

# Native riparian vegetation in Tasmania

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**Abstract:** Twenty-one riparian vascular plant communities are defined, mapped and described using presence/absence data from 460 sites from relatively unmodified stretches of rivers and streams on mainland Tasmania. The process of classification involved selection of groups of floristically distinct sites from a sorted table produced by a polythetic divisive process. The communities have strong geographic patterns. Many communities have a wide range of structural expression and/or dominants. Nearly half of the native vascular flora of Tasmania is present in the sites, including a large number of conservation-significant species, some of which are concentrated in riparian vegetation. In the drier, lowland parts of the State there are large areas with little or no native riparian vegetation remaining. Several of the communities that occur in this environment appear to be totally unreserved, while most of the communities from colder and more humid areas are represented within secure reserves.

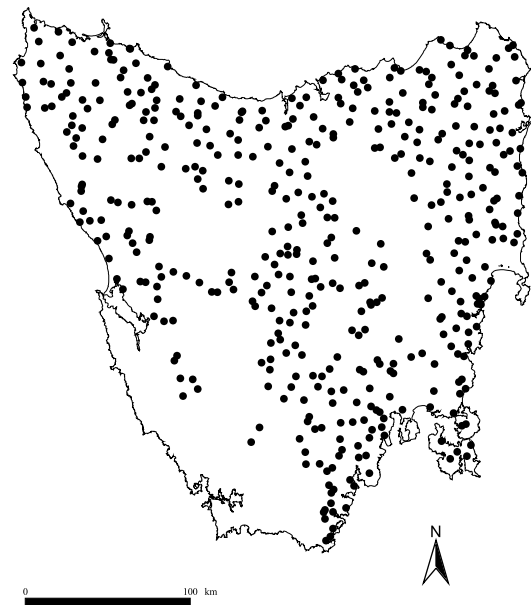
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## Introduction

Riparian vegetation is thought to be of critical importance for the health of aquatic communities, and as a refuge for threatened species in the landscape. As elements of biodiversity, riparian vascular plant communities are also of importance in themselves. Surprisingly, there are relatively few studies of variation in riparian vegetation at even the large catchment scale, with the studies of Merry et al. (1981) on the River Wye in England, Curry and Slater (1986) on four Welsh catchments, and that of Wasklewicz (2001) on central Arizonan rivers seeming to exhaust examples in international journals. The grey literature is likely to be richer in examples (e.g. Jarman & Crowden 1978, Kirkpatrick & Glasby, 1981, Kirkpatrick & Harwood 1983, North et al. 1998, Bridle & Kirkpatrick 1998, Woolley 1999, Davidson & Gibbons 2001).

In Tasmania, most major vegetation types have been sampled on a statewide basis, communities differentiated, and their reservation status assessed (Kirkpatrick et al. 1995). Riparian vegetation has been the biggest gap; an unfortunate one given the extent of stream modification for energy production and the exponential taming of Tasmanian streams under the Water Development Plan of the Tasmanian Government (DPIWE 2001). Kirkpatrick et al. (1995) in their conspectus of the reservation status of Tasmanian plant communities attempted to use the geographically partial information on riparian vegetation (Duncan 1983, Jarman et al. 1984, Hughes 1987a, Harris & Kirkpatrick 1991, Askey-Doran 1993) to provide a typology and reservation assessment, with an inevitably unsatisfactory outcome.

In the present paper we develop a classification of riparian plant communities for mainland Tasmania and deduce the reservation status of these communities. We also provide information on the importance of Tasmanian riparian vegetation for the conservation of vascular plant species.



**Fig. 1.** Riparian vegetation survey sites.

## Methods

### *Site selection*

Relatively intact riparian vegetation in each of the 10 × 10 km national mapping grid squares in mainland Tasmania was sampled (Daley 2003). Four hundred and sixty riparian sites were surveyed. Vegetation was regarded as relatively intact if exotic plants constituted less than 20% of the estimated overlapping cover and the stream showed no obvious signs of physical modification in the immediate vicinity. It proved not possible to gain access to many of the grid squares in the wilderness areas of the west of the State (Fig. 1). However, sufficient samples were gained from these areas to be confident that the variation in their riparian vegetation was adequately covered. More significantly, no stands of native riparian vegetation that met the selection criteria could be

found in 44 of the grids that were easily accessed. In 16 other grids that were easily accessed, it was possible that some isolated stands of riparian vegetation were present, but access to potential sites was not possible.

#### Data collection

Riparian vegetation was defined as that between the aquatic zone of the stream and the cessation of evidence of flood scouring or deposition. A list of vascular plant taxa (nomenclature according to Buchanan 1999) was obtained from this vegetation at each site, with searching for new taxa continuing along the stream on both sides until the nature of the orthogonal patterning, or type, of the vegetation changed, or no new taxa were evident. This plotless procedure aggregated vegetation zones in the relatively few sites where they clearly existed. Following the schema of Specht (1974), the structural types that occurred within this releve were recorded, as were the dominant taxa in each stratum. Taxa were regarded as codominant if they had about equal cover in the community.

#### Data analysis

A gigantic sorted table was produced using the polythetic divisive classificatory program, TWINSPAN (Hill 1979, Minchin 1990), on the taxon presence/absence data. The table was examined in detail to select groups of releves that: could be keyed out by combinations of the presences and absences of taxa; were relatively uniform within; and were constituted of at least 5 releves. Twenty-one such groups were selected from the table. Floristic similarities amongst groups were calculated using the Bray-Curtis measure on percentage frequency of species in groups.

The structural/dominance description of each community was derived from the structural/dominance descriptions of all sites within a community. The vegetation structure and dominant taxa that were common to the largest number of sites in a community were selected as the descriptors of the community. Affinity with previously described communities (those listed in Kirkpatrick et al. 1995, Wintle 2002) was calculated as the percentage of the number of frequently occurring species in common, divided by the mean number of species in the two lists (Bray-Curtis similarities). An affinity score of 50% or greater was taken to indicate close similarity between the newly described community and a previously listed or described community.

#### Reservation analysis

The land tenure of riparian reaches was determined. A distinction was made between secure reserves, protected by World Heritage status, or by the requirement for the approval of both houses of the Tasmanian parliament for revocation, and insecure reserves, which can be revoked by ministerial decision. Floristic communities have been regarded as well-reserved in Tasmania if they occur in at least two viable, and spatially well-separated areas within secure reserves (Kirkpatrick et al. 1995). This convention is followed herein.

Poorly-reserved is defined as presence within a secure reserve, but failure to satisfy the above criteria. Unreserved constitutes absence from a secure reserve. Our analysis of reservation status is largely based on the sample of releves. However, general observations of particular communities within reserves have also been used, as have records from the literature, where the nature of the community is clear.

## Results

### *The Tasmanian riparian vascular flora*

A total of 857 native taxa and 89 exotic taxa were recorded from the releves. The number of native taxa per site ranged between 10 at Falls Rivulet in the Southern Ranges bioregion to 85 along the middle reaches of the Little Swanport River in the South East bioregion. A large proportion of the native riparian species are shrubs (31%) and herbs (27%). A high proportion of the State's species of native trees, shrubs and ferns were found in the releves (Table 1). The most common species are *Pomaderris apetala* and *Leptospermum lanigerum*. Only 8 species are found in more than half the sites and only 84 species in at least 10% of sites (Table 2). Of all native Tasmanian vascular plant species, only two species, *Gynatrix pulchella* and *Phebalium daviesii*, both exceedingly rare, are known to occur only in riparian zones (Table 3). There are, however, 76 vascular plant species that are found predominantly in riparian zones of Tasmania and therefore could be categorized as 'riparian' plants (Table 3). Nearly 30% of these riparian plants are listed as threatened. While not all Tasmania's riparian plants were detected during the survey, there were forty-six species listed under the Tasmanian *Threatened Species Protection Act* 1995 (as of 2002).

**Table 1. The number and proportion of observed native taxa in the riparian zone in life-form classes, and as a proportion of life-form classes in Tasmania**

Life-form	No. of taxa	% of total	% of Tasmanian species
Trees	62	7	58
Shrubs	265	31	51
Graminoids	170	20	38
Herbs	231	27	36
Grasses	61	7	37
Ferns	68	8	54

**Table 2. Native vascular plant taxa found at 10% or more riparian sites.**

Common riparian species	% freq	Lifeform
<i>Pomaderris apetala</i>	69	tree/shrub
<i>Bursaria spinosa</i>	22	shrub
<i>Leptospermum lanigerum</i>	65	tree/shrub
<i>Histiopteris incisa</i>	22	fern
<i>Acaena novae-zelandiae</i>	62	herb
<i>Monotoca glauca</i>	21	shrub
<i>Acacia dealbata</i>	61	tree
<i>Beyeria viscosa</i>	21	shrub
<i>Blechnum nudum</i>	60	fern
<i>Blechnum minus</i>	21	fern

<i>Pteridium esculentum</i>	58	fern
<i>Nematolepis squamea</i>	20	shrub
<i>Acacia melanoxylon</i>	58	tree
<i>Exocarpos cupressiformis</i>	20	shrub
<i>Coprosma quadrifida</i>	54	shrub
<i>Melaleuca squarrosa</i>	20	shrub
<i>Carex appressa</i>	46	sedge
<i>Juncus pauciflorus</i>	20	rush
<i>Gahnia grandis</i>	44	sedge
<i>Eucalyptus ovata</i>	19	tree
<i>Polystichum proliferum</i>	42	fern
<i>Lomatia tinctoria</i>	19	shrub
<i>Dicksonia antarctica</i>	41	fern
<i>Poa</i> spp.	19	grasses
<i>Cassinia aculeata</i>	40	shrub
<i>Eucryphia lucida</i>	18	tree
<i>Blechnum watsii</i>	38	fern
<i>Epacris impressa</i>	18	shrub
<i>Eucalyptus viminalis</i>	38	tree
<i>Gleichenia microphylla</i>	17	fern
<i>Lomandra longifolia</i>	38	graminoid
<i>Notelaea ligustrina</i>	16	tree
<i>Acacia verticillata</i>	37	tree/shrub
<i>Microsorium pustulatum</i>	16	fern
<i>Oxalis perennans</i>	34	herb
<i>Hypericum japonicum</i>	16	herb
<i>Viola hederacea</i>	34	herb
<i>Lepidosperma laterale</i>	15	sedge
<i>Pimelea drupacea</i>	34	shrub
<i>Euchiton</i> spp.	15	herbs
<i>Nothofagus cunninghamii</i>	33	tree
<i>Sticherus tener</i>	15	fern
<i>Agrostis</i> spp.	33	grasses
<i>Anopterus glandulosus</i>	15	shrub
<i>Hydrocotyle hirta</i>	33	herb
<i>Eucalyptus delegatensis</i>	15	tree
<i>Eucalyptus obliqua</i>	32	tree
<i>Schoenus</i> spp.	15	sedges
<i>Poa labillardierei</i>	32	grass
<i>Eucalyptus regnans</i>	15	tree
<i>Leptospermum scoparium</i>	31	tree/shrub
<i>Isolepis</i> spp.	15	sedges
<i>Acacia mucronata</i>	30	shrub
<i>Olearia argophylla</i>	14	shrub
<i>Eucalyptus amygdalina</i>	30	tree
<i>Hypolepis rugosula</i>	14	fern
<i>Poaceae</i> spp.	29	grasses
<i>Juncus astreptus</i>	14	rush
<i>Clematis aristata</i>	27	climber
<i>Ozothamnus ferrugineus</i>	14	shrub
<i>Olearia lirata</i>	25	shrub
<i>Zieria arborescens</i>	14	shrub
<i>Tasmania lanceolata</i>	25	shrub
<i>Allocasuarina littoralis</i>	13	shrub
<i>Juncus</i> spp.	25	rushes
<i>Schoenus maschalinus</i>	13	sedge
<i>Pultenaea juniperina</i>	25	shrub
<i>Melaleuca ericifolia</i>	12	tree/shrub
<i>Gonocarpus teucroides</i>	24	herb
<i>Aristolelia peduncularis</i>	12	shrub
<i>Dianella tasmanica</i>	24	lily
<i>Baloskion tetraphyllum</i>	12	rush
<i>Banksia marginata</i>	24	tree/shrub
<i>Eucalyptus globulus</i>	12	tree
<i>Geranium potentilloides</i>	23	herb
<i>Cyathodes juniperina</i>	11	shrub
<i>Lepidosperma ensiforme</i>	23	sedge
<i>Senecio hispidulus</i>	11	herb
<i>Prostanthera lasianthos</i>	23	shrub
<i>Billardiera longiflora</i>	10	climber

<i>Pittosporum bicolor</i>	23	shrub
<i>Juncus australis</i>	10	rush
<i>Atherosperma moschatum</i>	23	tree
<i>Lepidosperma elatius</i>	10	sedge

**Table 3. Native species that show a strong preference for riparian vegetation, their lifeform, Tasmanian endemism and conservation status in Tasmania (under the Tasmanian Threatened Species Protection Act 1995).**

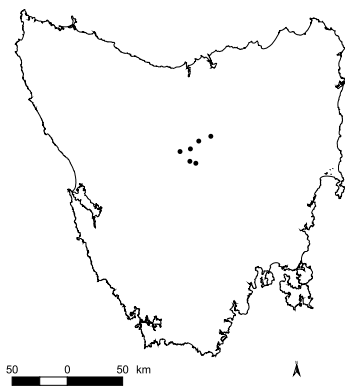
Species	Lifeform	Endemic (e) Rare (r) Vulnerable (v) Endangered (en)
<i>Acacia axillaris</i>	shrub	e; v
<i>Acacia</i> sp.	shrub	e
<i>Acradenia frankliniae</i>	tree	e
<i>Alternanthera denticulata</i>	herb	en
<i>Amphibromus neesii</i>	grass	
<i>Asperula charophyton</i>	herb	en
<i>Asterotrichion discolor</i>	shrub	e
<i>Barbarea australis</i>	herb	e; en
<i>Bertya rosmarinifolia</i>	shrub	v
<i>Blechnum cartilagineum</i>	fern	
<i>Blechnum chambersii</i>	fern	
<i>Callistemon viridiflorus</i>	shrub	e
<i>Callitris oblonga</i>	tree	e; v
<i>Carex appressa</i>	sedge	
<i>Carex gaudichaudiana</i>	sedge	
<i>Carex polyantha</i>	sedge	
<i>Centipeda cunninghamii</i>	herb	r
<i>Discaria pubescens</i>	shrub	
<i>Eleocharis acuta</i>	sedge	
<i>Eleocharis gracilis</i>	sedge	
<i>Eleocharis pusilla</i>	sedge	
<i>Epacris apseyensis</i>	shrub	e; en
<i>Epacris exserta</i>	shrub	e; v
<i>Epacris grandis</i>	shrub	e; v
<i>Epacris mucronulata</i>	shrub	e
<i>Eucalyptus ovata</i>	tree	
<i>Gleichenia dicarpa</i>	fern	
<i>Gleichenia microphylla</i>	fern	
<i>Gratiola nana</i>	herb	
<i>Gratiola peruviana</i>	herb	
<i>Gratiola pubescens</i>	herb	
<i>Grevillea australis</i> var. <i>australis</i>	shrub	
<i>Grevillea australis</i> var. <i>brevifolia</i>	shrub	e
<i>Grevillea australis</i> var. <i>erecta</i>	shrub	e
<i>Grevillea australis</i> var. <i>linearifolia</i>	shrub	e; r
<i>Grevillea australis</i> var. <i>planifolia</i>	shrub	e; r
<i>Grevillea australis</i> var. <i>subulata</i>	shrub	e
<i>Grevillea australis</i> var. <i>tenuifolia</i>	shrub	e
<i>Gunnera cordifolia</i>	herb	e
<i>Gynatrix pulchella</i>	shrub	r
<i>Hydrocotyle comocarpa</i>	herb	r
<i>Hydrocotyle pterocarpa</i>	herb	
<i>Isolepis fluitans</i>	sedge	
<i>Isolepis inundata</i>	sedge	
<i>Isolepis producta</i>	sedge	
<i>Isotoma fluviatilis</i>	herb	
<i>Juncus procerus</i>	rush	
<i>Lagarostrobos franklinii</i>	tree	e
<i>Leptospermum riparium</i>	shrub	e
<i>Lycopus australis</i>	herb	en
<i>Lythrum salicaria</i>	herb	
<i>Mazus pumilio</i>	herb	
<i>Micrantheum hexandrum</i>	shrub	
<i>Milligania longifolia</i>	lily	e; r
<i>Mimulus repens</i>	herb	

<i>Olearia obcordata</i>	shrub	e
<i>Oreomyrrhis gunnii</i>	herb	e
<i>Ourisia integrifolia</i>	herb	e
<i>Persicaria decipiens</i>	herb	v
<i>Phebalium daviesii</i>	shrub	e; en
<i>Plantago daltonii</i>	herb	e
<i>Pomaderris elachophylla</i>	shrub	v
<i>Pomaderris phyllicifolia</i>	shrub	r
<i>Pultenaea selaginoides</i>	shrub	e; v
<i>Ranunculus amphitrichus</i>	herb	r
<i>Richea gunnii</i>	shrub	e
<i>Rorippa dictyosperma</i>	herb	
<i>Rumex bidens</i>	herb	r
<i>Rumex brownii</i>	herb	
<i>Scaevola aemula</i>	herb	
<i>Scaevola hookeri</i>	herb	
<i>Schoenus fluitans</i>	sedge	
<i>Spyridium gunnii</i>	shrub	e
<i>Spyridium lawrencei</i>	shrub	e; v
<i>Typha domingensis</i>	grass	
<i>Uncinia riparia</i>	sedge	

The 89 exotic plant species recorded during the survey represent around 12% of introduced vascular plants in Tasmania. *Ulex europaeus* (Gorse), *Rubus fruticosus* (Blackberry), *Salix fragilis* (Crack willow) and *Crataegus monogyna* (Hawthorn) thrive in the riparian zone in Tasmania. While these four prominent shrubs are prolific and form extensive stands across much of the developed riparian landscape, the large number of exotic species observed to be invading native stands of riparian vegetation is of concern.

#### Community characteristics and their reservation status

Descriptions of the 21 riparian native floristic communities including the defining floristic characteristics based on the TWINSPAN sorted table, structural characteristics and reservation status follow. Taxa occurring in 30% or more of sites within a community are listed in the Appendix.



**Fig. 2a.** Community 1 *Orites acicularis* – *Baeckea gunniana* – *Richea acerosa* – *Hierochloe redolens* – *Poa costiniana* grassy heath.

#### Community 1: *Orites acicularis* – *Baeckea gunniana* – *Richea acerosa* – *Hierochloe redolens* – *Poa costiniana* grassy heath

Sample sites: 6 Mean no. species: 48.7 (sd 16.0)

**Defining floristic assemblage:** *Baeckea gunniana*, *Richea acerosa*, *Hierochloe redolens*, *Agrostis* spp., *Ranunculus triplodontus* and *Epacris serpyllifolia*.

**Location:** Central Highlands at altitudes of 1000 m or higher, in the catchments of the River Ouse, upper River Derwent and a watercourse that drains into Great Lake (Fig. 2a).

**Structural characteristics:** There are two distinctive structural variants within this community: (a) heath; and (b) open-heath over closed-grassland.

**Tallest stratum:** In the heath variant, *Orites acicularis*, *Baeckea gunniana* and *Leptospermum rupestre* are dominant and form closed thickets. Open-heath is much shorter, rarely exceeding 0.5 m in height. *Richea acerosa* is the dominant woody shrub in the tallest stratum of this variant with a covering of less than 50%.

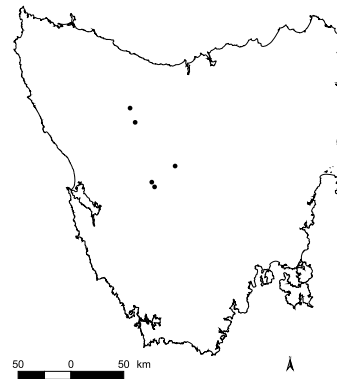
**Ground stratum:** In the heath variant, alpine grasses, sedges, rushes and a diverse array of herbs usually dominate. There is a dense cover of tussock grasses, mainly *Poa costiniana* and *Austrodanthonia* species underlying the open-heath variant.

**Adjacent communities:** Grassy-sedge heath dominated by *Ozothamnus*, *Leptospermum* or *Richea* species and *Eucalyptus coccifera* heathy open-forest.

**Closely related riparian floristic community:** Community 3.

**Affinity with other listed or described community:** None.

**Reservation status:** Well-reserved in the Central Plateau Conservation Area within the World Heritage Area and the Cradle Mountain-Lake St Clair National Park.



**Fig. 2b.** Community 2 *Eucalyptus* open-forest over *Baeckea gunniana* – *Gleichenia alpina* – *Rubus gunnianus* sedgey-ferny closed-heath.

#### Community 2: *Eucalyptus* open-forest over *Baeckea gunniana* – *Gleichenia alpina* – *Rubus gunnianus* sedgey-ferny closed-heath

Sample sites: 5 Mean no. species: 43.2 (sd 14.7)

**Defining floristic assemblage:** *Baeckea gunniana*, *Gleichenia alpina*, *Oxylobium ellipticum*, *Rubus gunnianus*, *Gymnoschoenus sphaerocephalus*, *Lomatia polymorpha* and *Allocasuarina zephyrea*.

**Locations:** Central Highlands at altitudes between 700 m and 1000 m, alongside headwater and middle-order streams of the River Forth, upper River Derwent and Pieman River catchments (Fig. 2b).

**Structural characteristics:** There are two distinctive structural/dominance variants: (a) *Eucalyptus* open-forest with a heathy understorey; and (b) *Hakea*–*Leptospermum* ferny-sedgey-grassy heath.

**Tallest stratum:** In the heathy open-forest, *Eucalyptus delegatensis* or *Eucalyptus pauciflora* occur as dominants with *Eucalyptus rodwayi*, *Eucalyptus dalrympleana* and *Eucalyptus gunnii* occasionally present. In the treeless heath community, *Baeckea gunniana*, *Leptospermum rupestre*, *Leptospermum nitidum*, *Leptospermum lanigerum* and *Hakea epiglottis* are the dominant shrubs.

**Middle stratum:** Amongst a variety of other shrubs, *Leptospermum lanigerum* and *Melaleuca squamea* are dominant in the heathy open-forest variant. The second stratum of this community is also characterised by a diverse range of heathy shrubs with a cover of between 76% and 100% and a height between 0.5 m and 1 m. The dominant species recorded in the treeless heath variant are *Nematolepis squamea* subsp. *retusa*, *Hakea lissosperma*, *Melaleuca squamea*, *Ozothamnus hookeri*, *Leptospermum lanigerum*, *Carex gaudichaudiana* and *Baeckea gunniana*.

**Ground stratum:** Shrubs, of which *Cyathodes parvifolia* and *Bauera rubioides* are the most common, dominate the heathy open-forest variant. Underlying the shrubs sparse coverings of herbs and a variety of graminoids, including rushes, cord rushes and sedges and/or a variety of ferns can also be found. In the treeless heath community where dominant species are discernible, these are usually *Bauera rubioides*, *Poa* species, *Gleichenia alpina* and *Cyathodes parvifolia*.

**Adjacent communities:** *Eucalyptus delegatensis*, *Eucalyptus pauciflora*, *Eucalyptus rodwayi*, and *Eucalyptus coccifera* heathy woodlands, buttongrass plains and, at one site, a *Poa* tussock grassland.

**Closely related riparian floristic community:** Community 3.

**Affinity with other listed or described community:** None.

**Reservation status:** Well-reserved. The community was sampled in the Cradle Mountain-Lake St Clair National Park, and an insecure reserve, the Vale of Belvoir Conservation Area. It occurs widely in the Cradle Mountain-Lake St Clair National Park



Community 3 along the Shannon River, *Eucalyptus* woodland over *Leptospermum lanigerum* sedgey heath.

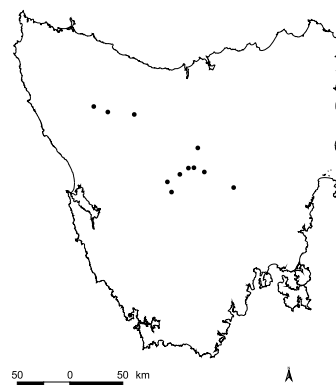
### Community 3: *Eucalyptus gunnii* woodland or open-forest over herby, grassy, sedgey *Leptospermum lanigerum* open-heath and closed-scrub

Sample sites: 11 Mean no. species: 41.8 (sd 15.1)

**Defining floristic assemblage:** *Leptospermum lanigerum*, *Eucalyptus gunnii*, *Acaena novae-zelandiae*, *Cyathodes parvifolia* and *Carex gaudichaudiana*

**Locations:** Central Highlands and the Southern Ranges bioregions at altitudes between 650 m and 1050 m. This community occurs mostly in the upper reaches of the Arthur River, River Clyde, River Ouse, Pieman River and upper River Derwent catchments and along watercourses that drain to the north coast and to Great Lake (Fig. 2c).

**Structural characteristics:** Structural variations in this community result primarily from variation in cover within each of the strata. The ground stratum of this community displays the greatest variation in species composition and cover. This is one of the communities where evidence of the interaction of native animals is abundant, as marsupial lawns occur in over half the sites.



**Fig. 2c.** Community 3 *Eucalyptus gunnii* woodland or open-forest over herby, grassy, sedgey *Leptospermum lanigerum* open-heath and closed-scrub.

**Tallest stratum:** *Eucalyptus gunnii* is the most common dominant but *Eucalyptus pauciflora*, *Eucalyptus rodwayi*, *Eucalyptus coccifera*, and *Eucalyptus dalrympleana* may also be present or dominant.

**Second stratum:** *Leptospermum lanigerum* is the most common dominant. *Banksia marginata*, *Callistemon viridiflorus* and *Hakea epiglottis* may also be present as co-dominants. *Tasmannia lanceolata*, *Hakea microcarpa*, *Coprosma nitida*, *Bedfordia linearis*, *Grevillea australis* and *Almaleea subumbellata* are also frequently found.

**Ground stratum:** The dominant species include *Carex gaudichaudiana*, *Poa labillardierei*, *Bauera rubioides*, *Cyathodes parvifolia*, *Leptospermum lanigerum* and *Baloskion australe*, although there is sometimes no clear dominant because of the diverse combinations of herbs, *Poa* and Cyperaceae species.

**Adjacent communities:** Buttongrass plains and heathy and scrubby *Eucalyptus* woodland and open-forest.

**Closely related riparian floristic community:** Community 12.

**Affinity with other listed or described community:** None.

**Reservation status:** Well-reserved. The community was sampled in only one reserve, the insecure Wentworth Creek Forest Reserve. However, it has been observed in the south of the Cradle Mountain-Lake St Clair National Park, and in the Walls of Jerusalem National Park.

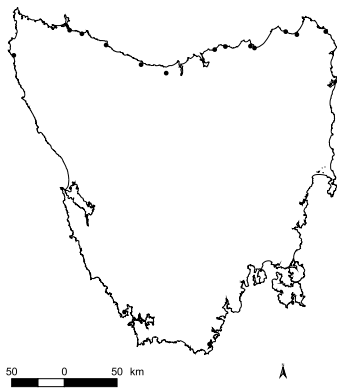
### Community 4: *Melaleuca ericifolia* – *Lomandra longifolia* – *Juncus kraussii* estuarine forest and scrub

Sample sites: 14 Mean no. species: 32.5 (sd 8.7)

**Defining floristic assemblage:** *Juncus kraussii*, *Samolus repens*, *Gahnia filum*, *Acacia sophorae*, *Selliera radicans*, *Schoenus nitens*, *Bursaria spinosa*, *Exocarpos cupressiformis*, *Leptinella longipes*, *Phragmites australis*, *Leucopogon parviflorus* and *Rhagodia candolleana* (mostly salt-tolerant species).

**Locations:** Estuarine reaches of watercourses predominantly along the north coast of Tasmania but also at the estuary of Arthur River in the northwest and Catamaran River in the south (Fig. 2d).

**Structural characteristics:** The most common structural/dominance type within this community is *Eucalyptus* woodland or open-forest over a sedgey, grassy or ferny *Melaleuca* closed-scrub. *Melaleuca* sedgey–herby closed-forests and various sedgey, scrubby, ferny, herby or grassy open-scrub structures also occur. *Melaleuca ericifolia* is present at nearly all sites and is dominant in one-third of the sites. Where *Eucalyptus* species are present in the tallest stratum, *Melaleuca ericifolia* is frequently dominant in the middle stratum. The ground stratum displays greatest variability in its composition, frequently including a variety of grasses, sedges, rushes, ferns and herbs.



**Fig. 2d.** Community 4 *Melaleuca ericifolia* – *Lomandra longifolia* – *Juncus kraussii* estuarine forest and scrub.

**Tallest stratum:** *Melaleuca ericifolia* is the most frequently occurring dominant species although *Eucalyptus amygdalina*, *Eucalyptus ovata*, *Eucalyptus obliqua*, *Eucalyptus pauciflora*, *Melaleuca squarrosa* and *Acacia sophorae* also occur as dominants. *Banksia marginata*, *Leptospermum scoparium* and *Pomaderris apetala* are frequently found as co-dominants.

**Middle stratum:** As well as *Melaleuca ericifolia*, *Melaleuca squarrosa*, *Leucopogon parviflorus*, *Leptospermum scoparium*, *Allocasuarina littoralis*, *Rhagodia candolleana* and *Acacia sophorae* are also amongst the shrubs that dominate. At some sites within this community, graminoids are dominant, *Lepidosperma elatius*, *Lepidosperma ensiforme*, and *Gahnia filum* being the most common. The grass, *Phragmites australis*, was also recorded as an infrequent dominant species in this stratum.

**Ground stratum:** Amongst the dominants in this stratum are *Juncus kraussii*, *Schoenus nitens*, *Lomandra longifolia*, *Poa labillardierei*, *Austrostipa stipoides*, *Distichlis distichophylla*, *Lepidosperma ensiforme*, *Leptocarpus tenax*, *Pteridium esculentum* and *Blechnum nudum*.

**Adjacent communities:** Coastal scrub and scrubby, sedgey or ferny *Eucalyptus* woodland and open-forest.

**Closely related riparian floristic community:** Community 5.

**Affinity with other listed or described community:** None.

**Reservation status:** Well-reserved. This community was sampled in Mt William National Park, has been observed in the Narawntapu National Park and the South West National Park, and also occurs in a large number of insecure reserves.

### Community 5: *Melaleuca squarrosa* – *Leptospermum lanigerum* heathy–ferny–sedgey closed-scrub

Sample sites: 35 Mean no. species: 33.8 (sd 8.7)

**Defining floristic assemblage:** *Pteridium esculentum*, *Melaleuca squarrosa*, *Leptospermum lanigerum*, *Gahnia grandis*, *Blechnum nudum*, *Dicksonia antarctica*, *Blechnum minus*, *Polystichum proliferum*, *Blechnum watsii*, *Gleichenia microphylla*, *Gleichenia dicarpa* and *Hydrocotyle hirta*.

**Locations:** Widespread at altitudes up to 400 m (Fig. 2e) and found from headwaters to estuaries.

**Structural characteristics:** There are three structural/dominance variants: (a) *Eucalyptus*, *Acacia*, *Melaleuca* or *Leptospermum* forest with an understorey of ferns and/or sedges; (b) *Eucalyptus*, *Acacia*, *Melaleuca*, *Leptospermum* or *Banksia* woodland over ferny–sedgey–heathy closed-scrub; and (c) *Eucalyptus*, *Acacia* or *Leptospermum* woodland over ferny–sedgey–grassy heath. The second variant is the most common type. Small shrubs, sedges and/or ferns all occur as dominants in this community.



Community 5 along Bosses Creek, *Eucalyptus* woodland over closed-heath.



**Fig. 2e.** Community 5 *Melaleuca squarrosa* – *Leptospermum lanigerum* heathy–ferny–sedgey closed scrub.

**Tallest stratum:** *Eucalyptus*, *Acacia*, *Melaleuca*, *Leptospermum* or *Banksia* species are found as dominants, with the most common being *Eucalyptus obliqua*, *Eucalyptus ovata*, *Eucalyptus nitida*, *Eucalyptus amygdalina*, *Acacia melanoxylon* and *Leptospermum lanigerum*. *Acacia melanoxylon* and *Leptospermum lanigerum* are common dominants in the closed-forest variants of this community.

**Middle stratum:** Shrubs, most commonly *Melaleuca squarrosa*, *Pomaderris apetala*, *Melaleuca ericifolia* and *Leptospermum lanigerum* are the most frequently occurring dominants.

**Ground stratum:** Where shrubs are dominant, *Bauera rubioides*, *Kunzea ambigua*, *Leptospermum lanigerum*, *Leptospermum scoparium*, *Melaleuca squarrosa* or *Bossiaea cordigera* were the dominant species. The dominant sedges and graminoids are *Lepidosperma filiforme*, *Lepidosperma laterale*, *Lepidosperma longitudinale*, *Lepidosperma ensiforme*, *Schoenus nitens*, *Carex appressa*, *Gahnia sieberiana* and *Empodisma minus*. Where ferns are dominant, *Gleichenia dicarpa*, *Gleichenia microphylla*, *Pteridium esculentum*, *Blechnum nudum* and *Todea barbara* were the most common.

**Adjacent communities:** *Eucalyptus* and *Melaleuca* scrubby, heathy or sedgey woodland and open-forest, buttongrass and *Xanthorrhoea* sedgelands.

**Closely related riparian floristic community:** Community 4.

**Affinity with other listed or described community:** This community has an affinity (53%) with *Asterotrichion discolor* – *Pteridium esculentum* – *Blechnum nudum* – *Lepidosperma ensiforme* fernland (Wintle 2002).

**Reservation status:** Well-reserved. This community was sampled in the Southwest and Mt William National Parks, and also occurs in a number of insecure reserves.



Community 6 along St Pauls River, *Eucalyptus* woodland over scrubby sedgeland.

**Community 6: *Eucalyptus* woodland over *Hakea microcarpa* – *Poa labillardierei* – *Lomandra longifolia* grassy–sedgely scrub**

Sample sites: 9 Mean no. species: 48 (sd 19.0)

**Defining floristic assemblage:** *Hakea microcarpa*, *Epacris gunnii*, *Lepidosperma inops*, *Hibbertia prostrata*, *Lagenifera stipitata*, *Hibbertia riparia*, *Epacris apseyensis*, *Grevillea australis*, *Baumea juncea*, *Baekkea ramosissima* and *Astroloma humifusum*.

**Locations:** At altitudes from sea level to 320 m in the catchments of the Apsley, Little Swanport, St Pauls, Swan, Wye and Macquarie Rivers and along an unnamed minor watercourse at Dodges Ferry (Fig. 2f).

**Structural characteristics:** There are two main variants of this community: (a) *Eucalyptus* woodland over sedgely and/or grassy scrub; and (b) *Eucalyptus* woodland over scrubby and/or grassy sedgeland. *Eucalyptus* cover in this community is always less than 25% and ferns are rarely present.

**Tallest stratum:** *Eucalyptus viminalis* is by far the most common dominant species but *Eucalyptus amygdalina*, *Eucalyptus ovata*, *Eucalyptus rodwayi*, *Eucalyptus pulchella* and *Eucalyptus tenuiramis* are occasional dominants.

**Middle stratum:** *Leptospermum lanigerum* is the most common dominant species with *Melaleuca squamea*, *Acacia mucronata*, *Acacia verticillata*, *Acacia melanoxylon*, *Leptospermum scoparium*, *Callitris oblonga*, *Allocasuarina littoralis* and *Allocasuarina monilifera* occurring infrequently as dominants. Also common are *Hakea microcarpa*, *Hibbertia riparia*, *Micrantheum hexandrum*, *Pomaderris apetala* and *Bursaria spinosa*.

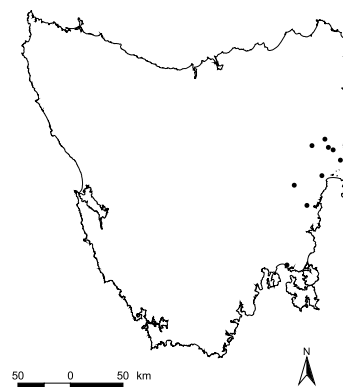
**Ground stratum:** This stratum is variously dominated by *Poa* species, *Lepidosperma inops*, *Lepidosperma laterale*, *Baumea juncea*, *Leptospermum lanigerum*, *Acacia mucronata* and *Baekkea ramosissima*. Also common are *Themeda triandra*, *Carex appressa*, *Epacris gunnii*, *Grevillea australis*, *Astroloma humifusum* and *Juncus* species.

**Adjacent communities:** Grassy–heathy–sedgely–scrubby *Eucalyptus* woodland and open-forest.

**Closely related riparian floristic community:** Community 7.

**Affinity with other listed or described community:** None.

**Reservation status:** Poorly-reserved. It was sampled in the secure Douglas-Apsley National Park, and insecure river reserves along the Little Swanport River, the St Pauls River at Royal George, and the Swan River Forest Reserve.



**Fig. 2f.** Community 6 *Eucalyptus* woodland over *Hakea microcarpa* – *Poa labillardierei* – *Lomandra longifolia* grassy–sedgely scrub.



Community 7 along the Buxton River, *Eucalyptus* woodland over grassy–sedgely closed-scrub.

**Community 7: *Eucalyptus viminalis* – *Eucalyptus globulus* – *Eucalyptus obliqua* – *Eucalyptus amygdalina* woodland over *Beyeria viscosa* – *Exocarpos cupressiformis* sedgely-grassy, ferny or heathy closed-scrub**

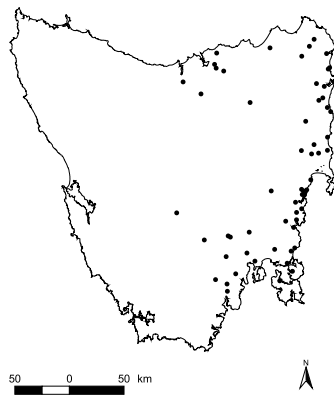
Sample sites: 58 Mean no. species: 35.2 (sd 10.8)

**Defining floristic assemblage:** *Eucalyptus globulus*, *Acacia melanoxylon*, *Allocasuarina littoralis*, *Bedfordia salicina*, *Cassinia aculeata*, *Beyeria viscosa*, *Epacris impressa*, *Lepidosperma laterale* and *Pteridium esculentum*.

**Locations:** Mainly in eastern Tasmania at altitudes from sea level to 380 m (Fig. 2g) and includes rocky estuarine sites.

**Structural characteristics:** The most common structural/dominance types in this community in order of frequency are: *Eucalyptus* woodland over sedgely–grassy open or closed-scrub; *Eucalyptus* woodland over sedgely open or closed-scrub; *Eucalyptus* woodland over sedgely–ferny open or closed-scrub; and *Eucalyptus* woodland over heathy closed-scrub.

**Tallest stratum:** The most common dominant species are *Eucalyptus viminalis*, *Eucalyptus obliqua*, *Eucalyptus globulus* and *Eucalyptus amygdalina*. At the sites where no tall *Eucalyptus* or *Acacia* species were present, *Dodonaea viscosa*, *Acacia verticillata* and *Leptospermum lanigerum* were recorded as the dominant species.



**Fig. 2g.** Community 7 *Eucalyptus viminalis* – *E. globulus* – *E. obliqua* – *E. amygdalina* woodland over *Beyeria viscosa* – *Exocarpos cupressiformis* sedgey–grassy, ferny or heathy closed-scrub.

**Middle stratum:** *Leptospermum lanigerum*, *Pomaderris apetala*, *Acacia mucronata*, *Acacia dealbata*, *Acacia melanoxylon*, *Acacia verticillata*, *Melaleuca ericifolia*, *Beyeria viscosa*, *Banksia marginata*, *Bursaria spinosa* and *Allocasuarina littoralis*. *Leptospermum lanigerum*, *Pomaderris apetala*, *Acacia mucronata*, *Acacia dealbata*, *Acacia melanoxylon*, *Acacia verticillata*, *Melaleuca ericifolia*, *Beyeria viscosa*, *Banksia marginata*, *Bursaria spinosa* and *Allocasuarina littoralis* were all recorded as dominant in this stratum.

**Ground stratum:** The most frequently occurring dominants in this stratum are *Leptospermum lanigerum*, *Leptospermum scoparium*, *Baeckea ramosissima*, *Lomandra longifolia*, *Lepidosperma laterale*, *Lepidosperma ensiforme* and *Carex appressa*.

**Adjacent communities:** *Eucalyptus* scrubby, sedgey, ferny, grassy, heathy woodland, or heathy open-forest.

**Closely related riparian floristic community:** Community 10.

**Affinity with other listed or described community:** This community has affinities with *Eucalyptus viminalis* – *Pomaderris apetala* – *Leptospermum lanigerum* – *Wahlenbergia* spp. shrubby open-forest (59%), *Eucalyptus amygdalina* – *Lomandra longifolia* – *Juncus* spp. – *Geranium potentilloides* sedgey woodland (56%) and *Crataegus monogyna* – *Rosa rubiginosa* – *Poa labillardierei* – *Dactylis glomerata* agricultural grassy woodland (52%) (Wintle 2002).

**Reservation status:** Poorly-reserved. The community occurs in the Mt Pearson State Reserve, and the following insecure reserves: Ansons River Reserve, Cameron Recreation Reserve, Swan River Forest Reserve.

### Community 8: *Eucalyptus obliqua* – *Eucalyptus regnans* woodland over *Acacia* – *Pomaderris* ferny–sedgey–grassy closed-scrub

Sample sites: 43      Mean no. species: 36.4 (sd 8.9)

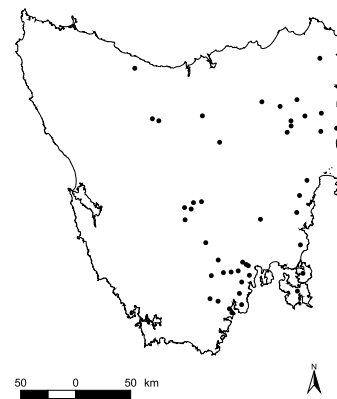
**Defining floristic assemblage:** *Acacia dealbata*, *Acacia mucronata*, *Eucalyptus obliqua*, *Eucalyptus regnans*, *Eucalyptus delegatensis*, *Pomaderris apetala*, *Coprosma quadrifida*, *Cassinia aculeata*, *Acacia verniciflua*, *Acacia verticillata*, *Prostanthera lasianthos*, *Bedfordia salicina*, *Olearia lirata*, *Olearia viscosa*, *Notelaea ligustrina*, *Callistemon pallidus*, *Hypericum japonicum*, *Senecio* spp., *Lomatia tinctoria*, *Lepidosperma ensiforme*, *Hypolepis rugosula*, *Histiopteris incisa*, *Blechnum fluviatile*, *Juncus australe* and *Ehrharta stipoides*.

**Locations:** Predominantly in the east at altitudes from 20 m to 740 m (Fig. 2h).

**Structural characteristics:** There are two frequently occurring structural/dominance forms in this community: (a) *Eucalyptus* woodland over sedgey, ferny, grassy or heathy closed-scrub; and (b)



Community 8 at Crabtree Rivulet, *Eucalyptus obliqua*/*E. regnans* woodland over *Leptospermum lanigerum* grassy open-scrub.



**Fig. 2h.** Community 8 *Eucalyptus obliqua* – *E. regnans* woodland over *Acacia* – *Pomaderris* ferny–sedgey–grassy closed-scrub.

*Acacia* or *Pomaderris* woodland over ferny, sedgey and/or heathy closed-scrub. This community exhibits high species diversity and cover in the middle and ground strata.

**Tallest stratum:** The most frequently dominant eucalypts in this community are *Eucalyptus delegatensis*, *Eucalyptus viminalis*, and *Eucalyptus regnans*, although *Eucalyptus dalrympleana*, *Eucalyptus amygdalina*, *Eucalyptus ovata*, *Eucalyptus globulus* and *Eucalyptus sieberi* also occur as infrequent dominants. *Acacia dealbata* and *Pomaderris apetala* are the most frequently occurring dominant species where *Eucalyptus* species are either not present or very sparse.

**Middle stratum:** *Pomaderris apetala*, *Leptospermum lanigerum* and *Acacia dealbata* are the most common dominant species in the second stratum. Also occurring as infrequent dominants are *Bedfordia salicina*, *Ozothamnus thyrsoides*, *Olearia argophylla*, *Olearia lirata*, *Allocasuarina littoralis*, *Beyeria viscosa*, *Acacia melanoxylon*, *Acacia mucronata*, *Acacia verniciflua*, *Acacia verticillata*, *Leptospermum riparium*, *Leptospermum scoparium*, *Pomaderris elliptica*, *Coprosma quadrifida*, *Zieria arborescens*, *Prostanthera lasianthos*, *Asterotrichion discolor*, *Micrantheum hexandrum* and *Melaleuca squarrosa*.



**Ground stratum:** Where a clear dominant species is discernible, shrubs, ferns, sedges and grasses are variably dominant. *Blechnum nudum* is the most frequent dominant species. Also occurring as infrequent dominant species are *Leptospermum lanigerum*, *Beyeria viscosa*, *Bauera rubioides*, *Prostanthera lasianthos*, *Carex appressa*, *Lepidosperma elatius*, *Lepidosperma laterale*, *Lepidosperma ensiforme*, *Lomandra longifolia*, *Blechnum watsii*, *Blechnum minus*, *Dicksonia antarctica*, *Gleichenia microphylla*, *Polystichum proliferum* and *Poa labillardierei*.

**Adjacent communities:** *Eucalyptus* open-forest and woodland that may be scrubby, shrubby, sedgy, ferny, grassy or heathy.

**Closely related riparian floristic community:** Community 9.

**Affinity with other listed or described community:** *Eucalyptus obliqua* – *Olearia lirata* – *Pultenaea juniperina* wet sclerophyll forest (52%), *Eucalyptus regnans* – *Eucalyptus obliqua* – *Pomaderris apetala* – *Olearia lirata* wet sclerophyll forest (60%), *Eucalyptus delegatensis* – *Eucalyptus viminalis* – *Acacia melanoxyton* wet sclerophyll forest (55%); *Eucalyptus globulus* – *Acacia dealbata* – *Cassinia aculeata* – *Acacia melanoxyton* wet sclerophyll forest (52%), *Eucalyptus ovata* – *Acacia dealbata* – *Pomaderris apetala* wet sclerophyll forest (52%), *Eucalyptus regnans* – *Acacia dealbata* – *Pomaderris apetala* wet sclerophyll forest (52%), *Eucalyptus sieberi* – *Olearia argophylla* – *Coprosma quadrifida* wet sclerophyll forest (50%) (Kirkpatrick et al. 1995), and *Pomaderris apetala* – *Olearia argophylla* – *Coprosma quadrifida* – *Hymenophyllum* spp. open-forest (Wintle 2002).

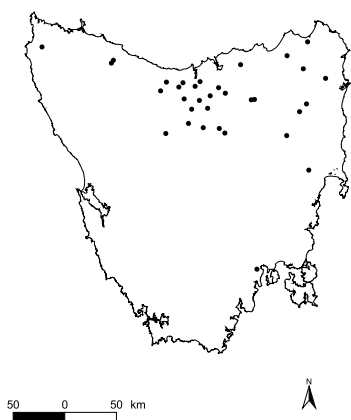
**Reservation status:** Unreserved. The community is known from no secure reserves, but was sampled in the following insecure reserves: Weavers Creek Forest Reserve; Kenmere Creek Forest Reserve; Castle Cary Recreation Reserve; and may also occur in the Mountain Creek Conservation Area.

### Community 9: *Eucalyptus viminalis* – *Eucalyptus ovata* – *Eucalyptus obliqua* – *Acacia dealbata* – *Acacia melanoxyton* woodland over sedgy-ferny scrub

Sample sites: 33 Mean no. species: 41.1 (sd 9.5)

**Defining floristic assemblage:** There is no species that is present at all sites in this community. However, it is characterized by the presences of most of *Eucalyptus ovata*, *Eucalyptus delegatensis*, *Acacia melanoxyton*, *Acacia verticillata*, *Acacia dealbata*, *Melaleuca ericifolia*, *Pittosporum bicolor*, *Exocarpos cupressiformis*, *Ozothamnus ferrugineus*, *Bursaria spinosa*, *Micranthemum hexandrum*, *Correa lawrenceana*, *Tasmannia lanceolata*, *Senecio hispidulus*, *Blechnum minus* and *Rubus parvifolius*.

**Locations:** Mainly in the north at altitudes between 10 m and 540 m (Fig. 2i).



**Fig. 2i.** Community 9 *Eucalyptus viminalis* – *E. ovata* – *E. obliqua* – *Acacia dealbata* – *A. melanoxyton* woodland over sedgy-ferny scrub.



Community 9 at Distillery Creek, *Eucalyptus* woodland over sedgy-ferny closed-scrub.

**Structural characteristics:** The most common structural/dominance types are: *Eucalyptus* woodland or open-forest over heathy, ferny, grassy and/or sedgy closed-scrub; *Eucalyptus* woodland over heathy, ferny, grassy and/or sedgy open-scrub; and *Acacia* open-forest over ferny-sedgy closed-scrub.

**Tallest stratum:** The most frequently occurring dominant species is *Eucalyptus viminalis* followed by *Eucalyptus obliqua*, *Acacia dealbata* and *Acacia melanoxyton*. Also occurring as infrequent dominants are *Eucalyptus delegatensis*, *Eucalyptus ovata*, *Eucalyptus rodwayi*, *Eucalyptus radiata*, *Eucalyptus regnans*, *Eucalyptus amygdalina*, *Melaleuca ericifolia*, *Leptospermum lanigerum* and *Nothofagus cunninghamii*.

**Middle stratum:** *Pomaderris apetala* is by far the most common dominant species in the second stratum, followed by *Leptospermum lanigerum*. Also occurring as infrequent dominants are *Acacia melanoxyton*, *Acacia dealbata*, *Acacia mucronata*, *Acacia verniciflua*, *Acacia verticillata*, *Prostanthera lasianthos*, *Melaleuca ericifolia*, *Melaleuca squarrosa*, *Notelaea ligustrina*, *Banksia marginata*, *Coprosma quadrifida*, *Atherosperma moschatum*, *Leptospermum scoparium*, *Pittosporum bicolor*, *Tasmannia lanceolata* and *Dicksonia antarctica*.

**Ground stratum:** Ferns and sedges are the dominant life-forms in this stratum at most sites. *Blechnum nudum* is the most common fern dominant. *Lepidosperma ensiforme* is the most common sedge dominant. Herbs and grasses do not have extensive cover in this floristic community, often less than 5%. However, at several sites, where grasses are dominant and readily identifiable, *Poa labillardierei* is the dominant species.

**Adjacent communities:** *Eucalyptus* woodlands and open-forests that have a mixed grassy, heathy, ferny and sedgy understorey.

**Closely related riparian floristic community:** Community 15.

**Affinity with other listed or described community:** None

**Reservation status:** Well-reserved. It is found in the Lost Falls Forest Reserve and the Warrawee Forest Reserve. It is also found in the following insecure reserves: Reedy Marsh Forest Reserve; Jackeys Creek Forest Reserve; Mersey White Water Forest Reserve; Franklin Rivulet Forest Reserve; and Griffin Forest Reserve.



Community 10 at Repulse River, *Eucalyptus* woodland over sedgey–heathy closed-scrub.

**Community 10: *Eucalyptus* woodland over *Pomaderris apetala* – *Pteridium esculentum* – *Poa labillardierei* – *Lomandra longifolia* – *Carex appressa* closed-scrub**

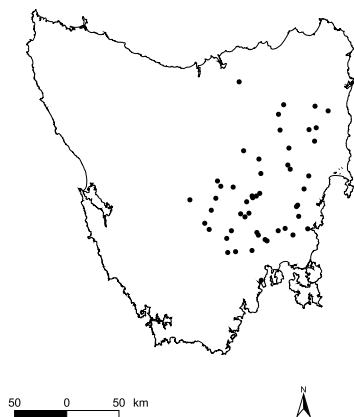
Sample sites: 49 Mean no. species: 28 (sd 7.7)

**Defining floristic assemblage:** *Eucalyptus viminalis*, *Eucalyptus amygdalina*, *Pomaderris apetala*, *Cassinia aculeata*, *Poa labillardierei*, *Lomandra longifolia*, *Carex appressa*, *Bursaria spinosa*, *Acacia melanoxyton*, *Beyeria viscosa*, *Coprosma quadrifida*, *Olearia viscosa*, *Asterotrichion discolor*, *Lepidosperma laterale*, *Lepidosperma ensiforme*, *Polystichum proliferum* and *Leptinella longipes*.

**Locations:** Mainly in the midlands at altitudes from 20 m to 760 m (Fig. 2j).

**Structural characteristics:** The most common structural/dominance type is *Eucalyptus* woodland over grassy-sedgey and/or ferny open or closed-scrub. However, *Acacia* woodlands or open-forest over sedgeylands or grasslands also characterize this community. *Eucalyptus* species are absent as dominant species in one-quarter of the riparian sites in this community despite nearly all sites being adjacent to dry land vegetation where *Eucalyptus* species dominate in the tallest stratum.

**Tallest stratum:** The most frequently occurring dominant is *Eucalyptus viminalis* followed by *Eucalyptus amygdalina*. Infrequently occurring dominants are *Eucalyptus pauciflora*, *Eucalyptus pulchella*, *Eucalyptus rubida*, *Eucalyptus delegatensis*, *Eucalyptus obliqua*, *Eucalyptus globulus*, *Eucalyptus ovata*, *Acacia dealbata*, *Acacia mucronata* and *Pomaderris apetala*.



**Fig. 2j.** Community 10 *Eucalyptus* woodland over *Pomaderris apetala* – *Pteridium esculentum* – *Poa labillardierei* – *Lomandra longifolia* – *Carex appressa* closed-scrub.

**Middle stratum:** Shrubs dominate at most sites; *Leptospermum lanigerum* and *Pomaderris apetala* are the most commonly occurring dominants. Also occurring as infrequent dominants are *Cassinia aculeata*, *Olearia viscosa*, *Cyathodes juniperina*, *Asterotrichion discolor*, *Bursaria spinosa*, *Banksia marginata*, *Coprosma quadrifida*, *Ozothamnus ferrugineus*, *Ozothamnus thyrsoides* and *Beyeria viscosa*.

**Ground stratum:** *Poa labillardierei* and other *Poa* species, *Lomandra longifolia* and *Carex appressa* are the most frequently occurring dominant species. Also occurring as infrequent dominants are *Lepidosperma laterale*, *Lepidosperma elatius*, *Lepidosperma ensiforme*, *Juncus astreptus*, *Pteridium esculentum*, *Polystichum proliferum*, *Leptospermum lanigerum*, *Cassinia aculeata*, *Micranthemum hexandrum* and *Acacia mucronata*.

**Adjacent communities:** All sites adjoin *Eucalyptus* woodland or open-forest that is scrubby, sedgey, grassy or has bracken dominating the understorey.

**Closely related riparian floristic community:** Community 7.

**Affinity with other listed or described community:** *Pomaderris apetala* – *Coprosma quadrifida* – *Carex appressa* – *Blechnum nudum* open riparian scrub (51%) (Kirkpatrick et al. 1995).

**Reservation status:** Unreserved. The community is known from only two reserves, Chauncey Vale Conservation Area and Tooms Lake Forest Reserve, both of which are insecure.



Community 11 at Hydro Creek, *Eucalyptus* woodland over *Leptospermum lanigerum* scrubby heath.

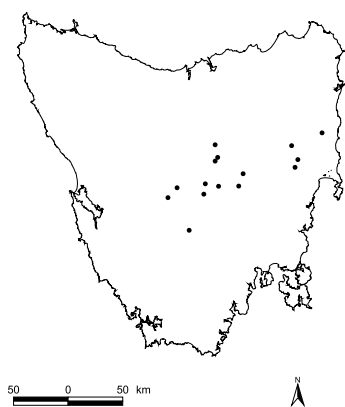
**Community 11: *Eucalyptus pauciflora* – *Eucalyptus viminalis* woodland over *Leptospermum lanigerum* grassy–sedgey closed-scrub.**

Sample sites: 16 Mean no. species: 34.1 (sd 8.9)

**Defining floristic assemblage:** *Eucalyptus coccifera*, *Eucalyptus delegatensis*, *Eucalyptus pauciflora*, *Eucalyptus rodwayi*, *Eucalyptus rubida*, *Eucalyptus ovata*, *Eucalyptus dalrympleana*, *Pultenaea juniperina*, *Hakea microcarpa*, *Notelaea ligustrina*, *Lomandra longifolia*, *Banksia marginata*, *Oxylobium ellipticum*, *Lomatia tinctoria*, *Cassinia aculeata*, *Coprosma hirtella* and *Almaleea subumbellata*.

**Locations:** Central and eastern Tasmania at altitudes from 220 m to 1020 m (Fig. 2k).

**Structural characteristics:** There are two main structural/dominance variants in this community: (a) *Eucalyptus* woodland over *Leptospermum lanigerum* sedgey–grassy closed-scrub; and (b) *Eucalyptus* woodland over *Leptospermum lanigerum* scrubby-heath. The ground stratum, dominated by shrubs, grasses and sedges, displays the greatest variation in life-form composition and cover.



**Fig. 2k.** Community 11 *Eucalyptus pauciflora* – *E. viminalis* woodland over *Leptospermum lanigerum* grassy–sedgey closed-scrub.

**Tallest stratum:** The most common dominant trees are *Eucalyptus pauciflora* and *Eucalyptus viminalis*. *Eucalyptus delegatensis*, *Eucalyptus ovata*, *Eucalyptus amygdalina*, *Eucalyptus dalrympleana*, *Eucalyptus rodwayi*, *Eucalyptus coccifera* and *Eucalyptus rubida* also appear infrequently as dominants.

**Middle stratum:** *Leptospermum lanigerum* was the dominant shrub in this stratum at most of the sites in this community. *Nothofagus cunninghamii* and *Acacia dealbata* also occurred as infrequent dominants.

**Ground stratum:** *Leptospermum lanigerum* and *Poa labillardierei* are the most common dominants, where dominant species are evident. Other infrequently occurring dominants are *Cyathodes juniperina*, *Olearia phlogopappa*, *Melaleuca gibbosa*, *Bauera rubioides*, *Cyathodes parvifolia*, *Themeda triandra*, *Lomandra longifolia*, *Gahnia grandis*, *Juncus astreptus* and *Carex appressa*.

**Adjacent communities:** Scrubby *Eucalyptus* woodlands and open-forests, grassy-sedgey *Eucalyptus* woodlands, and heaths.

**Closely related riparian floristic community:** Community 10.

**Affinity with other listed or described community:** None.

**Reservation status:** Unreserved. The community has not been observed in any secure reserves. It was sampled in three insecure reserves: the Great Western Tiers Conservation Area; Central Plateau Conservation Area (not WHA); and Snowy River Forest Reserve.

### Community 12: *Eucalyptus delegatensis* woodland over *Leptospermum lanigerum* grassy–herby–ferny closed-scrub

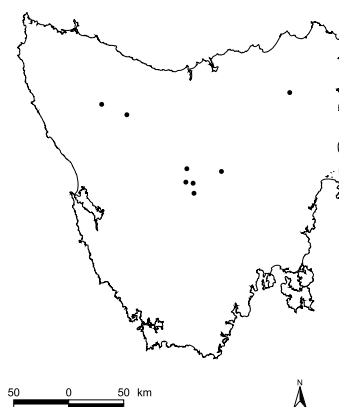
Sample sites: 8      Mean no. species: 37.3 (sd 7.0)

**Defining floristic assemblage:** *Geranium potentilloides*, *Hydrocotyle hirta*, *Blechnum penna-marina*, *Gonocarpus montanus*, *Euchiton involucratus*, *Oxalis perennans*, *Lagenifera stipitata*, *Gonocarpus micranthus* and *Carex gaudichaudiana*.

**Locations:** Central Highlands, Northern Slopes and Ben Lomond bioregions, predominantly in the headwaters and middle order of streams at altitudes from 680 m to 960 m (Fig. 2l).

**Structural characteristics:** There are two distinctive structural variants in this community: *Eucalyptus* woodland over grassy, sedgey, heathy and/or ferny closed-scrub; and sedgey or herby *Poa labillardierei* grasslands. The ground stratum of this community has the greatest diversity of species and life-forms.

**Tallest stratum:** The most common dominant species is *Eucalyptus delegatensis*. *Eucalyptus rodwayi*, *Eucalyptus amygdalina* and *Eucalyptus pauciflora* also occur as infrequent dominants. *Poa labillardierei* and *Juncus australis* occur as dominants in the treeless sites.



**Fig. 2l.** Community 12 *Eucalyptus delegatensis* woodland over *Leptospermum lanigerum* grassy–herby–ferny closed-scrub.

**Middle stratum:** In the variant with trees, *Leptospermum lanigerum* is the most common dominant shrub. *Poa labillardierei*, *Hydrocotyle* species and *Acaena novae-zelandiae* occur as dominants in the grassland variant.

**Ground stratum:** Pteridophyta species, mainly *Blechnum penna-marina*, occur as dominants in one-third of the sites. Cyperaceae species, including *Carex gaudichaudiana*, are dominant at three sites. Also occurring as infrequent dominants are *Cyathodes parvifolia* and *Gunnera cordifolia*.

**Adjacent communities:** Scrubby, shrubby, ferny and heathy woodland and open-forest, and, at one site, *Poa labillardierei* grasslands scattered with *Nothofagus cunninghamii*.

**Closely related riparian floristic community:** Community 3.

**Affinity with other listed or described community:** None.

**Reservation status:** Unreserved.



Community 13 at Wilmot River, *Nothofagus* closed-forest.

### Community 13: *Nothofagus cunninghamii* – *Atherosperma moschatum* – *Poa labillardierei*–*Libertia pulchella* – *Blechnum nudum* closed-forest

Sample sites: 6      Mean no. species: 40.2 (sd 12.2)

**Defining floristic assemblage:** *Nothofagus cunninghamii*, *Atherosperma moschatum*, *Poa labillardierei*, *Libertia pulchella*, *Uncinia tenella* and *Aristolelia pedunculata*.

**Locations:** At altitudes from 40 m to 620 m mainly in northern Tasmania but also along the Franklin River (Fig. 2m).



**Fig. 2m.** Community 13 *Nothofagus cunninghamii* – *Atherosperma moschatum* – *Poa labillardierei* – *Libertia pulchella* – *Blechnum nudum* closed-forest.

**Structural characteristics:** There are two equally common structural/dominance variants in this community: (a) *Nothofagus cunninghamii* shrubby, sedgey and/or ferny closed-forest; and (b) *Eucalyptus*, *Acacia* or *Nothofagus* woodland over *Leptospermum lanigerum* sedgey-ferny closed-scrub. Herbs, grasses and graminoids provide only a sparse covering (<6%).

**Tallest stratum:** *Nothofagus cunninghamii* is the most common dominant species. *Eucalyptus delegatensis*, *Acacia dealbata* and *Acacia melanoxylon* also occur as co-dominants.

**Middle stratum:** *Leptospermum lanigerum* is the most common dominant species. Also occurring as infrequent dominants are *Atherosperma moschatum*, *Leptospermum riparium*, *Pomaderris apetala* and *Coprosma quadrifida*.

**Ground stratum:** Ferns, most frequently *Blechnum nudum* and *Polystichum proliferum*, are the most common dominant species.

**Adjacent communities:** *Eucalyptus* and *Nothofagus/Acacia* scrubby forest.

**Closely related riparian floristic community:** Community 19.

**Affinity with other listed or described community:** None.

**Reservation status:** Well-reserved. It was sampled in the Franklin-Gordon Wild Rivers National Park and has been observed at several other sites within this secure reserve.

#### **Community 14: *Acacia* – *Nothofagus* – *Atherosperma* woodland and forest over *Olearia* shrubland and *Dicksonia antarctica* fernland**

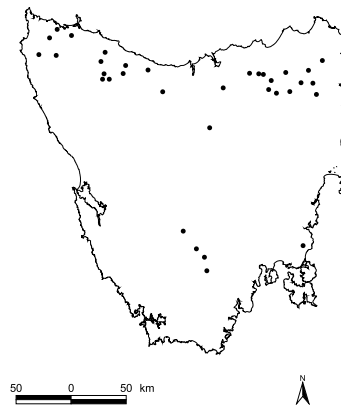
Sample sites: 34      Mean no. species: 30.7 (sd 7.6)

**Defining floristic assemblage:** *Olearia argophylla*, *Monotoca glauca*, *Microsorium pustulatum*, *Rumohra adiantiformis*, *Juncus pauciflorus*, *Urtica incisa*, *Muehlenbeckia gunnii*, *Grammitis billardierei*, *Hypolepis rugosula* and *Hymenophyllum flabellatum*.

**Locations:** At altitudes from 20 m to 900 m mainly in northern Tasmania but also in the upper catchment of the River Derwent (Fig. 2n).

**Structural characteristics:** There are two distinctive structural/dominance variants: (a) *Nothofagus*, *Atherosperma* and/or *Acacia* open and closed-forest over *Dicksonia* fernland; and (b) *Nothofagus*, *Atherosperma* and/or *Acacia* woodland over *Olearia* ferny shrubland. However, there are also structural variants that include *Eucalyptus* species.

**Tallest stratum:** The most frequently occurring dominant species is *Acacia melanoxylon* followed by *Nothofagus cunninghamii*, *Acacia dealbata* and *Atherosperma moschatum*. Also occurring as infrequent dominants are *Pomaderris apetala*, *Eucalyptus obliqua*, *Eucalyptus regnans*, *Eucalyptus delegatensis* and *Eucalyptus viminalis*.



**Fig. 2n.** Community 14 *Acacia* – *Nothofagus* – *Atherosperma* woodland and forest over *Olearia* shrubland and *Dicksonia antarctica* fernland.

**Middle stratum:** *Pomaderris apetala* is the most frequently occurring dominant species followed by *Dicksonia antarctica*. Also occurring as infrequent dominants are *Leptospermum lanigerum*, *Nothofagus cunninghamii*, *Acacia dealbata*, *Acacia melanoxylon*, *Olearia lirata*, *Olearia argophylla*, *Anodopetalum biglandulosum*, *Monotoca glauca*, *Pittosporum bicolor*, and *Eucriphia lucida*.

**Ground stratum:** Ferns are the most frequently occurring dominant species in this stratum with *Blechnum nudum*, *Polystichum proliferum* and *Dicksonia antarctica* the most common. However, *Lepidosperma elatius*, *Carex appressa*, *Olearia argophylla*, *Leptospermum lanigerum* and *Pittosporum bicolor* are also found as infrequent dominants.

**Adjacent communities:** *Eucalyptus* woodland, open-forest, and closed-forest.

**Closely related riparian floristic community:** Community 15.

**Affinity with other listed or described community:** Riparian blackwood/leatherwood forest (51%), *Eucalyptus obliqua* – *Nothofagus cunninghamii* – *Polystichum proliferum* – *Hymenophyllum flabellatum* mixed forest (64%), and *Eucalyptus regnans* – *Atherosperma moschatum* – *Acacia dealbata* – *Olearia argophylla* wet sclerophyll/mixed forest (71%) (Kirkpatrick et al. 1995).

**Reservation status:** Well-reserved. It was sampled in Roger River State Reserve, June Cave State Reserve, Notley Gorge State Reserve, Hellyer Gorge State Reserve, St Columba Falls State Reserve, Mt Barrow State Reserve, and the Sandspit Forest Reserve, and also occurs in several insecure reserves.

#### **Community 15: *Eucalyptus obliqua* – *Eucalyptus regnans* open-forest over sedgey-ferny *Pomaderris apetala* – *Olearia lirata* shrubland**

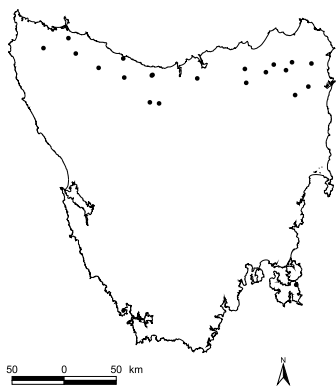
Sample sites: 21      Mean no. species: 37.7 (sd 9.6)

**Defining floristic assemblage:** *Pomaderris apetala*, *Olearia lirata*, *Eucalyptus obliqua*, *Prostanthera lasianthos*, *Acacia mucronata*, *Gahnia grandis*, *Dianella tasmanica*, *Lepidosperma ensiforme*, *Pultenaea juniperina*, *Blechnum minus* and *Sticherus tener*.

**Locations:** At altitudes from 5 m to 440 m mainly in northern Tasmania but also on the Tasman Peninsula in the southeast (Fig. 2o).

**Structural characteristics:** The most frequently occurring structural/dominance type in this community is *Eucalyptus/Acacia* woodland or open-forest over ferny closed-scrub. However the structure/dominance types are variable and *Eucalyptus* species are not present in five of the eight infrequently occurring variants of this community.

**Tallest stratum:** The most frequently occurring dominant species is *Eucalyptus obliqua* followed by *Acacia dealbata* and *Eucalyptus regnans*. Also occurring as infrequent dominants are *Acacia melanoxylon*, *Acacia verticillata*, *Nothofagus cunninghamii*,



**Fig. 2o.** Community 15 *Eucalyptus obliqua* – *E. regnans* open-forest sedgey–fern *Pomaderris apetala* – *Olearia lirata* shrubland.

*Eucalyptus globulus*, *Eucalyptus ovata*, *Eucalyptus viminalis*, *Leptospermum lanigerum*, *Pomaderris apetala* and *Atherosperma moschatum*.

**Middle stratum:** The most common dominant species is *Pomaderris apetala*. Also occurring as infrequent dominants are *Leptospermum lanigerum*, *Acacia melanoxylon*, *Acacia verticillata*, *Acacia mearnsii*, *Acacia mucronata*, *Nothofagus cunninghamii*, *Olearia argophylla*, *Atherosperma moschatum*, *Coprosma quadrifida*, *Cassinia trinerva* and *Leptospermum scoparium*.

**Ground stratum:** At most sites, ferns and sedges dominate the cover of the ground stratum. *Blechnum nudum* and *Dicksonia antarctica* are the most commonly occurring dominants. *Gleichenia dicarpa* and *Lepidosperma ensiforme* were infrequent dominants.

**Adjacent communities:** *Eucalyptus obliqua* or *Eucalyptus regnans* ferny, sedgey and/or scrubby woodland or open-forest.

Closely related riparian floristic community: Community 9.

**Affinity with other listed or described community:** *Eucalyptus obliqua* – *Nothofagus cunninghamii* – *Monotoca glauca* mixed forest (57%) and *Eucalyptus regnans* – *Eucalyptus obliqua* – *Pomaderris apetala* – *Olearia lirata* wet sclerophyll forest (58%) (Kirkpatrick et al. 1995).

**Reservation status:** Well-reserved. It was sampled in the Mathinna Falls Forest Reserve, Holwell Gorge State Reserve and Dip Falls Forest Reserve, and also occurs in several insecure reserves.

### Community 16: *Acacia dealbata* – *Pomaderris apetala* – *Olearia argophylla* – *Dicksonia antarctica* ferny–sedgey closed-scrub

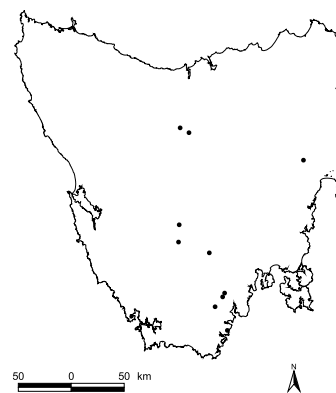
Sample sites: 9      Mean no. species: 37.3 (sd 6.4)

**Defining floristic assemblage:** *Dicksonia antarctica*, *Acacia dealbata*, *Pomaderris apetala* and *Olearia argophylla* at all sites and the frequent presences of *Eucalyptus regnans*, *Eucalyptus delegatensis*, *Tasmannia lanceolata* and *Euchiton collinus*.

**Locations:** At altitudes between 80 m and 660 m in the central south, and also along the Swan River in the east (Fig. 2p).

**Structural characteristics:** The community is diverse in structure, with four main variants: (a) *Eucalyptus* or *Nothofagus* woodland over ferny or sedgey closed-scrub; (b) *Acacia* or *Nothofagus* ferny closed-forest; (c) *Acacia* or *Eucalyptus* woodland over ferny open-scrub; and (d) *Atherosperma* woodland over *Dicksonia antarctica* fernland. Ferns are the dominant life-form in the ground stratum.

**Tallest stratum:** The most commonly occurring dominant species are *Acacia dealbata* and *Nothofagus cunninghamii*. *Atherosperma moschatum*, *Eucalyptus delegatensis*, *Eucalyptus obliqua*, *Eucalyptus regnans* and *Leptospermum lanigerum* also occur as infrequent dominants.



**Fig. 2p.** Community 16 *Acacia dealbata* – *Pomaderris apetala* – *Olearia argophylla* – *Dicksonia antarctica* ferny–sedgey closed-scrub.

**Middle stratum:** *Pomaderris apetala* is present at all sites and is the most common dominant species. *Coprosma quadrifida*, *Nematolepis squamea*, *Beyeria viscosa*, *Dicksonia antarctica*, *Acacia verticillata*, *Leptospermum lanigerum* and *Nothofagus cunninghamii* also occur as infrequent dominants.

**Ground stratum:** *Blechnum nudum* and *Blechnum wattsii* are the most commonly occurring dominants.

**Adjacent communities:** *Eucalyptus regnans* ferny–shrubby open-forest or woodland, and *Eucalyptus delegatensis* woodland over shrubby closed-forest.

Closely related riparian floristic community: Community 15.

**Affinity with other listed or described community:** *Eucalyptus obliqua* – *Nothofagus cunninghamii* – *Monotoca glauca* mixed forest (54%) and *Eucalyptus regnans* – *Eucalyptus obliqua* – *Pomaderris apetala* – *Olearia lirata* wet sclerophyll forest (57%) (Kirkpatrick et al. 1995).

**Reservation status:** Well-reserved. It was sampled in the secure Meander Forest Reserve and Meetus Falls Forest Reserve.

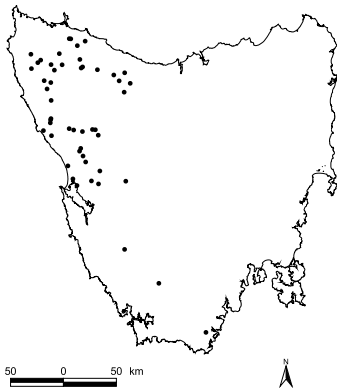


Community 17 along the King River, *Nothofagus* – *Acacia* ferny–sedgey–scrubby closed-forest.

### Community 17: *Acacia melanoxylon* – *Nothofagus cunninghamii* – *Eucryphia lucida* – *Acacia mucronata* mossy–sedgey–fern forest and closed-scrub

Sample sites: 49      Mean no. species: 38.7 (sd 9.0)

**Defining floristic assemblage:** *Nothofagus cunninghamii*, *Acacia mucronata*, *Nematolepis squamea*, *Eucalyptus nitida*, *Eucalyptus obliqua*, *Leptospermum riparium*, *Gleichenia microphylla*, *Histiopteris incisica* and *Monotoca glauca*.



**Fig. 2q.** Community 17 *Acacia melanoxylon* – *Nothofagus cunninghamii* – *Eucryphia lucida* – *Acacia mucronulata* mossy-sedgey-ferny forest and closed-scrub.

**Locations:** Widespread in western and northwestern Tasmania at altitudes from 5 m to 420 m (Fig. 2q).

**Structural characteristics:** The community largely consists of shrubby-ferny open or closed-forests or woodland over ferny-sedgey closed-forest or closed-scrub. The canopy can be dominated by eucalypts or other tree species.

**Tallest stratum:** The most frequently occurring dominant species is *Acacia melanoxylon*, followed by *Nothofagus cunninghamii*, *Eucalyptus obliqua* and *Eucalyptus nitida*. Also occurring as infrequent dominants are *Acacia dealbata*, *Acacia mucronata*, *Eucryphia lucida*, *Eucalyptus delegatensis*, *Eucalyptus ovata*, *Eucalyptus viminalis*, *Leptospermum lanigerum* and *Leptospermum scoparium*.

**Middle stratum:** *Leptospermum lanigerum*, followed by *Eucryphia lucida*, *Leptospermum riparium*, *Acacia melanoxylon* and *Acacia mucronata* are the most frequent dominants. Also occurring as infrequent dominants are *Pomaderris apetala*, *Acacia dealbata*, *Nothofagus cunninghamii*, *Anopterus glandulosus*, *Leptospermum scoparium*, *Melaleuca squarrosa*, *Acradenia frankliniae* and *Balioskion tetraphyllum*.

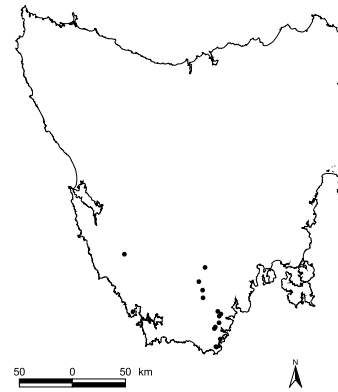
**Ground stratum:** Shrubs, ferns and graminoids dominate the cover of this stratum. Of the shrubs, *Leptospermum lanigerum* and *Leptospermum riparium* are the most frequently occurring dominants. Of the ferns, *Blechnum nudum* and *Polystichum proliferum* are the most commonly occurring dominants. Of the graminoids, *Balioskion tetraphyllum* is the most frequently occurring dominant.

**Adjacent communities:** *Eucalyptus* scrubby-ferny open-forests, *Eucalyptus* woodland over closed-scrub, heathy buttongrass plains, and scrubby heath or sedgeland.

**Closely related riparian floristic community:** Community 19.

**Affinity with other listed or described community:** Tea-tree mesophytic scrub forest (55%) and *Eucalyptus obliqua* – *Melaleuca squarrosa* – *Monotoca glauca* wet sclerophyll forest (51%) (Kirkpatrick et al. 1995).

**Reservation status:** Well-reserved. It was sampled in the Exit Caves State Reserve, Pieman River State Reserve, Lake Pieman Forest Reserve, the Southwest National Park, and the Franklin-Gordon Wild Rivers National Park.



**Fig. 2r.** Community 18 *Nothofagus cunninghamii* – *Acacia verticillata* – *Gahnia grandis* ferny closed-scrub.

**Community 18: *Nothofagus cunninghamii* – *Acacia verticillata* – *Gahnia grandis* ferny closed-scrub**

**Sample sites:** 13      **Mean no. species:** 40.2 (sd 12.2)

**Defining floristic assemblage:** There is no species that occurs at every site in this community. However, this community is characterised by the presences of *Acacia verticillata*, *Eucalyptus regnans*, *Acacia riceana*, *Acacia dealbata*, *Olearia stellulata*, *Melaleuca squamea*, *Gleichenia dicarpa*, *Drymophila cyanocarpa*, *Pimelea cinerea* and *Carex fascicularis*.

**Locations:** Mainly in the far south at altitudes from sea level to 360 m (Fig. 2r).

**Structural characteristics:** The two most frequently occurring structural/dominance variants in this community are: (a) *Eucalyptus* woodland and open-forest over sedgey-ferny open or closed-scrub; and (b) *Nothofagus* woodland and open-forest over sedgey-ferny closed-scrub.

**Tallest stratum:** The most frequently occurring dominant species is *Eucalyptus obliqua*, followed by *Nothofagus cunninghamii* and *Eucalyptus regnans*. Also occurring as infrequent dominants are *Eucalyptus globulus*, *Eucalyptus nitida*, *Atherosperma moschatum*, *Acacia verticillata* and *Leptospermum lanigerum*.

**Middle stratum:** *Leptospermum lanigerum* and *Acacia verticillata* are the most frequently occurring dominants. Also occurring as infrequent dominants are *Anodopetalum biglandulosum*, *Eucryphia lucida*, *Pittosporum bicolor* and *Nothofagus cunninghamii*.

**Ground stratum:** *Blechnum nudum* is the most commonly occurring dominant and *Gahnia grandis* is co-dominant in half the sites. *Gleichenia dicarpa*, *Gleichenia microphylla* and *Sticherus tener* are also present as infrequent dominants.

**Adjacent communities:** *Eucalyptus obliqua*, *Eucalyptus regnans* or *Eucalyptus nitida* shrubby or scrubby woodland and open-forest.

**Closely related riparian floristic community:** Community 17.

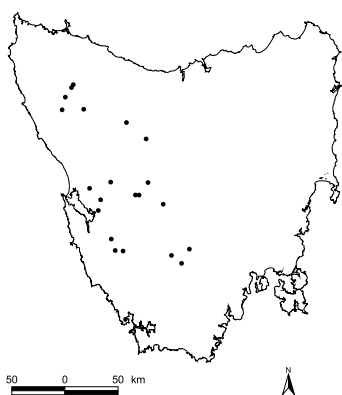
**Affinity with other listed or described community:** None.

**Reservation status:** Well-reserved. It was sampled in the Franklin-Gordon Wild Rivers National Park, the Southwest National Park, the Hartz Mountains National Park and the Tahune Forest Reserve.

**Community 19: *Nothofagus* – *Eucryphia* – *Phyllocladus* – *Trochocarpa* – *Libertia* shrubby closed-forest**

**Sample sites:** 19      **Mean no. species:** 36.3 (sd 9.5)

**Defining floristic assemblage:** *Nothofagus cunninghamii*, *Libertia pulchella*, *Anopterus glandulosus*, *Trochocarpa cunninghamii*, *Coprosma nitida*, *Cenarrhenes nitida*, *Trochocarpa gunnii*, *Archeria eriocarpa*, *Oxalis magellanica*, *Hakea lissosperma*, *Richea pandanifolia* and *Blechnum fluviatile*.



**Fig. 2s.** Community 19 *Nothofagus* – *Eucryphia* – *Phyllocladus* – *Trochocarpa* – *Libertia* shrubby closed-forest.

**Locations:** Western Tasmania at altitudes from 40 m to 940 m (Fig. 2s).

**Structural characteristics:** The most common structural/dominance type in this community is *Nothofagus/Eucryphia* shrubby closed-forest. The middle stratum has the greatest diversity of species.

**Tallest stratum:** The most frequently occurring dominant species is *Nothofagus cunninghamii* followed by *Eucryphia lucida* and *Acacia melanoxylon*. Also occurring as infrequent dominants are *Leptospermum lanigerum*, *Atherosperma moschatum*, *Eucalyptus nitida*, *Eucalyptus coccifera* and *Phyllocladus aspleniifolius*.

**Middle stratum:** The most common dominant species in this stratum is *Eucryphia lucida* followed by *Anopterus glandulosus*. Also occurring as infrequent dominants are *Leptospermum lanigerum*, *Leptospermum riparium*, *Atherosperma moschatum*, *Anodopetalum biglandulosum*, *Trochocarpa cunninghamii*, *Cenarrhenes nitida*, *Pomaderris apetala*, *Acradenia frankliniae*, *Dicksonia antarctica*, *Gaultheria hispida*, *Hakea lissosperma*, *Nematolepis squamea*, and *Nothofagus cunninghamii*.

**Ground stratum:** The most common dominant is *Polystichum proliferum*. Infrequent dominants include *Blechnum wattsi*, *Blechnum nudum*, *Dicksonia antarctica*, *Histiopteris incisa*, *Sticherus tener*, *Bauera rubioides*, *Trochocarpa cunninghamii* and *Libertia pulchella*.

**Adjacent communities:** Ferny–shrubby closed-forest overtopped by very tall *Eucalyptus* species or *Nothofagus cunninghamii*.

**Closely related riparian floristic community:** Community 17.

**Affinity with other listed or described community:** Thamnian leatherwood swamp forest (50%), Thamnian fern swamp forest (53%), Thamnian leatherwood/*Trochocarpa* swamp forest (54%), Thamnian celery top pine swamp forest (54%), Riparian blackwood/leatherwood forest (55%), and *Leptospermum lanigerum* – *Phyllocladus aspleniifolius* – *Nothofagus cunninghamii* over *Anopterus glandulosus* – *Anodopetalum biglandulosum* – *Telopea truncata* (51%) (Kirkpatrick et al. 1995).

**Reservation status:** Well-reserved. It was sampled in the Mt Field National Park, the Franklin-Gordon Wild Rivers National Park and the Cradle Mountain-Lake St Clair National Park.

**Community 20: *Eucalyptus nitida* woodland over *Leptospermum* – *Baloskion tetraphyllum* – *Gymnoschoenus sphaerocephalus* ferny–sedgely closed-scrub**

Sample sites: 8      Mean no. species: 34.9 (sd 10.7)

**Defining floristic assemblage:** *Eucalyptus nitida*, *Acacia mucronata*, *Baloskion tetraphyllum*, *Nothofagus cunninghamii*, *Gymnoschoenus sphaerocephalus*, *Diplarrena latifolia*, *Calorophus elongatus*, *Gaultheria hispida* and *Lepidosperma filiforme*.

**Locations:** Mainly in the west in the catchments of the Franklin, Gordon, Henty, Huon, King and Pieman Rivers at altitudes between 160 m and 770 m (Fig. 2t).

**Structural characteristics:** There are two main structural/dominance variants in this community: (a) *Eucalyptus*, *Acacia* or *Nothofagus* woodland over sedgely–ferny–heathy closed-scrub; and (b) *Leptospermum* open-scrub over heathy, ferny–grassy buttongrass sedgeland. The ground stratum has the greatest variation in life-forms and species.

**Tallest stratum:** The most frequently occurring dominant species in the first variant is *Eucalyptus nitida*. *Acacia mucronata*, *Acacia melanoxylon* and *Nothofagus cunninghamii* occur as infrequent dominants. In the second variant, *Leptospermum nitidum*, *Almaleea subumbellata* and *Melaleuca squamea* occur as dominants.

**Middle stratum:** *Acacia mucronata* and *Leptospermum scoparium* are the most frequently occurring dominant species. *Leptospermum nitidum*, *Monotoca glauca*, *Nematolepis squamea*, *Melaleuca squarrosa*, *Bauera rubioides*, *Gymnoschoenus sphaerocephalus* and *Leptocarpus tenax* occur as infrequent dominants.

**Ground stratum:** *Bauera rubioides* is the most frequently occurring dominant shrub. *Gymnoschoenus sphaerocephalus*, *Lepidosperma laterale* and *Schoenus* species are other frequent dominants.

**Adjacent communities:** Scrubby, heathy or sedgely buttongrass plains and/or *Eucalyptus nitida* scrubby woodland or open-forest over grassy–sedgely heath.

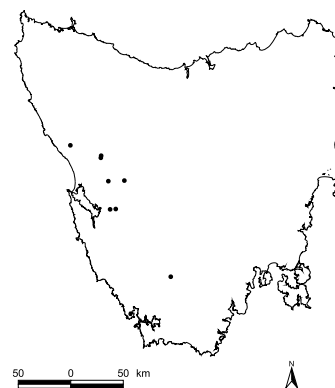
**Closely related riparian floristic community:** Community 21.

**Affinity with other listed or described community:** None.

**Reservation status:** Well-reserved. It was sampled in the Franklin-Gordon Wild Rivers National Park and the Southwest National Park.



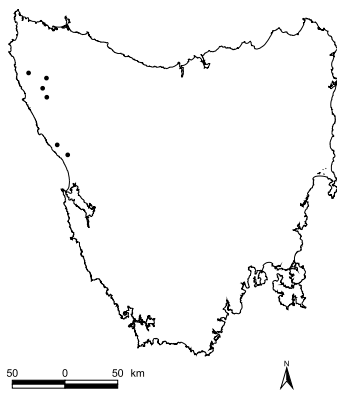
Community 20 at Newton Creek, *Leptospermum* open-scrub over heathy, ferny–grassy buttongrass sedgeland.



**Fig. 2t.** Community 20 *Eucalyptus nitida* woodland over *Leptospermum* – *Baloskion tetraphyllum* – *Gymnoschoenus sphaerocephalus* ferny–sedgely closed-scrub.



Community 21 at Lindsay River, *Eucalyptus nitida* woodland over *Acacia mucronulata* closed-scrub.



**Fig. 2u.** Community 21 *Eucalyptus nitida* woodland over *Gleichenia dicarpa* – *Persoonia juniperina* – *Philothea virgata* ferny closed-scrub.

**Community 21: *Eucalyptus nitida* woodland over *Gleichenia dicarpa* – *Persoonia juniperina* – *Philothea virgata* ferny closed-scrub**

Sample sites: 6      Mean no. species: 34.2 (sd 5.6)

**Defining floristic assemblage:** *Gleichenia dicarpa* and either *Persoonia juniperina* or *Philothea virgata*.

**Locations:** Northwest at altitudes between 160 m and 350 m (Fig. 2u).

**Structural characteristics:** The community is typically *Eucalyptus nitida* woodland over heathy, sedgey and/or ferny *Melaleuca squarrosa*, *Leptospermum scoparium* or *Acacia mucronata* closed-scrub.

**Tallest stratum:** The dominant species is almost exclusively *Eucalyptus nitida*.

**Middle stratum:** *Leptospermum scoparium* and *Melaleuca squarrosa* are present at all sites and are also the most frequently occurring dominant species in this stratum. *Acacia mucronata*, *Leptospermum nitidum* and *Hakea epiglottis* occur as infrequent dominants.

**Ground stratum:** *Bauera rubioides* is the most frequently occurring dominant shrub. *Gymnoschoenus sphaerocephalus*, *Lepidosperma laterale* and *Schoenus* species are other frequent dominants.

**Adjacent communities:** *Eucalyptus nitida* scrubby woodland, and sedgey heath.

**Closely related riparian floristic community:** Community 20.

**Affinity with other listed or described community:** None.

**Reservation status:** Unreserved. This community has not been found in any secure reserve. However, it does occur in the insecure Arthur-Pieman Conservation Area.

## Discussion

Daley (2003) found that the availability of water through rainfall and hydrological factors significantly influenced the distribution of riparian communities. Rainfall is intrinsically linked with catchment hydrology. The flow regime of a catchment controls the forces governing the appearance and supply of water to riparian areas (Tabacchi et al. 1998). Studies in Oregon, USA (Chapin et al. 2002) and Poland (Wassen et al. 2003) show that: (1) riparian vegetation communities depend strongly on overbank flows; (2) species presence/absence, and the variation in species composition were explained best by flood variables; and (3) river hydrology, together with nutrient release from the soil, were significant for riparian vegetation composition, species richness and productivity.

Tasmanian studies (Hughes 1987, Wintle 2002) show strong relationships between riparian vegetation and hydrological factors. Hughes found that some lateral and cross-section variations in floristic composition away from the river were a response to a flooding gradient, substratum stability and flow frequency. She attributed longitudinal variability in riparian communities to the mobility and dynamic geomorphology of some reaches, as evidenced by erosion and undercutting of banks and riparian vegetation. Wintle found that variation in hydrological regimes explained floristic differences in riparian vegetation communities (Wintle 2002).

That riparian lands provide refuge for native plant species is strongly supported by the present study where nearly half of Tasmania's native plant species, including many threatened species, were detected within the 460 survey sites. While there are only two species in Tasmania that are considered to be obligate riparian species, there are 76 vascular plant species found predominantly in the riparian zone. Nearly 30% of these 'riparian' plants are listed in the Tasmanian *Threatened Species Protection Act 1995*. The majority of riparian plants are shrubs, herbs and sedges. There are only four trees amongst Tasmania's riparian plants, *Eucalyptus ovata* (Black Gum), *Lagarostrobos franklinii* (Huon Pine), *Acradenia frankliniae* (Whitey Wood) and *Callitris oblonga* (South Esk Pine) (Table 3).

Threatened species form a high proportion of the species concentrated in the riparian zone. Some of these species, such as *Callitris oblonga* (Harris & Kirkpatrick 1991), *Acacia axillaris* (Lynch et al. 1999), *Spyridium lawrencei* (Coates et al. 1991) and the *Epacris* species (Keith 2002) may be concentrated in the riparian zone because of the protection that water, rocks and bare ground provide from the ingress of fire. Others, such as *Barbarea australis* (Kirkpatrick & Gilfedder 1998) may be concentrated in the riparian zone because they are susceptible to elimination by stock grazing and require disturbance to provide a suitable seedbed and freedom from competition. As many of the native species found in the riparian zone are herbs and graminoids (Table 1), and these occur in the ground stratum, the major consequences of extensive infestations of shrubby exotic



species such as Gorse (*Ulex europaeus*) and Blackberry (*Rubus fruticosus*) are a loss of light required for photosynthesis, a loss of space for growth because of competition, and alterations in nutrient loads and substrate conditions.

Given that disturbance by flood is a normal part of the riparian environment, and that a large variety of possible structural/dominance expressions could occur for any set of species, a floristic classification was used to define riparian communities. Some of the riparian communities are quite distinctive and have very few similarities with other communities (e.g. Communities 1 & 4). However, four of the larger communities have a number of structural and floristic characteristics that are also present in other communities (e.g. see descriptions of Communities 7 & 8, Communities 17 & 18).

Two-thirds of the riparian communities have no close floristic affinity with communities previously described in statewide surveys (Kirkpatrick et al. 1995). In most cases their affinities are with wet eucalypt forest communities, with two being with rainforest communities and one each being with swamp forest and riparian communities. The communities with affinities tend to be largely from high rainfall areas, where the contrast in moisture availability between the riparian zone and adjacent areas is less marked than in the drier parts of the State.

Regional, state and national audits of vegetation rely on the identification of observable and repeatable units (NLWRA 2001), and in most systematic assessments of future conservation areas, units rather than species are stipulated (Pressey & Logan 1998). The 21 riparian floristic communities derived from field surveys and the analysis provide a good platform from which to map riparian communities at the statewide scale, and to make recommendations for conservation. However, the classification of riparian reaches into communities based on floristics creates a degree of difficulty for mapping. While the majority of species that define a riparian floristic community are found in the second or ground strata, it is usually only the tallest stratum that is visible on aerial photographs. The structural diversity of riparian communities is evident from their descriptions. For example, in Community 17 there are several structural manifestations described as open-forest and each of these manifestations would appear different using remote-sensing technology as there are significant visual differences between a *Eucalyptus/Nothofagus* open-forest and *Eucalyptus/Acacia* open-forest. In addition, the structural description, *Eucalyptus/Acacia* open-forest, also exists within Community 14.

Even within a community where there is generic structural classification (e.g. Community 19 closed-forest), the species that dominate the generic structure can be quite varied. This in turn creates difficulties for classifying riparian reaches into communities using only remote-sensing technology.

Two-thirds of the riparian communities are considered well-reserved, using the rather weak criterion of secure reservation in two or more spatially separated situations. Security of riparian vegetation in reserves is likely to depend partly on the degree and nature of up-catchment factors such as alteration to hydrological regimes, spread of exotic species, sedimentation and water quality. With six of the poorly-reserved or unreserved riparian communities, the conversion of one or two insecure reserves to secure reserves would put them in the well-reserved category. Community 12 is not known from any reserve at all, but there is potential for adequate reservation on land owned by the State government.

In the present study sampling was restricted to native riparian vegetation in near natural condition. A significant proportion of Tasmania's remaining native riparian vegetation remains unexplored, undocumented and, in many regions, unreserved and unmanaged. Significant community variation in riparian vegetation in mainland Tasmania has been established. However, there is a need to sample degraded riparian vegetation in gap areas, especially remnants of native riparian vegetation outside existing reserves, with some prioritization of their importance and likely persistence at different levels of management.

With the current move to natural resource management regions within the State and across Australia, it may be timely to re-evaluate the reservation status of floristic communities in general. The current reservation paradigm in Tasmania may provide a high degree of protection for a broad community group but genetic variation within vegetation communities found across several natural resource management regions may be lost. A regional or bioregional conservation paradigm would address this deficiency.

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Taxon	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
Number of sites	6	5	11	14	35	9	58	43	33	49	16	8	6	34	21	9	49	13	19	8	6
<i>Hydrocotyle hirta</i>	+	.	+	.	+	+	.	+	+	.	+	+	+	+	+	.	+	.	+	.	.
<i>Agrostis</i> spp.	+	.	+	+	+	.	.	+	+	.	.	+	+	.	+	+	.	.	+	.	.
<i>Gahnia grandis</i>	.	+	.	.	+	.	+	+	+	.	+	.	+	.	+	+	+	+	+	+	.
<i>Pultenaea juniperina</i>	.	+	+	.	.	.	.	+	+	.	+	+	+	.	+	+	.	.	.	+	+
<i>Tasmania lanceolata</i>	.	+	+	.	.	.	.	.	+	.	+	+	+	.	.	+	+	+	+	.	+
<i>Blechnum nudum</i>	.	.	+	.	+	.	.	+	+	.	.	+	+	+	+	+	+	+	+	+	.
<i>Coprosma quadrifida</i>	.	.	.	+	+	.	+	+	+	+	.	.	+	+	+	+	+	+	+	.	.
<i>Acacia dealbata</i>	.	.	.	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	.	.
<i>Pomaderris apetala</i>	.	.	.	+	+	+	+	+	+	+	.	.	+	+	+	+	+	+	.	.	+
<i>Gonocarpus teucrioides</i>	.	.	.	+	+	.	.	+	+	.	.	.	.	.	+	.	.	+	.	+	+
<i>Blechnum minus</i>	.	.	.	.	+	.	.	.	+	.	.	.	.	.	+	.	+	.	.	+	.
<i>Acacia melanoxylon</i>	.	.	.	.	+	.	+	+	+	+	.	.	+	+	+	+	+	+	+	.	.
<i>Carex appressa</i>	.	.	.	.	+	+	+	+	+	+	.	+	+	+	+	.	+	.	+	.	.
<i>Pimelea drupacea</i>	.	.	.	.	+	.	.	+	+	.	.	.	+	+	+	+	+	+	+	.	.
<i>Lagenifera stipitata</i>	.	.	.	.	.	+	.	.	.	.	.	+	+	.	.	.	.	.	.	.	.
<i>Juncus</i> spp.	.	.	.	.	.	+	+	+	.	.	.	.	+	.	.	+	.	+	.	.	.
<i>Acacia mucronata</i>	.	.	.	.	.	+	+	.	.	.	.	.	+	.	+	.	+	.	.	+	+
<i>Viola hederacea</i>	.	.	.	.	.	.	+	+	+	.	.	+	+	+	+	+	+	+	+	.	.
<i>Cassinia aculeata</i>	.	.	.	.	.	.	+	+	+	+	+	.	+	+	+	+	.	+	.	.	.
<i>Olearia lirata</i>	.	.	.	.	.	.	.	+	+	.	.	.	.	+	+	.	.	.	.	.	.
<i>Olearia argophylla</i>	.	.	.	.	.	.	.	+	.	.	.	.	.	+	.	+	.	.	.	.	.
<i>Eucalyptus regnans</i>	.	.	.	.	.	.	.	+	.	.	.	.	.	.	+	+	+	.	.	.	.
<i>Polystichum proliferum</i>	.	.	.	.	.	.	.	+	+	+	+	+	+	+	+	+	+	.	+	.	.
<i>Blechnum watsii</i>	.	.	.	.	.	.	.	+	+	.	.	.	+	+	+	+	+	+	+	.	.
<i>Dicksonia antarctica</i>	.	.	.	.	.	.	.	+	+	.	.	.	+	+	+	+	+	+	+	.	.
<i>Prostanthera lasianthos</i>	.	.	.	.	.	.	.	+	+	.	.	.	+	.	+	.	+	+	+	+	.
<i>Clematis aristata</i>	.	.	.	.	.	.	.	+	+	.	.	.	+	.	+	+	+	+	.	.	.
<i>Juncus pauciflorus</i>	.	.	.	.	.	.	.	+	.	.	.	.	+	+	.	+	.	.	+	.	.
<i>Zieria arborescens</i>	.	.	.	.	.	.	.	+	.	.	.	.	.	.	+	+	.	.	.	.	.
<i>Schoenus</i> spp.	.	.	.	.	.	.	.	+	.	+	.	+	.	.	.	+	.	.	.	.	.
<i>Pittosporum bicolor</i>	.	.	.	.	.	.	.	+	.	.	.	.	+	+	+	.	+	.	.	.	+
<i>Isolepis</i> spp.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	+	.	.	.	+
<i>Notelaea ligustrina</i>	.	.	.	.	.	.	.	+	.	+	.	.	.	.	.	.	.	.	.	.	.
<i>Juncus astreptus</i>	.	.	.	.	.	.	.	+	.	+	.	.	.	.	.	.	.	.	.	.	.
<i>Olearia phlogopappa</i>	.	.	.	.	.	.	.	+	.	+	+	+	.	.	.	.	.	.	.	.	.
<i>Eucalyptus delegatensis</i>	.	.	.	.	.	.	.	+	.	+	+	+	.	.	+	.	.	.	.	.	+
<i>Gonocarpus micranthus</i>	.	.	.	.	.	.	.	+	.	.	.	+	.	.	.	.	.	.	.	.	.
<i>Euchiton involucratus</i>	.	.	.	.	.	.	.	+	.	.	.	+	.	.	.	.	.	.	.	.	.
<i>Euchiton</i> spp.	.	.	.	.	.	.	.	+	.	.	.	+	+	.	.	.	.	.	.	.	+
<i>Blechnum fluviatile</i>	.	.	.	.	.	.	.	+	.	.	.	.	+	.	.	+	.	.	.	.	.
<i>Nematolepis squamea</i>	.	.	.	.	.	.	.	+	.	.	.	.	+	.	+	+	+	+	+	.	.
<i>Atherosperma moschatum</i>	.	.	.	.	.	.	.	+	.	.	.	.	+	+	+	+	+	+	+	.	.
<i>Nothofagus cunninghamii</i>	.	.	.	.	.	.	.	+	.	.	.	.	+	+	+	+	+	+	+	.	.
<i>Anopterus glandulosus</i>	.	.	.	.	.	.	.	+	.	.	.	.	+	.	.	.	+	+	+	.	.
<i>Phyllocladus aspleniifolius</i>	.	.	.	.	.	.	.	+	.	.	.	.	+	.	.	.	+	.	+	.	.
<i>Cyathodes juniperina</i>	.	.	.	.	.	.	.	+	.	.	.	.	+	.	.	.	+	.	+	.	.
<i>Aristotelia pedunculata</i>	.	.	.	.	.	.	.	+	.	.	.	.	+	.	.	+	.	.	.	.	+
<i>Oxalis magellanica</i>	.	.	.	.	.	.	.	+	.	.	.	.	+	.	.	.	.	.	.	.	.
<i>Pimelea ligustrina</i>	.	.	.	.	.	.	.	+	.	.	.	.	+	.	.	.	.	.	.	.	.
<i>Uncinia tenella</i>	.	.	.	.	.	.	.	+	.	.	.	.	+	.	.	.	.	.	.	.	.
<i>Ozothamnus thyrsoides</i>	.	.	.	.	.	.	.	+	.	.	.	.	+	.	.	.	.	.	.	.	.
<i>Dryophila cyanocarpa</i>	.	.	.	.	.	.	.	+	.	.	.	.	+	.	.	.	.	+	.	.	.
<i>Anodopetalum biglandulosum</i>	.	.	.	.	.	.	.	+	.	.	.	.	+	.	.	.	.	.	+	.	.

