
Solanum aviculare
Themeda australis
Urtica incisa
Viola hederacea

Acacia melanoxyton
Aphanopetalum resinosum
Citriobatus pauciflorus
Coprosma quadrifida
Doryphora sassafras
Eucalyptus fastigata
Eucalyptus tereticornis
Eustrephus latifolius
Geitonoplesium cymosum
Hedycarya angustifolia
Lomandra longifolia
Microlaena stipoides
Pandorea pandorana
Pellaea falcata
Pittosporum undulatum
Poa labillardieri
Pteridium esculentum
Rubus rosifolius
Smilax australis
Stellaria flaccida
Tylophora barbata
Veronica plebeia

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- 3 The total species list of the flora and fauna of the community is considerably larger than that given in 2 (above), with many species present in only one or two sites or in very small quantity. The community includes vertebrates and invertebrates, many of which are poorly known. Invertebrate species may be restricted to soils or canopy trees and shrubs. In any particular site not all of the assemblage listed above may be present. At any one time, seeds of some species may only be present in the soil seed bank with no above-ground individuals present. Invertebrate species may be restricted to soils or canopy trees and shrubs, for example. The species composition of the site will be influenced by the size of the site and by its recent disturbance history. The number of species and the above-ground composition of species will change with time since fire, and may also change in response to changes in fire frequency.
- 4 Robertson Basalt Tall Open-forest was predominantly of tall open-forest structure, though remnants may now be of open forest or woodland structure due to clearing and disturbance. Typical trees include *Eucalyptus fastigata*, *Eucalyptus viminalis*, *Eucalyptus elata* and *Eucalyptus radiata*.
- 5 Robertson Basalt Tall Open-forest is found on high fertility soils derived generally from Tertiary basalts (mainly the Robertson Basalt and Kangaroo Valley Basanite), on areas of high rainfall (1000-1600 mm per annum). It is referred to in Fisher, Ryan & Lembit (1995) and Kodela (1990).
- 6 Robertson Basalt Tall Open-forest is or has been known to occur in the Wingecarribee and Shoalhaven Local Government areas, but may occur elsewhere in the Sydney Basin Bioregion. It has been reported from the Southern Highlands on the Robertson plateau and Cambewarra Range (Kodela, 1990, Kevin Mills pers. comm.).
- 7 Disturbed Robertson Basalt Tall Open-forest remnants are considered to form part of the community including where the vegetation would respond to assisted natural regeneration, such as where the natural soil and associated seedbank is still at least partially intact.
- 8 Robertson Basalt Tall Open-forest has been extensively cleared for agriculture and rural development. About 400ha or less than 15% of its original occurrence has been estimated to remain though this is mostly as small and isolated pockets.
- 9 Robertson Basalt Tall Open-forest has not been reported from any NPWS national parks or nature reserves.
- 10 Much of the remaining area of Robertson Basalt Tall Open-forest is highly fragmented with much of it occurring on private land. Threatening processes include clearing, logging, burning, introduced species and grazing.

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- 11 In view of the originally restricted distribution of this community, its inadequate representation within conservation reserves, the extensive disturbance and weed invasion that has occurred, and the threats from ongoing development, the Scientific Committee is of the opinion that Robertson Basalt Tall Open-forest in the Sydney Basin Bioregion is likely to become extinct in nature in New South Wales unless the circumstances and factors threatening its survival or evolutionary development cease to operate and that the community is eligible for listing as an endangered ecological community.

Associate Professor Paul Adam
Deputy Chairperson
Scientific Committee

References

- Fisher, M., Ryan, K. & Lembit, R. (1995) The natural vegetation of the Burrorang 1:100 000 map sheet. *Cunninghamia* 4(2): 143-215.
Kodala, P.G. (1990) Modern pollen rain from forest communities. *Australian Journal of Botany* 38:1-24.

Gazetted: 15/06/01

NSW SCIENTIFIC COMMITTEE

Final Determination

The Scientific Committee, established by the Threatened Species Conservation Act, has made a Final Determination to list the Robertson Rainforest in the Sydney Basin Bioregion, as an ENDANGERED ECOLOGICAL COMMUNITY on Part 3 of Schedule 1 of the Act. Listing of Endangered Ecological Communities is provided for by Part 2 of the Act.

The Scientific Committee has found that:

1. Robertson Rainforest in the Sydney Basin Bioregion is the name given to the ecological community characterised by the species assemblage listed in 2 below. The community occurs on high nutrient soils in high rainfall areas of the Southern Highlands. All sites are within the Sydney Basin Bioregion.
2. Robertson Rainforest is characterised by the following assemblage:

<i>Acacia melanoxydon</i>	<i>Acmena smithii</i>
<i>Acronychia oblongifolia</i>	<i>Alectryon subcinereus</i>
<i>Alphitonia excelsa</i>	<i>Aphanopetalum resinum</i>
<i>Arthropteris tenella</i>	<i>Asplenium attenuatum</i>
<i>Asplenium australasicum</i>	<i>Asplenium flabellifolium</i>
<i>Asplenium flaccidum</i>	<i>Australina pusilla</i>
<i>Austrocynoglossum latifolium</i>	<i>Blechnum nudum</i>
<i>Blechnum patersonii</i>	<i>Blechnum watsii</i>
<i>Carex appressa</i>	<i>Cassinia trinerva</i>
<i>Celastrus australis</i>	<i>Ceratopetalum apetalum</i>
<i>Cissus hypoglauca</i>	<i>Citriobatus pauciflorus</i>
<i>Clematis aristata</i>	<i>Clematis glycinoides</i>
<i>Coprosma quadrifida</i>	<i>Cryptocarya glaucescens</i>
<i>Cyathea australis</i>	<i>Cyathea leichhardtiana</i>
<i>Dendrobium pugioniforme</i>	<i>Dennstaedtia davallioides</i>
<i>Dicksonia antarctica</i>	<i>Diospyros australis</i>
<i>Diplazium australe</i>	<i>Doodia aspera</i>
<i>Doryphora sassafras</i>	<i>Elaeocarpus holopetalus</i>
<i>Elaeocarpus kirtonii</i>	<i>Elaeocarpus reticulatus</i>
<i>Elatostema reticulatum</i>	<i>Eucalyptus fastigata</i>
<i>Eucryphia moorei</i>	<i>Eustrephus latifolius</i>
<i>Ficus coronata</i>	<i>Fieldia australis</i>
<i>Galium propinquum</i>	<i>Geitonoplesium cymosum</i>
<i>Geranium homeanum</i>	<i>Grammitis billardieri</i>
<i>Guioa semiglaucula</i>	<i>Gymnostachys anceps</i>
<i>Hedycarya angustifolia</i>	<i>Helicia glabrifolia</i>
<i>Hibbertia scandens</i>	<i>Histiopteris incisa</i>
<i>Hydrocotyle laxiflora</i>	<i>Hymenantha dentata</i>
<i>Hymenophyllum cupressiforme</i>	<i>Hymenophyllum flabellatum</i>
<i>Lastreopsis acuminata</i>	<i>Lastreopsis decomposita</i>
<i>Lastreopsis microsora</i>	<i>Livistona australis</i>

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<i>Lomandra longifolia</i>	<i>Marsdenia rostrata</i>
<i>Microsorium pustulatum</i> subsp. <i>pustulatum</i>	<i>Microsorium scandens</i>
<i>Morinda jasminoides</i>	<i>Muellerina eucalyptoides</i>
<i>Notelaea venosa</i>	<i>Olearia argophylla</i>
<i>Ozothamnus diosmifolius</i>	<i>Ozothamnus ferrugineus</i>
<i>Palmeria scandens</i>	<i>Pandorea pandorana</i>
<i>Parsonsia brownii</i>	<i>Parsonsia straminea</i>
<i>Pellaea falcata</i>	<i>Pennantia cunninghamii</i>
<i>Pimelea ligustrina</i>	<i>Pittosporum revolutum</i>
<i>Pittosporum undulatum</i>	<i>Plantago debilis</i>
<i>Plectorrhiza tridentata</i>	<i>Polyosma cunninghamii</i>
<i>Polyphlebium venosa</i>	<i>Polyscias murrayi</i>
<i>Polyscias sambucifolia</i>	<i>Polystichum proliferum</i>
<i>Prostanthera lasianthos</i>	<i>Pteris umbrosa</i>
<i>Pyrrosia rupestris</i>	<i>Quintinia sieberi</i>
<i>Ranunculus lappaceus</i>	<i>Ranunculus plebeius</i>
<i>Rapanea howittiana</i>	<i>Rubus Moluccanus</i> var. <i>trilobus</i>
<i>Ripogonum album</i>	<i>Rubus nebulosus</i>
<i>Rubus rosifolius</i>	<i>Sambucus australasica</i>
<i>Sarcochilus falcatus</i>	<i>Sarcopetalum harveyanum</i>
<i>Schizomeria ovata</i>	<i>Smilax australis</i>
<i>Solanum aviculare</i>	<i>Solanum pungetium</i>
<i>Stellaria flaccida</i>	<i>Stenocarpus salignus</i>
<i>Sticherus lobatus</i>	<i>Symplocos thwaitesii</i>
<i>Synoum glandulosum</i>	<i>Tasmannia insipida</i>
<i>Tristaniopsis collina</i>	<i>Tylophora barbata</i>
<i>Urtica incisa</i>	<i>Veronica plebeia</i>
<i>Viola hederacea</i>	

- 3 The total species list of the flora and fauna of the community is considerably larger than that given in 2 (above), with many species present in only one or two sites or in very small quantity. The community includes vertebrates and invertebrates, many of which are poorly known. Invertebrate species may be restricted to soils or canopy trees and shrubs. In any particular site not all of the assemblage listed above may be present. At any one time, seeds of some species may only be present in the soil seed bank with no above-ground individuals present. The species composition of the site will be influenced by the size of the site and by its recent disturbance history. The number of species and the above-ground composition of species will change with time since fire, and may also change in response to changes in fire frequency.
- 4 Robertson Rainforest is a warm temperate/cool temperate rainforest type characterised by *Quintinia sieberi*, *Polyosma cunninghamia* and *Doryphora sassafras* (Mills & Jakeman 1995). *Eucryphia moorei* was probably common along streams. Tree and shrub species typically associated with this rainforest type are *Acmena smithii*, *Acacia melanoxylon*, *Quintinia sieberi*, *Hymenanthera dentata*, *Coprosma quadrifida*, *Tasmannia insipida* and occasionally *Ceratopetalum apetalum*. Cool temperate components include *Olearia argophylla*, *Hedycarya angustifolia*, *Eucryphia moorei*, *Dicksonia antarctica* and *Parsonsia*

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brownii. Ground cover is a dense fern cover including *Lastreopsis microsora* and *Microsorium pustulatum* subsp. *pustulatum*.

- 5 Robertson Rainforest is found on high fertility soils derived generally from Tertiary basalts (mainly the Robertson Basalt and Kangaroo Valley Basanite), at high altitudes (500-750 m) and under high rainfalls (1000-1600 mm per annum) (Mills & Jakeman 1995).
- 6 Robertson Rainforest is or has been known to occur in the Wingecarribee and Shoalhaven Local Government Area, but may occur elsewhere in the Sydney Basin Bioregion. It has been reported from the Robertson plateau and Cambewarra Range (Mills & Jakeman 1995).
- 7 Disturbed Robertson Rainforest remnants are considered to form part of the community including areas where the vegetation would respond to assisted natural regeneration, such as where the natural soil and associated seedbank is still at least partially intact.
- 8 Robertson Rainforest has been extensively cleared for agriculture and rural development. About 400-600 ha or about 20% of its original extent is estimated to survive though mostly as fragmented remnants (Mills 1988). Remnants are often dominated by *Acmena smithii*, *Doryphora sassafras* and *Acacia melanoxylon*.
- 9 A remnant of Robertson Rainforest is conserved in Robertson Nature Reserve at Robertson.
- 10 Much of the remaining area of Robertson Rainforest is highly fragmented with much of it occurring on private land. Threatening processes include invasion of exotic weed species including *Ligustrum sinense*, *Hedera helix*, *Lonicera japonica*, *Ilex aquifolium* and clearing, grazing, trampling and further fragmentation.
- 11 In view of the originally restricted distribution of this community, its inadequate representation within conservation reserves, and threats from fragmentation and weed invasion, the Scientific Committee is of the opinion that Robertson Rainforest in the Sydney Basin Bioregion is likely to become extinct in nature in New South Wales unless the circumstances and factors threatening its survival or evolutionary development cease to operate and that the community is eligible for listing as an endangered ecological community.

Associate Professor Paul Adam
Deputy Chairperson
Scientific Committee

References

- Mills, K. (1988) The clearing of Illawarra rainforest: problems in reconstructing pre-european vegetation patterns. *Australian Geographer* 19(2): 230-240.
- Mills, K. & Jakeman, J. (1995) *Rainforests of the Illawarra District*. (Coachwood Publishing:Jamberoo)

Gazetted: 15/06/01

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Final Determination

The Scientific Committee, established by the Threatened Species Conservation Act, has made a Final Determination to list the Southern Highlands Shale Woodlands in the Sydney Basin Bioregion, as an ENDANGERED ECOLOGICAL COMMUNITY on Part 3 of Schedule 1 of the Act. Listing of Endangered Ecological Communities is provided for by Part 2 of the Act.

The Scientific Committee has found that:

1. Southern Highlands Shale Woodlands in the Sydney Basin Bioregion is the name given to the ecological community characterised by the species assemblage listed in 2 below. It occurs on clay soils on Wianamatta Shale in the Southern Highlands. All sites are within the Sydney Basin Bioregion.
2. Southern Highlands Shale Woodlands includes vegetation ranging from open-forest to woodland and scrub though it was predominantly woodland. Remnants may now be of variable structure due to clearing and disturbance. Typical trees include *Eucalyptus radiata*, *Eucalyptus macarthurii*, *Eucalyptus pauciflora*, *Eucalyptus globoidea*, *Eucalyptus cypellocarpa*, *Eucalyptus quadrangulata*, *Eucalyptus amplifolia*, *Eucalyptus ovata*. Other trees include *Eucalyptus smithii*, *Eucalyptus obliqua*, *Eucalyptus fastigata*, *Eucalyptus viminalis*, *Eucalyptus elata*, *Eucalyptus punctata*, *Eucalyptus tereticornis*, *Eucalyptus mannifera* and *Eucalyptus cinerea*.

The understorey is variable with small trees including *Acacia melanoxylon*, *Acacia binervata* and *Pittosporum undulatum*, shrubs such as *Indigofera australis*, *Leucopogon juniperinus*, *Olearia microphylla* and *Bursaria spinosa*. Ground species may include *Hardenbergia violacea*, *Lomandra longifolia*, *Pteridium esculentum*, *Themeda australis*, *Dichelachne crinita* and *Microlaena stipoides*.

Southern Highlands Shale Woodlands is characterised by the following assemblage:

<i>Acacia binervata</i>	<i>Acacia buxifolia</i>
<i>Acacia decurrens</i>	<i>Acacia falciformis</i>
<i>Acacia implexa</i>	<i>Acacia longifolia</i>
<i>Acacia mearnsii</i>	<i>Acacia melanoxylon</i>
<i>Acacia parramattensis</i>	<i>Acacia penninervis</i>
<i>Acacia rubida</i>	<i>Acacia stricta</i>
<i>Amperea xiphioclada</i>	<i>Asperula conferta</i>
<i>Austrodanthonia pilosa</i>	<i>Austrodanthonia racemosa</i>
<i>Austrostipa rudis</i>	<i>Billardiera scandens</i>
<i>Blechnum cartilagineum</i>	<i>Bracteantha bracteata</i>
<i>Bursaria spinosa</i>	<i>Calochlaena dubia</i>
<i>Cassinia aculeata</i>	<i>Clematis aristata</i>
<i>Dianella laevis</i>	<i>Dichelachne crinita</i>
<i>Dillwynia ramosissima</i>	<i>Echinopogon caespitosus</i>
<i>Eucalyptus amplifolia</i>	<i>Eucalyptus cinerea</i>
<i>Eucalyptus cypellocarpa</i>	<i>Eucalyptus dives</i>
<i>Eucalyptus elata</i>	<i>Eucalyptus fastigata</i>
<i>Eucalyptus globoidea</i>	<i>Eucalyptus macarthurii</i>

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<i>Eucalyptus mannifera</i>	<i>Eucalyptus obliqua</i>
<i>Eucalyptus ovata</i>	<i>Eucalyptus pauciflora</i>
<i>Eucalyptus piperita</i>	<i>Eucalyptus punctata</i>
<i>Eucalyptus quadrangulata</i>	<i>Eucalyptus radiata</i>
<i>Eucalyptus rubida</i>	<i>Eucalyptus smithii</i>
<i>Eucalyptus tereticornis</i>	<i>Eucalyptus viminalis</i>
<i>Eustrephus latifolius</i>	<i>Exocarpos cupressiformis</i>
<i>Geranium homeanum</i>	<i>Geranium solanderi</i>
<i>Goodenia ovata</i>	<i>Hardenbergia violacea</i>
<i>Helichrysum elatum</i>	<i>Helichrysum scorpiodes</i>
<i>Hibbertia empetrifolia</i>	<i>Imperata cylindrica</i>
<i>Indigofera australis</i>	<i>Leptospermum polygalifolium</i>
<i>Leucopogon juniperinus</i>	<i>Leucopogon lanceolatus</i>
<i>Lomandra longifolia</i>	<i>Melaleuca linariifolia</i>
<i>Microlaena stipoides</i>	<i>Olearia microphylla</i>
<i>Patersonia glabrata</i>	<i>Persoonia linearis</i>
<i>Pittosporum undulatum</i>	<i>Plectanthurus parviflorus</i>
<i>Podolobium ilicifolium</i>	<i>Polyscias sambucifolia</i>
<i>Pratia purpurascens</i>	<i>Pteridium esculentum</i>
<i>Pultenaea blakelyi</i>	<i>Pultenaea flexilis</i>
<i>Rubus parvifolius</i>	<i>Schoenus melanostachys</i>
<i>Senecio hispidulus</i>	<i>Senecio minimus</i>
<i>Stackhousia monogyna</i>	<i>Themeda australis</i>
<i>Tricoryne simplex</i>	<i>Veronica plebeia</i>
<i>Viola betonicifolia</i>	<i>Viola hederacea</i>
<i>Zieria smithii</i>	

3. The total species list of the flora and fauna of the community is considerably larger than that given in 2 (above), with many species present in only one or two sites or in very small quantity. The community includes invertebrates, many of which are poorly known, as well as vertebrates. In any particular site not all of the assemblage listed above may be present. At any one time, seeds of some species may only be present in the soil seed bank with no above-ground individuals present. Invertebrate species may be restricted to soils or canopy trees and shrubs. The species composition of the site will be influenced by the size of the site and by its recent disturbance history. The number of species and the above-ground composition of species will change with time since fire, and may also change in response to changes in fire frequency.
4. Southern Highlands Shale Woodlands is found on clay soils derived from Wianamatta Shale on the Southern Highlands, south of Colo Vale, extending from west of Mittagong, eastwards to the Illawarra Escarpment, south to Bundanoon and south-west to Canyonleigh. Elevation ranges from about 600 m to about 800 m. Rainfall ranges from 1400 mm in the east to 900 mm per annum in the west. Southern Highlands Shale Woodlands for parts of this area are described in Fisher, Ryan & Lembit (1995) and Benson & Howell (1994)
5. Southern Highlands Shale Woodlands is or has been known to occur in the Wingecarribee Local Government Area, but may occur elsewhere in the Sydney Basin Bioregion.

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6. Disturbed Southern Highlands Shale Woodlands remnants are considered to form part of the community including areas where the vegetation would respond to assisted natural regeneration, such as where the natural soil and associated seedbank is still at least partially intact.
7. Southern Highlands Shale Woodlands has been extensively cleared for agriculture and rural development. Remnants are mostly small isolated pockets. About 2000 ha, or less than 5% of the original extent now remains (Benson & Howell, 1994).
8. Southern Highlands Shale Woodlands has been reported from the Cecil Hoskins Nature Reserve, and the Hammock Hill and Old Bowral Airfield council reserves. There are small areas on the edges of the Metropolitan Catchment Area.
9. Animal species of conservation significance possibly occurring in Southern Highlands Shale Woodlands include Giant Burrowing Frog, *Heleioporus australiacus*; Rosenberg's Goanna, *Varanus rosenbergi*; Glossy Black Cockatoo, *Calyptorhynchus lathami*; Powerful Owl, *Ninox strenua*; Regent Honeyeater, *Xanthomyza phrygia*; and Yellow-bellied Glider, *Petaurus australis*.
10. Much of the remaining area of Southern Highlands Shale Woodlands is highly fragmented with much of it occurring on private land. Many remnants are in poor condition, including in some reserves, with aging trees, lack of regeneration and weed invasion. Ongoing threats include clearing for agriculture, hobby farming and replacement with european landscape e.g. pines, grazing that kills saplings and understorey species, ringbarking by stock, firewood cutting and invasion by exotic species.
11. In view of the restricted and fragmented distribution of this community, its inadequate representation within conservation reserves, the extensive disturbance and weed invasion that has occurred, and the threats from ongoing development, the Scientific Committee is of the opinion that Southern Highlands Shale Woodlands in the Sydney Basin Bioregion is likely to become extinct in nature in New South Wales unless the circumstances and factors threatening its survival or evolutionary development cease to operate and that the community is eligible for listing as an endangered ecological community.

Associate Professor Paul Adam
Deputy Chairperson
Scientific Committee

References

- Benson, D. & Howell, J. (1994) Hawkesbury-Nepean Catchment Vegetation Mapping – Moss Vale – Kiama draft 1:100 000 vegetation map sheets. (Royal Botanic Gardens Sydney).
- Fisher, M., Ryan, K. & Lembit, R. (1995) The natural vegetation of the Burragarang 1:100 000 map sheet. *Cunninghamia* 4(2): 143-215.

Gazetted: 15/06/01

NSW SCIENTIFIC COMMITTEE

Final Determination

The Scientific Committee, established by the Threatened Species Conservation Act, has made a Final Determination to list the Sun Valley Cabbage Gum Forest in the Sydney Basin Bioregion as an ENDANGERED ECOLOGICAL COMMUNITY on Part 3 of Schedule 1 of the Act. The listing of Endangered Ecological Communities is provided for by Part 2 of the Act.

The Scientific Committee has found that:

1. Sun Valley Cabbage Gum Forest is the name given to the ecological community characterised by the assemblage of species listed in paragraph 4 that is currently known from Sun Valley in the Blue Mountains City Council Local Government Area. All sites are within the Sydney Basin Bioregion.
2. Sun Valley Cabbage Gum Forest is dominated by *Eucalyptus amplifolia* (Cabbage Gum) with *Eucalyptus eugenioides* (Thin-leaved Stringybark) as an associated tree. Native understorey species include *Acacia parramattensis*, *Imperata cylindrica*, *Lomandra longifolia* and *Pteridium esculentum*.
3. Sun Valley Cabbage Gum Forest occurs on the diatreme soils at Sun Valley. Other diatremes in the area have different dominant tree species and do not have *Eucalyptus amplifolia*.
4. Sun Valley Cabbage Gum Forest is characterised by the following assemblage of species.

Acacia decurrens
Acacia parramattensis
Agrostis sp.
Asperula conferta
Baumea rubiginosa
Bursaria spinosa
Calochlaena dubia
Cheilanthes sieberi
Daviesia ulicifolia
Dianella longifolia
Dichondra repens
Entolasia marginata
Epilobium billardieranum
Eucalyptus deanei
Exocarpos strictus
Geitonoplesium cymosum
Geranium solanderi
Glycine tabacina
Hardenbergia violacea
Hemarthria uncinata

Acacia implexa
Adiantum aethiopicum
Aristida sp.
Asplenium flabellifolium
Blechnum nudum
Caesia parviflora
Centella asiatica
Daucus glochidiatus
Dianella caerulea
Dichelachne sp.
Echinopogon caespitosus
Entolasia stricta
Eucalyptus amplifolia
Eucalyptus eugenioides
Galium gaudichaudii
Geranium homeanum
Glycine clandestina
Goodenia hederacea
Helichrysum apiculatum
Hibbertia diffusa

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Hibbertia fasciculata
Hypericum gramineum
Indigofera australis
Juncus usitatus
Lindsaea linearis
Lomandra longifolia
Patersonia sp.
Persoonia linearis
Pittosporum undulatum
Pratia purpurascens
Ranunculus lappaceus
Senecio bipinnatisectus
Themeda australis

Hibbertia linearis
Imperata cylindrica
Juncus continuus
Kunzea ambigua
Lomandra longifolia
Microlaena stipoides
Pellaea falcata
Persoonia oblongata
Poranthera microphylla
Pteridium esculentum
Schoenus apogon
Sporobolus creber
Veronica plebeia

5. The total flora species list for the community may be larger than that given above, with many species present in only one or two sites or in very small quantity. In any particular site not all of the assemblage listed above may be present. At any one time, some species may only be present as seeds in the soil seed bank with no above-ground individuals present. The species composition of the site will be influenced by the size of the site and by its disturbance history. The community is likely to be an important habitat for fauna (vertebrates and invertebrates), but detailed records are not available and the invertebrate fauna is poorly known.
6. Sun Valley Cabbage Gum Forest was originally tall open forest. Although there is still good cover of remnant trees and regeneration, much Sun Valley Cabbage Gum Forest has been cleared for timber and grazing and the canopy components remaining are often predominantly fairly recent growth (< about 20 years) with a relatively small number of older trees. The understorey has also been highly modified by grazing and disturbance- only about 15 ha of the community remains, mostly in poor condition.
7. Disturbed remnants are still considered to form part of the community including remnants where the vegetation, either understorey, overstorey or both, would, under appropriate management, respond to assisted natural regeneration, such as where the natural soil and associated seedbank are still at least partially intact.
8. Grazing of livestock, particularly horses, now affects much of the community, and tree recruitment is negligible in most of the remnants. Other threats are mowing, uncontrolled weed invasion, altered fire regimes, clearing of understorey for hazard reduction purposes, general tidying-up, landscaping for exotic gardens, and clearing for houses and infrastructure.
9. The community is not represented in any NSW National Parks & Wildlife Service conservation reserves.
10. Fauna species of conservation significance which may occur in Sun Valley Cabbage Gum Forest include the Squirrel Glider, *Petaurus norfolcensis*.

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11. In view of the small size of existing remnants, the threat of further disturbance and degradation, the Scientific Committee is of the opinion that Sun Valley Cabbage Gum Forest is likely to become extinct in nature in New South Wales unless the circumstances and factors threatening its survival or evolutionary development cease to operate and that listing as an endangered ecological community is warranted.

Dr Chris Dickman
Chairperson
Scientific Committee

Gazetted: 30/11/01

KEY THREATENING PROCESS

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Final Determination

The Scientific Committee, established by the Threatened Species Conservation Act, has made a Final Determination to list "Clearing of native vegetation" as a KEY THREATENING PROCESS on Schedule 3 of the Act. Listing of Key Threatening Processes is provided for by Part 2 of the Act.

The Scientific Committee made a Preliminary Determination to support the proposal to list the "Loss of biodiversity as a result of loss and/or degradation of habitat following clearing and fragmentation of native vegetation." The Scientific Committee considers that "Clearing of native vegetation" is a more appropriate name for this Key Threatening Process.

The Scientific Committee has found that:

1. Clearing of native vegetation is recognised as a major factor contributing to loss of biological diversity.
2. Land Clearance is listed as a Key Threatening Process under the Commonwealth's Environment Protection and Biodiversity Act, 1999.
3. In New South Wales since 1788 at least 61% of the original native vegetation has been cleared, thinned or substantially or significantly disturbed (Environment Protection Authority 1997). The proportion of area cleared varies between region and community type (Native Vegetation Advisory Council 1999) and in some cases has exceeded 90% (for example – South East Grassy Forests – (Keith & Bedward 1999).
4. Clearing of any area of native vegetation, including areas less than 2 hectares in extent, may have significant impacts on biological diversity.
5. Some examples of the impacts of the clearing of native vegetation on biological diversity are:

Destruction of habitat results in loss of local populations of individual species
Destruction of habitat is the major cause of loss of biological diversity. For species of restricted distribution, clearing of native vegetation may result in total extinction, for more widespread species there may be loss of local genotypes.

Fragmentation

Clearing of native vegetation often results in fragmentation, the process by which initially contiguous areas of habitat are separated into a number of smaller areas. Fragmentation impacts include the creation of small isolated populations with limited gene flow between populations, leading to inbreeding depression and reduced potential to adapt to environmental change. Fragmentation also leads to the loss or severe modification of the interactions between species, including those interactions that are important for the survival of species. Small isolated populations may be subject to local extinction from stochastic events. The hostility of the surrounding (cleared) environment is a major factor in limiting

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movement of organisms between patches. The physical environment within patches may be altered as a result of creation of edges and anthropogenic influences.

Important variables that must be considered in assessing the impacts of fragmentation include the distance apart of the fragments, the area of the fragments and their shape. Increasing the edge/area ratio increases the impacts of edge effects such as changed microclimate and susceptibility to invasion by non-indigenous species. This response of particular species to fragmentation will be affected by the mobility of the species (both as adult and in dispersal stages) and the scale of the fragmentation relative to the environmental scale of the species habitat.

Expansion of dryland salinity

The evidence of a relationship between the clearing of native vegetation and dryland salinity is substantial. There is evidence that increases in land salinisation can be attributed to rising groundwater consequent on clearing of native vegetation. There is evidence of a relationship between increases in stream salinity and the proportion of catchments cleared.

Riparian zone degradation

Riparian zones and the organisms inhabiting them have been substantially altered as a result of clearing of native vegetation. Clearing of native riparian vegetation has led to bank erosion, reduced nutrient filtering capacity and changes to stream behaviour. Aquatic communities throughout catchments and in coastal waters have been impacted by sedimentation and other changes following clearing of native vegetation.

Increased greenhouse gas emissions

Clearing of native vegetation results in emissions of greenhouse gases, both from burning of cleared vegetation and from the loss of soil organic matter. Agricultural practices after clearing may further contribute to greenhouse gas emissions.

Increased habitat for invasive species

The creation of increased edge habitat and disturbed habitat may permit the establishment and spread of exotic species which may displace native species. A number of native species may also have increased as a result of clearing of native vegetation (for example noisy miner).

Loss of leaf litter layer

Clearing of leaf litter and fallen logs, often associated with clearing and/or burning of the understorey for clearing, removes habitat for a wide variety of vertebrates and invertebrates which live in the leaf litter and in the fallen logs – including reptiles, small mammals, invertebrates, for example, spiders, molluscs, millipedes, ants etc. These impacts may affect ecological functioning. Loss of the leaf litter also exposes bare soil which will be susceptible to soil erosion and drying, and hence affects the soil biota, and may make sites more vulnerable to weed invasion.

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Loss or disruption of ecological function

Survival of ecological communities relies on the maintenance of ecological processes and interactions. Loss of habitat and fragmentation may disrupt these processes. For example, small fragments may not be large enough to support viable populations of pollinators or seed dispersers so that reproduction of plant species will be impaired.

Disruption of ecological processes may continue long after initial clearing of native vegetation has occurred, with consequent continued decline in biological diversity. In cleared and/or fragmented landscapes there may be an extinction debt, whereby, as a consequence of reduction in population size and disturbance to population structure, future local population extinction is inevitable.

Changes to soil biota

Clearing of native vegetation and its replacement by pasture or crops, and the subsequent management of these agricultural systems, may be accompanied by changes to the soil biota, both through the introduction of exotic species and declines in native species.

6. Examples of activities or developments which may result in the clearing of native vegetation include *inter alia*:
 - Conversion of native vegetation to crops, improved pasture or plantations.
 - Urban development.
 - Development for industry and/or infrastructure (for example quarries, mines, factory sites, dams, roads, railways, power lines).
 - Removal of understorey e.g. along roadsides or at picnic areas and “cleaning up” of native vegetation. (removal of one stratum may result in the loss or longterm modification of the structure of the native vegetation and also composition and function).
7. Clearing has been identified as a threat to a number of species, communities and populations listed under the Threatened Species Conservation Act (Appendix 1) and could cause species, populations or ecological communities that are not threatened to become threatened (Appendix 2). The determination applies to clearing as a process, regardless of the species, populations and ecological communities affected in a particular instance.
8. In view of the above the Scientific Committee is of the opinion that ‘Clearing of native vegetation’ adversely affects two or more threatened species, populations or ecological communities and could cause species, populations or ecological communities that are not threatened to become threatened.



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Definitions

Clearing Clearing is defined as the destruction of a sufficient proportion of one or more strata (layers) within a stand or stands of native vegetation so as to result in the loss, or long term modification, of the structure, composition and ecological function of stand or stands. The definition of clearing does not preclude management activities to control exotic species, or Australian species growing outside their natural geographic range.

Destruction Destruction may include physical removal by cutting, underscrubbing, bulldozing etc., or processes which leave a proportion of one or more strata on site in a dead or dying state [for example ringbarking, poisoning or herbicide spraying (except where specifically targeted at weed control) or modification of abiotic conditions].

Ecological function Ecological function encompasses the ecological processes/interactions that occur within an ecological community.

Ecological function includes:

- Provision of habitat for native biota
- Provision of food and other resources for native biota
- Maintenance of interactions between species (e.g. pollination, dispersal, mutualism, competition)
- Nutrient cycling and filtering and retention of nutrients
- Carbon storage
- Maintenance of soil processes
- Maintenance of catchment scale hydrological and geochemical processes
- Maintenance of landscape scale ecological processes

Some of the processes and interactions within ecological communities may depend upon the presence of leaf litter and fallen or standing dead trees.

Long term modification of native vegetation

Long term modification of native vegetation is the alteration of the composition, structure or ecological function of an ecological community such that recovery by natural means will take periods of time from decades to centuries (depending on the plant community concerned) or will require substantial management intervention.

Selective removal or alteration of one or more strata – for example removal and replacement of the understorey or removal of the canopy which can result in alteration of composition, structure and ecological function of the plant community may constitute long term modification.

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Loss of native vegetation

Loss of native vegetation is the removal of native vegetation by direct or indirect actions.

Loss of all strata may occur when native vegetation is replaced by infrastructure (for example, buildings or roads) or by the removal of pre-existing native vegetation and its replacement by species not previously present.

Native Vegetation

Native vegetation is made up of plant communities, comprising primarily indigenous species, the composition and structure of which reflects the interactions between plant species, between plants and fauna and with the environment. Native vegetation includes canopy trees (where present), understorey, ground cover and below ground biomass (roots, bulbs and the seed bank).

For the purposes of this Determination native vegetation does not include marine vegetation within the meaning of the Fisheries Management Act.

Introduced species may be prominent in many plant communities, but defining an arbitrary proportion of non-indigenous species, measured at a single point in time, as setting a limit between native and non-native vegetation is inappropriate. For example, at some sites, in 'good' seasons, there can be a very large cover of annual weeds in the ground cover, but at other times, these weeds may provide little or no cover.

If the composition has been altered (as a result of invasion by species outside their natural distributional range or the selective removal of species) or the structure modified, the vegetation is still native vegetation if the ecological functions of the unmodified plant communities are maintained and if composition and structure could be substantially restored in the short term through management intervention. Regrowth and newly colonising stands of indigenous species are native vegetation.

Native vegetation is dynamic and subject to change, either endogenous as in some successions, or in response to external factors – such as seasonal variation, longer term changes in climate (drought-wet cycles) or disturbances such as fire or storm.

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- Plant Community** A plant community is an assemblage of plant species occupying a particular area.
- The composition of a plant community is the assemblage of plant species that occur in the community.
- Plant communities are dynamic and subject to change, either endogenous as in some successions, or in response to external factors – such as seasonal variation, longer term changes in climate (drought-wet cycles) or disturbances such as fire or storm.
- Stand** A group of co-occurring plants being an observable feature in the landscape, stands may be of different size depending on the types of plants concerned, the availability of habitat and post clearing. A lichen or bryophyte mat on a rock covering a few tens of square centimetres may constitute a stand, as may a forest covering hundreds of hectares.
- Stratum (plural strata)** A more or less distinct layer within a stand of vegetation – for example ground layer, understorey, canopy, emergents. Some types of vegetation have a more complex structure and more strata than others. For example a rainforest compared with a grassland.
- Structure** The structure of a plant community is the three dimensional distribution of biomass within the community. Structure can be described in terms of more or less distinct layers (strata) – for example ground layer, understorey, canopy, emergents, and the spacing of plants (for example where trees are present, forest is distinguished from woodland by the canopies of the trees in a forest being closer together than those in a woodland).

Dr Chris Dickman
Chairperson
Scientific Committee

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APPENDIX 1

Threatened species, populations and ecological communities adversely affected by this threatening process

This list is provided to substantiate that the key threatening process satisfies section 15(a) of the Threatened Species Conservation Act. The determination applies to clearing of native vegetation as a process, regardless of the species, populations and communities affected in a particular instance.

Vertebrates

Mammals

- Aepyprymnus rufescens* Rufous Bettong
- Cercartetus concinnus* Western Pygmy Possum
- Cercartetus nanus*, Eastern Pygmy-possum
- Chalinolobus dwyeri* Large-eared Pied Bat
- Chalinolobus picatus* Little Pied Bat
- Dasyurus maculatus* Spotted-tailed Quoll
- Isoodon obesulus* Southern Brown Bandicoot
- Lasiorhinus latifrons*, Southern Hairy-nosed Wombat
- Macropus dorsalis* Black-striped Wallaby
- Ningauia yvonneae* Southern Ningauia
- Nyctophilus timoriensis* Greater Long-eared Bat
- Petaurus australis* Yellow-bellied Glider
- Petaurus norfolcensis* Squirrel Glider
- Phascogale tapoatafa* Brush-tailed Phascogale
- Phascolarctos cinereus* Koala
- Pseudomys apodemoides* Silky Mouse
- Pseudomys bolami* Bolam's Mouse
- Pseudomys pilligaensis* Pilliga Mouse
- Pteropus poliocephalus*, Grey-headed Flying-fox
- Saccolaimus flaviventris* Yellow-bellied Sheath-tail-bat
- Scoteanax rueppellii* Greater Broad-nosed Bat
- Vespadelus baverstocki* Inland Forest Bat

Reptiles

- Anomalopus mackayi* Five-clawed Worm-skink
- Aprasia inaurita* Mallee Worm Lizard
- Aprasia parapulchella* Pink-tailed Legless Lizard
- Cyclodomorphus melanops* subsp. *elongata* Gunther's Skink
- Delma impar* Striped Legless Lizard
- Echiopsis curta* Bardick

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Hoplocephalus bitorquatus Pale-headed Snake
Hoplocephalus bungaroides Broad-headed Snake
Suta flagellum Little Whip Snake
Tiliqua occipitalis Western Blue-tongued Lizard
Tympanocryptis lineata pinguicolla Southeastern Lined Earless Dragon
Underwoodisaurus sphyrurus Border Thick-tailed Gecko

Amphibians

Litoria aurea Green and Golden Bell Frog
Litoria castanea Yellow-spotted Tree Frog
Litoria littlejohni Littlejohn's Tree-Frog
Litoria raniformis Southern Bell Frog

Birds

Amytornis striatus Striated Grasswren
Amytornis textilis Thick-billed Grasswren
Ardeotis australis Australian bustard
Botaurus poiciloptilus Australasian Bittern
Burhinus grallarius Bush Stone-curlew
Cacatua leadbeateri Major Mitchell's Cockatoo
Calyptorhynchus banksii Red-tailed Black-Cockatoo
Calyptorhynchus lathami Glossy Black Cockatoo
Certhionyx variegatus Pied Honeyeater
Charadrius mongolus Lesser Sand-plover
Cinclosoma castanotus Chestnut Quail-thrush
Dasyornis brachyptera Eastern Bristlebird
Drymodes brunneopygia Southern Scrub-robin
Erythrotriorchis radiatus Red Goshawk
Falco hypoleucos Grey Falcon
Geophaps scripta Squatter Pigeon
Glossopsitta porphyrocephala Purple-crowned Lorikeet
Grantiella picta Painted Honeyeater
Hamirostra melanosternon Black-breasted Buzzard
Hylacola cauta Shy Heathwren
Ixobrychus flavicollis Black Bittern
Lathamus discolor Swift Parrot
Leipoa ocellata Malleefowl
Lichenostomus cratitius Purple-gaped Honeyeater
Lichenostomus fasciogularis Mangrove Honeyeater
Lophoictinia isura Square-tailed Kite
Manorina melanotis Black-eared Miner
Monarcha leucotis White eared Monarch
Neophema chrysogaster, Orange-bellied Parrot
Neophema pulchella Turquoise Parrot
Neophema splendida Scarlet-chested Parrot

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Nettapus coromandelianus Cotton Pygmy-goose
Ninox connivens Barking Owl
Ninox strenua Powerful Owl
Oxyura australis Blue-billed Duck
Pachycephala inornata Gilbert's Whistler
Pachycephala rufogularis Red-lored Whistler
Pandion haliaetus Osprey
Petroica rodinogaster Pink Robin
Pezoporus wallicus Ground Parrot
Podargus ocellatus Marbled Frogmouth
Polytelis anthopeplus Regent Parrot
Polytelis swainsonii Superb Parrot
Pomatostomus halli Hall's Babbler
Psittaculirostris diophthalma coxeni Double-eyed Fig Parrot
Ptilinopus magnificus Wompoo Fruit-Dove
Ptilinopus regina Rose-crowned Fruit dove
Ptilinopus superbus Superb Fruit-dove
Sericornis brunneus, Redthroat
Stictonetta naevosa Freckled Duck
Todiramphus chloris Collared Kingfisher
Turnix melanogaster Black-breasted Button-quail
Tyto capensis Grass Owl
Tyto novaehollandiae Masked Owl
Tyto tenebricosa Sooty Owl
Xanthomyza phrygia Regent Honeyeater

Invertebrates

Gastropods

Meridolum corneovirens a large land snail
Thersites mitchellae a land snail

Insects

Paralucia spinifera Bathurst Copper Butterfly
Synemon plana the Golden Sun Moth
Nurus atlas, a carab beetle
Nurus brevis, a carab beetle

Plants

Acacia acanthoclada
Acacia atrox ms
Acacia bynoeana
Acacia courtii
Acacia gordonii

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Acacia pubescens
Acacia ruppii
Acacia terminalis subsp. *terminalis*
Acronychia littoralis
Alexfloydia repens
Allocasuarina defungens
Allocasuarina glareicola
Almaleea cambagei
Amyema scandens
Ancistrachne maidenii
Angophora inopina
Austromyrtus fragrantissima
Austrostipa metatoris
Boronia repanda
Boronia ruppi
Bothriochloa biloba
Brachycome muelleroides
Brachycome papillosa
Caladenia concolor
Callistemon linearifolius
Callitris oblonga
Choricarpia subargentea
Corchorus cunninghamii
Cratystylis conocephala
Cryptocarya foetida
Cryptostylis hunteriana
Cynanchum elegans
Darwinia biflora
Davidsonia pruriens var. *jerseyana*
Davidsonia sp. A Mullumbimby
Digitaria porrecta
Dillwynia glauca
Dillwynia tenuifolia
Diospyros mabacea
Diploglottis campbellii
Diuris arenaria
Diuris disposita
Diuris pedunculata
Diuris sp. aff. *chrysantha* (Byron Bay)
Drynaria rigidula
Elaeocarpus sp. Rocky Creek
Eleocharis tetraquetra
Endiandra hayesii
Endiandra muelleri subsp. *bracteata*
Epacris purpurascens var. *purpurascens*

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Eriocaulon carsonii
Eucalyptus approximans
Eucalyptus camfieldii
Eucalyptus camphora subsp. *relicta*
Eucalyptus magnificata
Eucalyptus mckieana
Eucalyptus parramattensis subsp. *decadens*
Eucalyptus pulverulenta
Eucalyptus rubida subsp. *barbigerorum*
Eucalyptus sp. *Cattai*
Floydia praealta
Fontainea oraria
Genoplesium plumosum
Genoplesium rhyoliticum
Grammitis stenophylla
Grevillea beadleana
Grevillea caleyi
Grevillea hilliana
Grevillea juniperina subsp. *juniperina*
Grevillea parviflora subsp. *parviflora*
Grevillea parviflora subsp. *supplicans*
Grevillea scortechinii subsp. *sarmentosa*
Grevillea wilkinsonii
Irenepharsus trypherus
Isoglossa eranthemoides
Kunzea rupestris
Lasiopetalum behrii
Lasiopetalum joyceae
Lepiderema pulchella
Lepidium aschersonii
Lepidium hyssopifolium
Lepidium monoplacoides
Leptospermum thompsonii
Leucopogon fletcheri subsp. *fletcheri*
Lindsaea fraseri
Lindsaea incisa
Macadamia tetraphylla
Marsdenia longiloba
Melaleuca biconvexa
Melaleuca deanei
Melaleuca tamariscina subsp. *irbyana*
Melichrus hirsutus
Melichrus sp. *Gibberagee*
Micromyrtus grandis
Ochrosia moorei

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Olax angulata
Olearia flocktoniae
Owenia cepiodora
Persicaria elatior
Persoonia bargoensis
Persoonia hirsuta
Persoonia mollis subsp. *maxima*
Persoonia nutans
Persoonia pauciflora
Phaius australis
Phaius tankervilliae
Pimelea curviflora var. *curviflora*
Prasophyllum affine
Prasophyllum petilum
Prostanthera askania
Prostanthera junonis
Psoralea parva
Pterostylis gibbosa
Pterostylis saxicola
Pultenaea parviflora
Pultenaea pedunculata
Quassia sp. Mooney Creek
Randia moorei
Rapanea sp. A Richmond River
Rulingia procumbens
Rutidosia leptorrhynchoides
Sarcochilus weinthalii
Senecio garlandii
Senna acclinis
Sophora tomentosa
Styphelia perileuca
Swainsona murrayana
Swainsona recta
Swainsona sericea
Syzygium hodgkinsoniae
Syzygium moorei
Tasmannia glaucifolia
Tasmannia purpurascens
Tetratheca juncea
Thesium australe
Triplarina nowraensis
Tylophora woollsii
Zieria baeuerlenii
Zieria floydii
Zieria granulata

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Populations

Vertebrates

<i>Adelotus brevis</i>	Tusked frog population in the Nandewar and New England Tablelands Bioregion
<i>Callocephalon fimbriatum</i>	Gang-gang Cockatoo population in the Hornsby and Ku-ring-gai Local Government Areas.
<i>Calyptorhynchus lathamii</i>	Glossy Black-Cockatoo, Riverina population
<i>Eudyptula minor</i>	Little Penguin in the Manly Point Area
<i>Petrogale penicillata</i>	Brush tailed Rock Wallaby, Warrumbungles population
<i>Petaurus norfolcensis</i>	Squirrel Glider in the Wagga Wagga Local Government Area
<i>Petaurus norfolcensis</i>	Squirrel Glider on Barrenjoey Peninsula, north of Bushrangers Hill
<i>Phascolarctos cinereus</i>	Koala, Hawks Nest and Tea Gardens population
<i>Phascolarctos cinereus</i>	Koala in the Pittwater Local Government Area
<i>Menippus fugitivus</i>	<i>Menippus fugitivus</i> population in the Sutherland Shire

Plants

<i>Acacia prominens</i>	Gosford Wattle, Hurstville and Kogarah Local Government Areas
<i>Cryptandra longistaminea</i>	<i>Cryptandra longistaminea</i> in the vicinity of Ellandgrove Road, South Grafton
<i>Darwinia fascicularis</i> subsp. <i>oligantha</i>	<i>Darwinia fascicularis</i> subsp. <i>oligantha</i> population in the Baulkham Hills and Hornsby Local Government Areas
<i>Dillwynia tenuifolia</i>	<i>Dillwynia tenuifolia</i> , Kemps Creek
<i>Glycine clandestina</i> (broad leaf form)	<i>Glycine clandestina</i> (broad leaf form) population in the Nambucca Local Government Area.
<i>Hibbertia incana</i>	<i>Hibbertia incana</i> in the Local Government Area of Baulkham Hills
<i>Keraudrenia corrolata</i> var. <i>denticulata</i>	<i>Keraudrenia corrolata</i> var. <i>denticulata</i> in the Hawkesbury Local Government Area
<i>Lespedeza juncea</i> subsp. <i>sericea</i>	<i>Lespedeza juncea</i> subsp. <i>sericea</i> population in the Wollongong Local Government Area
<i>Pomaderris prunifolia</i>	<i>Pomaderris prunifolia</i> in the Parramatta, Auburn, Strathfield and Bankstown Local Government Areas
<i>Wahlenbergia multicaulis</i>	Tadgell's Bluebell in the Local Government Areas of Auburn, Bankstown, Strathfield and Canterbury

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Ecological Communities

Acacia loderi Shrublands

Agnes Banks Woodland in the Sydney Basin Bioregion

Blue Gum High Forest

Blue Mountains Shale Cap Forest in the Sydney Basin Bioregion

Byron Bay Dwarf Graminoid Clay Heath Community

Cadellia pentastylis (Ooline) community in the Nandewar and Brigalow Belt South IBRA Regions

Carbeen Open Forest community in the Darling Riverine Plains and Brigalow Belt South Bioregions

Castlereagh Swamp Woodland Community

Cooks River Clay Plain Scrub Forest

Cumberland Plain Woodland

Duffys Forest vegetation community

Eastern Suburbs Banksia Scrub

Elderslie Banksia Scrub Forest

Howell Shrublands in the Northern Tablelands and Nandewar Bioregions

Illawarra Lowlands Grassy Woodland in the Sydney Basin Bioregion

Kurnell Dune Forest in the Sutherland Shire and City of Rockdale

Lowland Rainforest on Floodplain in the New South Wales North Coast Bioregion

Low Woodland with Heathland on Indurated Sand at Norah Head

Mc Kies Stringybark/Blackbutt Open Forest in the Nandewar and New England Bioregions

Mount Gibraltar Forest in the Sydney Basin Bioregion

O'Hares Creek Shale Forest

Pittwater Spotted Gum Forest

Robertson Basalt Tall Open-forest in the Sydney Basin Bioregion

Robertson Rainforest in the Sydney Basin Bioregion

Semi-evergreen Vine Thicket in the Brigalow Belt South and Nandewar Bioregions

Shale/Sandstone Transition Forest

Southern Highlands Shale Woodlands in the Sydney Basin Bioregion

Sutherland Shire Littoral Rainforest

Sydney Coastal Estuary Swamp Forest in the Sydney Basin Bioregion

Sydney Coastal River-flat Forest

Sydney Freshwater Wetlands in the Sydney Basin Bioregion

Sydney Turpentine-Ironbark Forest

Western Sydney Dry Rainforest in the Sydney Basin Bioregion

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APPENDIX 2

Species, populations and ecological communities that could become threatened by this threatening process

This list is provided to substantiate that the key threatening process satisfies section 15(b) of the Threatened Species Conservation Act. The determination applies to clearing of native vegetation as a process, regardless of the species, populations and communities affected in a particular instance.

The species listed in the Appendix or *populations of these species* could become threatened by this threatening process.

Vertebrates

Mammals

Acrobates pygmaeus, Feathertail Glider
Antechinus flavipes, Yellow-footed Antechinus
Antechinus swainsonii, Dusky Antechinus
Isoodon macrourus, Northern Brown Bandicoot
Perameles nasuta, Long-nosed Bandicoot
Petaurus breviceps, Sugar Glider
Pseudocheirus peregrinus, Common Ringtail Possum
Pseudomys novaehollandiae, New Holland Mouse
Pteropus scapulatus, Little Red Flying-fox
Rattus fuscipes, Bush Rat
Rattus lutreolus, Swamp Rat
Trichosurus caninus, Mountain Brushtail Possum
Trichosurus vulpecula, Common Brushtail Possum
Wallabia bicolor, Swamp Wallaby

Reptiles

Ctenophorus fordi
Ctenotus brachyonyx
Ctenotus ingrami
Morethia obscura
Proablepharus kinghorni
Delma australis
Gehyra dubia
Oedura monolis
Morelia spilota variegata

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Birds

- Climacteris picumnus victoriae*, Brown Treecreeper (eastern subspecies)
- Melanodryas cucullata cucullata*, Hooded Robin (south-eastern form)
- Melithreptus gularis*, Black-chinned Honeyeater
- Neophema bourkii*, Bourke's Parrot
- Pomatostomus temporalis temporalis*, Grey-crowned Babbler (eastern subspecies)
- Pyrrholaemus sagittata*, Speckled Warbler
- Stagonopleura guttata*, Diamond Firetail
- Strepera versicolor melanoptera*, Black-winged Currawong

Invertebrates

Insects

- Aryreus hyberius inconstans*
- Cooraboorama canberrae*
- Cressida cressida*
- Keyacris scurra*
- Laxabilla smaragdina*
- Lestis* spp. (carpenter bees)
- Ocbadistes knightorium*
- Ornithoptera richmondia*
- Perunga ochracea*
- Telicota eurychlora*
- Tomoceridae spp.
- Xanthorhoini (some species)

Plants

- Acacia fulva*
- Acianthus amplexicaulis*
- Amphibromus pithogastrus*
- Boronia fraseri*
- Boronia serrulata*
- Brasenia schreberi*
- Callistemon shiressii*
- Discaria pubescens*
- Eucalyptus luehmanniana*
- Eucalyptus michaeliana*
- Euphrasia ciliolata*
- Grevillea granulifera*
- Grevillea longifolia*
- Hibbertia nitida*
- Lomandra brevis*
- Tetratheca neglecta*
- Typhonium eliosurum*

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Ecological Communities

Grassy Woodland Communities

Riparian Communities

This list (Appendix 2) was compiled from a number of sources including the following:

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Final Determination

The Scientific Committee, established by the Threatened Species Conservation Act, has made a Final Determination to list the "Loss and/or degradation of sites used for hill-topping by butterflies" as a KEY THREATENING PROCESS on Schedule 3 of the Act. Listing of Key Threatening Processes is provided for by Part 2 of the Act.

The Committee previously made a Preliminary Determination regarding the "Loss of butterfly hill-topping sites". The Committee has decided that the "Loss and/or degradation of sites used for hill-topping by butterflies" is a more appropriate name for this Process.

The Scientific Committee has found that:

1. Hill-topping in butterflies is a very complex behaviour that often facilitates meeting of the sexes (Shields, 1967; Atkins, 1975; Common and Waterhouse, 1981; Baughman and Murphy, 1988; Sands, 1993; New, 1997; Newland, 1997). Hill-tops act as a focus for mating. Many butterfly species, especially in the families Hesperidae, Papilionidae and Lycaenidae appear to be obligatory hill-toppers and tend to congregate on hill or ridge tops that are usually higher than the surrounding countryside. The nature of the sites varies and a site may be as small as a few square metres or may cover several hectares, or display minor or very marked topographic relief. The same sites are used year after year, whilst apparently similar nearby sites may not be used. Sites do not necessarily provide nectar food sources for the butterflies nor food plants for the next generation of caterpillars. Hill-top aggregations are essential for continuity of the reproductive cycle of some butterfly species, and hill-top sites may constitute vital focal points for such aggregations. The importance of hill-topping sites is out of proportion to their extent, so that a small area can be vital to the survival of species over a larger area (Smithers 1996). Hill-topping is often found in species which seasonally or habitually have low density populations and which have a greater need to facilitate male - female encounters, such as in the drier areas of NSW (G. Newland pers. comm). Well known examples of butterfly hill-topping sites are Mt Warning, Razorback Lookout, Lions Lookout, Peates Mountain Mt Ramornie (all in northern NSW), Mt Sugarloaf, near Newcastle and Cook Trig in Wahroonga. The importance of butterfly hill-topping sites has been recognised in the nomination and listing of Mt Ramornie (Nymboidea Invertebrate Habitat), on the Register of the National Estate.
2. Hill-topping butterflies are almost entirely males that frequently take flights over the area. These flights follow a more or less set pattern, with 'patrolling' males investigating females that enter the area. Most of the females that fly to the hilltop are virgin. These females soon mate, and after mating leave the site to seek appropriate food plants, which may be several kilometres distant on which to lay their eggs.
3. Hill-top physiognomy is important to hill-topping butterfly species (Smithers, 1996; New 1997). Small changes in the appearance of a site can result in males not recognising it as a suitable site. Factors which determine whether a site is used or not can be quite subtle (Baughman and Murphy, 1998) so that changes causing butterflies to abandon the site can be

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quite small (Smithers 1996). Disturbance of plants on, or topography of, the hill-top, or to its slopes and immediate surroundings, may render it unsuitable to butterflies as a hill-topping site. In the absence of other hill-topping sites, butterflies may disappear entirely from a district. Loss of hill-top habitats throughout NSW would affect butterfly species which rely on such sites and some local extinctions have undoubtedly occurred due to hill-top alteration.

4. "Loss and/or degradation of sites used for hill-topping by butterflies" is one of a number of threats to butterflies in NSW. Loss of hill-topping sites due to habitat alteration (e.g. loss of vegetation for agriculture, urban development, forestry, tourist development, communication towers or power transmission lines), may lead to loss of perching or patrolling sites for male butterflies, loss of focal points for mating and thus local extinctions. For example, at Mt Sugarloaf, near Newcastle, since the installation of communication towers there has been a decline in numbers of hill-topping butterfly species and there is evidence of decline or local extinction of *Acrodipsas brisbanensis*, *Delias harpalyce*, *Delias nysa* and *Dendorix epyarbas* (A. Atkins pers. comm.). In Queensland, disturbance of a hill-topping site in Brisbane Forest Park appears to have led to the local extinction of several species (which also occur in NSW), *Hesperilla crypsigramma*, *Hypochrysops ignitus* and *A. brisbanensis* (D. Sands pers. comm.). The determination to list the butterfly community at Mt. Piper in Victoria as a Threatened Community under the Fauna and Flora Guarantee Act, 1988 (Jelinek et al., 1994), further recognises the importance of hill-topping.
5. Butterflies which hill-top in NSW and whose populations could become threatened if hilltopping sites were lost include: Hesperidae such as *Neohesperilla xanthomera* and *Hesperilla crypsigramma*; Lycaenidae such as *Acrodipsas arcana*, *Acrodipsas brisbanensis*, *Acrodipsas cuprea*, *Acrodipsas mortoni*, *Acrodipsas myrmecophila*, *Ogyris genoveva*, *Ogyris olane*, *Ogyris oretes*, *Deudorix epijarbas* and *Candalides cyprotus*; and Theclinae such as *Hypochrysops ignitus* and *Hypochrysops delica*.
6. In view of 1, 2, 3, 4, and 5 above, the Scientific Committee is of the opinion that the "Loss and/or degradation of sites used for hill-topping by butterflies" could cause butterfly species, populations and communities that are not threatened to become threatened.

Dr Chris Dickman
Chairperson
Scientific Committee

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