IVG Forest Conservation Report 3B

Report for the Independent Verification Group of the Tasmanian Forests Intergovernmental Agreement (IGA) on palaeo-endemic plants (primitive, relictual and ancient plant groups)

Prepared by Greg Jordan; GIS analysis undertaken by Grant Williamson

Summary

Palaeo-endemic plants (primitive, relictual and ancient plant groups)

This report describes the evolutionary significance of primitive, relictual and ancient plants in reserves proposed under the Tasmanian Forests Intergovernmental Agreement. To do this, an objective and quantitative measure of palaeo-endemism was developed. This measure directly reflects the combined idea of ancient and relictual groups of organisms. Tasmania is a globally important area for palaeo-endemics, and the analysis showed very clear patterns. Palaeo-endemic groups were strongly clustered in south, central and western Tasmania and were almost all very well reserved in existing reserves, especially the World Heritage Area. None could be considered poorly reserved. Most of the groups with the highest scores for palaeo-endemism occur in high altitude, high rainfall, and fire-free areas, and many are characteristic of non-forested environments. Geographic patterns in the distribution of genetic types (chloroplast haplotypes) within *Nothofagus cunninghamii* and *Tasmannia lanceolata* reinforce the patterns described above. Some of the proposed reserves contained areas of vegetation with high value in terms of palaeo-endemism, but in most cases these values were clustered in very small portions of the reserves (often in alpine areas or sheltered rivers). Exceptions were the small proposed reserves 89, 80 and 65, of which a high proportion of the area contained vegetation with high palaeo-endemism. One of the highly ranked palaeo-endemics (*Gunnera*) is only moderately well reserved. Two of the proposed reserves (97 and 198) contain this clade.

Background

Objectives

This section of the report on significance of the reserves proposed under the Tasmanian Forests Intergovernmental Agreement addresses the concept of “ancient” or “primitive” groups of plants, as important indicators of past evolutionary processes. Tasmania is an important place for such plants.

Thus, the Tasmanian temperate rainforests include many groups with long fossil records, especially when compared with other Australian vegetation types (Sniderman and Jordan 2011). Some Tasmanian groups of plants are among the oldest geographically restricted groups of plants in the world. For example, *Athrotaxis* and *Microcachrys* may be older than any other similarly restricted vascular plant groups except *Ginkgo* from China, *Sciadopitys* in Japan, *Welwitschia* in Southern Africa and *Amborella* from New Caledonia. *Bellendena*, *Lagarostrobos* and *Isophysis* are also highly relictual genera endemic to Tasmania (Rozefelds 2008). However, earlier approaches at classifying Tasmania's flora in terms of its antiquity have of necessity been very broad brush or subjective. This report exploits recent developments in molecular phylogeny and the logical analysis of endemism to develop a new classification. The resulting classification captures most of the information obtained by earlier treatments, as well as eliminating many anomalies. It also includes a weighting system for different groups. This recognises and allows for the obvious fact that some groups of "primitive" plants are of more significance than others. In other words, this new classification is more objective and more informative than previous efforts.

Earlier classifications

The definition of "primitive" in the Natural Values Atlas (a definition which also broadly reflects the values represented in the earlier RFA process) considers the following criteria:

(1) proven evolutionary links with taxa that formed the vegetation of the ancient Supercontinent of Gondwana, and that these links are considered significant.

(2) early fossil evidence of species with close taxonomic affinities to living species within Australia.

(3) retaining floral or other morphological characteristics considered to be important in the evolution of flowering plants, and which identify them as important examples of living relicts of ancient flora.

(4) long lived species exhibiting evolutionary stasis; e.g. *Lagarostrobos franklinii* (Huon Pine).

Some important information comes from analyses of endemism in Tasmania. Notable cases include overall analyses of endemic species (Kirkpatrick and Brown 1984a; Kirkpatrick and Brown 1984b), and description of endemic genera (Rozefelds 2008). These analyses were hampered by the problems described in the next section.

Why did we need a new approach.

Earlier attempts to characterise the antiquity of the Tasmania's flora have been problematic for several reasons. They have largely been based on expert opinion employing the fossil record and some taxonomic information. However, we have fossil records for only a very small subset of the

past flora, meaning that any analysis will be biased towards those taxonomic groups and geographic areas that happen to have strong fossil records. Large tracts of time have virtually no record at all in Tasmania (e.g. the 17 million year period from the end of the Early Miocene to the Latest Pliocene, about 3 million years ago). The fossil record is also very patchy taxonomically. Many groups of plants have no fossil record in Australia (e.g. orchids, which have ~200 species in Tasmania). Some groups have very homogenous fossils (e.g. it is difficult or impossible to discriminate between the pollen of any of the native or introduced species of grasses)., but others (e.g. conifers, *Nothofagus* and Proteaceae) have taxonomically detailed records. The result is that fossil record is informative, but fails to provide a complete overview. An alternative source of evidence for antiquity is phylogeny. Some attempts at looking at antiquity of the flora have incorporated phylogenetic information (Carpenter 1996; Rozefelds 2008), but, given the limited information available at the time, they did so in an *ad hoc* manner. Rapid increases in phylogenetic understanding now permit the improved approach used in this report.

Methodology

The assessment is based on a measure of palaeo-endemism.To do this, it draws on some of the concepts of phylogenetic endemism (Rosauer *et al.* 2009), but employs a new approach that focusses specifically on palaeo-endemism. The approach objectively combines the age and geographic range of a taxon to give a metric describing palaeo-endemism.

The data to do a full analysis using the methods of (Rosauer *et al.* 2009) is not currently possible, because this would require a complete phylogeny of the whole flora. Such a phylogeny is not available, and will not be available in the near future. Instead, this study uses a logically related method, which is to calculate an individual score for individual clades (i.e. groups of closely related organisms, such as species, genera, families, or groups of species within genera). The score for a clade isits age divided by its maximum linear geographic extent. Since this project is focussed on old groups, only old clades (i.e. >~10 million years) were considered.

The logic of this metric can be explained by considering a hypothetical group of organisms. We will assume that this group originated as an individual, or small group of individuals in a restricted area (this is a normal model for evolution). With time, the group would expand out. If the rate of expansion was constant, then the age/linear extent would be constant regardless of the age or size of the group. However, unusually high values of this score would indicate that the clade was very old for its extent, and therefore has either expanded very slowly, or more likely, has been widespread and has contracted. This concept therefore matches the idea of palaeo-endemism well, and also captures the underlying issues of being ancient and special or unique.

The ages of clades were determined by molecular dating, and in a few cases directly from fossil evidence. While molecular dating has some considerable uncertainties and biases, the differences in phylogenetic endemism among clades (see Table 1) are so large that the overall impact of this is likely to be small. For some clades with only higher level dated phylogenies, the age of the clade was estimated by splitting the branch length into even sections according to how many speciation events would be required to gain the number of species in that group. By excluding all conspicuously young and extremely widespread clades, the whole flora could be reduced to a manageable size for analysis. Aquatics were also excluded. Some of the clades were species, but where higher scores could be gained by grouping species together, the clades were genera, or groups within genera. *Athrotaxis* illustrates this principle well: because the split between the two extant species is relatively recent - probably in the last few million years (Jordan *et al.* 2004) -, these individual species would receive only modest scores. However, the genus is very ancient and the two species of the genus are both endemic to Tasmania. As a result the genus gets a very high score (the second highest of all the clades in this study).

The overall result was that each clade could be allocated a level of phylogenetic endemism. Total scores for each geographic area were calculated in two ways (1) by adding the scores for all the taxa present in that area, and (2) by grouping taxa into two ranked grades (1-10), then adding these grades. Note that this approach differs in several ways from the method described by (Rosauer *et al.* 2009). (Rosauer *et al.* 2009) used the number of grid cells occupied. This is problematic because it does not take into account the proximity of the cells (or the lack thereof). This means that a species occurring in one grid cell in Tasmania and one in New Zealand would be treated as equivalent to a species that occurs in two adjacent grid cells. Furthermore, (Rosauer *et al.* 2009) looked at the whole flora, and therefore their results include a contribution from neo-endemics.

Distribution data was derived from the Natural Values Atlas, with significant culling (removal of ~1.5% of records as erroneous or unreliable, and also the removal geographic duplicates, defined as records of the same species occurring in the same 100mx100m area).

Results

Palaeo-endemic clades

Thirty six clades (52 species) were identified as palaeo-endemic, with scores ranging from 474 to 13 (Table 1). All but eight of these clades were recognised as being “primitive” in the Natural Values Atlas (NVA). Only two of these additional clades (*Dracophyllum milliganii* and *Blandfordia punicea*) had high palaeo-endemism scores (>60).

Some clades sometimes considered as important "primitive" plants occurred low in Table 1, or failed to satisfy the criteria. Prominent examples are *Nothofagus cunninghamii*, many ferns and four conifers (*Phyllocladus aspleniifolius*, *Podocarpus lawrencei* and the two *Callitris* species). In each case, phylogenetic analysis has shown that these species are relatively young members of very widespread groups (Biffin *et al.* 2012; Knapp *et al.* 2005; Schuettpelz and Pryer 2009).

All of the palaeo-endemic clades were common (as crudely indicated by number of 10km x 10km grid cells occupied; Table 1), except *Gleichenia abscida* and *Pherosphaera*. *Pherosphaera hookeriana* is listed as Vulnerable under the Tasmanian Threatened Species Act. *Gleichenia abscida* is rare but probably not listed because no there is no recognised threat to this species. Some of the clades with multiple species included threatened species (*Lomatia tasmanica*, *Orites milliganii*, *Planocarpa sulcata*, *Planocarpa nitida*, *Milligania longifolia* and *Milligania johnstonii*).

Almost all of the clades were very well reserved (>75% of NVA records occurring in existing reserves). Note that for many clades, the number of records may under-estimate the quality of reservation because the clades are focussed on the poorly sampled western Tasmanian region (Fig. 1; Appendix 1). Almost all of the less well-reserved clades are very widespread and common, and have low palaeo-endemism scores. Two clades with high palaeo-endemism scores were *Gunnera* and *Blandfordia punicea* showed low levels of reservation. The former species is not very well reserved, but is a species of open stream banks and boggy areas, not a forest species. The latter species is likely to be more common and better reserved than suggested by this data - it widespread and common in the World Heritage Area, which is relatively poorly sampled. It is also not a forest species.

Many of the species, especially those with high palaeo-endemism scores, are well known to be vulnerable to fire (Table 1) and/or *Phytophthera* (e.g. *Agastachys*, many Ericaceae).

Table 1. Palaeo-endemic clades. Association with fire-free vegetation, occurrence in forest, number of 10km x 10 km grid cells occupied, palaeo-endemicity score (clade age/linear geographic range, 1000 years per km), a graded classification of the score, percentages of records in existing reserves and in proposed reserves, and whether the clade is recognised as "primitive" in the NVA are also shown for each clade.

clade	Species included	no fire	forest	extent (# of cells)	palaeo-endemicity	grade	% reserved	% proposed	NVA
Microcachrys	*Microcachrys tetragona*	yes	no	39	474	10	97	3	yes
Athrotaxis	both species	yes	yes	75	451	10	77	3	yes
Bellendena	*Bellendena montana*	+/-	no	83	286	9	78	4	yes
Lagarostrobos	*Lagarostrobos franklinii*	yes	yes	68	197	8	80	4	yes
Gleichenia abscida	*Gleichenia abscida*	yes	no	10	172	8	100	0	yes
Isophysis	*Isophysis tasmanica*	+/-	no	52	171	8	98	0	yes
Campynema	*Campynema lineare*	yes	no	46	168	8	92	1	yes
Tetracarpaea	*Tetracarpaea tasmanica*	+/-	no	69	162	8	91	1	yes
Agastachys	*Agastachys odorata*	no	yes	117	160	8	84	2	yes
Orites acicularis milliganii	*Orites acicularis, O. milliganii*	yes	no	71	134	7	96	3	yes
Nothofagus gunnii	*Nothofagus gunnii*	yes	yes	25	127	7	94	0	yes
Diselma	*Diselma archeri*	yes	no	52	123	7	95	1	yes
Cenarrhenes	*Cenarrhenes nitida*	no	yes	212	105	7	59	5	yes
Pherosphaera	*Pherosphaera hookeriana*	yes	no	21	102	7	97	0	yes
Gunnera	*Gunnera cordifolia*	+/-	no	28	87	6	32	5	yes
Milligania	all five species	+/-	no	52	83	6	100	0	yes
Gleichenia alpina	*Gleichenia alpina*	no	no	66	77	6	81	4	yes
Dracophyllum milliganii	*Dracophyllum milliganii*	yes	yes	43	76	6	99	0	no
Prionotes	*Prionotes cerinthoides*	yes	yes	87	70	6	73	4	yes
Planocarpa	all three species	no	no	66	68	5	78	0	yes
Blandfordia	*Blandfordia punicea*	no	no	86	68	5	94	2	no
Archeria	all five Tasmanian species	yes	yes	114	67	5	92	2	yes
Anodopetalum	*Anodopetalum biglandulosum*	yes	yes	210	56	5	54	6	yes
Orites diversifolius revolutus	*Orites diversifolius, O. revolutus*	yes	yes	152	55	5	78	8	yes
Eucryphia	both Tasmanian species	yes	yes	224	54	5	54	6	yes
Anopterus	*Anopterus glandulosus*	yes	yes	205	40	4	58	6	no
Aristotelia	*Aristotelia peduncularis*	+/-	yes	283	38	4	41	4	no
Lomatia	all three Tasmanian species	+/-	yes	476	36	4	30	3	yes
Telopea	*Telopea truncata*	+/-	yes	182	32	4	67	5	yes
Drymophila	*Drymophila cyanocarpa*	+/-	yes	391	27	3	40	4	no
Tmesipteris	*Tmesipteris obliqua*	yes	yes	173	24	3	47	4	yes
Atherosperma	*Atherosperma moschatum*	yes	yes	374	20	2	41	4	no
Donatia	*Donatia novae-zelandiae*	no	no	40	17	2	46	4	no
Nothofagus cunninghamii	*Nothofagus cunninghamii*	yes	yes	353	17	2	99	1	yes
Calochlaena	*Calochlaena dubia*	+/-	yes	81	15	1	20	3	yes
Tasmannia	*Tasmannia lanceolata*	+/-	yes	371	13	1	53	5	no

Geographic patterns in palaeo-endemicity

The maps based on crude scores and those using categorical grades to downweight the effect of clades with very high scores show similar patterns (Figs. 1 and 2). The boundary between broad regions of high and low palaeo-endemicity is similar to the well-known Tyler's Line, but differs notably in extending far to the east to include the northern edges of the Central Plateau. The boundary is similar to the eastern limit of conifer diversity (Jordan 1995), partly because conifers are important contributors to the palaeo-endemicity metric. However, the palaeo-endemic angiosperms and ferns also tend to respect this line. To the east of the boundary, some areas of high rainfall (such as South Bruny Island and Snug Tiers) have relatively high scores. However, the high rainfall areas in the north-east do not have correspondingly high palaeo-endemism scores. Some areas with very high scores are Mt Read, the West Coast Range, Cradle Mountain, Mt Field, Mt Anne, the Arthur, Wilmot and Snowy Ranges. Overall, the regions of highest palaeo-endemicity scores correspond to unburnt, high altitude and high rainfall areas of south and western Tasmania (Figs. 1 and 2).

The clear demarcation into high and low significance regions corresponds closely to IBRA regionalisation. All cells with high palaeo-endemicity scores and most of the records for most of the clades identified in this analysis occur in the Tasmanian West, Tasmanian Central Highlands and Tasmanian Southern Ranges IBRA regions (Appendix 1). This general pattern in palaeo-endemicity is not an artefact of differential sampling intensity. In fact, western Tasmania has high scores of palaeo-endemicity in spite of being less well sampled than virtually all of the region east of the boundary (Fig. 1). Indeed, very low sampling intensity means that some cells in western Tasmania are likely contain considerably higher palaeo-endemism than indicated in Figure 1, especially if the cells contain alpine and subalpine vegetation. It is very unlikely that any part of eastern Tasmania would have a high score, regardless of sampling.

The highly ranked taxa are very well reserved overall, with at least 80% of records of all but a few of the taxa occurring in reserves (Table 1). The least well reserved of the highly ranked clades is *Gunnera* (32% of records in reserves). Among the lower ranked clades, *Calochlaena* is the worst reserved (20%). This low value may contain a measurement artefact. This species is found mainly in wet or damp forest in the north and north-east, and many of the reserves in this region are small (e.g. streamside reserves). As a result, relatively small errors in co-ordinates for individual records of this species may change the land tenure type.

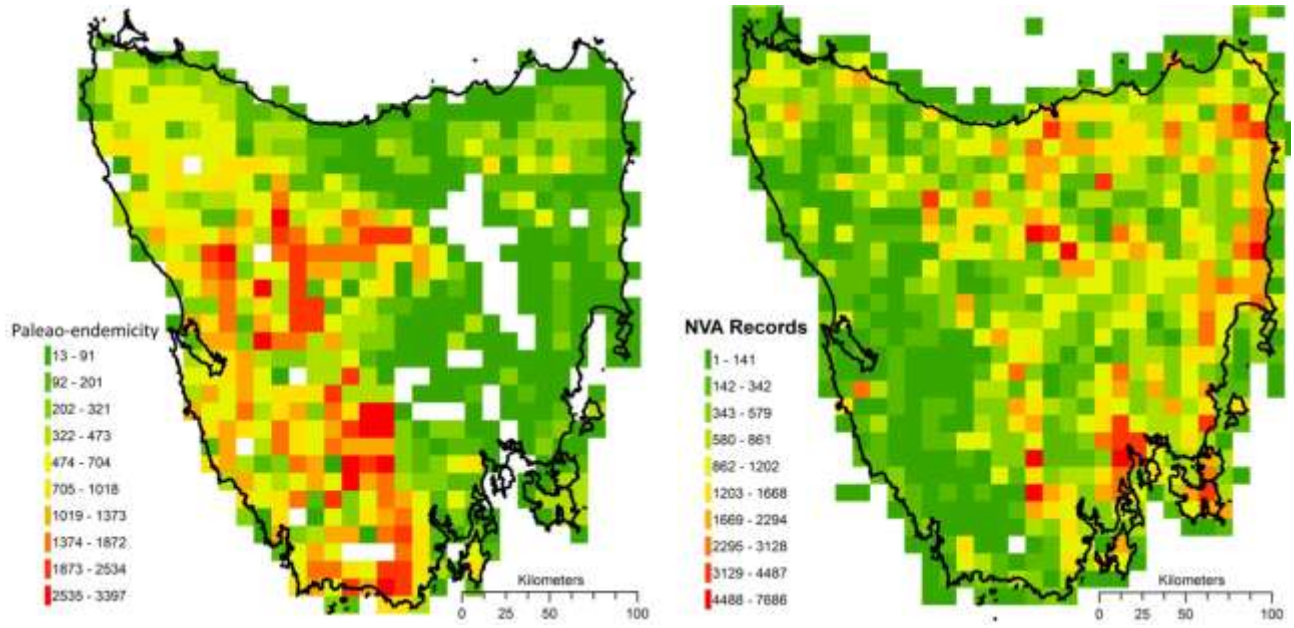

Figure 1. Geographic distribution of palaeo-endemicity scores in 10 x 10km grid cells (left). Grid cell values are the sum of the scores for the taxa present in that cell. Sampling intensity of vascular plants in the Natural Values Atlas is given on the right - note the very low numbers of records in most of western Tasmania (typically less than 10% of the numbers in most eastern cells).

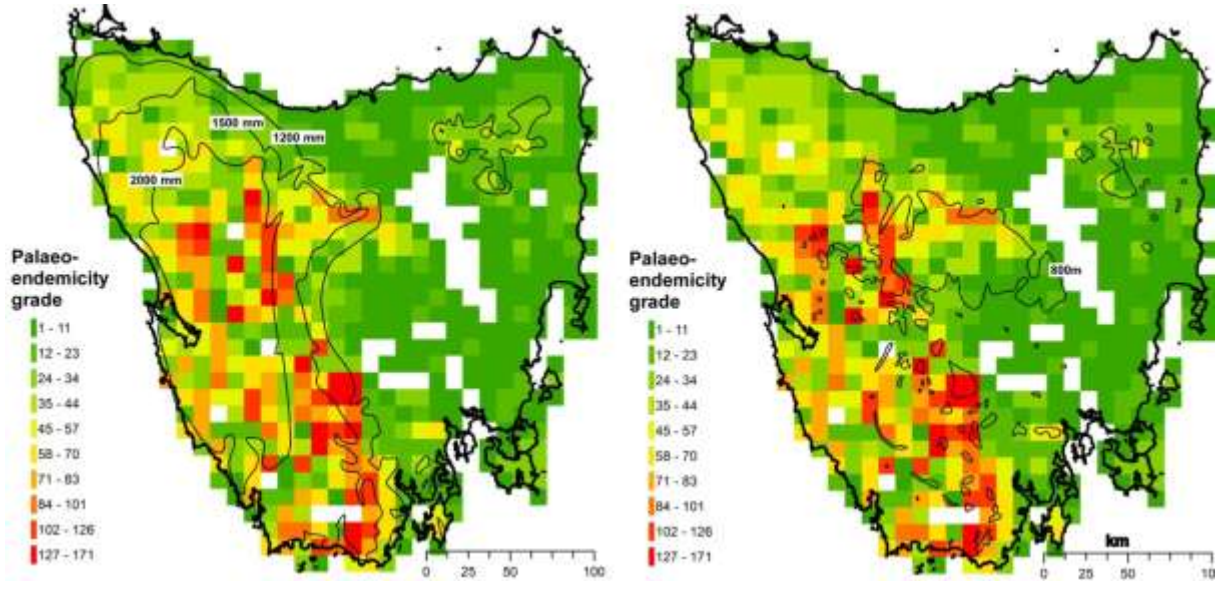

Figure 2. Geographic distribution of palaeo-endemicity based on categorical grades, as listed in Table 1. Some approximate isohyets (lines connecting areas of equal mean annual rainfall) are shown in left figure, the 800m altitude contour line is overlain on the right figure.

Proposed areas for reservation

Although many of the proposed reserves contain some of the clades listed as palaeo-endemic, in most cases these are either low value clades or the high value clades are focussed in small portions of the reserves. In most of these latter cases, the areas with high value for palaeo-endemism are in existing reserves and/or are unlikely to be logged (e.g. they are in alpine vegetation, *Lagarostrobos* forest).

Key examples are (numbers based on GIS analysis of Tasveg communities):

- Reserve 91 (10, 107 ha) contains *Athrotaxis selaginoides* rainforest and alpine vegetation that together occupy less than 0.5 % of the area.

- Reserve 25 (60,345 hectares), of which the vegetation types containing highly palaeo-endemic taxa (alpine vegetation and *Lagarostrobos* forest) occupy less than <1.2% of the area.

- Reserve 149 (10, 230 ha) contains *Lagarostrobos* rainforest that occupies less than 0.2% of the area.

- Reserve 176 (10, 593 ha) contains *Athrotaxis selaginoides* rainforest that occupies less than 0.1% of the area.

Important exceptions are

- Reserve 80 (1715 ha) with 45% *Athrotaxis selaginoides* forest

- Reserve 89 (204 ha) with 38% *Athrotaxis selaginoides* forest

- Reserve 65 (105 ha) with 10% *Lagarostrobos* forest

- Reserve 97 (15052 ha; located on the north-eastern part of the Central Plateau, and adjacent areas), contains an unknown area of the highly ranked, but only moderately well-reserved clade, *Gunnera*. This reserve also contains quite large areas of alpine vegetation (almost 50%). The lowland forest areas are unlikely to have significant representation of palaeo-endemics.

- Reserve 198 (37239 ha; located north-west of Cradle Mountain) contains an unknown area of *Gunnera*, but personal observations in region suggest that the clade is quite widespread and relatively common in this region. *Gunnera* is likely to be restricted to river and stream edges, and boggy areas, and forested areas are unlikely to have strong representation of palaeo-endemics.

Genetic variation within species

There is data on molecular genetic variation for some of the clades under consideration. The distribution of chloroplast genotypes in *Nothofagus cunninghamii* and *Tasmannia lanceolata* both reinforce the patterns shown in Fig. 1. In these two species, the chloroplast diversity in the south-western half of the island is considerably greater than in the areas east of this, or on mainland Australia (Worth *et al.* 2010; Worth *et al.* 2009). In the other relevant species investigated to date (*Atherosperma*

moschatum, *Telopea truncata* and *Lagarostrobos franklinii*), the data was insufficient to provide strong inferences regarding this question was at least consistent with the above results (Clark and Carbone 2008; Worth 2009; Worth *et al.* 2011).

Uncertainties and possible errors

The quality of the phylogenetic evidence underlying this study varies markedly from clade to clade. As a result, future evidence may reveal a number of clades that have higher or lower levels of palaeo-endemism than reported here. Some examples of potential palaeoendemics are *Pterygopappus lawrencii* (an endemic genus; see (Rozefelds 2008)), *Acradenia franklinii* and some ferns. However, it is unlikely that any of these will more than moderate palaeo-endemism scores. Furthermore, virtually all of the potential candidates are common and centred on regions with high scores in Fig. 1. In other words, none of these additional taxa are likely to have a significant effect on the overall inferences of this report.

Groups excluded from the analysis

The analysis did not consider bryophytes, lichens, fungi or aquatic plants. However, there is no reason to expect that they will show greatly different patterns to those apparent for vascular plants.

The phylogenetic, distributional and palaeobotanical information for bryophytes is inadequate to perform analyses to comparable those on vascular plants. However, bryophytes are likely to show very similar patterns to the vascular plants. Several bryophyte clades are strong candidates for palaeo-endemism based on current information. All of these are plants of western and south-western Tasmania. For example, *Rhabdodontium* and *Ambuchanania* (both endemic genera) are clearly ancient based on phylogenetic evidence, and are restricted to western Tasmania (P.J. Dalton pers. comm.). Other credible candidates include *Pleurophascum globosum*, *Ephemeropsis trentepohlioides* and the two endemic species of *Tayloria* (P.J. Dalton pers. comm.).

The antiquity of the aquatic plants is very difficult to determine because of poor phylogenetic information about these taxa. However, none of the potential aquatic candidates for “primitive” status (e.g. *Trithuria* species, *Isoetes* species, see grasses, *Damasonium*) are part of the forest estate.

Currently available evidence is inadequate to make strong statements about palaeoendemism among fungi or lichens, although palaeoendemics may well be present. The high diversity of these groups is in wet forests, which means that it is credible that they follow similar patterns to vascular plants.

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Appendix 1. Tables of palaeo-endemism in different land use types.

Table 1. Palaeo-endemic clades: Number of NVA records per land-use category across Tasmania. The clades are listed in order, from highest to lowest significance. Note, numbers of records refer to geographically unique records.

Score	Clade	------Existing Reserves -----				Proposed		Other areas		% of records in reserves	% of records in proposed reserves
		formal reserve (A1)	informal reserve (A2)	private reserve (FR)	proposed (already reserved) (P2)	Proposed (P3)	proposed (unattributed) (PZ)	other public land (A3)	freehold/other (ZZ)		
474	*Microcachrys*	184					5			97	3
451	*Athrotaxis*	362	3		11	1	11	3	79	77	3
286	*Bellendena*	343			1		19		78	78	4
197	*Lagarostrobos*	233	9		23	1	11	2	12	80	4
172	*Gleichenia abscida*	15								100	0
171	*Isophysis*	110			1				1	98	0
168	*Campynema*	76					1	2	4	92	1
162	*Tetracarpaea*	120	2		4		1		5	91	1
160	*Agastachys*	293	12		18	1	5	6	14	84	2
134	*Orites milliganii acicularis*	491	2				13	1	5	96	3
127	*Nothofagus gunnii*	78			2				3	94	0
123	*Diselma*	167			1		1		7	95	1
105	*Cenarrhenes*	732	48	5	205	40	26	38	143	59	5
102	*Pherosphaera*	91							3	97	0
87	*Gunnera*	25			3	1	3	3	43	32	5
83	*Milligania*	151								100	0
77	*Gleichenia alpina*	203	3		10		10	1	24	81	4
76	*Dracophyllum milliganii*	85			1					99	0
70	*Prionotes*	225	20		38	1	10	3	11	73	4
68	*Blandfordia*	122	3	1	5			5	21	78	0
68	*Planocarpa*	219	2		1		5	1	6	94	2
67	*Archeria*	371	3		7		8	3	13	92	2
56	*Anodopetalum*	802	138	6	217	48	38	109	133	54	6
55	*Orites diversifolius revolutus*	905	16		81	15	78	6	60	78	8
54	*Eucryphia*	1157	171		277	94	33	154	248	54	6
40	*Anopterus*	710	114	1	191	30	38	47	91	58	6
38	*Aristotelia*	534	105	5	215	22	29	66	323	41	4
36	*Lomatia*	1678	617	82	367	45	120	507	2087	30	3
32	*Telopea*	558	14		74	8	38	9	136	67	5
27	*Drymophila*	679	121	15	194	31	34	95	508	40	4
24	*Tmesipteris obliqua*	239	36	2	61	10	9	31	124	47	4
20	*Atherosperma*	1833	551	16	545	123	69	415	921	41	4
17	*Nothofagus cunninghamii*	2652	556	23	665	141	98	460	1143	46	4
17	*Donatia*	76					1			99	1
15	*Calochlaena*	48	27	4	19	4	3	48	90	20	3
13	*Tasmannia*	1423	176	15	277	44	95	91	572	53	5

Ben Lomond IBRA (657040 ha)

Table 2. Palaeo-endemic clades in the Ben Lomond IBRA: Number of records per land-use category. The clades are listed in order, from highest to lowest significance. The percentage of area in each land-use category is given under the code.

		----Existing Reserves ---				Proposed		Other areas		% of	% of
Score	Clade	A1	A2	FR	P2	P3	PZ	A3	ZZ	records	Tasmanian
		15%	2%	2%	4%	14%	1%	26%	36%	reserved	records
474	*Microcachrys*										0
451	*Athrotaxis*										0
286	*Bellendena*	21							2	91	5
197	*Lagarostrobos*										0
172	*Gleichenia abscida*										0
171	*Isophysis*										0
168	*Campynema*										0
162	*Tetracarpaea*	3								100	2
160	*Agastachys*										0
134	*Orites milliganii acicularis*	9								100	2
127	*Nothofagus gunnii*										0
123	*Diselma*										0
105	*Cenarrhenes*										0
102	*Pherosphaera*										0
87	*Gunnera*										0
83	*Milligania*										0
77	*Gleichenia alpina*	17			3		1		2	87	9
76	*Dracophyllum milliganii*										0
70	*Prionotes*										0
68	*Blandfordia*										0
68	*Planocarpa*										0
67	*Archeria*										0
56	*Anodopetalum*										0
55	*Orites diversifolius revolutus*	14			1				1	94	1
54	*Eucryphia*										0
40	*Anopterus*										0
38	*Aristotelia*	29	3	1	5	2	2		32	51	6
36	*Lomatia*	288	161	7	149	28	13	166	327	53	21
32	*Telopea*	36	1		7	1			2	94	6
27	*Drymophila*	74	24	3	14	7	3	14	67	56	12
24	*Tmesipteris obliqua*	27	7	0	17	7		12	35	49	21
20	*Atherosperma*	219	95		109	48	8	66	201	57	17
17	*Nothofagus cunninghamii*	367	67	1	142	66	16	66	248	59	17
17	*Donatia*										0
15	*Calochlaena*	27	15	3	15	3	2	29	29	49	51
13	*Tasmannia*	183	21	1	60	21	6	12	122	62	16

Flinders IBRA (490952 ha)

Table 3. Palaeo-endemic clades in the Flinders IBRA: Number of records per land-use category. The clades are listed in order, from highest to lowest significance. The percentage of area in each land-use category is given under the code.

Score	Clade	----Existing Reserves ---				Proposed Reserves		Other areas		% of records in reserves	% of Tasmanian records
		A1 26%	A2 1%	FR 1%	P2 2%	P3 1%	PZ 0%	A3 5%	ZZ 62%		
474	*Microcachrys*										0
451	*Athrotaxis*										0
286	*Bellendena*										0
197	*Lagarostrobos*										0
172	*Gleichenia abscida*										0
171	*Isophysis*										0
168	*Campynema*										0
162	*Tetracarpaea*										0
160	*Agastachys*										0
134	*Orites milliganii acicularis*										0
127	*Nothofagus gunnii*										0
123	*Diselma*										0
105	*Cenarrhenes*										0
102	*Pherosphaera*										0
87	*Gunnera*										0
83	*Milligania*										0
77	*Gleichenia alpina*										0
76	*Dracophyllum milliganii*										0
70	*Prionotes*										0
68	*Blandfordia*										0
68	*Planocarpa*										0
67	*Archeria*										0
56	*Anodopetalum*										0
55	*Orites diversifolius revolutus*										0
54	*Eucryphia*										0
40	*Anopterus*										0
38	*Aristotelia*										0
36	*Lomatia*	27	42	1	20	2	8	44	96	38	4
32	*Telopea*										0
27	*Drymophila*	3	1		1				3	63	0
24	*Tmesipteris obliqua*										0
20	*Atherosperma*	1	1					2	2	33	0
17	*Nothofagus cunninghamii*								1	0	0
17	*Donatia*										0
15	*Calochlaena*	7	4		3	1	1	1	21	37	16
13	*Tasmannia*										0

King IBRA (423946 ha)

Table 4. Palaeo-endemic clades in the King IBRA: Number of records per land-use category. The clades are listed in order, from highest to lowest significance. The percentage of area in each land-use category is given under the code.

Score	Clade	----Existing Reserves ---				Proposed Reserves		Other areas		% of records in reserves	% of Tasmanian records
		A1 17%	A2 3%	FR 2%	P2 1%	P3 4%	PZ 0%	A3 17%	ZZ 56%		
474	*Microcachrys*										0
451	*Athrotaxis*										0
286	*Bellendena*										0
197	*Lagarostrobos*										0
172	*Gleichenia abscida*										0
171	*Isophysis*										0
168	*Campynema*										0
162	*Tetracarpaea*										0
160	*Agastachys*										0
134	*Orites milliganii acicularis*										0
127	*Nothofagus gunnii*										0
123	*Diselma*										0
105	*Cenarrhenes*	64	2		3	2		5	52	54	10
102	*Pherosphaera*										0
87	*Gunnera*										0
83	*Milligania*										0
77	*Gleichenia alpina*										0
76	*Dracophyllum milliganii*										0
70	*Prionotes*										0
68	*Blandfordia*	1			1			1	12	13	10
68	*Planocarpa*										0
67	*Archeria*										0
56	*Anodopetalum*	52	20	1	2			15	44	56	9
55	*Orites diversifolius revolutus*										0
54	*Eucryphia*	101	44		6	44		36	105	45	16
40	*Anopterus*	23	4		2			2	17	60	4
38	*Aristotelia*	45	7					9	59	43	9
36	*Lomatia*	2	1						30	9	1
32	*Telopea*	5								100	1
27	*Drymophila*	15	4	2	2			6	48	30	5
24	*Tmesipteris obliqua*	38	3	1	1			4	32	54	15
20	*Atherosperma*	146	57	5	7	4		54	173	48	10
17	*Nothofagus cunninghamii*	206	122	9	12	5	1	103	269	48	13
17	*Donatia*										0
15	*Calochlaena*								10	0	4
13	*Tasmannia*	49	9	4	1	2		9	46	53	4

Tasmanian Northern Midlands IBRA (415121ha)

Table 5. Palaeo-endemic clades in the Flinders IBRA. Number of records per land-use category. The clades are listed in order, from highest to lowest significance. The percentage of area in each land-use category is given under the code.

		----Existing Reserves ---				Proposed Reserves		Other areas		% of records in reserves	% of Tasmanian records
Score	Clade	A1 3%	A2 0%	FR 5%	P2 0%	P3 0%	PZ 0%	A3 0%	ZZ 91%		
474	*Microcachrys*										0
451	*Athrotaxis*										0
286	*Bellendena*										0
197	*Lagarostrobos*										0
172	*Gleichenia abscida*										0
171	*Isophysis*										0
168	*Campynema*										0
162	*Tetracarpaea*										0
160	*Agastachys*										0
134	*Orites milliganii acicularis*										0
127	*Nothofagus gunnii*										0
123	*Diselma*										0
105	*Cenarrhenes*										0
102	*Pherosphaera*										0
87	*Gunnera*										0
83	*Milligania*										0
77	*Gleichenia alpina*										0
76	*Dracophyllum milliganii*										0
70	*Prionotes*										0
68	*Blandfordia*										0
68	*Planocarpa*										0
67	*Archeria*										0
56	*Anodopetalum*										0
55	*Orites diversifolius revolutus*										0
54	*Eucryphia*										0
40	*Anopterus*										0
38	*Aristotelia*										0
36	*Lomatia*		3	4			1		78	8	2
32	*Telopea*										0
27	*Drymophila*		1				1		4	17	0
24	*Tmesipteris obliqua*										0
20	*Atherosperma*										0
17	*Nothofagus cunninghamii*										0
17	*Donatia*										0
15	*Calochlaena*								1	0	0
13	*Tasmannia*								5	0	0

Tasmanian Northern Slopes IBRA (622547 ha)

Table 6. Palaeo-endemic clades in the Tasmanian Northern Slopes IBRA. Number of records per land-use category. The clades are listed in order, from highest to lowest significance. The percentage of area in each land-use category is given under the code.

		----Existing Reserves ---				Proposed Reserves		Other areas		% of records	% of Tasmanian
Score	Clade	A1 13%	A2 5%	FR 2%	P2 3%	P3 5%	PZ 0%	A3 17%	ZZ 54%	in reserves	records
474	*Microcachrys*										0
451	*Athrotaxis*	2	1						4	43	1
286	*Bellendena*								6	0	1
197	*Lagarostrobos*										0
172	*Gleichenia abscida*										0
171	*Isophysis*										0
168	*Campynema*										0
162	*Tetracarpaea*				1					100	1
160	*Agastachys*					1				0	0
134	*Orites milliganii acicularis*										0
127	*Nothofagus gunnii*										0
123	*Diselma*										0
105	*Cenarrhenes*	27	7	5	2			11	28	51	6
102	*Pherosphaera*										0
87	*Gunnera*	1							1	50	3
83	*Milligania*										0
77	*Gleichenia alpina*		1						1	50	1
76	*Dracophyllum milliganii*										0
70	*Prionotes*										0
68	*Blandfordia*		1						1	50	1
68	*Planocarpa*										0
67	*Archeria*										0
56	*Anodopetalum*	61	44	5	19			60	38	57	15
55	*Orites diversifolius revolutus*	4			1				4	56	1
54	*Eucryphia*	81	41		23	1		76	61	51	13
40	*Anopterus*	11	12		10			11	6	66	4
38	*Aristotelia*	30	11	3	6			10	92	33	12
36	*Lomatia*	155	57	18	16	4	1	92	336	36	12
32	*Telopea*	31	2		3				36	50	9
27	*Drymophila*	75	18	4	14	2		34	137	39	17
24	*Tmesipteris obliqua*	25	8		2			6	28	51	13
20	*Atherosperma*	169	94	10	52	3		128	276	44	16
17	*Nothofagus cunninghamii*	232	109	12	73	4	1	156	319	47	16
17	*Donatia*										0
15	*Calochlaena*	13	8	1				18	28	32	28
13	*Tasmannia*	81	15	6	11			21	128	43	10

Tasmanian South-east IBRA (1103033 ha)

Table 7. Palaeo-endemic clades in the Tasmanian South-east IBRA. Number of records per land-use category. The clades are listed in order, from highest to lowest significance. The percentage of area in each land-use category is given under the code.

		----Existing Reserves ---				Proposed Reserves		Other areas		% of records in reserves	% of Tasmanian records
Score	Clade	A1 13%	A2 3%	FR 4%	P2 2%	P3 2%	PZ 0%	A3 5%	ZZ 72%		
474	*Microcachrys*										0
451	*Athrotaxis*										0
286	*Bellendena*	4							3	57	2
197	*Lagarostrobos*										0
172	*Gleichenia abscida*										0
171	*Isophysis*										0
168	*Campynema*										0
162	*Tetracarpaea*										0
160	*Agastachys*										0
134	*Orites milliganii acicularis*	6							1	86	1
127	*Nothofagus gunnii*										0
123	*Diselma*										0
105	*Cenarrhenes*										0
102	*Pherosphaera*										0
87	*Gunnera*										0
83	*Milligania*										0
77	*Gleichenia alpina*	6								100	2
76	*Dracophyllum milliganii*										0
70	*Prionotes*										0
68	*Blandfordia*										0
68	*Planocarpa*	2								100	1
67	*Archeria*										0
56	*Anodopetalum*										0
55	*Orites diversifolius revolutus*	14							8	64	2
54	*Eucryphia*										0
40	*Anopterus*	45	7		8			1	19	75	7
38	*Aristotelia*	50	28	1	34	3	1	11	45	65	13
36	*Lomatia*	707	146	31	117	1	12	109	835	51	36
32	*Telopea*	18							3	86	3
27	*Drymophila*	104	10	1	22		2	1	98	58	14
24	*Tmesipteris obliqua*	17	2	1	1				10	68	6
20	*Atherosperma*	170	28	1	34	3	1	11	45	80	7
17	*Nothofagus cunninghamii*	60	8		14	2			24	76	2
17	*Donatia*										0
15	*Calochlaena*	1			1				1	67	1
13	*Tasmannia*	93	15	3	20			3	49	72	7

Tasmanian Central Highlands IBRA (767330 ha)

Table 8. Palaeo-endemic clades in the Tasmanian Central Highlands IBRA. Number of records per land-use category. The clades are listed in order, from highest to lowest significance. The percentage of area in each land-use category is given under the code.

		----Existing Reserves ---				Proposed Reserves		Other areas		% of records in reserves	% of Tasmanian records
Score	Clade	A1 56%	A2 2%	FR 2%	P2 2%	P3 3%	PZ 1%	A3 4%	ZZ 29%		
474	*Microcachrys*	67					5			93	38
451	*Athrotaxis*	236	2		6	1	10	3	71	74	70
286	*Bellendena*	144			1		19		63	64	51
197	*Lagarostrobos*	5								100	2
172	*Gleichenia abscida*										0
171	*Isophysis*	4								100	4
168	*Campynema*	20						2	1	87	28
162	*Tetracarpaea*	32	1						2	94	27
160	*Agastachys*	18							4	82	6
134	*Orites milliganii acicularis*	218	2				13	1	3	93	46
127	*Nothofagus gunnii*	45			2				3	94	60
123	*Diselma*	75			1		1		2	96	45
105	*Cenarrhenes*	77	3		2				26	76	9
102	*Pherosphaera*	18								100	19
87	*Gunnera*	23			3	1	3	3	40	36	94
83	*Milligania*	29								100	19
77	*Gleichenia alpina*	108	2				9		15	82	53
76	*Dracophyllum milliganii*	2								100	2
70	*Prionotes*	13	3				8		2	62	8
68	*Blandfordia*	15			1					100	10
68	*Planocarpa*	128	1		1		5	1	3	94	59
67	*Archeria*	49	1						4	93	13
56	*Anodopetalum*	75			3			1	18	80	7
55	*Orites diversifolius revolutus*	414	4				78	4	32	79	46
54	*Eucryphia*	100			1			1	28	78	6
40	*Anopterus*	36	1					1	8	80	4
38	*Aristotelia*	112	4		1		16	3	35	68	13
36	*Lomatia*	190	58	2	12		84	25	202	46	10
32	*Telopea*	275	4		1		35		55	76	44
27	*Drymophila*	150	5	1	4		21	1	48	70	14
24	*Tmesipteris obliqua*	9					1		8	50	4
20	*Atherosperma*	261	15		6	1	10	3	71	77	8
17	*Nothofagus cunninghamii*	617	18		10	1	20	6	119	82	14
17	*Donatia*	21					1			95	29
15	*Calochlaena*										0
13	*Tasmannia*	419	18	1	5	1	85	2	118	68	24

Tasmanian Southern Ranges IBRA (779358 ha)

Table 9. Palaeo-endemic clades in the Tasmanian Southern Ranges IBRA. Number of records per land-use category. The clades are listed in order, from highest to lowest significance. The percentage of area in each land-use category is given under the code.

		----Existing Reserves ---				Proposed Reserves		Other areas		% of records	% of Tasmanian
Score	Clade	A1 41%	A2 3%	FR 0%	P2 6%	P3 11%	PZ 0%	A3 18%	ZZ 21%	in reserves	records
474	*Microcachrys*	111								100	59
451	*Athrotaxis*	92			4				3	97	21
286	*Bellendena*	165							3	98	38
197	*Lagarostrobos*	39	6		19				2	97	23
172	*Gleichenia abscida*	3								100	20
171	*Isophysis*	26							1	96	24
168	*Campynema*	23							2	92	30
162	*Tetracarpaea*	56			2				2	97	45
160	*Agastachys*	56	4		10			2	1	96	21
134	*Orites milliganii acicularis*	230								100	45
127	*Nothofagus gunnii*	29								100	35
123	*Diselma*	75							5	94	45
105	*Cenarrhenes*	182	24		169	37		14	13	85	35
102	*Pherosphaera*	69							3	96	77
87	*Gunnera*	1							2	33	4
83	*Milligania*	76								100	50
77	*Gleichenia alpina*	71			7			1	4	94	33
76	*Dracophyllum milliganii*	28								100	33
70	*Prionotes*	99	16		35	1		3	3	96	51
68	*Blandfordia*	27	1	1					2	94	20
68	*Planocarpa*	62	1						2	97	28
67	*Archeria*	97			2					100	24
56	*Anodopetalum*	212	53		159	47		24	14	83	34
55	*Orites diversifolius revolutus*	369	11		78	15		2	14	94	42
54	*Eucryphia*	341	51		195	48		28	22	86	32
40	*Anopterus*	217	73	1	137	29		23	22	85	41
38	*Aristotelia*	136	49		159	17		31	49	78	34
36	*Lomatia*	183	147	19	44	10		68	168	62	12
32	*Telopea*	118	6		61	6		5	31	81	27
27	*Drymophila*	120	48	4	122	21		28	89	68	26
24	*Tmesipteris obliqua*	46	14		33	3		6	5	87	21
20	*Atherosperma*	398	236		287	63		140	120	74	28
17	*Nothofagus cunninghamii*	555	196	1	353	61		111	120	79	24
17	*Donatia*	32								100	42
15	*Calochlaena*										0
13	*Tasmannia*	375	92		163	19		32	80	83	28

Tasmanian West IBRA (1561494 ha)

Table 10. Palaeo-endemic clades in the Tasmanian West IBRA. Number of records per land-use category. The clades are listed in order, from highest to lowest significance. The percentage of area in each land-use category is given under the code.

		----Existing Reserves ---				Proposed Reserves		Other areas		% of records in reserves	% of Tasmanian records
Score	Clade	A1 86%	A2 0%	FR 0%	P2 3%	P3 5%	PZ 0%	A3 3%	ZZ 3%		
474	*Microcachrys*	6								100	3
451	*Athrotaxis*	32			1		1		1	94	7
286	*Bellendena*	9							1	90	2
197	*Lagarostrobos*	189	3		4	1	11	2	10	89	76
172	*Gleichenia abscida*	12								100	80
171	*Isophysis*	80			1					100	72
168	*Campynema*	33					1		1	94	42
162	*Tetracarpaea*	29	1		1		1		1	94	25
160	*Agastachys*	219	8		8		5	4	9	93	72
134	*Orites milliganii acicularis*	28							1	97	6
127	*Nothofagus gunnii*	4								100	5
123	*Diselma*	17								100	10
105	*Cenarrhenes*	382	12		29	1	26	8	24	88	39
102	*Pherosphaera*	4								100	4
87	*Gunnera*										0
83	*Milligania*	46								100	30
77	*Gleichenia alpina*	1							2	33	1
76	*Dracophyllum milliganii*	55			1					100	65
70	*Prionotes*	113	1		3		2		6	94	41
68	*Blandfordia*	79	1		3			4	6	89	59
68	*Planocarpa*	27							1	96	12
67	*Archeria*	225	2		5		8	3	9	92	62
56	*Anodopetalum*	402	21		34	1	38	9	19	87	35
55	*Orites diversifolius revolutus*	90	1		1				1	99	8
54	*Eucryphia*	534	35		52	1	33	13	32	89	33
40	*Anopterus*	378	17		34	1	38	9	19	86	41
38	*Aristotelia*	132	3		10		10	2	11	86	13
36	*Lomatia*	126	2		9		1	3	15	88	3
32	*Telopea*	75	1		2	1	3	4	9	82	11
27	*Drymophila*	138	10		15	1	7	11	14	83	12
24	*Tmesipteris obliqua*	77	2		7		8	3	6	83	20
20	*Atherosperma*	469	25		50	1	50	11	33	85	14
17	*Nothofagus cunninghamii*	615	36		61	2	60	18	43	85	15
17	*Donatia*	23								100	30
15	*Calochlaena*										0
13	*Tasmannia*	223	6		17	1	4	12	24	86	11

Appendix 2. Tables of Tasmanian eucalypt species in different land use types.

Ben Lomond IBRA (657040 ha)

Table 1. Eucalypt species in the Ben Lomond IBRA: Number of compiled records per land-use category. The percentage of area in each land-use category is given under the code.

	----Existing Reserves ---				Proposed		Other areas				
Eucalypt species	formal reserve A1 15%	informal reserve A2 2%	private reserve FR 2%	proposed (already reserved) P2 4%	Proposed P3 14%	proposed (unattributed) PZ 1%	other public land A3 26%	freehold/other ZZ 36%	% of records in reserves	% of records in proposed reserves	% of all records in this bioregion
E. amygdalina	568	110	15	58	402		1209	357	28	15	25
E. archeri	40			6	3			1	92	6	29
E. barberi											0
E. brookeriana	33	5	3	8	21		15	25	45	19	21
E. coccifera											0
E. cordata											0
E. dalrympleana subsp. dalrympleana	43	9	1	9	53		63	42	28	24	10
E. delegatensis subsp. tasmaniensis	373	38	3	93	306		386	56	40	24	16
E. globulus subsp. globulus	34	1	2	6	17		3	17	54	21	2
E. gunnii	6			8	4		2		70	20	2
E. johnstonii											0
E. morrisbyi											0
E. nebulosa											0
E. nitida								2	0	0	0
E. obliqua	516	172	13	122	599		1828	252	24	17	24
E. ovata var. ovata	72	9	14	7	43	1	104	199	23	10	15
E. pauciflora subsp. pauciflora	13	5		3	10		9	52	23	11	6
E. perriniana											0
E. pulchella			1		1		3	3	13	13	0
E. radiata subsp. radiata											0
E. regnans	245	120	7	106	409		996	66	25	21	48
E. risdonii											0
E. rodwayi	29	4		8	15		11	29	43	16	12
E. rubida	3	1		1	4		7	7	22	17	6
E. sieberi	184	11	4	18	163		166	31	38	28	44
E. subcrenulata				1					100	0	0
E. tenuiramis	7				2				78	22	1
E. urnigera											0
E. vernicosa											0
E. viminalis	332	76	14	55	294		664	265	28	17	19
E. cordata subsp. cordata											0
E. cordata subsp. cordata - quadrangulosa											0
E. cordata subsp. quadrangulosa											0
E. gunnii subsp. divaricata											0
E. viminalis subsp. hentyensis											0

Flinders IBRA (490952 ha)

Table 2. Eucalypt species in the Flinders IBRA: Number of compiled records per land-use category. The percentage of area in each land-use category is given under the code.

	----Existing Reserves ---				Proposed		Other areas				
	formal reserve	informal reserve	private reserve	proposed (already reserved)	Proposed	proposed (unattributed)	other public land	freehold/other	% of records in reserves	% of records in proposed reserves	% of all records in this bioregion
	A1	A2	FR	P2	P3	PZ	A3	ZZ			
Eucalypt species	26%	1%	1%	2%	1%	0%	5%	62%			
E. amygdalina	308	46	24	23	118	3	326	376	33	10	11
E. archeri											0
E. barberi											0
E. brookeriana								1	0	0	0
E. coccifera											0
E. cordata											0
E. dalrympleana subsp. dalrympleana	1								100	0	0
E. delegatensis subsp. tasmaniensis							1		0	0	0
E. globulus subsp. globulus	23	3	4		4	2	2	67	29	6	2
E. gunnii											0
E. johnstonii											0
E. morrisbyi											0
E. nebulosa											0
E. nitida	2	1						4	43	0	1
E. obliqua	102	25	2	26	124	1	254	63	26	21	4
E. ovata var. ovata	65	6	12	4	6		28	146	33	2	9
E. pauciflora subsp. pauciflora	13	1						22	39	0	2
E. perriniana											0
E. pulchella								1	0	0	0
E. radiata subsp. radiata											0
E. regnans		1					13		7	0	0
E. risdonii											0
E. rodwayi	1							6	14	0	1
E. rubida											0
E. sieberi	57	31	3	23	78	1	126	100	27	19	32
E. subcrenulata											0
E. tenuiramis											0
E. urnigera											0
E. vernicosa											0
E. viminalis	119	27	21	13	64	2	137	230	29	11	7
E. cordata subsp. cordata											0
E. cordata subsp. cordata - quadrangulosa											0
E. cordata subsp. quadrangulosa											0
E. gunnii subsp. divaricata											0
E. viminalis subsp. hentyensis											0

King IBRA (423946 ha)

Table 3. Eucalypt species in the King IBRA: Number of compiled records per land-use category. The percentage of area in each land-use category is given under the code.

	----Existing Reserves ---				Proposed		Other areas				
	formal reserve	informal reserve	private reserve	proposed (already reserved)	Proposed	proposed (unattributed)	other public land	freehold/other	% of records in reserves	% of records in proposed reserves	% of all records in this bioregion
	A1+IR	A2	FR	P2	P3	PZ	A3	ZZ			
Eucalypt species	17%	3%	2%	1%	4%	0%	17%	56%			
E. amygdalina	1			2				3	50	0	0
E. archeri											0
E. barberi											0
E. brookeriana	51	9	5	1	1		51	29	43	1	26
E. coccifera											0
E. cordata											0
E. dalrympleana subsp. dalrympleana							1		0	0	0
E. delegatensis subsp. tasmaniensis	1							2	33	0	0
E. globulus subsp. globulus											0
E. gunnii											0
E. johnstonii											0
E. morrisbyi											0
E. nebulosa											0
E. nitida	112	11	5	4	13		87	147	34	3	27
E. obliqua	242	58	10	17	140		744	182	23	10	9
E. ovata var. ovata	24	6	6	1	2		58	70	20	1	5
E. pauciflora subsp. pauciflora											0
E. perriniana											0
E. pulchella											0
E. radiata subsp. radiata											0
E. regnans	1	1					10	1	15	0	0
E. risdonii											0
E. rodwayi											0
E. rubida											0
E. sieberi											0
E. subcrenulata											0
E. tenuiramis											0
E. urnigera											0
E. vernicosa											0
E. viminalis	10	2	3		1		6	40	24	2	1
E. cordata subsp. cordata											0
E. cordata subsp. cordata - quadrangulosa											0
E. cordata subsp. quadrangulosa											0
E. gunnii subsp. divaricata											0
E. viminalis subsp. hentyensis											0

Tasmanian Northern Midlands IBRA (415121ha)

Table 4. Eucalypt species in the Flinders IBRA. Number of compiled records per land-use category. The percentage of area in each land-use category is given under the code.

	----Existing Reserves ---				Proposed		Other areas				
	formal reserve	informal reserve	private reserve	proposed (already reserved)	Proposed	proposed (unattributed)	other public land	freehold/other	% of records in reserves	% of records in proposed reserves	% of all records in this bioregion
	A1	A2	FR	P2	P3	PZ	A3	ZZ			
Eucalypt species	3%	0%	5%	0%	0%	0%	0%	91%			
E. amygdalina	79	23	121		14	2	8	495	30	2	7
E. archeri											0
E. barberi											0
E. brookeriana			1						100	0	0
E. coccifera								1	0	0	0
E. cordata											0
E. dalrympleana subsp. dalrympleana	15	1	1		11			7	49	31	2
E. delegatensis subsp. tasmaniensis	15		3	3	12		2	14	43	24	1
E. globulus subsp. globulus											0
E. gunnii											0
E. johnstonii											0
E. morrisbyi											0
E. nebulosa											0
E. nitida											0
E. obliqua	1		6	2	11		3	34	16	19	0
E. ovata var. ovata	6	1	20		3			223	11	1	8
E. pauciflora subsp. pauciflora	1	3	51	1	1		1	216	20	0	18
E. perriniana											0
E. pulchella		1						1	50	0	0
E. radiata subsp. radiata											0
E. regnans								1	0	0	0
E. risdonii											0
E. rodwayi		3	5				1	25	24	0	4
E. rubida								9	0	0	2
E. sieberi	16		3		3			1	83	13	2
E. subcrenulata											0
E. tenuiramis											0
E. urnigera								1	0	0	0
E. vernicosa											0
E. viminalis	55	18	110	2	9	2	4	436	29	2	7
E. cordata subsp. cordata											0
E. cordata subsp. cordata - quadrangulosa											0
E. cordata subsp. quadrangulosa											0
E. gunnii subsp. divaricata											0
E. viminalis subsp. hentyensis											0

Tasmanian Northern Slopes IBRA (622547 ha)

Table 5. Eucalypt species in the Tasmanian Northern Slopes IBRA. Number of compiled records per land-use category. The percentage of area in each land-use category is given under the code.

	----Existing Reserves ---				Proposed		Other areas				
Eucalypt species	formal reserve A1 13%	informal reserve A2 5%	private reserve FR 2%	proposed (already reserved) P2 3%	Proposed P3 5%	proposed (unattributed) PZ 0%	other public land A3 17%	freehold/other ZZ 54%	% of records in reserves	% of records in proposed reserves	% of all records in this bioregion
E. amygdalina	570	137	29	79	131	11	380	365	48	8	16
E. archeri											0
E. barberi											0
E. brookeriana	3						2	2	43	0	1
E. coccifera	11				1	1		3	69	13	2
E. cordata											0
E. dalrympleana subsp. dalrympleana	52	15		7	4	1	37	24	53	4	6
E. delegatensis subsp. tasmaniensis	242	61	8	91	158	4	332	55	42	17	12
E. globulus subsp. globulus											0
E. gunnii	7						6	9	32	0	2
E. johnstonii											0
E. morrisbyi											0
E. nebulosa											0
E. nitida	59	5	2	26	17		24	31	56	10	12
E. obliqua	780	198	44	155	294	13	792	383	44	12	18
E. ovata var. ovata	84	15	22	19	21	2	61	179	35	6	13
E. pauciflora subsp. pauciflora	18	8	9	1			8	24	53	0	4
E. perriniana											0
E. pulchella											0
E. radiata subsp. radiata	10	46	3	6			18	13	68	0	90
E. regnans	55	11	9	12	13		89	25	41	6	5
E. risdonii											0
E. rodwayi	3	4		9			9	24	33	0	6
E. rubida						1			0	100	0
E. sieberi											0
E. subcrenulata	24	1		4			2		94	0	9
E. tenuiramis											0
E. urnigera											0
E. vernicosa											0
E. viminalis	279	73	42	52	91	14	329	309	38	9	13
E. cordata subsp. cordata											0
E. cordata subsp. cordata - quadrangulosa											0
E. cordata subsp. quadrangulosa											0
E. gunnii subsp. divaricata											0
E. viminalis subsp. hentyensis											0

Tasmanian South-east IBRA (1103033 ha)

Table 6. Eucalypt species in the Tasmanian South-east IBRA. Number of compiled records per land-use category. The percentage of area in each land-use category is given under the code.

	----Existing Reserves ---				Proposed		Other areas				
	formal reserve	informal reserve	private reserve	proposed (already reserved)	Proposed	proposed (unattributed)	other public land	freehold/other	% of records in reserves	% of records in proposed reserves	% of all records in this bioregion
	A1+IR	A2	FR	P2	P3	PZ	A3	ZZ			
Eucalypt species	13%	3%	4%	2%	2%	0%	5%	72%			
E. amygdalina	2126	163	166	82	98	1	333	1046	63	2	37
E. archeri											0
E. barberi	133	1	30	20	6		1	75	69	0	100
E. brookeriana	95	10	4	9	25		33	39	55	12	40
E. coccifera	81	2	3	4	10		7	19	71	8	13
E. cordata	33	16	1	5	2		15	90	34	1	54
E. dalrympleana subsp. dalrympleana	326	83	5	17	41	1	295	133	48	5	41
E. delegatensis subsp. tasmaniensis	1322	96	17	90	267	1	494	137	63	11	31
E. globulus subsp. globulus	1220	122	232	86	114	1	214	1619	46	3	80
E. gunnii	29	1		2	2		5	6	71	4	4
E. johnstonii	30		1		5		1	7	70	11	15
E. morrisbyi	8							8	50	0	100
E. nebulosa											0
E. nitida	3			1				2	67	0	0
E. obliqua	1554	155	104	78	259	2	505	878	53	7	24
E. ovata var. ovata	305	56	97	31	16		69	749	37	1	43
E. pauciflora subsp. pauciflora	70	12	58	17	5		23	330	30	1	34
E. perriniana	18							3	86	0	48
E. pulchella	510	44	190	55	59	1	59	635	51	4	91
E. radiata subsp. radiata											0
E. regnans	50	27	1	4	47		151	63	24	14	8
E. risdonii	108		49				2	221	41	0	100
E. rodwayi	107	12	7	3	2		20	145	44	1	37
E. rubida	115	2	32	3			11	150	49	0	76
E. sieberi	241	5	4				12	25	87	0	22
E. subcrenulata											0
E. tenuiramis	816	49	120	13	49	1	60	554	60	3	94
E. urnigera	125		6	7	2		2	14	88	1	42
E. vernicosa											0
E. viminalis	1698	108	375	88	81	1	185	1710	53	2	48
E. cordata subsp. cordata	32	15	1	5	2		15	74	37	1	92
E. cordata subsp. cordata - quadrangulosa								7	0	0	33
E. cordata subsp. quadrangulosa	1	1						9	18	0	9
E. gunnii subsp. divaricata											0
E. viminalis subsp. hentyensis											0

Tasmanian Central Highlands IBRA (767330 ha)

Table 7. Eucalypt species in the Tasmanian Central Highlands IBRA. Number of compiled records per land-use category. The percentage of area in each land-use category is given under the code.

	----Existing Reserves ---				Proposed		Other areas				
	formal reserve	informal reserve	private reserve	proposed (already reserved)	Proposed	proposed (unattributed)	other public land	freehold/other	% of records in reserves	% of records in proposed reserves	% of all records in this bioregion
	A1	A2	FR	P2	P3	PZ	A3	ZZ			
Eucalypt species	56%	2%	2%	2%	3%	1%	4%	29%			
E. amygdalina	101	9	2	6	33	3	36	32	53	16	2
E. archeri	107			7	2	7			93	7	71
E. barberi											0
E. brookeriana											0
E. coccifera	341	13	9	23	5	33	8	65	78	8	53
E. cordata											0
E. dalrympleana subsp. dalrympleana	97	10	7	11	19	21	43	150	35	11	16
E. delegatensis subsp. tasmaniensis	688	42	26	109	184	61	202	238	56	16	20
E. globulus subsp. globulus											0
E. gunnii	260	39	33	14	12	64	10	458	39	9	82
E. johnstonii											0
E. morrisbyi											0
E. nebulosa											0
E. nitida	40	1	2	8	9		4	11	68	12	5
E. obliqua	93	2		9	39	1	32	9	56	22	1
E. ovata var. ovata	4	3	1		1		1	12	36	5	1
E. pauciflora subsp. pauciflora	53	15	17	1	1	12	10	177	30	5	19
E. perriniana											0
E. pulchella											0
E. radiata subsp. radiata	5	2						3	70	0	9
E. regnans	14						2	3	74	0	0
E. risdonii											0
E. rodwayi	24	4	17	1	1	4	3	130	25	3	23
E. rubida	1		4					6	45	0	3
E. sieberi											0
E. subcrenulata	99	1	2	2		1	1	16	85	1	34
E. tenuiramis											0
E. urnigera	23						9	59	25	0	24
E. vernicosa	17							1	94	0	9
E. viminalis	60	5	1	6	17	4	33	14	51	15	2
E. cordata subsp. cordata											0
E. cordata subsp. cordata - quadrangulosa											0
E. cordata subsp. quadrangulosa											0
E. gunnii subsp. divaricata	30	2	5	8	9	2	1	233	16	4	100
E. viminalis subsp. hentyensis											0

Tasmanian Southern Ranges IBRA (779358 ha)

Table 8. Eucalypt species in the Tasmanian Southern Ranges IBRA. Number of compiled records per land-use category. The percentage of area in each land-use category is given under the code.

	----Existing Reserves ---				Proposed		Other areas				
Eucalypt species	formal reserve A1 41%	informal reserve A2 3%	private reserve FR 0%	proposed (already reserved) P2 6%	Proposed P3 11%	proposed (unattributed) PZ 0%	other public land A3 18%	freehold/other ZZ 21%	% of records in reserves	% of records in proposed reserves	% of all records in this bioregion
E. amygdalina	95	28	1	5	16		70	88	43	5	3
E. archeri											0
E. barberi											0
E. brookeriana	6						2	7	40	0	3
E. coccifera	212	5	5	24	15		15	16	84	5	31
E. cordata	77		11					52	63	0	46
E. dalrympleana subsp. dalrympleana	53	59	3	16	22		242	120	25	4	24
E. delegatensis subsp. tasmaniensis	309	90	7	78	265		693	139	31	17	20
E. globulus subsp. globulus	82	38	17	31	95		209	175	26	15	14
E. gunnii	70	1		10	7		7	6	80	7	9
E. johnstonii	82	7	6	19	57		41	18	50	25	80
E. morrisbyi											0
E. nebulosa											0
E. nitida	105	9	5	32	44		45	26	57	17	19
E. obliqua	504	145	22	150	529		885	270	33	21	17
E. ovata var. ovata	37	6	5	3	6		14	95	31	4	5
E. pauciflora subsp. pauciflora	32	30	3	40	10		25	119	41	4	17
E. perriniana	22							1	96	0	52
E. pulchella	63	2	4	1	3		5	59	51	2	8
E. radiata subsp. radiata											0
E. regnans	308	175	6	92	265		565	59	40	18	36
E. risdonii											0
E. rodwayi	36	5	4	17	1		11	52	49	1	16
E. rubida	29	1	4				3	18	62	0	13
E. sieberi											0
E. subcrenulata	115		1	15	25		28		71	14	51
E. tenuiramis	36	2	2		1		13	33	46	1	5
E. urnigera	100	1	5	6	3		4	6	90	2	34
E. vernicosa	37			1	1		1		95	3	21
E. viminalis	52	19	6	4	9		52	102	33	4	3
E. cordata subsp. cordata	2		2					8	33	0	8
E. cordata subsp. cordata - quadrangulosa			5					9	36	0	67
E. cordata subsp. quadrangulosa	75		4					35	69	0	91
E. gunnii subsp. divaricata											0
E. viminalis subsp. hentyensis											0

Tasmanian West IBRA (1561494 ha)

Table 9. Eucalypt species in the Tasmanian West IBRA. Number of compiled records per land-use category. The percentage of area in each land-use category is given under the code.

	----Existing Reserves ---				Proposed		Other areas				
	formal reserve	informal reserve	private reserve	proposed (already reserved)	Proposed	proposed (unattributed)	other public land	freehold/other	% of records in reserves	% of records in proposed reserves	% of all records in this bioregion
	A1	A2	FR	P2	P3	PZ	A3	ZZ			
Eucalypt species	86%	0%	0%	3%	5%	0%	3%	3%			
E. amygdalina	17			3	1				95	5	0
E. archeri											0
E. barberi											0
E. brookeriana	33	3			5		1	3	80	11	8
E. coccifera	10								100	0	1
E. cordata											0
E. dalrympleana subsp. dalrympleana	1								100	0	0
E. delegatensis subsp. tasmaniensis	80	1	1	15	22	1	2	4	77	18	2
E. globulus subsp. globulus	29	1		11	2				95	5	1
E. gunnii	5						1		83	0	1
E. johnstonii	3			1	10				29	71	5
E. morrisbyi											0
E. nebulosa	2			1	1	4			38	63	100
E. nitida	355	4		32	40	2	23	24	81	9	35
E. obliqua	139	2		42	134		42	10	50	36	2
E. ovata var. ovata	23			2	1		4	4	74	3	1
E. pauciflora subsp. pauciflora	1								100	0	0
E. perriniana											0
E. pulchella											0
E. radiata subsp. radiata	1								100	0	1
E. regnans	8	1			43		14		14	65	2
E. risdonii											0
E. rodwayi	1								100	0	0
E. rubida											0
E. sieberi											0
E. subcrenulata	16				3			1	80	15	6
E. tenuiramis	18								100	0	1
E. urnigera											0
E. vernicosa	124			1	3		3	4	93	2	70
E. viminalis	13				1		3	9	50	4	0
E. cordata subsp. cordata											0
E. cordata subsp. cordata - quadrangulosa											0
E. cordata subsp. quadrangulosa											0
E. gunnii subsp. divaricata											0
E. viminalis subsp. hentyensis	13				1		3	9	50	4	100