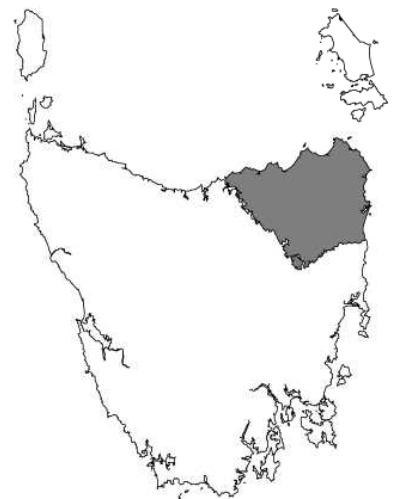




FOREST BOTANY MANUAL

MODULE 3

BEN LOMOND REGION



2005

FPA
FOREST PRACTICES AUTHORITY

***FOREST BOTANY MANUAL:
MODULE 3 – BEN LOMOND REGION***

2005

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INTRODUCTION

Tasmania is divided into eight bioregions on the basis of the State's biogeography. Separate Forest Botany Modules have been developed for these regions.

This module deals with the Ben Lomond Region. It covers subjects relevant to conservation of flora, as required by the Tasmanian *Forest Practices Code* (2000), the *Forest Practices Act* and other legislation and processes.

The module is designed to assist Forest Practices Officers (FPOs), and others involved with forest management, to prepare Forest Practices Plans (FPPs) for sites within the region. The information can also be used for other purposes (e.g. management planning for reserves, preparation of property plans).

The module is divided into six sections, which follow the format of the FPP *Flora Evaluation Sheet*:

Section 1 gives a brief overview of Ben Lomond Region.

Section 2 provides keys to forest and non-forest vegetation, and more detailed keys to forest communities. Tables indicate conservation priorities for forest communities.

Section 3 lists plant species that have a priority for conservation in the region - most of these are species listed on the Tasmanian *Threatened Species Protection Act 1995*.

Section 4 indicates sites of potential significance for flora conservation. These are environments that are often associated with species or communities that have a priority for conservation.

Section 5 discusses some other issues (e.g. weed and disease management) that may need to be considered by FPOs, to ensure that the operation complies with botanical requirements of the *Forest Practices Code* and other policies.

Section 6 summarises the evaluation process and indicates the steps that need to be taken after a FPO has assessed the FPP area. It also indicates whether specialist advice is required.

The processes used to determine if communities, species and sites of potential significance are present in an area, will also capture those National Estate flora values (as identified in the Tasmanian Regional Forest Agreement) that have the potential to be affected by operations requiring FPPs.

Module 1 of the *Forest Botany Manual* gives background information relevant to users of the regional modules. The Manual is supported by information on the Forest Practices Authority (FPA) website, including a gallery containing images of many threatened species, and species used to identify vegetation types and forest communities. An ongoing series of Flora Technical Notes also covers aspects of vegetation management in Tasmanian forests. The Manual provides links to several external websites – the FPA website will maintain updates to these sites, and should be consulted if there are problems accessing the links given in the Manual.

Queries and comments about the format or content of the *Forest Botany Manual* should be referred to the FPA's Senior Botanist. Queries and notifications about vegetation in operational areas should generally be referred to the Senior Ecologist.

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Section 1 OVERVIEW OF BEN LOMOND REGION

Ben Lomond Region covers the northeastern sector of the Tasmanian mainland. It is a relatively compact region, dominated by the mountainous bulwarks of the Ben Lomond massif, Mt Victoria, Blue Tier and their fellow travellers. The highlands rise gradually from the coast and hinterland to the north and east, and the broad flats of the Midlands and Fingal Valley to the west and south. The region contains a wide range of rock types and landforms, and steep climatic gradients at regional and local levels. Consequently, the native vegetation is also diverse. Land use and fire history have also influenced the extent, structure and composition of the vegetation.

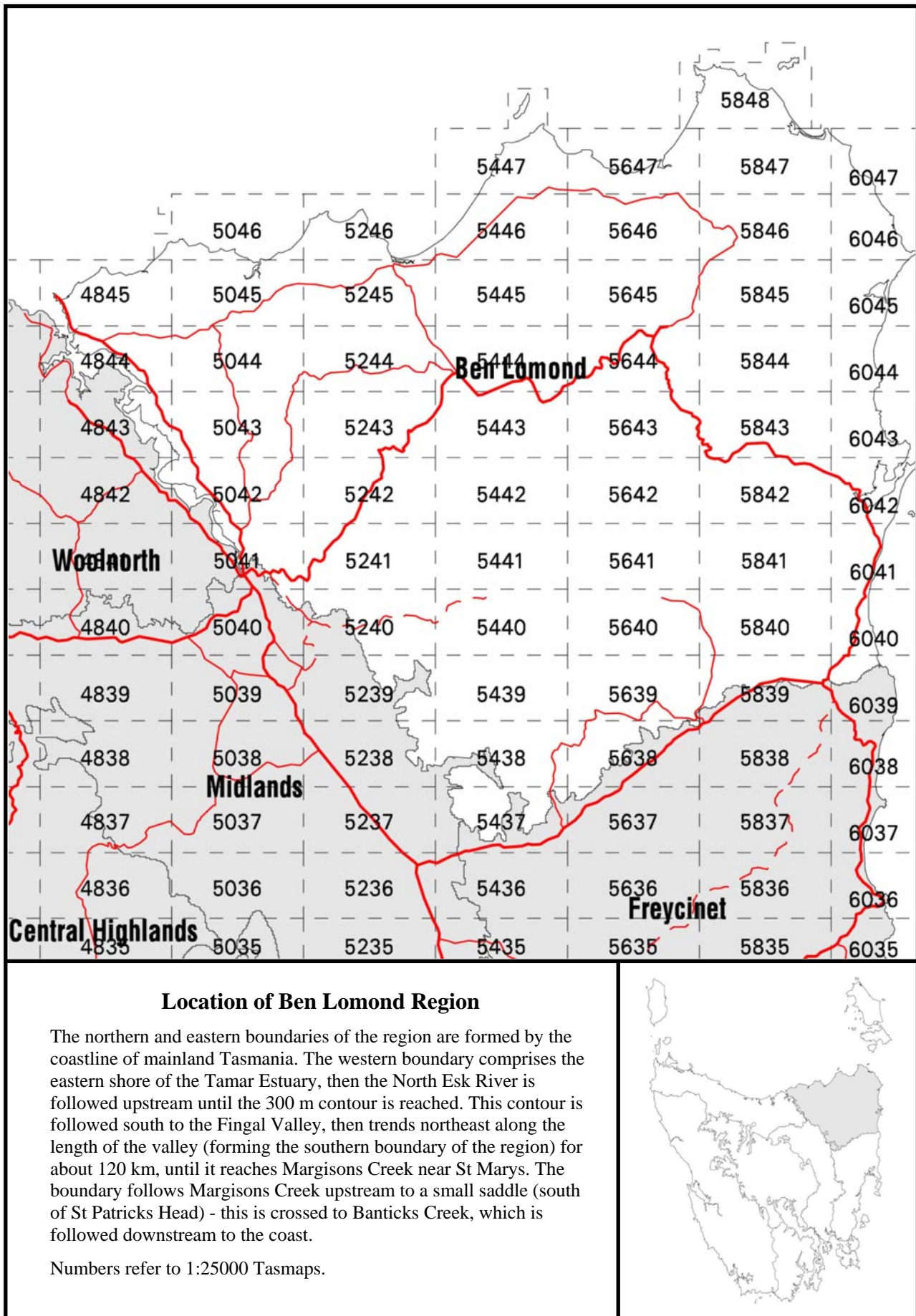
Dry sclerophyll forests and woodlands occur extensively in less fertile and drier lowland areas, and also occupy exposed sites at higher altitudes. They form mosaics and transition zones with wet sclerophyll forests throughout much of the region, with wetter forests assuming dominance as humidity increases in higher rainfall areas and more shaded and less fire-prone landforms. Mixed forests (eucalypt forest with a rainforest understorey) and rainforests are largely restricted to humid upland environments, but both vegetation types also occur as remnant patches in fire-shadow sites in lowland areas. Small areas of other forest types, including blackwood forest, swamp forest and silver wattle forest, occupy specific environments within the region. Non-forest vegetation occurring in Ben Lomond Region includes native grassland (mainly dry inland areas), heath, scrub and moorland (infertile coastal environments and alpine areas), salt marshes and wetlands.

Ben Lomond Region contains about a thousand species of vascular plants that are native to Tasmania. About 150 of these species are Tasmanian endemics. A high proportion of the endemic species is associated with high altitude environments and dry or exposed sites on dolerite, a rock type virtually absent from the southeastern Australian mainland. Several endemic species, and some non-endemic species, have their only recorded distribution in Ben Lomond Region. The non-vascular flora of the region (i.e. mosses, liverworts and lichens) is poorly known compared to the vascular flora. Non-vascular diversity is highest in rainforest, mixed forest and high altitude communities.

The native vegetation of more arable environments has been most affected by settlement and agriculture. Less viable country, such as infertile and dissected lowland areas and the extensive uplands, support large areas of native forest, including silvicultural regeneration. Establishment of hardwood and softwood plantations has mainly occurred in wetter parts of the region, though significant plantations are also located on sites that previously supported dry sclerophyll forest. Extensive grazing is practised in more open forests and woodlands. The root rot pathogen *Phytophthora cinnamomi* is a significant threat to the biota in much of the region.

A substantial proportion of the native vegetation in Ben Lomond Region is formally reserved. Larger reserves containing native forest include Mt William National Park, Ben Lomond NP, Blue Tier Forest Reserve, Mt Victoria FR, Avenue River FR and Lefroy FR. Recent additions to the public reserve system have improved the conservation status of many species and communities. Some forest communities and species remain threatened or poorly reserved, and require additional protection by reservation or prescription on public land (e.g. through Special Management Zoning on State Forest) and private land (e.g. through agreements developed through the Private Forest Reserves Program).

An overview of the vegetation of Ben Lomond Region and its relationship with the environment is given in Pinkard (1980) and Mesibov (1996). Several other references describe the vegetation of sites within the region. Some useful references on plant species and vegetation types are given in *Flora Technical Note 2*.



Section 2 FOREST COMMUNITIES

This section provides keys to the native vegetation types and native forest communities occurring within Ben Lomond Region. Tables indicate the potential conservation priority of forest communities. The explanatory notes should be read before the keys and tables are used. The FPP *Flora Evaluation Sheet* indicates when FPOs need specialist botanical advice, when communities that may have a priority for conservation could be affected by forestry operations.

The keys are based on species and other vegetation characteristics that should be familiar to FPOs and field workers. Illustrations of species used in the keys are given in several publications listed in *Flora Technical Note 2*. The FPA website also carries scanned images of diagnostic species. The common and scientific names of all species used in the keys are listed in Appendix 6 of Module 1.

This section does not cover existing plantations (hardwood or softwood) or areas of exotic vegetation (e.g. pasture). Botanical advice relating to communities is not needed if the proposed operation will only affect these vegetation types. However, FPOs need to consider if other botanical values (e.g. threatened species) have the potential to occur on such sites.

Some non-forest vegetation in Ben Lomond Region has a high priority for conservation, contains threatened species or is very susceptible to disturbance or disease. There are guidelines in the *Forest Practices Code* to avoid disturbance to localised environments that contain these vegetation types. Seek botanical advice in all cases where native non-forest vegetation will be affected by forestry operations.

USING THE KEYS AND TABLES

The forests occurring in Ben Lomond Region have been divided into several broad forest types:

- Rainforest;
- Swamp forest and related forest or scrub;
- Other forest or scrub;
- Mixed forest (eucalypt forest with rainforest species also prominent);
- Wet sclerophyll forest;
- Dry sclerophyll forest and woodland.

Different researchers have classified each forest type into several communities, on the basis of the composition and structure of the overstorey and understorey. In the Manual these are called **floristic communities**. The floristic communities can be allocated to the forest communities that were described and mapped for the RFA - these are called **RFA communities** in the Manual. There is generally good correlation between floristic communities and RFA communities, but this is not always the case.

Use the keys to determine:

- **The forest types and non-forest vegetation types present in the area;**
- **The floristic communities present in each forest type.**

Use the associated tables to determine:

- **The RFA communities present (based on the floristic communities identified);**
- **The conservation priority of each of the floristic communities and RFA communities.**

Some forest communities are particularly susceptible to the root rot pathogen *Phytophthora cinnamomi* – these are also identified in the tables (see discussion on page 10).

A typical native forest coupe in Ben Lomond Region is likely to contain 3 to 5 floristic communities, the number being largely related to variation in the environment (e.g. landform, rock type, disturbance history). There are usually more floristic communities than RFA communities in any given area, because the RFA communities are less finely differentiated. It is important to identify the floristic communities, as they give a much better picture of the variation in the region's forests than the RFA community classification. For example, in Ben Lomond Region there are ten mixed forest or wet sclerophyll forest floristic communities dominated by *E. obliqua*. These are all included in the RFA community "tall *E. obliqua* forest." Most of the *E. obliqua* floristic communities are well reserved in the region, but two are poorly reserved.

It is important to recognise that any system of vegetation classification imposes a taxonomy on something that varies continuously in nature. In addition, our knowledge of Tasmania's vegetation is far from complete. Consequently, FPOs will inevitably come across forest vegetation that does not key out easily. There are a few reasons for this. They include:

- the community may not have been previously recorded from Ben Lomond Region;
- the community may be close to a particular community given in the key, but in the area assessed may lack a species or other characteristic that allows it to be keyed out to that community (this may happen if fire or other disturbance has altered the structure or composition of the vegetation);
- the community may be intermediate between two communities given in the keys (this may happen if vegetation is sampled in transition zones).

It is essential that proposed operational areas are field assessed to determine the range of forest and non-forest vegetation that they contain. Using a combination of the RFA vegetation map, PI maps, aerial photographs, geology maps, topographic maps and local information, will give a good indication of where different communities may occur in an FPP area.

Contact the FPA Botanist or FPA Ecologist if you have problems identifying communities, providing details of the vegetation and site. References given for each forest type also contain useful information.

CONSERVATION PRIORITIES

Conservation priorities for forest communities are based on the requirements and findings of the RFA and associated processes (e.g. identification of communities as Rare, Vulnerable or Endangered) and known distribution of communities in formal reserves (see Module 1).

FPA advice regarding a priority community in an operational area will depend on many factors. They include: conservation status and distribution of the community; the condition of the vegetation; the nature of the proposed operation; presence of other values; and legislative or policy requirements. In some cases, no changes to plans will be needed; in others prescriptions or reservation will be required.

Conservation priorities for floristic communities

Priority	Explanation	General course of action
A	Community may be inadequately reserved in Tasmania, and/or may have a very high conservation priority in the region.	Seek botanical advice in all cases if an area is thought to contain a Priority A community.
B	Community may be inadequately reserved in the region, but is adequately reserved elsewhere in Tasmania.	Seek botanical advice if an area is thought to contain a Priority B community <u>and</u> the site will not be regenerated to native forest.
Non-priority (np)	Community is adequately reserved in Tasmania and in the region.	Unless priority species (Section 3) or other flora values are thought to be present, there is generally no need to seek botanical advice if an area only contains non-priority communities.

Conservation priorities for RFA communities

Priority	Explanation	General course of action
Y	The RFA has identified that additional Statewide conservation is required for the community (oldgrowth and non-oldgrowth).	Seek botanical advice in all cases if an area is thought to contain a Priority Y community.
Yog	The RFA has identified that additional Statewide conservation is required for the oldgrowth component of the community.	Seek botanical advice where the community is oldgrowth, or other flora values are thought to be present.
Non-priority (N)	The RFA has not identified that additional Statewide conservation is required for the community.	Unless priority species (Section 3) or other flora values are thought to be present, there is generally no need to seek botanical advice if an area only contains non-priority communities.

RFA processes have identified communities that are Rare (R), Vulnerable (V) or Endangered (E) at a Statewide level. These are identified (*) in the tables that indicate the conservation priorities and attributes of the different forest types (see column dealing with conservation status of the RFA community). RVE communities in Tasmania are listed in Module 1 (Appendix 3).

The RFA lists several forest communities that require further protection on public land in Tasmania. Most of these communities also have a high priority for conservation on private land.

The table below lists all RVE communities, and other communities that require protection on public land, that have been recorded from Ben Lomond Region.

- R E *Melaleuca ericifolia* coastal swamp forest
- R E *Notelaea ligustrina* and/or *Pomaderris apetala* closed forest
- E Shrubby *E. ovata* - *E. viminalis* forest
- E *E. viminalis* wet forest
- R V *E. viminalis* and/or *E. globulus* coastal shrubby forest
- V *E. brookeriana* wet forest
- V *E. amygdalina* forest on sandstone
- V Inland *E. amygdalina* - *E. viminalis* - *E. pauciflora* forest / woodland on Cainozoic deposits
- V Inland *E. tenuiramis* forest
- V Grassy *E. globulus* forest
- E. viminalis* grassy forest / woodland
- E. rodwayi* forest
- Allocasuarina verticillata* forest
- E. amygdalina* forest on mudstone (oldgrowth only)
- E. pauciflora* forest on dolerite (oldgrowth only)
- E. sieberi* forest on granite (oldgrowth only)
- E. sieberi* forest on other substrates (oldgrowth only)
- E. viminalis* - *E. ovata* - *E. amygdalina* - *E. obliqua* damp sclerophyll forest (oldgrowth only).

The tables in this section of the Ben Lomond Module indicate that all occurrences of these communities need to be referred to FPA. The other RFA communities that require referral to FPA have been identified through other analyses as having some priority for conservation within the region.

There are constraints on conversion of RVE forest communities (and RVE non-forest communities). There will be restrictions on further conversion of other forest communities if their clearance approaches the limits set by Tasmania's Permanent Forest Estate Policy (monitored by FPA).

EXPLANATORY NOTES

Some additional notes that will help FPOs to assess areas and use the keys and tables are given below.

Sources of information

There are many sources of information to indicate which vegetation types and forest communities occur in a FPP area. Assessments and surveys conducted prior to preparing FPPs will generally provide enough information to identify the communities. Published and unpublished reports and botanical data from various databases may also be useful. Distribution notes given in the tables may help confirm community identifications.

Broad scale vegetation maps such as the RFA Forest Communities Map and TASVEG maps are available through DPIWE GTSpot database and Forestry Tasmania's NewCONSERVE database. Details for accessing these databases are given in Module 1. These maps may give a useful indication of the vegetation in a FPP area, but the scale of mapping means that they are often inaccurate at the coupe level. They rarely pick up localised occurrences of communities (which may have high conservation significance), and they will not allow floristic communities to be identified.

Further information about the different forest types is provided in the major references cited in the text. *Flora Technical Note 2* provides other references on forest and non-forest vegetation.

How big is a forest community?

In preparing FPPs, the **minimum** area of forest that should be identified as a distinct community is **1 ha** (this includes contiguous areas of the community that extend beyond the FPP boundary). However, botanical advice should be sought for smaller areas of non-forest vegetation (e.g. *Sphagnum* peatlands).

Small areas of communities can be easily missed during surveys of FPP areas, though the chances of this are reduced by good sampling across the range of environments in the area. It is important to survey localised habitats within the FPP area. Communities with a high priority for conservation often occupy distinctive habitats (e.g. rocky knolls, poorly drained flats) or have fairly distinctive features (e.g. the white trunks of *E. viminalis* in *E. viminalis* wet forests contrast with the fibrous trunks of *E. obliqua* and *E. delegatensis*, the more widespread wet eucalypt forest dominants).

FPOs should try to identify a community occupying a small area (<1 ha) if:

- the forest in the small area is significantly different to the adjacent forest; or
- the forest community in the small area may be a priority community.

FPOs can subsume a community occupying a small area into the adjacent community if:

- the forest in the small area has obvious affinities to the forest community in the adjacent area (e.g. the same canopy dominants); and
- the forest community in the small area is not a priority community.

For RFA communities that only require additional conservation of oldgrowth occurrences, FPA should be notified for all oldgrowth patches exceeding 3 ha (including areas that extend beyond the FPP area).

There are particular problems in dealing with transitional vegetation and the RFA damp sclerophyll forest community (see discussion below). FPOs should take care not to confuse vegetation in transition zones with distinct communities.

When small areas of priority forest communities are referred to FPA, the advice given will be determined on a case-by-case basis. Factors that may be relevant include: requirements under the RFA and other policies; location within a coupe (e.g. whether adjacent to streamside reserve or in the middle of a proposed plantation); proposed silvicultural practices; presence of other values; and the local context of the community.

Qualifications in the tables

There are many grey areas in classifying vegetation and determining conservation priorities. The tables give qualifications for some communities. For example, some floristic communities can be allocated to more than one RFA community, depending on site characteristics (e.g. rock type) or co-occurring species. Rainforest communities in Ben Lomond Region can have two conservation priorities – they are generally low priority communities in wetter parts of the region and high priority communities in drier parts, where they occur as relicts outside the typical range of rainforest.

More on community names and relationships

The systems of classifying floristic communities differ between forest types. This is because the classifications were undertaken by different researchers at different times. Most communities have an abbreviated name (used in the keys) and a more detailed name (used in the tables) that indicates some typical species or characteristics of the community. However, some stands of a particular community may not contain all the “typical” species given in the more detailed name of the community.

Most floristic communities can be readily allocated to RFA communities, but this is not always the case. Most RFA communities contain two or more floristic communities. In some cases, the RFA community names may seem inappropriate for some forest communities. For example, areas of wet sclerophyll forest dominated by *E. dalrympleana* are included in the RFA community “*E. delegatensis* forest”, and wet sclerophyll forest dominated by *E. globulus* is allocated to the RFA community “*E. regnans* forest.”

Dominance in forest communities

Accurate determination of the dominant canopy (overstorey) species and understorey characteristics is needed to classify communities. Most areas of forest contain one or more shrub layers below the canopy, and a ground layer of grasses, sedges, ferns or some combination of these. The dominant component of a vegetation layer is the species (or group of species) that supply most of the cover.

Overstorey dominance

Identifying the dominant overstorey species is one of the first steps in keying out most forest communities. This can be difficult in forests containing more than one species of eucalypt. However, in most situations, one species is clearly dominant while the others are subdominant or minor. An example: *E. ovata* provides about 60% cover on a poorly drained flat with an understorey dominated by sedges; the flat also carries *E. amygdalina* and *E. viminalis*. The floristic community is sedgy *E. ovata* dry sclerophyll forest and the correlated RFA community is shrubby *E. ovata* - *E. viminalis* forest.

Two species occasionally occur as codominants, having about equal cover in the community. The community should be keyed out using both dominants as options. Botanical advice may be needed if one of those options is a priority community. An example: if *E. obliqua* and *E. viminalis* are codominant in a wet sclerophyll forest, the community can be identified as an *E. obliqua* wet sclerophyll forest community or an *E. viminalis* wet sclerophyll forest community. The latter community has a high priority for protection in all regions of Tasmania, and the operation needs to be referred to FPA. If neither community is a priority community (e.g. *E. obliqua* and *E. delegatensis* codominant in wet sclerophyll forest), the operation does not need to be referred to FPA unless other flora values are present. FPOs should exercise their own judgement (e.g. by taking account of associated vegetation and site characteristics) when allocating such forest to floristic and RFA communities.

Understorey dominance

Within a broad forest type, some communities key out simply on the basis of their overstorey dominants. However, most floristic communities are keyed out by the presence or absence of understorey species (e.g. most wet sclerophyll forest communities) or by characteristics of the dominant understorey layer (e.g. most dry sclerophyll forest communities). For example, shrubs exceeding 2 m in height will be the most conspicuous understorey layer in a shrubby dry sclerophyll forest community. Grasses or sags are the most conspicuous understorey components in a grassy dry sclerophyll forest.

FPOs may need to make allowance if land uses or events have temporarily changed the nature of the understorey. For example, a recent fire may remove the shrub layer from a heathy forest, but if the vegetation in nearby areas or other evidence suggests that short shrubs are typically present, the community should be allocated to a heathy dry sclerophyll forest community. Section 2.6 gives more information on identifying the dominant understorey characteristics in dry sclerophyll communities.

Distinguishing eucalypt species

Correct identification of eucalypt species is essential as they are the main tree species used to identify most dry sclerophyll, wet sclerophyll and mixed forest communities. Identification can sometimes be difficult because eucalypts hybridise readily. Seek botanical advice if you find unusual or outlying occurrences of eucalypts, as these may be genetically important.

The FPA website contains scanned images of Tasmanian eucalypts; a key to species and notes on distinguishing between some closely-related species (*E. viminalis* and *E. dalrympleana*; and *E. brookeriana* and *E. ovata*) associated with communities with a high priority for conservation. Useful references for identifying eucalypts are also listed in *Flora Technical Note 2*.

FPOs may need to collect material or take notes to determine the identity of a species. Bark characteristics, fruit, buds and adult and juvenile leaves can all be important for diagnosis. Juvenile leaves may be needed to identify some species (e.g. *E. viminalis* and *E. dalrympleana*).

Oldgrowth

Oldgrowth forests have over-mature to senescent trees contributing over 30% of the crown cover to the overstorey, and have not been significantly affected by man-made disturbance. Fire does not preclude classification as oldgrowth, providing other oldgrowth characteristics are present. Oldgrowth forests generally contain a greater range of habitats than regrowth forests and consequently support a different (and generally more diverse) suite of species. Oldgrowth forest is discussed in *Flora Technical Note 7*.

Generally, oldgrowth forests have a higher conservation value than non-oldgrowth forests of the same community. Areas of oldgrowth forest, or areas containing oldgrowth trees, should be preferentially located in retained areas, if this is an option under the proposed silvicultural regime. Some RFA communities require additional protection for the oldgrowth component of the community only. For

these communities, the practical minimum patch size that requires notification to FPA is 3 hectares (including areas extending beyond the coupe boundary).

Transition zones

Transition zones often occur between adjacent forest types or adjacent forest communities, with vegetation of these zones being intermediate in structure and composition. Transition zones should be avoided when communities are being identified. Some forest communities (e.g. damp sclerophyll forest communities) are inherently intermediate in character and occupy relatively large areas - see below.

Damp sclerophyll forest communities

Some eucalypt-dominated forests have an understorey with a similar proportion of wet sclerophyll species (e.g. broad-leaved shrubs and wet ferns) and dry sclerophyll species (e.g. narrow-leaved shrubs and grasses). An example of a damp sclerophyll understorey could include dogwood, blanket bush, prickly mo, prickly beauty, guitar plant and sagg. Such vegetation is sometimes described as damp sclerophyll forest. In this section, it should be keyed to its floristic community using the dry sclerophyll forest key (where it will generally key out as a shrubby dry sclerophyll community).

One of the RFA communities is *E. viminalis* - *E. ovata* - *E. amygdalina* - *E. obliqua* damp sclerophyll forest (DSC). The community has a damp sclerophyll understorey and *E. amygdalina* and/or *E. obliqua* are both prominent in the overstorey. *E. viminalis* and *E. ovata* may be present as subdominant or minor species or may dominate very small patches within a mosaic of forest dominated by *E. amygdalina* or *E. obliqua*. This community is mapped inconsistently on the RFA Forest Communities Map. On most sites mapped as DSC, the vegetation can be better allocated to other RFA communities (e.g. dry *E. obliqua* forest, tall *E. obliqua* forest, *E. amygdalina* forest on dolerite, shrubby *E. ovata* - *E. viminalis* forest).

Inland *E. amygdalina* forest

In 2005, the RFA community Inland *E. amygdalina* forest (AI) was split into two distinct communities. Inland *E. amygdalina* - *E. viminalis* - *E. pauciflora* forest/woodland on Cainozoic deposits (AIC) is associated with Recent and Tertiary sediments (including ironstone lags) – it occurs mainly on private land and is listed as a Vulnerable community. It is abbreviated to Inland *E. amygdalina* forest on Cainozoic deposits in tables in Section 2.6. *E. amygdalina* forest on mudstone (AM) is relatively common on dry sites on Permian mudstone and Mathinna series substrate in Ben Lomond Region – it is not identified as a threatened community, though oldgrowth stands require protection on public land.

Forest communities that are susceptible to *Phytophthora cinnamomi*

Some communities are very susceptible to the root rot pathogen *Phytophthora cinnamomi* because they:

- contain many species of susceptible plants, including threatened species;
- occur in warm, moist environments that are conducive to establishment of *Phytophthora*;
- occur in locations where spores can be transferred into uninfected sites by land use.

Forest communities that are highly susceptible to *Phytophthora* are identified (#) in the tables indicating conservation priorities of the different forest types (see column dealing with conservation status of the floristic community). Most are lowland dry sclerophyll forest communities – many are also Priority A communities. Several non-forest communities are also susceptible to *Phytophthora* – these should be referred to FPA if they are in operational areas (see below). Information on *Phytophthora* and its management in Tasmanian forests is given in Section 6 of this module and in *Flora Technical Note 8*.

Non-forest vegetation

Native non-forest vegetation (e.g. moorland, heath, wetland and native grassland) may be associated with native forests (and sometimes plantations). Some of these vegetation types have a high priority for conservation, contain threatened species or are very susceptible to disturbance or disease. There are specific guidelines in the *Forest Practices Code* to avoid disturbance to localised environments (e.g. swamps, rocky knolls, streambanks) that often contain these vegetation types. The key on the following page will allow FPOs to identify broad non-forest vegetation types. Seek botanical advice in all cases where native non-forest vegetation will be affected by forestry operations.

When to seek advice

This section of the module, and the FPP *Flora Evaluation Sheet*, indicates when botanical advice is needed because of the presence of particular communities in areas proposed for forestry operations. However, there is no shortage of grey areas in the natural world. Specialist advice should be sought if FPOs are uncertain about identification of communities or their conservation priority.

KEY TO VEGETATION TYPES AND FOREST COMMUNITIES

Use the key to forest and non-forest types to identify the vegetation types present in the coupe, then go to the indicated section (forest types only) to identify the floristic communities. The table following the key will allow the floristic communities to be related to the RFA communities.

Each key should be followed through sequentially. A true/false decision should be made for each statement bearing the same number (e.g. ❶). If true, proceed to the next numbered statement immediately below (❷). If false (or there is some degree of doubt), proceed to the next statement of the same number (❶) in the key.

The keys are based on species or understorey types that will be familiar to most field workers. Understoreys are defined by their dominant species, although species typical of other vegetation types may be present. Information on species and other characteristics used to distinguish communities is provided in Module 1, *Flora Technical Note 2* and on the FPA Website.

Transitional vegetation may not key out easily. If the forest is intermediate between two recognisable floristic communities, assess the conservation priorities for both communities. Contact the FPA Botanist or Ecologist if a vegetation type or forest community does not key out.

KEY TO FOREST TYPES

Use when vegetation is dominated by trees exceeding 5 metres, or with potential to exceed 5 metres

❶ Eucalypts absent or less than 5% cover

- ❷ Myrtle, sassafras or celery-top pine dominant Rainforest (go to 2.1)
- ❷ Blackwood, tea-trees or paperbarks dominant Swamp forest and related forest or scrub (go to 2.2)
- ❷ Forest or tall scrub with other species dominant Other forest or scrub (go to 2.3)

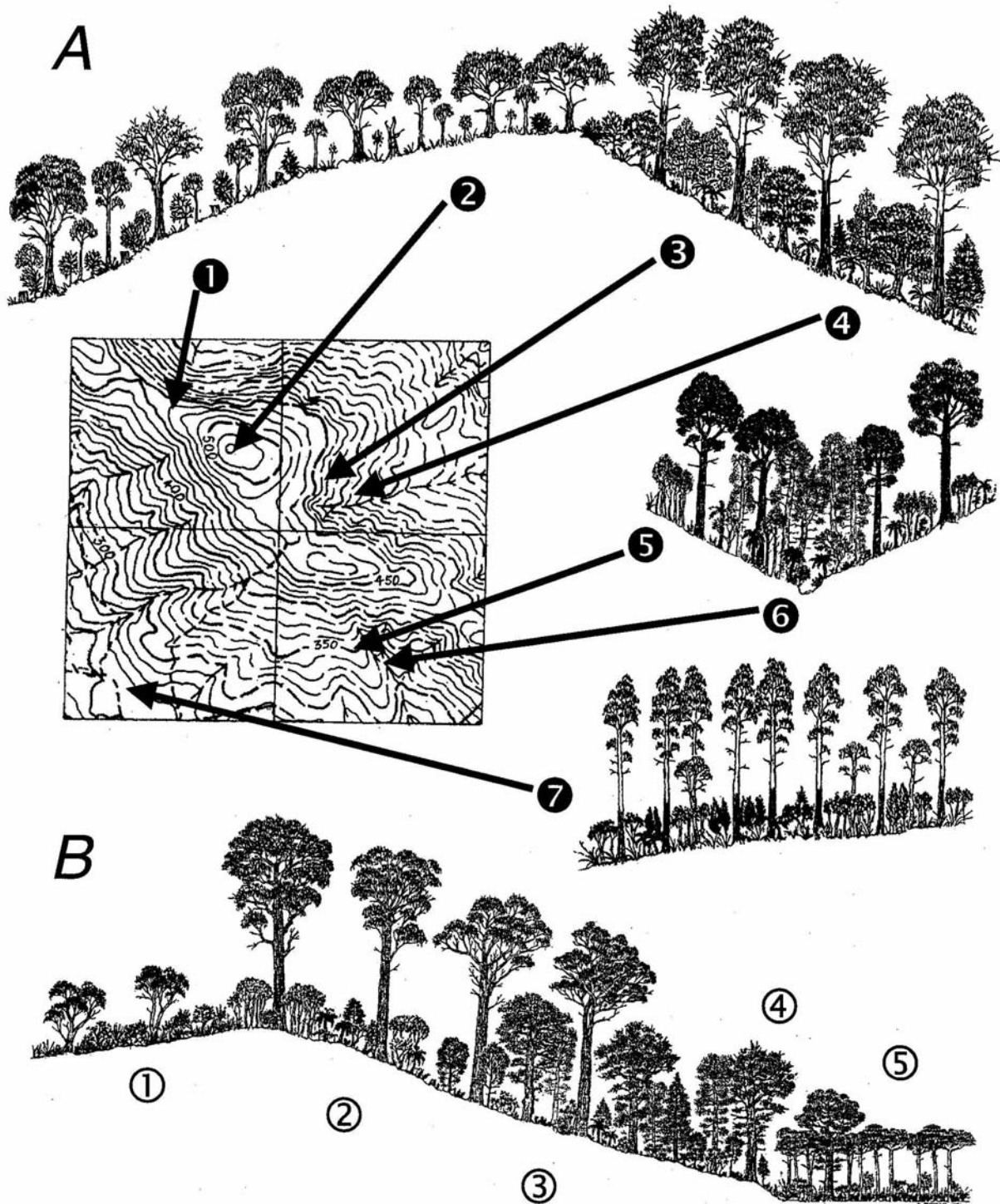
❶ Eucalypts present with greater than 5% cover

- ❷ Myrtle, sassafras or celery-top pine prominent as secondary trees or shrubs Mixed forest (go to 2.4)
- ❷ Understorey dominated by tall tea-trees or paperbarks Wet sclerophyll forest (go to 2.5)
- ❷ Understorey dominated by broad-leaved (soft-leaved) shrubs Wet sclerophyll forest (go to 2.5)
- ❷ Understorey dominated by an equal mixture of broad-leaved and narrow-leaved shrubs Dry sclerophyll forest/woodland (go to 2.6)
- ❷ Understorey dominated by grasses, sedges, heaths or narrow-leaved (hard-leaved) shrubs (often under 2 m in height) Dry sclerophyll forest/woodland (go to 2.6)

KEY TO NON-FOREST TYPES

Seek advice from FPA in all cases if operations may affect native non-forest vegetation.

- ❶ Dominated by shrubs over 2 m Scrub
- ❶ Dominated by shrubs under 2 m, usually infertile or exposed sites Heathland
- ❶ High altitude sites dominated by a mixture of low species Alpine vegetation
- ❶ Dominated by sedges or buttongrass; low to high altitudes, often on the boundary of sedgy woodland or tea-tree scrub forest Moorland/sedgeland
- ❶ Dominated by native grasses and saggs; often herb-rich; generally fertile sites Native grassland
- ❶ Dominated by *Sphagnum* moss; shrubs (e.g. tea-tree or richiea) may be sparse or locally dense; often in high altitude soaks or drainage lines *Sphagnum* peatland
- ❶ Aquatic vegetation or vegetation submerged seasonally, generally dominated by graminoids, herbs or succulent species Wetland



Diagrams showing relationships between forest types and typical Tasmanian forest environments:

A: Moderate rainfall site: soils of moderate fertility (e.g. dolerite); site varying in landform and fire history

1 – shrubby *E. amygdalina* dry sclerophyll forest (exposed slope); 2 – grassy *E. amygdalina* dsf (exposed ridgeline); 3 – *E. delegatensis* wet sclerophyll forest (shaded slopes at higher altitudes); 4 – *E. delegatensis* mixed forest (humid slope, infrequently burnt); 5 – *E. obliqua* wsf and mixed forest (shaded slopes at lower altitudes); 6 – callidendrous rainforest (humid fire-shadow gully); 7 – *E. regnans* wsf (regrowth on humid site after wildfire or intensive logging).

B: High rainfall site, low altitude: site varying greatly in soil fertility and drainage

1 – heathy *E. nitida* dry sclerophyll forest (infertile substrate); 2 – *E. obliqua* wet sclerophyll forest (shaded slope); 3 – *E. obliqua* mixed forest (humid slope, infrequently burnt); 4 – callidendrous rainforest (humid, well-drained lower slope; fire-shadow site); 5 – *Leptospermum lanigerum* swamp forest (poorly-drained flat).

2.1 RAINFOREST COMMUNITIES

Major References: Jarman, Brown and Kantvilas (1984); Jarman, Kantvilas and Brown (1991); Neyland (1991); *Flora Technical Note 4*.

Tasmanian cool temperate rainforest is defined as vegetation with trees taller than 8 m, dominated by the following species: myrtle, deciduous beech, sassafras, leatherwood, horizontal, celery-top pine, King Billy pine, Huon pine, Cheshunt pine or pencil pine. In Ben Lomond Region, rainforest is most extensive in humid upland environments that have escaped burning for a long period, and is dominated by myrtle and sassafras. Celery-top pine occurs locally on some upland sites. Sassafras is the main dominant of rainforest at lower altitudes – here patches are more localised, and often qualify as relict patches which have a high priority for conservation (see discussion below). Areas containing rainforest on the eastern slopes of Blue Tier have been identified in the RFA as glacial refugia, because rainforest surviving on these sheltered sites in a forthcoming glacial period would provide a source of seed or spores that would facilitate recolonisation of other areas by rainforest species in the subsequent warmer interglacial period.

Rainforest generally grades into other moist forest types (e.g. mixed forest and swamp forest), but can also form sharp boundaries (e.g. adjacent to wet sclerophyll forest and native grassland) associated with substantial differences in environment, fire history or land use. Although most rainforest communities are represented in reserves, their susceptibility to fire, particularly in high altitude areas, needs to be taken into account in planning for forestry operations in the region.

KEY TO RAINFOREST COMMUNITIES

- ❶ Dominated by myrtle; celery-top pine not prominent in canopy
 - ❷ Ground ferns prominent
 - ❸ Musk common.....RAIN-C3.1
 - ❸ Musk sparse or absent.....RAIN-C1.1
 - ❷ Ground ferns rare; woolly tea-tree or native pepper often present.....RAIN-C2.1
- ❶ Dominated by sassafras; celery-top pine not prominent in canopy
 - ❷ Musk common.....RAIN-C3.2
 - ❷ Musk sparse or absentRAIN-C1.2
- ❶ Celery-top pine prominent in canopyRAIN-CT3

RELICT RAINFOREST AND RAINFOREST IN GLACIAL REFUGIA

Relict rainforest comprises isolated patches of rainforest that occur locally in humid or fire-shadow environments, outside the normal range of Tasmanian rainforest. Thirty patches have been identified from lowland parts of the region, ranging in size from less than 1 ha to over 30 ha (Ringarooma River near Branxholm). Grid references and details of known sites are given in Neyland 1991 and *Flora Technical Note 4*. Other patches of relict rainforest may occur in the region, most likely on sites with a PI type containing S or T.

The Blue Tier glacial refuge is effectively bounded in the south by Lottah Road, in the west by Blue Tier Forest Reserve, in the north by a line from Sun Flats to New England Road and in the east by Terrys Hill Road. Rainforest to the north and east of the glacial refuge (and in the eastern part of the glacial refuge itself) qualify as relict rainforest. Rainforest in the Blue Tier glacial refugia should be treated as relict rainforest if it is located in proposed operational areas.

Areas of relict rainforest or rainforest in the Blue Tier glacial refugia that could be affected by forestry operations need to be referred to FPA. Typical prescriptions for protection of relict rainforest (and rainforest in glacial refugia) are given in *Flora Technical Note 4*.

CONSERVATION PRIORITIES AND ATTRIBUTES OF RAINFOREST COMMUNITIES

Note: * – Community identified as Rare, Vulnerable or Endangered at a Statewide level through RFA processes

Floristic community code and name		Qualification	RFA community code and name		Conservation priority		Distribution in Ben Lomond Region
					Floristic	RFA	
RAIN-C1.1 Callidendrous	<i>Nothofagus cunninghamii</i> - <i>Atherosperma moschatum</i> over <i>Dicksonia antarctica</i> and/or <i>Polystichum proliferum</i>	Relict patch or glacial refuge	M+	Callidendrous & thamnisc rainforest on fertile sites	A	N	Moderately widespread on moist upland sites and along rivers (e.g. Blue Tier, Mount Maurice, Mount Victoria, South Esk River).
		Other sites			np		
RAIN-C1.2 Callidendrous	<i>Atherosperma moschatum</i> over <i>Dicksonia antarctica</i> - <i>Polystichum proliferum</i> - <i>Blechnum wattsii</i>	Relict patch or glacial refuge	M+	Callidendrous & thamnisc rainforest on fertile sites	A	N	Occasional in protected gullies and along creeks; less common than RAIN C1.1.
		Other sites			A		
RAIN-C2.1 Callidendrous	<i>Nothofagus cunninghamii</i> - (<i>Leptospermum lanigerum</i>) over clear understorey or <i>Telopea truncata</i> or <i>Tasmannia lanceolata</i>	Other sites	M+	Callidendrous & thamnisc rainforest on fertile sites	A	N	Moderately widespread at higher altitudes (e.g. Blue Tier, Mount Maurice, Mount Victoria, Mt Young, South Esk).
RAIN-C3.1 Callidendrous	<i>Nothofagus cunninghamii</i> - <i>Atherosperma moschatum</i> over <i>Olearia argophylla</i> with <i>Dicksonia antarctica</i> and/or <i>Polystichum proliferum</i>	Relict patch or glacial refuge	M+	Callidendrous & thamnisc rainforest on fertile sites	A	N	Occasional on humid, fire-protected sites at a range of altitudes (e.g. Mount Horror, Mount Maurice, Mount Cameron East)..
		Other sites			np		
RAIN-C3.2 Callidendrous	<i>Atherosperma moschatum</i> over <i>Olearia argophylla</i> with <i>Dicksonia antarctica</i> - and/or <i>Polystichum proliferum</i>	Relict patch or glacial refuge	M+	Callidendrous & thamnisc rainforest on fertile sites	A	N	Localised in protected gullies (e.g. St. Marys Pass), or on S or SE facing slopes. Common relict rainforest community.
		Other sites			B		
RAIN-CT3 Callidendrous – thamnisc	<i>Phyllocladus aspleniifolius</i> - <i>Nothofagus cunninghamii</i> over clear understoreys		M+	Callidendrous & thamnisc rainforest on fertile sites	A	N	Local on upland sites on granite (e.g. Blue Tier, Camden Plateau).

2.2 SWAMP FOREST AND RELATED FOREST OR SCRUB COMMUNITIES

Major Reference: Pannell (1992)

Swamp forest is defined as closed forest dominated by blackwood, tea-trees and paperbarks, which typically occupies flat, poorly drained sites. Eucalypts are sparse or absent. In Ben Lomond Region, swamp forests are associated with poorly drained (sub)coastal flats, but have been extensively cleared for agriculture and now mainly survive as remnant stands and riverine corridors (e.g. along the Great Forester and Little Forester Rivers). Related riparian blackwood forest contain some typical wet sclerophyll species (e.g. dogwood, cheesewood, stinkwood and bracken) that are not found in swamp forests. They occur on better drained sites adjacent to rivers and creeks, and extend to lower slopes.

Montane forests dominated by woolly tea-tree (*Leptospermum lanigerum*) are found on upland sites, as part of a successional sequence leading to rainforest. Lowland tea-tree forest occurs locally on poorly drained flats and is mainly dominated by *Leptospermum scoparium*. Its scrub phase is lower (<8 m) and denser, and associated with more exposed or frequently burnt sites, often adjacent to moorland.

KEY TO SWAMP FOREST AND RELATED FOREST / SCRUB COMMUNITIES

- ❶ **Blackwood, scented paperbark or woolly tea-tree dominant; swamp paperbark not prominent in canopy; mainly found on poorly drained lowland flats**
 - ❷ Sassafras common.....SWAMP-A2
 - ❷ Sassafras sparse or absent
 - ❸ Woolly tea-tree or cutting grass common
 - ❹ Cutting sedge present; scented paperbark absent SWAMP-C4
 - ❹ Cutting sedge absent; scented paperbark often present.....SWAMP-A1
 - ❸ Woolly tea-tree and cutting grass sparse or absent.....SWAMP-A3
- ❶ **Swamp paperbark prominent in canopy (sometimes with blackwood or woolly tea-tree); cutting sedge (*Carex*) often common in understorey; mainly found on poorly drained lowland flats**
 - ❷ Swamp paperbark dominant
 - ❸ Cutting sedge present SWAMP-C3
 - ❸ Cutting sedge absent..... SWAMP-C2
 - ❷ Blackwood or woolly tea-tree dominant
 - ❸ Woolly tea-tree prominent; scented paperbark sparse or absent..... SWAMP-C4
 - ❸ Swamp paperbark prominent; woolly tea-tree sparse or absent SWAMP-C3
- ❶ **Blackwood dominant or codominant; dogwood, cheesewood, musk, cathead fern or bracken prominent in understorey; mainly found on better drained flats, riparian sites and slopes**
 - ❷ Myrtle common
 - ❸ Dogwood commonSWAMP-D5
 - ❸ Dogwood sparse or absentSWAMP-D6
 - ❷ Myrtle sparse or absent
 - ❸ Silver wattle present; sword sedge absentSWAMP-D2
 - ❸ Silver wattle absent; sword sedge often presentSWAMP-D4
- ❶ **Canopy dominated by woolly tea-tree and montane sites (usually above 500 m)**
 - ❷ Myrtle codominant or common (silver wattle sparse or absent) SWAMP-E2
 - ❷ Myrtle sparse or absent SWAMP-E1
- ❶ **Tea-tree (manuka) usually dominant or codominant; mainly lowland sites**
 - ❷ Swamp paperbark common.....SWAMP-F2
 - ❷ Swamp paperbark sparse or absentSWAMP-F1

CONSERVATION PRIORITIES AND ATTRIBUTES OF SWAMP FOREST AND RELATED FOREST OR SCRUB COMMUNITIES

Note: * – Community identified as Rare, Vulnerable or Endangered at a Statewide level through RFA processes

Floristic community code and name		Qualification	RFA community code and name		Conservation priority		Distribution in Ben Lomond Region
					Floristic	RFA	
SWAMP-A1	Depauperate callidendrous swamp forest	Tea-tree or scented paperbark dominant	L	<i>Leptospermum</i> species - <i>Melaleuca squarrosa</i> swamp forest	A	N	Local on poorly drained lowland flats.
		Blackwood dominant	BF	<i>Acacia melanoxylon</i> forest on flats			
SWAMP-A2	Callidendrous sassafras swamp forest	Tea-tree or scented paperbark dominant	L	<i>Leptospermum</i> species - <i>Melaleuca squarrosa</i> swamp forest	A	N	Not recorded from region but likely to occur on poorly drained lowland flats.
		Blackwood dominant	BF	<i>Acacia melanoxylon</i> forest on flats			
SWAMP-A3	Depauperate callidendrous fern swamp forest	Tea-tree or scented paperbark dominant	L	<i>Leptospermum</i> species - <i>Melaleuca squarrosa</i> swamp forest	A	N	Local on better drained flats, may be associated with mixed forest or wet sclerophyll forest (e.g. Old Chum Dam area).
		Blackwood dominant	BF	<i>Acacia melanoxylon</i> forest on flats			
SWAMP-C2	Depauperate coastal paperbark swamp forest		ME	<i>Melaleuca ericifolia</i> coastal swamp forest	A	Y*	Coastal flats that are periodically disturbed by fire or flood (e.g. Rushy Lagoon, Waterhouse area). May also occur in sites disturbed by agricultural activity.
SWAMP-C3	Coastal paperbark/ <i>Carex</i> swamp forest	Swamp paperbark dominant	ME	<i>Melaleuca ericifolia</i> coastal swamp forest	A	Y*	Coastal flats that are periodically disturbed by fire or flood (e.g. Rushy Lagoon area, Dianas Basin).
		Blackwood dominant	BF	<i>Acacia melanoxylon</i> forest on flats	A	N	
SWAMP-C4	Coastal tea-tree/ <i>Carex</i> swamp forest	Tea-tree or scented paperbark dominant	L	<i>Leptospermum</i> species - <i>Melaleuca squarrosa</i> swamp forest	A	N	Uncommon on poorly drained flats associated with lower reaches of major rivers (e.g. Great Forester River).
		Blackwood dominant	BF	<i>Acacia melanoxylon</i> forest on flats			
SWAMP-D2	Riparian blackwood/wattle forest	On flats	BF	<i>Acacia melanoxylon</i> forest on flats	A	N	Uncommon on better drained river flats (e.g. middle reaches of Great Forester River, Murdochs Road).
		On rises	BR	<i>Acacia melanoxylon</i> forest on rises			
SWAMP-D4	Riparian blackwood/dogwood forest	On flats	BF	<i>Acacia melanoxylon</i> forest on flats	A	N	Occasional in moist gullies and riparian flats on well drained fertile sites (e.g. Boobyalla River, Maurice River).
		On rises	BR	<i>Acacia melanoxylon</i> forest on rises			
SWAMP-D5	Riparian blackwood myrtle/dogwood forest	On flats	BF	<i>Acacia melanoxylon</i> forest on flats	A	N	Very localised in long-unburnt gullies and riverine corridors (e.g. Murdochs Road).
		On rises	BR	<i>Acacia melanoxylon</i> forest on rises			

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Floristic community code and name		Qualification		RFA community code and name		Conservation priority		Distribution in Ben Lomond Region
						Floristic	RFA	
SWAMP-D6	Riparian blackwood rainforest	Myrtle dominant		M+	Callidendrous & thamnic rainforest on fertile sites	A	N	Very localised in long-unburnt gullies and riverine corridors (e.g. Murdochs Road).
		Myrtle not dominant	On flats	BF	<i>Acacia melanoxylon</i> forest on flats	A	N	
			On rises	BR	<i>Acacia melanoxylon</i> forest on rises			
SWAMP-E1	Depauperate montane tea-tree forest	Silver wattle common		SI	<i>Acacia dealbata</i> closed forest	np	N	Often occurs as a regenerating forest following clearance of rainforest or mixed forest in upland areas.
		Silver wattle sparse or absent		L	<i>Leptospermum</i> species - <i>Melaleuca squarrosa</i> swamp forest	np	N	Higher altitudes, often on poorly drained flats on granite (e.g. Paradise Plains, Mt Maurice).
SWAMP-E2	Montane myrtle tea-tree forest			M+	Callidendrous & thamnic rainforest on fertile sites	np	N	Later successional stage of SWAMP-E1, often forming a mosaic with rainforest (e.g. Mt Young, Blue Tier).
SWAMP-F1	Depauperate tea-tree scrub forest			L	<i>Leptospermum</i> species - <i>Melaleuca squarrosa</i> swamp forest	np	N	Locally common on poorly drained lowland flats and drainage soaks, often adjacent to heath and moorland (e.g. Old Chum Dam area, Boobyalla, Waterhouse, Mt Cameron).
SWAMP-F2	Depauperate tea-tree/paperbark scrub forest	Tea-tree or scented paperbark dominant		L	<i>Leptospermum</i> species - <i>Melaleuca squarrosa</i> swamp forest	np	N	Similar distribution to SWAMP-F1, but on sites with poorer drainage (e.g. Mt. William, Rushy Lagoon)
		Swamp paperbark dominant		ME	<i>Melaleuca ericifolia</i> coastal swamp forest	A	Y*	

2.3 OTHER FOREST OR SCRUB COMMUNITIES

Major Reference: Kirkpatrick, Barker, Brown, Harris and Mackie (1995)

This section covers an array of forest communities that are not dominated by rainforest species, eucalypts, blackwood, tea-trees or paperbarks. They occupy a wide environmental range, from humid sites capable of supporting rainforest, to dry rocky gorges. Most of these communities occur as localised patches in other forest types. Examples include small stands (or groves) of native olive associated with rocky sites in wet sclerophyll forest; and she-oak forests on very dry hillsides.

Most of the communities have a high priority for conservation, because of their localised distribution. Some are associated with threatened species. The exception is silver wattle (*Acacia dealbata*) forest, which is found locally where inadequate regeneration of eucalypts has followed land clearing, wildfire or logging.

KEY TO OTHER FOREST OR SCRUB COMMUNITIES

Note: These communities may have a sparse (<5%) cover of eucalypts or other tree species.

- ❶ Bull-oak dominant DRY-LIT
- ❶ She-oak dominant
 - ❷ Non coastal environments DRY-VERT-inland
 - ❷ Coastal environments DRY-VERT-coastal
- ❶ Dogwood (native pear) dominant OTHER-03
- ❶ Blanket bush dominant OTHER-06
- ❶ Native olive (dorrel) dominant OTHER-07
- ❶ Silver wattle dominant OTHER-10
- ❶ Yellow bottlebrush (*Callistemon pallidus*) dominant OTHER-11
- ❶ Black wattle dominant, often with prickly box and scattered *E. viminalis* OTHER-12

CONSERVATION PRIORITIES AND ATTRIBUTES OF OTHER FOREST OR SCRUB COMMUNITIES

Note: * – Community identified as Rare, Vulnerable or Endangered at a Statewide level through RFA processes

Floristic community code and name		Qualification	RFA community code and name		Conservation priority		Distribution in Ben Lomond Region
					Floristic	RFA	
DRY-LIT	<i>Allocasuarina littoralis</i> forest		check	check	A	check	Local on dry sites on siliceous sediments and granite in lowland areas (e.g. Herrick, Gladstone, Lanka Road).
DRY-VERT coastal	Coastal <i>Allocasuarina verticillata</i> low forest		AV	<i>Allocasuarina verticillata</i> forest	A	Y	Local on exposed and often rocky coastal sites (e.g. Waterhouse Point, Ansons Bay).
DRY-VERT inland	Inland <i>Allocasuarina verticillata</i> low forest		AV	<i>Allocasuarina verticillata</i> forest	A	Y	Local on rocky and drought-prone dolerite sites (e.g. Tippogoree Hills, Red Hills). This community has displaced grassy eucalypt woodlands in some areas.
OTHER-03	<i>Pomaderris apetala</i> - <i>Beyeria viscosa</i> - <i>Asterotrichion discolor</i> closed forest/scrub	Site disturbed by heavy logging or clearing	varies	Treat as associated forest community or non-forest scrub (no referral needed)	np	N	Occasional where very poor eucalypt regeneration has occurred following logging or clearing of wet forest.
		Not as above	NP	<i>Notelaea ligustrina</i> and/or <i>Pomaderris apetala</i> closed forest	A	Y*	Shaded creeks and gullies in drier areas, but also occurring as localised patches on moist slopes (e.g. Moss Gully).
OTHER-06	<i>Bedfordia salicina</i> - <i>Olearia argophylla</i> closed forest/ scrub	Site disturbed by heavy logging or clearing	varies	Treat as associated forest community or non-forest scrub (no referral needed)	np	N	Occasional where very poor eucalypt regeneration has occurred following logging or clearing of wet forest.
		Not as above	—	None appropriate	A	—	Shaded creeks and gullies in drier areas, but also localised patches on moist slopes. Mainly on dolerite, in upland areas
OTHER-07	<i>Notelaea ligustrina</i> closed forest		NP	<i>Notelaea ligustrina</i> and/or <i>Pomaderris apetala</i> closed forest	A	Y*	Not recorded from region but likely to be present in rocky fire-shadow gullies and on rocky sites in wet forest.
OTHER-10	<i>Acacia dealbata</i> forest		SI	<i>Acacia dealbata</i> forest	np	N	Usually created by successive fires, poor eucalypt regeneration or failed attempts at clearing on moist sites. (e.g. Sideling, Cuckoo Hill, Diddleum, Mt Victoria).
OTHER-11	<i>Callistemon pallidus</i> closed forest		—	None appropriate	A	—	Isolated patches, mainly in upland areas (e.g. Mt Victoria).
OTHER-12	<i>Acacia mearnsii</i> forest/woodland		—	None appropriate	A	—	Typically occurs as grassy woodland on dry dolerite hills and slopes (e.g. Evandale area). Sometimes occurs as a scrub community invading paddocks.

2.4 MIXED FOREST COMMUNITIES

Major Reference: Kirkpatrick, Peacock, Cullen and Neyland (1988)

Mixed forest comprises vegetation with an understorey of rainforest species and an overstorey of eucalypts that becomes sparse as the forest approaches maturity. Often only one species of eucalypt is present, with trees frequently exceeding 50 m in mature forest. The eucalypts tend to be even-aged, and are usually of one or two age classes, which relate to period since fire or other major disturbance. Mixed forests have a minimum eucalypt canopy cover of 5% - if eucalypt cover is less than 5% the forest is considered as rainforest. Mixed forests represent a transition (in space or time) between the rainforests and the wet sclerophyll forests into which they grade. They also grade into swamp forest, riparian blackwood forest and tea-tree forests.

Mixed forests are moderately extensive in upland areas of Ben Lomond Region. In deeply dissected terrain they may form relatively narrow bands between rainforest and wet sclerophyll communities. Most communities are reserved, but those that have been extensively converted on more arable and fertile sites have a high priority for conservation (e.g. mixed forest dominated by *E. viminalis*).

KEY TO MIXED FOREST COMMUNITIES

- ❶ Dominated by *E. dalrympleana* WET-DAL10
- ❶ Dominated by *E. delegatensis*
 - ❷ Silver wattle, musk, dogwood or manfern common; waratah and mountain currant absent
 - ❸ Cutting grass common
 - ❹ Stinkwood, goldeywood or bracken common WET-DEL0111
 - ❹ Stinkwood, goldeywood and bracken sparse or absent WET-DEL1001
 - ❸ Cutting grass sparse or absent
 - ❹ Stinkwood or goldeywood common WET-DEL0111
 - ❹ Stinkwood and goldeywood sparse or absent
 - ❺ Silver wattle or bracken common
 - ❻ Sassafras more common than myrtle WET-DEL0110
 - ❻ Myrtle more common than sassafras WET-DEL1000
 - ❺ Silver wattle and bracken sparse or absent WET-DEL1000
 - ❷ Silver wattle, musk, dogwood and manfern sparse or absent; waratah or mountain currant present
 - ❸ Woolly tea-tree, bauera or cutting grass present; cathead fern absent WET-DEL1100
 - ❸ Woolly tea-tree, bauera and cutting grass absent; cathead fern often present WET-DEL1110
- ❶ Dominated by *E. obliqua*
 - ❷ Cutting grass, prickly mo or goldeywood present; epiphytic ferns usually sparse or absent WET-OB101
 - ❷ Cutting grass, prickly mo and goldeywood absent; epiphytic ferns usually common WET-OB1000
- ❶ Dominated by *E. regnans*
 - ❷ Silver wattle or blackwood present; broad-leaved shrub layer (e.g. dogwood, musk, *Cassinia trinerva*) usually well-developed WET-REG101
 - ❷ Silver wattle and blackwood absent; broad-leaved shrub layer sparse or absent WET-REG110
- ❶ Dominated by *E. viminalis* WET-VIM111

CONSERVATION PRIORITIES AND ATTRIBUTES OF MIXED FOREST COMMUNITIES

Note: * – Community identified as Rare, Vulnerable or Endangered at a Statewide level through RFA processes

Floristic community code and name		Qualification	RFA community code and name		Conservation priority		Distribution in Ben Lomond Region
					Floristic	RFA	
WET-DAL10	<i>E. dalrympleana</i> - <i>Tasmannia lanceolata</i> - <i>Dicksonia antarctica</i> mixed forest	Make sure dominant is not <i>E. viminalis</i> – contact FPA if unsure	DT	Tall <i>E. delegatensis</i> forest	B	N	Uncommon in region on fire-protected margins of creeks and gullies in upland areas (e.g. Mt Maurice).
WET-DEL0110	<i>E. delegatensis</i> - <i>Atherosperma moschatum</i> - <i>Olearia argophylla</i> wsf/mixed forest		DT	Tall <i>E. delegatensis</i> forest	np	N	Reasonably common in fire-protected slopes and deep gullies in upland areas, mainly on dolerite (e.g. Mt Barrow, Mt Victoria).
WET-DEL0111	<i>E. delegatensis</i> - <i>Zieria arborescens</i> - <i>Hydrocotyle sibthorpioides</i> wsf/mixed forest		DT	Tall <i>E. delegatensis</i> forest	np	N	Occasional in fire-protected slopes and deep gullies in upland areas, mainly on granite (e.g. Blue Tier).
WET-DEL1000	<i>E. delegatensis</i> - <i>Nothofagus cunninghamii</i> - <i>Grammitis billardierei</i> mixed forest		DT	Tall <i>E. delegatensis</i> forest	np	N	A late successional stage before rainforest, occasional on very humid and long-unburnt sites which have good drainage (e.g. Mt Maurice, Camden Plateau).
WET-DEL1001	<i>E. delegatensis</i> - <i>Nothofagus cunninghamii</i> - <i>Gahnia grandis</i> mixed forest		DT	Tall <i>E. delegatensis</i> forest	np	N	Similar environment to DEL1000, but on sites with poorer drainage.
WET-DEL1100	<i>E. delegatensis</i> - <i>Telopea truncata</i> - <i>Pittosporum bicolor</i> subalpine mixed forest		DT	Tall <i>E. delegatensis</i> forest	np	N	Higher altitude sites for <i>E. delegatensis</i> forest (e.g. upper slopes of Mt Maurice).
WET-DEL1110	<i>E. delegatensis</i> - <i>Hakea lissosperma</i> - <i>Monotoca glauca</i> mixed forest		DT	Tall <i>E. delegatensis</i> forest	np	N	Higher altitude sites for <i>E. delegatensis</i> forest, often on less fertile sites with impeded drainage (e.g. Ben Nevis area).
WET-OB1000	<i>E. obliqua</i> - <i>Nothofagus cunninghamii</i> - <i>Polystichum proliferum</i> - <i>Hymenophyllum flabellatum</i> mixed forest		OT	Tall <i>E. obliqua</i> forest	np	N	Relatively common on humid slopes and gullies with deep soils and good drainage (e.g. Mt Horror, lower slopes of Blue Tier, Lilydale Falls).
WET-OB101	<i>E. obliqua</i> - <i>Nothofagus cunninghamii</i> - <i>Monotoca glauca</i> mixed forest		OT	Tall <i>E. obliqua</i> forest	np	N	Relatively common on low to mid altitude sites often on drier sites and less fertile sites than WET-OB1000.(e.g. Mt Nicholas, lower slopes of Mt Maurice).

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Floristic community code and name		Qualification	RFA community code and name		Conservation priority		Distribution in Ben Lomond Region
					Floristic	RFA	
WET-REG101	<i>E. regnans</i> - <i>Atherosperma moschatum</i> - <i>Acacia dealbata</i> - <i>Olearia argophylla</i> wsf/mixed forest		R	<i>E. regnans</i> forest	np	N	Occasional in moist, fire-shadow slopes and gullies (e.g. Mt Horror, Tombstone Creek, Weld River).
WET-REG110	<i>E. regnans</i> - <i>Nothofagus cunninghamii</i> - <i>Atherosperma moschatum</i> mixed forest		R	<i>E. regnans</i> forest	A	N	Local in moist, fire-shadow slopes, gullies and creeklines (e.g. lower slopes of Blue Tier, Tombstone Creek).
WET-VIM111	<i>E. viminalis</i> - <i>Nothofagus cunninghamii</i> - <i>Atherosperma moschatum</i> - <i>Dicksonia antarctica</i> mixed forest		VW	<i>E. viminalis</i> wet forest	A	Y*	Local in humid, fire-shadow sites associated with gullies and fertile river flats (e.g. Tombstone Creek, Evercreech FR).

2.5 WET SCLEROPHYLL FOREST COMMUNITIES

Major Reference: Kirkpatrick, Peacock, Cullen and Neyland (1988)

Wet sclerophyll forests are typically dominated by eucalypts and have an understorey dominated by broad-leaved (soft-leaved) shrubs. Trees in mature forest generally exceed 40 m. Wet sclerophyll forests typically contain only one or two eucalypt age classes - these relate to period since fire or other major disturbance (including intensive logging and regeneration burning). Often only one species of eucalypt is present. The shrub layer is generally dense, preventing continuous regeneration of shade-intolerant species such as eucalypts. Ferns are often prominent in the ground layer.

Wet sclerophyll communities are extensive in Ben Lomond Region, particularly in higher rainfall areas. They are also common in shaded and fire-shadow environments in drier parts of the region. Wet sclerophyll forest grades into mixed forest (as rainforest species become more prominent in the understorey) and into dry sclerophyll forest (often through a damp sclerophyll transition zone) as sites become more exposed to drought and fire.

Most wet sclerophyll forest communities are well reserved, but some that have been extensively converted on more arable and fertile sites have a high priority for conservation (e.g. *E. viminalis* wet sclerophyll forest communities).

KEY TO WET SCLEROPHYLL FOREST COMMUNITIES

❶ Dominated by *E. amygdalina*

- ❷ Manfern, dogwood or goldeywood common; narrow-leaved shrubs and
sagg sparse or absent; moister sites WET-AM0
- ❷ Manfern, dogwood and goldeywood sparse or absent; narrow-leaved shrubs or
sagg usually common; drier sites WET-AM1

❶ Dominated by *E. brookeriana*

- ❷ Blanket bush, musk or bracken common; prickly mo and sword sedge sparse or absent WET-BR11
- ❷ Blanket bush, musk and bracken sparse or absent; prickly mo or sword sedge common WET-BR2

❶ Dominated by *E. dalrympleana*

- ❷ Guitar plant, prickly beauty or sagg common; manfern and musk absent WET-DAL00
- ❷ Guitar plant, prickly beauty and sagg sparse or absent; manfern or musk often present..... WET-DAL01

❶ Dominated by *E. delegatensis*

- ❷ Guitar plant or prickly beauty common
 - ❸ Mountain currant, waratah or tussock grass common; rocky subalpine sites
 - ❹ Waratah present; viscid daisy bush and flax lily absent..... WET-DEL0011
 - ❹ Waratah sparse or absent; viscid daisy bush or flax lily present WET-DEL0010
 - ❸ Mountain currant, waratah and tussock grass sparse or absent; not on rocky subalpine sites
 - ❹ Dogwood, manfern or cutting grass common
 - ❺ Stinkwood or goldeywood common; blanket bush absent WET-DEL0111
 - ❺ Stinkwood and goldeywood sparse or absent; blanket bush often present WET-DEL0100
 - ❹ Dogwood, manfern and cutting grass sparse or absent
 - ❺ Silver wattle or native currant common; blackwood, kangaroo fern,
dwarf musk or dolly bush sparse or absent WET-DEL0000
 - ❺ Silver wattle and native currant sparse or absent; blackwood,
kangaroo fern, dwarf musk and dolly bush common WET-DEL0001

- ② Guitar plant and prickly beauty sparse or absent
 - ③ Cutting grass or sword sedge common
 - ④ Woolly tea-tree common; goldeywood or stinkwood sparse or absent WET-DEL3
 - ④ Woolly tea-tree sparse or absent; goldeywood or stinkwood common WET-DEL0111
 - ③ Cutting grass and sword sedge sparse or absent
 - ④ Mountain currant, waratah or tussock grass common; rocky subalpine sites
 - ⑤ Waratah present; viscid daisy bush and flax lily absent..... WET-DEL0011
 - ⑤ Waratah sparse or absent; viscid daisy bush or flax lily present..... WET-DEL0010
 - ④ Mountain currant, waratah and tussock grass sparse or absent; not on rocky subalpine sites
 - ⑤ Dwarf musk, viscid daisy bush or bracken common; drier sites..... WET-DEL0101
 - ⑤ Dwarf musk, viscid daisy bush and bracken sparse or absent; moister sites (myrtle or sassafras may be present)..... WET-DEL0110
- ① Dominated by *E. globulus*
 - ② Blanket bush, pinkwood or cutting grass common; manfern and kangaroo fern sparse or absent
 - ③ Blanket bush or pinkwood common, tea-tree, paperbark and blackwood sparse or absent WET-GLOB0100
 - ③ Blanket bush and pinkwood sparse or absent; tea-tree, paperbark or blackwood common..... WET-GLOB0101
 - ② Blanket bush, pinkwood and cutting grass sparse or absent; manfern or kangaroo fern often common WET-GLOB001
- ① Dominated by *E. obliqua*
 - ② Guitar plant or prickly beauty common; drier sitesWET-OB010
 - ② Guitar plant and prickly beauty sparse or absent; moister sites
 - ③ Paperbark, tea-tree, sword sedge or cutting grass commonWET-OB0111
 - ③ Paperbark, tea-tree, sword sedge and cutting grass sparse or absent.....WET-OB0110
- ① Dominated by *E. ovata*
 - ② Understorey dominated by paperbarks or tea-trees; cutting grass or sword sedge usually common..... WET-OV00
 - ② Understorey dominated by broad-leaved shrubs; cutting grass and sword sedge usually sparse or absent WET-OV01
- ① Dominated by *E. regnans*
 - ② Bracken, cutting grass or sword sedge common; (myrtle or sassafras generally absent)
 - ③ Dwarf musk, *Cassinia trinerva* or dolly bush common WET-REG1000
 - ③ Dwarf musk, *Cassinia trinerva* and dolly bush sparse or absent WET-REG1001
 - ② Bracken, cutting grass and sword sedge sparse or absent; (myrtle or sassafras often present) WET-REG101
- ① Dominated by *E. sieberi* WET-SIEB01
- ① Dominated by *E. viminalis*
 - ② Paperbark or tea-tree common; *E. ovata* often present; poorly drained sites..... WET-VIM2
 - ② Paperbark or tea-tree sparse or absent; *E. ovata* absent; well-drained sites
 - ③ Native cherry, guitar plant or little prickly common; drier sites WET-VIM0011
 - ③ Native cherry, guitar plant and little prickly sparse or absent; moister sites
 - ④ Prickly mo or dolly bush common; blanket bush and manfern sparse or absent WET-VIM0100
 - ④ Prickly mo and dolly bush sparse or absent; blanket bush or manfern common. WET-VIM0101

CONSERVATION PRIORITIES AND ATTRIBUTES OF WET SCLEROPHYLL FOREST COMMUNITIES

Note: * – Community identified as Rare, Vulnerable or Endangered at a Statewide level through RFA processes

Floristic community code and name		Qualification	RFA community code and name		Conservation priority		Distribution in Ben Lomond Region
					Floristic	RFA	
WET-AM0	<i>E. amygdalina</i> - <i>Monotoca glauca</i> - <i>Pomaderris apetala</i> - <i>Dicksonia antarctica</i> wsf/mixed forest		check	check	check	check	Local on locally humid sites in predominantly dry forest dominated by <i>E. amygdalina</i> (e.g. Scamander Tier).
WET-AM1	<i>E. amygdalina</i> - <i>E. viminalis</i> - <i>Lomandra longifolia</i> wsf	On dolerite	AD	<i>E. amygdalina</i> forest on dolerite	np	N	Mainly on damp dolerite slopes (e.g. East Tamar area).
		On other substrates	check	check	check	check	Localised, mainly in moist sites in drier areas.
WET-BR11	<i>E. brookeriana</i> - <i>E. obliqua</i> - <i>Bedfordia salicina</i> wsf		BA	<i>E. brookeriana</i> wet forest	A	Y*	Uncommon in Ben Lomond Region, in damp but well drained gullies and slopes (e.g. Mt Nicholas, St Patricks Head, St Marys Pass).
WET-BR2	<i>E. brookeriana</i> - <i>Leptospermum</i> species - <i>Lepidosperma elatius</i> wsf		BA	<i>E. brookeriana</i> wet forest	A	Y*	Local on poorly drained flats (e.g. St Marys Pass).
WET-DAL00	<i>E. dalrympleana</i> / <i>E. delegatensis</i> - <i>Lomatia tinctoria</i> wsf	Make sure dominant is not <i>E. viminalis</i> – contact FPA if unsure.	DT	Tall <i>E. delegatensis</i> forest	B	N	Rocky dolerite gullies in dry escarpments of the northern Midlands; may extend into Ben Lomond.
WET-DAL01	<i>E. dalrympleana</i> - <i>Pomaderris apetala</i> - <i>Bedfordia salicina</i> wsf		DT	Tall <i>E. delegatensis</i> forest	B	N	Uncommon in region, mainly around river flats and gullies at higher altitudes (e.g. Mt Barrow).
WET-DEL0000	<i>E. delegatensis</i> - <i>Bedfordia salicina</i> - <i>Lomatia tinctoria</i> wsf		DT	Tall <i>E. delegatensis</i> forest	np	N	Common on rocky dolerite sites (e.g. Ben Lomond NP, Mt Barrow), may occur on other substrates.
WET-DEL0001	<i>E. delegatensis</i> - <i>Acacia melanoxylon</i> - <i>Bedfordia salicina</i> wsf		DT	Tall <i>E. delegatensis</i> forest	np	N	Scree and boulder slopes on drier mountains (e.g. Nicholas Range).
WET-DEL0010	<i>E. delegatensis</i> - <i>Olearia phlogopappa</i> - <i>Olearia viscosa</i> wsf		DT	Tall <i>E. delegatensis</i> forest	np	N	Local on rocky high altitude slopes and boulder fields (e.g. Mt Nicholas).
WET-DEL0011	<i>E. delegatensis</i> - <i>Telopea truncata</i> wsf		DT	Tall <i>E. delegatensis</i> forest	np	N	Occasional on higher altitude sites, mainly rocky dolerite sites (e.g. Ben Lomond, Mt Barrow).
WET-DEL0100	<i>E. delegatensis</i> - <i>E. viminalis</i> - <i>Acacia melanoxylon</i> wsf		DT	Tall <i>E. delegatensis</i> forest	B	N	Occasional on shaded and sometimes disturbed sites at the lower altitudinal limit of <i>E. delegatensis</i> (e.g. Burns Creek area)..

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Floristic community code and name		Qualification	RFA community code and name		Conservation priority		Distribution in Ben Lomond Region
					Floristic	RFA	
WET-DEL0100	<i>E. delegatensis</i> - <i>E. viminalis</i> - <i>Acacia melanoxydon</i> wsf		DT	Tall <i>E. delegatensis</i> forest	B	N	Occasional on shaded and sometimes disturbed sites at the lower altitudinal limit of <i>E. delegatensis</i> (e.g. Burns Creek area)..
WET-DEL0101	<i>E. delegatensis</i> - <i>E. obliqua</i> - <i>Acaena novae-zelandiae</i> wsf		DT	Tall <i>E. delegatensis</i> forest	np	N	Occurs at the lower altitude limit of <i>E. delegatensis</i> , commonly forming a transition zone with <i>E. obliqua</i> wet sclerophyll forest.
WET-DEL0110	<i>E. delegatensis</i> - <i>Atherosperma moschatum</i> - <i>Olearia argophylla</i> wsf/mixed forest		DT	Tall <i>E. delegatensis</i> forest	np	N	Upland drainage headwaters, creeklines and shaded slopes, often grades into mixed forest (e.g. Mt Barrow, Mathinna Falls, Mt Maurice).
WET-DEL0111	<i>E. delegatensis</i> - <i>Zieria arborescens</i> - <i>Hydrocotyle sibthorpioides</i> wsf/mixed forest		DT	Tall <i>E. delegatensis</i> forest	B	N	Occasional in the higher altitude parts of region on less fertile sites such as granite and sandstone (e.g. Blue Tier).
WET-DEL3	<i>E. delegatensis</i> - <i>Leptospermum lanigerum</i> - <i>Gahnia grandis</i> wsf		DT	Tall <i>E. delegatensis</i> forest	np	N	Local in drainage headwaters and poorly drained saddles (e.g. Roses Tier, Camden Plateau).
WET-GLOB001	<i>E. globulus</i> - <i>Dicksonia antarctica</i> - <i>Ctenopteris heterophylla</i> wsf		R	<i>E. regnans</i> forest	A	N	May occur locally on sheltered slopes and gullies in SE of region (e.g. St Marys Pass).
WET-GLOB0100	<i>E. globulus</i> - <i>Bedfordia salicina</i> - <i>Beyeria viscosa</i> wsf		R	<i>E. regnans</i> forest	B	N	Occasional on shaded slopes and gully flanks in SE of region (e.g. St Marys Pass, Germantown).
WET-GLOB0101	<i>E. globulus</i> - <i>Acacia dealbata</i> - <i>Acacia melanoxydon</i> - <i>Cassinia aculeata</i> wsf		R	<i>E. regnans</i> forest	B	N	Not recorded from region, but may occur locally on sheltered slopes and gullies in SE (e.g. St Marys Pass).
WET-OB010	<i>E. obliqua</i> - <i>Olearia lirata</i> - <i>Pultenaea juniperina</i> wsf		OT	Tall <i>E. obliqua</i> forest	np	N	Common on fairly dry sites (e.g. Doctors Peak); often intermediate community between wet and dry sclerophyll forests.
WET-OB0110	<i>E. obliqua</i> - <i>Acacia dealbata</i> - <i>Olearia argophylla</i> wsf		OT	Tall <i>E. obliqua</i> forest	np	N	Widespread on moist slopes and gully flanks at lower altitudes (e.g. Mt Cameron, Mathinna Falls, Mt Horror, Scamander area).
WET-OB0111	<i>E. obliqua</i> - <i>Melaleuca squarrosa</i> - <i>Monotoca glauca</i> wsf		OT	Tall <i>E. obliqua</i> forest	np	N	Wet or poorly drained sites; particularly along creeks (e.g. Lefroy area, Boobyalla River).
WET-OV00	<i>E. ovata</i> - <i>Leptospermum</i> species - <i>Melaleuca</i> species wsf		OV	Shrubby <i>E. ovata</i> - <i>E. viminalis</i> forest	A	Y*	Local on poorly drained lowland flats, which have escaped fire for a long period.

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Floristic community code and name		Qualification	RFA community code and name		Conservation priority		Distribution in Ben Lomond Region
					Floristic	RFA	
WET-OV01	<i>E. ovata</i> - <i>Acacia dealbata</i> - <i>Pomaderris apetala</i> wsf		OV	Shrubby <i>E. ovata</i> - <i>E. viminalis</i> forest	A	Y*	Local on shaded or fertile lowland flats, drainage fair (e.g. Little Boobyalla flats).
WET-REG1000	<i>E. regnans</i> - <i>E. obliqua</i> - <i>Pomaderris apetala</i> - <i>Olearia lirata</i> wsf		R	<i>E. regnans</i> forest	np	N	Local on shaded slopes in transition zone between <i>E. obliqua</i> and <i>E. regnans</i> wsf (e.g. Mt Horror, Weld River). Mainly occurs as regrowth.
WET-REG1001	<i>E. regnans</i> - <i>Acacia dealbata</i> - <i>Pomaderris apetala</i> wsf		R	<i>E. regnans</i> forest	np	N	Sheltered slopes and gullies in drier areas but extending to drier sites in high rainfall areas. Often occurs as a regrowth community (e.g. Sideling).
WET-REG101	<i>E. regnans</i> - <i>Atherosperma moschatum</i> - <i>Acacia dealbata</i> - <i>Olearia argophylla</i> wsf		R	<i>E. regnans</i> forest	np	N	Very humid slopes and gullies, often with deep soils in higher rainfall areas (eg Tombstone Creek, Mt Horror, Blue Tier). Grades into mixed forest.
WET-SIEB01	<i>E. sieberi</i> - <i>Olearia argophylla</i> - <i>Coprosma quadrifida</i> wsf/mixed forest	Substrate granite	SG	<i>E. sieberi</i> forest on granite	B	Yog	Restricted to deep valleys and wet, fire-protected gullies on granite and Mathinna beds, often forming a sharp boundary with <i>E. sieberi</i> dry sclerophyll forest (e.g. Beahrs Creek area).
		Substrate not granite	SO	<i>E. sieberi</i> forest on other substrates	B	Yog	
WET-VIM0011	<i>E. viminalis</i> - <i>Bedfordia salicina</i> - <i>Pultenaea juniperina</i> wsf	<i>E. amygdalina</i> or <i>E. obliqua</i> codominant or subdominant	DSC	<i>E. viminalis</i> - <i>E. ovata</i> - <i>E. amygdalina</i> - <i>E. obliqua</i> damp sclerophyll forest	A	Yog	Wet sclerophyll - dry sclerophyll transition community found locally on dolerite and mudstone slopes (e.g. Avenue River).
		Not DSC	VW	<i>E. viminalis</i> wet forest	A	Y*	
WET-VIM0100	<i>E. viminalis</i> - <i>Acacia dealbata</i> - <i>Pomaderris apetala</i> wsf		VW	<i>E. viminalis</i> wet forest	A	Y*	Local on moist, fertile sites often associated with river flast (e.g. Gleadow Creek, St Marys Pass).
WET-VIM0101	<i>E. viminalis</i> - <i>Acacia dealbata</i> - <i>Dicksonia antarctica</i> wsf		VW	<i>E. viminalis</i> wet forest	A	Y*	Local on humid slopes or creeklines, often associated with fertile substrates (e.g. Evercreech). Previously extensive on basalt in Scottsdale area.
WET-VIM2	<i>E. viminalis</i> - <i>Leptospermum lanigerum</i> - <i>Melaleuca squarrosa</i> wsf		OV	Shrubby <i>E. ovata</i> - <i>E. viminalis</i> forest	A	Y*	Not recorded from region but may occur locally on better-drained sites adjacent to flats with <i>E. ovata</i> forest.

2.6 DRY SCLEROPHYLL FOREST AND WOODLAND COMMUNITIES

Major Reference: Duncan and Brown (1985)

Dry sclerophyll forests and woodlands are typically dominated by eucalypts under 40 m in height, and have a multi-layered understorey dominated by hard-leaved shrubs, including eucalypt regeneration. The eucalypts often form mixed species stands, and generally several age classes of eucalypts are present. The ground layer varies, but bracken, grasses and graminoids (sedges) are typical components. Many grassy communities are described in Kirkpatrick, Gilfedder and Fensham (1988).

Dry sclerophyll forest communities are classified by their overstorey dominants and the broad characteristics of their understorey. The understorey types are grassy (g), sedgy (sd), scrubby (sc), shrubby (sh) and heathy (h): they are described below. Inevitably, many areas will support vegetation with intermediate understoreys. FPOs need to use a precautionary approach when determining the conservation priority of such forests. Land use practices (e.g. frequent or recent firing) can also modify the structure or composition of dry sclerophyll understoreys. For example, frequent firing can lead to bracken displacing a diverse heathy understorey. FPOs should allow for land use practices when determining floristic communities.

Dry sclerophyll forests and woodlands are widespread in less fertile, drier or more exposed environments in Ben Lomond Region. They comprise much of the coastal and hinterland (subcoastal) country (particularly on siliceous sediments and granite) and dry slopes and ridges in the dissected lowland hills (on a range of substrates). They also occurred extensively on flats (now mainly cleared) and lower slopes associated with the broad valleys of the Midlands, and Tamar and Esk catchments. Dry sclerophyll communities tend to form a mosaic with wetter forest types at intermediate altitudes, but often reassume dominance on exposed sites at higher altitudes (mainly on dolerite). Dry sclerophyll forest grades into wet sclerophyll forest (often through a damp sclerophyll transition zone) as sites become progressively more humid and less frequently burnt. As the environment becomes drier or more limiting to tree growth, dry sclerophyll forests grade into woodland, scrub, heath, grassland and sedgeland, depending on site characteristics. Some dry sclerophyll communities, mainly associated with arable sites, have been extensively cleared or modified and have a high priority for conservation.

There are difficulties with allocating some dry sclerophyll floristic communities to RFA communities. These problem communities are not encountered in many FPP areas. The tables indicate when FPOs need to check with FPA for guidance on community affinities, priorities and prescriptions. In Ben Lomond Region, there are also problems with classifying *E. amygdalina*-dominated forests occurring on sediments of the Mathinna Group. This is discussed in more detail after the *Key to dry sclerophyll forest and woodland communities*.

Many lowland dry sclerophyll communities in Ben Lomond Region, particularly on siliceous substrates and poorly drained sites, are highly susceptible to *Phytophthora cinnamomi*. These are indicated in the tables. Specialist advice will be needed if prescriptions in *Flora Technical Note 8* cannot be applied to operations in these communities.

RECOGNISING THE DIFFERENT DRY SCLEROPHYLL UNDERSTOREYS

Each understorey type is recognised by the dominance or prominence of a distinctive suite of species. Species from other understorey types may also be present, and these communities will grade into one another in some situations, so it is important to note which species are the most dominant, rather than just which species are present. Eucalypt regrowth can be present in all understorey types.

Grassy forests

Grasses or saggs are the dominant or most prominent feature of the understorey. Typical species include tussock grass, kangaroo grass, wallaby grass and sagg (*Lomandra longifolia*). Note that buttongrass and cutting grass are actually sedges, and forests with understoreys dominated by these species should be considered as sedgy communities. The ground layer generally contains a high diversity of herbs, most evident when they are flowering in spring and summer. Small trees and shrubs (e.g. black wattle, she-oak, prickly box) are widespread on drier lowland sites. The eucalypt canopy is often fairly open; common species in Ben Lomond Region include *E. delegatensis*, *E. amygdalina* and *E. viminalis*.

Grassy forests are often found on fertile substrate (e.g. basalt, dolerite) and well drained sites, such as on slopes adjacent to the Midlands and Fingal Valley.

Sedgy forests

Sedges or rushes are the dominant or most prominent feature of the understorey. Typical species include cutting sedge, sword sedge, buttongrass, cutting grass and rushes. Coral ferns are often present. Shrubs such as tea-trees and paperbarks are generally present. The eucalypt canopy is fairly open. Common species in Ben Lomond Region include *E. amygdalina* and *E. ovata*. Sedgy forests grade into scrubby forests as shrub cover increases (in the absence of fire) and sedges reduce in cover. Sedgy forests occur on sites with impeded drainage, often on sites that have been burnt frequently or recently.

Scrubby forests

Shrubs (typically tea-trees and paperbarks) are the dominant or most prominent feature of the understorey. They form a moderately dense to dense cover, generally over a sedgy ground layer. Other common shrub species include prickly mo, banksia, hakea and a range of legumes and heath species. The ground layer contains species typical of sedgy forest, though it is generally sparser, particularly under a dense shrub layer. The eucalypt canopy is typically fairly open. Common species in Ben Lomond Region include *E. amygdalina* and *E. ovata*. Scrubby forests mainly occur on flats with impeded drainage, generally on sites that have not been burnt or severely disturbed for many years. They often intergrade or form a mosaic with sedgy communities.

Heathy forests

Shrubs less than 2 m in height are the dominant or most prominent feature of the understorey, though in frequently burnt sites this shrub layer can be displaced by bracken. Occasional taller shrubs are also often present in heathy forests. Shrub species include many heaths (e.g. *Epacris* species), legumes, wattles, bull-oak, banksia, tea-trees and grasstree (*Xanthorrhoea* species). Bracken is the most widespread ground layer species, but sags, sedges and colourful herbs (e.g. orchids, lilies) are often conspicuous. Eucalypt height and density varies in response to site conditions, but common species in Ben Lomond Region include *E. amygdalina* and *E. viminalis*. Heathy forests are generally found on well drained sites on infertile or siliceous substrates (e.g. sands, sandstone, quartzite, granite).

Shrubby forests

Shrubs more than 2 m in height are the dominant or most prominent feature of the understorey. Several shrub layers are often present, often containing a mixture of wet sclerophyll (broad-leaved) and dry sclerophyll (narrow-leaved) shrubs. Shrubby forests are synonymous with damp sclerophyll forests when wet sclerophyll and dry sclerophyll shrubs are present in similar proportions. Shrub species present vary greatly, depending on site conditions. Common species include native cherry, wattles, blanket bush, dolly bush, banksia, hop bush, prickly beauty, guitar plant and hakea. Ground layer species include bracken and other ferns, flax lily, sagg and grasses, though their cover is often sparse. Eucalypts are typically taller and denser than in other dry sclerophyll forest communities. In Ben Lomond Region they include *E. obliqua*, *E. delegatensis* on moist sites and *E. amygdalina* on drier sites. Shrubby forests tend to occupy more fertile sites, or more shaded and humid environments, than other dry sclerophyll types.

KEY TO DRY SCLEROPHYLL FOREST AND WOODLAND COMMUNITIES

Note: Exclude eucalypt regeneration in assessing dominance of understorey layers.

- ❶ Understorey dominated by grasses and sags; small trees or shrubs generally sparse; mainly on drier sites on basalt, dolerite or other fertile substrates
 - ❷ *E. amygdalina* dominant DRY-gAM
 - ❷ *E. dalrympleana* dominant DRY-gDAL
 - ❷ *E. delegatensis* dominant DRY-gDEL
 - ❷ *E. globulus* dominant DRY-gGLOB
 - ❷ *E. ovata* dominant DRY-gOV
 - ❷ *E. pauciflora* dominant DRY-gPAUC
 - ❷ *E. rodwayi* dominant DRY-gROD
 - ❷ *E. rubida* dominant DRY-gRUB

- ② *E. viminalis* dominant DRY-gVIM
- ① Understorey dominated by sedges, cutting grass or buttongrass or tea-trees or paperbarks; mainly on sites with impeded drainage (e.g. flats and marsh edges)
 - ② Sedges, cutting grass or buttongrass prominent
 - ③ *E. amygdalina* dominant DRY-sdAM
 - ③ *E. gunnii* dominant DRY-sdGUN
 - ③ *E. ovata* dominant DRY-sdOV
 - ③ *E. rodwayi* dominant DRY-sdROD
 - ② Tea-trees or paperbarks prominent
 - ③ *E. amygdalina* dominant DRY-scAM
 - ③ *E. gunnii* dominant DRY-scGUN
 - ③ *E. ovata* dominant DRY-scOV
 - ③ *E. rodwayi* dominant DRY-scROD
- ① Understorey dominated by bracken or low shrubs (generally less than 2 m), notably heaths, legumes, wattles, tea-trees, bull-oak and banksia; mainly on well drained sites on granite, sands, sandstone and other sediments
 - ② *E. amygdalina* dominant DRY-hAM
 - ② *E. globulus* dominant DRY-hGLOB
 - ② *E. obliqua* dominant DRY-hOB
 - ② *E. pauciflora* dominant DRY-hPAUC
 - ② *E. sieberi* dominant DRY-hSIEB
 - ② *E. viminalis* dominant DRY-hVIM
- ① Understorey dominated by shrubs over 2 m (excluding tea-trees and paperbarks), often including broad-leaved species; bracken or other ferns sometimes dense; mainly on well drained or sheltered sites of moderate fertility
 - ② *E. amygdalina* dominant DRY-shAM
 - ② *E. dalrympleana* dominant DRY-shDAL
 - ② *E. delegatensis* dominant DRY-shDEL
 - ② *E. globulus* dominant DRY-shGLOB
 - ② *E. obliqua* dominant DRY-shOB
 - ② *E. pauciflora* dominant DRY-shPAUC
 - ② *E. sieberi* dominant DRY-shSIEB
 - ② *E. viminalis* dominant DRY-shVIM

Note on Mathinna series substrate:

The Mathinna Group comprises siliceous (sandstone) and argillaceous (mudstone) sequences of Ordovician and Devonian origin, which are widespread in Ben Lomond Region. Allocating *E. amygdalina*-dominated forests on Mathinna series substrate has proved difficult, and has not been satisfactorily addressed in the RFA. *E. amygdalina* forests on Mathinna sediments in lowland parts of the region have strong affinities with the RFA community “coastal *E. amygdalina* forest”, while those in more inland and upland areas can be allocated to several communities, depending on species composition and structure.

Different rules have been adopted to allocate RFA communities and priorities for *E. amygdalina* forests on Mathinna series substrate (see tables). The determining factor is the FPPs location in the Region.

Northern Mathinna series: This comprises all Mathinna series substrate in Ben Lomond Region that is below 300 m altitude and is north of the Tasman Highway between Launceston and St Helens.

Southern Mathinna series: This comprises all Mathinna series substrate in Ben Lomond Region that is above 300 m altitude or is south of the Tasman Highway between Launceston and St Helens.

CONSERVATION PRIORITIES AND ATTRIBUTES OF DRY SCLEROPHYLL FOREST / WOODLAND COMMUNITIES

Notes: 1 – See comments on Mathinna series substrate on page 29;

– Community highly susceptible to *Phytophthora cinnamomi* – specialist advice needed if prescriptions in *Flora Technical Note 8* cannot be applied

* – Community identified as Rare, Vulnerable or Endangered at a Statewide level through RFA processes

Floristic community code and name		Qualification		RFA community code and name		Conservation priority		Distribution in Ben Lomond Region
						Floristic	RFA	
DRY-gAM	Grassy <i>E. amygdalina</i> forest/woodland	Substrate sand, alluvium, Tertiary gravels or ironstone (non-coastal areas)		AIC	Inland <i>E. amygdalina</i> forest on Cainozoic deposits	A	Y*	Local on broad valley flats (e.g. Fingal Valley, North Esk Valley, South Esk Valley).
		Substrate dolerite (or basalt)	Not associated with AIC	AD	<i>E. amygdalina</i> forest on dolerite	np	N	Widespread on dolerite landforms, especially East Tamar area and South Esk catchment (e.g. Temple Bar, The Retreat).
			Occurs with AIC	check	check	check	check	Local on lower slopes and flats (e.g. Camelford).
		Substrate other (mainly mudstone)		check	check	check	check	Local on dry sites (e.g. Blessington area, Fingal Valley).
DRY-gDAL	Grassy <i>E. dalrympleana</i> forest/woodland	Make sure dominant is not <i>E. viminalis</i> - contact FPA if unsure.		D	Dry <i>E. delegatensis</i> forest	B	N	Local on well drained slopes and flats at higher altitudes (e.g. Ben Nevis area); often associated with dry <i>E. delegatensis</i> forest.
DRY-gDEL	Grassy <i>E. delegatensis</i> forest/woodland			D	Dry <i>E. delegatensis</i> forest	np	N	Occasional on cool, dry upland dolerite slopes and tier surfaces (e.g. Mt Barrow, Nicholas Range); also local on granite (e.g. Camden Plateau).
DRY-gGLOB	Grassy <i>E. globulus</i> forest			GG	Grassy <i>E. globulus</i> forest	A	Y*	Local on dolerite or granite mainly in coastal and subcoastal areas south of St Helens.
DRY-gOV	Grassy <i>E. ovata</i> forest/woodland			OV	Shrubby <i>E. ovata</i> - <i>E. viminalis</i> forest	A [#]	Y*	Local on lowland flats with impeded drainage, often frequently fired (e.g. East Tamar area).
DRY-gPAUC	Grassy <i>E. pauciflora</i> forest/woodland	Substrate dolerite (or basalt)		PJ	<i>E. pauciflora</i> forest on Jurassic dolerite	B	Yog	Frost hollows and flats, mainly on well drained sites (e.g. Ben Lomond Rivulet).
		Substrate other		check	check	check	check	Occasional, mainly on sediments.
DRY-gROD	Grassy <i>E. rodwayi</i> forest/woodland			RO	<i>E. rodwayi</i> forest	A	Y	Local on poorly drained flats and frost hollows, (e.g. eastern Midlands, South Esk Valley).
DRY-gRUB	Grassy <i>E. rubida</i> forest/woodland			V	<i>E. viminalis</i> grassy forest/woodland	A	Y	Local on better-drained flats and frost hollows in drier inland areas (e.g. Beauty Flats).

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Floristic community code and name		Qualification	RFA community code and name		Cons. priority		Distribution in Ben Lomond Region
					Floristic	RFA	
DRY-gVIM	Grassy <i>E. viminalis</i> forest/woodland	Substrate dolerite (or basalt)	V	<i>E. viminalis</i> grassy forest/woodland	A	Y	Common on dolerite slopes, flats and ridges (e.g. Temple Bar, The Retreat).
		Substrate sand, alluvium, Tertiary gravels or ironstone (non-coastal areas)	AIC	Inland <i>E. amygdalina</i> forest on Cainozoic deposits	A	Y*	Local on broad valley flats (e.g. Fingal Valley, North Esk Valley, South Esk Valley).
		Substrate other (mainly mudstone)	check	check	check	check	Occasional, mainly on sediments. Generally associated with <i>E. amygdalina</i> forest.
DRY-hAM	Heathy <i>E. amygdalina</i> forest	Substrate sand or alluvium in (sub)coastal areas, <u>or</u> granite <u>or</u> northern Mathinna series ¹	AC	Coastal <i>E. amygdalina</i> forest	np [#]	N	Widespread on sand and granite in coastal areas (e.g. Waterhouse, Lefroy, Mt William) but also local in inland areas (e.g. Castle Cary).
		Substrate sandstone (mainly Triassic, also southern Mathinna series ¹)	AS	<i>E. amygdalina</i> forest on sandstone	A [#]	N	Mainly occurs on Triassic sandstone (e.g. Blessington area) but also local on Mathinna sandstone (e.g. Mangana, Avenue catchment).
		Substrate sand, alluvium, Tertiary gravels or ironstone (non-coastal areas)	AIC	Inland <i>E. amygdalina</i> forest on Cainozoic deposits	A	Y*	Localised on broad valley flats (e.g. Fingal Valley, North Esk Valley, South Esk Valley).
		Substrate mudstone or southern Mathinna series ¹	AM	<i>E. amygdalina</i> forest on mudstone	check	check	Common on dry slopes and ridges (e.g. Mathinna, Rossarden).
DRY-hGLOB	Heathy <i>E. globulus</i> forest		G	<i>E. viminalis</i> and/or <i>E. globulus</i> coastal shrubby forest	A [#]	Y*	May occur locally on well drained sites on Recent sand (or occasionally granite) in coastal areas (e.g. St Helens Point, Scamander).
DRY-hOB	Heathy <i>E. obliqua</i> forest		O	Dry <i>E. obliqua</i> forest	np [#]	N	Mainly on siliceous sites in coastal and subcoastal areas (e.g. Boobyalla, Tomahawk, Mt William).
DRY-hOV	Heathy <i>E. ovata</i> forest/woodland		OV	Shrubby <i>E. ovata</i> - <i>E. viminalis</i> forest	A [#]	Y*	Local on poorly drained flats, mainly in coastal areas (e.g. Tomahawk, Cape Portland).
DRY-hPAUC	Heathy <i>E. pauciflora</i> forest	Substrate mudstone or southern Mathinna series ¹	PS	<i>E. pauciflora</i> forest on sediments	B [#]	N	Local on dry frost-hollows and benches (e.g. Rossarden area, Aberfoyle).
		Substrate sand, alluvium, Tertiary gravels or ironstone (non-coastal areas)	AIC	Inland <i>E. amygdalina</i> forest on Cainozoic deposits	A	Y*	May occur locally on broad valley flats in inland areas (e.g. Fingal Valley, North Esk Valley, South Esk Valley).
		Substrate other (mainly sand or alluvium in (sub)coastal areas	check	check	check	check	Mainly remnants on well-drained flats receiving cold air drainage (e.g. Great Northern Plain.).

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Floristic community code and name		Qualification	RFA community code and name		Cons. priority		Distribution in Ben Lomond Region
					Floristic	RFA	
DRY-hSIEB	Heathy <i>E. sieberi</i> forest		SG	<i>E. sieberi</i> forest on granite	np [#]	Yog	Common on granite in coastal and subcoastal sites in the St Helens - Scamander area.
DRY-hVIM	Heathy <i>E. viminalis</i> forest	Substrate coastal sand	G	<i>E. viminalis</i> and/or <i>E. globulus</i> coastal shrubby forest	A [#]	Y*	Local on well drained sites on Recent sand in coastal areas (e.g. Tomahawk, Waterhouse).
		Substrate granite or (sub)coastal gravels	AC	Coastal <i>E. amygdalina</i> forest	B [#]	N	Local on granite, mainly in subcoastal areas (e.g. lower Wyniford River, Gladstone).
		Substrate sand, alluvium, Tertiary gravels or ironstone (non-coastal areas)	AIC	Inland <i>E. amygdalina</i> forest on Cainozoic deposits	A	Y*	May occur locally on broad valley flats in inland areas (e.g. Fingal Valley, North Esk Valley, South Esk Valley).
		Substrate other (mainly mudstone)	check	check	check	check	Occasional on other substrates (e.g. sandstone, mudstone), generally with <i>E. amygdalina</i> forest.
DRY-sdAM and DRY-scAM	Sedgy <i>E. amygdalina</i> forest/woodland Scrubby <i>E. amygdalina</i> forest/woodland	Substrate sand or alluvium in (sub)coastal areas <u>or</u> granite <u>or</u> Precambrian beds	AC	Coastal <i>E. amygdalina</i> forest	np [#]	N	Common around drainage lines and margins of marshes on a range of substrates (e.g. Boobyalla River flats, Martins Hill area, Gleadow Creek, Emu Ground, Blackboy Plain, Mt William, Rattra Marsh).
		Substrate sandstone (mainly Triassic and Ordovician)	AS	<i>E. amygdalina</i> forest on sandstone	A [#]	Y*	
		Substrate sand, alluvium, Tertiary gravels or ironstone (non-coastal areas)	AIC	Inland <i>E. amygdalina</i> forest on Cainozoic deposits	A	Y*	
		Substrate dolerite (or basalt)	AD	<i>E. amygdalina</i> forest on dolerite	np	N	
			check	check	check	check	
		Substrate other	check	check	check	check	
DRY-sdGUN and DRY-scGUN	Sedgy <i>E. gunnii</i> forest/woodland Scrubby <i>E. gunnii</i> forest/woodland		C	<i>E. coccifera</i> forest	A	N	Local on high altitude flats subject to frost and poor drainage (e.g. Mt Victoria, Mt Barrow, Ben Lomond plateau).
DRY-sdOV and DRY-scOV	Sedgy <i>E. ovata</i> forest/woodland Scrubby <i>E. ovata</i> forest/woodland		OV	Shrubby <i>E. ovata</i> - <i>E. viminalis</i> forest	A [#]	Y*	Widespread but local on poorly drained flats and drainage lines, particularly in lowland areas (e.g. Mt William, Great Northern Plain, Henderson Lagoon, Gleadow Creek).

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Floristic community code and name		Qualification	RFA community code and name		Cons. priority		Distribution in Ben Lomond Region
					Floristic	RFA	
DRY-sdROD <u>and</u> DRY-scROD	Sedgy <i>E. rodwayi</i> forest/woodland Scrubby <i>E. rodwayi</i> forest/woodland		RO	<i>E. rodwayi</i> forest	A [#]	Y	Local on poorly drained flats, particularly in upland areas (e.g. Blackboy Plain, Ben Lomond Marshes, Northallerton Valley) but local at lower altitudes (e.g. Rattrays Marsh, Turners Marsh).
DRY-shAM	Shrubby <i>E. amygdalina</i> forest	Understorey with similar amount of wet and dry sclerophyll shrubs <u>and</u> <i>E. obliqua</i> or <i>E. viminalis</i> subdominant or codominant	DSC	<i>E. viminalis</i> - <i>E. ovata</i> - <i>E. amygdalina</i> - <i>E. obliqua</i> damp sclerophyll forest	np [#]	Yog	Found on sites intermediate between wet and dry forest. Occurs on shaded slopes in drier parts of the region and moderately exposed slopes in wetter parts of the region (e.g. Den Ranges, Mt Stronach, Dilston, Avenue River catchment).
		Not DSC and substrate dolerite or basalt	AD	<i>E. amygdalina</i> forest on dolerite	np	N	Common on dolerite in west of region (e.g. Prossers Forest, Tippogoree Hills).
		Not DSC and substrate sand, granite or northern Mathinna series ¹	AC	Coastal <i>E. amygdalina</i> forest	np [#]	N	Local on moderately shaded slopes on granite and possibly sand (e.g. Mt Cameron, Mt Stronach, Castle Cary).
		Not DSC and substrate sandstone	AS	<i>E. amygdalina</i> forest on sandstone	A [#]	N	Local on moderately shaded slopes on sandstone (e.g. Mangana area)..
		Not DSC and substrate mudstone or southern Mathinna series ¹	AM	<i>E. amygdalina</i> forest on mudstone	check	check	Moderately shaded slopes and gully flanks or long unburnt sites (e.g. Emu Ground, Avenue River, Tyne catchment).
		Not DSC and substrate other	check	check	check	check	Local on shaded or long unburnt sites.
DRY-shDAL	Shrubby <i>E. dalrympleana</i> forest	Make sure dominant is not <i>E. viminalis</i> - contact FPA if unsure.	D	Dry <i>E. delegatensis</i> forest	B	N	Local on well drained slopes and flats at higher altitudes; usually associated with <i>E. delegatensis</i> forest (e.g. Ben Nevis property).
DRY-shDEL	Shrubby <i>E. delegatensis</i> forest		D	Dry <i>E. delegatensis</i> forest	np	N	Common on drier slopes, ridges and tiers in upland areas, often on rocky free draining sites (e.g. Mt Barrow, Ben Lomond, Mt Maurice, Mt Cameron).
DRY-shGLOB	Shrubby <i>E. globulus</i> forest	Substrate dolerite	GG	Grassy <i>E. globulus</i> forest	A	Y*	Local on humid or fire-free sites that would normally support more open <i>E. globulus</i> forest.
		Substrate coastal sand	G	<i>E. viminalis</i> and/or <i>E. globulus</i> coastal shrubby forest	A [#]	Y*	
		Substrate other	check	check	check	check	

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Floristic community code and name		Qualification	RFA community code and name		Cons. priority		Distribution in Ben Lomond Region
					Floristic	RFA	
DRY-shOB	Shrubby <i>E. obliqua</i> forest	Understorey with similar amount of wet and dry sclerophyll shrubs <u>and</u> <i>E. amygdalina</i> or <i>E. viminalis</i> subdominant or codominant	DSC	<i>E. viminalis</i> - <i>E. ovata</i> - <i>E. amygdalina</i> - <i>E. obliqua</i> damp sclerophyll forest	np	Yog	Found on sites intermediate between wet and dry forest. Common on shaded slopes in drier parts of the region, and moderately exposed slopes in wetter parts of the region (e.g. Den Ranges, Mt Stronach, Dilston, Avenue River catchment).
		Not DSC	O	Dry <i>E. obliqua</i> forest	np	N	Widespread in lowland environments on several substrates, on less exposed slopes and gully flanks.
DRY-shOV	Shrubby <i>E. ovata</i> forest		OV	Shrubby <i>E. ovata</i> - <i>E. viminalis</i> forest	A [#]	Y*	Local on sites intermediate between DRY-scOV and wet sclerophyll forest.
DRY-shPAUC	Shrubby <i>E. pauciflora</i> forest	Substrate dolerite (or basalt)	PJ	<i>E. pauciflora</i> forest on Jurassic dolerite	B	Yog	Local on dolerite flats subject to frost and cold air drainage (e.g. Nunamara area).
		Substrate mudstone or southern Mathinna series ¹	PS	<i>E. pauciflora</i> forest on sediments	B	N	Local on dry frost-hollows and benches (e.g. Rossarden area, Aberfoyle).
		Substrate other	check	check	check	check	Occasional, mainly on sandstone.
DRY-shSIEB	Shrubby <i>E. sieberi</i> forest	Substrate sand or granite	SG	<i>E. sieberi</i> forest on granite	np [#]	Yog	Common in coastal and subcoastal sites in the St Helens area (e.g. Doctors Peak, Mt Pearson).
		Other substrates	SO	<i>E. sieberi</i> forest on other substrates	np [#]	Yog	Widespread on Mathinna series in southeast of region (e.g. Scamander Tier, Sawpit Ridge).
DRY- shVIM	Shrubby <i>E. viminalis</i> forest	Understorey with similar amount of wet and dry sclerophyll shrubs <u>and</u> <i>E. amygdalina</i> or <i>E. obliqua</i> subdominant or codominant	DSC	<i>E. viminalis</i> - <i>E. ovata</i> - <i>E. amygdalina</i> - <i>E. obliqua</i> damp sclerophyll forest	A	Yog	Local in dry sclerophyll - wet sclerophyll transition zones, sometimes along creeklines in drier areas.
		Not DSC and substrate dolerite	V	<i>E. viminalis</i> grassy forest/woodland	A	Y	Local on humid or fire-free sites that would normally support grassy <i>E. viminalis</i> forest.
		Not DSC and substrate coastal sand	G	<i>E. viminalis</i> and/or <i>E. globulus</i> coastal shrubby forest	A [#]	Y*	Local on humid or fire-free coastal sites that would normally support heathy <i>E. viminalis</i> forest.
		Not DSC and substrate granite or (sub)coastal gravels	AC	Coastal <i>E. amygdalina</i> forest	B [#]	N	Occasional, usually with <i>E. amygdalina</i> forest.
		Not DSC and substrate other	check	check	check	check	Occasional, usually with <i>E. amygdalina</i> forest.

Section 3 PRIORITY SPECIES

Species listed in this section have some priority for conservation, and are known or likely to occur in Ben Lomond Region. Most are listed on Schedules of the Tasmanian *Threatened Species Protection Act* 1995, with a small proportion also being listed under the Commonwealth *Environment Protection and Biodiversity Conservation Act* 1999. This section also includes a few species (e.g. outliers of biogeographic interest) that are not listed under either Act. Priority species are arranged on the basis of the timber quality of the forests that they typically occupy, but may also occur in other vegetation types. Some priority species have been recorded from plantations.

Much more information is available on the taxonomy, distribution and conservation status of vascular species (ferns, conifers and flowering plants) than non-vascular species (mosses, liverworts and lichens). This is partly because more texts are available on vascular plants, and partly because identification of non-vascular species often requires microscopic examination of specimens.

Our knowledge of the distribution and ecology of threatened species is improving as new information is obtained from targeted studies and from surveys in different areas of Tasmania (including surveys conducted by forest workers). Information from all sources allows the conservation status and requirements of listed species to be reviewed and better prescriptions to be developed.

In many cases, assessments can be directed towards particular environments (e.g. dry rocky knolls) because many threatened species have narrow habitat ranges, and potential occurrences can be predicted from conditions of the physical environment (e.g. geology, aspect, altitude) or biological environment (e.g. dominant tree species, plant community). Many sites containing listed species will be flagged as priority communities (Section 2) or sites of potential significance for flora (Section 4).

Many threatened species are known or likely (based on taxonomic affinities) to be susceptible to *Phytophthora cinnamomi*. These species are indicated in the tables of priority species. Many of these species are found on lowland, siliceous sites. Some of the species play an important role in ecosystem functioning. Particular care is needed in evaluating FPP areas and planning operations in environments that contain *Phytophthora*-susceptible species (see Section 6 and *Flora Technical Note 8*).

The FPP flora evaluation requires that FPOs use databases to determine if threatened species have been recorded from within or close to proposed operational areas. The nominated databases are GTSpot (DPIWE) and NewCONSERVE (Forestry Tasmania). Details of how to access these databases are given in Module 1. Both databases provide other information that may be useful in preparing FPPs. The databases are updated regularly to incorporate new records of threatened species. Updated information on threatened species in this bioregion may also be found on the FPA Website.

The absence of records does not mean that threatened species are not present – many FPP areas will not have been surveyed previously. If new sites containing threatened species are found, details on site location, abundance of the species, and other potentially useful information (e.g. habitat, land use and fire history) should be forwarded to FPA. Material (e.g. photos or scans) can also be sent to the FPA Botany or Ecology programs for confirmation.

Many priority species will not be familiar to FPOs, but some are readily identifiable. Information to help identify many of the listed species is available on the FPA Website and in some of the references in *Flora Technical Note 2*. Further information on threatened plant species can be obtained from the Threatened Flora of Tasmania website (<http://www.gisparks.tas.gov.au/ThreatenedFloraCD/>). This site contains individual PDF files of all plant species listed on Schedules of the *Threatened Species Protection Act*. The files contain an image of the species (which could be useful in field verification) as well as information on habitat, distribution and conservation management.

Contact FPA if any priority species are identified or are likely to occur in an area that could be affected by a forestry operation. Recommendations to take account of such occurrences will be developed in conjunction with DPIWE (Threatened Species Unit). They will depend on characteristics of the species, site and proposed operation. Some sites may need to be excluded from operations, but often the values can be maintained by management prescriptions. In some cases (e.g. for opportunistic species) no changes to the proposed operation will be needed.

PRIORITY SPECIES ARRANGED BY BROAD VEGETATION TYPES

Priority species are arranged by broad vegetation type: corresponding PI typing is also indicated. More information on distribution and habitat can be obtained from the Threatened Flora of Tasmania website (www.gisparcs.tas.gov.au/ThreatenedFloraCD/).

The status of the species refers to its presence on Schedules of the *Threatened Species Protection Act*:

- X Presumed extinct in Tasmania (Schedule 3)
- E Endangered in Tasmania (Schedule 3)
- V Vulnerable in Tasmania (Schedule 4)
- R Rare and at risk in Tasmania (Schedule 5)

Susceptibility of species (in their natural habitat) to *Phytophthora cinnamomi* (Pc) is indicated. This is based on Barker and Wardlaw (1995) and Schahinger *et al.* (2003):

- Hs Highly susceptible: expect >75% mortality of infected plants to be killed
- Ms Moderately susceptible: expect 25-75% mortality of infected plants
- Prb Probably highly or moderately susceptible but no records of *Phytophthora* infection
- Ss Slightly susceptible: symptomless but reduced vigour
- S Susceptible but unable to make a rating
- Rh Resistant host: *Phytophthora* persists but host shows no symptoms.

FOREST QUALITY MODERATE TO HIGH (e.g. E3+, E2, M+)

Life form	Status	Pc	Scientific name	Common name
Trees & shrubs	R	Ss	<i>Acacia pataczekii</i>	Wally's wattle
	R		<i>Gynatrix pulchella</i>	Hemp bush
	R	Ms	<i>Hovea corrickiae</i>	Glossy hovea
	R		<i>Pimelea filiformis</i>	Trailing rice flower
	R		<i>Pimelea curviflora</i> var. <i>gracilis</i>	Curved rice flower
Ferns	V		<i>Blechnum cartilagineum</i>	Gristle fern
	E		<i>Cyathea cunninghamii</i>	Slender tree fern
	R		<i>Cyathea Xmarcescens</i>	Skirted tree fern
	R		<i>Hypolepis muelleri</i>	Harsh ground fern
Herbs	R		<i>Centaurium spicatum</i>	Australian centaury
	R		<i>Plantago debilis</i>	Shade plantain
	R		<i>Senecio velleioides</i>	Forest groundsel
Orchids			<i>Sarcophilus australis</i>	Gunn's tree orchid
Grasses	R		<i>Hierochloe rariflora</i>	Scented holly grass
	R		<i>Ehrharta juncea</i>	Forest wire grass
Other monocots	R		<i>Carex gunniana</i>	Mountain sedge
	R		<i>Thismia rodwayi</i>	Fairy lanterns
Non-vascular	E		<i>Budophorum notatum</i>	Lichen

FOREST QUALITY LOW TO MODERATE (e.g. E4, E3-)

Note that many species listed above for moderate to high quality forests extend to lower quality forests.

Life form	Status	Pc	Botanical name	Common name
Trees & shrubs	V	Ms	<i>Acacia axillaris</i>	Midlands mimosa
	R	Hs	<i>Acacia mucronata</i> subsp. <i>dependens</i>	Variable sawtooth wattle
	R	Hs	<i>Acacia ulicifolia</i>	Juniper wattle
	R	Ss	<i>Bossiaea obcordata</i>	Spiny bossiaea
	E	Prb	<i>Boronia hemichiton</i>	Mt Arthur boronia
	R		<i>Cyphanthera tasmanica</i>	Tasmanian ray flower
	V	Ms	<i>Epacris exserta</i>	South Esk heath
			<i>Eucalyptus archeri</i>	Alpine cedar gum
			<i>Eucalyptus subcrenulata</i>	Subalpine yellow gum
	R		<i>Grevillea australis</i> var. <i>linearifolia</i>	Narrow-leaf southern grevillea

	R		<i>Grevillea australis</i> var. <i>planifolia</i>	Flat-leaf southern grevillea
	V	Hs	<i>Hibbertia calycina</i>	Lesser guinea flower
	R	Hs	<i>Hibbertia virgata</i>	Twiggy guinea flower
Life form	Status	Pc	Botanical name	Common name
Trees & shrubs	R	Prb	<i>Pentachondra ericifolia</i>	Matted carpet heath
	R	Hs	<i>Persoonia muelleri</i> var. <i>angustifolia</i>	Mueller's geebung
	E	Hs	<i>Phebalium daviesii</i>	Davies' wax flower
	R		<i>Pimelea flava</i> subsp. <i>flava</i>	Yellow rice flower
	R		<i>Pomaderris intermedia</i>	Tree pomaderris
	V		<i>Pomaderris elachophylla</i>	Small leaf pomaderris
	R		<i>Pomaderris phyllicifolia</i> ssp. <i>phyllicifolia</i>	Narrow leaf pomaderris
	V	Hs	<i>Pultenaea mollis</i>	Soft bush pea
	R		<i>Spyridium vexilliferum</i>	Winged spyridium
	R	Hs	<i>Thryptomene micrantha</i>	Ribbed thryptomene
	R		<i>Westringia angustifolia</i>	Scabrous westringia
Herbs	R		<i>Brachyscome sieberi</i> var. <i>gunnii</i>	Sieber's daisy
	V		<i>Brunonia australis</i>	Blue pincushion
	R		<i>Colobanthus curtisiae</i>	Curtis' colobanth
	R		<i>Cynoglossum australe</i>	Austral hounds tongue
	V		<i>Desmodium gunnii</i>	Slender tick trefoil
	V		<i>Glycine latrobeana</i>	Dwarf clover or purple glycine
	V		<i>Glycine microphylla</i>	Small leafed glycine
	R		<i>Haloragis heterophylla</i>	Variable raspwort
	R		<i>Lobelia rhombifolia</i>	Branched lobelia
	R		<i>Stellaria multiflora</i>	Rayless starwort
	R		<i>Teucrium corymbosum</i>	Forest germander
	R		<i>Veronica plebeia</i>	Trailing speedwell
	R		<i>Viola caleyana</i>	Swamp violet
Orchids	E		<i>Caladenia lindleyana</i>	Lindley's spider orchid
	E		<i>Caladenia tonellii</i>	Robust fingers
	E		<i>Pterostylis atriola</i>	Snug greenhood
			<i>Pterostylis furcata</i>	Forked greenhood
	R		<i>Pterostylis grandiflora</i>	Superb greenhood
Grasses	R		<i>Pterostylis squamata</i>	Ruddy greenhood
	R		<i>Deyeuxia brachyathera</i>	Short bent grass
Other monocots	R		<i>Deyeuxia minor</i>	Small bent grass
	R		<i>Aphelia gracilis</i>	Slender aphelia
	R		<i>Arthropodium strictum</i>	Chocolate lily

FOREST QUALITY VERY LOW OR NON-FOREST (e.g. E5, S, Vz)

Note that many species listed above for low quality forests extend to very low quality forest or non-forest vegetation. Some species listed below have also been recorded within or adjacent to FPP areas.

Life form	Status	Pc	Botanical name	Common name
Trees & shrubs	R	Ms	<i>Acacia siculiformis</i>	Dagger wattle
	V	Prb	<i>Boronia gunnii</i>	Gunn's boronia
	R		<i>Brachyloma depressum</i>	Spreading brachyloma
	V		<i>Callitris oblonga</i> subsp. <i>oblonga</i>	South Esk pine
	V	S	<i>Conospermum hookeri</i>	Variable smoke bush
	E		<i>Cryptandra amara</i>	Bitter cryptandra
	E		<i>Discaria pubescens</i>	Thorn bush, anchor plant
	V	Ms	<i>Epacris</i> aff. <i>virgata</i> 'graniticola'	Mt Cameron heath
	R		<i>Eutaxia microphylla</i>	Common eutaxia
	R		<i>Gyrostemon thesioides</i>	Broom wheel fruit
	X	Prb	<i>Hibbertia rufa</i>	Brown guinea flower
	R	Prb	<i>Hovea tasmanica</i>	Tasman hovea
	R		<i>Lasiopetalum baueri</i>	Slender velvet bush
	R	Hs	<i>Monotoca submutica</i> var. <i>autumnalis</i>	Roundleaf broom heath
	R		<i>Muehlenbeckia axillaris</i>	Matted lignum
	R		<i>Pomaderris oraria</i>	Coast dogwood

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	R		<i>Pomaderris paniculosa</i> subsp. <i>paralia</i>	Shining dogwood
	V	Rh	<i>Prostanthera rotundifolia</i>	Round leaved mint bush
	V	Hs	<i>Pultenaea paleacea</i> var. <i>sericea</i>	Chaffy bush pea
	V	Hs	<i>Pultenaea prostrata</i>	Prostrate bush pea
	R		<i>Spyridium parvifolium</i> var. <i>parvifolium</i>	Dusty miller
	R	Ms	<i>Tetradlea ciliata</i>	Black-eyed Susan
	R		<i>Wilsonia humilis</i>	Silky wilsonia
Life form	Status	Pc	Botanical name	Common name
Trees & shrubs	R		<i>Wilsonia rotundifolia</i>	Round leaved wilsonia
	R		<i>Zieria veronicea</i> subsp. <i>veronicea</i>	Pink zieria
Ferns	R		<i>Anogramma leptophylla</i>	Annual fern
			<i>Asplenium trichomanes</i> ssp. <i>trichomanes</i>	Maidenhair spleenwort
	R		<i>Cheilanthes distans</i>	Bristly cloak fern
	V		<i>Doodia caudata</i>	Small rasp fern
	R		<i>Isoetes drummondii</i> subsp. <i>drummondii</i>	Plain quillwort
	R		<i>Isoetes elatior</i>	Tall quillwort
	R		<i>Pellaea calidrupium</i>	Hot rock fern
	R		<i>Phylloglossum drummondii</i>	Pygmy clubmoss
	R		<i>Ptilularia novae-hollandiae</i>	Austral pillwort
			<i>Schizaea asperula</i>	Rough comb fern
			<i>Alternanthera denticulata</i>	Lesser joyweed
Herbs	R		<i>Asperula subsimplex</i>	Water woodruff
	E		<i>Barbarea australis</i>	Native wintercress
	R		<i>Brachyscome perpusilla</i>	Tiny daisy
	V		<i>Brachyscome rigidula</i>	Hairy cut leaf daisy
	R		<i>Calandrinia granulifera</i>	Grainy purslane
	R		<i>Calocephalus lacteus</i>	Milky beauty heads
	R		<i>Calystegia sepium</i>	Great bindweed
	R		<i>Calystegia soldanella</i>	Bindweed
	R		<i>Chionohebe ciliolata</i>	Ciliolate hebe
	R	Prb	<i>Comesperma defoliatum</i>	Leafless milkwort
	R		<i>Cotula vulgaris</i> var. <i>australasica</i>	Slender cotula
	R		<i>Cuscuta tasmanica</i>	Native dodder
	R		<i>Drosera glanduligera</i>	Scarlet sundew
	R		<i>Epilobium pallidiflorum</i>	Showy willowherb
	R		<i>Epilobium willisii</i>	Carpet willowherb
	R		<i>Euchiton fordianus</i>	Soft cudweed
	R		<i>Euphrasia collina</i> subsp. <i>deflexifolia</i>	Eastern eyebright
	R		<i>Euphrasia collina</i> subsp. <i>gunnii</i>	Gunn's purple eyebright
	E		<i>Euphrasia scabra</i>	Yellow eyebright
	E		<i>Lepidium hyssopifolium</i>	Springy peppergrass
	R		<i>Lepidium pseudotasmanicum</i>	Peppergrass
	R		<i>Limonium australe</i>	Sea lavender
	R		<i>Lotus australis</i>	Austral trefoil
	E		<i>Lycopus australis</i>	Native gypsywort
	V		<i>Lythrum salicaria</i>	Purple loosestrife
	V		<i>Myriophyllum integrifolium</i>	Tiny water milfoil
	R		<i>Myriophyllum muelleri</i>	Water milfoil
	R		<i>Parietaria debilis</i>	Pellitory
	V		<i>Persicaria decipiens</i>	Slender knotweed
	E		<i>Persicaria subsessilis</i>	Bristly knotweed
	R		<i>Phyllangium distylis</i>	Tiny mitrewort
	V		<i>Phyllangium divergens</i>	Wiry mitrewort
	R		<i>Ranunculus pumilio</i>	Ferny buttercup
	R		<i>Ranunculus sessiliflorus</i>	Small flowered buttercup
	R		<i>Rumex bidens</i>	Mud dock
	R		<i>Scleranthus brockiei</i>	Knawel
	R		<i>Scutellaria humilis</i>	Dwarf skullcap
	R		<i>Senecio squarrosus</i>	Rigid grassland groundsel
	R		<i>Siloxerus multiflora</i>	Small wrinklewort
	E		<i>Solanum opacum</i>	Green berry nightshade
	E		<i>Stenopetalum lineare</i>	Threadgrass

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R	Prb	<i>Stylidium despectum</i>	Small trigger plant
R	Prb	<i>Stylidium inundatum</i>	White flowered triggerplant
R	Prb	<i>Stylidium perpusillum</i>	Tiny trigger plant
V		<i>Velleia paradoxa</i>	Spur velleia
R		<i>Villarsia exaltata</i>	Erect or yellow marshflower
R		<i>Viola cunninghamii</i>	Cunningham's violet
R		<i>Vittadinia cuneata</i>	New Holland daisy
R		<i>Vittadinia gracilis</i>	Graceful New Holland daisy
R		<i>Xerochrysum bicolor</i>	White alpine everlasting

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Life form	Status	Pc	Botanical name	Common name
Orchids	R		<i>Caladenia caudata</i>	Tailed spider orchid
	E		<i>Caladenia congesta</i>	Black tongue caladenia
	R		<i>Caladenia filamentosa</i>	Daddy long legs
	V		<i>Caladenia patersonii</i>	Paterson's spider orchid
	R		<i>Caladenia pusilla</i>	Tiny caladenia
	E		<i>Calochilus campestris</i>	Copper beard orchid
	E		<i>Chiloglottis trapeziformis</i>	Broad lip bird orchid
	E		<i>Corunastylis morrisii</i>	Bearded midge orchid
	R		<i>Corunastylis nuda</i>	Tiny midge orchid
	E		<i>Cyrtostylis robusta</i>	Large gnat orchid
	E		<i>Diuris palustris</i>	Swamp diuris
	R		<i>Hydrorchis orbicularis</i>	Swamp onion orchid
	R		<i>Microtidium atratum</i>	Yellow onion orchid
	R		<i>Orthoceras strictum</i>	Horned orchid
	E		<i>Prasophyllum apoxychilum</i>	Tapered leek orchid
	V		<i>Prasophyllum secutum</i>	Northern leek orchid
			<i>Prasophyllum sphacelatum</i>	Subalpine leek orchid
	E		<i>Prasophyllum stellatum</i>	Ben Lomond leek orchid
	E		<i>Pterostylis cynocephala</i>	Swamp greenhood
	R		<i>Pterostylis falcata</i>	Sickle greenhood
	R		<i>Pterostylis sanguinea</i>	Banded greenhood
	E		<i>Pterostylis tunstallii</i>	Tunstall's greenhood
	E		<i>Pterostylis ziegeleri</i>	Cape Portland greenhood
	E		<i>Thelymitra antennifera</i>	Rabbit ears
	E		<i>Thelymitra jonesii</i>	Skyblue sun orchid
	R		<i>Thelymitra holmesii</i>	Holmes' sun orchid
	E		<i>Thelymitra malvina</i>	Mauve-tufted sun orchid
	R		<i>Thelymitra mucida</i>	Plum orchid
			<i>Thelymitra simulata</i>	Collared sun orchid
Grasses	R		<i>Agrostis diemenica</i>	Flat leaf southern bent grass
	R		<i>Amphibromus neesii</i>	Swamp wallaby grass
			<i>Amphibromus sinuatus</i>	Sinuate swamp wallaby grass
	R		<i>Austrostipa bigeniculata</i>	Double-jointed speargrass
	R		<i>Austrostipa blackii</i>	Crested spear grass
	R		<i>Deyeuxia densa</i>	Heath bent grass
	R		<i>Lachnagrostis aequata</i>	Southern bent grass
	R		<i>Lachnagrostis punicea</i> var. <i>filifolia</i>	Narrow-leaf blown grass
	R		<i>Lachnagrostis robusta</i>	Tall blown grass
	R		<i>Poa mollis</i>	Soft poa grass
	R		<i>Poa poiformis</i> var. <i>ramifer</i>	Island poa grass
	R		<i>Sporobolus virginicus</i>	Salt couch grass
Other monocots	R		<i>Baumea articulata</i>	Jointed twig rush
	R		<i>Baumea gunnii</i>	Slender twig rush
	R		<i>Bolboschoenus caldwellii</i>	Sea club rush
	R		<i>Bolboschoenus medianus</i>	Marsh club rush
	R		<i>Caesia calliantha</i>	Blue grass lily
	R		<i>Carex longibrachiata</i>	Drooping sedge
	R		<i>Caustis pentandra</i>	Thick twist rush
	R		<i>Centrolepis strigosa</i> subsp. <i>pulvinata</i>	Scarce centrolepis
	V		<i>Chorizandra enodis</i>	Black bristle rush
	R		<i>Damasonium minus</i>	Star fruit
	R		<i>Hypoxis vaginata</i>	Sheathing yellow star
	R		<i>Isolepis stellata</i>	Star club rush
	R		<i>Juncus amabilis</i>	Gentle juncus
	R		<i>Juncus prismatocarpus</i>	Branching rush
	R		<i>Juncus vaginatus</i>	Clustered rush
	R		<i>Lepidosperma forsythii</i>	Large flowered rapier sedge
	R		<i>Lepidosperma tortuosum</i>	Twisting rapier sedge
	R		<i>Lepidosperma viscidum</i>	Sticky sword sedge
	R		<i>Potamogeton pectinatus</i>	Fennel pondweed

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	R		<i>Schoenoplectus validus</i>	River club sedge
	R		<i>Schoenus brevifolius</i>	Zig zag or short-leaf bogrush
	E		<i>Schoenus latelaminatus</i>	Medusa bog sedge
Life form	Status	Pc	Botanical name	Common name
Other monocots	R		<i>Sowerbaea juncea</i>	Vanilla plant, rushlily
	R		<i>Tricoryne elatior</i>	Yellow rushlily
	R		<i>Triglochin minutissimum</i>	Tiny arrowgrass
			<i>Triglochin rheophilum</i>	Riverine water-ribbon
	R		<i>Tricostularia pauciflora</i>	Needle bog rush
	R		<i>Trithuria submersa</i>	Juncella
	R		<i>Vallisneria americana</i>	Ribbonweed
	V	Hs	<i>Xanthorrhoea arenaria</i>	Sand grasstree
		Hs	<i>Xanthorrhoea australis</i>	Austral grasstree
	V	Hs	<i>Xanthorrhoea bracteata</i>	Shiny grasstree
Non-vascular	R		<i>Neofuscelia graniticola</i>	Lichen
	R		<i>Parmelina whinrayi</i>	Lichen
			<i>Pseudocephaloxia paludicola</i>	Liverwort
	R		<i>Teloschistes flavicans</i>	Lichen
	R		<i>Xanthoparmelia microphyllizans</i>	Lichen

Section 4 SITES OF POTENTIAL SIGNIFICANCE FOR FLORA

Information in this section is oriented towards sites rather than communities or species. It concentrates on environments within the region that have the potential to be directly or indirectly affected by forestry operations. This provides another approach to conservation of flora, which could be particularly useful for gaining an overview of potential botanical issues or values in an area. It could also be useful when there are problems with identifying species or communities in an area of proposed operations. However, it should not be used as a substitute for determining communities (Section 2) and priority species (Section 3) in an FPP area.

Species and communities of high conservation significance are often associated with particular environments. Sites can be identified by features of the physical environment (e.g. geology, altitude, landform) or the vegetation (e.g. dominant eucalypts, P.I. type). Local knowledge, coupled with use of aerial photographs and topographic, geology and P.I. maps, will help identify sites of potential significance. Many of these sites are of low or marginal timber value, and are not suitable for forestry activities or agricultural development. Such sites include dry ridgelines and river gorges. Other sites may be of greater commercial interest, for example forests on basalt and patches of relict rainforest. Many of the sites of potential significance in Ben Lomond Region contain species that are susceptible to *Phytophthora cinnamomi*.

Table 4A and 4B indicate forest and woodland sites that have the greatest potential to contain significant flora values.

Table 4A: Sites that are often associated with priority communities or species.

Contact FPA in all cases if proposed operations could affect these sites. The botanical significance of the site can then be evaluated from available information, or a vegetation survey may be needed. Areas of remnant forest that are proposed for conversion are included in this table, though they may not always contain priority communities or species.

Table 4B: Sites that are occasionally associated with priority communities or species.

Assess these environments carefully. Contact FPA if priority species or communities are found in areas that could be affected by proposed operations.

Notes:

1. Sites supporting native non-forest vegetation types (e.g. heath, wetland, native grassland) have not been included in the table, though they may co-occur with forests and woodlands on many of the sites listed. Such vegetation often contains rare species, particularly in areas of the region where little non-forest vegetation remains. Contact FPA if areas of native non-forest vegetation could be affected by the proposed operation.
2. Management of remnant forests and woodlands, which often have important flora values, is treated in Section 6.

Section 4 SITES OF POTENTIAL SIGNIFICANCE FOR FLORA

The sites listed in this section are associated with species or communities with a priority for conservation in Ben Lomond Region. Information in the tables is not a substitute for information given in Section 2 and Section 3 of this module. Botanical advice should be sought for all sites with native non-forest vegetation.

Table 4A: Sites often associated with priority communities or species. Contact FPA in all cases if these sites could be affected by operations.

Site of potential significance	Vegetation dominants	Main understorey	Main PI type	Reason for significance	Example locations
Blue Tier rainforest (non-relict rainforest N and E of Lottah Rd on Blue Tier 1:25000 mapsheet)	Myrtle, sassafras	Wet forest shrubs and ferns	M, S	Glacial refuge for rainforest species	Eastern slopes of Blue Tier
Lowland swamp forests	<i>E. ovata</i> , blackwood, tea-tree, paperbark	Variable - often wet sclerophyll shrubs or scrubby	E3 or T; S often present	Priority communities	Great Forester River, Boobyalla River
River flats, frost hollows and marshes	<i>E. pauciflora</i> , <i>E. ovata</i> , <i>E. rodwayi</i> , tea-tree, paperbark	Variable – often scrubby, sedgy or grassy	E3, E4, E5, T, S, Vz or Wg	Priority communities and species (e.g. <i>Epacris exserta</i> , <i>Lepidosperma tortuosum</i> , <i>Baumea gunnii</i>)	Rattrays Marsh, Charlies Marsh, Boobyalla River flats
Forests and woodlands on Tertiary ironstone, gravels or Recent sand or alluvium in non-coastal areas	<i>E. amygdalina</i> , <i>E. viminalis</i> , <i>E. pauciflora</i> , <i>E. ovata</i>	Heathy, sedgy, or grassy	E4, E5	Priority communities and species (e.g. <i>Brunonia australis</i>)	Evercreech Road
Dry ridges, knolls, and upper slopes often with high rock cover (mainly dolerite and granite)	<i>E. amygdalina</i> , <i>E. viminalis</i> , she-oak	Variable, often grassy, shrubby or almost bare	E4 or E5; S or Wr	Priority communities and species (e.g. <i>Epacris virgata</i> 'graniticola', <i>Pentachondra ericifolia</i>)	South Sister, Mt Nicholas, Mt Cameron, Doctors Peak, Mt Pearson
Rocky outcrops including plates, large boulders, cliffs and scree fields	Variable	Grassy, shrubby or bare	E4 or E5; S or Wr	Localised vascular and non-vascular species; susceptibility to disturbance	Mt Cameron, Doctors Peak, Mt Pearson
Vegetation with grasstrees (<i>Xanthorrhoea</i> species)	<i>E. amygdalina</i> , <i>E. viminalis</i>	Variable – often heathy	E4, E5, S	Priority species and high susceptibility to <i>Phytophthora</i>	Tomahawk, Mt William
Rocky gorges and creeklines particularly with N or W orientation or aspect	<i>E. amygdalina</i> , <i>E. viminalis</i> , she-oak	Variable, often scrubby or shrubby	Variable	Priority communities and species (e.g. <i>Barbarea australis</i> , <i>Acacia siculiformis</i>)	St Patricks River, Nile River

Table 4B: Sites occasionally associated with priority communities or species. Assess these environments carefully. Contact FPA if priority communities or species could be affected by operations.

Site of potential significance	Vegetation dominants	Main understorey	Main PI type	Reason for significance	Example locations
Very humid watercourses and slopes generally with a S or E aspect, in fire shadow locations	<i>Sassafras</i> , myrtle, (<i>E. regnans</i> , <i>E. obliqua</i> , <i>E. delegatensis</i> , <i>E. viminalis</i>)	Rainforest	S or T; >E3 often sparsely present	Relict rainforest and other priority communities. Priority species, mainly ferns (e.g. <i>Cyathea cunninghamii</i> , <i>Blechnum cartilagineum</i>)	Swan Rivulet, Cascade Creek
Nunamara dolerite landforms - dolerite landforms in Nunamara - Prossers Forest - Hollybank area	<i>E. amygdalina</i> , <i>E. obliqua</i> , <i>E. ovata</i> , <i>E. viminalis</i> , (plantation species?)	Shrubby or scrubby	E3, E4	Priority species (e.g. <i>Pimelea filiformis</i>)	Eaglehawk Creek, Nunamara, Prossers Forest. Note that some priority species have been recorded from plantations in other regions.
Dry NW-facing upper slopes and ridgelines on Mathinna sediments in Scamander and Mathinna areas	<i>E. sieberi</i> , <i>E. amygdalina</i>	Shrubby	E3-, E4	Priority species (e.g. <i>Hibbertia calycina</i> , <i>Hovea corrickiae</i> , <i>Bossiaea obcordata</i>)	Skyline Tier, Loila Tier, Mt Echo, Castle Cary, Tower Hill
Recent sands in coastal areas	<i>E. viminalis</i> , <i>E. amygdalina</i> , <i>E. globulus</i> , <i>E. ovata</i>	Variable – often heathy	E4, E5	Priority communities and species (e.g. <i>Stylidium despectum</i>)	Waterhouse area, Tomahawk, Dianas Basin, Ansons Bay area

Section 5 EVALUATION OF OTHER FLORA ISSUES

Section 5 covers issues that need to be considered by FPOs to ensure that operations comply with the *Forest Practices Code* and other current legislation and policies. Issues discussed in this section will not be relevant to all FPP areas.

Some topics have already been covered to some extent in previous sections of the module (for example, Section 2 identifies forest communities that may need prescriptions related to *Phytophthora cinnamomi*). However, they are also treated in Section 5, because they are dealt with separately in the FPP *Flora Evaluation Sheet*. Reference to *Flora Technical Notes* may be needed.

Additional topics may be introduced to this section (and the *Flora Evaluation Sheet*) as information becomes available from research, and if there are changes to legislation, policies and codes of practice.

WEED AND DISEASE MANAGEMENT

Flora values in many forest and scrub communities can be adversely affected by the introduction of disease and exotic plants. Section D3.1 of the *Forest Practices Code* gives guidelines to reduce the risk of weeds and disease being introduced through forestry operations. Quarrying, roading and road use are generally of more concern than logging and regeneration activities.

Diseases and weeds that can seriously threaten flora (and fauna) values are discussed below. Many other weeds and disease can affect wood production and plant species and communities – some of these are detailed in information available from Forestry Tasmania.

Phytophthora cinnamomi

Phytophthora cinnamomi (often called root rot fungus) is a disease that attacks the roots of many native species. Some plants die rapidly (e.g. banksias, grasstrees), while others (e.g. several eucalypt species) only show signs of disease in periods of drought or other stress. Many threatened species are highly susceptible. Open vegetation in relatively moist, lowland environments, such as dry sclerophyll forest, scrub, heath and moorland, are most at risk from *Phytophthora*. The resultant reduction in plant diversity and resources (e.g. nectar, pollen and shelter) has flow-on effects to fauna. Information on *Phytophthora* is given in *Flora Technical Note 8*.

Phytophthora is widespread in lowland areas of Ben Lomond Region, across all land tenures. Cool soil temperatures in wet forests and at higher altitudes tend to inhibit the disease, but opening up the canopy (e.g. by tracks) can cause local infestations.

Phytophthora has been introduced to many areas by soil carried on vehicles and machinery, but other sources include the boots of wandering people and the feet of wandering animals. Once established, it is impossible to eradicate, and can spread rapidly in surface run-off and groundwater percolation. The risk of spreading *Phytophthora* can be reduced by machinery hygiene, use of *Phytophthora*-free material in road construction, and attention to infrastructure planning (e.g. roads located on ridgelines will place a larger area of susceptible vegetation at risk than roads located on lower slopes).

Over sixty *Phytophthora* Management Areas, containing species or communities that are particularly susceptible to the pathogen, have been delineated – mainly on public land in lowland areas of the State. About a quarter of these are located in Ben Lomond Region (many in existing reserves).

Location of *Phytophthora* Management Areas and records of *Phytophthora* are given in databases that FPOs need to use to complete the FPP *Flora Evaluation Sheet* (Module 1 details how to access these databases). Forest communities that are susceptible to *Phytophthora* are indicated in *Flora Technical Note 8*. They are also indicated (#) in the community tables in Section 2 of this module.

FPOs need to refer to *Flora Technical Note 8* if:

- *Phytophthora* has been recorded from the proposed operational area;
- the operation will affect a highly susceptible forest community; or
- the operation is located within a *Phytophthora* Management Area.

Specialist advice should be sought if prescriptions in *Flora Technical Note 8* cannot be applied. Non-forest vegetation that could be affected by *Phytophthora* should routinely be referred to FPA.

Myrtle wilt

Myrtle wilt is a disease of myrtle (*Nothofagus cunninghamii*) caused by the fungus *Chalara australis*. It kills infected trees, and can spread to other trees by root contact. Myrtle wilt occurs naturally in undisturbed forest. Damage to stems increases the chance of infection. Operations with the potential to adversely affect rainforest in formal reserves or Special Management Zones (Flora) should be routinely referred to FPA.

Threatening weed species

Weed species can colonise disturbed sites associated with forestry operations, particularly when operations are close to agricultural land. Some weed species (e.g. thistles) decrease in abundance as understoreys re-establish in the regenerating forest. Other weed species are more persistent in forest – they include species with seeds that remain viable for a long time (e.g. gorse and broom), and species that are capable of vegetative regeneration (e.g. blackberry). Open sites, such as road verges, tracks, landings, quarries and bridge approaches, provide good environments for weeds to establish and persist. Weeds can also take advantage of disturbance (including burns associated with forest management) to establish in areas of non-forest vegetation (e.g. moorlands and native grasslands). Any infestation provides a launching pad, which allows the weed species to colonise other sites in the general area – through seeds dispersed by wind, birds, water movement, livestock or other land use (including road construction and use, and forestry operations).

There are legislative requirements under the Tasmanian *Weed Management Act* for land managers to control declared weed species. The required course of action will depend on the circumstances, including characteristics of the species, and extent of infestation at the site and in the municipality. The DPIWE website (www.dpiwe.tas.gov.au) gives details of the Act and Statutory Weed Management Plans for declared weed species. Declared weed species of most concern in forest environments include gorse, Scotch broom, Spanish heath, ragwort, blackberry and pampas grass. A greater range of declared weed species may be present on plantation sites, or areas of previously cleared land proposed for plantation establishment. Control through hygiene and active management is particularly important where threatening exotics have the potential to spread into reserves or other areas of native forest where they are rare or absent.

REMNANT FOREST AND WOODLAND

The *Forest Practices Code* supports the maintenance of remnant forest in those parts of the state where native vegetation has been extensively cleared. The RFA also requires that the values of remnant vegetation are considered at a regional level as a part of forest practices planning.

For the purpose of assessing FPP flora values, remnant forests and woodlands comprise stands that are:

- greater than 1 ha in area, and
- separated by more than 2 km from the closest area of native forest or woodland that exceeds 20 ha in area.

In some cases, remnant forests in Ben Lomond Region contain communities (e.g. *E. ovata* forest) and species that have a high priority for conservation. Other remnants contain communities that are more widespread and better reserved. Remnant vegetation will differ greatly in its condition – from sites with an understorey dominated by native species, to sites with understoreys having a high proportion of exotic shrubs or pasture grasses. In parts of the region with a long history of modification from agriculture and plantation forestry, such as the Great Northern Plain and parts of the South Esk catchment, remnant vegetation may be scattered and degraded by a combination of land use, edge effects and attrition of species over the years. However, even substantially disturbed remnants can play an important role in maintaining flora and fauna at a local to subregional scale.

In all cases, remnants in FPP areas need to be carefully evaluated. Those containing communities (Section 2), species (Section 3) or sites of potential significance (Section 4) need to be referred to FPA for specialist advice. In addition, FPA needs to be contacted for any proposed operation (typically clearance for plantation or agriculture) involving conversion of remnant vegetation. Advice concerning the operation will take account of the composition, extent, condition and context of the remnant.

MANAGEMENT OF FORESTRY OPERATIONS IN VICINITY OF RESERVES

This section deals with forestry operations (logging, roading, quarrying, plantation establishment, regeneration treatments) that are within or adjacent to formal reserves. Formal reserves are gazetted reserves on public land (e.g. National Parks, State Reserves, Forest Reserves) and reserves on private land that have been registered on property titles (e.g. reserves established through the Private Forest Reserves Program). This section also deals with operations that could affect areas categorised by Forestry Tasmania as Special Management Zones (Flora). Comments may also be relevant for other areas being managed for conservation on public and private land.

Botanical values in reserves adjacent to proposed operational areas will often be identified in the assessments of plant communities (Section 2); priority species (Section 3) and sites of potential significance (Section 4).

Some reserves incorporate buffers or have management systems that are designed to prevent, absorb or reduce disturbance associated with adjacent or nearby land use. However, good forest practices planning needs to take account of potentially adverse effects on botanical values (and other values) in all reserves. Such effects could include:

- introduction or increased incidence of weeds (including wildlings of pines or non-indigenous eucalypts sown or planted in the FPP area);
- introduction or increased incidence of disease (*Phytophthora* and myrtle wilt are of most concern – see above);
- change in microclimate in reserve [this is of most concern when vegetation along the reserve boundary contains localised wet forest vegetation (e.g. rainforest) which is susceptible to warmer and drier conditions];
- increased risk of fire entering the reserve (particularly when vegetation in the reserve is upslope of the forestry operation, and contains fire-sensitive plant communities or species).

The effect of forestry operations will depend on:

- attributes of the FPP area;
- attributes of the adjacent reserve and its vegetation (plant species and communities);
- the type of operation;
- regeneration treatment or post-operational land use.

FPOs need to consider carefully all these factors. Advice should be sought from FPA if the vegetation in the reserve has the potential to be adversely affected by an adjacent forestry operation and subsequent land use. FPA must be notified in all cases where a proposed operation is within a formal reserve or Special Management Zone (Flora).

Section 6 ASSESSING THE FLORA VALUES OF AN AREA

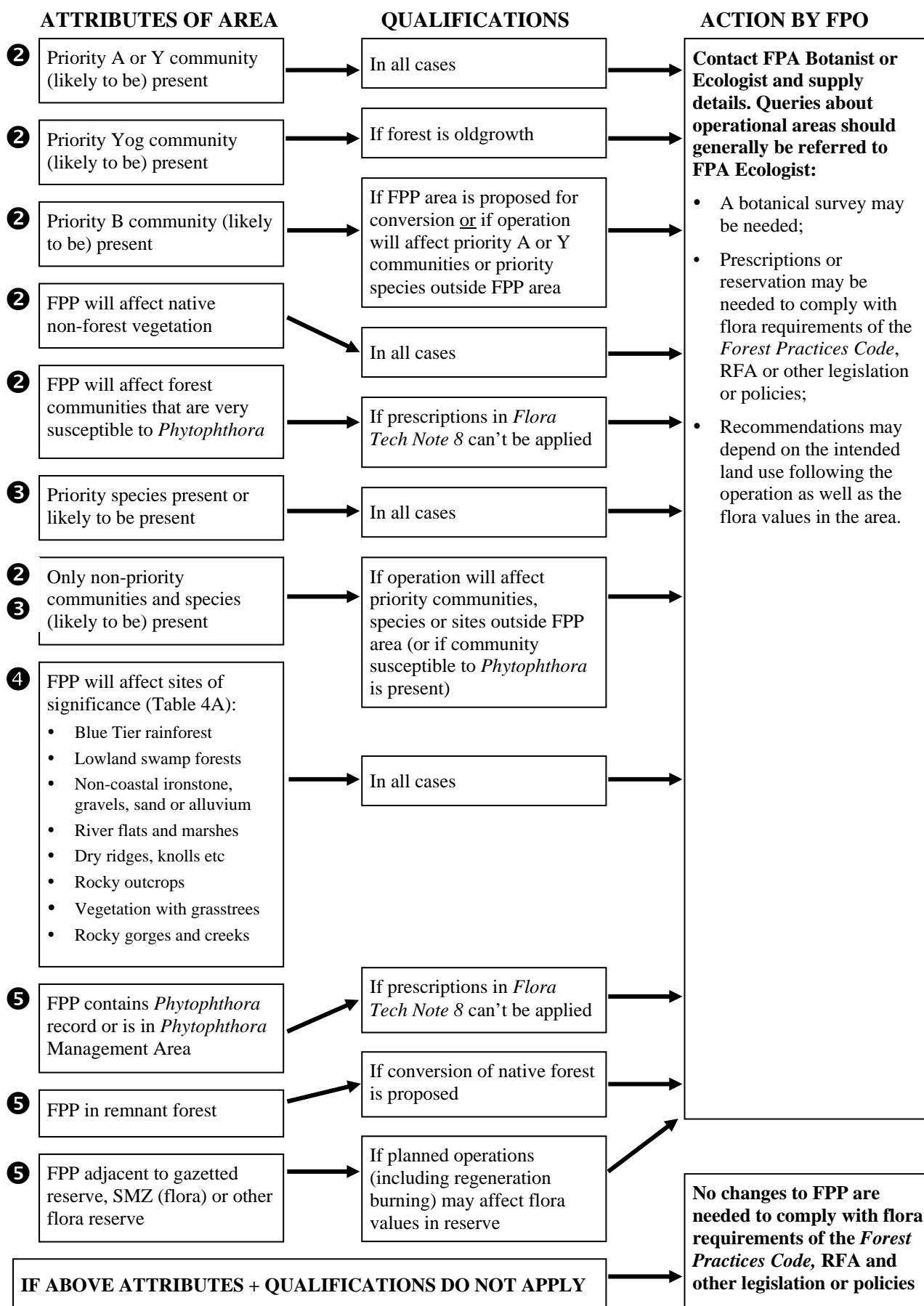
The main aim of the *Forest Botany Manual* is to allow Forest Practices Officers, and others involved with preparing Forest Practices Plans, to comply with the requirements of the *Forest Practices Code* and other policies and legislation. A similar assessment process can also be used for other areas where botanical values need to be considered.

This section uses a flow diagram to summarise the actions FPOs should take after they have assessed the vegetation of an area. It is based on information contained in sections of the module dealing with forest communities (Section 2), priority species (Section 3), sites of potential significance for flora (Section 4) and other flora issues (Section 5). Relevant sections of the manual are indicated on the left side of the flow diagram. The FPP *Flora Evaluation Sheet* has a similar format to the diagram. An example of a completed *Flora Evaluation Sheet* is given in Module 1.

Note the following points:

1. The term 'FPP area' is used to describe the area under assessment – this may extend outside the proposed harvest area (e.g. cable tailhold areas).
2. The flora evaluation needs to determine if the operation will affect flora values in adjacent areas. Conversion of native vegetation has greater potential to affect nearby vegetation than native forest operations. The FPA needs to be contacted for any FPP where conversion of native vegetation is proposed next to gazetted reserves (public or private) or Special Management Zones or other informal reserves established to protect flora values.
3. If the assessment indicates that FPA should be contacted:
 - Advice on botanical issues can be sought from the FPA Botany or Ecology programs. A discussion by phone or email may allow the botanical issues to be resolved, or clarified prior to more formal notification.
 - The normal notification process will need to be followed in most situations. Forward the FPP *Flora Evaluation Sheet* to the FPA Ecologist. Additional information that will be useful includes maps showing distribution of priority communities or priority species in the FPP area. Other information that may be needed includes past and proposed land use, site characteristics (e.g. geology) and other natural or cultural values in the area. Some of this information is required for the FPP cover sheet.
 - FPOs need to consider, and discuss with FPA if necessary, if values protected by reservation or prescription would be adversely affected by logging, regeneration practices or other activities related to the forestry operation (e.g. if regeneration burning in a coupe could affect a threatened species in an exclusion zone.)
4. **It is essential that relevant forest planners and workers are aware of agreed recommendations (e.g. exclusion of areas from coupes or roadline; procedures for control of weeds and diseases; fire management prescriptions).**

Section 6 ASSESSING THE FLORA VALUES OF AN AREA



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