



FOREST BOTANY MANUAL

MODULE 5

MIDLANDS REGION



2005

FPA
FOREST PRACTICES AUTHORITY

***FOREST BOTANY MANUAL:
MODULE 5 – MIDLANDS 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 Midlands 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 Midlands 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 MIDLANDS REGION

Midlands Region is one of the most complex of Tasmania's bioregions. The broad rift valley of the Midlands itself forms its centre, stretching from the Tamar to the Derwent Estuary and bounded by the Western and Eastern Tiers. The region extends in the northwest to include undulating lowlands between the Western Tiers and the Meander River, and similar vegetation is captured in the Derwent Valley in the south. Part of the region's environmental complexity arises because it includes higher altitude landforms (e.g. slopes of the Western Tiers and Wellington Range, and localised uplands such as Mt Seymour and Yarrington Tier). Coastal landforms are associated with the Derwent Estuary and D'Entrecasteaux Channel.

The diversity of native vegetation within the region is related to variation in altitude, rock types and landforms, as well as climatic gradients operating at a regional scale (from the humid Tiers to the semi-arid centre) and locally (relating to exposure to insolation, wind and frost). Land use and fire history have also influenced the extent, structure and composition of the vegetation. Aboriginal firing patterns were responsible for maintaining the grassy forests and woodlands that covered much of the Midlands at the time of European settlement. The Midlands is Tasmania's agricultural heartland, and supports its two largest population centres. Consequently, the native vegetation has been substantially displaced or modified.

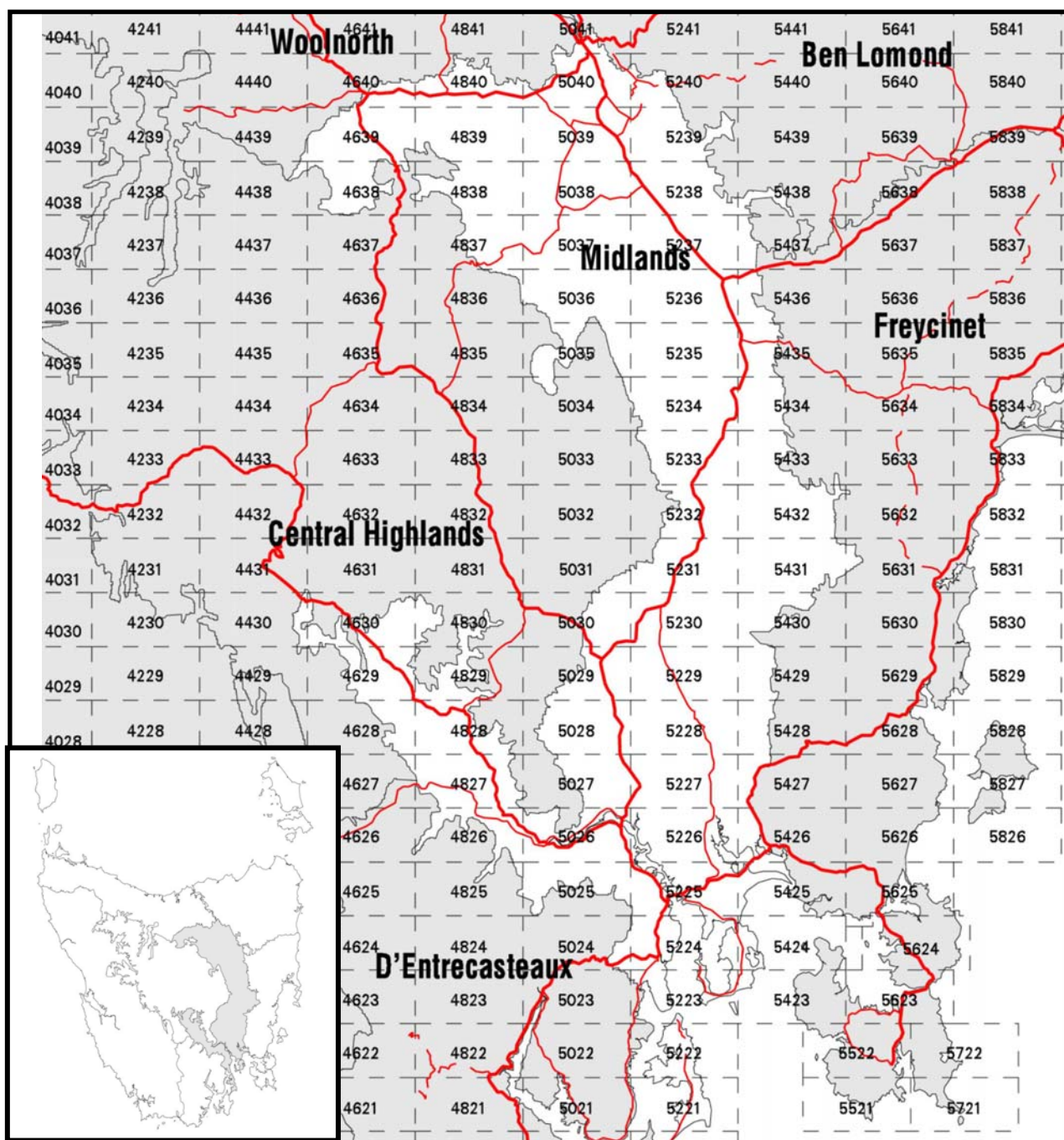
Rainforest, mixed forest (eucalypt forest with a rainforest understorey) and swamp forest have very localised distributions in humid parts of the region. Wet sclerophyll forest is mainly found on sheltered slopes and riparian environments. Dry sclerophyll forest is still relatively common on more difficult terrain, including country close to Hobart and Launceston. Dry sclerophyll forests grade into woodlands in drier and more arable parts of the region, and it is this vegetation type that has been most depleted or modified by agricultural activities – in many places it exists as remnant vegetation which is succumbing to tree decline and other pressures. Non-forest vegetation occurring in the Midlands Region includes heath, scrub, sedgeland, native grasslands, wetlands and salt marshes (located in saline lagoons in dry inland areas as well as more traditional coastal sites).

The Midlands Region contains about 900 species of native vascular plants, about 10% being Tasmanian endemic species. The relatively low rate of endemism reflects similarities between the Midlands Region and drier hinterland environments on the southeastern Australian mainland. Over 200 threatened species occur in forest and non-forest vegetation in the region. This disproportionately high number is related to the extent of native vegetation loss, and the high number of species that occur in localised or remnant vegetation. The non-vascular flora of the region (i.e. mosses, liverworts and lichens) is not well known, but has a relatively low diversity compared to more humid parts of the state.

As mentioned, much of the region's native vegetation has been lost or modified. There has been a long history of logging for timber in better quality forests, including areas that are now reserved. Drier forests have been mainly logged for pulpwood and firewood. Softwood and hardwood plantations are mainly located in more humid parts of the region, including the base of the Western Tiers and Derwent Valley, but some have also been established in drier environments (e.g. Seven Mile Beach).

The Midlands Region has by far the lowest proportion of public land (either reserved or unreserved) of any Tasmanian bioregion. Important reserves are located close to population centres (e.g. Trevallyn State Reserve, Wellington Park, Meehan Range Nature Recreation Area) and in remnant vegetation in the Midlands proper (e.g. Tom Gibson Nature Reserve, Coal River Gorge NR). Several 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). Not surprisingly, the Midlands Region has been a focus for conservation initiatives, and many landowners have taken steps to conserve and rehabilitate important areas of forest and non-forest vegetation..

An overview of the vegetation of the region and its relationship with the environment is given for the northwest and north of the region by Richley (1978) and Pinkard (1980); the base of the Western Tiers by Pemberton (1986); and the south and east of the region by Davies (1988). Several other references describe the vegetation of sites within the region. Some useful references on plant species and vegetation types are given in Module 1 and *Flora Technical Note 2*.



Location of Midlands Region

The numbers refer to 1:25000 Tasman sheets

The southern boundary of the region is formed by the Derwent Estuary and includes North Bruny Island. The eastern boundary initially follows the Tasman Highway from Pittwater (Sorell) to Woodsdale Road, which is followed north to the Little Swanport River. The river is followed downstream to Green Tier Creek, which is followed north to Tooms Lake Road. The road is followed west to the 300 m contour, which is followed north for 80 km, to an unnamed creek southwest of Morgans Sugarloaf. This creek is followed north to the South Esk River, which is followed west for 1 km to Horse Paddock Gully. The western tributary of this gully is followed to the 300 m contour. This contour is followed north till it reaches the North Esk River, which is followed downstream to the Tamar Estuary. The northern boundary is formed by the South Esk River (upstream from the Tamar), to its junction with the Meander River, then the Meander River to Western Creek, which is followed upstream to the 600 m contour. This contour is followed east, along the slopes of the Western Tiers and Cluan Tier, before trending southeast along the Tiers, until Petherton Creek is reached. This creek is followed downstream to the Jordan River, which is followed to the 300 m contour (near Red Sugarloaf). This contour is followed south to the lower slopes of Mt Dromedary, then up the Derwent Valley (initially in a northwest direction), which it effectively encircles. At the point where the 300 m contour turns sharply to the west (near Westerway), the boundary heads south, crossing the Tyenna River until it picks up the 300 m contour on the southern side of the river, near Nations Hill. This contour is followed southeast, skirting the valleys of the Styx and Plenty Rivers, until it reaches Mt Lloyd Road. The boundary follows a line southeast through Glenfern, until it picks up the 600 m contour near Swamp Gum Hill. The 600 m contour is then followed as it skirts the northern and eastern sides of the Wellington Range, until it reaches North West Bay Rivulet. The rivulet is followed to the coast.

Section 2 FOREST COMMUNITIES

This section provides keys to the native vegetation types and native forest communities occurring within the Midlands Region. Tables indicate the potential conservation priority of forest communities. The explanatory notes should be read before the keys and tables are used. The Forest Practices Plan *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 the Midlands 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 may contain these vegetation types. Seek botanical advice in all cases where forestry operations will affect native non-forest vegetation.

USING THE KEYS AND TABLES

The forests occurring in the Midlands 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. These are called **floristic communities** in the Manual. 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 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 the Midlands 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 will usually be 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 the Midlands Region there are three wet sclerophyll forest floristic communities dominated by *E. obliqua*. These are all included in the RFA community "tall *E. obliqua* forest." Two of the *E. obliqua* floristic communities are well reserved in the region, but one is 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 Midlands 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 the Midlands Region.

- R E *Notelaea ligustrina* and/or *Pomaderris apetala* closed forest
- R E *E. morrisbyi* forest
- E *E. viminalis* wet forest
- E Shrubby *E. ovata* - *E. viminalis* forest
- R V *E. globulus* and/or *E. viminalis* coastal shrubby forest
- R *E. risdonii* 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. viminalis* - *E. ovata* - *E. amygdalina* - *E. obliqua* damp sclerophyll forest (oldgrowth only).

The tables in this section of the Midlands 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*, the more widespread wet eucalypt forest dominant).

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, when the conservation priority of the community will depend on particular circumstances. 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. Grassy forests dominated by *E. globulus* are allocated to the RFA community “grassy *E. globulus* forest” (high conservation priority) if *E. pulchella* is sparse or absent, but are allocated to “*E. pulchella* - *E. globulus* - *E. viminalis* grassy shrubby forest” (low conservation priority) if *E. pulchella* is a subdominant species.

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) which 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 to describe some forest communities. For example, areas of wet sclerophyll forest dominated by *E. globulus* are included in 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

The RFA community inland *E. amygdalina* forest (AI) was divided in 2005 into two distinct facies. 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) occurs locally on dry sites on Permian mudstone in Midlands 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 or sassafras 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 (5 to 8 m) with other species dominant Other forest or scrub (go to 2.3)

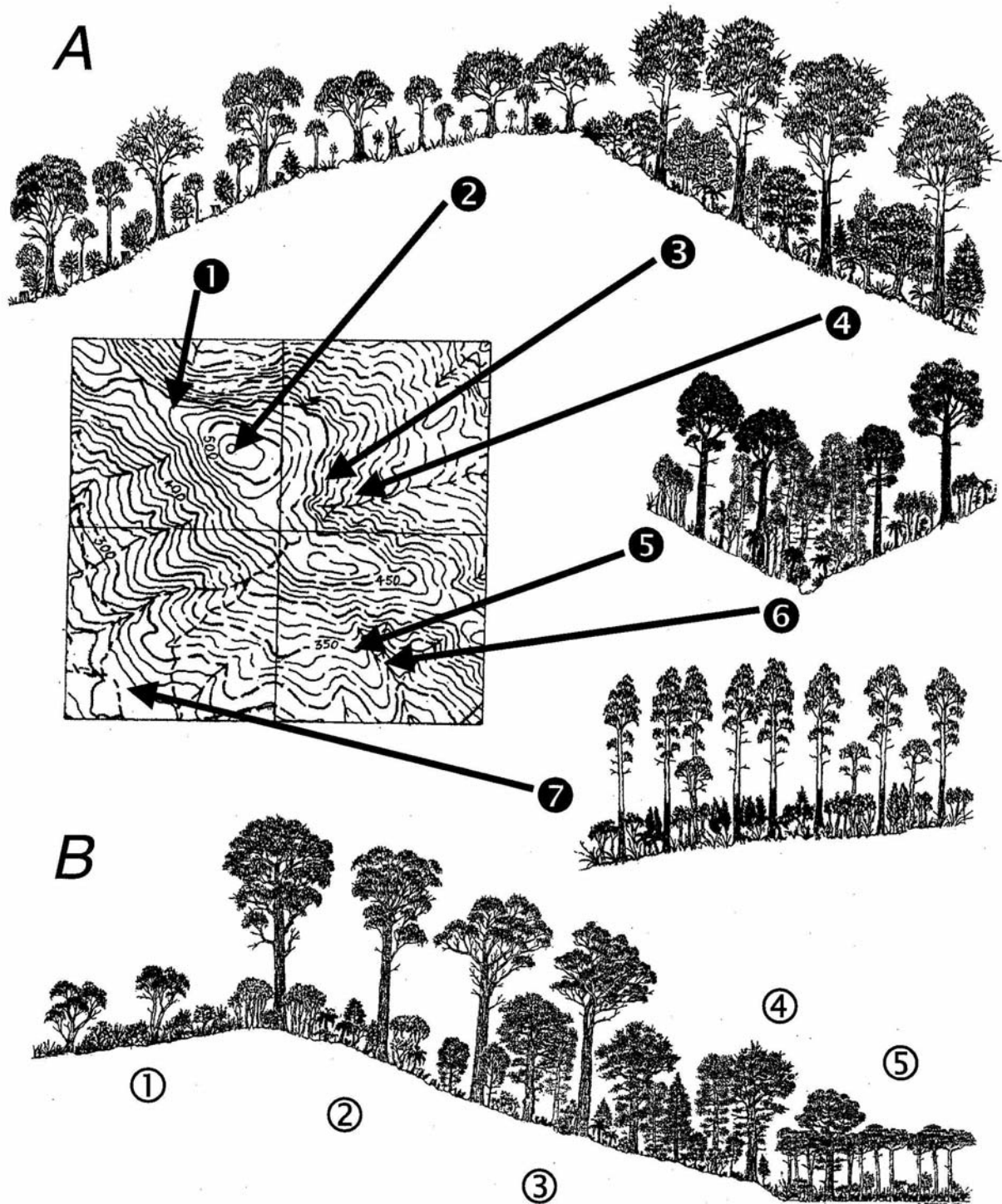
❶ Eucalypts present with greater than 5% cover

- ❷ Myrtle or sassafras 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 sedges, heaths or narrow-leaved (hard-leaved) shrubs (generally 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 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; lowland to upland sites Native grassland
- ❶ Dominated by *Sphagnum* moss; shrubs (e.g. tea-tree or *richea*) 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 and 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. amygdalina* 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. Sassafras is the main dominant of rainforest patches in the Midlands Region, with myrtle occurring locally on some sites. Rainforest has a very localised distribution in the region, and is mainly found in shaded gullies creeklines that have escaped fire for a long 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) associated with substantial differences in environment, fire history or land use.

Most rainforest patches in the region can be classified as relict stands, which have a high priority for conservation. Some areas of rainforest at the margins of the region (particularly at the base of the Western Tiers and on the lower slopes of the Wellington Range) fall outside the accepted distributional boundary of relict rainforest. They may also have conservation significance.

KEY TO RAINFOREST COMMUNITIES

❶ Generally tall forest (except at high altitudes); myrtle or sassafras dominant; understorey open

❷ Myrtle dominant or common; sassafras often present

❸ Ground ferns common

❹ Musk common RAIN-C3.1

❹ Musk sparse or absent RAIN-C1.1

❸ Ground ferns sparse; woolly tea-tree or native pepper often present RAIN-C2.1

❷ Sassafras dominant; myrtle usually sparse or absent;

❸ Musk common RAIN-C3.2

❸ Musk sparse or absent RAIN-C1.2

RELICT RAINFOREST

Relict rainforest comprises isolated patches of rainforest that occur locally in humid or fire-shadow environments, outside the normal range of Tasmanian rainforest. Most rainforest patches in the Midlands Region are considered as relict rainforest (see discussion above). Grid references and details of known sites are given in Neyland 1991 and *Flora Technical Note 4*.

Areas of relict rainforest that could be affected by forestry operations need to be referred to FPA. Prescriptions for protection of relict rainforest are given in *Flora Technical Note 4*. Other rainforest patches in more humid parts of the region also need to be referred to FPA if they could be affected by forestry operations. They are most likely to occur on sites with a PI type containing S or T. Recommendations will take account of location, context and other site characteristics and values.

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 Midlands 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 and other sites	M+	Callidendrous & thamnial rainforest on fertile sites	A	N	Occasional in protected gullies and along creeks on fertile sites (e.g. base of Western Tiers, Wellington Range).
RAIN-C1.2 Callidendrous	<i>Atherosperma moschatum</i> over <i>Dicksonia antarctica</i> - <i>Polystichum proliferum</i> - <i>Blechnum wattsii</i>	Relict patch and other sites	M+	Callidendrous & thamnial rainforest on fertile sites	A	N	Occasional in protected gullies and along creeks on fertile sites (e.g. base of Western Tiers, Wellington Range).
RAIN-C2.1 Callidendrous	<i>Nothofagus cunninghamii</i> - (<i>Leptospermum lanigerum</i>) over clear understorey or <i>Telopea truncata</i> or <i>Tasmanian lanceolata</i>	Relict patch and other sites	M+	Callidendrous & thamnial rainforest on fertile sites	A	N	Very localised at higher altitudes on dolerite, on sites with impeded drainage (e.g. Little Quoin).
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 and other sites	M+	Callidendrous & thamnial rainforest on fertile sites	A	N	Occasional in protected gullies and along creeks on fertile sites (e.g. Liffey FR).
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 and other sites	M+	Callidendrous & thamnial rainforest on fertile sites	A	N	Occasional in protected gullies and along creeks on fertile sites (e.g. base of Western Tiers, Wellington Range).

2.2 SWAMP FOREST AND RELATED FOREST OR SCRUB COMMUNITIES

Major Reference: Pannell (1992)

Swamp forests have a closed canopy of blackwood, tea-trees or paperbarks, and typically occupy flat, poorly drained sites. Riparian blackwood forest contains 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 shaded slopes.

Swamp forests and related forest types have a very restricted distribution in the Midlands Region, partly as a result of agricultural clearance. They occur locally in more humid parts of the region, such as the base of the Western Tiers. All sites are potentially important for conservation.

KEY TO SWAMP FOREST AND RELATED FOREST / SCRUB COMMUNITIES

- ❶ **Blackwood, paperbark or woolly tea-tree dominant; mainly found on poorly drained sites**
 - ❸ Sassafras common..... SWAMP-A2
 - ❸ Sassafras sparse or absent
 - ❹ Woolly tea-tree common; scented paperbark present; cutting sedge absent..... SWAMP-A1
 - ❹ Woolly tea-tree sparse or absent..... SWAMP-A3
- 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 Silver wattle common; woolly tea-tree often present; dogwood sparse or absent SWAMP-D2
 - ❷ Silver wattle and woolly tea-tree sparse or absent; dogwood common SWAMP-D4
- ❶ **Woolly tea-tree dominant and montane sites (usually above 500 m)**
 - ❷ Myrtle sparse or absent
 - ❸ Silver wattle commonSWAMP-E1
 - ❸ Silver wattle sparse or absentSWAMP-E1
 - ❷ Myrtle common (silver wattle sparse or absent).....SWAMP-E2

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 Freycinet Region
					Floristic	RFA	
SWAMP-A1	Depauperate callidendrous swamp forest		BF	<i>Acacia melanoxylon</i> forest on flats	A	N	May occur locally on poorly drained flats at base of Western Tiers..
SWAMP-A2	Callidendrous sassafras swamp forest		BF	<i>Acacia melanoxylon</i> forest on flats	A	N	May occur locally on poorly drained flats at base of Western Tiers..
SWAMP-A3	Depauperate callidendrous fern swamp forest		BF	<i>Acacia melanoxylon</i> forest on flats	A	N	May occur locally on poorly drained flats, less recently disturbed than SWAMP-A1 or A2.
SWAMP-D2	Riparian blackwood/ wattle forest	On flats	BF	<i>Acacia melanoxylon</i> forest on flats	A	N	Uncommon on moist fertile lowland flats, where drainage is not too impeded (e.g. Woodside Rivulet, Nile River). Also occurs in gullies and shaded slopes.
		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	Uncommon on moist fertile lowland flats, where drainage is not too impeded (e.g. Woodside Rivulet, Nile River). Also occurs in gullies and shaded slopes.
		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> forest	B	N	Local on flats, often disturbed; mainly in dolerite uplands.
		Silver wattle sparse or absent	L	<i>Leptospermum</i> species - <i>Melaleuca squarrosa</i> swamp forest	B	N	Local on flats with impeded drainage, mainly in dolerite uplands (e.g. Quoin Mtn).
SWAMP-E2	Montane myrtle tea-tree forest		M+	Callidendrous & thamnic rainforest on fertile sites	A	N	Very localised on seepage areas, mainly in dolerite uplands (e.g. Stainers Springs).

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. Many 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. However, some communities are reasonably extensive in the region, and in some cases (e.g. *Acacia mearnsii* forest/woodland) have had their range extended by land use practices.

Most of the communities have a high priority for conservation, because of their localised distribution. Some are associated with threatened species.

KEY TO OTHER FOREST OR SCRUB COMMUNITIES

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

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

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 Midlands Region
					Floristic	RFA	
DRY-LIT	<i>Allocasuarina littoralis</i> woodland		check	check	A	check	Local on dry, exposed sites on sediments (e.g. Long Ridge area).
DRY-VERT coastal	Coastal <i>Allocasuarina verticillata</i> low forest		AV	<i>Allocasuarina verticillata</i> forest	A	Y	Exposed drought-prone coastal sites (e.g. Betsey Island, North Bruny Island).
DRY-VERT inland	Inland <i>Allocasuarina verticillata</i> low forest		AV	<i>Allocasuarina verticillata</i> forest	A	Y	Locally common on exposed and rocky dolerite sites which are drought-prone (e.g. Cataract Gorge, Mt Direction, St Peters Pass, Butchers Hills). This community may have 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. slopes of Mt Wellington, Mt Nelson, Meehan Range).
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 occurring as localised patches on moist slopes. Mainly on dolerite, in upland areas (e.g. slopes of Mt Wellington).
OTHER-07	<i>Notelaea ligustrina</i> closed forest		NP	<i>Notelaea ligustrina</i> and/or <i>Pomaderris apetala</i> closed forest	A	Y*	May occur locally 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	Localised in wetter parts of region, where usually created by successive fires, poor eucalypt regeneration or failed attempts at clearing on moist sites. (e.g. Dunning's Rivulet).
OTHER-12	<i>Acacia mearnsii</i> forest/woodland		—	None appropriate	A	—	Typically occurs as grassy woodland on dry dolerite hills and slopes (e.g. Long Ridge, Richmond). Often 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.

Mixed forests have a very restricted distribution in the Midlands Region. In deeply dissected terrain (e.g. slopes of Mt Wellington) and very humid sites (e.g. shaded lower slopes and riparian environments on the Western Tiers), they may form relatively narrow bands between rainforest and wet sclerophyll communities. All communities occur in formal reserves, but this is mainly at the margins of the region. Some communities are very localised and have a high priority for conservation.

KEY TO MIXED FOREST COMMUNITIES

- ❶ Dominated by *E. dalrympleana*..... WET-DAL10
- ❶ Dominated by *E. delegatensis*
 - ❷ Celery top pine, goldeywood, native plum, dragon heath or native laurel common; musk or manfern sparse or absent..... WET-DEL1011
 - ❷ Celery top pine, goldeywood, native plum, dragon heath and native laurel sparse or absent; musk or manfern often common
 - 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 Myrtle present WET-DEL1000
 - ❺ Myrtle absent WET-DEL0110
- ❶ Dominated by *E. obliqua*
 - ❷ Cutting grass, prickly mo or goldeywood common; epiphytic ferns sparse or absent..... WET-OB101
 - ❷ Cutting grass, prickly mo and goldeywood sparse or absent; epiphytic ferns often common WET-OB1000
- ❶ Dominated by *E. regnans* WET-REG101
- 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 Midlands Region
					Floristic	RFA	
WET-DAL10	<i>E. dalrympleana</i> - <i>Tasmannia lanceolata</i> - <i>Dicksonia antarctica</i> mixed forest	Make sure dominant not <i>E. viminalis</i> – Contact FPA if unsure.	DT	Tall <i>E. delegatensis</i> forest	A	N	May occur locally in shaded gullies, riparian corridors and shaded, fire-shadow slopes in upland areas (e.g. Western Tiers). Generally associated with <i>E. delegatensis</i> 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	B	N	Moist, shaded slopes, gullies and drainage headwaters on fertile sites in upland areas (e.g. Western Tiers, Wellington Range).
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	Extends into higher altitude parts of Midlands Region on less fertile substrates such as sandstone (e.g. Western Tiers, Wellington Range).
WET-DEL1000	<i>E. delegatensis</i> - <i>Nothofagus cunninghamii</i> - <i>Grammitis billardiarei</i> mixed forest		DT	Tall <i>E. delegatensis</i> forest	B	N	Very localised on more humid or fire-shadow sites than DEL0110.
WET-DEL1001	<i>E. delegatensis</i> - <i>Nothofagus cunninghamii</i> - <i>Gahnia grandis</i> mixed forest		DT	Tall <i>E. delegatensis</i> forest	B	N	Very localised on more humid or fire-shadow sites than DEL0111.
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	B	N	Local on humid slopes and gullies with deep soils and good drainage (e.g. Meander Falls area).
WET-OB101	<i>E. obliqua</i> - <i>Nothofagus cunninghamii</i> - <i>Monotoca glauca</i> mixed forest		OT	Tall <i>E. obliqua</i> forest	B	N	Local on less fertile sites than WET-OB1000 (e.g. Western Tiers).
WET-REG101	<i>E. regnans</i> - <i>Atherosperma moschatum</i> - <i>Acacia dealbata</i> - <i>Olearia argophylla</i> mixed forest		R	<i>E. regnans</i> forest	B	N	Local in moist, fire-shadow gullies and slopes (e.g. Wellington Range, Moogara).
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*	Very local in humid, fire-shadow sites associated with gullies and creeklines (e.g. Myrtle Creek, Cluan Tier).

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 more extensive than mixed forest, but are still mainly confined to the more humid margins of the region (e.g. Wellington Range, Western Tiers, Deddington area). Elsewhere, they are found in humid uplands (e.g. Mt Seymour, Quoin Mountain) and on relatively humid and shaded sites, particularly in the southeast 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 reserved, but some localised communities (e.g. wet sclerophyll forests dominated by *E. viminalis* or *E. ovata*) have a high priority for conservation.

KEY TO WET SCLEROPHYLL FOREST COMMUNITIES

- ❶ Dominated by *E. amygdalina* 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. cordata* WET-CORD1
- 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, native pepper or tussock grass common WET-DEL0010
 - ❸ Mountain currant, waratah, native pepper and tussock grass sparse or absent
 - 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 dollybush sparse or absent WET-DEL0000
 - ❺ Silver wattle and native currant sparse or absent; blackwood, kangaroo fern, dwarf musk and dollybush common WET-DEL0001
 - ❷ Guitar plant and prickly beauty sparse or absent
 - ❸ Cutting grass or sword sedge common
 - ❹ Woolly tea-tree common; goldeywood or stinkwood sparse or absent WET-DEL3
 - ❹ Woolly tea-tree sparse or absent; goldeywood or stinkwood common WET-DEL0111
 - ❸ Cutting grass or sword sedge sparse or absent
 - ❹ Dwarf musk, viscid daisy bush or bracken common; drier sites WET-DEL0101
 - ❹ Dwarf musk, viscid daisy bush or bracken sparse or absent; moister sites WET-DEL0110

❶ Dominated by *E. globulus*

- ❷ Tussock grass (*Poa*), sagg or prickly mo common
 - ❸ Cutting grass or musk present; viscid daisy bush sparse or absent..... WET-GLOB0101
 - ❸ Cutting grass and musk sparse or absent; viscid daisy bush often present WET-GLOB1
- ❷ Tussock grass (*Poa*), sagg and prickly mo sparse or absent
 - ❸ Manfern, kangaroo fern or epiphytic ferns present; cutting grass absent WET-GLOB001
 - ❸ Manfern, kangaroo fern and epiphytic ferns absent; cutting grass often present
 - ❹ Blanket bush or pinkwood common, tea-tree and paperbark sparse or absent..... WET-GLOB0100
 - ❹ Blanket bush and pinkwood sparse or absent; tea-tree or paperbark often present..... WET-GLOB0101

❶ Dominated by *E. johnstonii* WET-JOHN2**❶ Dominated by *E. obliqua***

- ❷ Guitar plant or prickly beauty common; drier sites WET-OB010
- ❷ Guitar plant and prickly beauty sparse or absent; moister sites
 - ❸ Paperbark, tea-tree, sword sedge or cutting grass common; musk, silver wattle, blanket bush and pinkwood sparse or absent..... WET-OB0111
 - ❸ Paperbark, tea-tree, sword sedge and cutting grass sparse or absent, musk silver wattle, blanket bush or pinkwood common WET-OB0110

❶ Dominated by *E. ovata*

- ❷ Understorey dominated by paperbarks or tea-trees; cutting grass or sword sedge usually common WET-OV00
- ❷ Understorey dominated by broad-leaved shrubs; cutting grass and sword sedge usually sparse or absent..... WET-OV01

❶ Dominated by *E. regnans*

- ❷ Bracken, cutting grass or sword sedge common; (myrtle or sassafras generally absent)
 - ❸ Dwarf musk, prickly mo, stinkwood or goldeywood common..... WET-REG1000
 - ❸ Dwarf musk, prickly mo, stinkwood and goldeywood sparse or absent..... WET-REG1001
- ❷ Bracken, cutting grass and sword sedge sparse or absent; (myrtle or sassafras often present)..... WET-REG101

❶ Dominated by *E. rodwayi*..... WET-ROD1**❶ Dominated by *E. urnigera* WET-URN2****❶ Dominated by *E. viminalis***

- ❷ Paperbark or tea-tree common; *E. ovata* often present; poorly drained sites WET-VIM2
- ❷ Paperbark or tea-tree sparse or absent; *E. ovata* absent; well drained sites
 - ❸ Native cherry, guitar plant or little prickly common; drier sites..... WET-VIM0011
 - ❸ Native cherry, guitar plant and little prickly sparse or absent; moister sites
 - ❹ Prickly mo or dollybush common; blanket bush and manfern sparse or absent .. WET-VIM0100
 - ❹ Prickly mo and dollybush 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 Freycinet Region
					Floristic	RFA	
WET-AM1	<i>E. amygdalina</i> - <i>E. viminalis</i> - <i>Lomandra longifolia</i> wsf		AD	<i>E. amygdalina</i> forest on dolerite	np	N	Moderately shaded slopes on dolerite; sites often rocky (e.g. Western Tiers).
WET-BR11	<i>E. brookeriana</i> - <i>E. obliqua</i> - <i>Bedfordia salicina</i> wsf		BA	<i>E. brookeriana</i> wet forest	A	Y*	Localised in well drained gully headwaters in the east of region (e.g. Levendale, Mt Ponsonby).
WET-BR2	<i>E. brookeriana</i> - <i>Leptospermum</i> species - <i>Lepidosperma elatius</i> wsf		BA	<i>E. brookeriana</i> wet forest	A	Y*	May occur locally on poorly drained flats in east of region.
WET-CORD1	<i>E. cordata</i> wsf		DT	Tall <i>E. delegatensis</i> forest	A	N	Very local on moist upland dolerite sites in lower Derwent Valley (e.g. Mt Lloyd).
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	Occurs locally in shaded upland areas of the region, in association with <i>E. delegatensis</i> forest.
WET-DAL01	<i>E. dalrympleana</i> - <i>Pomaderris apetala</i> - <i>Bedfordia salicina</i> wsf		DT	Tall <i>E. delegatensis</i> forest	B	N	
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 dolerite uplands (Jackeys Creek, Wellington Range, Colebrook Height)s.
WET-DEL0001	<i>E. delegatensis</i> - <i>Acacia melanoxylon</i> - <i>Bedfordia salicina</i> wsf		DT	Tall <i>E. delegatensis</i> forest	np	N	Occasional on rocky dolerite uplands (e.g. Poatina).
WET-DEL0010	<i>E. delegatensis</i> - <i>Olearia viscosa</i> - <i>Olearia phlogopappa</i> wsf		DT	Tall <i>E. delegatensis</i> forest	np	N	Occasional on rocky dolerite uplands (e.g. Western Tiers, Kempton Quoin).
WET-DEL0011	<i>E. delegatensis</i> - <i>Telopea truncata</i> wsf		DT	Tall <i>E. delegatensis</i> forest	B	N	May occur locally at higher altitudes on dolerite, but typically a subalpine community.
WET-DEL0100	<i>E. delegatensis</i> - <i>E. viminalis</i> - <i>Acacia melanoxylon</i> wsf		DT	Tall <i>E. delegatensis</i> forest	np	N	Common on shaded and sometimes disturbed sites at the lower altitudinal limit of <i>E. delegatensis</i> (about 300 m); often with <i>E. obliqua</i> wsf (e.g. Mt Lloyd area, Western Tiers. Mt Ponsonby)
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> , often forming a transition zone with <i>E. obliqua</i> wsf (e.g. Brown Mountain).

Floristic community code and name		Qualification	RFA community code and name		Conservation priority		Distribution in Freycinet Region
					Floristic	RFA	
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	Occasional in upland drainage headwaters, creeklines and shaded slopes, often grading into mixed forest (e.g. Western Tiers, Little Quoin).
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 on moist upland sites of relatively low nutrient status (e.g. sandstone on Cluan Tier, lower slopes of Mt Dromedary).
WET-DEL3	<i>E. delegatensis</i> - <i>Leptospermum lanigerum</i> - <i>Gahnia grandis</i> wsf		DT	Tall <i>E. delegatensis</i> forest	B	N	May occur locally in drainage headwaters and poorly drained saddles, in higher rainfall parts of the region (e.g. Western Creek).
WET-GLOB001	<i>E. globulus</i> - <i>Dicksonia antarctica</i> - <i>Ctenopteris heterophylla</i> wsf		R	<i>E. regnans</i> forest	B	N	Sheltered slopes and gullies, mainly on dolerite in southeast of region (e.g. lower slopes of Mt Wellington).
WET-GLOB0100	<i>E. globulus</i> - <i>Bedfordia salicina</i> - <i>Beyeria viscosa</i> wsf		R	<i>E. regnans</i> forest	np	N	Common on shaded slopes and gully flanks in southeast of region (e.g. lower slopes of Mt Wellington, Mt Nelson, Mt Direction).
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	Occasional on shaded slopes and gully flanks in southeast of region; sites often disturbed (e.g. Gravelly Ridge, Forcett, Meehan Range).
WET-GLOB1	<i>E. globulus</i> - <i>Poa labillardierei</i> - <i>Hypochoeris radicata</i> wsf		GG	Grassy <i>E. globulus</i> forest	A	Y*	Moister aspects of dry hills and on wetter sites in southeast, which are grazed or burnt frequently. May form transition zone between wsf and dsf (e.g. Meehan Range, Wellington Range).
WET-JOHN2	<i>E. johnstonii</i> wsf		SU	<i>E. subcrenulata</i> forest	A	N	Local on moist benches on sandstone and dolerite; drainage often impeded (e.g. Wellington Range).
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 moist sites in dry areas and dry sites in moist areas (e.g. Wellington Range, Mt Nelson, Tunnack); often forms an intermediate community between wsf and dsf.
WET-OB0110	<i>E. obliqua</i> - <i>Acacia dealbata</i> - <i>Olearia argophylla</i> wsf		OT	Tall <i>E. obliqua</i> forest	np	N	Relatively widespread on moist slopes and gully flanks in more humid parts of the region (e.g. Wayatinah, Western Tiers).
WET-OB0111	<i>E. obliqua</i> - <i>Melaleuca squarrosa</i> - <i>Monotoca glauca</i> wsf		OT	Tall <i>E. obliqua</i> forest	B	N	Uncommon on wet or poorly drained sites in wetter parts of the region (e.g. Western Tiers).

Floristic community code and name		Qualification	RFA community code and name		Cons. priority		Distribution in Freycinet Region
					Floristic	RFA	
WET-OB0111	<i>E. obliqua</i> - <i>Melaleuca squarrosa</i> - <i>Monotoca glauca</i> wsf		OT	Tall <i>E. obliqua</i> forest	B	N	Uncommon on wet or poorly drained sites in wetter parts of the region (e.g. Western Tiers).
WET-OV00	<i>E. ovata</i> - <i>Leptospermum lanigerum</i> wsf		OV	Shrubby <i>E. ovata</i> - <i>E. viminalis</i> forest	A	Y*	Local on flats that have escaped fire for a long period (e.g. Warners Creek, Western Creek).
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 fertile sites where drainage less impeded than in most <i>E. ovata</i> - communities (e.g. Duncansons Rivulet, Rhyndaston).
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	B	N	Local on shaded slopes in transition zone between <i>E. obliqua</i> and <i>E. regnans</i> wsf (e.g. Wayatinah, Wellington Range). 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	Similar environments to REG1000, but more widespread in region (e.g. Little Quoin, Tunnack).
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	B	N	Local in moist, fire-shadow gullies and slopes (e.g. Wellington Range, Moogara).
WET-ROD1	<i>E. rodwayi</i> wsf		RO	<i>E. rodwayi</i> forest	A	Y	Very localised on fertile flats in cooler inland areas (e.g. flats on Western Creek near Long Ridge).
WET-URN2	<i>E. urnigera</i> wsf		C	<i>E. coccifera</i> forest	A	N	May occur locally on dolerite uplands in southeast of region (e.g. Mt Seymour, Quoin Mountain).
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 slopes (e.g. Poatina, Mt Nelson).
		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 along gullies, river flats and shaded slopes off Western Tiers (e.g. Woodside Rivulet, Bluegong).
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 along humid creeklines and gullies on fertile sites in north of region (e.g. base of Cluan Tier).
WET-VIM2	<i>E. viminalis</i> - <i>Leptospermum lanigerum</i> - <i>Mel. squarrosa</i> wsf		OV	Shrubby <i>E. ovata</i> - <i>E. viminalis</i> forest	A	Y*	Very localised on better-drained sites adjacent to flats with <i>E. ovata</i> forest, in north of region.

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 communities are widespread and diverse in the Midlands Region. Dominant and understorey species vary in response to substrate, aspect, climate and drainage. 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 or sedgeland, depending on site characteristics. Land use also plays an important influence in determining vegetation structure and composition. For example, the grassy forests and woodlands of the broad Midland valleys were maintained by the fire regimes used firstly by Tasmanian Aborigines, then by European settlers. Most dry sclerophyll communities in the Midlands Region have been extensively modified, mainly by agricultural development or intensive settlement. Many communities are associated with threatened species of plants and animals, and have a very 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 following table indicates when FPOs need to check with FPA for guidance on community affinities, priorities and prescriptions.

Some lowland dry sclerophyll communities in coastal and hinterland areas of the region 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 sites. The eucalypt canopy is often fairly open; common species in the Midlands Region include *E. amygdalina*, *E. globulus*, *E. pulchella* and *E. viminalis*. Grassy forests are often associated with fertile substrate (e.g. basalt, dolerite) and well drained sites.

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 present on many sites. The eucalypt canopy is fairly open. Common species in the Midlands 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 the Midlands 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-tree and grass-tree (*Xanthorrhoea australis*). 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 the Midlands Region include *E. amygdalina*, *E. tenuiramis* and *E. pauciflora*. Heathy forests are generally found on well drained sites on infertile or siliceous substrates (e.g. sands, sandstone, quartzite).

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, dollybush, 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 the Midlands Region they include *E. obliqua* and *E. delegatensis* on moist sites and *E. amygdalina* and *E. globulus* on drier sites. Shrubby forests tend to occupy more fertile substrates, 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 <i>E. amygdalina</i> dominant	DRY-gAM
❷ <i>E. dalrympleana</i> dominant	DRY-gDAL
❷ <i>E. delegatensis</i> dominant	DRY-gDEL
❷ <i>E. globulus</i> dominant	DRY-gGLOB
❷ <i>E. gunnii</i> dominant	DRY-gGUN
❷ <i>E. morrisbyi</i> dominant	DRY-gMOR
❷ <i>E. ovata</i> dominant	DRY-gOV
❷ <i>E. pauciflora</i> dominant	DRY-gPAUC
❷ <i>E. pulchella</i> dominant	DRY-gPUL
❷ <i>E. risdonii</i> dominant	DRY-gRIS
❷ <i>E. rodwayi</i> dominant	DRY-gROD
❷ <i>E. rubida</i> dominant	DRY-gRUB
❷ <i>E. tenuiramis</i> dominant	DRY-gTEN
❷ <i>E. viminalis</i> dominant	DRY-gVIM

❶ Understorey dominated by sedges or cutting grass or tea-trees or paperbarks; mainly on sites with impeded drainage (e.g. flats and marsh edges)

❷ Sedges or cutting grass prominent

- ❸ *E. amygdalina* dominant..... DRY-sdAM
- ❸ *E. gunnii* dominant DRY-sdGUN
- ❸ *E. ovata* dominant..... DRY-sdOV
- ❸ *E. perriniana* dominant..... DRY-sdPER
- ❸ *E. rodwayi* dominant DRY-sdROD

❷ Tea-trees or paperbarks prominent

- ❸ *E. amygdalina* dominant..... DRY-scAM
- ❸ *E. gunnii* dominant DRY-scGUN
- ❸ *E. ovata* dominant..... DRY-scOV
- ❸ *E. perriniana* dominant..... DRY-scPER
- ❸ *E. rodwayi* dominant DRY-scROD

❶ 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 gravels, sand, sandstone or other sediments

- ❷ *E. amygdalina* dominant DRY-hAM
- ❷ *E. globulus* dominant DRY-hGLOB
- ❷ *E. obliqua* dominant DRY-hOB
- ❷ *E. pauciflora* dominant..... DRY-hPAUC
- ❷ *E. pulchella* dominant DRY-gPUL or DRY-shPUL
- ❷ *E. risdonii* dominant..... DRY-hRIS
- ❷ *E. rubida* dominant..... DRY-hRUB
- ❷ *E. tenuiramis* dominant DRY-hTEN
- ❷ *E. viminalis* dominant..... DRY-hVIM

❶ 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 (e.g. dolerite)

- ❷ *E. amygdalina* dominant DRY-shAM
- ❷ *E. coccifera* dominant DRY-shCOC
- ❷ *E. cordata* dominant..... DRY-shCORD
- ❷ *E. dalrympleana* dominant DRY-shDAL
- ❷ *E. delegatensis* dominant DRY-shDEL
- ❷ *E. globulus* dominant DRY-shGLOB
- ❷ *E. obliqua* dominant DRY-shOB
- ❷ *E. pauciflora* dominant..... DRY-shPAUC
- ❷ *E. pulchella* dominant DRY-shPUL
- ❷ *E. tenuiramis* dominant DRY-shTEN
- ❷ *E. viminalis* dominant..... DRY-shVIM

CONSERVATION PRIORITIES AND ATTRIBUTES OF DRY SCLEROPHYLL FOREST / WOODLAND COMMUNITIES

Notes: # - 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		Cons. priority		Distribution in Midlands 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*	Broad valley flats, particularly in northern Midlands (e.g. Conara, Forest Vale, Longford).
		Substrate dolerite (or basalt)	Not associated with AIC	AD	<i>E. amygdalina</i> forest on dolerite	np	N	Common on dry hills, particularly in north (e.g. Black Jack Hill, McRaes Hills, Currajong Hills).
			Occurs with AIC	check	check	check	check	Local on lower slopes and flats (e.g. Epping Forest)
		Substrate mudstone		AM	<i>E. amygdalina</i> forest on mudstone	check	check	Mainly dry slopes at base of Western Tiers and in south (e.g. Gravelly Ridge).
		Substrate other		check	check	check	check	Local on lower slopes and flats (e.g. Epping Forest)
DRY-gCOC	Grassy <i>E. coccifera</i> forest/woodland			C	<i>E. coccifera</i> forest	A	N	Very localised on high altitude tiers and peaks (e.g. Mt Seymour, Mt Ponsonby).
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; often 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	Cool, dry upland dolerite slopes and tier surfaces (e.g. Mount Seymour, The Nipples, Jocks Knob).
DRY-gGLOB	Grassy <i>E. globulus</i> forest/woodland	<i>E. pulchella</i> present as codominant		P	<i>E. pulchella</i> - <i>E. globulus</i> - <i>E. viminalis</i> grassy shrubby forest	np	N	Dry dolerite slopes and ridges in south of region (e.g. Meehan Range, Mt Nelson).
		<i>E. pulchella</i> present as minor or subdominant species or absent		GG	Grassy <i>E. globulus</i> forest	A	Y*	Local on dolerite in eastern Midlands (e.g. Fonthill) and common on slopes and ridges in south (e.g. Craigow Hill, North Bruny, Plenty).
DRY-gGUN	Grassy <i>E. gunnii</i> forest/woodland			C	<i>E. coccifera</i> forest	A	N	Very localised on high altitude tiers subject to frost and poor drainage (e.g. Mt Seymour).
DRY-gMOR	Grassy <i>E. morrisbyi</i> forest/woodland			MO	<i>E. morrisbyi</i> forest	A	Y*	Very localised on dry hills on sediments (East Risdon NR, Calverts Hill, South Arm).
DRY-gOV	Grassy <i>E. ovata</i> forest/woodland			OV	Shrubby <i>E. ovata</i> - <i>E. viminalis</i> forest	A	Y*	Local on flats with impeded drainage, often fired frequently (e.g. Mt Nelson, Quoin Ridge, Jericho).

Floristic community code and name		Qualification	RFA community code and name		Cons. priority		Distribution in Midlands Region
					Floristic	RFA	
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 broad flats, on well drained sites on dolerite or basalt (e.g. Tunbridge, Ross).
		Substrate other	check	check	check	check	Occasional, mainly on sediments.
DRY-gPUL	Grassy <i>E. pulchella</i> forest/woodland	May occur locally with a heathy understorey	P	<i>E. pulchella</i> - <i>E. globulus</i> - <i>E. viminalis</i> grassy shrubby forest	np	N	Dry dolerite slopes and ridges in south of region (e.g. Meehan Range, Mt Nelson, Mt Ponsonby).
DRY-gRIS	Grassy <i>E. risdonii</i> forest/woodland		RI	<i>E. risdonii</i> forest	A	Y*	Very dry mudstone sites, often frequently burnt (e.g. Meehan Range, Rokeby Hills).
DRY-gROD	Grassy <i>E. rodwayi</i> forest/woodland		RO	<i>E. rodwayi</i> forest	A	Y	Poorly drained flats, often frequently fired, particularly in upland frost hollows (e.g. Big Den).
DRY-gRUB	Grassy <i>E. rubida</i> forest	Understorey often intermediate between grassy and heathy	V	<i>E. viminalis</i> grassy forest/woodland	A	Y	Local on dolerite flats, saddles and frost hollows in the south of region (e.g. Jocks Knob).
DRY-gTEN	Grassy <i>E. tenuiramis</i> forest	Substrate dolerite	TD	<i>E. tenuiramis</i> forest on dolerite	A	N	May occur locally on well drained dolerite flats and broad ridges in south of region.
		Substrate mudstone or sandstone	TI	Inland <i>E. tenuiramis</i> forest	A	Y*	Dry mudstone sites, often frequently burnt (e.g. Meehan Range, North Bruny, Meadowbank).
DRY-gVIM	Grassy <i>E. viminalis</i> forest	Substrate dolerite (or basalt)	V	<i>E. viminalis</i> grassy forest/woodland	A	Y	Common on dry dolerite hills and slopes (e.g. Little Flinty, Macquarie Tier, Nth Bruny, Dulcot).
		Substrate sand, alluvium, Tertiary gravels or ironstone	AIC	Inland <i>E. amygdalina</i> forest on Cainozoic deposits	A	Y*	Occasional on broad valley flats, particularly in northern Midlands (e.g. Cleveland).
		Substrate other	check	check	check	check	Uncommon, mainly on mudstone.
DRY-hAM	Heathy <i>E. amygdalina</i> forest	Substrate sand or alluvium (coastal and subcoastal areas)	AC	Coastal <i>E. amygdalina</i> forest	B [#]	N	Local in coastal areas in south of region (e.g. South Arm, Bruny Neck).
		Substrate sand, alluvium, Tertiary gravels or ironstone (non-coastal areas)	AIC	Inland <i>E. amygdalina</i> forest on Cainozoic deposits	A	Y*	Occasional on broad valley flats, particularly in northern Midlands (e.g. Cleveland, Epping Forest).
		Substrate sandstone (mainly Triassic)	AS	<i>E. amygdalina</i> forest on sandstone	A [#]	Y*	Well drained sandstone sites (e.g. Poatina, Long Ridge, Chauncy Vale, Woodsdale, Kingston).
		Substrate mudstone (mainly Permian)	AM	<i>E. amygdalina</i> forest on mudstone	check	check	Mainly dry slopes and well-drained flats in south of region (e.g. Tunnack, New Norfolk area).

Floristic community code and name		Qualification	RFA community code and name		Cons. priority		Distribution in Midlands Region
					Floristic	RFA	
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 in coastal areas.
DRY-hOB	Heathy <i>E. obliqua</i> forest		O	Dry <i>E. obliqua</i> forest	B	N	Local on well drained siliceous sites (e.g. Plenty).
DRY-hPAUC	Heathy <i>E. pauciflora</i> forest	Substrate sand, alluvium, Tertiary gravels or ironstone	AIC	Inland <i>E. amyg.</i> forest on Cainozoic deposits	A	Y*	Local on broad inland flats (e.g. Epping Forest) – mainly on sand. Occurs on one site at South Arm.
		Substrate sandstone, mudstone or other sediments	PS	<i>E. pauciflora</i> forest on sediments	B	N	Well drained sandstone sites in south of region (e.g. Monks Sugarloaf, Rhyndaston).
DRY-hRIS	Heathy <i>E. risdonii</i> forest/woodland	Understorey often intermediate between grassy and heathy	RI	<i>E. risdonii</i> forest	A	Y*	Very dry mudstone sites, often frequently burnt (e.g. Meehan Range, Rokeby Hills).
DRY-hRUB	Heathy <i>E. rubida</i> forest		check	check	A	check	Local in south of region, usually associated with <i>E. tenuiramis</i> or <i>E. pauciflora</i> forest
DRY-hTEN	Heathy <i>E. tenuiramis</i> forest		TI	Inland <i>E. tenuiramis</i> forest	A [#]	Y*	Slopes and flats on sediments in south of region (e.g. Chauncy Vale, Gravelly Ridge, Mt Bethune).
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. South Arm, Bruny Neck).
		Substrate non-coastal sand, alluvium, gravels or ironstone	AIC	Inland <i>E. amyg.</i> forest on Cainozoic deposits	A	Y*	Occasional on broad valley flats in inland areas (e.g. Cleveland, Preston).
		Substrate other	check	check	check	check	
DRY-sdAM and DRY-scAM	Sedgy <i>E. amygdalina</i> forest/woodland	Substrate sand or alluvium in (sub)coastal areas	AC	Coastal <i>E. amygdalina</i> forest	B [#]	N	Occasional around drainage lines and margins of marshes on a range of substrates (e.g. Bruny Neck, Diprose Lagoon area, Woodsdale, Western Creek).
	Scrubby <i>E. amygdalina</i> forest/woodland	Substrate sandstone (mainly Triassic)	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	A	Y	
			check	check	check	check	
		Substrate other	check	check	check	check	

Floristic community code and name		Qualification	RFA community code and name		Cons. priority		Distribution in Midlands Region
					Floristic	RFA	
DRY-sdGUN <u>and</u> DRY-scGUN	Sedgy <i>E. gunnii</i> forest/woodland Scrubby <i>E. gunnii</i> forest/woodland		C	<i>E. coccifera</i> forest	A	N	Very localised on poorly drained flats at high altitudes (e.g. Mt Seymour).
DRY-sdOV <u>and</u> 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 (e.g. Jackeys Marsh, Liffey, Meander, Meehan Range, Hooks Marsh, Huntingfield).
DRY-sdPER <u>and</u> DRY-scPER	Scrubby <i>E. perriniana</i> forest/woodland Sedgy <i>E. perriniana</i> forest/woodland	<i>E. rodwayi</i> prominent	RO	<i>E. rodwayi</i> forest	A	Y	Local on poorly drained flats on sandstone or mudstone. Known only from Hungry Flats (south of Tunnack). May be associated with <i>E. tenuiramis</i> forest, <i>E. rodwayi</i> forest or <i>Sphagnum</i> peatland.
		<i>E. tenuiramis</i> prominent	TI	Inland <i>E. tenuiramis</i> forest	A	Y*	
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. Little Den, Hungry Flats, Mt Ponsonby).
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. Occasional on shaded slopes in drier parts of the region, and moderately exposed slopes in wetter parts of the region (e.g. base of Western Tiers, Deddington area).
		Not DSC and substrate dolerite (or basalt)	AD	<i>E. amygdalina</i> forest on dolerite	np	N	Common on dry hills, particularly in north of region (e.g. Black Jack Hill, Poatina).
		Not DSC and substrate sandstone	AS	<i>E. amygdalina</i> forest on sandstone	A	Y*	Local on moderately shaded slopes on sandstone (e.g. Chauncy Vale, Monks Sugarloaf).
		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, particularly in northern Midlands.
		Not DSC and substrate mudstone)	check	check	check	check	Moderately shaded slopes and gully flanks or long unburnt sites (e.g. Gravelly Ridge).
		Not DSC and substrate other	check	check	check	check	Local on shaded or long unburnt sites.
DRY-shCOC	Shrubby <i>E. coccifera</i> forest		C	<i>E. coccifera</i> forest	A	N	Very localised on high altitude tiers (e.g. Mt Seymour, Mt Ponsonby, Quoin Mountain).

Floristic community code and name		Qualification	RFA community code and name		Cons. priority		Distribution in Midlands Region
					Floristic	RFA	
DRY-shCORD	Shrubby <i>E. cordata</i> forest		check	check	A	check	Very local, often on dolerite knolls and saddles, in south of the region (e.g. Mt Lloyd).
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; often associated with DRY-shDEL.
DRY-shDEL	Shrubby <i>E. delegatensis</i> forest		D	Dry <i>E. delegatensis</i> forest	np	N	Upland slopes, ridges and tier surfaces, often on rocky dolerite sites (e.g. Mt Ponsonby, Little Quoin, O'Connors Peak, Mt Hobbs).
DRY-shGLOB	Shrubby <i>E. globulus</i> forest	Substrate sand in coastal areas	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. globulus</i> forest.
		<i>E. pulchella</i> present as codominant	P	<i>E. pulchella</i> - <i>E. globulus</i> - <i>E. viminalis</i> grassy shrubby forest	np	N	Occasional on shaded, rocky or infrequently burnt dolerite sites in south of region (e.g. slopes of Wellington Range, North Bruny, Charlies Mount, Meehan Range).
		<i>E. pulchella</i> present as minor or subdominant species or absent	GG	Grassy <i>E. globulus</i> forest	A	Y*	
DRY-shOB	Shrubby <i>E. obliqua</i> forest	Understorey with similar amount of wet and dry sclerophyll shrubs and <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. Occasional on moister sites in drier parts of the region, and moderately exposed slopes in wetter parts of the region (e.g. base of Western Tiers, Deddington area).
		Not DSC	O	Dry <i>E. obliqua</i> forest	np	N	Common in moister lowland environments on less exposed slopes and gully flanks on several substrates (e.g. Meander, Brown Mtn, Wayatinah).
DRY-shPAUC	Shrubby <i>E. pauciflora</i> forest	Substrate dolerite (or basalt)	PJ	<i>E. pauciflora</i> forest on Jurassic dolerite	B	Yog	Frost hollows and broad flats, on well drained sites on dolerite or basalt.
		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. Cleveland, Epping Forest) – mainly on sand rather than ironstone or gravels.
		Substrate sandstone, mudstone or other sediments	PS	<i>E. pauciflora</i> forest on sediments	B	N	Well drained sandstone sites in south of region (e.g. Monks Sugarloaf, Rhyndaston).
DRY-shPUL	Shrubby <i>E. pulchella</i> forest	May occur locally with a heathy understorey	P	<i>E. pulchella</i> - <i>E. globulus</i> - <i>E. viminalis</i> grassy shrubby forest	np	N	Occasional on partly shaded dolerite slopes in south of region, forming a transition between wet and dry forests (e.g. Mt Nelson, Wellington Range).

Floristic community code and name		Qualification	RFA community code and name		Conservation priority		Distribution in Midlands Region
					Floristic	RFA	
DRY-shPUL	Shrubby <i>E. pulchella</i> forest		P	<i>E. pulchella</i> - <i>E. globulus</i> - <i>E. viminalis</i> grassy shrubby forest	np	N	Occasional on partly shaded dolerite slopes and flats in south of region, sometimes forming a transition zone between wet forests and dry forests (e.g. Mt Nelson, slopes of Wellington Range).
DRY-shTEN	Shrubby <i>E. tenuiramis</i> forest		TI	Inland <i>E. tenuiramis</i> forest	A	Y*	Slopes and flats on mudstone and sandstone in south of region (e.g. Chauncy Vale, Gravelly Ridge, Mt Bethune, Whitefoord, Meehan Range).
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 (e.g. base of Western Tiers, Deddington area).
		Not DSC and substrate dolerite (or basalt)	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 (may not occur in region).
		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 the Midlands 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 (<http://www.gisparks.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	Botanical name	Common name
Trees & shrubs	R	Ss	<i>Acacia pataczekii</i>	Wally's wattle
	R		<i>Gynatrix pulchella</i>	Hemp bush
	R		<i>Pimelea curviflora</i> var. <i>gracilis</i>	Curved rice flower
Ferns	V		<i>Asplenium hookerianum</i>	Spleenwort
	R		<i>Hypolepis muelleri</i>	Harsh ground fern
Herbs	R		<i>Senecio velleioides</i>	Forest groundsel
Grasses	R		<i>Deyeuxia benthamiana</i>	Bent grass
Other monocots	R		<i>Carex gunniana</i>	Mountain sedge
	R		<i>Thismia rodwayi</i>	Fairy lanterns

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>	Small spike mimosa
	R	Hs	<i>Acacia mucronata</i> subsp. <i>dependens</i>	Variable sallow wattle
	R	Hs	<i>Acacia ulicifolia</i>	Juniper wattle
	R		<i>Allocasuarina duncanii</i>	Duncan's she oak
	R	Ss	<i>Bossiaea obcordata</i>	Spiny bossiaea
	V		<i>Bertya tasmanica</i> subsp. <i>tasmanica</i>	Bertya
	R	Ss	<i>Epacris acuminata</i>	Clasping leaf heath
	V	Ms	<i>Epacris exserta</i>	South Esk heath
	V	Hs	<i>Epacris virgata</i> 'Kettering'	Southern pretty heath
			<i>Eucalyptus cordata</i>	Heart-leaved silver gum
			<i>Eucalyptus gunnii</i> subsp. <i>gunnii</i>	Cider gum
	E		<i>Eucalyptus morrisbyi</i>	Morrisby's gum
			<i>Eucalyptus urnigera</i>	Urn gum
	R		<i>Grevillea australis</i> var. <i>linearifolia</i>	Southern grevillea
	R	Prb	<i>Leucopogon virgatus</i> var. <i>brevifolius</i>	Shortleaf beard heath
	R		<i>Olearia hookeri</i>	Hooker's crimson tip daisy bush
	R	Prb	<i>Pentachondra ericifolia</i>	Matted pentachondra
	R		<i>Pimelea flava</i> subsp. <i>flava</i>	Yellow rice flower
	V		<i>Pomaderris elachophylla</i>	Small-leaf pomaderris
	R		<i>Pomaderris phyllicifolia</i> ssp. <i>phyllicifolia</i>	Narrow-leaf pomaderris

Life form	Status	Pc	Botanical name	Common name
Trees & shrubs	V	S	<i>Pultenaea humilis</i>	Dwarf bush pea
	E		<i>Spyridium eriocephalum</i>	Heath spyridium
	R		<i>Spyridium vexilliferum</i>	Winged spyridium
	V		<i>Stenanthemum pimeleoides</i>	Spreading stenanthemum
	R		<i>Westringia angustifolia</i>	Scabrous westringia
Herbs	R		<i>Brachyscome perpusilla</i>	Tiny daisy
	R		<i>Brachyscome radicata</i>	Rooted daisy
	R		<i>Brachyscome sieberi</i> var. <i>gunnii</i>	Sieber's daisy
	V		<i>Brunonia australis</i>	Blue pincushion
	R		<i>Centaurium spicatum</i>	Australian centuary
	R		<i>Cynoglossum australe</i>	Forget me not
	V		<i>Eryngium ovinum</i>	Blue devil
	V		<i>Glycine latrobeana</i>	Dwarf clover
	V		<i>Glycine microphylla</i>	Small-leaf glycine
	R		<i>Lobelia rhombifolia</i>	Branched lobelia
	R		<i>Scutellaria humilis</i>	Dwarf scullcap
	R		<i>Stellaria multiflora</i>	Rayless starwort
	R		<i>Teucrium corymbosum</i>	Forest germander
	R		<i>Veronica plebeia</i>	Trailing speedwell
Orchids	E		<i>Caladenia anthracina</i>	Black tipped spider orchid
	R		<i>Caladenia filamentosa</i>	Daddy long legs
	E		<i>Caladenia lindleyana</i>	Lindley's spider orchid
	E		<i>Caladenia pallida</i>	Rosy spider orchid
	E		<i>Caladenia sylvicola</i>	Forest fingers
	E		<i>Prasophyllum amoenum</i>	Dainty leek orchid
	E		<i>Prasophyllum apoxychilum</i>	Tapered leek orchid
	E		<i>Prasophyllum milfordense</i>	Milford leek orchid
	E		<i>Prasophyllum perangustum</i>	Knocklofty leek orchid
	E		<i>Pterostylis commutata</i>	Midland greenhood
	R		<i>Pterostylis grandiflora</i>	Superb greenhood
	R		<i>Pterostylis squamata</i>	Ruddy greenhood
Grasses	R		<i>Deyeuxia brachyathera</i>	Short bentgrass
	R		<i>Rytidosperma procerum</i>	Tall wallaby grass
Other monocots	R		<i>Aphelia gracilis</i>	Slender aphelia
	R		<i>Arthropodium strictum</i>	Chocolate lily
	R		<i>Uncinia elegans</i>	Handsome hook sedge
Non-vascular	V		<i>Xanthoparmelia jarmaniae</i>	Lichen

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		<i>Atriplex suberecta</i>	Saltbush
	R	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
	R		<i>Eucalyptus coccifera</i>	Snow peppermint
	R		<i>Eucalyptus perriniana</i>	Spinning gum
	R		<i>Eucalyptus risdonii</i>	Risdon peppermint
	R		<i>Eutaxia microphylla</i>	Common eutaxia
	R		<i>Gyrostemon thesioides</i>	Didymotheca
	E		<i>Hardenbergia violacea</i>	Happy wanderer
	R		<i>Hovea tasmanica</i>	Tasman hovea
	R	Prb	<i>Hibbertia</i> species 'Pontville'	Pontville guinea flower

	V		<i>Mirbelia oxylobioides</i>	Mountain mirbelia
	R		<i>Muehlenbeckia axillaris</i>	Matted lignum
Life form	Status	Pc	Botanical name	Common name
Trees & shrubs	X		<i>Ozothamnus selaginoides</i>	Clubmoss everlasting
	E		<i>Ozothamnus reflexifolius</i>	Reflexed everlasting
	R		<i>Pomaderris paniculosa</i> subsp. <i>paralia</i>	Shining pomaderris
	X		<i>Prostanthera cuneata</i>	Alpine mint bush
	V	Rh	<i>Prostanthera rotundifolia</i>	Round leaved mint bush
	V		<i>Pultenaea prostrata</i>	Prostrate bush pea
	R	Ms	<i>Tetradlea ciliata</i>	Pink bells
	R		<i>Wilsonia humilis</i>	Silky wilsonia
Ferns	R		<i>Wilsonia rotundifolia</i>	Round leaved wilsonia
	R		<i>Anogramma leptophylla</i>	Parsley fern
	V		<i>Doodia caudata</i>	Small rasp fern
	R		<i>Isoetes drummondii</i>	Plain quillwort
	R		<i>Isoetes elatior</i>	Tall quillwort
	R		<i>Pellaea calidirupium</i>	Hot rock fern
	R		<i>Pilularia novae-hollandiae</i>	Pillwort
			<i>Schizaea asperula</i>	Rough comb fern
Herbs	E		<i>Alternanthera denticulata</i>	Lesser joyweed
	R		<i>Asperula minima</i>	Grassy woodruff
	R		<i>Asperula scoparia</i> var. <i>scoparia</i>	Prickly woodruff
	R		<i>Asperula subsimplex</i>	Water woodruff
	E		<i>Barbarea australis</i>	Native wintercress
	R		<i>Brachyscome</i> aff. <i>radicans</i>	Snow daisy
	V		<i>Brachyscome rigidula</i>	Hairy cut leaf daisy
	R		<i>Callitriche umbonata</i>	Water starwort
	R		<i>Calocephalus citreus</i>	Lemon beauty heads
	R		<i>Calocephalus lacteus</i>	Milky beauty heads
	R		<i>Calystegia sepium</i>	Great bindweed
	R		<i>Colobanthus curtisiae</i>	Curtis' colobanth
	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>Epilobium pallidiflorum</i>	Showy willowherb
	R		<i>Epilobium willisii</i>	Carpet willowherb
	E		<i>Euphrasia scabra</i>	Yellow eyebright
	V		<i>Gratiola pubescens</i>	Hairy brooklime
	V		<i>Haloragis aspera</i>	Rough raspwort
	R		<i>Haloragis heterophylla</i>	Variable raspwort
	E		<i>Hyalosperma demissum</i>	Drooping hyalosperma
	V		<i>Hydrocotyle laxiflora</i>	Stinking pennywort
	E		<i>Isoetopsis graminifolia</i>	Grass cushions
	E		<i>Lepidium hyssopifolium</i>	Springy peppergrass
	R		<i>Lepidium pseudotasmanicum</i>	Peppergrass
	E		<i>Leptorhynchus elongatus</i>	Lanky buttons
	E		<i>Leucochrysum albicans</i> subsp. <i>albicans</i>	Hoary sunray
	R		<i>Limonium australe</i>	Sea lavender
	V		<i>Lobelia pratioides</i>	Poison lobelia
	R		<i>Lotus australis</i>	Austral trefoil
	E		<i>Lycopus australis</i>	Native gypsywort
	V		<i>Lythrum salicaria</i>	Purple loosestrife
	E		<i>Mentha australis</i>	River mint
	E		<i>Myosurus minimus</i>	Mouse tail
	V		<i>Myriophyllum integrifolium</i>	Water milfoil
	R		<i>Parietaria debilis</i>	Pellitory
	V		<i>Persicaria decipiens</i>	Slender knotweed
	E		<i>Persicaria subsessilis</i>	Bristly persicaria
	V		<i>Phyllangium divergens</i>	Wiry mitrewort
	V		<i>Plantago gaudichaudii</i>	Narrow plantain
	E		<i>Ranunculus prasinus</i>	Tunbridge buttercup
	R		<i>Ranunculus pumilio</i>	Ferny buttercup
	R		<i>Ranunculus sessiliflorus</i>	Small flowered buttercup

	R		<i>Rhodanthe anthemoides</i>	Chamomile sunray
	R		<i>Rumex bidens</i>	Mud dock
	R		<i>Scleranthus brockiei</i>	Brock knawel
	V		<i>Scleranthus diander</i>	Knawel
Life form	Status	Pc	Botanical name	Common name
Herbs	V		<i>Scleranthus fasciculatus</i>	Knawel
	R		<i>Senecio squarrosus</i>	Rigid grassland groundsel
	R		<i>Siloxerus multiflorus</i>	Small wrinklewort
	E		<i>Stackhousia gunnii</i>	Gunn's mignonette
	E		<i>Stenopetalum lineare</i>	Thread cress
	R	Prb	<i>Stylidium despectum</i>	Small trigger plant
	V		<i>Triptilodiscus pygmaeus</i>	Sunray
	R		<i>Utricularia australis</i>	Austral or yellow bladderwort
	V		<i>Velleia paradoxa</i>	Spur velleia
	R		<i>Villarsia exaltata</i>	Erect or yellow marsh flower
	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>Vittadinia muelleri</i>	Narrow leaf New Holland daisy
	R		<i>Xerochrysum bicolor</i>	Multicoloured buttons
Orchids	E		<i>Caladenia campbellii</i>	Thick stem caladenia
	R		<i>Caladenia caudata</i>	Tailed spider orchid
	E		<i>Caladenia congesta</i>	Black tongue caladenia
	V		<i>Caladenia dienema</i>	Wind swept spider orchid
	V		<i>Caladenia patersonii</i>	Paterson's spider orchid
	R		<i>Caladenia pusilla</i>	Tiny caladenia
	E		<i>Caladenia saggicola</i>	Sagg spider orchid
	E		<i>Chiloglottis trapeziformis</i>	Broad-lip bird orchid
	E		<i>Corunastylis brachystachya</i>	Short spiked midge orchid
	R		<i>Corunastylis nuda</i>	Tiny midge orchid
	X		<i>Corunastylis nudiscapa</i>	Dense midge orchid
	R		<i>Cyrtostylis robusta</i>	Large gnat orchid
	E		<i>Diuris palustris</i>	Swamp diuris
	R		<i>Hydorchis orbicularis</i>	Swamp onion orchid
	R		<i>Microtidium atratum</i>	Yellow onion orchid
	R		<i>Orthoceras strictum</i>	Horned orchid
	E		<i>Prasophyllum favonium</i>	Western leek orchid
	E		<i>Prasophyllum olidum</i>	Pungent leek orchid
	E		<i>Prasophyllum pulchellum</i>	Pretty leek orchid
	E		<i>Prasophyllum pyriforme</i>	Graceful leek orchid
	V		<i>Prasophyllum secutum</i>	Northern leek orchid
	E		<i>Prasophyllum taphanix</i>	Graveside leek orchid
	E		<i>Prasophyllum tunbridgense</i>	Tunbridge leek orchid
	E		<i>Pterostylis cucullata</i>	Leafy greenhood
	E		<i>Pterostylis cycnocephala</i>	Swan greenhood
	R		<i>Pterostylis falcata</i>	Sickle greenhood
	R		<i>Pterostylis pratensis</i>	Liawenee greenhood
	E		<i>Pterostylis rubenachii</i>	Arthur River greenhood
	E		<i>Pterostylis wapstrarum</i>	Fleshy greenhood
	E		<i>Thelymitra antennifera</i>	Rabbit ears
	E		<i>Thelymitra bracteata</i>	Leafy sun orchid
	E		<i>Thelymitra jonesii</i>	Azure 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
Grasses	R		<i>Agrostis diemenica</i>	Flat-leaf southern bent grass
	E		<i>Amphibromus macrorrhinus</i>	Long nosed swamp wallaby grass
	R		<i>Amphibromus neesii</i>	Swamp wallaby grass
			<i>Amphibromus sinuatus</i>	Sinuate swamp wallaby grass
	E		<i>Austrodanthonia popinensis</i>	Roadside wallaby grass
	R		<i>Austrostipa bigeniculata</i>	Double-jointed spear grass
	R		<i>Austrostipa blackii</i>	Crested spear grass
	R		<i>Austrostipa nodosa</i>	Knotty spear grass

	R		<i>Austrostipa scabra</i>	Rough spear grass
	R		<i>Deyeuxia densa</i>	Heath bent grass
	X		<i>Deyeuxia lawrencei</i>	Lawrence's bent grass
	R		<i>Lachnagrostis diemenica</i>	Flat-leaf southern bent grass
	R		<i>Lachnagrostis punicea</i> subsp. <i>filifolia</i>	Narrow leaf grass
	R		<i>Lachnagrostis punicea</i> subsp. <i>punicea</i>	Bristle blown grass
Life form	Status	Pc	Botanical name	Common name
Grasses	R		<i>Lachnagrostis robusta</i>	Tall blown grass
	R		<i>Poa mollis</i>	Soft poa grass
	R		<i>Puccinellia stricta</i> var. <i>perlaxa</i>	Spreading saltmarsh grass
Other monocots	R		<i>Aphelia pumilio</i>	Dwarf aphelia
	R		<i>Baumea gunnii</i>	Slender twig rush
	R		<i>Bolboschoenus caldwellii</i>	Sea club rush
	R		<i>Bolboschoenus medianus</i>	Marsh clubrush, river bulrush
	R		<i>Caesia calliantha</i>	Blue grass lily
	R		<i>Carex longibrachiata</i>	Drooping sedge
			<i>Carex tasmanica</i>	Curly sedge
	R		<i>Caustis pentandra</i>	Thick twist rush
	R		<i>Damasonium minus</i>	Star fruit
		Prb	<i>Dianella amoena</i>	Matted flax lily
	R	Hs	<i>Dianella longifolia</i> var. <i>longifolia</i>	Pale or smooth flax lily
	R		<i>Hypoxis vaginata</i>	Purple star
	R		<i>Isolepis habra</i>	Habra club rush
	R		<i>Isolepis stellata</i>	Star club rush
	R		<i>Juncus amabilis</i>	Gentle juncus
	R		<i>Juncus fockei</i>	Slender joint leaf rush
	R		<i>Juncus prismatocarpus</i>	Branching rush
	R		<i>Juncus vaginatus</i>	Clustered rush
	R		<i>Lepidosperma tortuosum</i>	Twisting rapier sedge
	R		<i>Lepidosperma viscidum</i>	Sticky sword sedge
	X		<i>Lepilaena australis</i>	Austral water mat
	R		<i>Lepilaena preissii</i>	Slender water mat
	R		<i>Potamogeton pectinatus</i>	Fennel pondweed
	R		<i>Ruppia tuberosa</i>	Tuberous tassel
	R		<i>Schoenoplectus validus</i>	River or lake club rush
	E		<i>Schoenus latelaminatus</i>	Medusa leaf bog rush
	V		<i>Tricoryne elatior</i>	Yellow rush lily, Autumn lily
	R		<i>Triglochin minutissimum</i>	Tiny arrowgrass
	R		<i>Trithuria submersa</i>	Trithuria
	R		<i>Vallisneria americana</i>	Ribbon weed
	R	Hs	<i>Xanthorrhoea australis</i>	Austral grass tree
Non-vascular	R		<i>Cetraria islandica</i> subsp. <i>antarctica</i>	Lichen
	V		<i>Melanelia piliferella</i>	Lichen
	E		<i>Neofuscelia subloxodella</i>	Lichen
	E		<i>Parmelia pallida</i>	Lichen
	R		<i>Parmeliopsis ambigua</i>	Lichen
	R		<i>Parmeliopsis hyperopta</i>	Lichen
	E		<i>Xanthoparmelia amphixantha</i>	Lichen
	V		<i>Xanthoparmelia mannumenisis</i>	Lichen
	R		<i>Xanthoparmelia microphyllizans</i>	Lichen
	E		<i>Xanthoparmelia molliuscula</i>	Lichen
	R		<i>Xanthoparmelia vicaria</i>	Lichen
	R		<i>Xanthoparmelia vicariella</i>	Lichen
	E		<i>Xanthoparmelia willisii</i>	Lichen
			<i>Pseudocephalozia paludicola</i>	Bryophyte

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. Other sites may be of greater commercial interest, for example riverine environments suitable for construction of dams, and forests and woodlands on fertile soils suitable for intensive agriculture or plantation development. Some sites of potential significance in the Midlands 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 Midlands 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	Typical dominants	Main understorey	Main PI type	Reason for significance	Example locations
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. ovata</i> , <i>E. pauciflora</i>	Heathy, sedgy, or grassy	E4	Priority communities and species (e.g. <i>Brunonia australis</i> , <i>Stenanthemum pimeleoides</i>)	Conara, Epping Forest, Cressy.
River flats, frost hollows and marshes	<i>E. ovata</i> , <i>E. rodwayi</i> , <i>E. pauciflora</i> , <i>E. viminalis</i> , blackwood	Variable - often scrubby, sedgy or grassy	Variable	Priority communities and species (e.g. <i>Acacia axillaris</i>)	Nile River, Blackwood Creek, Big Den, Woodside Rivulet
Grassy woodlands and other grassy ecosystems	<i>E. amygdalina</i> , <i>E. viminalis</i> , <i>E. rubida</i> , <i>E. pauciflora</i> , <i>E. ovata</i>	Grassy	E4, E5, Vz	Priority communities and species (e.g. <i>Pultenaea prostrata</i>)	Tunbridge, Queens Domain
Dry or poorly drained mudstone sites (mainly in south of region)	<i>E. tenuiramis</i> , <i>E. amygdalina</i> , <i>E. risdonii</i> , <i>E. rubida</i>	Heathy or shrubby	E4, E5	Priority communities and species (e.g. <i>Eucalyptus risdonii</i> , <i>E. morrisbyi</i> , <i>E. perriniana</i>)	Meehan Range, Rokeby Hills, South Arm, Goat Hills, Gravelly Ridge, Hungry Flats
Dry ridges, knolls, and upper slopes often with high rock cover (particularly dolerite and sandstone)	<i>E. amygdalina</i> , <i>E. pulchella</i> , <i>E. viminalis</i> , <i>E. globulus</i> , she-oak	Grassy, shrubby or bare	E4 or E5; S or Wr often present	Priority communities and vascular and non-vascular species (e.g. <i>Hyalosperma demissum</i> , <i>Xanthorrhoea australis</i>)	Gavins Sugarloaf, Hummocky Hills, Meehan Range, Grasstree Hill, Heathy Hills
High altitude peaks and plateaux above 550 m	<i>E. delegatensis</i> , <i>E. gunnii</i> , <i>E. coccifera</i> , <i>E. urnigera</i>	Grassy or shrubby	<E4	Priority communities and species (e.g. <i>Eucalyptus gunnii</i> , <i>E. coccifera</i>)	Mt Seymour, Mt Ponsonby, Quoin Mountain
Rocky outcrops including plates, large boulders, cliffs and scree fields	Variable, often <i>E. amygdalina</i> , <i>E. viminalis</i> , she-oak	Grassy, shrubby or bare	E4 or E5; S or Wr	Localised vascular and non-vascular species; susceptibility to disturbance	Mt Direction, Gunners Quoin, Heathy Hills, Jocks Knobs, Mt Cartwright

Continued next page

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

Site of potential significance	Typical dominants	Main understorey	Main PI type	Reason for significance	Example locations
Rocky gorges and creeklines particularly with N or W orientation or aspect	Variable, often <i>E. amygdalina</i> , <i>E. viminalis</i> , she-oak	Variable, often scrubby or shrubby	Variable	Priority communities and species (e.g. <i>Callitris oblonga</i> , <i>Epacris exserta</i> , <i>Prostanthera rotundifolia</i>)	Cataract Gorge, Coal River Gorge
Exposed or sandy coastal sites	<i>E. amygdalina</i> , <i>E. viminalis</i> , she-oak	Coastal shrubs	E5, S, Wr	Priority communities and species (e.g. <i>Cynoglossum australe</i>)	Betsey Island, Bruny Neck

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

Site of potential significance	Typical 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	Sassafras, myrtle, (<i>E. regnans</i> , <i>E. obliqua</i> , <i>E. viminalis</i>)	Rainforest, wet sclerophyll	S or T; >E3 often present	Relict rainforest and other priority communities.	Lower slopes of Wellington Range
Dry sclerophyll and damp sclerophyll forest and woodland at base of the Great Western Tiers	<i>E. obliqua</i> , <i>E. amygdalina</i> , <i>E. viminalis</i> , <i>E. ovata</i>	Shrubby or sedgy	E3, E4	Priority communities in transition zones between lowlands and uplands.	Western Creek, Jackeys Marsh
Grassy forests	<i>E. amygdalina</i> , <i>E. globulus</i> , <i>E. viminalis</i> , <i>E. pulchella</i> , <i>E. rubida</i>	Grassy	E4, E5, Vz	Priority communities and species (e.g. <i>Pultenaea prostrata</i>)	Big Flinty, Bisdee Tier

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*.

Much of the Midlands Region is too dry or cool for *Phytophthora* to establish successfully. However, the disease has been recorded from some sites in coastal and hinterland areas, including the Meehan Range and North Bruny Island, and there are localised occurrences in inland areas south of Launceston.

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. No Management Areas are located in the Midlands Region.

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.

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, English 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 Freycinet 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 those 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 parts of the Eastern Midlands, 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 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 have been 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).

Many reserves contain 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 reserves. Such effects could include:

- introduction or increased incidence of weeds (including wildlings of non-native species sown or planted in the FPP area);
- introduction or increased incidence of disease;
- change in microclimate in reserve (this is of most concern when vegetation along the reserve boundary contains localised wet forest vegetation (e.g. relict 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 the characteristics of the plant species and communities in the reserve. Advice should be sought from FPA if there is a possibility that botanical values in the reserve could be adversely affected by the forestry operation, regeneration treatment or post-operational land use.

Section 6 ASSESSING THE FLORA VALUES OF AN AREA

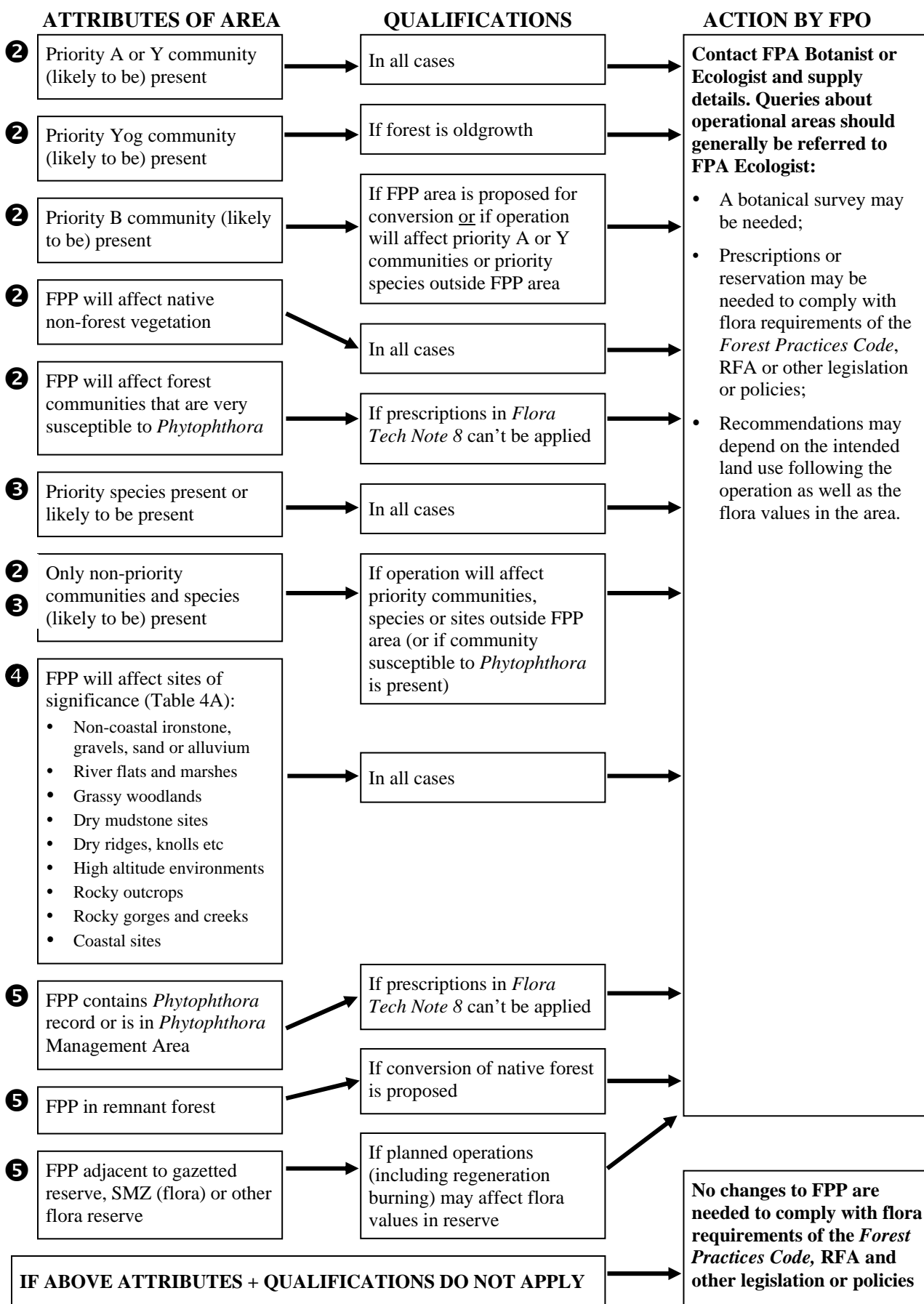
The main aim of the *Forest Botany Manual* is to allow Forest Practices Officers, and others involved with preparing Forest Practices Plans, to comply with the requirements of the *Forest Practices Code* and other policies and legislation. A similar assessment process can also be used for other areas 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 BOTANICAL VALUES OF AN AREA



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