

Rare or threatened vascular plant species of Wollemi National Park, central eastern New South Wales.

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Abstract: Wollemi National Park (c. 32° 20'– 33° 30'S, 150°– 151°E), approximately 100 km north-west of Sydney, conserves over 500 000 ha of the Triassic sandstone environments of the Central Coast and Tablelands of New South Wales, and occupies approximately 25% of the Sydney Basin biogeographical region. 94 taxa of conservation significance have been recorded and Wollemi is recognised as an important reservoir of rare and uncommon plant taxa, conserving more than 20% of all listed threatened species for the Central Coast, Central Tablelands and Central Western Slopes botanical divisions. For a land area occupying only 0.05% of these divisions, Wollemi is of paramount importance in regional conservation.

Surveys within Wollemi National Park over the last decade have recorded several new populations of significant vascular plant species, including some sizeable range extensions. This paper summarises the current status of all rare or threatened taxa, describes habitat and associated species for many of these and proposes IUCN (2001) codes for all, as well as suggesting revisions to current conservation risk codes for some species.

For Wollemi National Park 37 species are currently listed as Endangered (15 species) or Vulnerable (22 species) under the New South Wales *Threatened Species Conservation Act 1995*. An additional 50 species are currently listed as nationally rare under the Briggs and Leigh (1996) classification, or have been suggested as such by various workers. Seven species are awaiting further taxonomic investigation, including *Eucalyptus* sp. 'Howes Swamp Creek' (Doherty 26), known from a single location within the park, and *Pultenaea* sp. (Olinda) from Dunns Swamp – both these species remain undescribed, but are listed as endangered species. After applying IUCN criteria to the 94 taxa, 2 are considered Critically Endangered; 11 are considered Endangered; 23 are considered Vulnerable; 3 are considered Near Threatened; 19 are considered Data Deficient; and 36 are considered of Least Concern. It is likely that additional highly restricted plant taxa await discovery in remote locations.

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Introduction

Wollemi National Park conserves over 500 000 ha of rugged, dissected sandstone country within the Greater Sydney area of New South Wales, covering approximately 25% of the Sydney Basin biogeographical region. Together with other nearby reserves, Wollemi forms part of the large, mostly unmodified expanse of sandstone landscapes of the Greater Blue Mountains World Heritage Area which collectively conserve an impressive diversity of flora and fauna habitats. After Kosciuszko National Park, Wollemi National Park is currently the second largest conservation reserve within New South Wales, and sizable sections have been declared as Wilderness under the New South Wales *Wilderness Act 1987* (Helman, Jones, Pigram & Smith 1976; Gold & Prineas 1978; National Parks & Wildlife Service 1996b).

The diversity of habitats in Wollemi is reflected in the total number of species recorded (c. 1600 species) and in the large number of rare or threatened vascular plant species recorded. For an idea of the richness of the non-vascular flora see Downing et al (2007). Systematic vegetation survey

undertaken in Wollemi over the past decade has revealed new records of rare, threatened or other significant plant taxa.

While there are a number of treatments of rare and threatened plant species within the Sydney Basin (eg: Briggs & Leigh 1996; James et al. 1999; Miller 2002; Fairley 2004), none have focused solely on Wollemi National Park. This paper aims to consolidate all records of significant taxa from the park, as well as to highlight the important role that Wollemi plays in the preservation of biodiversity in the Greater Sydney region. Information on associated species and habitat are provided where available, and in some cases population sizes are discussed.

Study Area

Wollemi National Park (c. 32° 20'– 33° 30'S, 150°– 151°E), is approximately 100 km north-west of Sydney (Figure 1), and forms part of an extensive system of relatively unmodified and interconnected sandstone landscapes, much of which is part of the Greater Blue Mountains World Heritage Area.

The Park is bounded in the north by the Hunter Valley floor, Goulburn River National Park, and the towns of Bulga, Jerrys Plains, Denman and Bylong; in the south by the Bells Line of Road, Blue Mountains National Park, and Bell, Bilpin and Kurrajong Heights; in the east by the Putty Road and Putty State Forest; and in the west by the cleared grazing lands of the Central Western Slopes, and the towns of Glen Alice, Kandos and Rylstone. Parts of the local government areas of Rylstone, Muswellbrook, Singleton, Hawkesbury, and Greater Lithgow occur within the park.

Environmental setting

Wollemi National Park falls within the Sydney Basin Biogeographic Region (of Thackway & Cresswell 1995), a region of dissected plateaus of Mesozoic sandstones and shales, supporting forests, woodlands and heaths on skeletal sandy and podzolic soils. Thackway and Cresswell (1995) indicated that over 10% of the land area (the maximum

category in that publication) within this region is reserved primarily for nature conservation, although the true figure is much higher than this. Indeed, there are currently over seventy conservation reserves within this region. Wollemi National Park, at just over half a million hectares, represents the largest of these reserves.

Wollemi is regionally situated between Goulburn River, Gardens of Stone, Blue Mountains, and Yengo National Parks, Pantoneys Crown Nature Reserve, and Parr State Conservation Area, and forms an integral link in the chain of protected natural lands surrounding the Sydney metropolitan area (National Parks & Wildlife Service 1996a). Important links through Wollemi connect the Sydney, Hunter, Tablelands, and Central Western Slopes landscapes. The large size of Wollemi National Park is reflected in the range of state botanical subdivisions (Anderson 1961) occurring. In Wollemi, four subdivisions, the North Coast, Central Coast, Central Western Slopes and Central Tablelands occur.



Fig. 1. Location of Wollemi National Park in central eastern New South Wales.

The interplay of these four botanical subdivisions with their differing climatic conditions provides floristically distinct areas, where elements of coastal, tablelands and western floras may be found in close proximity. In no other location in New South Wales are the influences of all three elements represented within one conservation reserve.

Climate

Extending from the drier western portions of the Hunter Valley, to the wetter and cooler tablelands of the Blue Mountains, Wollemi experiences a wide range of climatic variation. Principal influences on weather patterns are elevation, and proximity to coastal and continental influences. The weather patterns in the Hunter Valley, which encompasses the northern sections of the reserve are summarised Bridgeman (1984).

In elevation terms, Wollemi National Park can be bisected along a north-south axis, with the eastern half ranging between 100 and 500m ASL, and the western half between 500 and 1000m ASL. The eastern half is influenced more by coastal air masses moving along the New South Wales coastline, while the western sections are influenced by westerly moving continental air masses. More elevated areas, such as the basalt-capped mountains on the western side, are also subject to local orographic climatic affects.

Annual average monthly rainfall figures for Wollemi National Park are highly variable and directly reflect geographical location and elevation. The northern portions are typically very dry, ranging from maxima of 80–90 mm/month during summer at Kerrabee, Bylong, and Bulga, to as low as 25 mm/month during cooler periods (NPWS, pers. comm.). Annual figures for these three centres are approximately 650, 670 and 680 mm/year respectively, with 636 mm/year also reported for Jerrys Plains (Bureau of Meteorology 2008).

The western escarpment is also dry, with annual figures of 650, 700 and 625 mm/year for Olinda, Kandos, and Glen Alice, showing similar monthly maxima to the northern escarpment, but lows of 35–40 mm/month during winter. At Nullo Mountain, on the Central Tablelands near the central-west of the park, maximum falls of 170 mm in January contrast markedly to the <5 mm in April and August, although records have only been maintained at this station for a five year period. Annual figures here are reported as 730 mm/year, although they are likely to be considerably higher during wetter years (NPWS pers. comm.).

Along the eastern side of the park, higher rainfall is received from coastal air masses, with Howes Valley ranging from approximately 30–110 mm/month (July–January), and Colo Heights 40–130 mm/month (July–February). These stations have average annual figures of 805 and 1032 mm/year respectively (NPWS pers. comm.).

To the south and south-east, high rainfall is also received in the northern Blue Mountains. Bilpin, towards the south-

east, receives around 1300 mm annually, with maxima of 150–170 mm in January–February and minima of 68–76 mm in June–August. At nearby Kurrajong Heights, annual figures of 1253 mm are reported, with similar monthly ranges (Bureau of Meteorology 1998). Further west, Mt Wilson receives 1228 mm/year, with around 70 mm/month in August–September, to 153 mm/month in February, while Newnes State Forest in the south-west of the park receives 1073 mm/year (Bureau of Meteorology 2008). To the north of the Newnes Plateau, rainshadow effects are strongly evident, with lower rainfalls reported for the Capertee and Wolgan Valleys, and figures as low as 621 mm/year noted for Glen Alice, and 634 mm/year for Glen Davis (Bureau of Meteorology 1998). Similar figures generally continue north along the western escarpment of the park.

Seasonality of rainfall is generally consistent across most of the area, with the highest falls occurring between January and March, and the lowest in the July–August period (Bureau of Meteorology 2008). In some western districts, such as Olinda, seasonality is less pronounced but still apparent.

Average maximum and minimum temperatures also vary widely throughout the park. In the north at Jerrys Plains, average temperatures range from 3.7°–31.8° C (Bureau of Meteorology 1998), while Nullo Mountain in the west shows a range of 2.3°–23.7° C (NPWS pers. comm.). Ranges of 2°–28° C are provided by Ryan, Fisher and Schaeper (1996) for the St Albans 1:100 000 map sheet, which includes the south-eastern section of the park. In the south-west, the elevated Newnes Plateau and associated Central Tablelands exerts a strong influence on temperatures, with average maximum temperatures for January of 25.4° C for Lithgow, 23.2° C at Newnes State Forest, and 27° C in the Capertee Valley. Average minimum temperatures for July are 0.6° C at Lithgow and -0.8° C in Newnes State Forest. Glen Davis, on the western edge of the park, ranges from a minimum of 2.0° C in July, to a maximum of 30.3° C in January (Bureau of Meteorology 2008). The extreme south-western sections of the park (Newnes Plateau) may receive light snow falls for elevations above 1000m ASL (Bureau of Meteorology 2008).

Geology and soils

Wollemi National Park lies on the north-western edge of the Sydney Basin geological unit that stretches from Batemans Bay in the south, to the Hunter Valley in the north. The Sydney Basin Geological unit approximates the Sydney Basin Biogeographical Region of Thackway and Cresswell (1995). Wollemi National Park lies within the Blue Mountains Plateau structural unit of the Sydney Basin (Bembrick *et al.* 1973). This plateau rises from an elevation of 300 m ASL in the east, to around 1100 m ASL in the west; dramatic gradients in rainfall, temperature, relative humidity, and wind speed are associated with this rise. This area is commonly referred to as the Blue Mountains Dissected Sandstone Plateau, and

is characterised by dramatic valleys and cliffines. This part of the Sydney Basin also exhibits a tilting to the north-west, giving rise to dramatic cliff lines along the western escarpment of the park. The major geological types occurring in Wollemi National Park (listed from geologically oldest) are Permian sediments and coal measures, Triassic Narrabeen and Hawkesbury sandstones, and Wianamatta Shale, Tertiary basalt and Quaternary alluvium.

Permian sediments

The Illawarra and Singleton Coal Measures underlie the Triassic Sandstones, and outcrop in the western and northern fringes of the park. These outcrops occur only in gully situations, and typically produce steep talus slopes surmounted by sheer cliffs of the Triassic Sandstones. The Permian Sediments comprise a complex of shale, sandstone, conglomerate, tuff, chert, coal and torbanite seams (Brunker & Rose 1967), and are highly erodible. The coal seams in the Hunter Valley have been mined for high quality coal for many years.

Triassic Narrabeen Sandstones

The Triassic Narrabeen sediments occupy the majority of the park, and consist of multi-coloured chert sandstone, quartzose sandstone, shales and claystones (Brunker & Rose 1967). The thickness and extent of shale and claystone layers are highly variable, and in places give rise to flat plateaus and saddles. The shale bands allow undercutting erosion to produce incised valleys typical of the Blue Mountains Plateau.

Triassic Hawkesbury Sandstone

Triassic Hawkesbury Sandstone generally occurs in the south-eastern portions of the park around Colo, but extends a small way into the eastern edge of the park along the Lapstone Monocline (Branagan 1969). This sequence is primarily composed of quartz sandstone layers, with minor shale (Brunker & Rose 1967). Bembrick, Herbert and Clark (1991) indicate that the Hawkesbury Sandstone contains detrital grains averaging 68% quartz, 2% rock fragments and clay pellets, 1% feldspar and mica, 20% clay, 6% secondary quartz, and more than 4% siderite, and that the sandstone is dominantly medium to coarse-grained in texture, but varies from fine to very coarse grained. Mudstone facies, ranging from 0.5–3m in thickness also occur between sandstone beds (Bembrick, Herbert & Clark 1991).

Triassic Wianamatta Shale

Wianamatta Shale is restricted to a few isolated locations in the south-east of the park, such as along the Culoul Range, where it forms remnant caps over the Triassic Hawkesbury Sandstone, although it is more widespread on the Cumberland Plain in western Sydney. Only remnants of the Ashfield Shales (Bembrick, Herbert & Clark 1991) (hereafter referred to as Wianamatta Shale) occur within Wollemi.

Tertiary basalt

Small areas of Tertiary age basalt material occur in the park, particularly in the north-west (Brunker & Rose 1967). Such material may take the form of basalt caps, from large-scale volcanic surface flows (as on Mt Monundilla, Mt Coricudgy), to much smaller diatremes or dykes.

For the Hunter Valley area, Galloway (1967) indicates that a massive outpouring of basalt occurred during the Lower Tertiary period, followed by some minor volcanicity during the Pliocene or early Pleistocene. The many basalt caps currently present in the north-western sections of Wollemi represent remnants of this initial basalt flow. Galloway (1967) cites thicknesses of these flows of up to 150m for Mt Coricudgy, and possibly 230m on Kerry Mountain.

Further south, occurrences of basalt and related material are less common, and more typically consist of diatremes and dykes. Brownlow et al. (1991) describe three diatremes north of Kurrajong (the Bull Ridge, Tennyson and Diamond Hill diatremes), near the Wollemi National Park boundary, stating their composition to be volcanic breccia and alkali-olivine basalt. In contrast to diatremes, no volcanic dykes are apparent west of the Lapstone Monocline, although this may be a reflection of the ruggedness of the topography and the lack of detailed survey (Brownlow et al. 1991).

Quaternary Alluvium

Small areas of Quaternary Alluvium occur commonly along river valleys across most of Wollemi. Such alluvial material typically consists of varying compositions of gravel, sand, silt and clay (Brunker & Rose 1967). Larger instances of alluvium also occur in the Mellong Swamps and Garland Valley areas, where deep sands have accumulated over a clay sub-soil layer, producing a distinctly different environment (Henry 1987; Riley & Henry 1987).

Methods

As part of the reserve management program for Wollemi National Park, flora survey and vegetation mapping was undertaken for the NSW National Parks and Wildlife Service (NPWS) in 1997–98 (Bell 1998) (a revision of that work is currently underway with the NSW Department of Environment and Climate Change). The 1997–98 floristic field surveys of Wollemi National Park (covering over 200 sites), included a large number of new records of rare or threatened plant species (incorporated into the survey report of Bell 1998). Subsequent forays into the park for various survey and mapping projects have resulted in additional records which have now been amalgamated and incorporated with databases (eg: DECC Atlas) and the taxonomic literature.

All rare or threatened taxa recorded within Wollemi National Park, i.e. listed under the Commonwealth *Environment Protection and Biodiversity Conservation* (EPBC) Act (1999) or NSW *Threatened Species Conservation* (TSC) Act

Table 1. Conservation Risk Codes of Briggs and Leigh (1996)

| Code | |
|----------------------|---|
| Distribution | |
| 1 | known from one collection only. |
| 2 | geographical range in Australia less than 100km. |
| 3 | geographical range in Australia greater than 100km. |
| Conservation status | |
| X | Presumed Extinct: not collected or otherwise verified over the past 50 years despite thorough searching in all known or likely habitats, or of which all known wild populations have been destroyed more recently. |
| E | Endangered: in serious risk of disappearing from the wild within 10–20 years if present land use and other threats continue to operate. This category includes taxa with populations possibly too small (usually less than 100 individuals) to ensure survival even if present in proclaimed reserves. |
| V | Vulnerable: not presently Endangered, but at risk over a longer period (20–50 years) of disappearing from the wild through continued depletion, or which occurs on land whose future use is likely to change and threaten its survival. |
| R | Rare: rare in Australia (and hence usually in the world) but which currently does not have any identifiable threat. Such species may be represented by a relatively large population in a very restricted area or by smaller populations spread over a wide range or some intermediate combination of distribution pattern. |
| K | Poorly Known: suspected, but not definitely known, to belong to one of the above categories. At present, accurate field distribution information is inadequate. |
| C | Reserved: has at least one population within a national park, other proclaimed conservation reserve or in an area otherwise dedicated for the protection of flora. The taxon may or may not be considered adequately conserved within the reserve(s), as reflected by the conservation status assigned to it. Where applicable, the 'C' symbol immediately follows the conservation status symbol in the written code, eg 2RC. |
| Reserved populations | |
| a | 1000 plants or more are known to occur within a conservation reserve(s). |
| i | less than 1000 plants are known to occur within a conservation reserve(s). |
| - | reserved population size is not accurately known. |
| t | total known population reserved |
| + | overseas occurrence (included if the taxon has a natural occurrence overseas). |

Table 2. IUCN Red List Categories (IUCN 2001).

| | |
|--|----|
| Extinct | EX |
| there is no reasonable doubt that the last individual has died. A taxon is presumed extinct when exhaustive surveys in known and/or expected habitat, at appropriate times (diurnal, seasonal, annual), throughout its historic range have failed to record an individual. Surveys should be over a time frame appropriate to the taxon's life cycle and life form. | |
| Extinct in the Wild | EW |
| known only to survive in cultivation, in captivity or as a naturalized population (or populations) well outside the past range. A taxon is presumed Extinct in the Wild when exhaustive surveys in known and/or expected habitat, at appropriate times (diurnal, seasonal, annual), throughout its historic range have failed to record an individual. Surveys should be over a time frame appropriate to the taxon's life cycle and life form. | |
| Critically Endangered | CR |
| the best available evidence indicates that it meets any of the criteria A to E for Critically Endangered, and it is therefore considered to be facing an extremely high risk of extinction in the wild. | |
| Endangered | EN |
| the best available evidence indicates that it meets any of the criteria A to E for Endangered, and it is therefore considered to be facing a very high risk of extinction in the wild. | |
| Vulnerable | VU |
| the best available evidence indicates that it meets any of the criteria A to E for Vulnerable, and it is therefore considered to be facing a high risk of extinction in the wild. | |
| Near Threatened | NT |
| it has been evaluated against the criteria but does not qualify for Critically Endangered, Endangered or Vulnerable now, but is close to qualifying for or is likely to qualify for a threatened category in the near future. | |
| Least Concern | LC |
| it has been evaluated against the criteria and does not qualify for Critically Endangered, Endangered, Vulnerable or Near Threatened. Widespread and abundant taxa are included in this category. | |
| Data Deficient | DD |
| there is inadequate information to make a direct, or indirect, assessment of its risk of extinction based on its distribution and/or population status. A taxon in this category may be well studied, and its biology well known, but appropriate data on abundance and/or distribution are lacking. Data Deficient is therefore not a category of threat. Listing of taxa in this category indicates that more information is required and acknowledges the possibility that future research will show that threatened classification is appropriate. It is important to make positive use of whatever data are available. In many cases great care should be exercised in choosing between DD and a threatened status. If the range of a taxon is suspected to be relatively circumscribed, and a considerable period of time has elapsed since the last record of the taxon, threatened status may well be justified. | |
| Not Evaluated | NE |
| has not yet been evaluated against the criteria. | |

(1995), or as a ROTAP species (Briggs & Leigh 1996) have been identified. For each species, information on location within Wollemi National Park, habitat, potential threats and conservation status were tabulated. Where possible, habitat information has been drawn directly from field survey information and includes commonly associated species. The information has been discussed with relevant botanical experts, particularly those at the National Herbarium of New South Wales in Sydney. Extensive herbarium searches or examination of archival material has not been undertaken. Table 1 summarises the conservation risk codes of Briggs and Leigh (1996).

The conservation assessment scheme developed by the International Union for Conservation of Nature (IUCN) is now being widely accepted and increasingly used in NSW particularly for assessment under the *TSC Act*. With the exception of *Wollemia nobilis* (listed as CR D on the current IUCN Red List) there are no published IUCN codings for any of the Wollemi National Park species listed here. Codings developed under IUCN rules are given in Table 2. Coding for species have been determined by examining each against the criteria of IUCN (2001), utilising the available information on known distribution and populations throughout their entire geographical range, habitat and potential threats within that habitat, plant habit and known reproductive traits, and known population sizes.

Results

For Wollemi National Park, 94 taxa are currently regarded as rare or threatened. These are listed in Table 3, with their current conservation status, under the Commonwealth *Environment Protection & Biodiversity Conservation* (EPBC) Act, and the NSW *Threatened Species Conservation* (TSC) Act, which provide legislative protection, and as the conservation risk code scheme presented in Briggs and Leigh (1996).

Fifteen species are currently listed as Endangered and 22 as Vulnerable under the NSW TSC Act. An additional 50 species are currently listed as nationally rare under the Briggs and Leigh (1996) ROTAP classification (Table 1), or have been suggested as such by various workers. Seven species are awaiting further taxonomic investigation, including *Eucalyptus* sp. 'Howes Swamp Creek' (Doherty 26), known from a single location within the park, and *Pultenaea* sp. (Olinda) from Dunns Swamp – both these species remain undescribed, but are listed as endangered species.

Proposed IUCN codings are provided in Table 3. After applying IUCN criteria to the 94 taxa, 2 are considered Critically Endangered; 11 are considered Endangered; 23 are considered Vulnerable; 3 are considered Near Threatened; 19 are considered Data Deficient; and 36 are considered of Least Concern. For some species currently listed as Endangered (eg: *Apatophyllum constablei*) or Vulnerable (*Eucalyptus cannonii*) on the EPBC Act, recently acquired survey data has suggested that these are now of relatively little concern with respect to conservation priorities.

Rare or threatened plant species of Wollemi National Park

1. *Acacia asparagoides* A. Cunn. (Fabaceae: Mimosoideae)

Distribution within Wollemi – a single DECC Atlas record from 1965 for the Glen Davis area, in the south-west of the park.

Habitat – Tame (1992) indicates that this species occurs on sandstone plateaus in heath and open forest in the upper and northern Blue Mountains. Douglas and Bell (in prep.) have recorded this species within open forest dominated by *Eucalyptus sieberi* and *Eucalyptus piperita* in the higher Blue Mountains.

Threats – no threats identified.

Conservation Status – populations also present within Blue Mountains National Park (pers. obs.). Benson and Keith (1990) report populations in the Blackheath and Newnes Plateau areas, which may be contiguous with the Glen Davis record.

EPBC Act not listed; TSC Act not listed; IUCN (2001) LC (proposed); ROTAP: 2R

2. *Acacia bulgaensis* Tindale & Stuart J. Davies (Fabaceae: Mimosoideae) Bulga Wattle

Distribution within Wollemi – occurs in the north-east of Wollemi, mainly where it adjoins Yengo NP, around Bulga and Milbrodale, and south along the Putty Road.

Habitat – varies from an exposed low open woodland or forest where *Acacia bulgaensis* clearly dominates the vegetation, to being occasional in better structured open forest. Maryott-Brown and Wilks (1993) describe the habitat as occupying crests and upper slopes of Narrabeen Sandstone ridges, where it is commonly found in dry sclerophyll woodland with *Eucalyptus punctata* and *Eucalyptus fibrosa*, over an understorey of *Backhousia myrtifolia* and *Choretrum* sp. A, and various herb and grass species.

Threats – frequent fire events may exhaust seed banks rendering local extinction.

Conservation Status – also known from adjoining Yengo NP (Tindale, Kodala & Davies 1992; Maryott-Brown & Wilks 1993). A revised conservation risk code of 2RCa has been suggested by Bell (2001), on the basis that well over 1000 plants are known from conservation reserves.

EPBC Act: not listed; TSC Act: not listed; IUCN (2001): LC (proposed); ROTAP: 2RC–; 2RCa (Bell 2001)

3. *Acacia bynoeana* Benth. (Fabaceae: Mimosoideae) Tiny Wattle

Distribution within Wollemi – single record for the Morans Rocks area in the south-east, where three plants were observed in 1999 (DECC Atlas). Given the tendency for further populations and greater population sizes to be uncovered with targeted survey, there is some potential that greater numbers are present within the park. New populations have recently been discovered in the western parts of the adjacent Yengo NP near Colo Heights (pers. obs.).

Habitat – Fairley (2004) describes a habitat of sandy clay soils often containing ironstone gravels, in open forest and shrubland, usually on ridge tops. Recently recorded populations in the adjacent Yengo NP occur in scrub dominated by *Angophora hispida*, *Petrophile pulchella*, *Leptospermum trinervium*, *Leucopogon attenuatus*, *Banksia serrata*, *Grevillea buxifolia*, *Hakea laevipes* subsp. *laevipes* and *Pimelea linifolia* subsp. *linifolia*, over a ground layer of *Ptilothrix deusta*, *Lomandra glauca*, *Cyathochaeta diandra*, *Entolasia stricta*, *Phyllanthus hirtellus*, *Schoenus imberbis* and *Xanthorrhoea resinifera*.

Threats – inadvertent road maintenance and widening.

Table 3. Rare or threatened plant species known from Wollemi National Park. IUCN codes are as listed in the IUCN Red List Database 2006. ROTAP codes shown within “[]” represent codes recommended by various authors, and are not shown as such within Briggs and Leigh (1996). * = recovery plan prepared.

IUCN Codes: Critically Endangered = CR; Endangered = EN; Vulnerable = VU; Near Threatened = NT; Least Concern = LC; Data Deficient = DD (IUCN 2001).

| Species number in text | Species | EPBC Act | NSW TSC Act | IUCN (2001) | Briggs & Leigh (1996) | | |
|------------------------|---|----------|-------------|-------------|-----------------------|-------------|----------|
| | | | | | Proposed | Current | Proposed |
| 1 | <i>Acacia asparagoides</i> | | | LC | 2R | - | |
| 2 | <i>Acacia bulgaensis</i> | | | LC | 2RC- | - | |
| 3 | <i>Acacia bynoeana</i> | V | E | NT | 3VC- | - | |
| 4 | <i>Acacia flocktoniae</i> | V | V | LC | 2VC- | - | |
| 5 | <i>Acacia fulva</i> | | | LC | 2RC- | 2RCa | |
| 6 | <i>Acacia gordonii</i> | E | E | NT | 2K | - | |
| 7 | <i>Acacia matthewii</i> | | | LC | 3RC- | - | |
| 8 | <i>Acacia pubescens</i> | V | V | VU A2bc | 3VCa | - | |
| 9 | <i>Acacia subtilinervis</i> | | | LC | 3RCa | - | |
| 10 | <i>Almaleea incurvata</i> | | | LC | 2RC-t | 2RC- | |
| 11 | <i>Apatophyllum constablei</i> | E | | LC | 2EC- | 2RCa | |
| 12 | <i>Asterolasia elegans</i> | E | E | EN C2b | 2Eca | - | |
| 13 | <i>Atkinsonia ligustrina</i> | | | LC | 2RCa | - | |
| 14 | <i>Baeckea kandos</i> | E | E | EN D1 | 2RC-t | - | |
| 15 | <i>Banksia penicillata</i> | | | LC | 3RC- | - | |
| 16 | <i>Blechnum gregsonii</i> | | | DD | 2RCa | - | |
| 17 | <i>Boronia barkeriana</i> subsp. <i>barkeriana</i> | | | DD | - | [2RC-] | |
| 18 | <i>Boronia floribunda</i> | | | LC | - | [2RC-] | |
| 19 | <i>Boronia fraseri</i> | | | LC | 2RCa | - | |
| 20 | <i>Boronia rubiginosa</i> | | | LC | 2RCa | - | |
| 21 | <i>Brasenia schreberi</i> | | | DD | 3RC-+ | - | |
| 22 | <i>Callistemon shiressii</i> | | | LC | 3RC- | - | |
| 23 | <i>Cynanchum elegans</i> | E | E | VU D2 | 3ECi | - | |
| 24 | <i>Cyphanthera scabrella</i> | | | DD | 2RC- | - | |
| 25 | <i>Darwinia peduncularis</i> | | V | LC | 3RCi | - | |
| 26 | <i>Diuris</i> sp. aff. <i>punctata</i> (Colo River) | | | DD | - | 2KC | |
| 27 | <i>Epacris coriacea</i> | | | VU D2 | 3RC- | - | |
| 28 | <i>Epacris muelleri</i> | | | VU D2 | 3RC- | - | |
| 29 | <i>Eucalyptus aenea</i> | | | VU D2 | 2RC | [2RC-] | |
| 30 | <i>Eucalyptus bensonii</i> | | | VU D2 | 2RC-t | - | |
| 31 | <i>Eucalyptus burgessiana</i> | | | VU D2 | 2RCa | - | |
| 32 | <i>Eucalyptus cannonii</i> | V | V | LC | 2VCi | [2RCa] | |
| 33 | <i>Eucalyptus corticosa</i> | | V | VU D2 | - | 2VC- | |
| 34 | <i>Eucalyptus fergusonii</i> subsp. <i>dorsiventralis</i> | | | LC | 2RC- | - | |
| 35 | <i>Eucalyptus gregsoniana</i> | | | DD | 3RCa | - | |
| 36 | <i>Eucalyptus hypostomatica</i> | | | LC | 3RC- | - | |
| 37 | <i>Eucalyptus prominula</i> | | | LC | 2KC- | - | |
| 38 | <i>Eucalyptus</i> sp. aff. <i>eugenioides</i> (Bees Nest Ridge) | | | DD | - | 3KC | |
| 39 | <i>Eucalyptus</i> sp. 'Howes Swamp Creek' (Doherty 26) | E | E | CR D1 | 2ECi | - | |
| 40 | <i>Gonocarpus longifolius</i> | | | LC | 3RC- | [3RCa] | |
| 41 | <i>Grevillea evansiana</i> | V | V | LC | 2VC- | 2VCa | |
| 42 | <i>Grevillea johnsonii</i> | | | LC | - | 2RCi [2RCa] | |
| 43 | <i>Grevillea montana</i> | | | LC | 2KC- | [2RCa] | |
| 44 | <i>Grevillea obtusiflora</i> subsp. <i>obtusiflora</i> | E | E | VU D1+2 | 2E | - | |
| 45 | <i>Gyrostemon thesioides</i> | | E | EN D1 | - | 2EC | |
| 46 | <i>Haloragodendron gibsonii</i> | E | E | EN D1 | 2Rcat | - | |

| Species number in text | Species | EPBC Act | NSW TSC Act | IUCN (2001) | Briggs & Leigh (1996) | | |
|------------------------|--|----------|-------------|-----------------|-----------------------|---------------|----------|
| | | | | | Proposed | Current | Proposed |
| 47 | <i>Homoranthus cernuus</i> | | | LC | 2RCa | - | |
| 48 | <i>Isotropis foliosa</i> | | | VU D2 | 3KC- | - | |
| 49 | <i>Kennedia retrorsa</i> | V | V | DD | 2VCa | 2VCi | |
| 50 | <i>Keraudrenia corollata</i> var. <i>denticulata</i> | | | DD | 3RC- | - | |
| 51 | <i>Leionema lamprophyllum</i> subsp. <i>orbiculare</i> | | | DD | - | [2R-] | |
| 52 | <i>Leionema scopulinum</i> | | | VU D2 | - | [2RCit] | |
| 53 | <i>Leionema sympetalum</i> | V | V | NT | 2VC- | - | |
| 54 | <i>Leionema</i> sp. 'Colo River' (Weston 2423) | | | DD | - | [2VC-] | |
| 55 | <i>Leptospermum spectabile</i> | | | VU D1+2 | 2RC- | 2RCt | |
| 56 | <i>Leucochrysum graminifolium</i> | | | LC | 2R | 2RC- | |
| 57 | <i>Lissanthe sapida</i> | | | LC | 3RCa | - | |
| 58 | <i>Lomandra fluviatilis</i> | | | LC | 3RCa | - | |
| 59 | <i>Macrozamia elegans</i> | | | EN A2ad | - | [2VC-] | |
| 60 | <i>Melaleuca deanei</i> | V | V | VU C2(ai) | 3RC- | - | |
| 61 | <i>Melaleuca groveana</i> | | V | VU C2(ai); D2 | - | 3RC- | - |
| 62 | <i>Olearia cordata</i> | V | V | VU B1; C2b | - | 2VCi | - |
| 63 | <i>Olearia quercifolia</i> | | | LC | 3RC- | - | |
| 64 | <i>Ozothamnus tessellatus</i> | V | V | VU B1 | 2VC- | - | |
| 65 | <i>Pentachondra dehiscens</i> | | | VU D2 | - | [3RC] | |
| 66 | <i>Persoonia hirsuta</i> var. <i>evoluta</i> | E | E | EN B1 | 3Kci | - | |
| 67 | <i>Persoonia marginata</i> | V | V | EN B1 | 2V | - | |
| 68 | <i>Philothea obovalis</i> | | | LC | 3RCa | - | |
| 69 | <i>Pimelea curviflora</i> var. <i>curviflora</i> | V | V | EN B1 | - | 2VC- | |
| 70 | <i>Platysace clelandii</i> | | | LC | 2RCa | - | |
| 71 | <i>Pomaderris bodalla</i> | | V | VU D2 | - | [2R] | |
| 72 | <i>Pomaderris brunnea</i> | V | V | DD | 2VC- | - | |
| 73 | <i>Pomaderris pauciflora</i> | | | DD | 3RC- | - | |
| 74 | <i>Pomaderris precaria</i> | | | VU D1 | - | [2VC-] [2EC-] | |
| 75 | <i>Pomaderris sericea</i> | V | E | EN D1 | 3VCi | - | |
| 76 | <i>Pomaderris</i> sp. aff. <i>nitidula</i> (Glen Gallic) | | | DD | - | 2KC | |
| 77 | <i>Prostanthera cryptandroides</i> | V | V | VU D2 | 2RC-t | [2VC-] | |
| 78 | <i>Prostanthera discolor</i> | V | V | VU D2 | 2VC- | - | |
| 79 | <i>Prostanthera hindii</i> | | | LC | 2KC- | - | |
| 80 | <i>Prostanthera</i> sp. A (Rylstone) | | | DD | - | 2KC- | |
| 81 | <i>Prostanthera</i> sp. aff. <i>rotundifolia</i> . (Mt Iris) | | | DD | - | 2KC- | |
| 82 | <i>Prostanthera stricta</i> | V | V | VU D2 | 2V | - | |
| 83 | <i>Pseudanthus divaricatissimus</i> | | | LC | 3RCa | - | |
| 84 | <i>Pultenaea glabra</i> | V | V | DD | 3VCa | - | |
| 85 | <i>Pultenaea</i> sp. (Olinda) | | E | EN B1 | - | 2EC- | |
| 86 | <i>Rulingia hermannifolia</i> | | | LC | 3RCa | - | |
| 87 | <i>Rulingia</i> sp. aff. <i>dasyphylla</i> (Goulburn River Valley) | | | DD | - | 2KC | |
| 88 | <i>Rupicola ciliata</i> | | | LC | 2RC-t | - | |
| 89 | <i>Rupicola decumbens</i> | | | LC | 2RC- | - | |
| 90 | <i>Swainsona recta</i> | E | E | DD | 3ECi | - | |
| 91 | <i>Tetratea glandulosa</i> | V | V | LC | 2VC- | - | |
| 92 | <i>Velleia perfoliata</i> | V | V | VU B2ac(iv); D1 | - | 2VC- | - |
| 93 | <i>Wollemia nobilis</i> | E | E | [CR D] | 2Ecit | - | |
| 94 | <i>Zieria involucrata</i> | V | E | EN A1a; B12VCa | - | - | |

Conservation Status – *Acacia bynoeana* extends from the Sydney area north to Cessnock (Kodala & Harden 2002; pers obs.). Briggs and Leigh (1996) noted conserved populations present in Blue Mountains and Royal NPs. Several other reserved populations are now known in Yengo, Marramorra and Popran NPs, Lake Macquarie State Conservation Area, and Castlereagh, Dharawal and Agnes Banks Nature Reserves (NSW Scientific Committee 1999; James 1997). Large populations are also present in the Cessnock area of the Hunter Valley, but none of these are currently present in conservation reserves (Bell & Driscoll 2007). Driscoll (2006) summarises all available information on this species.

EPBC Act: Endangered; TSC Act: Endangered; IUCN (2001): NT (proposed); ROTAP: 3VC-

4. *Acacia flocktoniae* Maiden (Fabaceae: Mimosoideae)

Distribution within Wollemi – historical record for the Coxs Gap area in the north of Wollemi from 1968, but possibly in error since this locality occurs well north of its accepted range (Mt Wilson to Picton). No indication of this species was noted during survey in this area (Bell 1998), nor of the adjacent Goulburn River NP (Hill 1999). A collection was made from the sandstone hills around Mellong Swamps in the east of the park (Doherty 1985). New collections are required to confirm its presence within the park.

Habitat – no information available.

Threats – no threats identified.

Conservation Status – Briggs and Leigh (1996) stated that this species is conserved only within Blue Mountains NP. Fisher et al. (1995) also record it for Yerranderie, most likely within Yerranderie State Conservation Area and the Blue Mountains World Heritage Area.

EPBC Act: Vulnerable; TSC Act: Vulnerable; IUCN (2001): LC (proposed); ROTAP: 2VC-

5. *Acacia fulva* Tindale (Fabaceae: Mimosoideae) Soft Wattle

Distribution within Wollemi – known from “California” and “Winter’s Run” in the north-east of the park, in both cases associated with isolated basalt soils.

Habitat – At both locations, *Acacia fulva* clearly dominates the area, and is regenerating profusely following the cessation of grazing practices. *Eucalyptus moluccana*, *E. tereticornis* and *E. punctata* dominate the canopy on basalt soils, over a grassy understorey with scattered shrubs. In nearby areas on Narrabeen Sandstone soils, dense stands of *Acacia fulva* are also present in open forest of *Eucalyptus sparsifolia* and *E. punctata*, over a dense understorey of *Podolobium ilicifolium*, *Acacia prominens*, *Acacia filicifolia*, *Indigofera australis* and *Commersonia fraseri*. Smaller populations can be found up to several kilometres from the basalt soils, within the wider *Eucalyptus sparsifolia* – *E. punctata* open forest that dominates this part of the park. Based on observations made in mid-2005, many thousands of *Acacia fulva* individuals are present within Wollemi NP, with considerable germination evident following wildfires in the last decade. In some of the denser areas of regrowth, between 10 and 15 stems per square metre are present across an area of at least 1 ha. Maryott-Brown and Wilks (1993) indicated that in the adjacent Yengo NP, *Acacia fulva* also occurs on basalt-derived soils in open forest dominated by *Eucalyptus tereticornis* and *E. moluccana*. They also documented its presence within a sheltered forest of *Angophora floribunda* and *Allocasuarina torulosa*, with *Acacia fulva* and *Backhousia myrtifolia* dominating the shrub layer, and *Adiantum aethiopicum* and *Oplismenis imbecillis* in the groundlayer.

Threats – frequent fire events may exhaust seed banks.

Conservation Status – Briggs and Leigh (1996) list this species as occurring in unknown population sizes within Wollemi NP, while Maryott-Brown and Wilks (1993) detail the species’ occurrence in Yengo NP. In view of the large populations evident within Wollemi, together with the likelihood of high numbers of seed present within



Fig. 2. *Acacia bulgaensis* (illustration by Don Fortescue)



Fig. 3. *Acacia bynoeana* (illustration by C. Wardrop 2001)

the soil seedbank, a revision to the conservation risk code to 2RCa is suggested.

EPBC Act: not listed; *TSC Act*: not listed; *IUCN (2001)*: LC (proposed); *ROTAP*: 2RC-; 2RCa (proposed)

6. *Acacia gordonii* (Tind.) Pedley (Fabaceae: Mimosoideae)

Distribution within Wollemi – occurs only above Wheeny Creek near Bilpin in the extreme south of the park; other populations occur within the nearby Blue Mountains NP (1985 record, DECC Atlas).

Habitat – Tame (1992) describes habitat for this species as dry heath in eucalypt woodland, usually on shallow sandy soil among sandstone outcrops, while James *et al.* (1999) indicate rocky platforms on ridgetops and rocky spurs of Hawkesbury Sandstone, often with a clay influence. Fairley (2004) also includes lateritic influences near rocky outcrops.

Threats – no threats identified.

Conservation Status – James (1997) notes that this species is not protected in any other conservation reserve.

EPBC Act: Endangered; *TSC Act*: Endangered; *IUCN (2001)*: NT (proposed); *ROTAP*: 2K

7. *Acacia matthewii* Tindale & Stuart J. Davies (Fabaceae: Mimosoideae) Matthew's Wattle

Distribution within Wollemi – occurs in the west of the park, around Rylstone and Kandos, further south near Capertee and the Newnes Plateau, and in Howes Valley area to the east (Tindale, Kodela & Davies 1992).

Habitat – Tindale, Kodela & Davies (1992) indicate that this species occurs in sandy soil on sandstone ridges or steep rocky hillsides, especially on the northern faces at the head of creeks, at the margins of wet sclerophyll forest, and also on Narrabeen Sandstone shale lenses. Tame (1992) more broadly states “eucalypt forests and woodlands in hilly country on well drained soils”, and Fairley (2004) includes steep rocky hillsides, especially on north-facing heads of creeks, at margins of wet sclerophyll forest, or in shale deposits.

Threats – no threats identified.

Conservation Status – Briggs and Leigh (1996) list this species as occurring in Wollemi, Yengo and Dharug NPs. Washington (2001a) also notes a record of this species for the Wolgan Pinnacle area of Gardens of Stone NP.

EPBC Act: not listed; *TSC Act*: not listed; *IUCN (2001)*: LC (proposed); *ROTAP*: 3RC-

8. *Acaciapubescens* (Vent.) R.Br. (Fabaceae: Mimosoideae) Downy Wattle

Distribution within Wollemi – recorded in 1993 in the Mountain Lagoon area in the south-east; also in the Mt Popong area in the north-east (DECC Atlas). A 1980s population estimate of over 2000 plants at Mountain Lagoon has not been recently substantiated; however numbers are likely to fluctuate with fire history. The small number of reported records for Wollemi suggest that the species is inadequately conserved in this park, however as with many wattles it is likely that population numbers will fluctuate widely following disturbances such as fire.

Habitat – Maryott-Brown and Wilks (1993) indicate that the Mountain Lagoon population occurs on Hawkesbury Sandstone, in vegetation dominated by *Eucalyptus punctata* and *Corymbia gummifera*. In western Sydney, *Acacia pubescens* occurs in clay soils, often associated with gravels and ironstones (James *et al.* 1999).

Threats – road widening and maintenance, weed invasion, low genetic variability due to isolated populations, inappropriate fire regimes, hybridisation, mechanical removal, disease, rubbish dumping (NPWS 2003a).

Conservation Status – Briggs and Leigh (1996) state that this species is adequately represented within Wollemi NP, while Latham (1995) and James (1997) indicate that the species is also present in Scheyville NP and Windsor Downs Nature Reserve, and in Hoxton Park Reserve, all three occurring in western Sydney.

EPBC Act: Vulnerable; *TSC Act*: Vulnerable; *IUCN (2001)*: VU A2bc (proposed); *ROTAP*: 3VCa

9. *Acacia subtilinervis* F.Muell. (Fabaceae: Mimosoideae)

Distribution within Wollemi – recorded only above Rocky Creek (near Wolgan) in the west of the park (1970 record, DECC Atlas).

Habitat – Kodela and Harden (2002) state that this species grows in heath and dry sclerophyll forest on rocky outcrops, on the ranges south from the Wolgan River, and on the coast south from Nowra. Tame (1992) indicates that this species grows in gravelly soils in eucalypt forests and woodlands, and is rare in both NSW and Victoria.

Threats – no threats identified.

Conservation Status – Briggs and Leigh (1996) list this species as occurring in Tarlo River, Morton, Deua, Morton, Wadbilliga, and Snowy River NPs, all well to the south of Wollemi NP.

EPBC Act: not listed; *TSC Act*: not listed; *IUCN (2001)*: LC (proposed); *ROTAP*: 3RCa

10. *Almaleea incurvata* (Cunn.) Crisp & P. Weston (Fabaceae: Faboideae)

Distribution within Wollemi – in the south-west around the Newnes Plateau and adjacent areas, and in the south-east near the Culoul Range in 2004 (DECC Atlas).

Habitat – Typical habitat in the south-west includes areas of localised impeded drainage, supporting hanging swamps of *Leptospermum squarrosum*, *Lepidosperma forsythii*, *Lepyrodia scariosa*, *Epacris obtusifolia*, *Sphaerolobium minus*, *Epacris microphylla* var. *microphylla*, *Grevillea evansiana*, *Dampiera stricta*, *Lycopodium laterale*, *Baumea rubiginosa*, *Boronia microphylla*, *Gleichenia dicarpa* and *Pultenaea canescens*. Benson and Keith (1990) have suggested that the location and orientation of these hanging swamps is related to the Deanes Creek and Happy Valley Lineaments which dominate the hydrology of parts of the Newnes Plateau.

Threats – draining of swamp habitat, pollution.

Conservation Status – Briggs and Leigh (1996) list this species as occurring only in Blue Mountains NP. Other records of *Almaleea incurvata* for urban areas of the Blue Mountains (Douglas & Bell in prep.), as well as within conservation reserves; the conservation risk code should be amended to 2RC-.

EPBC Act: not listed; *TSC Act*: not listed; *IUCN (2001)*: LC (proposed); *ROTAP*: 2RC-t; 2RC- (proposed)

11. *Apatophyllum constablei* McGillivray (Celastraceae)

Distribution within Wollemi – restricted to the hills around Glen Davis in the southwest. Thirty-two populations are known in this area, each supporting between 10 and 400+ plants (S. Clarke, pers. comm. 2006). Briggs and Leigh (1996) indicate species is known only from this part of Wollemi NP.

Habitat – Associated species at one location in Running Stream catchment south of Gaspers Mountain included a canopy of *Eucalyptus considensiana* and *Eucalyptus piperita*, over a scattered shrub layer of *Banksia spinulosa* var. *spinulosa*, *Leptospermum sphaerocarpum*, *Pimelea linifolia*, *Eriostemon hispidulus*, *Bossiaea rhombifolia* subsp. *rhombifolia*, *Hibbertia acicularis*, *Pultenaea echinula*, *Lasiopetalum parviflorum*, *Kunzea ambigua*, *Monotoca scoparia* and *Grevillea sericea*. Ground layer vegetation included *Entolasia stricta*, *Dampiera stricta*, *Patersonia glabrata*, *Poranthera ericifolia*, *Patersonia sericea*,



Fig. 4. *Acacia flocktoniae* (illustration by C. Wardrop 2001)

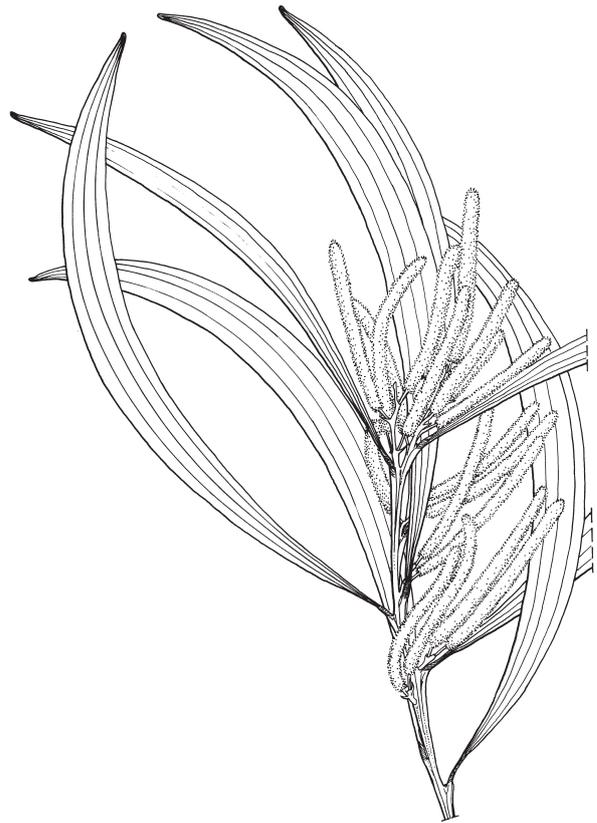


Fig. 6. *Acacia matthewii* (illustration by Don Fortescue)

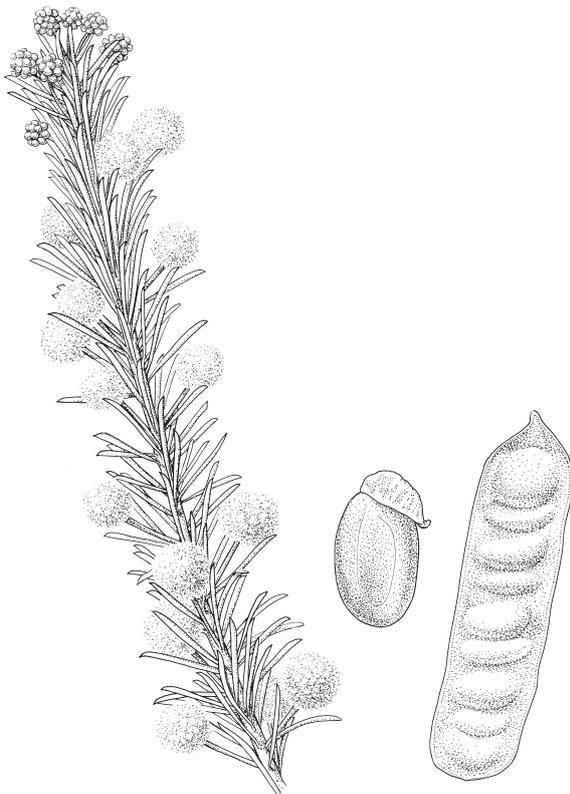


Fig. 5. *Acacia gordonii* (illustration by C. Wardrop 2001)

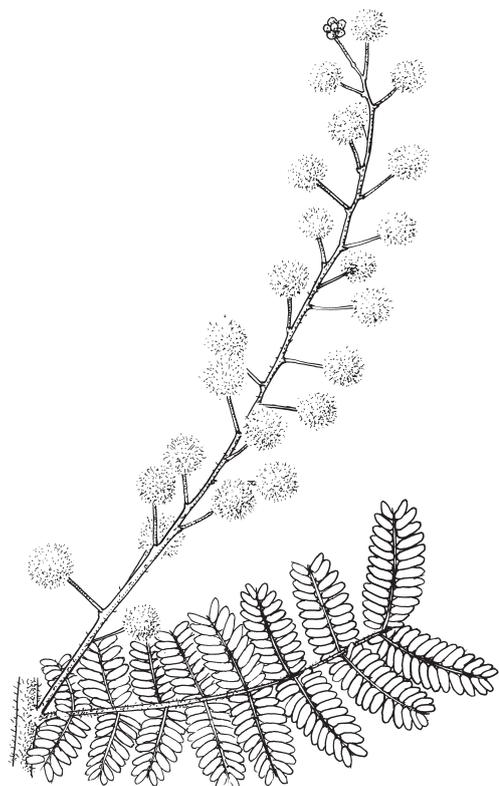


Fig. 7. *Acacia pubescens* (illustration by C. Wardrop 2001)

Lomandra glauca, *Lomandra obliqua*, *Xanthosia atkinsoniana* and *Goodenia heterophylla* subsp. *heterophylla*. At this location, around 15–20 plants were scattered on a westerly-facing lower slope on coarse sandstone soils, approximately 3.5 years after a major fire. It is likely that small scattered populations of this species occur on many of the exposed ridges in this part of Wollemi. Cooper (1986) investigated the type location of *Apatophyllum constablei*, and summarised the habitat there as a dry sclerophyll forest of *Eucalyptus piperita* with an understorey of *Banksia serrata*, *Caustis flexuosa*, *Petrophile pulchella* and *Grevillea mucronulata*. He also concluded that only 24 plants were present at the type location at the time of his survey. Other reported habitat for this species includes lower slopes in close proximity to streams, particularly in the central Coorongooba Creek area. It is possible that fire is an important factor in the lifecycle of this species, as seedlings have only been observed in areas recently burnt (S. Clarke, pers. comm.).

Threats – no threats identified.

Conservation Status – A Species Recovery Plan has been prepared (Jones & Vollmer 1994); additional information on biology in Cooper (1986). The species has recently been removed from listing under the NSW *TSC Act 1995* due to the finding of large numbers of individuals over an area of 230 km² (Scott & Keith 2006). A revised conservation risk code is proposed here.

EPBC Act: **Endangered**; *TSC Act*: **not listed**; *IUCN (2001)*: **LC (proposed)**; *ROTAP*: 2EC-; **2RCa (proposed)**

12. *Asterolasia elegans* L.McDougall & Porteners (**Rutaceae**)

Distribution within Wollemi – DECC Atlas records for the Morans Rocks area (near Maroota), detailed in Latham (1995).

Habitat – McDougall and Porteners (1990) describe the habitat in north-western Sydney as a sandy soil with underlying yellow clay, on the southern aspect of a steep hillside above a creek in open forest of *Syncarpia glomulifera* and *Eucalyptus piperita*, with an understorey of wet sclerophyll plants. Benson and McDougall (2001) add *Angophora costata*, *Acmena smithii*, *Trochocarpa laurina* and *Ceratopetalum apetalum*. Such habitat is widespread in south-eastern Wollemi, and hence potential habitat within the park is widespread.

Threats – no threats identified.

Conservation Status – Briggs and Leigh (1996) indicate adequate populations occur in Marramorra NP in north-western Sydney. Species Recovery Plan prepared by Scott (1994).

EPBC Act: **Endangered**; *TSC Act*: **Endangered**; *IUCN (2001)*: **EN C2b (proposed)**; *ROTAP*: 2ECa

13. *Atkinsonia ligustrina* (Cunn. ex F.Muell.) F.Muell. (**Loranthaceae**)

Distribution within Wollemi – occurs in the Newnes Plateau area in the south-west; around the Colo/Capertee River junction and the Culool Range in the south-east.

Habitat – Quirico (1992) states that this species grows in woodland and heath in exposed sites, a single plant often parasitic on the roots of several nearby plants. Maryott-Brown and Wilks (1993) indicate that this species occurs in low open woodland dominated by *Eucalyptus sieberi*, *E. piperita*, *Allocasuarina distyla* and *Banksia serrata*. Of additional interest for Wollemi populations is the occurrence of *Atkinsonia ligustrina* on deep sandy substrates in the Mellong Swamps, in south-eastern Wollemi. Here the species occurs in an open woodland of *Angophora costata*, *Banksia serrata* and *Corymbia gummifera*, with a well developed understorey of *Acacia ulicifolia*, *Brachyloma daphnoides*, *Phyllota phyllicoides*, *Pteridium esculentum*, *Conospermum taxifolium*, *Lomandra glauca*, *Entolasia stricta* and *Hibbertia fascicularis*.

Threats – no threats identified.

Conservation Status – Briggs and Leigh (1996) list occurrence in Blue Mountains and Wollemi NPs, although populations there are of unknown size and status.

EPBC Act: **not listed**; *TSC Act*: **not listed**; *IUCN (2001)*: **LC (proposed)**; *ROTAP*: **2RCa**

14. *Baeckea kandos* A.R.Bean (**Myrtaceae**)

Distribution within Wollemi – only known from Dunns Swamp (Kandos Weir) in the north-west.

Habitat – Bean (1997) describes the habitat of the species as heathland or shrubland on skeletal sandstone soils, associated with *Leptospermum parvifolium*, *Leptospermum arachnoides* and *Grevillea diffusa*. The total population has been estimated at fewer than 100 plants. Bean (1997) indicates that searches of apparently suitable habitat in the vicinity of the known population have not revealed further specimens; none were recorded elsewhere in Wollemi (Bell 1998).

Threats – no threats identified.

Conservation Status – *Baeckea kandos* [syn. *Baeckea* sp. 6 (*Kandos*) and *Baeckea* sp. E] occurs only within Wollemi NP. In his description of the species, Bean (1997) discusses *Baeckea kandos* as endangered, with only two small populations known a few hundred metres apart near Dunns Swamp.

EPBC Act: **Endangered**; *TSC Act*: **Endangered**; *IUCN (2001)*: **EN D1 (proposed)**; *ROTAP*: **2RC-t**

15. *Banksia penicillata* (A.S.George) K.R. Thiele (**Proteaceae**)

Distribution within Wollemi – recorded as far north as Benjang Gap in the north-west of the park, with good populations around Hefrons Gap and the northern end of the Newnes Plateau. It is generally widespread along the western sections of Wollemi, from the Lee Creek area, south to the Newnes Plateau (S. Clarke, pers. comm. 2006).

Habitat – In the Wolgan Lookout and Deanes Creek areas, *Banksia penicillata* is scattered within habitat dominated by *Eucalyptus considensiana*, *E. punctata*, *E. sparsifolia*, *E. sclerophylla*, *Bossiaea rhombifolia* subsp. *rhombifolia*, *Dodonaea triquetra*, *Exocarpus strictus*, *Acacia terminalis*, *Leucopogon muticus*, *Grevillea mucronulata*, *Podolobium ilicifolium*, *Leptospermum trinervium*, *Dillwynia phyllicoides*, *Grevillea sericea*, *Lomandra glauca*, *Patersonia glabrata*, *Caustis flexuosa* and *Lomandra confertifolia* subsp. *rubiginosa*. Near Cyrils Rocks further to the north, *Banksia penicillata* occurs in a mallee heathland of *Eucalyptus bensonii*, *Allocasuarina distyla*, *A. nana*, *Boronia floribunda*, *Kunzea ambigua*, *Grevillea buxifolia*, *Grevillea evansiana*, *Isopogon anethifolius*, *Leptospermum arachnoides*, *Dillwynia acicularis*, *Schoenus imberbis*, *Laxmannia gracilis*, *Lepidosperma viscidum*, *Lomandra glauca*, *Chloanthes stoechadis* and *Patersonia sericea*. On the deeper sands around Hefrons Gap, this species is present on slopes and ridges within an open forest of *Eucalyptus rossii*, *E. punctata*, *E. sparsifolia*, *Leucopogon muticus*, *Leptomeria acida*, *Bossiaea heterophylla*, *Monotoca scoparia*, *Pultenaea microphylla*, *Podolobium ilicifolium*, *Brachyloma daphnoides*, *Pomax umbellata*, *Aristida ramosa*, *Hibbertia circumdans*, *Patersonia sericea* and *Phyllanthus hirtellus*. In the more sheltered gullies associated with pagoda rock formations, it also occurs in open forest of *Eucalyptus piperita*, *Pteridium esculentum*, *Acacia longifolia*, *A. parvipinnula*, *Leptospermum polyanthum*, *Leucopogon lanceolata* var. *lanceolata*, *Gonocarpus teucroides* and *Stellaria pungens*. Outside of Wollemi, Washington (2001a) indicates that this species is the dominant taxon in heath, scrub, woodland and forest vegetation in Gardens of Stone NP.

Threats – no threats identified.

Conservation Status – *Banksia penicillata* was formerly included as a variety in *Banksia conferta* and listed as 3RC- by Briggs and

Leigh (1996). These authors list *Banksia conferta* as occurring within Lamington, Mount Barney, Ngungun, and Tibrogargan NPs (all in Queensland), as well as Wollemi NP in New South Wales. Of these, it is likely that only Wollemi NP supports populations of *B. penicillata*. Washington (2001a) has recorded *Banksia penicillata* in several parts of Gardens of Stone NP to the south-west of Wollemi, and suggests that there are several thousand plants conserved there. Bell (2001) suggested that the conservation risk code for this species be amended to 3RCa to reflect the extent of conserved populations.

EPBC Act: not listed; *TSC Act*: not listed; *IUCN (2001)*: LC (proposed); *ROTAP*: 3RC-; 3RCa (Bell 2001)

16. *Blechnum gregsonii* (Watts) Tind. (Blechnaceae)

Distribution within Wollemi – likely to be present in rainforest gullies in the south of the park.

Habitat – Wilson (1990) states that this species grows in cool rainforests mainly in the Blue Mountains and Illawarra coastal ranges. Extensive areas of this habitat type are present within the Wollemi-Blue Mountains wilderness; it may be assumed that this species is represented there.

Threats – no threats identified.

Conservation Status – Briggs and Leigh (1996) list this species as occurring in Blue Mountains, Wollemi, and Budderoo NPs; only in Wollemi is it considered to be adequately conserved.

EPBC Act: not listed; *TSC Act*: not listed; *IUCN (2001)*: DD (proposed); *ROTAP*: 2RCa

17. *Boronia barkeriana* F.Muell. subsp. *barkeriana* (Rutaceae)

Distribution within Wollemi – disjunct locations between Kekeelbon Mountain and Mt Coricudgy, in the central sections of the Park.

Habitat – Duretto (2003) indicates it is usually found in heath in damper areas.

Threats – no threats identified.

Conservation Status – Duretto (2003) has reviewed the taxonomy of *Boronia barkeriana*, defining three subspecies. Subspecies *barkeriana* is apparently restricted to the Blue Mountains with disjunct locations between Kekeelbon Mountain and Mt Coricudgy. Duretto (2003) indicates that the most recent collection dates back to the 1960s, and for this reason has applied a conservation risk code of 2RC- until further field research can be undertaken.

EPBC Act: not listed; *TSC Act*: not listed; *IUCN (2001)*: DD (proposed); *ROTAP*: 2RC- (Duretto 2003)

18. *Boronia floribunda* Sieber ex Spreng. (Rutaceae)

Distribution within Wollemi – Deanes Creek and Cyrils Rock areas north of the Newnes Plateau, as well as the Kekeelbon Mountains, Mt Coricudgy, Gaspers Mountain and Glen Davis (Duretto 2003).

Habitat – In the Deanes Creek area *Boronia floribunda* occurs within open forest of *Eucalyptus sclerophylla*, *E. considiniana*, *E. sparsifolia*, *Dillwynia phyllicoides*, *Caustis flexuosa*, *Bossiaea rhombifolia* subsp. *rhombifolia*, *Boronia microphylla*, *Leptospermum sphaerocarpum*, *Grevillea sericea*, *Kunzea ambigua*, *Gahnia filifolia*, *Mitrasacme polymorpha*, *Lepidosperma laterale*, *Hibbertia serpyllifolia* and *Xanthosia atkinsoniana*. Near Cyrils Rocks further to the north, *Boronia floribunda* occurs in a mallee heathland of *Eucalyptus bensonii*, *Banksia penicillata*, *Allocasuarina distyla*, *Allocasuarina nana*, *Kunzea ambigua*, *Grevillea buxifolia*, *Grevillea evansiana*, *Isopogon anethifolius*, *Leptospermum arachnoides*, *Dillwynia acicularis*, *Schoenus imberbis*, *Laxmannia gracilis*, *Lepidosperma viscidum*, *Lomandra glauca*, *Chloanthes stoechadis* and *Patersonia sericea*.

Threats – no threats identified.



Fig. 8. *Apatophyllum constablei* (illustration by Lesley Elkan, 2002)



Fig. 9. *Asterolasia elegans* (illustration by Lesley Elkan 2002)

Conservation Status – confined to the Sydney region in heath and sclerophyll forest on sandstone (Weston & Duretto 2002). Duretto (2003) considers that a conservation risk code of 2RC- is appropriate, given its limited distribution. Reserved populations known from Garigal, Ku-ring-gai Chase, Blue Mountains, Royal and Nattai NPs (Benson & McDougall 2001).

EPBC Act: not listed; TSC Act: not listed; IUCN (2001): LC (proposed); ROTAP: 2RC- (Duretto 2003)

19. *Boronia fraseri* Hook. (Rutaceae)

Distribution within Wollemi – occurs in the south-east of the Park.

Habitat – Benson and McDougall (2001) cite habitat for *Boronia fraseri* as gullies supporting moist eucalypt open forest (with *Acacia elata*) and margins of gallery rainforest (with *Ceratopetalum apetalum*, *Tristaniopsis laurina*). Along the Culoul Range in south-eastern Wollemi, *Boronia fraseri* occurs in an open forest of *Corymbia eximia*, *Eucalyptus sparsifolia* and *E. piperita*, over an understorey of *Dillwynia floribunda* var. *teretifolia*, *Leptospermum trinervium*, *Dillwynia acicularis*, *Boronia ledifolia*, *Persoonia linearis*, *Platysace linearifolia*, *Grevillea buxifolia* subsp. *buxifolia*, *Lissanthe sapida*, *Stylidium productum*, *Hibbertia obtusifolia*, *Lomandra glauca* and *Patersonia glabrata*. *E. sparsifolia*, *Acacia buxifolia*, *Leucopogon muticus*, *Persoonia linearis*, *Goodenia decurrens*, *Philotheca salsolifolia*, *Dodonaea boronifolia*, *Lisanthe strigosa*, *Stypantra glauca*, *Goodenia heterophylla* subsp. *heterophylla*, *Patersonia sericea*, *Pomax umbellata*, *Stackhousia muricata*, *Hybanthus monopetalus*, *Joycea pallida*, *Cleistochloa rigida* and *Lomandra multiflora* subsp. *multiflora* in the Lee Creek catchment and along the northern escarpment of the park.

Threats – no threats identified.

Conservation Status – listed for Goulburn River and Wollemi NPs (adequate representation), and Kanangra-Boyd and Gibraltar Range NPs (unknown status and size) (Briggs & Leigh 1996); also present in crown land adjacent to Manobalal Nature Reserve (Bell 1997a), and likely to also occur within that reserve.

EPBC Act: not listed; TSC Act: not listed; IUCN (2001): LC (proposed); ROTAP: 2RCa

21. *Brasenia schreberi* Gmelin. (Cabombaceae) Watershield

Distribution within Wollemi – recorded in the Central Colo area in 1975, 1977 and 1989 (DECC atlas), but it is unclear whether these populations occur within the present Park boundaries.

Habitat – water bodies, shallow freshwater lagoons and backwaters of rivers (Fairley 2004).

Threats – draining of swamp habitats, pollution.

Conservation Status – Briggs and Leigh (1996) list this species as occurring only in Crowdy Bay NP, although it is present in many other areas. James (1997) also adds Thirlmere Lakes NP.

EPBC Act: not listed; TSC Act: not listed; IUCN (2001): DD (proposed); ROTAP: 3RC+

22. *Callistemon shiressii* Blakely (Myrtaceae)

Distribution within Wollemi – along Colo River and catchments in the south-east.

Habitat – in sheltered forest adjacent to creeks on alluvial soils, in habitat dominated by *Eucalyptus michaeliana*, *E. crebra* and *Syncarpia glomulifera*, over an understorey of *Backhousia myrtifolia*, *Bursaria spinosa*, *Podolobium ilicifolium*, *Acacia filicifolia*, *Dianella caerulea* and *Entolasia stricta*, in Yengo and Wollemi NPs (Maryott-Brown & Wilks 1993).

Threats – no threats identified.

Conservation Status – listed for Yengo and Wollemi NPs (Briggs & Leigh 1996); other records for Brisbane Water NP (Benson & Fallding 1981), Jilliby State Conservation Area and Watagans NP (unpubl. data) and the State Forests around Wyong (Bell 2002a). The northern limit of the species is Bow Wow Gorge near Quorrobolong in Cessnock LGA (Bell & Murray 2001).

EPBC Act: not listed; TSC Act: not listed; IUCN (2001): LC (proposed); ROTAP: 3RC-

23. *Cynanchum elegans* (Benth.) Domin. (Asclepiadaceae) White Cynanchum

Distribution within Wollemi – a collection from the headwaters of Doyles Creek in the east of the park is the first confirmed record for Wollemi NP (Bell 1998).

Habitat – at Doyles Creek, occurs in moist open forest on a sheltered upper slope, where dominant species include *Eucalyptus piperita*, *Syncarpia glomulifera*, *Allocasuarina torulosa* and *Angophora floribunda*, over a sparse understorey of *Rapanea variabilis*, *Polyscias sambucifolia*, *Indigofera australis* and a dense ground layer of *Blechnum cartilagineum* and *Pteridium esculentum*. It is possible that this species occurs in many of the sheltered gullies of the park, although the level of survey undertaken to date would suggest that populations are not widespread. In south-eastern Wollemi along the Culoul Range, *Cynanchum elegans* also occurs on ridgetop remnants of Wianamatta Shale, in open forest of *Eucalyptus crebra*, *E. eugenioides*, *E. punctata* and *E. beyeriana*. Understorey vegetation comprises *Acacia parramattensis*, *Syncarpia glomulifera*, *Bursaria spinosa*, *Exocarpus strictus* and *Rapanea variabilis*, over a dense ground layer of *Pratia purpurascens*, *Lomandra filiformis*, *Goodenia heterophylla* subsp. *heterophylla*, *Dianella caerulea*, *Galium binifolium* and *Poranthera microphylla*.

Threats – fire impacting on rainforest habitats.

Conservation Status – Copeland and Hunter (1999) have suggested a revised code of 3VCi, to reflect new populations found in recent years, but the majority of populations are small, and it is better retained as 3ECi (Bell 2001). A Species Recovery Plan has been prepared (Matthes & Nash 1993). Other confirmed populations are Camels Hump Nature Reserve and Woko NP (Briggs & Leigh 1996), Goulburn River NP (McRae & Cooper 1985), and Glenrock SRA and Booti Booti NP (M.Schroder, NPWS, pers. comm.). James (1997) also reports findings around Richmond in western Sydney.

EPBC Act: Endangered; TSC Act: Endangered; IUCN (2001): VU D2 (proposed); ROTAP: 3ECi; 3VCi (Copeland & Hunter 1999); 3ECi (Bell 2001)

24. *Cyphanthera scabrella* (Benth.) Miers (Solanaeae)

Distribution within Wollemi – DECC Atlas record from 1977 for near Bilpin in the south of Wollemi, although no further details on habitat at this sites are known.

Habitat – Conn (1992a) states that this species grows in dry or wet sclerophyll forest in sandstone-derived soil, in the Bilpin-Mt Wilson area of the Blue Mountains. Benson and McDougall (2001) note that it occurs on rocky slopes in eucalypt forest bordering creekside rainforest, with *Ceratopetalum apetalum* and *Doryphora sassafras*.

Threats – no threats identified.

Conservation Status – Briggs and Leigh (1996) list this species only for Blue Mountains NP.

EPBC Act: not listed; TSC Act: not listed; IUCN (2001): DD (proposed); ROTAP: 2RC-

25. *Darwinia peduncularis* B. Briggs (Myrtaceae)

Distribution within Wollemi – from the Mt Iris to Mt Boonbourwa area in the west of Wollemi (S. Clarke, pers. comm. 2006).

Habitat – exposed ridgelines above Wollemi Creek in the centre of the park, in an open woodland/ heath of *Eucalyptus rossii*, *E. bensonii* and *E. multicaulis*, with a variety of shrubs including *Leptospermum parvifolium*, *Leucopogon muticus*, *Leptospermum trinervium*, *Calytrix tetragona*, *Baeckea densifolia*, *Leptospermum sphaerocarpum*, *Leptospermum arachnoides*, *Caustis flexuosa*, *Acacia linifolia*, *Bossiaea heterophylla* and *Dillwynia retorta*. Other populations in this area occur in sheltered locations in an open forest of *Eucalyptus consideriana* and *E. piperita*, with *Hakea dactyloides*, *Leptospermum trinervium*, *Dillwynia retorta*, *Gompholobium virgatum*, *Persoonia oblongata*, *Styphelia tubiflora*, *Isopogon anemonifolius*, *Lomatia silaifolia*, *Monotoca scoparia*, *Lomandra obliqua*, *Stylidium productum* and *Caustis flexuosa*. *Darwinia peduncularis* is locally common in this area, and appears to be sporadically distributed in the remote parts of the park.

Threats – no threats identified.

Conservation Status – listed for Blue Mountains, Wollemi, and Murrumbidgee NPs (Briggs & Leigh 1996).

EPBC Act: not listed; TSC Act: Vulnerable; IUCN (2001): LC (proposed); ROTAP: 3RCi

26. *Diuris* sp. aff. *punctata* (Colo River) (Orchidaceae)

Distribution within Wollemi – Bishop (2000) describes a purple flowered *Diuris* from the Mellong Range area in the south-eastern section of the park.

Habitat – occurs on swamp fringes growing in heathland or heathy sclerophyll forest, in peaty, gravelly soils.

Threats – illegal removal of plants by orchid enthusiasts, fire during flowering season.

Conservation Status – other records are mentioned by Bishop (2000) for the Hunter Valley. While no estimate is made of its conservation status, the low number of records would suggest that it may be a species of quite restricted distribution.

EPBC Act: not listed; TSC Act: not listed; IUCN (2001): DD (proposed); ROTAP: not listed; 2KC (proposed)

27. *Epacris coriacea* Cunn. ex DC. (Epacridaceae)

Distribution within Wollemi – recorded at several locations in the upper reaches of Wollemi Creek.

Habitat – grows in skeletal sandy soils on sandstone cliffs and in rock crevices on the Woronora Plateau, and west to Bare Rock near Rylstone (Powell 1992). At upper Wollemi Creek, it occurs in an open forest of *Eucalyptus rossii* and *Corymbia gummifera*, with an understorey of species such as *Leptospermum trinervium*, *Banksia spinulosa* var. *spinulosa*, *Persoonia levis*, *Dillwynia floribunda* var. *floribunda*, *Dillwynia retorta*, *Gompholobium virgata* subsp. *aspalathoides*, *Patersonia glabrata*, *Caustis flexuosa*, *Bossiaea heterophylla*, *Xanthosia atkinsoniana* and *Lomandra glauca*.

Threats – no threats identified.

Conservation Status – Briggs and Leigh (1996) list occurrence in Budderoo, Wollemi, and Macquarie Pass NPs, although there are no details on the extent and status of their populations.

EPBC Act: not listed; TSC Act: not listed; IUCN (2001): VU D2 (proposed); ROTAP: 3RC-



Fig. 10. *Olearia cordata* (illustration by Helen Bryant)



Fig. 11. *Boronia floribunda* (illustration by M. Maiden)

28. *Epacris muelleri* Sonder (Epacridaceae) Mueller's Heath

Distribution within Wollemi – recorded on damp rock faces in the southern and south-western sections of the park, around Mt Irvine and Glen Davis; also in the central portion near the Kekeelbon Mountains, Mt Duran Duran, Cyrils Rocks, and Dunns Swamp (Kandos Weir).

Habitat – near Box Hole Clearing, it occurs on rocky outcrops in a mallee heathland with *Eucalyptus bensonii*, *Kunzea ambigua*, *Boronia floribunda*, *Allocasuarina distyla*, *Allocasuarina nana*, *Grevillea buxifolia* subsp. *ecorniculata*, *Caustis pentandra*, *Isopogon anethifolius*, *Banksia conferta*, *Goodenia decurrens*, *Dampiera stricta*, *Schoenus imberbis* and *Actinotus minor*. Further to the south near Wolgan Lookout, *Epacris muelleri* occurs within a sheltered open forest of *Eucalyptus piperita*, *E. cypellocarpa*, *Angophora floribunda* and *Eucalyptus punctata*, with an understorey of *Acacia terminalis*, *Persoonia linearis*, *Acacia obtusifolia*, *Podolobium ilicifolium*, *Leucopogon muticus*, *Platysace lanceolata*, *Dodonaea triquetra*, *Lomandra longifolia*, *Styandra glauca* and *Lepidosperma laterale*.

Threats – no threats identified.

Conservation Status – Briggs and Leigh (1996) list only for Wollemi and Blue Mountains NPs; recently recorded in Gardens of Stone NP (Washington 2001a).

EPBC Act: not listed; TSC Act: not listed; IUCN (2001): VU D2 (proposed); ROTAP: 3RC-

29. *Eucalyptus aenea* K.Hill (Myrtaceae)

Distribution within Wollemi – a single population of around 40 plants recorded on the extreme northern boundary of the park near Denman (V. Klaphake, per. comm. 2007).

Habitat – Hill (1997b) describes the habitat for this species as shallow soils on the higher flanks of low sandstone ridges, with *Eucalyptus sideroxylon*, *E. sparsifolia* and *E. fibrosa*. Understorey vegetation is composed of a variety of scleromorphic shrub species.

Threats – indiscriminate clearing by adjacent land-owners.

Conservation Status – Hill (1997b) suggested conservation code of 2RC, reflecting the presence within Goulburn River NP. Other small populations occur in Manobalai Nature Reserve (Bell 2001).

EPBC Act: not listed; TSC Act: not listed; IUCN (2001): VU D2 (proposed); ROTAP: 2RC (Hill 1997b); 2RC- (Bell 2001)

30. *Eucalyptus bensonii* L.A.S.Johnson & K.Hill (Myrtaceae)

Distribution within Wollemi – all known occurrences of *Eucalyptus bensonii* are in the south-western and central sections of Wollemi, in the area north of Glen Davis between Cyrils Rocks and Box Hole Clearing, east to around Mt Monundilla.

Habitat – most prevalent in heathland with emergent mallee eucalypts or on resistant sandstone platforms, in skeletal sandy soils derived from Narrabeen Sandstone. At one site near Box Hole Clearing, an unusual and unique small ridgeline of very resistant sandstone supports mallee heathland for its entire length, with species such as *Eucalyptus multicaulis*, *E. laophila*, *Allocasuarina distyla*, *A. nana*, *Boronia floribunda*, *Kunzea ambigua*, *Dampiera stricta*, *Dillwynia acicularis*, *Platysace lanceolata*, *Schoenus imberbis*, *Laxmannia gracilis*, *Grevillea buxifolia* subsp. *ecorniculata*, *Actinotus minor*, *Caustis pentandra*, *Lepidosperma viscidum*, *Grevillea evansiana*, *Lomandra glauca*, *Leptospermum arachnoides*, *Isopogon anethifolius* and *Acacia suaveolens*. At another location in the upper Wollemi Creek catchment, approximately five individuals were recorded on an exposed sandstone platform surrounded by an open forest of *Eucalyptus sparsifolia*, *E. piperita*, and *E. punctata*, with an understorey of *Acacia longifolia*, *Prostanthera prunellioides*, *Leptospermum sphaerocarpum*, *Persoonia linearis*, *Podolobium ilicifolium*, *Lomatia silaifolia*, *Pomaderris*

ledifolia, *Lepidosperma gunnii*, *Styidium productum*, *Pteridium esculentum*, *Lepidosperma urophorum* and *Lomandra confertifolia* subsp. *rubiginosa*. A further sandstone platform 7km east of Hanging Rock supported a few scattered individuals of *Eucalyptus bensonii*, with this location representing the eastern limit of the species. Vegetation here comprised an open woodland/ heath of *Eucalyptus rossii* and *E. multicaulis*, with a variety of shrubs including *Leptospermum parvifolium*, *Leucopogon muticus*, *Leptospermum trinervium*, *Calytrix tetragona*, *Baeckea densifolia*, *Leptospermum sphaerocarpum*, *L. arachnoides*, *Caustis flexuosa*, *Acacia linifolia*, *Bossiaea heterophylla* and *Dillwynia retorta*. It is likely that scattered individuals of this species occur on most of the many sandstone platforms within the central and south-western sections of Wollemi, much of which is remote.

Threats – no threats identified.

Conservation Status – Briggs and Leigh (1996) list only Wollemi NP; no other records are known.

EPBC Act: not listed; TSC Act: not listed; IUCN (2001): VU D2 (proposed); ROTAP: 2RCt

31. *Eucalyptus burgessiana* L.A.S.Johnson & Blaxell (Myrtaceae) Faulconbridge Mallee

Distribution within Wollemi – approximately 20 plants between Mountain Lagoon and Mt Irvine reported in 2001 (DECC Atlas), and several tens of plants on a ridge near Tootie Creek east of Mountain Lagoon.

Habitat – near Mountain Lagoon, *Eucalyptus burgessiana* co-dominates low mallee scrub and open forest on skeletal sandstone soils with *Eucalyptus piperita*, *Corymbia gummifera* and *Eucalyptus considaniana*. Understorey species include *Petrophile pulchella*, *Hakea dactyloides*, *Leptospermum trinervium*, *Dillwynia elegans*, *Phyllota grandiflora*, *Bossiaea heterophylla*, *Platysace linearifolia* and *Lambertia formosa* in the shrub layer, and *Lomandra glauca*, *Schoenus imberbis*, *Lepyrodia scariosa*, *Patersonia sericea*, *Cyathochaeta diandra*, *Caustis flexuosa* and *Lomandra gracilis* on the ground. A second stand of mallee also occurs in deep sandy alluvium in an unusual gully floor situation below this ridge, where *E. burgessiana* co-occurs with *Leptospermum trinervium* and a variety of other shrubs.

Threats – no threats identified.

Conservation Status – recorded only from Blue Mountains NP (Briggs & Leigh 1996), but recent records in southern Wollemi have extended the northern distribution limit.

EPBC Act: not listed; TSC Act: not listed; IUCN (2001): VU D2 (proposed); ROTAP: 2RCa

32. *Eucalyptus cannonii* R.T. Baker (Myrtaceae) Capertee Stringybark

Distribution within Wollemi – between Wolgan and Dunns Swamp (Kandos Weir) along the western escarpment of the park.

Habitat – in most cases, individuals are scattered in mixed eucalypt forest typically dominated by *Eucalyptus punctata*, *E. rossii*, *E. sparsifolia* and *Angophora floribunda*. Understorey vegetation is dominated by *Podolobium ilicifolium*, *Acacia buxifolia*, *Bossiaea obcordata*, *Banksia cunninghamii* subsp. *cunninghamii*, *Monotoca scoparia*, *Lomandra glauca*, *Pomax umbellata* and *Lomandra multiflora*. Other occurrences are known from open forest of *Eucalyptus dawsonii*, *E. cypellocarpa* and *E. punctata* in footslope positions. Washington (2001b) recorded this species in a range of similar habitats in the adjacent Gardens of Stone NP, generally within open forest of species such as *Eucalyptus rossii*, *E. tenella*, *E. fibrosa*, *E. punctata*, *E. ligustrina*, *E. macrorhyncha*, *E. eugenioides*, *E. melliodora*, *E. albens*, *E. crebra*, *E. polyanthemus* and *E. praecox*.

Threats – no threats identified.

Conservation Status – also known from Avisford Nature Reserve (Bell 1995), Pantoney's Crown Nature Reserve (Benson & Keith 1990), Winburndale Nature Reserve and Gardens of Stone NP (Hunter & White 1999; Washington 2001a), Newnes and Ben Bullen State Forests (Forestry Commission of NSW 1987). Hunter and White (1999) have discussed in detail the distribution and conservation status of *Eucalyptus cannonii*, and suggest that this species be delisted from the NSW TSC Act in recognition of substantial populations in several reserves, and lowered clearing threats. They also suggest a revision of the conservation risk code to 2RCa, which seems justified. Washington (2001b) has undertaken a detailed survey of this species within the Gardens of Stone NP, with the aim of determining population sizes currently conserved. He estimated around 2000–3000 plants for that reserve and a total of 10 000–15 000 for the region, but also indicated that the majority of specimens attributable to *Eucalyptus cannonii* are potentially hybrids with *Eucalyptus macrorhyncha*.

EPBC Act: Vulnerable; TSC Act: Vulnerable; IUCN (2001): LC (proposed); ROTAP: 2VCi; 2RCa (Hunter & White 1999)

33. *Eucalyptus corticosa* L.A.S. Johnson (Myrtaceae)

Distribution within Wollemi – occurs west of Mt Coricudgy with some plants within the park boundary near Dunns Swamp (A. Fairley, *pers. comm.*).

Habitat – sclerophyll woodland on shallow, infertile sandy soils in the upper reaches of the Cudgegong River, often associated with *Eucalyptus rossii* (DECC).

Threats – clearing for agriculture or road maintenance, inappropriate fire regimes.

Conservation Status – known only within an area of 20 km² around Mt Coricudgy; not known how extensive the population is within Wollemi.

EPBC Act: not listed; TSC Act: Vulnerable; IUCN (2001): VU D2 (proposed); ROTAP: 2VC- (proposed)

34. *Eucalyptus fergusonii* subsp. *dorsiventralis* L. Johnson & K. Hill (Myrtaceae)

Distribution within Wollemi – recorded along the Tootie Track north of Mountain Lagoon, representing a southerly range extension.

Habitat – on the western end of the Culoul Range near the Colo River, this species occurs on a lower hillslope on shale-influenced soils in an open forest with *Eucalyptus paniculata* subsp. *paniculata*, *E. racemosa*, *E. punctata* and *Syncarpia glomulifera*. Understorey vegetation comprises *Backhousia myrtifolia*, *Notelaea venosa*, *Bursaria spinosa*, *Acacia parramattensis*, *Pultenaea scabra*, *Entolasia stricta*, *Lomandra filiformis* subsp. *filiformis*, *Galium binifolium*, *Asplenium flabellifolium* and *Lomandra longifolia*. The species is also present within the north-eastern sections of the park, although no recent records could be located. In the adjacent Yengo NP, Maryott-Brown and Wilks (1993) summarise the habitat for this taxon as dry sclerophyll forest on Narrabeen Sandstone ridges, usually in saddles or benches near ridgetops, where underlying shale becomes evident. Associated species include *Eucalyptus fibrosa*, *E. sparsifolia*, *Cassinia cunninghamii* and *Podolobium ilicifolium*.

Threats – no threats identified.

Conservation Status – Briggs and Leigh (1996) list only Wollemi NP, although it also occurs in the adjacent Yengo NP (Bell, Vollmer and Gellie 1993; Maryott-Brown and Wilks 1993), and several other locations in the Hunter Valley (Bell 2001). Good stands of the species also occur in recent additions to Werakata NP near Cessnock (Bell & Driscoll 2007). Bell (2001) has suggested that the conservation risk code be revised to 2RCa or 3RCa, depending on confirmation of specimens collected around Newcastle. This has now been done, and the opportunity is taken here to suggest that the code be revised to 3RCa.

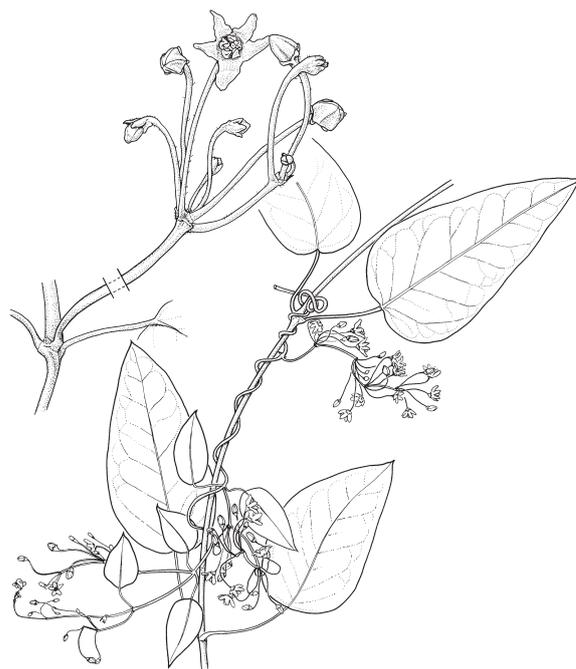


Fig. 12. *Cynanchum elegans* (illustration by Lesley Elkan 2002)

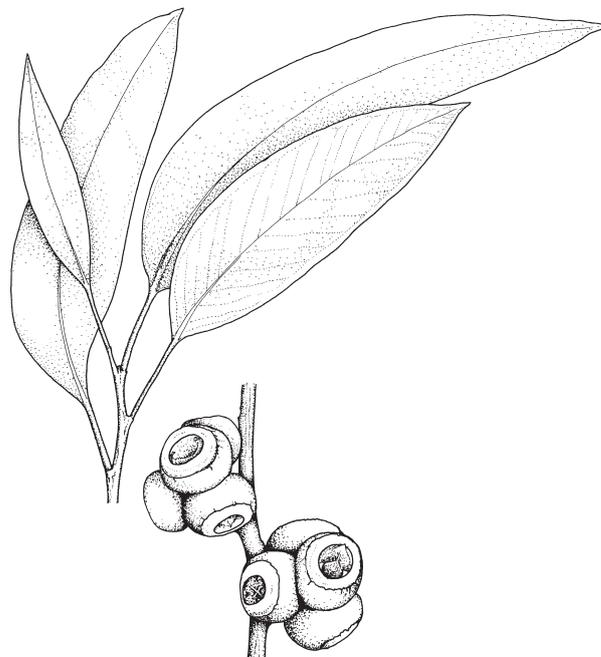


Fig. 13. *Eucalyptus bensonii* (Illustration by David Mackay)

EPBC Act: not listed; *TSC Act*: not listed; *IUCN (2001)*: LC (proposed); *ROTAP*: 2RC-; 3RCa (proposed)

35. *Eucalyptus gregsoniana* L.A.S.Johnson & Blaxell (Myrtaceae) Wolgan Snow Gum

Distribution within Wollemi – a small number of records for the Newnes Plateau (Fairley 2004).

Habitat – in poorly-drained heath on the Newnes Plateau, also Clarence-Blackheath area (Benson & Keith 1990). Population sizes in Wollemi are not known.

Threats – no threats identified.

Conservation Status – Briggs and Leigh (1996) list this species for Wollemi and Morton NPs, with adequate representation considered only for the latter.

EPBC Act: not listed; *TSC Act*: not listed; *IUCN (2001)*: DD (proposed); *ROTAP*: 3RCa

36. *Eucalyptus hypostomatica* L.A.S.Johnson & K.Hill (Myrtaceae)

Distribution within Wollemi – a small population discovered along the Elcom Trail in the north-east of the park in 2005. More recent investigations revealed a substantial population of an unusual mallee-like stand along a broad ridgeline. Unconfirmed specimens of *Eucalyptus hypostomatica* were also collected from a sheltered gully during fire fighting activities in the Blackwater Creek area several kilometres to the west in the late 1990s. There are no other recent records within Wollemi, although Johnson and Hill (1990) do mention the species for the Widden Brook area.

Habitat – the Elcom trail population occurred within a sheltered gully head where it was locally dominant. Other species present included *Eucalyptus melliodora* (in an interesting disjunct occurrence), *E. punctata*, *E. sparsifolia*, *Backhousia myrtifolia*, *Stenocarpus salignus*, *Pittosporum undulatum*, *Notelaea longifolia* and *Acacia prominens*. On the broad ridgeline nearby, other associated species were *Eucalyptus punctata*, *E. sparsifolia* and *E. fibrosa*.

Threats – no threats identified.

Conservation Status – listed only for Yengo NP by Briggs and Leigh (1996); also from Nattai River and Laceys Creek, in Nattai and Blue Mountains NPs (Fisher et al. 1995); also in Watagans NP near Newcastle (Bell 2002b).

EPBC Act: not listed; *TSC Act*: not listed; *IUCN (2001)*: LC (proposed); *ROTAP*: 3RC-

37. *Eucalyptus prominula* L.A.S. Johnson & K.D. Hill (Myrtaceae)

Distribution within Wollemi – recorded at the western end of the Culoul Range in south-eastern Wollemi, occurring on a ridgeline in dry sclerophyll forest, extending the known geographical range of the species. Given the extent of new populations recently located in Yengo NP and around the township of Putty (pers. obs 2007), it is likely that sizeable populations also exist in Wollemi.

Habitat – within the adjacent Yengo NP, *Eucalyptus prominula* co-dominates the canopy with *Eucalyptus sparsifolia*, *Corymbia gummifera*, *Syncarpia glomulifera* subsp. *glomulifera*, *Angophora costata* and *Allocasuarina torulosa*. Understorey vegetation includes *Dodonaea triquetra*, *Podolobium ilicifolium*, *Acacia terminalis*, *Persoonia linearis*, *Platysace linearifolia*, *Acacia linifolia*, *Themeda australis*, *Joycea pallida*, *Lepidosperma laterale*, *Phyllanthus hirtellus*, *Opercularia diphylla*, *Stackhousia viminea* and *Panicum simile*. To the east of Cessnock in Hunter Valley, *Eucalyptus prominula* occurs on low sandstone ridges with *Corymbia eximia* and *Angophora costata*,

over *Dillwynia retorta*, *Podolobium ilicifolium*, *Bossiaea obcordata*, *Joycea pallida*, *Xanthorrhoea johnsoni*, *Entolasia stricta*, *Lomandra cylindrica* and *Lomandra obliqua*.

Threats – no threats identified.

Conservation Status – known from Yengo NP, and several State Forests in the Hunter Region (Bell et al. 1993; Bell 2001). Revised code to 2RC- has been suggested by Bell (2001).

EPBC Act: not listed; *TSC Act*: not listed; *IUCN (2001)*: LC (proposed); *ROTAP*: 2KC-; 2RC- (Bell 2001)

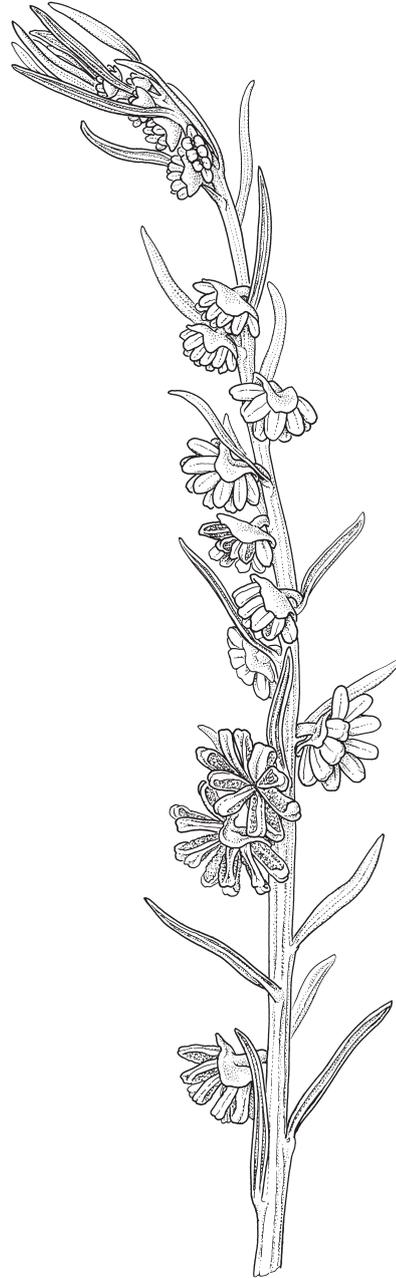


Fig. 14. *Gyrostemon thesioides* (illustration by Lesley Elkan 2004)

38. *Eucalyptus* sp. aff. *eugenioides* (Bees Nest Ridge) (Myrtaceae) A Stringybark

Distribution within Wollemi – Hunter Range in the east of the park.

Habitat – occurs as an emergent with *Eucalyptus deanei* in gullies, over a closed canopy of *Backhousia myrtifolia*, *Acmena smithii*, *Acacia prominens*, *Acacia parvipinnula* and *Syncarpia glomulifera*. The lower stratum consists of a sparse shrub layer of *Notelaea longifolia* forma *intermedia*, *Pittosporum revolutum*, *Cyathia australis*, and *Ficus coronata*, over a dense ground layer of *Calochlaena dubia*, *Blechnum cartilagineum*, *Adiantum aethiopicum*, *Polystichum australiense*, *Doodia aspera*, *Oplismenus imbecillus*, *Dichondra repens*, *Commelina cyanea*, *Echinopogon ovatus*, *Microlaena stipoides*, and *Viola hederacea*. Vines such as *Sarcopetalum harveyanum* and *Marsdenia rostrata*, and epiphytic orchids such as *Plectorrhiza tridentata* are also present.

Threats – no threats identified.

Conservation Status – a tall tree of sheltered forests bearing some resemblance to *Eucalyptus eugenioides*, although differing from that species in the strongly exerted and narrow valves on the fruit (Binns 1996; pers. obs.). Previously known only from very localised stands in the Bees Nest Ridge area of Pokolbin State Forest to the east (Binns 1996), with new records made for Wollemi NP. Several populations have also been recorded in Yengo NP during 2007 (pers. obs.). *Eucalyptus* sp. aff. *eugenioides* is an entity of uncertain taxonomic status, and further investigation is required.

EPBC Act: not listed; *TSC Act*: not listed; *IUCN (2001)*: DD (proposed); *ROTAP*: not listed; 3KC (proposed)

39. *Eucalyptus* sp. ‘Howes Swamp Creek’ (Doherty 26) (Myrtaceae)

Distribution within Wollemi – only known from Howes Swamp Creek along the Putty Road.

Habitat – Canopy layer of *Eucalyptus piperita*, *Angophora floribunda* and *Eucalyptus viminalis*, over a sparse understorey of *Acacia parramattensis*, *Bursaria spinosa*, *Pteridium esculentum*, *Persoonia oblongata*, *Lomatia silaifolia*, *Polyscias sambucifolia*, *Leucopogon muticus*, *Cryptandra amara*, *Platysace lanceolata*, *Imperata cylindrica* var. *major*, *Helichrysum scorpioides*, *Gonocarpus tetragynus*, and *Hypericum gramineum*.

Threats – frequent fire, over-collecting.

Conservation Status – although listed as threatened, the taxonomy of *Eucalyptus* sp. ‘Howes Swamp Creek’ [syn. *Eucalyptus wollemiensis* ms] is still uncertain, as the only known stand (of ~5 individuals) shows characteristics similar to *Eucalyptus angophoroides* (which occurs well to the south, in the Towrang district on the NSW South Coast and Tablelands). The remaining trees at Howes Swamp Creek are in poor health due to repeated burning, and it has been difficult to collect sufficient material to confirm the status of this taxon (K. Hill, National Herbarium, pers. comm.).

EPBC Act: **not listed**; *TSC Act*: **Endangered**; *IUCN (2001)*: **CR D1 (proposed)**; *ROTAP*: **2ECi**

40. *Gonocarpus longifolius* (Schindler) Orch. (Haloragaceae)

Distribution within Wollemi – occurs across much of Wollemi NP, collections made in recent years suggest that this species is adequately conserved in this reserve.

Habitat – includes open forest dominated by *Corymbia maculata*, *Eucalyptus crebra* and *E. moluccana*, over an understorey of *Bursaria spinosa*, *Breynia oblongifolia*, *Exocarpus strictus*, *Sorghum leiocladum*, *Lomandra filiformis* subsp. *filiformis*, *Cymbopogon refractus*, *Eragrostis brownii* and *Dichondra repens* near Milbrodale

in the north-east; open forest on shale soils supporting *Eucalyptus resinifera*, *E. globoides*, *Syncarpia glomulifera*, *Allocasuarina torulosa* and *Angophora costata*, over *Persoonia linearis*, *Acacia implexa*, *Themeda australis*, *Aristida vagans*, *Anisopogon avenaceus*, *Entolasia stricta*, *Panicum simile*, *Imperata cylindrica* var. *major*, *Lomandra multiflora* subsp. *multiflora*, *Lomandra longifolia* and *Phyllanthus hirtellus* along the Drip Rock Trail in the south-east; and a riparian forest of *Casuarina cunninghamiana* subsp. *cunninghamiana* and *Angophora floribunda*, over *Tristaniopsis laurina*, *Leptospermum polygalifolium* subsp. *transmontanum*, *Backhousia myrtifolia*, *Hakea salicifolia*, *Ceratopetalum apetalum*, *Polyscias sambucifolia*, *Lomandra longifolia*, *Adiantum aethiopicum*, *Oplismenus imbecillus*, *Desmodium varians*, *Hydrocotyle laxiflora*, *Dichondra repens* and *Poa affinis* along Blackwater Creek in the north.

Threats – no threats identified.

Conservation Status – listed for Goulburn River, Blue Mountains, Border Ranges, and Mount Walsh NPs, with only Goulburn River NP



Fig. 15. *Haloragodendron gibsonii* (illustration by C. Wardrop 2005)

considered to support adequate populations (Briggs & Leigh 1996). Other populations have been recorded in Manobalai Nature Reserve (Peake & Bell in prep.), Gardens of Stone NP (Washington 2001a), Burratorang Valley (Fisher et al. 1995) and Gulguer Nature Reserve (James 1997). Bell (2001) suggested a revised code to 3RCa to reflect current knowledge.

EPBC Act: not listed; *TSC Act*: not listed; *IUCN (2001)*: LC (proposed); *ROTAP*: 3RC-; 3RCa (Bell 2001)

41. *Grevillea evansiana* (McKee) McGillivray (Proteaceae)

Distribution within Wollemi – principally around the Dunns Swamp (Kandos Weir) area in the central west, but also in outlying locations in the northern sections of the Newnes Plateau and around Glen Davis.

Habitat – occurs in a range of habitats including pagoda heath, open forest and hanging swamps. In pagoda heath at Dunns Swamp, associated species include *Leptospermum arachnoides*, *Calytrix tetragona*, *Leptospermum parvifolium*, *Leucopogon muticus*, *Leucopogon microphyllus* subsp. *pilibundus*, *Leptospermum sphaerocarpum*, *Prostanthera* sp. A., *Ochrosperma oligomerum*, *Dillwynia sericea*, *Callitris rhomboidea*, *Eucalyptus laophila* and *Laxmannia gracilis*. Above the pagoda heaths in an open forest of *Eucalyptus rossii*, *E. sparsifolia* and *E. punctata*, *Grevillea evansiana* occurs with an understorey of *Podolobium ilicifolium*, *Leptospermum sphaerocarpum*, *Leucopogon muticus*, *Monotoca scoparia*, *Leptospermum arachnoides*, *Kunzea ambigua*, *Brachyloma daphnoides* subsp. *daphnoides*, *Dillwynia phyllicoides*, *Callitris endlicheri*, *Pomax umbellata*, *Lomandra glauca*, *Phyllanthus hirtellus*, *Rhytidosporeum procumbens* and *Patersonia sericea*. In general terms, *Grevillea evansiana* is more common in the pagoda heaths of Dunns Swamp than the open forest habitat. In hanging swamp on the Newnes Plateau, *Grevillea evansiana* occurs with *Leptospermum squarrosus*, *Lepidosperma forsythii*, *Lepyrodia scariosa*, *Epacris obtusifolia*, *Sphaerolobium minus*, *Epacris microphylla* var. *microphylla*, *Almaleea incurvata*, *Dampiera stricta*, *Lycopodium laterale*, *Baumea rubiginosa*, *Boronia microphylla*, *Gleichenia dicarpa* and *Pultenaea canescens*. At Tea Tree Flat near Bogee, this species occurs in a non-pagoda heath of *Leptospermum arachnoides*, *Leptospermum parvifolium*, *Leucopogon muticus*, *Platysace lanceolata*, *Leucopogon microphyllus* subsp. *pilibundus*, *Calytrix tetragona*, *Leptospermum sphaerocarpum*, *Prostanthera saxicola* subsp. *bracteola*, *Acacia ulicifolia*, *Styphelia triflora*, *Acacia elongata* var. *elongata*, *Drosera auriculata*, *Lepidosperma viscidum*, *Amperea xiphoclada* var. *xiphoclada* and *Anisopogon avenaceus*. Near Box Hole Clearing, this species occurs in mallee heath of *Eucalyptus bensonii*, *E. multicaulis*, *E. laophila*, *Allocasuarina nana*, *Boronia floribunda*, *Kunzea ambigua*, *Allocasuarina distyla*, *Platysace lanceolata*, *Dillwynia acicularis*, *Banksia penicillata*, *Chloanthes stoechadis*, *Caustis pentandra*, *Actinotus minor*, *Dampiera stricta*, *Laxmannia gracilis* and *Acacia suaveolens*.

Threats – no threats identified.

Conservation Status – known only from Wollemi NP (Briggs & Leigh 1996). The range of habitats and the geographical spread of records suggest that at least 1000 plants are conserved; conservation risk code could be amended to 2VCa.

EPBC Act: Vulnerable; *TSC Act*: Vulnerable; *IUCN (2001)*: LC (proposed); *ROTAP*: 2VC-; 2VCa (proposed)

42. *Grevillea johnsonii* McGillivray (Proteaceae) Johnson's Grevillea

Distribution within Wollemi – widespread across the northern portions of the park, extending down the western flank to at least Growee Gulf.

Habitat – typical habitat is heath or open woodland on the edges of rocky escarpments, but specimens have also been recorded below clifflines on steep slopes in open forest, and along drainage lines on deeper alluvial soils. Near Mt Oxford in the north-east of the park, associated species on

an exposed upper slope include a canopy of *Eucalyptus sparsifolia*, *E. punctata*, *E. dwyeri* and *Corymbia trachyphloia* subsp. *amphistomatica*, over a sparse understorey of *Dodonaea viscosa* subsp. *cuneata*, *Boronia ledifolia*, *Pultenaea flexilis*, *Cassinia cunninghamii*, *Leptospermum trinervium*, *Acacia doratoxylon*, *Phebalium squamulosum* subsp. *gracile*, *Grevillea mucronulata*, *Maytenus silvestris*, *Cleistochloa rigida*, *Lomandra confertifolia* subsp. *rubiginosa*, *Lepidosperma gunnii*, *Lomandra glauca* and *Pomax umbellata*. At Cox's Gap in the north-west, *Grevillea johnsonii* occurs in an open forest of *Eucalyptus punctata*, *E. sparsifolia* and *E. fibrosa*, with an understorey of *Phebalium squamulosum* subsp. *gracile*, *Dodonaea triangularis*, *Hovea lanceolata*, *Pultenaea cunninghamii*, *Acacia penninervis*, *A. uncinata*, *Philotheca salsolifolia*, *Acacia crassa* subsp. *crassa*, *Leucopogon muticus*, *Cassinia cunninghamii*, *Cleistochloa rigida*, *Lomandra confertifolia* subsp. *rubiginosa*, *Lomandra glauca*, *Dianella revoluta* var. *revoluta*, *Goodenia rotundifolia*, *Joycea pallida* and *Hibbertia circumdens*.

Threats – no threats identified.

Conservation Status – Briggs and Leigh (1996) list only Goulburn River NP, where they consider populations to be inadequate. However, Bell (2001) has suggested that the conservation code for this species be amended to 2RCa, in view of populations recorded from reserves in the Goulburn River valley area over recent years. In addition populations are known from Manobalai NR (Peake & Bell in prep.) and at Mount Gundangaroo near Glen Davis (Benson & Keith 1990).

EPBC Act: not listed; *TSC Act*: not listed; *IUCN (2001)*: LC (proposed); *ROTAP*: 2RCi; 2RCa (Bell 2001)

43. *Grevillea montana* R.Br. (Proteaceae) Mountain Grevillea

Distribution within Wollemi – extensive populations in the Glen Gallic and Woodlands Trig areas of the northern sections of the park, as well as other populations along the Elcom Trail that runs south from Appletree Creek near Jerrys Plains.

Habitat – occurs predominantly in open forest of *Eucalyptus sparsifolia* and *E. punctata*, over an understorey of species such as *Pultenaea flexilis*, *Podolobium ilicifolium*, *Indigofera australis*, *Cleistochloa rigida*, *Lomandra confertifolia* subsp. *rubiginosa*, *Pomax umbellata*, *Helichrysum adeonophorum* var. *waddelliae*, *Poranthera corymbosa*, *Hibbertia obtusifolia* and *Styphandra glauca*. In some locations, plants exceeding 2m in height are not uncommon, which is greater than reported in taxonomic texts.

Threats – no threats identified.

Conservation Status – Briggs and Leigh (1996) list only Wollemi NP as supporting this species, although collections have also been made in Yengo and Werakata NPs (Bell 2004) and other relatively secure conservation tenures in the Hunter Valley over recent years (eg: Myambat Logistics Company site, Singleton Army Training Area). A revised conservation code of 2RCa has been previously suggested to better reflect the status of this species (Bell 2001).

EPBC Act: not listed; *TSC Act*: not listed; *IUCN (2001)*: LC (proposed); *ROTAP*: 2KC-; 2RCa (Bell 2001)

44. *Grevillea obtusiflora* subsp. *obtusiflora* R.Br. (Proteaceae)

Distribution within Wollemi – DECCAtlas record from 2002 exists for this subspecies near Glen Alice in the south-west of the park. This population consists of several hundred plants, and extends over an area of 1.5km of Stacks Ridge and its side spurs in open eucalypt woodland on sandy soil (S. Clarke, pers. comm.).

Habitat – near Clandulla, populations occur in a woodland of *Eucalyptus crebra*, *E. dealbata* and *E. tenella*, over an understorey of species such as *Callistemon linearis*, *Acacia buxifolia*, *Acacia elongata*, *Leucopogon* sp., *Caustis flexuosa*, *Dianella* sp. and *Patersonia* sp. (NPWS 2001). McGillivray (1993) notes only that this taxon occurs in eucalypt woodland with a shrubby understorey, on loamy soils.

Threats – vehicular access, inappropriate fire regimes and roadside management activities (NPWS 2001).

Conservation Status – NPWS (2001) noted that *G. obtusiflora* subsp. *obtusiflora* occurs in and adjacent to Clandulla State Forest near Rylstone to the west of the park, and that no populations were known from secure conservation lands.

EPBC Act: not listed; TSC Act: Endangered; IUCN (2001): VU D1+2 (proposed); ROTAP: 2E

45. *Gyrostemon thesioides* (Hook. f) A.S. George (Gyrostemonaceae)

Distribution within Wollemi – a single male plant recently discovered by Tony Rodd in the Colo River area (Bob Turner's Track) in the south-east of the park, but little information is available.

Habitat – reported habitat includes hillsides and riverbanks, with the Wollemi specimen found on an alluvial terrace above the normal flood zone.

Threats – site and habitat threatened by *Lantana camara* and other weeds.

Conservation Status – a fire-opportunist, *Gyrostemon thesioides* is reportedly confined to the Georges and Nepean Rivers in the wider Sydney region (Harden 1990c).

EPBC Act: not listed; TSC Act: Endangered; IUCN (2001): EN D1 (proposed); ROTAP: not listed; 2EC (proposed)

46. *Haloragodendron gibsonii* Peter G. Wilson & M. Moody (Haloragaceae)

Distribution within Wollemi – recorded from the Wollangambe Wilderness in the south of the park, and on the Newnes Plateau. At least seven populations are known.

Habitat – Fairley (2004) notes (in discussion on *Haloragodendron lucasii*) the general habitat of the Wollemi populations as being in rugged and remote gorges of Bungleboori and Yarramun Creeks in the Wollangambe Wilderness. Wilson and Moody (2006) describe habitat as sheltered gullies and on creek banks, in open forest of *Eucalyptus oreades* with *Ceratopetalum apetalum*, *Logania albiflora*, *Todea barbara*, *Gahnia* sp. and *Prostanthera* sp.. In more exposed sites (such as dissected cliff-lines and pagodas), plants have been found in heath associated with species such as *Allocasuarina distyla*, *Banksia ericifolia*, *Banksia conferta*, *Eucalyptus stricta*, *Leptospermum trinervium*, *Acacia hamiltoniana*, *Oxalis stricta* and *Caustis pentandra*.



Fig. 16. *Leonema scopulinum* (illustration by C. Wardrop 2004)

Threats – no threats identified.

Conservation Status – Briggs and Leigh (1996) coded this species 2RCat (as *Haloragodendron lucasii* subsp. 1 Wollangambe Creek). Orchard (1990) outlines the rediscovery of this species and the closely-related *Haloragodendron lucasii*.

EPBC Act: Endangered; TSC Act: Endangered; IUCN (2001): EN D1 (proposed); ROTAP: 2RCat

47. *Homoranthus cernuus* (R.Baker) Craven & S.R.Jones (Myrtaceae)

Distribution within Wollemi – several populations have been recorded in the Growee Gulf area in the west of the park. These observations would concur with the adequate reservation status applied to this species by Briggs and Leigh (1996).

Habitat – near Oz Mountain and in the upper catchment of Long Creek, *Homoranthus cernuus* occurs in dry open forest of *Eucalyptus sparsifolia* and *E. punctata*, over an understorey of *Allocasuarina littoralis*, *Dillwynia floribunda* var. *teretifolia*, *Philotheca salsoloides*, *Gompholobium virgata* subsp. *aspalathoides*, *Doodenia decurrens*, *Dampiera lanceolata*, *Gonocarpus elatius*, *Lomandra confertifolia* subsp. *rubiginosa*, *Lomandra glauca* and *Cleistochloa rigida*. In the middle Lee Creek catchment, habitat includes heath on pagoda rock formations, associated with *Allocasuarina gymnanthera*, *Leptospermum parvifolium*, *Dillwynia sericea*, *Philotheca salsolifolia*, *Leptospermum sphaerocarpum*, *Baeckea densifolia*, *Leptospermum arachnoides*, *Caustis pentandra*, *Leucopogon muticus*, *Isopogon dawsonii* and other rare species such as *Banksia penicillata*, *Prostanthera hindii* and *Pentachondra dehiscens*.

Threats – no threats identified.

Conservation Status – Briggs and Leigh (1996) note this species as occurring only in Wollemi NP.

EPBC Act: not listed; TSC Act: not listed; IUCN (2001): LC (proposed); ROTAP: 2RCa

48. *Isotropis foliosa* Crisp (Fabaceae: Faboideae)

Distribution within Wollemi – about 100 plants recorded in the Apple Tree Creek area, near Denman, northern Wollemi during the 1990s, in dry, rocky, sandy soils in very open vegetation (T. Tame, pers. comm.).

Habitat – on alluvial soils supporting open grassy forest of *Eucalyptus crebra* (Fallding et al. 1997). This habitat is widespread across the northern sections of Wollemi, and additional unrecorded populations may be present.

Threats – grazing from adjacent properties.

Conservation Status – *Isotropis foliosa* is a poorly known species occupying an extensive range between the Moreton district of Queensland, south to the Hunter Valley. Within the Hunter Valley, populations are known from the Myambat Logistics Company site near Denman just outside of Wollemi (Fallding et al. 1997), on the boundary of Wingen Maid Nature Reserve (Hill et al. 2001), and at three other locations near Scone (T. Peake, pers. comm.). A small population occurs at Derra Derra Ridge on the North Western Slopes (Benson et al. 1996). Crisp (1987) suggested a conservation risk code of 2E when describing *Isotropis foliosa*, although at that time it was known only from Queensland. Subsequent populations discovered in NSW resulted in the revised code of 3KC- by Briggs and Leigh (1996), although a Vulnerable listing may now be more appropriate.

EPBC Act: not listed; TSC Act: not listed; IUCN (2001): VU D2 (proposed); ROTAP: 3VC- (proposed)

49. *Kennedia retrorsa* Hemsley (Fabaceae: Faboideae)

Distribution within Wollemi – recorded from Hungerford Creek catchment in the east of the park (1969), near Bilpin in the south (1969), and Dingo Creek and the Baerami Valley (1984, 1999) in the north (DECC Atlas Gibson 2002). Gibson (2002) discusses a fruitless search in the Hungerford Creek location, and suggests there may have been identification and/or databasing errors with the original collection.

Habitat – Maryott-Brown and Wilks (1993) indicate that *Kennedia retrorsa* occurs in sheltered forests on rich soils, in association with *Eucalyptus deanei*, *Smilax australis*, *Rapanea howittiana*, *Baeckea cunninghamii* and *Senecio* spp.

Threats – no threats identified.

Conservation Status – Goulburn River (inadequately conserved) and Wollemi (adequate) NPs (Briggs & Leigh 1996). Due to lack of recent records, there may be a case for upgrading the risk code to 2VCi

EPBC Act: not listed; TSC Act: Vulnerable; IUCN (2001): DD (proposed); ROTAP: 2VCa; 2VCi (proposed)



Fig. 17. *Lissanthe sapida* (illustration by C. Wardrop 2003)

50. *Keraudrenia corollata* var. *denticulata* C.White (Sterculiaceae)

Distribution within Wollemi – recorded in the proposed Morans Rocks additions adjacent to the south-eastern corner of the park (Latham 1995).

Habitat – Sydney ridge-top woodland on Hawkesbury Sandstone (Latham 1995). Benson and McDougall (2001) described habitat for this species as open forest with *Eucalyptus deanei*, *Tristaniopsis laurina*, *Backhousia myrtifolia*, *Commersonia fraseri*, *Rulingia dasyphylla* and *Hibiscus heterophyllus*.

Threats – no threats identified.

Conservation Status – Briggs and Leigh (1996) list this species only for Gibraltar Range NP near Grafton, with no reservation in the Greater Sydney area.

EPBC Act: not listed; TSC Act: not listed; IUCN (2001): DD (proposed); ROTAP: 3RC

51. *Leionema lamprophyllum* subsp. *orbiculare* F.M. Anderson (Rutaceae)

Distribution within Wollemi – within and near Wollemi NP in the vicinity of Dunns Swamp (Kandos Weir), also from Newnes and Coricudgy State Forests

Habitat – restricted to the exposed sandstone turrets and domes that characterise sections of the west of Wollemi, commonly referred to as “pagodas”. Anderson (1999) notes that the subspecies has been recorded from open heath to open shrubland of *Acacia* and *Calytrix* species, to low open *Eucalyptus*-dominated woodland. Benson and McDougall (2001) add the associates *Banksia ericifolia*, *Banksia spinulosa*, *Calytrix tetragona* and *Brachyloma daphnoides*. Such habitat is reasonably common in restricted areas along the western escarpment of Wollemi, and consequently there is considerable potential habitat for this taxa.

Threats – no threats identified.

Conservation Status – Anderson (1999) described three new subspecies of *Leionema lamprophyllum* (formerly *Phebalium lamprophyllum*), with subsp. *orbiculare* occurring on the western escarpment including Wollemi NP, and applied a conservation risk code of 2R-. A small population of this subspecies recorded in rocky cliffline habitat in Pokolbin State Forest, over 100 km to the east, is now listed as an Endangered Population in the Hunter Catchment, on the NSW TSC Act 1995 (T. Tame, pers. comm.).

EPBC Act: not listed; TSC Act: not listed; IUCN (2001): DD (proposed); ROTAP: 2R- (Anderson 1999)

52. *Leionema scopulinum* B.M. Horton & Crayn (Rutaceae)

Distribution within Wollemi – known from 29 occurrences in the north-west of the park, in the headwaters of Lee Creek and the Growee River (Horton et al. 2004). A total population of about 1500 plants within an area 14 km by 7 km has been estimated.

Habitat – Habitat is described as heathland on shallow sandy soils on Narrabeen Sandstone pagodas, where common associated species include *Acacia obtusifolia*, *A. terminalis*, *A. ulicifolia*, *Allocasuarina distyla*, *Amperea xiphioclada*, *Banksia penicillata*, *Boronia anemonifolia*, *B. angustisepala*, *Callitris endlicheri*, *Calytrix tetragona*, *Caustis pentandra*, *Cooperookia barbata*, *Dampiera adpressa*, *Dillwynia retorta*, *Eucalyptus rossii*, *Epacris coriacea*, *E. reclinata*, *Exocarpus cupressiformis*, *Goodenia decurrens*, *Hibbertia monogyne*, *Homoranthus cernuus*, *Isopogon anemonifolius*, *Leptospermum arachnoides*, *L. parvifolium*, *L. sphaerocarpum*, *Leucopogon muticus*, *L. setiger*, *Logania albiflora*, *Monotoca scoparia*, *Ochrosperma oligomerum*, *Persoonia linearis*, *Phebalium squamulosum* subsp. *gracile*, *Philotheca salsolifolia* subsp. *salsolifolia*, *Platysace linifolia*,

Prostanthera hindii and *Pseudanthus pimeleoides* (Horton et al. 2004; Washington 2004).

Threats – no threats identified.

Conservation Status – Horton et al. (2004) suggest that listing under the NSW TSC Act 1995 as Vulnerable or Endangered may be appropriate, and a provisional conservation risk code of 2RCit.

EPBC Act: not listed; TSC Act: not listed; IUCN (2001): VU D2 (proposed); ROTAP: 2RCit (Horton et al. 2004)

53. *Leionema sympetalum* (Paul G. Wilson) Paul G. Wilson (Rutaceae) Rylstone Bell

Distribution within Wollemi – Populations are known from approximately 1.5kms south of Dunns Swamp (Kandos Weir); at the headwaters of Coorongooba Creek to the west of the Army Road; on the slopes of Mt Iris in the west; north of Tayan Peak; and in the Capertee River area 5km north-west of Glen Davis (DECC Atlas; S. Clarke, pers. comm.).

Habitat – Benson and McDougall (2001) indicate rocky outcrops with woodland of *Eucalyptus laophila* and *Eucalyptus bensonii*, and heath



Fig. 18. *Pentachondra dehiscens* (illustration by Lesley Elkan 2000)

of *Allocasuarina distyla*, *Caustis pentandra* and *Acacia suaveolens* as habitat. In some populations, plants support 4- or 5-flowered inflorescences rather than the reported 1–3, and regenerate from the rootstock following severe fire (S. Clarke, pers. comm.)

Threats – no threats identified.

Conservation Status – Briggs and Leigh (1996) only list Wollemi NP

EPBC Act: not listed; TSC Act: Vulnerable; IUCN (2001): NT (proposed); ROTAP: 2VC-

54. *Leionema* sp. ‘Colo River’ (Weston 2423) (Rutaceae)

Distribution within Wollemi – undescribed species (Weston & Harden 2002) known only from riparian forests along the Colo River and Hungryway Creek.

Habitat – Benson and McDougall (2001) note *Leionema* sp. ‘Hungryway Creek’ as a poorly-known local endemic occurring within Wollemi NP. Associated species are *Tristaniopsis laurina*, *Stenocarpus salignus*, *Lomatia myricoides* and *Backhousia myrtifolia*.

Threats – no threats identified.

Conservation Status – In a review of the former *Phebalium*, Wilson (1998b) suggested that specimens from this location, formerly known as *Phebalium* sp. A, may be hybrids with *Leionema elatius* due to the presence of deformed flowers and apparently sterile anthers. However, *Leionema elatius* has not been recorded from the Colo River area, and further sampling is required.

EPBC Act: not listed; TSC Act: not listed; IUCN (2001): DD (proposed); ROTAP: 2VC- (Wilson 1998b)

55. *Leptospermum spectabile* J.Thompson (Myrtaceae)

Distribution within Wollemi – occurs only along the Colo River in the south-eastern portion of Wollemi, where it grows on rocky sandstone banks amongst sandstone boulders (Thompson 1989; Thompson & Logan 2002).

Habitat – occurs in localised small populations in sandy alluvium and amongst rocky boulders in areas subject to flooding, within thickets of *Tristaniopsis laurina* and *Lomatia myricoides* (Benson 1990).

Threats – no threats identified.

Conservation Status – coded 2RC-, and only conserved in Wollemi NP (Briggs & Leigh 1996)

EPBC Act: not listed; TSC Act: not listed; IUCN (2001): VU D1+2 (proposed); ROTAP: 2RC-; 2RCt (proposed)

56. *Leucochrysum graminifolium* Paul G. Wilson (Asteraceae)

Distribution within Wollemi – Rocky Creek and Mt Dawson areas in the south-west, north of Newnes Plateau.

Habitat – In the Rocky Creek area of the Newnes Plateau, *Leucochrysum graminifolium* occurs in rocky pagoda heath with *Banksia ericifolia*, *Allocasuarina nana*, *Dillwynia floribunda* var. *teretifolia*, *Prostanthera hindii*, *Leptospermum parvifolium*, *Calytrix tetragona*, *Cryptandra propinqua*, *Petrophile pulchella*, *Leptospermum arachnoides*, *Acacia hamiltoniana*, *Schoenus ericetorum*, *Dampiera stricta*, *Stylidium lineare*, *Hakea laevipes* and *Hakea propinqua*. A few scattered plants were noted at this location, and it is possible that most pagodas in this area support the species. Plants are also known from the Red Rocks and Mt Dawson areas of the park near Newnes (H. Washington, pers. comm.).

Threats – no threats identified.

Conservation Status – listed by Briggs and Leigh (1996) with a conservation code of 2R. Apart from Wollemi, there is one 1993 record from the nearby Pantoneys Crown Nature Reserve (DECCAtlas), and

Washington (2001a) has also recorded this species within the adjacent Gardens of Stone NP, where it is common on rocky pagodas and rock shelves. These recent records represent the first for a conservation reserve, and consequently it is suggested that the conservation risk code be amended to 2RC-.

EPBC Act: not listed; TSC Act: not listed; IUCN (2001): LC (proposed); ROTAP: 2R; 2RC- (proposed)

57. *Lissanthe sapida* R.Br. (Epacridaceae)

Distribution within Wollemi – principally occurs in the southern portions around Mountain Lagoon and the Colo River, although Maryott-Brown and Wilks (1993) indicate some small populations in the Mt Popong area towards the north-east of the park.

Habitat – Maryott-Brown and Wilks (1993) summarise the habitat of this species as dry sheltered forest on a variety of sandstone and mudstone derived soils, in association with *Eucalyptus punctata*, *E. globoidea*, *Pultenaea cunninghamii*, *Dodonaea triquetra*, *Podolobium ilicifolium*, *Phyllanthus hirtellus* and various *Lomandra* species. Along the Culoul Range in south-eastern Wollemi, *Lissanthe sapida* occurs in an open forest of *Corymbia eximia*, *Eucalyptus sparsifolia* and *E. piperita*, over an understorey of *Dillwynia floribunda* var. *teretifolia*, *Leptospermum trinervium*, *Dillwynia acicularis*, *Boronia ledifolia*, *Persoonia linearis*, *Platysace linearifolia*, *Grevillea buxifolia* subsp. *buxifolia*, *Stylidium productum*, *Hibbertia obtusifolia*, *Lomandra glauca* and *Patersonia glabrata*. Other habitats in southern Wollemi include sheltered forest of *Allocasuarina torulosa*, *Corymbia gummifera*, *Syncarpia glomulifera*, *Angophora costata* and *Eucalyptus sparsifolia*, over an understorey of *Lomatia silaifolia*, *Kunzea ambigua*, *Podolobium ilicifolium*, *Xylomelum pyriforme*, *Tetratheca thymifolia*, *Goodenia decurrens*, *Entolasia stricta*, *Stylidium productum* and *Dianella caerulea*; and an exposed woodland of *Eucalyptus piperita*, *Angophora costata*, *Corymbia gummifera*, *Eucalyptus sparsifolia*, *Banksia serrata*, *Dillwynia retorta*, *Gompholobium latifolium*, *Leptospermum polyanthum*, *Pteridium esculentum*, *Leucopogon muticus*, *Lomandra filiformis* subsp. *filiformis*, *Amperea xiphioclada* var. *xiphioclada*, *Lomandra glauca* and *Stylidium productum*.

Threats – no threats identified.

Conservation Status – present in Blue Mountains, Wollemi and Dharug NPs (Briggs & Leigh 1996). Maryott-Brown and Wilks (1993) note that this species occurs on the western border of Yengo NP, and James (1997) notes the species for Gulguer Nature Reserve. NPWS (2003b) indicate that it is well represented within the Warragamba Special Area, which includes several conservation reserves.

EPBC Act: not listed; TSC Act: not listed; IUCN (2001): LC (proposed); ROTAP: 3RCa

58. *Lomandra fluviatilis* (R.Br.) A.T.Lee (Lomandraceae)

Distribution within Wollemi – recorded from the Colo River, Howes Valley and northern parts of the park (Maryott-Brown and Wilks 1993; Fairley 2004).

Habitat – Maryott-Brown and Wilks (1993) indicate that this species occurs in moist sheltered areas in creek beds, growing amongst sandstone outcroppings.

Threats – no threats identified.

Conservation Status – Briggs and Leigh (1996) note this species for Blue Mountains, Morton, Garigal, Marramara, and Royal NPs, and Bents Basin State Recreation Area (Briggs & Leigh 1996). It is also known from Heathcote NP (pers obs.), Gulguer Nature Reserve (James 1997) and Gardens of Stone NP (Washington 2001a).

EPBC Act: not listed; TSC Act: not listed; IUCN (2001): LC (proposed); ROTAP: 3RCa

59. *Macrozamia elegans* K.D. Hill & D.L. Jones (Zamiaceae)

Distribution within Wollemi – Mountain Lagoon, Cedar Ridge and Grassy Hill between the Colo River and the Putty Road (Hill 1998; Fairley 2004).

Habitat – dry sclerophyll woodland on undulating to steeply sloping sites on sandstone.

Threats – illegal collecting of seeds and plants

Conservation Status – Hill (1998) suggests that this species is potentially under threat from habitat destruction and poaching, despite much of the known population lying within NP. Donaldson (2003) lists this species with an IUCN code of EN A2ad.

EPBC Act: not listed; TSC Act: not listed; IUCN (2001): EN A2ad (Donaldson 2003); ROTAP: 2VC-

60. *Melaleuca deanei* F. Muell. (Myrtaceae) Deane's Honey-Myrtle

Distribution within Wollemi – a single DECCAtlas record from 1998 near Upper Colo in the south-east of the park, however further details are unavailable.

Habitat – Fairley (2004) indicates that this species prefers dry ridges with sandy soils, or with laterite in shrubby woodland, while Maryott-Brown and Wilks (1993) suggest wet heaths near streams or perched swamps on ridges of Hawkesbury Sandstone geology.

Threats – no threats identified.

Conservation Status – represented within several coastal reserves, including Brisbane Water, Garigal, Heathcote, Ku-ring-gai Chase, Royal and Morton NPs (Briggs & Leigh 1996).

EPBC Act: not listed; TSC Act: Vulnerable; IUCN (2001): VU C2(ai) (proposed); ROTAP: 3RC-

61. *Melaleuca groveana* Cheel & C. White (Myrtaceae) Grove's Paperbark

Distribution within Wollemi – known from one location on the California Trail in the north-east of the park, although likely to be scattered elsewhere in the north-east.

Habitat – on the California Trail, *Melaleuca groveana* occurs in an open forest of *Eucalyptus fibrosa*, *E. sparsifolia*, *E. punctata* and *Angophora costata* over a shrubby understorey of *Acacia linifolia*, *Pultenaea scabra*, *Pultenaea flexilis*, and *Lasiopetalum ferrugineum* var. *cordatum*, and a ground layer of *Entolasia stricta*, *Cleistochloa rigida*, *Anisopogon avenaceus*, *Austrostipa scabra* subsp. *falcata*, *Lomandra filiformis* subsp. *coriacea*, and *Phyllanthus hirtellus*. Individual specimens of *Melaleuca groveana* were noted to be 5–8m in height, and several were resprouting from their bases following fire. It is likely that up to 50 plants occur at this location. Populations present in the adjacent Yengo NP occur in close proximity to rocky outcrops, but still within an open forest or woodland of *Eucalyptus punctata*, *E. sparsifolia* and *E. crebra* (Maryott-Brown & Wilks 1993).

Threats – no threats identified.

Conservation Status – Populations are known from Yengo NP (Bell et al. 1993, where they are considered inadequate) as well as Tomaree NP (Benson 1981; Bell 1997b, inadequate) and Six Brothers Flora Reserve (inadequate, Briggs & Leigh 1996). Binns (1996) also reports the species from Pokolbin and Corrabare State Forests. In Queensland, this species also occurs in Blacktown Tableland and Mount French NPs (unknown population sizes), and Beerwah NP (inadequate) (Briggs & Leigh 1996).

EPBC Act: not listed; TSC Act: Vulnerable; IUCN (2001): VU C2(ai); D2 (proposed); ROTAP: 3RC-

62. *Olearia cordata* Lander (Asteraceae)

Distribution within Wollemi – recorded at two locations above Milbrodale Creek in the north-eastern section of the park (Bell 1998), extending its known range north from Wollombi (Lander 1992). Other known populations include the ridges around the Colo and Capertee Rivers, and the Mountain Lagoon area in the south (DECC Atlas; Fairley 2004).

Habitat – above Milbrodale Creek, scattered plants were recorded on a ridgeline in an open forest of *Eucalyptus sparsifolia*, *E. beyeriana*, *E. fibrosa*, and *Angophora costata*. Understorey vegetation included



Fig. 19. *Pomaderris sericea* (illustration by Lesley Elkan 2004)

the shrubs *Monotoca scoparia*, *Acacia linifolia*, *Pultenaea scabra*, *Acacia terminalis*, *Exocarpus strictus*, *Acacia saliciformis*, *Podolobium ilicifolium*, and *Acacia ulicifolia*, and the herbs/ grasses *Lomandra obliqua*, *Entolasia stricta*, *Patersonia sericea*, *Lomandra filiformis* subsp. *coriacea*, *Goodenia heterophylla*, *Anisopogon avenaceus*, *Dianella revoluta* var. *revoluta* and *Panicum simile*. Further down the ridge in a lower slope position, associated species included *Eucalyptus punctata*, *E. beyeriana*, *E. sparsifolia* and *Angophora euryphylla* in the canopy, with the shrubs *Prostanthera violacea*, *Dodonaea triquetra*, *Pultenaea scabra*, *Gompholobium virgatum* var. *aspalathoides*, *Grevillea mucronulata*, *Podolobium ilicifolium*, *Bursaria spinosa*, and the herbs/ grasses *Pomax umbellata*, *Phyllanthus hirtellus*, *Lomandra filiformis* subsp. *coriacea*, *Entolasia stricta*, *Dianella caerulea* var. *caerulea*, *Actinotus helianthi*, and *Aristida vagans*. Both areas had suffered an intense fire three years previously, which had dramatically opened up the understorey vegetation. Estimates of around 80–100 plants were made at these locations, although not all areas were examined thoroughly. Maryott-Brown and Wilks (1993) report that populations of *Olearia cordata* in the adjacent Yengo NP occur in a habitat comprising *Angophora costata*, *Angophora bakeri*, *Eucalyptus punctata* and *Corymbia eximia* in the canopy, over a shrub layer of *Allocasuarina torulosa*, *Acacia linifolia*, *Persoonia linearis*, *Leucopogon muticus* and various grasses.

Threats – frequent fire events.

Conservation Status – These authors list this species for Wollemi and Yengo NPs, as well as Wisemans Ferry Historic Site. All three reserves reportedly support inadequate populations (Briggs & Leigh 1996).

EPBC Act: not listed; TSC Act: Vulnerable; IUCN (2001): VU B1; C2b (proposed); ROTAP: 2VCi

63. *Olearia quercifolia* Sieber ex DC (Asteraceae)

Distribution within Wollemi – a DECC Atlas record from 2004 exists for *Olearia quercifolia* from the Galah Mountain area in the south-west of the park, along the Mt Cameron Fire Trail.

Habitat – The NSW Scientific Committee (2005) include this species in Newnes Plateau Shrub Swamp Endangered Ecological Community, listed under the NSW TSC Act 1995. This community is dominated by shrubs, with a variable cover of sedges. Shrubs have a dense to open cover, and include *Baekea linifolia*, *Grevillea acanthifolia* subsp. *acanthifolia*, *Epacris paludosa* and *Leptospermum* species. The cover of sedges varies inversely with shrub cover. Common sedges include *Baloskion australe*, *Empodisma minus*, *Lepyrodia scariosa* and *Lepidosperma limicola*, while herbs include *Patersonia fragilis* and *Xanthosia dissecta*. *Gleichenia dicarpa* and *Gymnoschoenus sphaerocephalus* may occur around drainage lines, while *Lomandra longifolia* may be prominent around the swamp margins. Douglas and Bell (in prep.) note that *Olearia quercifolia* occurs in plateau swamps in the Blue Mountains, which include a fern-dominated form, sedge-dominated form, and a *Leptospermum* and *Hakea*-dominated form, all of which can occur in a single swamp.

Threats – no threats identified.

Conservation Status – Briggs and Leigh (1996) note this species for Blue Mountains and Kosciusko NPs.

EPBC Act: not listed; TSC Act: not listed; IUCN (2001): LC (proposed); ROTAP: 3RC-

64. *Ozothamnus tessellatus* (Maiden & R.Baker) A.Anderb. (Asteraceae)

Distribution within Wollemi – restricted to the drier, northern footslopes of Wollemi, such as around Coxs Gap and the major valleys draining into the Goulburn River, generally along the talus slopes at the edge of the escarpment.

Habitat – scattered populations of this species occur in open woodland or forest on Permian Sediments dominated by *Eucalyptus dawsonii*, *E. punctata* and *E. albens/ moluccana*, with an understorey of species such as *Acacia ixiophylla*, *Dodonaea viscosa*, *Bursaria longissima*, *Lomandra multiflora* subsp. *multiflora*, *Opercularia hispida*, *Dianella revoluta*, *Lomandra confertifolia* subsp. *rubiginosa* and *Sida corrugata*.

Threats – no threats identified.

Conservation Status – Briggs and Leigh (1996) indicated that Wollemi and Goulburn River NPs support the only known populations of this species from gazetted reserves. McRae and Cooper (1985), Bell (1997c) and Hill (1999) detail populations in Goulburn River NP.

EPBC Act: not listed; TSC Act: Vulnerable; IUCN (2001): VU B1 (proposed); ROTAP: 2VC-

65. *Pentachondra dehiscens* W. Cherry (Ericaceae)

Distribution within Wollemi – growing on cliff faces in the rugged west of the park, with few populations known. Recently described (Cherry et al. 2001), based on specimens collected from the Oz Mountain area of Wollemi and the Grose River valley in Blue Mountains NP.

Habitat – restricted to crevices in sandstone outcrops and cliff lines, usually with a south to south-western aspect, in sheltered to open situations in eucalypt woodlands and forests. Associated species include *Rupicola ciliata*, *Dracophyllum secundum*, *Epacris muelleri*, *Epacris crassifolia* and *Epacris reclinata*.

Threats – no threats identified.

Conservation Status – Cherry et al. (2001) suggest a conservation risk code of 3RC.

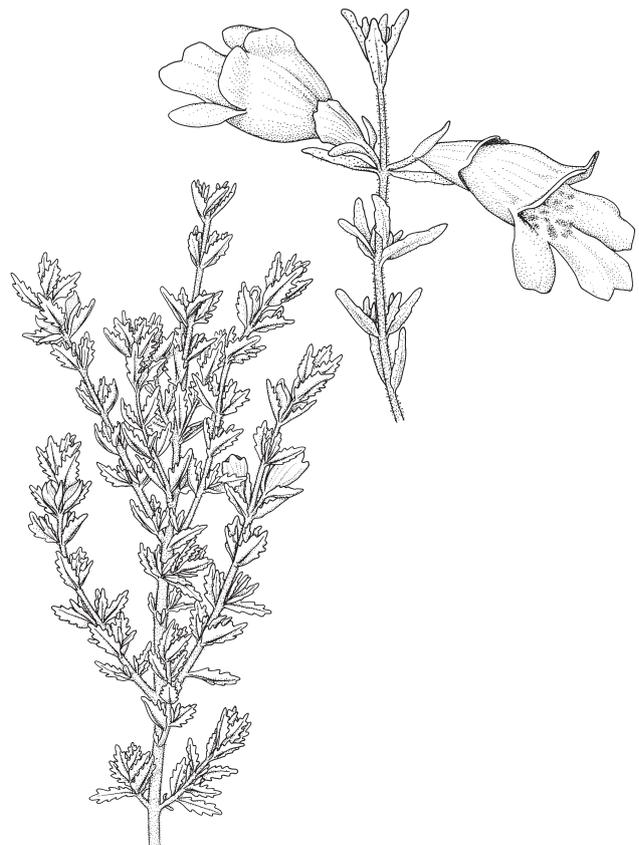


Fig. 20. *Prostanthera cryptandroides* (illustration by Lesley Elkan 1998)

EPBC Act: not listed; TSC Act: not listed; IUCN (2001): VU D2 (proposed); ROTAP: 3RC (Cherry et al. 2001)

66. *Persoonia hirsuta* subsp. *evoluta* L.A.S. Johnson & P.H. Weston (Proteaceae)

Distribution within Wollemi – recorded around the Putty district in the central east of the park, extending west to near Glen Davis, and occurring as scattered individuals or in small groups (Weston 2002).

Habitat – mountainous areas between Putty and Glen Davis (Fairley 2004). No other habitat information available.

Threats – no threats identified.

Conservation Status – two subspecies of *Persoonia hirsuta* are currently recognised, both of which intergrade extensively from the lower Blue Mountains to within 15km of the coast. *Persoonia hirsuta* subsp. *hirsuta* has linear to narrow-oblong leaves 0.75–1.5mm wide, with revolute margins, and occurs from Gosford to Royal NP; *Persoonia hirsuta* subsp. *evoluta* shows spatulate to elliptic or narrowly-elliptic leaves 1.5–5mm wide, with recurved margins, and occurs from the Putty district to Glen Davis and Hill Top (Weston 2002). Briggs and Leigh (1996) include Blue Mountains, Wollemi, Dharug, Ku-ring-gai Chase, Marramarra, Royal, and Sydney Harbour NPs as reserves supporting this species, stating all but Wollemi NP carry inadequate populations.

EPBC Act: Endangered; TSC Act: Endangered; IUCN (2001): EN B1 (proposed); ROTAP: 3KCi

**67. *Persoonia marginata* A. Cunn. Ex R.Br. (Proteaceae)
Clandulla Geebung**

Distribution within Wollemi – a single DECC Atlas record from 1999 for the northern rim of Wollemi, in the Dingo Creek area. Requires confirmation as all other records occur south of Rylstone on older sediments (DEC 2000).

Habitat – occurs in sclerophyll forest on sandstone, in woodland of *Eucalyptus punctata*, *E. sparsifolia*, *E. rossii*, *E. fibrosa* and *E. crebra*. Associated understorey species include *Acacia buxifolia*, *Exocarpos strictus*, *Acacia terminalis*, *Pultenaea microphylla*, *Acacia verniciflua*, *Dillwynia phyllicoides*, *Platysace ericoides*, *Persoonia linearis* and *Grevillea ramosissima*. Ground layer species include *Joycea pallida*, *Lomandra filiformis* var. *coriacea*, *Dianella revoluta* and *Chrysocephalum apiculatum* (DEC 2000).

Threats – no threats identified.

Conservation Status – principally occurs within the Clandulla State Forest near Kandos (NPWS 2000c), but is also present in Gardens of Stone NP to the south-west of Wollemi (Washington 2001a).

EPBC Act: Vulnerable; TSC Act: Vulnerable; IUCN (2001): EN B1 (proposed); ROTAP: 2V

68. *Philotheca obovalis* (Cunn.) Paul G. Wilson (Rutaceae)

Distribution within Wollemi – recorded on the northern Newnes Plateau, and east along Mt Cameron Fire Trail.

Habitat – In the area north of Newnes Plateau, *Philotheca obovalis* occurs in montane rocky heath, associated with species such as *Banksia ericifolia*, *Leptospermum parvifolium*, *Eucalyptus laophila*, *Dillwynia floribunda* var. *teretifolia*, *Leptospermum arachnoides*, *Calytrix tetragona*, *Platysace lanceolata*, *Kunzea ambigua*, *Baeckea densifolia*, *Lomandra glauca*, *Schoenus turbinatus*, *Allocasuarina nana* and *Grevillea sericea*. Along the Mt Cameron Fire Trail, it occurs in an open forest of *Eucalyptus sclerophylla*, *E. piperita* and *E. sieberi*, over an understorey of several sclerophyllous species including *Dillwynia phyllicoides*, *Hakea propinqua*, *Hakea dactyloides*, *Hibbertia serpyllifolia*, *Leptospermum sphaerocarpum*, *Telopea speciosissima*, *Banksia serrata*, *Phyllota squarrosa*, *Petrophile*

pulchella, *Podolobium ilicifolium*, *Caustis flexuosa*, *Lomandra obliqua* and *Patersonia glabrata*.

Threats – no threats identified.

Conservation Status – Briggs and Leigh (1996) considered that this species is adequately conserved in Blue Mountains NP, with insufficient information available on population sizes within Wollemi NP. Washington (2001a) also records it near Mt Jamison and Point Cameron in Gardens of Stone NP.

*EPBC Act: not listed; TSC Act: not listed; IUCN (2001): LC (proposed); ROTAP: 3RCa (as *Eriostemon obovalis*)*

69. *Pimelea curviflora* var. *curviflora* R. Br. (Thymelaeaceae)

Distribution within Wollemi – Latham (1995) includes this taxon for the proposed Morans Rock addition to Wollemi near Maroota in the south-east, but no other records are known.

Habitat – Sydney ridge-top woodland on Hawkesbury Sandstone geology (Latham 1995). Benson and McDougall (2001) describe habitat for this species as woodland on ridges and upper slopes, supporting *Corymbia eximia*, *Eucalyptus capitellata*, *E. sieberi* and *E. punctata*, and open forest of *E. pilularis*, *Angophora costata*, *Corymbia gummifera* and *Eucalyptus sieberi*. Such habitat is widespread in the south-eastern sections of the park, and there is potential for other populations to be present.

Threats – no threats identified.

Conservation Status – restricted to coastal areas around Sydney (Harden 1990a). In listing the species, the NSW Scientific Committee noted that this taxon is known only from one locality in each of Garigal NP and



Fig. 21. *Prostanthera hindii* (illustration by Lesley Elkan 1997)

Muogamarra Nature Reserve, and that a total of only 20 populations were known from North Sydney to Maroota. Benson and McDougall (2001) also note its presence in Ku-ring-gai Chase and Wollemi NPs.

EPBC Act: Vulnerable; TSC Act: Vulnerable; IUCN (2001): EN B1 (proposed); ROTAP: 2VC- (proposed)

70. *Platysace clelandii* (Maiden & Betche) L.Johnson (Apiaceae)

Distribution within Wollemi – recorded in the hills around the Colo and Capertee Rivers in the south, east of Glen Davis in the west, and near the Kekeelbon Mountains in the centre of the park. Latham (1995) notes the species as occurring in the proposed Morans Rock addition to the park near Maroota.

Habitat – in the upper catchment of Wollemi Creek, *Platysace clelandii* was recorded occurring in an open forest of *Eucalyptus piperita*, *E. sparsifolia* and *E. punctata*, over an understorey of *Acacia longifolia*, *Prostanthera prunelloides*, *Persoonia linearis*, *Podolobium ilicifolium*, *Oxylobium arborescens*, *Lomatia silaifolia*, *Pomaderris ledifolia*, *Pteridium esculentum*, *Lepidosperma urophorum*, *Lomandra filiformis* and *Lepidosperma laterale*. Maryott-Brown and Wilks (1993) summarise the habitat of this species for the adjacent Yengo NP as dry sclerophyll woodland on exposed Hawkesbury Sandstone ridges, associated with *Angophora costata*, *Angophora bakeri*, *Eucalyptus punctata*, *Corymbia eximia*, *Syncarpia glomulifera*, *Podolobium ilicifolium*, *Acacia linifolia*, *Persoonia linearis*, *Pultenaea cunninghamii* and various grasses.

Threats – no threats identified.

Conservation Status – currently known from Wollemi, Yengo, and Marramarra NPs, and Parr State Recreation Area (Briggs & Leigh 1996; Maryott-Brown and Wilks 1993).

EPBC Act: not listed; TSC Act: not listed; IUCN (2001): LC (proposed); ROTAP: 2RCa

71. *Pomaderris bodalla* N.G. Walsh & F.Coates (Rhamnaceae)

Distribution within Wollemi – recorded on the slopes of Woodlands Trig. (a basalt knoll) along the northern escarpment of the park. While only a few plants were noted, it is possible that further populations occur in the area.

Habitat – open forest of *Eucalyptus moluccana*, *Eucalyptus punctata*, *Eucalyptus beyeriana*, *Grevillea montana*, *Dodonaea viscosa* var. *cuneata*, *Notelaea microcarpa* var. *microcarpa*, *Aristida vagans*, *Pratia purpurascens*, *Aristida ramosa*, *Lagenophora stipitata*, *Lomandra confertifolia* subsp. *rubiginosa*, *Gahnia aspera*, *Joycea pallida* and *Veronica plebeia*.

Threats – no threats identified.

Conservation Status – Walsh and Coates (1997) suggested a conservation code of 2R for this recently described species, although more recent collections from the Hunter Valley suggest a revision to 3RC- (Bell 2001). On the South Coast of NSW, Walsh and Coates (1997) indicated that *Pomaderris bodalla* was apparently endemic to the area between Nerrigundah and Brogo, where it grows in sheltered sites (gullies and streambanks) in moist open forest, within an altitudinal range of 40–350m ASL. The species occurs in Bodalla State Forest, but is not mentioned for formal reserves in that area. Other collections have also been made from Wingen Maid Nature Reserve near Scone in the upper Hunter Valley (Hill, Peake, Bell & Raine 2001).

EPBC Act: not listed; TSC Act: Vulnerable; IUCN (2001): VU D2 (proposed); ROTAP: 2R (Walsh & Coates 1997); 3RC- (Bell 2001)

72. *Pomaderris brunnea* Wakef. (Rhamnaceae)

Distribution within Wollemi – only known from the Tea Tree Flat area in the central west of the park, and the Culoul Range in the south-east (1966 DECC Atlas record).

Habitat – At Tea Tree Flat, *Pomaderris brunnea* occurred as scattered plants in a riparian forest of *Eucalyptus cypellocarpa*, *E. elata*, and *Angophora floribunda*, over a tall shrub layer of *Acacia parramattensis* and *Acacia obliquenerva*. Ground layer vegetation included the ferns *Pteridium esculentum* and *Calochlaena dubia*, together with the herbs *Lomandra longifolia*, *Geranium homeanum*, *Dichondra repens*, *Galium propinquum*, *Veronica plebeia*, *Desmodium varians*, and *Ajuga australis*. Maryott-Brown and Wilks (1993) report this species from open forests and woodlands in association with *Eucalyptus amplifolia*, *Angophora floribunda*, *Acacia parramattensis*, *Bursaria spinosa* and *Kunzea ambigua*.

Threats – no threats identified.

Conservation Status – Briggs and Leigh (1996) indicate that this species occurs only in Wollemi NP, where population sizes are largely unknown.

EPBC Act: not listed; TSC Act: Vulnerable; IUCN (2001): DD (proposed); ROTAP: 2VC-

73. *Pomaderris pauciflora* Wakef. (Rhamnaceae)

Distribution within Wollemi – collected at Hoolem Boy Point in the western section of the park in 1969, but no further details are available.

Habitat – Harden (1990b) states that this species often grows near streams, on the ranges south of Merriwa, and in the Braidwood district to the south.

Threats – no threats identified.

Conservation Status – Briggs and Leigh (1996) list this species as occurring only in Deua NP in NSW, and in Cooperacambra State Park in Victoria.

EPBC Act: not listed; TSC Act: not listed; IUCN (2001): DD (proposed); ROTAP: 3RC-

74. *Pomaderris precaria* N.G. Walsh & F. Coates (Rhamnaceae)

Distribution within Wollemi – Scattered plants recorded from Oz Mountain in the west of the park (Bell 1998). Walsh and Coates (1997) earlier indicated that this species had not been collected from Wollemi since 1966, and that the species was in a precarious reservation state.

Habitat – Associated species at Oz Mountain were *Eucalyptus sparsifolia* and *E. punctata* in the canopy, *Dodonaea boronifolia*, *Prostanthera prunelloides*, *Boronia anethifolia*, *Isopogon dawsonii*, *Hakea dactyloides*, *Poranthera corymbosa*, *Acacia linearifolia* and *Acacia buxifolia* in the shrub layer, and with a ground cover of *Lomandra confertifolia* subsp. *rubiginosa*, *Stypantra glauca*, *Dampiera lanceolata*, *Joycea pallida*, *Lepidosperma laterale* and *Phyllanthus hirtellus*. Other collections of this species in Goulburn River NP (Bell 1997d) and the Myambat Logistics Company Site at Denman (Fallding et al. 1997) occur in similar habitat, suggesting that this species may be distributed sporadically in sheltered localities along much of the western escarpment of Wollemi.

Threats – no threats identified.

Conservation Status – listed 2VC- when described by Walsh and Coates (1997). Bell (2001) suggested a revision of this code to 2EC-, and that consideration be given to the listing of this species as Vulnerable under Schedule 2 of the NSW TSC Act, to better reflect the small sizes of known populations and their susceptibility to local extinction. Despite the potential for several populations to occur along the western escarpment of the park, it is unlikely that the combined total of all populations exceeds 1000 plants (Bell 2001).

EPBC Act: not listed; TSC Act: not listed; IUCN (2001): VU D1 (proposed); ROTAP: 2VC- (Walsh & Coates 1997); 2EC- (Bell 2001)

75. *Pomaderris sericea* Wakef. (Rhamnaceae)

Distribution within Wollemi – collected at one location in the Benjang Gap area in the north-west corner of the park in 1997 by the author (confirmed by Neville Walsh). Previously known in NSW only from Berrima at the turn of the 20th century (Harden 1990b). The Wollemi find extends the known range of this species well north of Berrima, and confirms its existence in NSW.

Habitat – At Benjang Gap, approximately 15 plants in a narrow gorge along a small creekline.

Threats – no threats identified.

Conservation Status – Briggs and Leigh (1996) indicated that this species was presumed extinct on the NSW Central Tablelands, although there are inadequately conserved populations in Coopracambra State Park, Victoria. Bell (2001) has suggested that the conservation risk code in NSW be amended to include 51Ci (Wollemi NP).

EPBC Act: Vulnerable; TSC Act: Endangered; IUCN (2001): EN D1 (proposed); ROTAP: 3VCi

76. *Pomaderris* sp. aff. *nitidula* (Glen Gallic) (Rhamnaceae)

Distribution within Wollemi – Collections of an unknown *Pomaderris* species in the Glen Gallic area in the north of the park, may represent a new species. Specimens were deemed to display characteristics of the North Coast and Northern Tablelands species *Pomaderris nitidula*, but were considered to not represent typical examples of this species (N. Walsh, National Herbarium of Victoria, pers. com.). The nearest known locality of *Pomaderris nitidula* to Wollemi is in the Nightcap Range and north of Mt Seaview, near Port Macquarie (Harden 1990b).

Habitat – sheltered forest of *Eucalyptus moluccana*, *Eucalyptus blakelyi*, *Indigofera coronifolia*, *Solanum brownii*, *Acacia parvipinnula*, *Acacia implexa*, *Bursaria spinosa*, *Sigesbeckia australiense*, *Dichondra repens*, *Galium gaudichaudii*, *Hydrocotyle tripartita*, *Lomandra longifolia*, *Desmodium varians*, *Digitaria ramularis*, *Cyperus gracilis* and *Ajuga australis*.

Threats – no threats identified.

Conservation Status – Further information on the taxonomy and distribution of this taxon is required to determine its conservation status.

EPBC Act: not listed; TSC Act: not listed; IUCN (2001): DD (proposed); ROTAP: not listed; 2KC (proposed)

77. *Prostanthera cryptandroides* Cunn. ex Benth. (Lamiaceae)

Distribution within Wollemi – recorded from the Coxs Gap area in the north-west, as well as from the slopes of Glen Trig., and Mount Gundangaroo near Glen Davis in the west (DECC Atlas; Gibson 2002). Other recent finds are from Crypt Hill (Gibson 2002), and immediately north of Wollemi at the Myambat Logistics Company Site near Denman (Fallding et al. 1997).

Habitat – occurs sporadically in dry open forest or rocky heath in low rainfall areas along much of the western sections of Wollemi. NPWS (2000a) note habitats for *Prostanthera cryptandroides* at Glen Davis as consisting of open forest dominated by *Eucalyptus fibrosa*, with *E. albens*, *E. crebra*, *E. dawsonii*, *E. punctata* and *Callitris endlicheri*, as well as in pagoda rock formations. To the immediate north of Wollemi, it occurs in open forest of *Eucalyptus dwyeri*, *E. fibrosa*, *E. punctata*, *Acacia doratoxylon* and *Allocasuarina verticillata*; open heath/scrubland of *Calytrix tetragona*, *Isopogon dawsonii*, *Leptospermum parvifolium*, *Acacia crassa*, *Acacia doratoxylon* and *Callitris endlicheri*; and other ecotonal communities where *Acacia triptera*, *Micromyrtus sesilis*, *Baekea densifolia*, *Dillwynia floribunda*, *Aotus ericoides* and *Hemigenia cuneifolia* occur (NPWS 2000a).

Threats – no threats identified.

Conservation Status – A revision of *Prostanthera cryptandroides*, *P. euphrasioides*, and *P. odoratissima* by Conn (1999) re-evaluated the relationships within this complex, and concluded that a single species with two subspecies is involved (*Prostanthera cryptandroides* subsp. *cryptandroides*, and subsp. *euphrasioides*). Subsp. *cryptandroides* is restricted to the Central Tablelands and Central Western Slopes between Lithgow and Sandy Hollow, but both occur on dry rocky sandstone ridges (Conn 1999). Briggs and Leigh (1996) applied a conservation code of 2RC-t for *P. cryptandroides*, indicating that the total known population is contained within conservation reserves (Wollemi and Blue Mountains NP's, both unknown in size). Recently, Washington (2001a) has recorded this species at a single location within Gardens of Stone NP to the south-west of Wollemi. Conn (1999) has suggested that neither subspecies is common and that subsp. *cryptandroides* has a very restricted distribution. Bell (2001) has documented the suggested revision of this species to 2VC- to indicate that the species is present outside of conservation reserves, and to reflect the listing of this species in NSW on the TSC Act.

EPBC Act: not listed; TSC Act: Vulnerable; IUCN (2001): VU D2 (proposed); ROTAP: 2RC-t; 2VC- (Bell 2001)

78. *Prostanthera discolor* R.Baker. (Lamiaceae)

Distribution within Wollemi – During remote helicopter survey near Cousins Creek in the north-west of Wollemi, *Prostanthera discolor* was found to be locally common in basalt-influenced colluvial sandstone soils on an upper slope. Gibson (2002) has disputed the identity of these specimens, referring them instead to a form of *Prostanthera ovalifolia* sens. lat. However, the presence of relatively dense hairs on the calyx of the original collections would place them closer to *P. discolor*, and it may be that both species are present. Gibson (2002) also notes the presence of *Prostanthera discolor* in one of the main tributaries of Baerami Creek in 1988. Other records of the species exist for the dry sandstone area north-west of Coxs Gap in the extreme north of the park where it abuts Goulburn River NP (DECC Atlas), although no further details of habitat or population size are known.

Habitat – At Cousins Creek, relatively dense stands of *Prostanthera discolor* occurred below a canopy of *Eucalyptus albens*, *E. punctata* and *Callitris glaucophylla*, with other understorey species including the shrubs *Dodonaea viscosa* subsp. *cuneata*, *Acacia uncinata*, *Indigofera coronifolia*, *Pomaderris angustifolia*, *Melichrus urceolatus*, *Cassinia compacta* and *Macrozamia reducta*, and the herbs *Hibbertia acicularis*, *Senecio linearifolius*, *Daucus glochidiatus*, *Hydrocotyle tripartita*, *Plantago debilis*, *Hypericum gramineum*, *Dichondra repens*, *Stellaria pungens*, *Asplenium flabellifolium*, *Galium propinquum*, *Stackhousia monogyna* and *Oplismenus imbecillis*. Unfortunately, inclement weather prevented reconnaissance of the wider population of *Prostanthera discolor* at this location; however it is likely that at least 50–80 plants were present.

Threats – no threats identified.

Conservation Status – listed as occurring only in Goulburn River NP (Briggs & Leigh (1996).

EPBC Act: not listed; TSC Act: Vulnerable; IUCN (2001): VU D2 (proposed); ROTAP: 2VC-

79. *Prostanthera hindii* B.J.Conn (Lamiaceae)

Distribution within Wollemi – recorded in pagoda heath vegetation at three locations along the western edge of the park; Lee Creek, Dunns Swamp and Rocky Creek near the Newnes Plateau.

Habitat – In his description of the species, Conn (1997) suggests that *Prostanthera hindii* is confined to *Eucalyptus* woodlands with an understorey of *Lepidosperma* sp., *Leptospermum* sp., *Leucopogon* sp., *Platysace* sp. and *Calytrix tetragona*, occurring in quartz-rich sandy soil of rocky sandstone or conglomerate platforms and outcrops, amongst steep rocky turret faces and deep rubble-filled fissures. In the

Lee Creek catchment to the north (currently known northern limit), this species occurs with *Caustis pentandra*, *Allocasuarina gymnanthera*, *Leptospermum parvifolium*, *Leptospermum arachnoides*, *Ochrosperma monticola*, *Philotheca salsolifolia*, *Baeckea densifolia*, *Banksia penicillata*, *Isopogon dawsonii*, *Homoranthus cernuus*, *Leucopogon muticus*, *Dillwynia sericea*, *Styphelia triflora*, *Eucalyptus dwyeri*, *Callitris rhomboidea*, *Lepidosperma viscidum*, *Pomax umbellata* and *Boronia rigens*. Near Dunns Swamp, associated species include *Leptospermum parvifolium*, *Calytrix tetragona*, *Kunzea ambigua*, *Eucalyptus multicaulis*, *Platysace lanceolata*, *Acacia decora*, *Leucopogon muticus*, *Pultenaea* sp. E, *Brachyloma daphnoides* subsp. *daphnoides*, *Leptospermum arachnoides*, *Dillwynia floribunda* var. *teretifolia*, *Schoenus ericetorum*, *Lomandra confertifolia* subsp. *rubiginosa*, *Chloanthes stoechadis* and *Aristida ramosa*. In the Rocky Creek area of the Newnes Plateau, *Prostanthera hindii* occurs with *Banksia ericifolia*, *Allocasuarina nana*, *Dillwynia floribunda* var. *teretifolia*, *Leptospermum parvifolium*, *Calytrix tetragona*, *Cryptandra propinqua*, *Petrophile pulchella*, *Leptospermum arachnoides*, *Acacia hamiltoniana*, *Schoenus ericetorum*, *Dampiera stricta*, *Stylidium lineare*, *Hakea laevipes* and *Hakea propinqua*. There is considerable variation in associated species in these pagoda heath environments, reflecting the variation in elevation and rainfall along the western regions of Wollemi. Populations estimates were not made at any location, and it is likely that this species occurs in many of the pagoda heath systems along the west of the park.

Threats – no threats identified.

Conservation Status – Conn (1997) noted the unknown status of this species at the time, and suggested a conservation risk code of 2RCi. A revised conservation risk code of 2RCa has been suggested by Bell (2001). Washington (2001a) recently recorded this species near Mt Jamison and at Point Cameron within Gardens of Stone NP, adjacent to Wollemi in the south-west.

EPBC Act: not listed; TSC Act: not listed; IUCN (2001): LC (proposed); ROTAP: 2KC-; 2RCi (Conn 1997); 2RCa (Bell 2001)

80. *Prostanthera* sp. A (Rylstone) (Lamiaceae)

Distribution within Wollemi – hills and ranges near Rylstone and Dunns Swamp.

Habitat – in *Callitris endlicheri*-*Eucalyptus rossii* forest in sandy loamy soils amongst sandstone outcrops (Conn (1992b)). No conservation risk code has yet been assigned or suggested for this species, although it does occupy a restricted distribution in and around western Wollemi. In pagoda heath at Dunns Swamp, *Prostanthera* sp. A occurs with *Leptospermum arachnoides*, *Calytrix tetragona*, *Leptospermum parvifolium*, *Leucopogon muticus*, *Leucopogon microphyllus* subsp. *pilobundus*, *Leptospermum sphaerocarpaceum*, *Grevillea evansiana*, *Ochrosperma monticola*, *Dillwynia sericea*, *Callitris rhomboidea*, *Eucalyptus laophila* and *Laxmannia gracilis*.

Threats – no threats identified.

Conservation Status – Based on existing records, it is suggested that *Prostanthera* sp. A (Rylstone) be assigned a conservation risk code of 2KC- until further investigation can determine the extent of populations within Wollemi.

EPBC Act: not listed; TSC Act: not listed; IUCN (2001): DD (proposed); ROTAP: not listed; 2KC- (proposed)

81. *Prostanthera* sp. aff. *rotundifolia* (Mt Iris) (Lamiaceae)

Distribution within Wollemi – Mt Iris-Gospers Mountain area in the west.

Habitat – shallow sandy soils in open forest of *Eucalyptus punctata*, *Eucalyptus sparsifolia*, *Eucalyptus beyeriana*, *Acacia longifolia*, *Cassinia cunninghamii*, *Allocasuarina littoralis*, *Acacia penninervis*, *Lepidosperma laterale*, *Lomandra confertifolia* subsp. *rubiginosa*,

Hibbertia circumdans, *Dianella caerulea* and *Lomandra filiformis* subsp. *filiformis*.

Threats – no threats identified.

Conservation Status – relatively common in the Mt Iris-Gospers Mountain area and possibly represents a new species (B.Conn. National Herbarium of NSW, pers. comm.). Specimens collected have superficial similarities to *Prostanthera rotundifolia*, but differ in floral arrangement and leaf size. Further investigation is currently underway.

EPBC Act: not listed; TSC Act: not listed; IUCN (2001): DD (proposed); ROTAP: not listed; 2KC- (proposed)

82. *Prostanthera stricta* R. Baker (Lamiaceae)

Distribution within Wollemi – Conn (1992b) describes *Prostanthera stricta* as occurring only in the Widden Valley district, where it grows in sandy alluvium near watercourses. During surveys of Wollemi NP, this species was not recorded here nor anywhere else in the park (Bell 1998). Gibson (2002) considers the Wollemi material to be a separate species with close affinities to *P. stricta*, and reports it for the creeklines around Mt Monundilla and Gundy Wattle Flat.

Habitat – *Prostanthera* sp. aff. *stricta* (see note below) occurs on Narrabeen Sandstone geology, as well as Quaternary alluvial and colluvial material. NPWS (2000b) report that it can be locally dominant, and can grow at the base of conglomerate slopes and cliffs, on ledges and in crevices, sandy colluvium at the base of cliffs, in fluvial depositional zones, on sandy alluvial deposits and on rocky side slopes. Associated species include *Backhousia myrtifolia*, *Cryptandra buxifolia*, *Isopogon dawsonii* and *Leucopogon muticus* in a low scrub; open forest of *Eucalyptus caleyi*, *E. punctata*, *E. sideroxylon*, *Allocasuarina torulosa* and *Macrozamia communis*; open forest of *Eucalyptus tereticornis*, *E. sideroxylon*, *Angophora floribunda*, *Acacia caesiella* and *Callistemon salignus*; and open forest of *Angophora floribunda*, *Eucalyptus fibrosa* and *E. punctata*.

Threats – no threats identified.

Conservation Status – Gibson (2002) considers the material growing in Dingo Creek and the Widden and Baerami Valleys within the park to be distinct from *Prostanthera stricta* s. str., the latter species restricted to Mount Vincent and Genowlan Mountain (outside of reserve). The two taxa differ in that the Wollemi specimens have broad-ovate to ovate leaves, leaf bases which are often broadly rounded, and a longer and greater density of indumentum on the whole plant (NPWS 2000b). In addition, only *Prostanthera* sp. aff. *stricta* has been observed to reproduce vegetatively, with the layering of branches when growing in riparian situations.

EPBC Act: Vulnerable; TSC Act: Vulnerable; IUCN (2001): VU D2 (proposed); ROTAP: 2V

83. *Pseudanthus divaricatissimus* (Muell. Arg.) Benth. (Euphorbiaceae)

Distribution within Wollemi – recorded only around Newnes in the south-west of the park.

Habitat – James & Harden (1990) indicate that this species grows on rocky ground at higher altitudes. Washington (2001a) located this species in low heath on and near the Newnes Plateau in Gardens of Stone NP.

Threats – no threats identified.

Conservation Status – recorded from Wollemi, Blue Mountains, Kanangra-Boyd, Budawang, Deua, and Morton NPs in NSW, and Brisbane Ranges, Snowy River, and Croajingolong NPs in Victoria (Briggs & Leigh 1996). Also from Gardens of Stone NP to the south-west of Wollemi (Washington 2001a), and Royal NP (A. Fairley, pers. comm.).

EPBC Act: not listed; TSC Act: not listed; IUCN (2001): LC (proposed); ROTAP: 3RCa

84. *Pultenaea glabra* Benth. (Fabaceae: Faboideae)

Distribution within Wollemi – *Pultenaea glabra* s. str. occurs approximately 7km to the north-east, and 3km to the south, of Glen Davis in the west of the park, and around Mt Coricudgy in the centre. No information is available on the sizes of these populations, nor of their habitat attributes.

Habitat – *Pultenaea* sp. E (see notes below) has been recorded in pagoda heath in the west of the park, where it occurs as scattered plants in the shrub layer with *Leptospermum parvifolium*, *Calytrix tetragona*, *Acacia decora*, *Prostanthera hindii*, *Leucopogon muticus*, *Kunzea ambigua*, *Platysace lanceolata*, *Brachyloma daphnoides*, *Baeckea utilis*, and *Leptospermum arachnoides*. Ground layer vegetation includes *Aristida ramosa*, *Lomandra confertifolia* subsp. *rubiginosa*, *Schoenus ericetorum*, *Hibbertia circumdans*, and *Chloanthes stoechadis*.

Threats – no threats identified.

Conservation Status – A recent revision of the *Pultenaea* genus has shown that specimens previously determined as *Pultenaea* sp. E (as in Weston 1991), *Pultenaea wiendorferi* (as in Corrick 1996) and *Pultenaea* sp. ‘Olinda’ (see below) should now be considered within the limits of *Pultenaea glabra* (de Kok & West 2002). These authors also state that *Pultenaea glabra* is consequently more widespread than previously thought, and suggest that a revision of the current conservation risk code is required. However, Peter Weston (National Herbarium of NSW) is of the opinion that several forms within this complex may indeed warrant recognition at the specific rank (Weston & de Kok 2002). Briggs and Leigh (1996) list this species as occurring in Wollemi and Blue Mountains NPs, both of which are considered to support adequate populations. De Kok and West (2002) also include Goulburn River NP in New South Wales, and also Kinglake NP and Gembrook Regional Park in Victoria (as *Pultenaea wiendorferi*).

EPBC Act: not listed; TSC Act: Vulnerable; IUCN (2001): DD (proposed); ROTAP: 3VCa

85. *Pultenaea* sp. “Olinda” (Coveny 6616) (Fabaceae: Faboideae)

Distribution within Wollemi – occurs only in a very limited area of pagoda rock formation east of Rylstone from Currant Mountain Gap to Nullo Mountain (Weston & de Kok 2002). Two populations approximately 3km apart are also present in the Spring Log Ridge area.

Habitat – at Spring Log Ridge, this species occurs on ledges and in crevices at the base of small cliffines (S. Clarke, pers. comm.).

Threats – no threats identified.

Conservation Status – De Kok and West (2002) are of the opinion that this taxon, together with the endangered *Pultenaea* sp. ‘Genowlan Point’, are geographical variants of *Pultenaea glabra*. However, there is still some uncertainty concerning the latest revision, and it is suggested that this taxon should be treated as distinct.

EPBC Act: not listed; TSC Act: Endangered; IUCN (2001): EN B1 (proposed); ROTAP: 2EC- (proposed)

86. *Rulingia hermannifolia* (DC.) Endl. (Sterculiaceae)

Distribution within Wollemi – one record exists within the DECC Atlas from 1975 for the slopes of Mt Towinhyngy, near Dunns Swamp, in the western sections of Wollemi. This record may possibly be in error, as this area is well outside of the species’ generally accepted more coastal range. Field investigations are required at this location to confirm its status.

Habitat – no information is available for this location.

Threats – no threats identified.

Conservation Status – recorded from Botany Bay, Bouddi, Ku-ring-gai Chase, Royal, Sydney Harbour, Morton, Jervis Bay, and (in Victoria) Girraween NPs, as well as Captains Cook Landing Place Historic Site (Briggs & Leigh 1996).

EPBC Act: not listed; TSC Act: not listed; IUCN (2001): LC (proposed); ROTAP: 3RCa

87. *Rulingia* sp. aff. *dasyphylla* (Sterculiaceae)

Distribution within Wollemi – found in sheltered forest on alluvial soils in remote areas of northern Wollemi during helicopter-based surveys. Initially collected from locations within Goulburn River NP and Crown reserve to the north of Wollemi near Sandy Hollow (Bell 1997a).

Habitat – open forest of *Angophora floribunda*, *Eucalyptus blakelyi*, *E. punctata*, *Allocasuarina torulosa*, *Bursaria spinosa*, *Breynia oblongifolia*, *Hydrocotyle laxiflora*, *Pratia concolor*, *Asplenium flabellifolium*, *Adiantum aethiopicum* and *Ajuga australis*. In Goulburn River NP, it occurs in mallee woodland of *Eucalyptus aenea*, *Acacia muelleriana*, *Acacia doratoxylon*, *Dodonaea triangularis*, *Acrotricha rigida*, *Allocasuarina littoralis*, *Dillwynia juniperina*, *Phyllanthus hirtellus*, *Goodenia rotundata* and *Panicum subxerophilum* (Bell 1997d).

Threats – no threats identified.

Conservation Status – members of the *Rulingia* genus are currently undergoing revision; the status of this taxon is unknown.

EPBC Act: not listed; TSC Act: not listed; IUCN (2001): DD (proposed); ROTAP: not listed; 2KC (proposed)

88. *Rupicola ciliata* Telford (Epacridaceae)

Distribution within Wollemi – a single DECC Atlas record from 2001 for Tootie Creek, in the southern section of the park.

Habitat – Powell (1992) reports that this species grows in skeletal sandy soils in rock crevices, on rock ledges, and beneath cliff overhangs in the Kurradjong Heights, Bilpin, and lower Yarramun Creek districts in the Blue Mountains.

Threats – no threats identified.

Conservation Status – Briggs and Leigh (1996) indicate that Wollemi and Blue Mountains NPs support the only known populations of this species.

EPBC Act: not listed; TSC Act: not listed; IUCN (2001): LC (proposed); ROTAP: 2RCt

89. *Rupicola decumbens* Telford (Epacridaceae)

Distribution within Wollemi – recorded only near the Glow-worm tunnel in the south-west in the Glen Davis and Cudgegong River areas (1995 DECC Atlas record).

Habitat – occurs in skeletal sandy soils on rock ledges, cliff faces, and at the base of sandstone cliffs at 550–950 m altitude (Powell 1992).

Threats – no threats identified.

Conservation Status – Briggs and Leigh (1996) list only Wollemi NP.

EPBC Act: not listed; TSC Act: not listed; IUCN (2001): LC (proposed); ROTAP: 2RC-

90. *Swainsona recta* A.Lee. (Fabaceae: Faboideae) Mountain Swainsona-pea

Distribution within Wollemi – a single DECC Atlas record for Nullo Mountain (1987) in the central-west of the park.

Habitat – grassland and open woodland, often on stony hillsides (Thomson 1993).

Threats – grazing by adjacent landowners.

Conservation Status – Briggs and Leigh (1996) indicate that this species occurs in Burrendong SRA and Mt Arthur Reserve on the Central Western Slopes.

EPBC Act: Endangered; TSC Act: Endangered; IUCN (2001): DD (proposed); ROTAP: 3EC-

91. *Tetratheca glandulosa* Smith (Tremandraceae) A Black-eyed Susan

Distribution within Wollemi – hills above Upper Colo and around Mountain Lagoon.

Habitat – open forest or woodland of *Eucalyptus sparsifolia*, *Angophora costata*, *Corymbia gummifera*, and *Eucalyptus punctata*. Occasional *Corymbia eximia* and *Angophora bakeri* may also occur at more exposed aspects. Understorey vegetation is typically dense, and includes shrub species such as *Kunzea ambigua*, *Boronia ledifolia*, *Phyllota phyllicoides*, *Platysace linearifolia*, *Dillwynia floribunda* var. *teretifolia*, *Persoonia linearis*, *Lambertia formosa*, *Lomatia silaifolia*, *Banksia spinulosa* var. *spinulosa*, and *Hakea sericea*, and the ground layer plants *Entolasia stricta*, *Lomandra obliqua*, *Caustis flexuosa*, *Patersonia glabrata* and *Lindsaea microphylla*. Reported in association with *Angophora bakeri*, *Corymbia gummifera*, *Banksia serrata*, *Banksia spinulosa*, *Leptospermum trinervium*, *Hakea dactyloides*, and *Dillwynia floribunda* in Yengo NP (Maryott-Brown & Wilks (1993).

Threats – no threats identified.

Conservation Status – Briggs and Leigh (1996) state that this species is represented within Dharug, Ku-ring-gai Chase, and Garigal NPs, while Maryott-Brown and Wilks (1993) list the species for Yengo NP. Latham (1995) also notes the species for a number of proposed Nature Reserves and NPs in Greater Sydney. It is also present in Popran NP (Bell 1998), and James (1997) notes unsubstantiated records for Cattai NP.

EPBC Act: not listed; TSC Act: Vulnerable; IUCN (2001): LC (proposed); ROTAP: 2VC-

92. *Velleia perfoliata* R.Br. (Goodeniaceae)

Distribution within Wollemi – recorded from the Wheeny Creek and Morans Rocks area, in the south-east of the park (DECC Atlas), and from the base of Bob Turner's Track near Colo Heights (A. Fairley, pers. comm.).

Habitat – for eastern Yengo NP, Maryott-Brown and Wilks (1993) describe the habitat as sandstone rock platforms surrounded by *Angophora bakeri*, *Corymbia gummifera*, *Banksia serrata*, *Leptospermum parvifolium*, *Hakea dactyloides*, *Pultenaea villosa* and *Lepidosperma laterale*.

Threats – mistaken for weeds and uprooted.

Conservation Status – A Species Recovery Plan has been completed (Maryott-Brown 1994a); also occurs in adjacent Yengo NP (Briggs & Leigh 1996; Maryott-Brown & Wilks 1993).

EPBC Act: Vulnerable; TSC Act: Vulnerable; IUCN (2001): VU B2ac(iv); D1 (proposed); ROTAP: 2VC-

93. *Wollemia nobilis* W.D.Jones, K.D.Hill & J.M.Allen (Araucariaceae) Wollemi Pine

Distribution within Wollemi – a few locations comprising less than 100 adults within two catchments (Ravallion 2000; DEC 2006)

Habitat – all stands occur in deep narrow sandstone gorges in warm temperate rainforest of *Ceratopetalum apetalum*, *Doryphora sassafras* and *Acmena smithii*, with an understorey comprising several fern species such as *Dicksonia antarctica*, *Cyathea australis*, *Sticherus flabellatus*, *Adiantum diaphanum*, *Doodia aspera* and *Blechnum nudum* (Benson & Allen 2007). Tall eucalypt woodland dominated by *Eucalyptus piperita* surrounds these areas (Jones et al. 1995). See Jones, Hill and Allen (1995), Hill (1997a), Gilmore and Hill (1997), and Offord and Meagher (2001) for further details on ecology.

Threats – dieback from the pathogen *Phytophthora cinnamomi* and potentially threatened by the further introduction of plant pathogens and weeds, soil compaction, seedling damage, collectors and catastrophic fire events. Stands may also be threatened by changes to the habitat through the effects of climate change (DEC 2006a).

Conservation Status – A Species Recovery Plan for *Wollemia nobilis* has been completed (DEC 2006a), and a Declaration of Critical Habitat has been legislated (DEC 2007).

EPBC Act: Endangered; TSC Act: Endangered; IUCN (2001): CR D; ROTAP: 2ECit-

94. *Zieria involucreta* R.Br. ex Benth. (Rutaceae)

Distribution within Wollemi – south-eastern sections of Wollemi, in the Colo Heights area (DECC Atlas).

Habitat – In southern Yengo NP, Maryott-Brown and Wilks (1993) indicate that this species occurs in sheltered forests on lower slopes in association with *Syncarpia glomulifera*, *Angophora costata* and *Allocasuarina torulosa*, with an understorey of *Ceratopetalum gummiferum*, *Bachousia myrtifolia*, *Acacia linifolia*, *Calochlaena dubia*, *Entolasia stricta* and *Lomandra* spp. Benson and McDougall (2001) indicate that this species occurs on steep sandy slopes and on ridges, within moist open forest of *Angophora costata*, *Syncarpia glomulifera*, *Eucalyptus punctata*, *E. piperita*, *Allocasuarina torulosa* and *Eucalyptus oreades*.

Threats – inappropriate fire, weed invasion, clearing for urban development (DEC 2006b).

Conservation Status – Briggs and Leigh (1996) state that this species is represented within Blue Mountains, Marramorra, and Yengo NPs, with extensive populations in Parr State Recreation Area. Maryott-Brown (1994b) has prepared a Conservation Research Statement and recovery plan.

EPBC Act: not listed; TSC Act: Endangered; IUCN (2001): EN A1a; B1 (proposed); ROTAP: 2VCa

Table 4. Rare or threatened plant species of Wollemi National Park listed by proposed IUCN and ROTAP codes.

IUCN Codes: Critically Endangered = CR; Endangered = EN; Vulnerable = VU; Near Threatened = NT; Least Concern = LC; Data Deficient = DD (IUCN 2001).

| Species | IUCN (2001) | EPBC Act | TSC Act | ROTAP code | |
|--|-----------------|----------|---------|------------|---------------|
| | Proposed here | | | Current | Proposed here |
| Critically Endangered CR | | | | | |
| <i>Wollemia nobilis</i> | [CR D] | E | E | 2Eci | - |
| <i>Eucalyptus</i> sp. 'Howes Swamp Creek' (Doherty 26) | CR D1 | E | E | 2ECi | - |
| Endangered EN | | | | | |
| <i>Zieria involucreta</i> | EN A1a; B1 | V | E | 2VCa | - |
| <i>Macrozamia elegans</i> | EN A2ad | | | - | [2VC-] |
| <i>Persoonia hirsuta</i> var. <i>evoluta</i> | EN B1 | E | E | 3Kci | - |
| <i>Persoonia marginata</i> | EN B1 | V | V | 2V | - |
| <i>Pimelea curviflora</i> var. <i>curviflora</i> | EN B1 | V | V | - | 2VC- |
| <i>Pultenaea</i> sp. (Olinda) | EN B1 | | E | - | 2EC- |
| <i>Asterolasia elegans</i> | EN C2b | E | E | 2Eca | - |
| <i>Baekea kandos</i> | EN D1 | E | E | 2RC-t | - |
| <i>Gyrostemon thesioides</i> | EN D1 | | E | - | 2EC |
| <i>Haloragodendron gibsonii</i> | EN D1 | E | E | 2Rcat | - |
| <i>Pomaderris sericea</i> | EN D1 | V | E | 3VCi | - |
| Vulnerable VU | | | | | |
| <i>Acacia pubescens</i> | VU A2bc | V | V | 3VCa | - |
| <i>Ozothamnus tessellatus</i> | VU B1 | V | V | 2VC- | - |
| <i>Olearia cordata</i> | VU B1; C2b | V | V | 2VCi | - |
| <i>Velleia perfoliata</i> | VU B2ac(iv); D1 | V | V | 2VC- | - |
| <i>Melaleuca deanei</i> | VU C2(ai) | V | V | 3RC- | - |
| <i>Melaleuca groveana</i> | VU C2(ai); D2 | | V | 3RC- | - |
| <i>Pomaderris precaria</i> | VU D1 | | | - | [2VC-] [2EC-] |
| <i>Grevillea obtusiflora</i> subsp. <i>obtusiflora</i> | VU D1+2 | E | E | 2E | - |
| <i>Leptospermum spectabile</i> | VU D1+2 | | | 2RC- | 2RCt |
| <i>Cynanchum elegans</i> | VU D2 | E | E | 3ECi | - |
| <i>Epacris coriacea</i> | VU D2 | | | 3RC- | - |
| <i>Epacris muelleri</i> | VU D2 | | | 3RC- | - |
| <i>Eucalyptus aenea</i> | VU D2 | | | 2RC | [2RC-} |
| <i>Eucalyptus bensonii</i> | VU D2 | | | 2RC-t | - |
| <i>Eucalyptus burgessiana</i> | VU D2 | | | 2RCa | - |
| <i>Eucalyptus corticosa</i> | VU D2 | | V | - | 2VC- |
| <i>Isotropis foliosa</i> | VU D2 | | | 3KC- | - |
| <i>Leionema scopulinum</i> | VU D2 | | | - | [2RCit] |
| <i>Pentachondra dehiscens</i> | VU D2 | | | - | [3RC] |
| <i>Pomaderris bodalla</i> | VU D2 | | V | - | [2R] |
| <i>Prostanthera cryptandroides</i> | VU D2 | V | V | 2RC-t | [2VC-] |
| <i>Prostanthera discolor</i> | VU D2 | V | V | 2VC- | - |
| <i>Prostanthera stricta</i> | VU D2 | V | V | 2V | - |
| Near Threatened NT | | | | | |
| <i>Acacia bynoeana</i> | NT | V | E | 3VC- | - |
| <i>Acacia gordonii</i> | NT | E | E | 2K | - |
| <i>Leionema sympetalum</i> | NT | V | V | 2VC- | - |
| Least Concern LC | | | | | |
| <i>Acacia asparagoides</i> | LC | | | 2R | - |
| <i>Acacia bulgaensis</i> | LC | | | 2RC- | - |
| <i>Acacia flocktoniae</i> | LC | V | V | 2VC- | - |
| <i>Acacia fulva</i> | LC | | | 2RC- | 2RCa |
| <i>Acacia matthewii</i> | LC | | | 3RC- | - |
| <i>Acacia subtilinervis</i> | LC | | | 3RCa | - |
| <i>Almaleea incurvata</i> | LC | | | 2RC-t | 2RC- |
| <i>Apatophyllum constablei</i> | LC | E | | 2EC- | 2RCa |

| | | | | | |
|--|----|---|---|-------|-----------------------|
| <i>Atkinsonia ligustrina</i> | LC | | | 2RCa | - |
| <i>Banksia penicillata</i> | LC | | | 3RC- | - |
| <i>Boronia floribunda</i> | LC | | | - | [2RC-] |
| <i>Boronia fraseri</i> | LC | | | 2RCa | - |
| <i>Boronia rubiginosa</i> | LC | | | 2RCa | - |
| <i>Callistemon shiressii</i> | LC | | | 3RC- | - |
| <i>Darwinia peduncularis</i> | LC | | V | 3RCi | - |
| <i>Eucalyptus cannonii</i> | LC | V | V | 2VCi | [2RCa] |
| <i>Eucalyptus fergusonii</i> subsp. <i>dorsiventralis</i> | LC | | | 2RC- | - |
| <i>Eucalyptus hypostomatica</i> | LC | | | 3RC- | - |
| <i>Eucalyptus prominula</i> | LC | | | 2KC- | - |
| <i>Gonocarpus longifolius</i> | LC | | | 3RC- | [3RCa] |
| <i>Grevillea evansiana</i> | LC | V | V | 2VC- | 2VCa |
| <i>Grevillea johnsonii</i> | LC | | | - | 2RCi [2RCa] |
| <i>Grevillea montana</i> | LC | | | 2KC- | [2RCa] |
| <i>Homoranthus cernuus</i> | LC | | | 2RCa | - |
| <i>Leucochrysum graminifolium</i> | LC | | | 2R | 2RC- |
| <i>Lissanthe sapida</i> | LC | | | 3RCa | - |
| <i>Lomandra fluviatilis</i> | LC | | | 3RCa | - |
| <i>Olearia quercifolia</i> | LC | | | 3RC- | - |
| <i>Philotheca obovalis</i> | LC | | | 3RCa | - |
| <i>Platysace clelandii</i> | LC | | | 2RCa | - |
| <i>Prostanthera hindii</i> | LC | | | 2KC- | - |
| <i>Pseudanthus divaricatissimus</i> | LC | | | 3RCa | - |
| <i>Rulingia hermanniifolia</i> | LC | | | 3RCa | - |
| <i>Rupicola ciliata</i> | LC | | | 2RC-t | - |
| <i>Rupicola decumbens</i> | LC | | | 2RC- | - |
| <i>Tetratheca glandulosa</i> | LC | V | V | 2VC- | - |
| Data Deficient DD | | | | | |
| <i>Blechnum gregsonii</i> | DD | | | 2RCa | - |
| <i>Boronia barkeriana</i> subsp. <i>barkeriana</i> | DD | | | - | [2RC-] |
| <i>Brasenia schreberi</i> | DD | | | 3RC+ | - |
| <i>Cyphanthera scabrella</i> | DD | | | 2RC- | - |
| <i>Diuris</i> sp. aff. <i>punctata</i> (Colo River) | DD | | | - | 2KC |
| <i>Eucalyptus gregsoniana</i> | DD | | | 3RCa | - |
| <i>Eucalyptus</i> sp. aff. <i>eugenioides</i> (Bees Nest Ridge) | DD | | | - | 3KC |
| <i>Kennedia retrorsa</i> | DD | V | V | 2VCa | 2VCi |
| <i>Keraudrenia corollata</i> var. <i>denticulata</i> | DD | | | 3RC- | - |
| <i>Leionema lamprophyllum</i> subsp. <i>orbiculare</i> | DD | | | - | [2R-] |
| <i>Leionema</i> sp. 'Colo River' (Weston 2423) | DD | | | - | [2VC-] |
| <i>Pomaderris brunnea</i> | DD | V | V | 2VC- | - |
| <i>Pomaderris pauciflora</i> | DD | | | 3RC- | - |
| <i>Pomaderris</i> sp. aff. <i>nitidula</i> (Glen Gallic) | DD | | | - | 2KC |
| <i>Prostanthera</i> sp. A (Rylstone) | DD | | | - | 2KC- |
| <i>Prostanthera</i> sp. aff. <i>rotundifolia</i> . (Mt Iris) | DD | | | - | 2KC- |
| <i>Pultenaea glabra</i> | DD | V | V | 3VCa | - |
| <i>Rulingia</i> sp. aff. <i>dasyphylla</i> (Goulburn River Valley) | DD | | | - | 2KC |
| <i>Swainsona recta</i> | DD | E | E | 3ECi | - <i>Apatophyllum</i> |
| <i>constablei</i> | LC | E | | 2EC- | 2RCa |
| <i>Atkinsonia ligustrina</i> | LC | | | 2RCa | - |
| <i>Banksia penicillata</i> | LC | | | 3RC- | - |
| <i>Boronia floribunda</i> | LC | | | - | [2RC-] |
| <i>Boronia fraseri</i> | LC | | | 2RCa | - |
| <i>Boronia rubiginosa</i> | LC | | | 2RCa | - |
| <i>Callistemon shiressii</i> | LC | | | 3RC- | - |
| <i>Darwinia peduncularis</i> | LC | | V | 3RCi | - |
| <i>Eucalyptus cannonii</i> | LC | V | V | 2VCi | [2RCa] |
| <i>Eucalyptus fergusonii</i> subsp. <i>dorsiventralis</i> | LC | | | 2RC- | - |
| <i>Eucalyptus hypostomatica</i> | LC | | | 3RC- | - |
| <i>Eucalyptus prominula</i> | LC | | | 2KC- | - |
| <i>Gonocarpus longifolius</i> | LC | | | 3RC- | [3RCa] |
| <i>Grevillea evansiana</i> | LC | V | V | 2VC- | 2VCa |
| <i>Grevillea johnsonii</i> | LC | | | - | 2RCi [2RCa] |
| <i>Grevillea montana</i> | LC | | | 2KC- | [2RCa] |

| | | | | | |
|--|----|---|---|-------|--------|
| <i>Homoranthus cernuus</i> | LC | | | 2RCa | - |
| <i>Leucochrysum graminifolium</i> | LC | | | 2R | 2RC- |
| <i>Lissanthe sapida</i> | LC | | | 3RCa | - |
| <i>Lomandra fluviatilis</i> | LC | | | 3RCa | - |
| <i>Olearia quercifolia</i> | LC | | | 3RC- | - |
| <i>Philothea obovalis</i> | LC | | | 3RCa | - |
| <i>Platysace clelandii</i> | LC | | | 2RCa | - |
| <i>Prostanthera hindii</i> | LC | | | 2KC- | - |
| <i>Pseudanthus divaricatissimus</i> | LC | | | 3RCa | - |
| <i>Rulingia hermanniifolia</i> | LC | | | 3RCa | - |
| <i>Rupicola ciliata</i> | LC | | | 2RC-t | - |
| <i>Rupicola decumbens</i> | LC | | | 2RC- | - |
| <i>Tetratea glandulosa</i> | LC | V | V | 2VC- | - |
| Data Deficient DD | | | | | |
| <i>Blechnum gregsonii</i> | DD | | | 2RCa | - |
| <i>Boronia barkeriana</i> subsp. <i>barkeriana</i> | DD | | | - | [2RC-] |
| <i>Brasenia schreberi</i> | DD | | | 3RC-+ | - |
| <i>Cyphanthera scabrella</i> | DD | | | 2RC- | - |
| <i>Diuris</i> sp. aff. <i>punctata</i> (Colo River) | DD | | | - | 2KC |
| <i>Eucalyptus gregsoniana</i> | DD | | | 3RCa | - |
| <i>Eucalyptus</i> sp. aff. <i>eugenioides</i> (Bees Nest Ridge) | DD | | | - | 3KC |
| <i>Kennedia retrorsa</i> | DD | V | V | 2VCa | 2VCi |
| <i>Keraudrenia corollata</i> var. <i>denticulata</i> | DD | | | 3RC- | - |
| <i>Leionema lamprophyllum</i> subsp. <i>orbiculare</i> | DD | | | - | [2R-] |
| <i>Leionema</i> sp. 'Colo River' (Weston 2423) | DD | | | - | [2VC-] |
| <i>Pomaderris brunnea</i> | DD | V | V | 2VC- | - |
| <i>Pomaderris pauciflora</i> | DD | | | 3RC- | - |
| <i>Pomaderris</i> sp. aff. <i>nitidula</i> (Glen Gallic) | DD | | | - | 2KC |
| <i>Prostanthera</i> sp. A (Rylstone) | DD | | | - | 2KC- |
| <i>Prostanthera</i> sp. aff. <i>rotundifolia</i> . (Mt Iris) | DD | | | - | 2KC- |
| <i>Pultenaea glabra</i> | DD | V | V | 3VCa | - |
| <i>Rulingia</i> sp. aff. <i>dasyphylla</i> (Goulburn River Valley) | DD | | | - | 2KC |
| <i>Swainsona recta</i> | DD | E | E | 3ECi | - |

Table 5. Other rare or threatened plant species recorded near Wollemi NP.

| Endangered | Nearby locations | | |
|--|--|--|---|
| <i>Acacia dangarensis</i> | Mt Dangar (Tindale & Kodela 1991) | <i>Bunochilus lineatus</i> | Blue Mountains (Jones 2006) ("2VC") |
| <i>Asterolasia buxifolia</i> | Hartley area (Wilson 1998a; Makinson 2002a) | <i>Bunochilus chokolatinus</i> | Blue Mountains (Jones 2006) ("2V") |
| <i>Boronia ruppia</i> | Glen Davis, Wolgan Pinnacle and East Kurrajong (Fairley 2004) | <i>Dianella tenuissima</i> | Blue Mountains, Newnes Plateau (Carr 2006) ("Data deficient") |
| <i>Commersonia rosea</i> | Crown lands around Sandy Hollow (Bell & Copeland 2004) | <i>Eucalyptus michaeliana</i> | Yengo NP (Maryott-Brown & Wilks 1993; Ryan et al. 1996) (3RCa) |
| <i>Eucalyptus</i> sp. "Cattai" | Colo Heights | <i>Hakea constablei</i> | west of Mt Irvine (DECC Atlas) (2RCa) |
| <i>Eucalyptus fracta</i> | northern Yengo NP (pers. obs.) | <i>Leptospermum rupicola</i> | Glen Davis, upper Blue Mountains (Benson 1990; Fairley 2004) (3RC-) |
| <i>Persoonia hindii</i> | Newnes Plateau (Weston & Johnson 1996) | <i>Lomandra brevis</i> | southern Yengo NP (Maryott-Brown & Wilks 1993; Ryan et al. 1996) (2RC-) |
| <i>Phebalium bifidum</i> | Capertee Valley (Weston & Turton 2004) | <i>Persoonia recedens</i> | Newnes Plateau (Fairley 2004) (2R) |
| <i>Pterostylis gibbosa</i> | private land north of Yengo NP (Bradburn 2000) | <i>Prostanthera cineolifera</i> | Yengo NP (Ryan et al. 1996) (2K) |
| <i>Pultenaea</i> sp. "Genowlan Point" | Genowlan Point | <i>Sphaerocionium lyallii</i> | northern Blue Mountains (DECC Atlas) (3RC-) |
| <i>Senecio linearifolius</i> var. <i>dangarensis</i> | Mt Dangar, Goulburn River NP (Thompson 2004) | <i>Acacia leprosa</i> (?) | Mt Tayar east of Rylstone (Fairley 2004) |
| | | <i>Grevillea sericea</i> subsp. <i>riparia</i> (?) | lower Grose and Colo Rivers (Makinson 2000, 2002b) |
| Vulnerable | | | |
| <i>Acrophyllum australe</i> | northern Blue Mountains NP (DECC Atlas) | | |
| <i>Acrotricha crassifolia</i> | Glen Davis area (Harden 1993) | | |
| <i>Boronia deanei</i> subsp. <i>deanei</i> | Newnes Plateau (Benson & Keith 1990) | | |
| <i>Darwinia biflora</i> | Bulga (DECC Atlas, possibly in error) | | |
| <i>Derwentia blakeyi</i> | Nullo State Forest (pers. obs.; Benson & McDougall 2001) | | |
| <i>Dillwynia tenuifolia</i> | northern Yengo NP (Maryott-Brown & Wilks 1993) | | |
| <i>Epacris sparsa</i> | northern Blue Mountains NP (DECC Atlas) | | |
| <i>Eucalyptus aligatrix</i> subsp. <i>aligatrix</i> | Rylstone district | | |
| <i>Grevillea obtusiflora</i> subsp. <i>fecunda</i> | Gardens of Stone NP, Glen Alice (Washington 2001a) | | |
| <i>Grevillea parviflora</i> subsp. <i>parviflora</i> | Putty area (Fairley 2004) | | |
| <i>Homoranthus darwinioides</i> | Lees Pinch, Goulburn River NP | | |
| <i>Lasiopetalum longistamineum</i> | Mt Dangar (DECC Atlas) | | |
| <i>Persoonia acerosa</i> | upper Blue Mountains (DECC Atlas) | | |
| <i>Zieria murphyi</i> | Mt Tomah area (Armstrong 2002) | | |
| Rare | | | |
| <i>Acacia alaticaulis</i> ("2RC-t") | Howes Mountain, Yengo NP (Maryott-Brown & Wilks 1993) | | |
| <i>Acacia asparagoides</i> (2R) | Newnes Plateau and Gardens of Stone NP (Benson & Keith 1990; Washington 2001a) | | |
| <i>Acacia meiantha</i> (2RCi) | Clarence (Fairley 2004) | | |
| <i>Arthrochilus prolixus</i> (2K) | Morans Rocks (DECC Atlas) | | |
| <i>Bothriochloa biloba</i> (3V) | Goulburn River valley (DECC Atlas) | | |

Discussion

The importance of Wollemi in conserving regionally significant taxa

Wollemi National Park supports a diverse range of vascular plant species in its 500 000 ha of sandstone forests, woodlands, heaths and rainforests. The 94 rare or threatened species presented here highlight the importance of the park in preserving taxa of restricted distribution, and it is likely that additional species and new populations will be added as survey of remote areas continues. Of the known significant flora, 37 are currently listed on the NSW TSC Act (15 as Endangered, 22 as Vulnerable). Based on data in Mokany and Adam (2000), this figure represents more than 20% of all listed threatened species for the Central Coast, Central Tablelands and Central Western Slopes botanical subdivisions (given that several species occur in more than one subdivision). The combined area of these three divisions equals 112 000 km² (or 1 120 000 000 ha), and Wollemi NP comprises only 0.05% of this total. The occurrence of 20% of the listed threatened species in this small proportion of these three divisions stresses the importance of Wollemi in regional conservation.

Of the 94 significant Wollemi species, the majority are considered to be adequately conserved. Bell (2001) has previously suggested amendments to the ROTAP conservation risk codes (the Briggs & Leigh 1996 system) of some of these species, based on the results from vegetation surveys in the Hunter Valley. Further amendments are now provided for several other taxa, given their large populations present within the park (Tables 3 & 4). Appropriate IUCN

codes have also been attributed to all significant species - only one species (*Wollemia nobilis*) is included within the current IUCN Red List.

In recent years, new and undescribed taxa have also been located within the rugged and remote parts of Wollemi. This is exemplified in the discovery of the Wollemi Pine (*Wollemia nobilis*) in 1994, but also in new species of *Prostanthera*, *Pomaderris*, *Pentachondra* and *Eucalyptus*. While several helicopter-based surveys have been undertaken in remote locations, there is still considerable potential for further new taxa to be found.

Representation of significant *Pomaderris* species within Wollemi is considered to be of particular interest. To date, 19 species of *Pomaderris* have been recorded from the park, including one undescribed taxon and four threatened or rare species. New locations of the significant *Pomaderris precaria*, *Pomaderris brunnea*, *Pomaderris sericea*, and *Pomaderris pauciflora* have been recorded in recent years. The occurrence of the recently described *Pomaderris bodalla* from the slopes of Woodlands Trig. along the Northern Escarpment of the park represents a significant range extension from the South Coast (Walsh & Coates 1997). Other populations have been recorded recently from Wingen Maid Nature Reserve, confirming its occurrence in the region (Hill, Peake, Bell & Raine 2001). Of equal significance is the collection of *Pomaderris sericea* from Benjang Gap in the north-west of the park, representing a sizeable range extension for this Endangered species; the only other NSW location being an old collection from Berrima, and in Victoria far East Gippsland, (N.Walsh, National Herbarium of Victoria, *pers. comm.*).

It would appear from these disjunct populations of significant *Pomaderris* species, that the northern sections of Wollemi NP, particularly around the Goulburn River valley, provide important refugia for this genus. The occurrence of the highly endemic *Pomaderris reperta* from Denman adds weight to this notion; this species is apparently restricted to one ridgeline (Fallding, Bell & Murray 1997; Walsh & Coates 1997). The occurrence of *Pomaderris queenslandica* and *Pomaderris precaria* also from the Denman and Goulburn River NP areas is also noteworthy (Bell 2001). The interesting collection of *Pomaderris* sp. aff. *nitidula* from the Martindale Trail area of Wollemi is also of relevance, since *Pomaderris nitidula* occurs in the Nightcap Range to the north. Further survey for *Pomaderris* species within the Goulburn River valley is likely to add considerable knowledge to this genus.

Several other documented threatened or rare plant species are known from areas adjacent to Wollemi (less than 15km from the park boundary), and all of these potentially occur within the park (Table 3), and recent taxonomic revisions also raise the possibility of other significant species occurring within the park. Armstrong (2002) recognised *Zieria caducibracteata* as a restricted taxa occurring from the Colo River to Batemans Bay. The northern populations in the Colo

River Gorge are distinct in having rounded (not acute) leaflet apices and slightly shorter leaflets. These populations occur in skeletal sandy soils in open eucalypt forests associated with understorey species such as *Prostanthera prunelloides*. Halford and Henderson (2002) described *Bertya linearifolia* as being restricted to the Denman – Sandy Hollow area, with the type collected from Upper Baerami Creek in Wollemi NP. Orchard (2004) has recently recognised *Cassinia decipiens* (previously included within *Cassinia cunninghamii*) from the Goulburn River valley, south to near Rylstone, and *Cassinia accipitrum* (previously included within *Cassinia compacta*) from the Hawkesbury and Colo River valleys, inland to Colo Heights and Mountain Lagoon. Both of these newly segregated *Cassinia* species most likely occur within Wollemi, and both occupy restricted geographical ranges. The newly described and highly restricted *Paenula storryi* from near Wollar (Orchard 2005) may also occur within Wollemi. At Glen Gallic in northern Wollemi, stunted mallee-like redgums occur which are currently attributed to *Eucalyptus dealbata* (Bell 2001). Further investigation on these specimens is required, as they occur in a small disjunct population well to the east of the main range of this species, and on infertile sandy soils on Narrabeen Sandstone, which is an unusual habitat for the species. Along the western portions of the park (such as in the Benjang Gap area), terete-leaved forms of *Lomandra multiflora* occur. Washington (2001a) has also found this form in the nearby Gardens of Stone NP (and other areas), and considered it uncommon and worthy of nomination to the *TSC Act 1995*.

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