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# **FOREST ECOSYSTEM MAPPING AND ANALYSIS**

## **B. REGIONAL ECOSYSTEMS**

**QUEENSLAND CRA/RFA STEERING  
COMMITTEE**

**FOREST ECOSYSTEM**

**MAPPING AND ANALYSIS**

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## SUMMARY

This report has been prepared for the joint Commonwealth/State Steering Committee which oversees the Comprehensive Regional Assessment (CRA) of forests in the South East Queensland CRA.

The Comprehensive Regional Assessment provides the scientific basis on which the State and Commonwealth governments will sign a Regional Forest Agreement (RFA) for the forests of the South East Queensland CRA region. This agreement will determine the future of the region's forests and will define those areas needed to form a comprehensive, adequate and representative (CAR) reserve system and those available for ecologically sustainable commercial use.

The objectives of this report are to define a surrogate for biodiversity based upon biotic and abiotic components of the landscape and to assess the current status of biodiversity using the surrogates that have been described. The base unit of surrogacy is the ecosystem or regional ecosystem that comprises aggregations of species and their abiotic surroundings (after Endangered Species Scientific Subcommittee 1995).

A total of 142 regional ecosystems (REs) are presently defined for Southeast Queensland, comprising 84 eucalyptus forest REs, 20 non-eucalyptus forest and woodland REs, 26 rainforest and vine thicket REs and 13 non forest REs.

Under definitions established in JANIS (1997) 10 REs have been classified as 'endangered' and 43 as 'vulnerable'.

Twenty-four REs are not known to be represented within protected areas such as national park. A large number of REs that are conserved are represented by small areas and are not replicated to any extent. Some landscapes in Southeast Queensland such as moist elevated Tertiary volcanics, sand plains and dunes of the coastal lowlands are relatively well conserved, while other landscapes such as the alluvial valleys of subcoastal parts of the bioregion are virtually unrepresented in conservation reserves.

About 30 forest and woodland regional ecosystems are harvested for sawlogs to varying extents. Forests containing blackbutt (4 REs) and spotted gum (7 REs) account for much of the timber harvested from state lands.

Much of the tenure of Southeast Queensland is freehold. This has some significant ramifications for planning a comprehensive adequate and representative reserve system based upon state lands as substantive tracts of forests are in private ownership. For example spotted gum - ironbark open forest to woodland on metamorphic hills and ranges (RE 12.11.6) has a present area of about 222 000ha (63% remaining) of which about 155 000 is on private land and 66 000 (17%) is within state forest. A further area of about 1000ha is currently contained within conservation reserves.

## CAVEATS

### 1. Statistics

The statistics provided for regional ecosystems in this report are based upon the data layer signed off by EHTC on 14 November 1997. The rationale behind a signed off data layer was to ensure that a standard data set was available for the RFA. Since November 1997 Queensland Herbarium botanists have made a number of detail changes to their vegetation mapping from which REs have been derived. The Queensland Herbarium has also updated 1995 vegetation cover statistics using 1997 LANDSAT data. Preliminary statistics indicating the clearing that has occurred between 1995-97 are provided in Table 4 in this report. The digital RE data layer will be altered to incorporate the revised Queensland Herbarium mapping and the updated 1997 cover data during November 1998. Revised statistics will therefore become available for reference during the integration phase of the RFA. It is not envisaged that changes will be very large numerically, as most of the Queensland Herbarium's alterations are minor (e.g. mis-typing of a polygon).

### 2. Threatening processes

Threatening processes including fragmentation are described for individual REs in the report (refer to Table 3 and Appendix 1). Logging is not presently listed as a threatening process for any RE with the exception of 12.3.3 *Eucalyptus tereticornis* forest on alluvium. For this RE it is the collective opinion of a number of field ecologists that on state lands, logging in combination with total grazing pressure and controlled use of fire has led to a decline in old trees and little to no regeneration.

### 3. Regional ecosystems as a surrogate for biodiversity and investigation of species patterns and geographical relationships within ecosystems

Steering Committee is requested to note that while the testing of the hypothesis that ecosystems are an effective surrogate for biodiversity within Southeast Queensland is a major research undertaking, vegetation and vegetation-environment (ecosystem) patterns have been shown to be good surrogates in a number of recent methodological studies within Australia (Kirkpatrick and Brown, 1991; Pressey and Nicholls, 1989; Brooker and Margules, 1995; Ferrier and Watson, 1996).

JANIS provides recommendations based upon conservation planning principles for dealing with forest ecosystems that are geographically extensive in planning a CAR reserve network. In addition to the JANIS recommendations flora survey site data and environment data (e.g. climate, topography) can be used to profile REs to determine the species commonly associated with an RE and to test whether samples of REs such as areas that may be selected as part of a CAR reserve system are capturing an acceptable level of the species used to characterise the RE. A large amount of data preparation and method development has been required before the hypothesis testing can begin. This is now complete and hypothesis testing is proceeding. Preliminary details will be available for Steering Committee during the next 2-3 months.

# 1. CHAPTER ONE

# INTRODUCTION

## 1.1 REGIONAL ECOSYSTEMS

Ecosystems or regional ecosystems when used in the context of biogeographic regions, (e.g. Thackway and Cresswell 1995), have been developed by the Queensland Department of Environment as part of a nature conservation planning framework (Sattler and Williams 1998 in prep.). The following definition of an ecosystem is based upon the Endangered Species Scientific Subcommittee (1995) :

“The concept of an ecological community is that species form groupings that occur in the wild as distinct geographic entities. Ecological communities are aggregations of species which interact with each other and their abiotic surroundings. With their abiotic surroundings, ecological communities form ecosystems.”

The imperative for defining ecosystems across Queensland using the best available data is based upon the contemporary view that whilst they are synthetic units, ecosystems can provide a practical and highly adaptable tool for planning and managing most native species and habitats (e.g. see Graetz and Wilson 1994; JANIS 1997). Issues such as tree management on leasehold lands and rapid urban expansion along the Queensland coast demonstrate the urgent need for developing an effective biodiversity surrogate such as regional ecosystems.

The identification of regional ecosystems is a two step process. The first stage deals with the broader abiotic landscape and defines patterns in the physical environment, in particular geology and landform. The resultant classification units are called land zones. Twelve land zones have been defined across Queensland - these were identified at a DoE workshop in March 1997 (Figure 1). Land zones are similar to landscape classification units defined in recent land resource mapping (e.g. Kent and Sorby 1993).

The second step in the recognition of regional ecosystems is the classification of biotic components of the landscape within individual land zones. Up until the present this is mostly limited to flora because of the paucity of fauna data across the state. The delineation of regional ecosystems and their areal extent utilises both land resource mapping and vegetation mapping. Land resource mapping is based upon an integrated approach to classifying landscapes (e.g. Mabbutt 1968) that incorporates attributes such as geology, soils, landform, local climate and vegetation. Vegetation mapping, whilst reflecting the response of a plants abiotic factors does not necessarily explicitly define these relationships. However establishing relationships between plant species, vegetation structure and environmental feature, at a broad landscape rather than single site scale has been the subject of specific investigation (e.g. Ridley 1962) or is viewed as an essential part of the

descriptive analysis of vegetation (e.g. McDonald and Elsol 1984). Consequently if an ecological approach is taken in the classification of vegetation, the resultant units are compatible with the units defined in land resource mapping.

In Southeast Queensland, vegetation mapping rather than land resource mapping has been used to delineate regional ecosystems. The classification hierarchy used to delineate regional ecosystems is summarised in Figure 1. Some broad vegetation types occur across a range of geology/landform classes and consequently these are classified into a number of different vegetation mapping units and regional ecosystems using the land zone approach. For example tall open forest dominated by blackbutt (*Eucalyptus pilularis*) that grows on a range of different substrates (usually siliceous soils of fairly low fertility) in higher rainfall parts of Southeast Queensland can be subdivided into:

- 12.2.8 blackbutt tall open forest on land zone 2 - high dunes (e.g. Fraser Island);
- 12.5.6 blackbutt tall open forest on land zone 5 - remnant Tertiary surfaces (plateaus) with deep red soils (e.g. Blackbutt Range);
- 12.9/10.14 blackbutt tall open forest on land zone 9/10 - sedimentary rocks (coarse grained sandstone - rugged hills with gorges) (e.g. Helidon Hills);
- 12.12.2 blackbutt tall open forest on land zone 12 - acid igneous rocks (mountains) (Mt. Mee, parts of Conondale Range).

The classification of a single broad vegetation type such as blackbutt forest into several different regional ecosystems on the basis of geology and landform may be reflected among other plant species present within a community. For example blackbutt forest on high dunes contains a distinctive suite of understorey species that are absent from or uncommon in the other blackbutt types (e.g. *Leucopogon margarodes*, *Monotoca scoparia*, *Macrozamia douglasii*). While some vegetation units have been subdivided to form regional ecosystems there has also been some grouping of mapping units. The grouping that has occurred is largely a consequence of the vegetation mapping in which thirty-five whole or part 1:100 000 vegetation map sheets compiled by a number of different authors have had to be linked together. Grouping has occurred in such a way to highlight the types of relationships described in 3.1 below.

As noted previously there are a lack of fauna data to inform the description of ecosystems to any extent with the exception of species such as ground parrot (*Pezeporus wallicus*) with specialised habitat requirements and regional ecosystems such as *Eucalyptus tereticornis* open forest and woodland on alluvium that contains large old trees providing habitat for hollow dependant species (e.g. refer to REs 12.2.12 and 12.3.3 in Appendix 1). Information from the fauna surveys that have been undertaken in Southeast Queensland as part of Comprehensive Regional Assessment will enable fauna to be incorporated in far greater detail in the future for general conservation planning in the region.

# 2. CHAPTER TWO

# METHODOLOGY

## 2.1 DATA SOURCES

The major source of data for the regional ecosystems analysis has been provided by the Queensland Herbarium. Data sources used to prepare the regional ecosystems coverages for the SEQ bioregion are listed in Appendix 1. Mapping is mostly at a scale of 1:100 000 with some larger scale mapping from other vegetation studies (e.g. 1:25 000) incorporated for limited areas.

A flora database containing in excess of 250 000 records can be interrogated to provide an indication of whether particular sites are sampling the more common and abundant species associated with regional ecosystems as well as providing an indicator of the degree of heterogeneity within ecosystems (see 2.6 below).

## 2.2 DELINEATION OF REGIONAL ECOSYSTEMS

Vegetation types, as delimited on pre-clearing and remnant vegetation maps, have been translated to regional ecosystems by combining vegetation, geology, soils and topography attributes (Figure 1). In the recognition of REs, emphasis is placed upon recurrent patterns in the response of species to environmental attributes. Thus characteristic or diagnostic species or suites of species have been identified and these are used as the basis of the RE descriptions in Appendix 1. For ecosystems such as open forest and rainforest, these species are mostly overstorey trees but other diagnostic growth forms and vegetation structural features have also been used to describe REs in greater detail. Where variation in species composition occurs within a regional ecosystem at a microhabitat level and is recurring and predictable it is incorporated into the regional ecosystem description. Localised and distinctive variation (i.e. not recurring and predictable) has tended to result in the recognition of a new regional ecosystem. Relationships between species and major environmental features and how these are reflected in delineating regional ecosystems are shown in diagrams in Figures 2 and 3.

In Southeast Queensland REs have been delineated and described over the past several years as individual vegetation map sheets have become available. This has entailed amalgamating map units across different map sheets and taking into account the extent to which different authors lump or split vegetation classification units. This task was virtually completed when the Queensland Herbarium seamless map units became available at the end of 1997. Consequently, where differences between the seamless vegetation map units and REs occur, individual map units rather than a seamless unit or units continue to be referenced in Appendix 1 as the data source on which the RE has been based (e.g. refer to RE 12.11.3 in Appendix 1). Such differences are due to either:

- more rigid application of geology and landform relationships in the derivation of REs compared with seamless vegetation units; or
- differences in the way units of individual map sheets have been grouped - the seamless vegetation map units are probably more sensitive to minor differences in species composition than the REs where the emphasis is placed upon recurrent patterns in the response of species to geology, landform and local climate. For example seamless unit G29 is characterised by *Corymbia* spp. and *Eucalyptus longirostrata* and grows predominantly on old red soils of remnant Tertiary surfaces in inland parts of the bioregion. These occurrences are fairly localised. It has been combined with G33 that also occurs in a few places on the old red soils of remnant Tertiary surfaces in inland parts of the bioregion to form RE 12.5.1. G33 also contains *Corymbia* spp., *Eucalyptus longirostrata* as well as *E. melanoleuca*. The occurrence of *Eucalyptus melanoleuca* is not overlooked - the RE 12.5.1 description in Appendix 1 indicates it is a rare species and consequently can be dealt with in conservation assessment as part of a point location data layer of species of species interest;
- for rainforests, the seamless map units have been more finely split on the basis of geographical patterns in species composition than the REs (see 2.6 below).

Tables 1 and 2 indicate the relationship between seamless vegetation map units and REs.

The Queensland Herbarium preclearing and remnant vegetation coverages have been used as the basis for compilation of corresponding preclearing and remnant regional ecosystem maps. These data have been used to derive the statistics that are summarised in Table 3, using a Geographic Information System (GIS). The analyses took into account heterogenous polygons (see following sections). Some protected areas have been mapped at larger scales (e.g. 1:25 000) and this information has been used to refine some of the protected area statistics provided in Table 3.

Regional ecosystems have been assessed using JANIS (1997) criteria to determine whether they are endangered or vulnerable. An endangered RE is defined thus:

“ An endangered ecosystem is one where its distribution has contracted to less than 10% of its former range or the total area has contracted to less than 10% of its former area, or where 90% of its area is in small patches which are subject to threatening processes and unlikely to persist”.

A vulnerable ecosystem is one which is:

- “i) approaching a reduction in areal extent of 70% within a bioregional context and which remains subject to threatening processes; or
- ii) not depleted but subject to continuing and significant threatening processes which may reduce its extent.”

JANIS (1997) also defines rare ecosystems in recognition of limited natural extent:

“A rare forest ecosystem is defined as one with a restricted geographic distribution, based on 1:100 000 mapping within a region, in which the total range is generally less than 10 000ha; or where patch sizes are generally less than 100ha, where such patches do not aggregate into significant areas”.

The JANIS (1997) definition of rare has been altered in some RFAs such as Tasmania to include ecosystems that have a present area less than 1000ha due to significant depletion. This expanded definition of rare has been adopted here.

Some REs occur across a range of geographic and environmental conditions. Environmental conditions can be broadly grouped into topographic (e.g. slope, aspect, etc.) and climatic (e.g. temperature and rainfall). These conditions enable a profile to be built up and described for any particular ecosystem occurrence. This profile can then be used to assess the representativeness of the ecosystem. For example, if it was found that an area selected for a particular ecosystem was an atypical occurrence, it could be rejected or selected for inclusion with other areas which capture the overall variation that occurs across the range of the ecosystem. Therefore, it is possible to check the selection of areas based upon this profile obtained from the pre-clearing extent of the ecosystem. Vegetation site data can also be accessed in conjunction with regional ecosystems to address issues such as representativeness and to assess whether nodes or focal areas sample the more common and abundant species associated with individual regional ecosystems.

## **2.3 HETEROGENEOUS POLYGONS**

The Queensland Herbarium mapping contains a mixture of polygons containing a single vegetation type and polygons containing more than one vegetation type. There are a number of factors accounting for recognition of heterogeneous polygons including:

- localised occurrences of a vegetation type that is too small to map at the given scale of 1:100 000 (e.g. patch of shrubland on top of a mountain),
- mosaic of different vegetation types is present that cannot be satisfactorily delineated at 1:100 000, and
- presence of linear vegetation types (e.g. riparian vegetation along watercourses) that cannot be satisfactorily delineated at 1:100 000.

Where polygons contain more than one type the vegetation mappers have provided an estimate of the proportion of each type in the polygon. The recognition of more than one unit within polygons is a means of retaining information that would normally be lost or incorporated into more generalised units if scale limitations were rigidly adopted. Where vegetation polygons contain a mosaic of vegetation types, the spatial extent and boundary of a regional ecosystem may not be able to be closely defined within the polygon even though the areal extent of the type can be determined.

## **2.4 AMALGAMATING FOREST REGIONAL ECOSYSTEMS INTO BROADER FOREST GROUPINGS**

Regional ecosystems could be grouped on the basis of species composition into broad forest types if required. For example the blackbutt forests described in 1.1 above could be grouped to form a broad type “blackbutt tall open forest” comprising REs 12.2.8, 12.5.6, 12.9/10.14, 12.12.2. Grouping of ecosystems has been undertaken to provide more generalised information within the CRA for old growth disturbance classification and fauna modelling.

It is important to note however that grouping of regional ecosystems into broad forest types may result in any appreciable reduction in the number of heterogeneous polygons. The broad forest types would also mask many of the components of biodiversity that a CAR-based reserve system aims to capture.

## **2.5 USE OF REGIONAL ECOSYSTEM MAPS TO DEFINE AREAS OF CONSERVATION INTEREST**

Analyses based upon CAR criteria using regional ecosystems can be undertaken to inform the development of reserve options for Southeast Queensland. For example, areas that contain a local concentration of regional ecosystems (ecosystem-rich) including some that are poorly conserved may provide a useful basis around which to start developing some reserve options. Certain areas have been distinguished as being highly distinctive during the process of compiling the seamless regional ecosystem coverage. Some of these coincide with areas such as Kroombit Tops that is different from surrounding country as it is a topographic isolate - the regional ecosystems therefore reflect its topo-climatic distinctiveness. However, other areas that are highly distinctive are less well known. For example two areas that have shown up as being especially diverse in terms of geological and vegetation patterns include an area south of Gayndah on the drier western margins of the bioregion and the Great Dividing Range north of Toowoomba (e.g. Ravensbourne - Crows Nest). The latter locality is influenced in terms of complexity by sharp moisture and temperature gradients and contains a catena of eucalyptus forest diversity. These two examples illustrate patterns that are definable intuitively - systematic analysis of regional ecosystems enables areas to be defined using a broad range of different criteria and decision rules.

## **2.6 USING REGIONAL ECOSYSTEMS AT FINER SCALES OF RESOLUTION**

Regional ecosystems as their name suggests are intended for application at the bioregional level. However, they also provide a framework for use at finer scales of resolution. For example, the species assemblages described for some REs contain known local patterns in species composition - this is especially true of some rainforest REs. On the basis of the present level of understanding, distribution patterns among rainforest species may be related to the sifting of species that has occurred during climate changes during the past 400 000 years (e.g. refer to Project 3.1 described in Annual Report 1996-1997, Co-operative Research Centre for Tropical Rainforest Ecology and Management, Queensland) as well as environmental factors. However environmental factors such as rainfall may be able to be correlated with local patterns in species composition in other vegetation types especially *Eucalyptus* forests. Where this can be demonstrated it may warrant recognition of RE subtypes, especially for REs that are widely distributed.

Comprehensive Regional Assessment now has available a number of important data sets for investigating species: environment patterns and relationships at finer scales of resolution, including:

- CORVEG (vegetation site sampling database)
- forestry type maps and databases and large scale maps for protected areas
- digital elevation model, climate model and substrate/fertility models

This information will be used to help support and inform the integration phase of the CRA by providing detailed information about the species composition and environmental relationships of forest REs, assessing the use of REs as a surrogate for biodiversity by identifying the suite of species of all life forms commonly associated with an RE throughout its range and, where appropriate, identifying RE subtypes.

## **2.7 DEFINITION OF DIFFERENT VEGETATION STRUCTURAL TYPES**

Terms such as open forest and woodland used in the description of vegetation broadly follow the Queensland Herbarium (refer to Report A. Vegetation Mapping). The term wet sclerophyll forest is used in the sense of Ashton (1981) and rainforest types are based upon Webb (1968). The term moist sclerophyll forest is also introduced here to describe *Eucalyptus* forests growing under moderate rainfall regimes or in sheltered situations in which the understorey may contain scattered broad-leaved shrubs and vines (e.g. *Breynia oblongifolia*, *Clematis glycinoides*) with ferns and herbaceous species often present in the ground layer (e.g. *Doodia* spp., *Geranium homeanum*).

# 3. CHAPTER THREE

## RESULTS

### 3.1 INVENTORY AND DESCRIPTION OF REGIONAL ECOSYSTEMS

A total of 142 regional ecosystems have been recognised. A breakdown of ecosystems by broad vegetation classes indicates:

eucalyptus forest	52
eucalyptus woodland	31
non-eucalyptus forest and woodland	20
rainforest and vine thicket	26
non-forest	13
	<b>142</b>

A detailed description of regional ecosystems is contained in Appendix 1.

Some key features of the vegetation of the region that have been reflected in the recognition of REs include:

- Compared with southeast Australia there is a tendency for rainforest to replace eucalyptus vegetation especially on higher fertility soils and/or in the absence of fire. Rainforest is estimated to have occupied about 9% of the region (approximately 600 000ha) at the time of European settlement.
- Partly as a consequence of the pattern described under the first dot point, wet sclerophyll forest or forest with a potential to develop into wet sclerophyll forest (generally forest initiated by large scale disturbance promoting the regeneration of species including *Eucalyptus grandis* and/or *E. saligna* and/or *Lophostemon confertus* and/or *Syncarpia hillii* and/or *E. microcorys* and/or *E. resinifera*) has a limited distribution (approximately 100 000ha or 1.5% of the bioregion). In addition to forests in which the aforementioned species are common other eucalyptus types characteristic of higher rainfall parts of the region include *Eucalyptus pilularis* and *E. campanulata* or *E. montivaga* forests that generally occur on lower fertility substrates and develop an understorey of shrubs and ferns rather than the broad-leaved trees of other wet sclerophyll forest types (approximately 100 000ha or 1.5% of the bioregion) and “moist” sclerophyll forest that occur somewhat lower or more seasonal rainfall regimes than typical wet sclerophyll forest. Characteristic species of moist forests include *Eucalyptus siderophloia* and *E. propinqua* in the southern half of the bioregion, *E. cloeziana* east of Gympie and *E. decolor*, *E. acmenoides*, *E. resinifera* and *Syncarpia glomulifera* in the central and northern parts of the

region. These forest types occupied about 200 000ha or 3% of the bioregion and can develop an understorey of broad-leaved species especially species characteristic of Araucarian rainforests in the absence of fire.

- Eucalypt forests and woodlands in which one or a few species are predominant are restricted to wettest and drier habitats. Many of the forests of areas receiving approximately 900-1250mm rainfall p.a. are mixed in terms of tree species composition and it is not unusual for 6-8 tree species to be present locally.
- There are some pronounced north-south trends in terms of forest composition within the bioregion. For example, a number of eucalyptus species characteristic of coastal mid eastern Australia are at the northern most part of their geographic range in the Gympie-Bundaberg area (e.g. *Eucalyptus pilularis*, *E. racemosa*, *E. propinqua*, *E. siderophloia*, large-leaved form of *Lophostemon confertus*, *E. microcorys*).
- Woodlands especially ironbark woodlands (*Eucalyptus crebra* and/or *E. melanophloia*) occupied about 15% of the region (1.0m ha) and *Eucalyptus tereticornis* woodland and forest on alluvial plains a further 0.7m ha (10% of bioregion).

## 3.2 REGIONAL ECOSYSTEM STATISTICS

For individual regional ecosystems, the preclearing extent, present extent and area within conservation reserves is presented in Table 3.

The extent remaining and size and distribution of remnants provide an indication of the degree of threat and threatening processes that are documented in Appendix 1. When extent remaining and degree of threat are taken into account 10 REs are classified as 'endangered' and 43 as 'vulnerable'. Endangered and vulnerable ecosystems and ecosystems that are naturally rare and/or rare due to significant depletion are listed in Table 4.

Table 1 indicates the extent to which individual REs are represented in protected areas.

The regional ecosystems that have the best representation in protected areas are associated with the beach ridges, dunes and coastlines of the coastal lowlands including islands (land zones 1 and 2), the basalts and rhyolites (land zone 8 - Cainozoic igneous rocks) of the Scenic Rim south and southwest of Brisbane and the Bunya Mountains, rocky elevated country of little use for grazing and timber production (e.g. REs 12.12.9, 12.12.27) and the sedimentary rocks of the Cooloola area (e.g. RE 12.9/10.4). In general terms land zone 9/10 - sedimentary rocks, land zone 11 - metamorphic rocks and land zone 12 - older volcanic rocks are poorly conserved. In terms of areal extent, the most poorly conserved regional ecosystems are the woodlands associated with better quality agricultural and grazing lands (e.g. REs 12.3.3, 12.3.10, 12.5.5, 12.12.7, 12.12.8). Drier forests and woodlands are also generally poorly conserved. For example forests and woodlands containing the ubiquitous spotted gum/lemon-scented gum (*Corymbia citriodora*) including REs 12.5.7, 12.9/10.2, 12.9/10.5, 12.9/10.17, 12.11.5, 12.11.6, 12.12.3, 12.12.5 covered 1.4m ha or 21% of the region prior to clearing yet only about 9000ha are contained within protected areas.

Clearing for agriculture, pasture, urban areas and rural residential settlement fringing urban areas has reduced the remaining areas of some regional ecosystems to a small proportion of their notional pre-clearing extent. The regional ecosystems most impacted by clearing are those of better quality,

agricultural and grazing lands (e.g. RE 12.3.3). Ecosystems of the coastal fringe (e.g. RE 12.2.7, 12.3.5) have been depleted in southern mainland parts of the bioregion but their status is offset by remnant areas on islands and along the coastal lowlands from Cooloola northwards.

### 3.3 REGIONAL ECOSYSTEMS UTILISED FOR NATIVE HARDWOOD PRODUCTION

Regional ecosystems known to contain better quality stands of commercial native hardwood timber species and are presently in areas available for logging on state lands include:

- 12.3.2 flooded gum ± other species such as brush box in gullies and fringing watercourses in high rainfall areas
- 12.3.3 forest red gum ± other species on alluvial plains (**vulnerable**; whilst the species remains abundant, 90% of habitat has been cleared or thinned and remnants are often young and contain introduced grasses)
- 12.5.1 mixed forest often with spotted gum on Tertiary surfaces
- 12.5.6 mixed tall moist forest with Queensland grey ironbark ± tallowwood, blackbutt on Tertiary surfaces (**vulnerable**)
- 12.5.7 lemon-scented gum/yellow stringybark open forest on Tertiary surfaces
- 12.8.8 Sydney blue gum or flooded gum ± brush box on Cainozoic igneous rocks
- 12.9/10.1 mixed tall open forest with pink bloodwood, red mahogany tallowwood, flooded gum etc. on sedimentary rocks in moist coastal areas (**vulnerable**)
- 12.9/10.2 spotted gum/lemon-scented gum open forest on sedimentary rocks
- 12.9/10.14 blackbutt tall open forest on sedimentary rocks
- 12.9/10.17 mixed moist tall open forest with stringybark, grey gums, ironbarks ± spotted gum on sedimentary rocks
- 12.9/10.20 New England blackbutt open forest on sedimentary rocks
- 12.9/10.21 yellow stringybark open forest on sedimentary rocks
- 12.11.2 Sydney blue gum or flooded gum with tallowwood, brush box etc. on metamorphics ± interbedded volcanics
- 12.11.3 Queensland grey ironbark, grey gum tall open forest on metamorphics
- 12.11.5 mixed open forest with stringybarks, grey gums, ironbarks, spotted gum on metamorphics
- 12.11.6 spotted gum open forest on metamorphics

- 12.11.16 tall open forest with Gympie messmate on metamorphics
- 12.11.17 yellow stringybark tall open forest on metamorphics
- 12.12.2 blackbutt tall open forest on older volcanic rocks
- 12.12.3 mixed tall open forest with stringybarks, grey gums, ironbarks, spotted gum on older volcanics
- 12.12.4 yellow stringybark, gum-topped ironbark, turpentine tall open forest on older volcanics including granite
- 12.12.5 spotted gum/lemon-scented gum on older volcanics
- 12.12.11 yellow stringybark tall open forest on older volcanics including granite
- 12.12.15 pink bloodwood, grey gum, tallowwood, Queensland grey ironbark tall open forest on older volcanics
- 12.12.20 Sydney blue gum tall open forest on older volcanics

Some other regional ecosystems contain species that are harvested for sawlogs in some situations, but are often of limited commercial value because of poor form and hollows. Examples include:

- 12.11.7 narrow-leaved ironbark woodland on metamorphics
- 12.12.7 narrow-leaved ironbark woodland on older volcanics (**vulnerable**)
- 12.9/10.19 broad-leaved red ironbark open forest on sedimentary rocks

Many of the better quality forests containing native hardwood species have not been substantially depleted by clearing and a high proportion of their respective pre-clearing area remains. The exceptions are those types growing on better quality sites and/or higher rainfall parts of the region. These have been subject to competition from other land uses since European settlement (e.g. REs 12.5.6, 12.11.16) as well as being naturally restricted in some instances (e.g. (12.9/10.1). The aforementioned spotted gum forests and woodlands remain relatively abundant in the landscape but have been subject to clearing and thinning to promote pasture - for example RE 12.9/10.2 has been reduced in area from 220 000ha to 82 000ha (37% remaining). For extensive forest types such as those containing spotted gum, the total area within state forest, whilst tens of thousands of hectares, is only a small proportion of the total pre-clearing area in some cases; e.g. RE 12.11.6 had a notional pre-clearing area of 348 000ha of which 66 500ha (19%) is contained in state forest. This example serves to illustrate the extent to which land tenure influences the distribution and extent of forests remaining in the region.

### 3.4 BLACKDOWN TABLELAND REGIONAL ECOSYSTEMS

Blackdown Tableland is a moist topographic isolate situated within the Brigalow Belt bioregion. Upland parts of Blackdown Tableland have climatic similarities with Kroombit Tops in Southeast

Queensland. The upland forests of Blackdown Tableland contain narrow endemic species and consequently are classified into distinctive REs that have no direct equivalents in SEQ. A narrow fringe of slopes and foothills country is included within the parts of Blackdown Tableland defined for inclusion in the RFA. These areas support small areas of REs characteristic of the surrounding Brigalow Belt bioregion. For planning purposes it is recommended that the RFA focus on the upland REs only. The total areas of upland REs and percent within protected areas include:

RE	Preclearing area (ha)	Remnant area (%)	% in protected area
11.10.2	310	310 (100)	97
11.10.5	18 900	18 900 (600)	42
11.10.13	16 100	16 100 (100)	78

- 11.3.4 *Eucalyptus tereticornis*, *Angophora floribunda* open forest on alluvium - base of tableland. Widespread in eastern Brigalow Belt and affinities with SEQ 12.3.3.
- 11.9.5 *Acacia harpophylla* woodland on labile sedimentary rocks - base of tableland. Widespread in Brigalow Belt
- 11.5.2 *Eucalyptus crebra*, *Corymbia clarksoniana* woodland on duricrusted Cainozoic sand plains. Other species are present in patches including *Eucalyptus tenuipes*, *Lysicarpus angustifolius*, *E. populnea* *Acacia shirleyi* - base of tableland. Fairly restricted distribution in Brigalow Belt.
- 11.10.1 *Corymbia citriodora*, *Eucalyptus crebra* tall open forest to woodland on sandstone scarps. Occurs in other parts of Brigalow Belt such as Carnarvon, Expedition Range.
- 11.10.2 *Eucalyptus propinqua*, *Syncarpia glomulifera*, *E. acmenoides*, *Angophora leiocarpa*, *E. suffulgens* tall open forest on sandstone in vicinity of cliffs. Upland RE. Restricted to Blackdown and Carnarvon.
- 11.10.5 *Eucalyptus sphaerocarpa* and/or *E. mensalis* and/or *E. saligna* tall open forest on sandstone tableland. In places growing on residual red soils (land zone 5). Upland RE. Restricted to Blackdown Tableland.
- 11.10.13 *Eucalyptus cloeziana*, *E. melanoleuca*, *E. sphaerocarpa*, *Corymbia* spp. open forest on sandstone, lower slopes and spurs. Upland RE. Restricted to Blackdown Tableland.

### 3.5 THE EFFECT OF CLEARING FROM 1995 TO 1997

A preliminary analysis has been undertaken using 1997 data to determine the loss of REs through clearing between 1995 and 1997 (Table 5). The data presented in the table are restricted to REs that have lost approximately 1% or greater of 1995 area and where areas lost have been greater than 10ha. The clearing that has occurred during the past two years has occurred across a broad range of REs. Coastal REs and REs of grazing areas tend to have lost the biggest areas including 12.3.5, 12.5.12, 12.9/10.2, 12.12.5, 12.12.7, 12.12.8 and 12.12.23. Significantly the greatest numerical loss has been in spotted gum forest REs which are valuable in terms of native hardwood production.

## Explanatory notes

Regional ecosystems are identified by a three part number; the first part refers to the bioregion (always 12 in the case of Southeast Queensland), the second to the land zone and the third to the ecosystem. Regional ecosystems are partly defined from the geomorphic situation or land zone in which the vegetation community occurs. The land zone classification for the State is described in detail in Sattler (1998) *The Conservation Status of Queensland's Bioregional Ecosystems*.

The regional ecosystems descriptions include distribution, conservation status, representation in protected areas (total area given in brackets) and special ecological values. The description also includes an indication of the provinces in which REs occur — provinces are a finer-scale classification of landscapes within biogeographic regions (a full description is contained in Sattler, 1998).

Provinces can be used in conservation planning in recognition of the variation that can occur within more widely distributed REs in response to present day gradients in temperature and rainfall and as a consequence of species sifting in response to historical events (e.g. Pleistocene climate changes). The provinces described for Southeast Queensland are indicated in Figure 4.

# Regional ecosystems of Southeast Queensland

**Land zone 1:** Quaternary marine deposits.

## Regional ecosystem 12.1.1

**Description:** *Casuarina glauca* ± *Melaleuca quinquenervia* or *M. fluviatilis* (in extreme north of bioregion) open forest on margins of Quaternary estuarine deposits.

**Provinces:** 4, 8, 9, 10.

**Protected areas:** Bribie Island NP (150ha), Poona NP (730ha); also numerous protected areas <1000ha.

**Extent reserved:** Low.

**Comments:** Subject to weed invasion, especially groundsel *Baccharis halimifolia*. Can extend inland beyond tidal influence.

**Estimated extent:** 48% remains of a preclearing area of about 13 700ha.

**Conservation status:**

## Regional ecosystem 12.1.2

**Description:** Saltpan vegetation comprising *Sporobolus virginicus* grassland and samphire herbland on Quaternary estuarine deposits. Grasses including *Bothriochloa decipiens* sometimes present in upper portions of tidal flats. Marine plains/tidal flats.

**Provinces:** 4, 8, 9, 10.

**Protected areas:** Bribie Island NP (190ha), Burrum Coast NP (560ha); also numerous protected areas <1000ha.

**Extent reserved:** Medium.

**Estimated extent:** 91% remains of a total area of about 16 200ha.

**Conservation status:**

## Regional ecosystem 12.1.3

**Description:** Mangrove shrubland to low closed forest on Quaternary estuarine deposits.

**Provinces:** 4, 8, 9, 10.

**Protected areas:** Bribie Island NP (220ha), Burrum Coast NP (240ha), Eurimbula NP and RR (480ha), Great Sandy NP (380ha); also numerous protected areas <1000ha.

**Extent reserved:** Low.

**Estimated extent:** 88% remains of a total mappable area of about 51 800ha.

**Conservation status:**

**Land zone 2:** Quaternary coastal dunes.

## Regional ecosystem 12.2.1

**Description:** Notophyll/evergreen notophyll rainforest generally with abundant *Archontophoenix cunninghamiana* or *A. alexandrae* in north of bioregion. Moist/wet, valley floors of parabolic dunes. The plant families Lauraceae, Myrtaceae and Elaeocarpaceae are diagnostic of the type.

**Provinces:** 8, 9, 10.

**Protected areas:** Eurimbula NP and RR (550ha), Great Sandy NP (3000ha).

**Extent reserved:** High.

**Special ecological values:** Habitat for rare and threatened flora species including *Archidendron lovelliae*, *Cinnamomum baileyannum*, *Cryptocarya foetida*, *Glycine argyraea* and *Symplocos harroldii*.

**Estimated extent:** 94% remains of a total area of about 4400ha.

**Conservation status:**

## Regional ecosystem 12.2.2

**Description:** Mixed microphyll/notophyll rainforest on Quaternary coastal dunes and beaches. Characteristic species include *Cupaniopsis*

*anacardioides*, *Flindersia schottiana*, *Syzygium* spp., *Elaeocarpus obovatus*. Melaleuca and eucalypt emergents may be present, e.g. *Melaleuca dealbata* and *Corymbia tessellaris*.

**Provinces:** 4, 8, 9, 10.

**Protected areas:** Deepwater NP and RR (20ha).

**Extent reserved:** Low.

**Special ecological values:** Habitat for rare and threatened flora species including *Acianthus amplexicaulis*, *Alyxia sharpei*, *Xylosma ovatum*, *Dansiea elliptica* and *Acronychia littoralis*.

**Comments:** Associated with RE 12.2.11. Patches often too small to map at 1:100 000 scale. Continues to be threatened by clearing for coastal residential development.

**Estimated extent:** 20% remains of a total area of about 2500ha.

**Conservation status:** Endangered and rare due to depletion.

## Regional ecosystem 12.2.3

**Description:** Araucarian microphyll/notophyll rainforest on parabolic dunes. *Backhousia myrtifolia* common in understorey on Fraser Island and Cooloola and forms low canopy in places.

**Provinces:** 9, 10.

**Protected areas:** Great Sandy NP (1130ha).

**Extent reserved:** High.

**Comments:** *Agathis robusta* present in province 9.

**Estimated extent:** 100% remains of a total area of about 2800ha.

**Conservation status:**

## Regional ecosystem 12.2.4

**Description:** *Syncarpia hillii* and *Lophostemon confertus* tall closed forest with rainforest understorey ('wet sclerophyll') on parabolic dunes.

**Provinces:** 9.

**Protected areas:** Great Sandy NP (2800ha).

**Extent reserved:** High.

**Special ecological values:** Habitat for rare and threatened flora species including *Syncarpia hillii* and *Tecomanthe hillii*.

**Estimated extent:** 100% remains of a total area of about 9800ha.

**Conservation status:**

## Regional ecosystem 12.2.5

**Description:** Open forest to low closed forest of Quaternary coastal dunes and beaches and sandy banks of coastal streams. Beach ridges and swales in southern parts of bioregion. Species can include *Corymbia intermedia*, *Eucalyptus tessellaris*, *Banksia integrifolia* var. *integrifolia*, *Acacia* spp., *Lophostemon confertus*, *Callitris columellaris*, *Livistona* spp. and *Endiandra sieberi*. *Melaleuca quinquenervia* in swales. Understorey generally shrubby and can include rainforest species.

**Provinces:** 4, 8, 9.

**Protected areas:** Bribie Island NP (280ha), Great Sandy NP (13 600ha), Moreton Island NP (2170ha), Noosa NP (270ha), Poona NP (130ha).

**Extent reserved:** High.

**Comment:** Tends to grade into RE 12.2.14 on seaward side and RE 12.2.9 on inland side. This regional ecosystem is vulnerable south of Noosa due to weed invasion, recreational use and threat of over frequent fire.

**Estimated extent:** 81% remains of a total mappable area of about 33 800ha.

**Conservation status:**

## Regional ecosystem 12.2.6

**Description:** *Eucalyptus racemosa*, *Corymbia intermedia*, *C. gummifera*, *Angophora leiocarpa* and *E. pilularis* shrubby or grassy woodland to open forest on Quaternary coastal dunes and beaches. Dunes with deeply leached soils.

**Provinces:** 4, 8, 9.

**Protected areas:** Great Sandy NP (24 600ha), Moreton Island NP (6400ha).

**Extent reserved:** High.

**Comments:** Extensively cleared south of Noosa. Regional ecosystem is potentially at risk from high fire frequency.

**Estimated extent:** 97% remains of a preclearing area of about 77 000ha.

**Conservation status:**

## Regional ecosystem 12.2.7

**Description:** *Melaleuca quinquenervia* or *M. viridiflora* open forest to woodland on Quaternary coastal dunes and beaches. Seasonally waterlogged sand plains. Other species include *Eucalyptus bancroftii*, *E. umbra*, *E. robusta*, *Corymbia intermedia* and *Lophostemon suaveolens*. Understorey of ferns and sedges. *Banksia robur* sometimes forms dense shrub layer.

**Provinces:** 4, 8, 9, 10.

**Protected areas:** Bribie Island NP (1270ha), Burrum Coast NP (660ha), Great Sandy NP (2360ha), Moreton Island NP (360ha), Noosa NP.

**Extent reserved:** High.

**Special ecological values:** Habitat for rare and threatened flora species including *Phaius australis* and *P. tancarvilleae*.

**Comments:** Extensively cleared on southern mainland for coastal development. Clearing is also occurring in other parts of bioregion.

**Estimated extent:** 68% remains of a preclearing area of about 12 700ha.

**Conservation status:**

## Regional ecosystem 12.2.8

**Description:** *Eucalyptus pilularis*, *E. microcorys*, *E. resinifera* and *Syncarpia hillii* tall open forest on parabolic dunes.

**Provinces:** 9.

**Protected areas:** Great Sandy NP (4800ha).

**Extent reserved:** High.

**Estimated extent:** 96% remains of a total area of about 20 500ha.

**Conservation status:**

## Regional ecosystem 12.2.9

**Description:** *Banksia aemula* low shrubby woodland on Quaternary coastal dunes and beaches. Dunes and beach ridges with deeply leached soils. Mallee eucalypts sometimes present e.g. *Eucalyptus umbra*.

**Provinces:** 4, 8, 9.

**Protected areas:** Bribie Island NP (260ha), Burrum Coast NP (3860ha), Deepwater RR (+), Eurimbula NP (40ha), Great Sandy NP (40 450ha), Noosa NP.

**Extent reserved:** High.

**Special ecological values:** Habitat for rare and threatened flora species including *Macarthuria complanata* and *Melaleuca cheelii*.

**Comments:** One of the communities included under the common name 'wallum'. Floristically rich. Naturally restricted extent on mainland south of Noosa where it has been extensively cleared for urban development. While on a bioregion-wide basis extensive areas remain (e.g. Great Sandy area, Moreton Island) it is considered to be endangered on the mainland south of Noosa. Frequent fire can promote fire tolerant species at the expense of fire sensitive species.

**Estimated extent:** 98% remains of a total area of about 59 000ha.

**Conservation status:**

## Regional ecosystem 12.2.10

**Description:** *Eucalyptus-Corymbia* spp., (mallee forms of *Corymbia intermedia*, *E. umbra* and *E. planchoniana*) low shrubby woodland on Quaternary coastal dunes and beaches. Deeply leached dunes and sand plains.

**Provinces:** 4.

**Protected areas:** Moreton Island NP (4100ha).

**Extent reserved:** High.

**Comments:** Occurs mostly on southern sandmass islands. Areas on North Stradbroke Island have been impacted by sand mining.

**Estimated extent:** 88% remains of a preclearing area of about 11 600ha.

**Conservation status:**

## Regional ecosystem 12.2.11

**Description:** Woodland to open forest on Quaternary coastal dunes and beaches. Beach ridges and swales in central and northern parts of bioregion. Species include *Corymbia tessellaris*, *Eucalyptus tereticornis*, *Callitris columellaris*, *Petalostigma pubescens*, *Corymbia intermedia* or *C. clarksoniana*, *E. exserta*, *Livistona decipiens*, *Planchonia careya*, *Leptospermum neglectum*, *Acacia julifera*. *Melaleuca dealbata* and *Eucalyptus tereticornis* in swales. Rainforest species sometimes present as subcanopy or understorey.

**Provinces:** 8, 9, 10.

**Protected areas:** Burrum Coast NP (1980ha), Deepwater NP and RR (880ha), Eurimbula NP and RR (2100ha).

**Extent reserved:** Medium.

**Estimated extent:** 63% remains of a total area of about 27 500ha.

**Conservation status:**

## Regional ecosystem 12.2.12

**Description:** Closed or wet heath ± stunted emergent shrubs/low trees on Quaternary coastal dunes and beaches. Poorly drained sand plains. Characteristic shrubs include *Banksia* spp. (especially *B. robur*) *Boronia falcifolia*, *Epacris* spp., *Baeckea stenophylla*, *Schoenus brevifolius*, *Leptospermum* spp., *Hakea sericea*, *Melaleuca thymifolia*, *Xanthorrhoea fulva* with *Restio* spp. and *Lepyrodia* spp. in ground stratum.

**Provinces:** 4, 8, 9, 10.

**Protected areas:** Bribie Island NP (520ha), Burrum Coast NP (1400ha), Deepwater RR (+), Great Sandy NP (1960ha), Moreton Island NP (1900ha), Noosa NP (630ha); also represented in protected areas <1000ha.

**Extent reserved:** Medium.

**Special ecological values:** Low part of coastal landscape where water collects from both overland flow and infiltration from adjoining sand

dunes. Habitat for rare and threatened flora and fauna species including ground parrot *Pezoporus wallicus*, *Boronia rivularis*, *Durringtonia paludosa*, *Phaius tancavilleae*, *Schoenus scabripes* *Blandfordia grandiflora* and *Acacia baueri*.

**Comments:** Regional ecosystem sometimes occurs on other substrates such as alluvium. Subject to high rate of clearing for urbanisation south of Noosa and the regional ecosystem is considered to be endangered in this area.

**Estimated extent:** 69% remains of a total area of about 19 400ha.

**Conservation status:**

## Regional ecosystem 12.2.13

**Description:** Open or dry heath on Quaternary coastal dunes and beaches. Sand plains. Characteristic shrubs include *Leptospermum* spp., *Leucopogon* spp., *Ricinocarpos pinifolius*, *Strangea linearis*, *Brachyloma daphnoides*, *Persoonia virgata*, *Xanthorrhoea* spp., *Styphelia viridis*, *Monotoca scoparia*, *Woolisia pungens* and stunted *Allocasuarina littoralis*.

**Provinces:** 4, 8, 9.

**Protected areas:** Noosa NP (320ha); also represented in protected areas <1000ha.

**Extent reserved:** Low.

**Special ecological values:** Habitat for rare and threatened flora species including *Acacia attenuata*, *A. baueri* subsp. *baueri*, *Blandfordia grandiflora*, *Macarthuria complanata* and *Prasophyllum wallum*.

**Comments:** Floristically rich. Naturally restricted extent on mainland where it has been extensively cleared for urban development.

**Estimated extent:** 30% remains of a mappable area of about 1600ha.

**Conservation status:** Endangered and rare due to depletion.

## Regional ecosystem 12.2.14

**Description:** Strand and foredune complex comprising *Spinifex sericeus* grassland *Allocasuarina equisetifolia* woodland/open forest and with *Acacia leiocalyx*, *A. aulacocarpa*,

*Banksia integrifolia* var. *integrifolia*, *Pandanus tectorius*, *Corymbia tessellaris*, *Cupaniopsis anacardioides*, *Acronychia imperforata*. Similar vegetation can occur on exposed parts of dunes further inland.

**Provinces:** 4, 8, 9, 10.

**Protected areas:** Bribie Island NP (65ha), Burrum Coast NP (40ha), Deepwater NP (40ha), Great Sandy NP (+), Moreton Island NP (420ha).

**Extent reserved:** High.

**Estimated extent:** 100% remains of a mappable area of about 2900ha.

**Conservation status:**

## Regional ecosystem 12.2.15

**Description:** Coastal sedgeland/wetland with *Baumea* spp., *Juncus* spp. *Lepironia articulata*, *Gahnia* spp. and *Eleocharis* spp. in wetlands associated with Quaternary coastal dunes and beaches.

**Provinces:** 4, 8, 9, 10.

**Protected areas:** Burrum Coast NP (+), Deepwater RR (+), Eurimbula NP (20ha), Great Sandy NP (5100ha).

**Extent reserved:** High.

**Special ecological values:** Habitat for rare and threatened flora species including *Schoenus scabripes*.

**Comments:** Low part of coastal landscape where water collects from both overland flow and infiltration from adjoining sand dunes. (The community has not valued this ecosystem very highly) and has been subject to disturbance such as landfill. Extensively infilled or modified by urban development in the south of bioregion and the regional ecosystem is considered to be endangered in this area. Generally too small to map at 1:100 000 scale.

**Estimated extent:** 100% remains of a mappable area of about 10 300ha.

**Conservation status:**

**Land zone 3:** Cainozoic alluvial plains and piedmont fans. Includes terraces and

levees.

## Regional ecosystem 12.3.1

**Description:** Complex to simple notophyll rainforest on Cainozoic alluvial plains. *Waterhousea floribunda* is predominant fringing stream channels. Other species include *Cryptocarya hypospodia*, *C. obovata*, *C. triplinervis*, *Argyrodendron trifoliolatum*, *Ficus coronata*, *F. fraseri*, *F. macrophylla*, *Aphananthe philippinensis*, *Elaeocarpus grandis*, *Grevillea robusta*, *Castanospermum australe* and *Syzygium francisii*. *Ficus racemosa* and *Nauclea orientalis* in north of bioregion. *Eucalyptus* emergents (e.g. *E. grandis*) often present.

**Provinces:** 1, 2, 3, 4, 7, 8, 10.

**Protected areas:** Represented in protected areas <1000ha.

**Extent reserved:** Low.

**Special ecological values:** Habitat for rare and threatened flora and fauna species including *Xanthostemon oppositifolius*, *Fontainea rostrata*, *Macadamia integrifolia*, *M. ternifolia*, *Ornithoptera richmondia* and *Cyclopsitla diophthalma coxeni*. Important for fruit eating birds many of which migrate seasonally from upland to lowland rainforest.

**Comments:** Extensively cleared for agriculture. Prone to invasion by weeds such as camphor laurel *Cinnamomum camphora*, cat's claw creeper *Macfadyena unguisati* on margins and when disturbed. Often too narrow to be mapped at 1:100 000 scale. Occurs up to about 100km inland.

**Estimated extent:** 23% remains of a preclearing mappable area of about 23 100ha.

**Conservation status:** Vulnerable.

## Regional ecosystem 12.3.2

**Description:** *Eucalyptus grandis* ± *E. microcorys*, *Lophostemon confertus* tall open forest with rainforest understorey ('wet sclerophyll') on Cainozoic alluvial plains extending onto adjacent lower slopes and into narrow gullies in high rainfall areas. Patches of *Eucalyptus pilularis* sometimes present especially in vicinity of sedimentary rocks (e.g. around Palmwoods).

**Provinces:** 1, 3, 4, 7, 9.

**Protected areas:** Great Sandy NP (730ha); also a number of protected areas <1000ha.

**Extent reserved:** Low.

**Special ecological values:** Habitat for rare and threatened flora species including *Acianthus amplexicaulis*, *Liparis simmondsii*, *Marsdenia longiloba*.

**Comments:** Habitat fragmented by land uses such as horticulture and rural residential. Much of this regional ecosystem is prone to infestation by weeds especially *Lantana camara*. Requires fire for regeneration.

**Estimated extent:** 58% remains of a total area of about 23 500ha.

**Conservation status:**

### Regional ecosystem 12.3.3

**Description:** *Eucalyptus tereticornis* open forest to woodland on Cainozoic alluvial plains including older floodplain complexes. *Eucalyptus crebra* and *E. moluccana* are sometimes present and may be relatively abundant in places especially on edges of plains. *Corymbia intermedia* is commonly associated with *Eucalyptus tereticornis* in moister areas. Other species that may be present as scattered individuals or clumps include *Angophora subvelutina* or *A. floribunda*, *Corymbia clarksoniana*, *C. tessellaris*, *Eucalyptus siderophloia*, *E. melanophloia* and *Lophostemon suaveolens*.

**Provinces:** 1, 2, 3, 4, 5, 6, 7, 8, 10.

**Protected areas:** Bunya Mountains NP (100ha), Deepwater NP (140ha), Eurimbula NP (80ha), Great Sandy NP (600ha), Main Range NP (60ha), Noosa NP (130ha).

**Extent reserved:** Low.

**Special ecological values:** Habitat for rare and threatened flora species including *Stemmacantha australis*.

**Comments:** While *Eucalyptus tereticornis* remains common in the landscape, very few intact stands remain. *Eucalyptus tereticornis* grows into a very large hollow forming tree and has a special significance for fauna species especially in drier areas. The type is variable, ranging from woodland in drier parts to tall open forest in higher rainfall

areas and monospecific to intermixed with other canopy species. *Eucalyptus tereticornis* will regenerate readily but there is a lack of recruitment to replace old trees in stands that are logged, thinned or grazed and regularly burnt. The grasses and herbs associated with intact *Eucalyptus tereticornis* communities also persist in the landscape so there is a potential for re-establishing the regional ecosystem and increasing its remnant area. *Eucalyptus tereticornis* is replaced by *E. grandis* in highest rainfall parts of the bioregion.

**Estimated extent:** 10% remains of a preclearing area of about 694 000ha.

**Conservation status:** Vulnerable — while only 10% remains, a 'Vulnerable' status has been ascribed in recognition of the resilience of the regional ecosystem and the potential for its re-establishment.

### Regional ecosystem 12.3.4

**Description:** *Eucalyptus* spp., especially *E. tereticornis* and/or *E. robusta*, *Melaleuca quinquenervia* and *Lophostemon suaveolens* open forest on Cainozoic alluvial plains in coastal areas. Other species can include *Corymbia intermedia*, *Lophostemon confertus*, *Eucalyptus siderophloia*, *Livistona australis* and *L. decipiens*.

**Provinces:** 4, 8, 9.

**Protected areas:** Bribie Island NP (1800ha), Burrum Coast NP (320ha), Deepwater NP (700ha), Eurimbula NP (200ha), Great Sandy NP (1700ha).

**Extent reserved:** Medium.

**Special ecological values:** Habitat for rare and threatened flora species including *Acacia perangusta*.

**Comments:** Widely cleared for horticulture and residential development particularly in south of bioregion. Data on clearing rate between 1995-97 indicate that the RE continues to experience an annual loss of about 1% of current extent per annum. The area remaining is likely to fall below 30% within 5-10 years.

**Estimated extent:** 34% remains of a preclearing area of about 49 200ha.

**Conservation status:** Vulnerable.

## Regional ecosystem 12.3.5

**Description:** *Melaleuca quinquenervia* tall open forest to tall woodland on Cainozoic alluvial plains in coastal areas. Understorey depends upon duration of waterlogging with sedges and ferns especially *Blechnum indicum* in wetter microhabitats and grasses and shrubs in drier microhabitats. Other tree species that may be present as scattered individuals or clumps include *Lophostemon suaveolens*, *Eucalyptus robusta*, *E. tereticornis*, *Corymbia intermedia*, *Livistona australis*, *Endiandra sieberi*. *Melastoma affine* and *Glochidion sumatranum* and *Euodia elleryana* are often in understorey.

**Provinces:** 4, 8, 10.

**Protected areas:** Burrum Coast NP (1000ha), Great Sandy NP (2700ha); also in protected areas <1000ha.

**Extent reserved:** Medium.

**Special ecological values:** Habitat for rare and threatened flora species including *Phaius australis* and *P. tancarvilleae*.

**Comments:** Extensively cleared for sugar cane and urban development in south of bioregion. Tallest stands associated with estuarine sediments. Subject to weed invasion especially groundsel *Baccharis halimifolia*. Data on clearing rate between 1995-97 indicate that the RE continues to experience an annual loss in excess of 1% of current extent per annum. The area remaining is likely to fall below 30% within 5-10 years.

**Estimated extent:** 36% remains of a preclearing area of about 51 000ha.

**Conservation status:** Vulnerable.

## Regional ecosystem 12.3.6

**Description:** *Melaleuca quinquenervia* (sometimes *M. viridiflora* or *M. fluviatilis* in north) woodland to open woodland on Cainozoic alluvial plains in coastal areas. Understorey includes shrubs, sedges and grasses. Other tree species may be present, for example *Eucalyptus robusta*, *E. tereticornis*, *Lophostemon suaveolens*, *Eucalyptus umbra* and *E. bancroftii*.

**Provinces:** 4, 8, 10.

**Protected areas:** Bribie Island NP (100ha), Burrum Coast NP (+), Deepwater NP (160ha), Eurimbula NP (1840ha), Great Sandy NP (3500ha).

**Extent reserved:** Medium.

**Special ecological values:** Habitat for rare and threatened flora species including *Phaius tancarvilleae*. Often occurs in seasonally flooded drainage lines where waterlogging is prolonged.

**Comments:** Extensively cleared on the mainland south of Noosa for urban development and pasture. Data on clearing rate between 1995-97 indicate that the RE continues to experience an annual loss in excess of 1% of current extent per annum. The area remaining is likely to fall below 30% within 5-10 years.

**Estimated extent:** 35% remains of a total area of about 28 100ha.

**Conservation status:** Vulnerable.

## Regional ecosystem 12.3.7

**Description:** Narrow fringing community of *Eucalyptus tereticornis*, *Callistemon viminalis*, *Allocasuarina cunninghamiana* ± *Waterhousea floribunda* on Cainozoic alluvial plains along watercourses. *Lomandra hystrix* often present in stream beds.

**Provinces:** 1, 2, 3, 5, 6, 7, 8, 10.

**Protected areas:** Small areas in Lamington NP, and protected areas <1000ha.

**Extent reserved:** Low.

**Comments:** Too small to map at 1:100 000 scale. Prone to invasions by weeds such as Chinese elm *Celtis sinensis* and cat's claw creeper *Macfadyena unguiscati*. Other species associated with this regional ecosystem include *Melaleuca bracteata*, *M. linariifolia* var. *trichostachya* and *M. fluviatilis* in north of bioregion.

**Estimated extent:** 44% remains of a mappable area of about 30 600ha.

**Conservation status:**

## Regional ecosystem 12.3.8

**Description:** Freshwater swamps associated with floodplains away from the coast. Characteristic

species include *Cyperus* spp., *Schoenoplectus* spp., *Philydrum lanuginosum*, *Eleocharis* spp., *Leersia hexandra*, *Triglochin procera*, *Nymphaea nymphoides*, *Polygonum* spp., *Typha* spp., and *Pennisetum alopecuroides*.

**Provinces:** 2, 5, 6, 7, 10.

**Protected areas:** Represented in protected areas <1000ha.

**Extent reserved:** Low.

**Comments:** Generally too small to map at 1:100 000 scale. Important for waterbirds and freshwater vertebrates and invertebrates such as tortoises. Many shallower seasonal waterbodies in the region have been drained or have become silted. Wetlands of the coastal lowlands are also included under RE 12.2.15.

**Estimated extent:** 96% remains of a mappable area of about 400ha. However freshwater wetlands overall are at continued risk of degradation and depletion.

**Conservation status:** Vulnerable.

## Regional ecosystem 12.3.9

**Description:** *Eucalyptus nobilis* (formerly included within *E. viminalis*) tall open forest on Cainozoic alluvial plains. Forms a narrow fringing community.

**Provinces:** 1.

**Protected areas:** Small areas in Main Range NP.

**Extent reserved:** Low.

**Comments:** Occurs on the headwaters of streams on the western side of Main Range, where it is subject to disturbance and weeds associated with grazing. *Eucalyptus nobilis* is endemic to northern tablelands of New South Wales and adjacent high country of southern Queensland.

**Estimated extent:** 72% remains of a total preclearing area of about 900ha (naturally rare type).

**Conservation status:** Vulnerable.

## Regional ecosystem 12.3.10

**Description:** *Eucalyptus populnea* ± *E. tereticornis* grassy woodland/tall woodland on Cainozoic

alluvial plains including older floodplain complexes ± patches of *Acacia harpophylla* and *Melaleuca bracteata*.

**Provinces:** 5, 6, 10.

**Protected areas:** No representation.

**Special ecological values:** *Eucalyptus populnea* is one of the species characteristics of the broad overlap between the Southeast Queensland and Brigalow Belt bioregions.

**Comments:** Cleared and thinned for grazing and agriculture. Confined to western margins of bioregion. Some relatively intact remnants present in road reserves.

**Estimated extent:** <1% remains of a preclearing area of about 27 100ha.

**Conservation status:** Endangered.

## Regional ecosystem 12.3.11

**Description:** Tall woodland to tall open forest of *Eucalyptus siderophloia*, *Corymbia intermedia*, *E. tereticornis* ± *Angophora leiocarpa*, *E. exserta*, *Lophostemon suaveolens*, *C. trachyphloia*, *C. citriodora*, *E. umbra*, *E. tindaliae*, *Melaleuca quinquenervia* and *M. viridiflora* on Cainozoic alluvial plains along coastal lowlands especially adjacent to offshore islands around Brisbane and Hervey Bay areas.

**Provinces:** 4, 8.

**Protected areas:** Burrum Coast NP (100ha); additional areas in protected areas <1000ha.

**Extent reserved:** Low.

**Comments:** Extensively cleared and modified in some populous southern parts of the bioregion.

**Estimated extent:** 38% remains of a preclearing area of about 129 000ha.

**Conservation status:**

## Regional ecosystem 12.3.12

**Description:** *Eucalyptus umbra* or *E. exserta* and *Melaleuca viridiflora* or *M. quinquenervia* ± *Corymbia intermedia*, *C. trachyphloia*, *E. bancroftii*, *E. acmenoides* on Cainozoic alluvial

plains and associated lower slopes along coastal lowlands north from Cooloola.

**Provinces:** 4, 8, 9, 10.

**Protected areas:** Deepwater NP (960ha), Great Sandy NP (2500ha).

**Extent reserved:** Medium.

**Estimated extent:** 83% remains of a total area of about 18 800ha.

**Conservation status:**

### Regional ecosystem 12.3.13

**Description:** Closed or wet heathland on seasonally waterlogged Cainozoic alluvial plains along coastal lowlands. Characteristic species include *Melaleuca thymifolia*, *Banksia robur*, *Xanthorrhoea fulva*, *Hakea* sp. aff. *H. gibbosa*, *Leptospermum* spp. and *Baeeckea stenophylla*.

**Provinces:** 4, 8, 9, 10.

**Protected areas:** Burrum Coast NP (160ha), Deepwater NP (150ha), Eurimbula NP (100ha), Great Sandy NP (4900ha).

**Extent reserved:** High.

**Estimated extent:** 58% remains of a preclearing area of about 16 100ha.

**Conservation status:**

### Regional ecosystem 12.3.14

**Description:** *Banksia aemula* ± mallee eucalypt low woodland to shrubland and/or *E. racemosa* woodland to open forest on Cainozoic alluvial plains along coastal lowlands.

**Provinces:** 4, 8, 9, 10.

**Protected areas:** Burrum Coast NP (100ha), Deepwater NP (820ha), Great Sandy NP (2230ha).

**Special ecological values:** Habitat for rare and threatened flora species including *Eucalyptus conglomerata*.

**Extent reserved:** Medium.

**Estimated extent:** 55% remains of a total area of about 11 200ha.

**Conservation status:**

**Land zone 5:** Remnant Tertiary surfaces with old soils including deep red soils and truncated red soils.

### Regional ecosystem 12.5.1

**Description:** Mixed open forest with *Corymbia trachyphloia* and/or *C. citriodora* ± *Eucalyptus crebra*, *E. longirostrata*, *C. intermedia*, *E. major*, *E. fibrosa* subsp. *fibrosa* and *E. acmenoides* on remnant Tertiary surfaces. Localised occurrences of *Eucalyptus pilularis*, *E. taurina*, *E. dura* and *E. melanoleuca*. Understorey grassy or shrubby.

**Provinces:** 2, 5, 6.

**Protected areas:** Represented in protected areas <1000ha.

**Extent reserved:** Low.

**Special ecological values:** Habitat for rare and threatened flora species including *Eucalyptus melanoleuca*.

**Comments:** Extensively cleared for cropping. Occurs in subcoastal parts of bioregion. Extends into adjacent Brigalow Belt bioregion. Isolate of regional ecosystem with *Eucalyptus dura* locally prominent at Moggill on Brisbane's western outskirts.

**Estimated extent:** 49% remains of a preclearing area of about 36 500ha.

**Conservation status:**

### Regional ecosystem 12.5.2

**Description:** *Eucalyptus tereticornis* and/or *Corymbia intermedia* grassy woodland to open forest on complex of remnant Tertiary surfaces and Cainozoic to Proterozoic sediments. Other species include *Lophostemon suaveolens*, *Angophora leiocarpa*, *Eucalyptus acmenoides*, *E. siderophloia*, *E. major*, *Corymbia tessellaris* and *E. crebra*. *Eucalyptus moluccana* on lower slopes.

**Provinces:** 4, 7, 8, 10.

**Protected areas:** Littabella NP (770ha); also in protected areas <1000ha.

**Extent reserved:** Low.

**Comments:** This is a coastal equivalent to RE 12.5.1. It has been extensively cleared for horticulture, sugar cane and urban development.

**Estimated extent:** About 28% remains of a preclearing area of about 24 800ha.

**Conservation status:** Vulnerable.

## Regional ecosystem 12.5.3

**Description:** Open forest to woodland often with *Eucalyptus racemosa* and/or *E. tindaliae* prominent on complex of remnant Tertiary surfaces and Tertiary sedimentary rocks. Other species include *Corymbia intermedia*, *C. gummifera*, *Eucalyptus umbra*, *E. pilularis*, *E. acmenoides*, *E. trachyphloia*, *Angophora woodsiana*, *A. leiocarpa*, *Syncarpia glomulifera* or *S. verecunda* and *Endiandra sieberi*. Understorey shrubby. *Melaleuca quinquenervia* on lower slopes. Patches of *Eucalyptus pilularis* often occur on eroded slopes (e.g. near watercourses) where duricrust has been eroded.

**Provinces:** 4, 8, 9.

**Protected areas:** Poona NP (240ha); also represented in protected areas <1000ha.

**Extent reserved:** Low.

**Special ecological values:** Habitat for rare and threatened flora species including *Acacia attenuata* and *Macrozamia pauliguilielmi*.

**Comments:** Extensively cleared for exotic pine plantation and horticulture.

**Estimated extent:** 13% remains of a preclearing area of about 51 700ha.

**Conservation status:** Vulnerable.

## Regional ecosystem 12.5.4

**Description:** *Eucalyptus*-*Corymbia*-*Melaleuca* shrubby or grassy woodland in low lying areas on complex of remnant Tertiary surfaces and Tertiary sedimentary rocks. Characteristic species include *Eucalyptus umbra*, *E. exserta*, *Corymbia intermedia*, *E. bancroftii*, *Lophostemon suaveolens*, *Melaleuca viridiflora*, *M. quinquenervia*, *M. nodosa* and *Grevillea banksii*. Patches of *Allocasuarina*

*luehmannii* or *Banksia robur* present locally and *Xanthorrhoea johnsonii* common in ground layer.

**Provinces:** 8.

**Protected areas:** Burrum Coast NP (50ha), Littabella NP (50ha), Poona NP (2700ha).

**Extent reserved:** Medium.

**Special ecological values:** Habitat for rare and threatened flora species including *Macrozamia lomandroides*, *Melaleuca cheelii* and *Eucalyptus hallii*.

**Comments:** Has been extensively cleared and fragmented for exotic pine plantation, sugar cane and rural residential development.

**Estimated extent:** About 32% remains of a preclearing area of about 20 800ha.

**Conservation status:** Vulnerable.

## Regional ecosystem 12.5.5

**Description:** *Eucalyptus crebra* ± *E. tereticornis* ± *E. melanophloia* ± *E. longirostrata* ± *Corymbia intermedia* grassy tall woodland to open forest on remnant Tertiary surfaces. *Eucalyptus moluccana* often present on lower slopes.

**Provinces:** 6, 7.

**Protected areas:** No representation.

**Comments:** Extensively cleared for cropping.

**Estimated extent:** 15% remains of a preclearing area of about 43 300ha.

**Conservation status:** Vulnerable.

## Regional ecosystem 12.5.6

**Description:** *Eucalyptus siderophloia*, *E. propinqua*, *E. longirostrata* and *E. microcorys* tall open forest on remnant Tertiary surfaces. Scattered patches of *E. pilularis* and/or *E. andrewsii* subsp. *campanulata*. Near coastal areas and rarely moist uplands (e.g. Blackbutt Range).

**Provinces:** 4, 6.

**Protected areas:** No representation.

**Comments:** Largely contained within state forest.

**Estimated extent:** 28% remains of a total preclearing area of about 13 400ha.

**Conservation status:** Vulnerable.

## Regional ecosystem 12.5.7

**Description:** *Corymbia citriodora* ± *Eucalyptus acmenoides* ± *C. intermedia*, *E. fibrosa* subsp. *fibrosa*, *C. trachyphloia*, *E. moluccana* (lower slopes), *E. crebra*, *E. exserta* tall woodland on complex of remnant Tertiary surfaces and Tertiary sedimentary rocks.

**Provinces:** 8.

**Protected areas:** Represented in protected areas <1000ha.

**Extent reserved:** Low.

**Comments:** Occurs mostly in Gin Gin–Childers area.

**Estimated extent:** 71% remains of a total area of about 39 100ha.

**Conservation status:**

## Regional ecosystem 12.5.8

**Description:** Tall woodland of *Eucalyptus hallii*, *Corymbia intermedia* ± *Angophora leiocarpa*, *E. umbra*, *E. exserta*, *E. moluccana*, *Melaleuca quinquenervia*, *E. siderophloia* and *E. fibrosa* subsp. *fibrosa* on complex of remnant Tertiary surfaces and Tertiary sedimentary rocks.

**Provinces:** 8.

**Protected areas:** Burrum Coast NP (1830ha).

**Extent reserved:** Medium.

**Special ecological values:** Habitat for rare and threatened flora species including *Eucalyptus hallii* and *Macrozamia pauli-guilielmi*. Restricted distribution in Burrum River–Bundaberg area.

**Comments:** Being cleared for sugar cane expansion and residential development.

**Estimated extent:** 61% remains of a total area of about 16 400ha.

**Conservation status:**

## Regional ecosystem 12.5.9

**Description:** Closed sedgeland to heathland on complex of remnant Tertiary surfaces and Tertiary sedimentary rocks. Lower slopes subject to periodic waterlogging. Characteristic species include *Schoenus brevifolius* and/or *Baumea juncea* and/or *Banksia robur* and/or *Melaleuca nodosa*.

**Provinces:** 8.

**Protected areas:** Burrum Coast NP (2330ha), Littabella NP (50ha), Poona NP (410ha).

**Extent reserved:** High.

**Special ecological values:** Habitat for rare and threatened flora species including *Melaleuca cheelii* and *Eucalyptus hallii*.

**Estimated extent:** 63% remains of a total area of about 9200ha.

**Conservation status:**

## Regional ecosystem 12.5.10

**Description:** *Banksia aemula* ± *E. umbra* low shrubby open woodland on complex of remnant Tertiary surfaces and Tertiary sedimentary rocks. Diverse understorey of heath species.

**Provinces:** 8.

**Protected areas:** Burrum Coast NP (6160ha), Littabella NP (110ha).

**Extent reserved:** High.

**Estimated extent:** 76% remains of a total area of about 17 200ha.

**Conservation status:**

## Regional ecosystem 12.5.11

**Description:** *Syncarpia glomulifera* ± *Eucalyptus trachyphloia*, *E. acmenoides* tall woodland to open forest on complex of remnant Tertiary surfaces and Tertiary sedimentary rocks.

**Provinces:** 8.

**Protected areas:** Represented in protected areas <1000ha.

**Extent reserved:** Low.

**Comments:** Restricted to Childers–Bundaberg area. Cleared for sugar cane and crops. Represents an attenuated form of tall forests with *Syncarpia* spp. that grow under high rainfall on Fraser Island and Cooroy–Nambour areas, and consequently is of biogeographic significance. A disjunct northernmost population of *Eucalyptus racemosa* grows in the same area.

**Estimated extent:** 21% remains of a total area of about 9900ha.

**Conservation status:** Endangered.

## Regional ecosystem 12.5.12

**Description:** *Corymbia intermedia*, *Eucalyptus umbra*, *C. trachyphloia* ± *Angophora leiocarpa*, *E. exserta*, *E. siderophloia* and *E. acmenoides* grassy or shrubby woodland to open forest on complex of remnant Tertiary surfaces and Tertiary sedimentary rocks. Low rises and slopes of undulating coastal plains.

**Provinces:** 8.

**Protected areas:** Burrum Coast NP (1060ha), Littabella NP (820ha).

**Extent reserved:** Low.

**Special ecological values:** Habitat for rare and threatened flora species including *Eucalyptus hallii* and *Macrozamia lomandroides*.

**Comments:** Is being actively cleared for sugar cane and residential development. *Allocasuarina luehmannii* present locally.

**Estimated extent:** 45% remains of a total area of about 104 000ha.

**Conservation status:**

**Land zone 7:** Tertiary surfaces stripped of soil to expose chemically altered rock.

## Regional ecosystem 12.7.1

**Description:** Woodland to open forest of *Eucalyptus dura* and/or *Corymbia trachyphloia* ± *Lysicarpus angustifolius* (western areas), *E. crebra*, *E. exserta*, *E. acmenoides*, *Acacia* spp. on ridge crests and upper slopes of duricrust jump-ups.

**Provinces:** 5, 6, 8.

**Protected areas:** No representation.

**Comments:** Mostly restricted to western margins of central part of bioregion in the vicinity of Barambah Creek extending westward into the Brigalow Belt. Small isolated patches elsewhere, e.g. Wondai SF, vicinity of Cordalba SF.

**Estimated extent:** A mappable area of about 300ha occurs in the bioregion. >80% remains.

**Conservation status:**

## Regional ecosystem 12.7.2

**Description:** *Eucalyptus rhombica*, *Corymbia trachyphloia*, *E. virens*, *E. apothalassica* shrubby woodland on crests and slopes of duricrust jump-ups.

**Provinces:** 5, 10.

**Protected areas:** No representation.

**Special ecological values:** Habitat for rare and threatened flora species including *Eucalyptus virens* and *E. rhombica*.

**Comments:** Restricted to western margins of central part of bioregion in the Possum Range area, extending westward into the Brigalow Belt.

**Estimated extent:** About 750ha occurs in the bioregion. 100% remains.

**Conservation status:**

**Land zone 8:** Cainozoic igneous rocks, including extrusive and intrusive types.

## Regional ecosystem 12.8.1

**Description:** *Eucalyptus andrewsii* subsp. *campanulata* and/or *E. pilularis* tall open forest to open forest with shrubby understorey on Cainozoic igneous rocks especially rhyolite and sometimes lateritised basalt.

**Provinces:** 1, 2, 6.

**Protected areas:** Lamington NP (550ha), Main Range NP (1490ha), Mount Barney NP (1590ha), Springbrook NP (260ha).

**Extent reserved:** Medium.

**Special ecological values:** Habitat for rare and threatened flora species including *Acacia acrionastes*, *A. saxicola*, *Arundinella montana*, *Gahnia insignis*, *Hibbertia hexandra*, *H. monticola*, *Pandorea baileyana* and *Rulingia salviifolia*.

**Estimated extent:** 82% remains of a total area of 10 500ha.

**Conservation status:**

## Regional ecosystem 12.8.2

**Description:** *Eucalyptus oreades* ± *E. andrewsii* subsp. *campanulata* tall open forest on Cainozoic igneous rocks.

**Provinces:** 1.

**Protected areas:** Mount Barney NP (370ha), Springbrook NP (60ha).

**Extent reserved:** High.

**Special ecological values:** Habitat for rare and threatened flora species including *Hibbertia monticola*.

**Comments:** *Eucalyptus oreades* is related to the snow gums. It has a scattered distribution at high altitudes between the Blue Mountains and southern Queensland.

**Estimated extent:** 100% remains of a total area of about 370ha (naturally rare type).

**Conservation status:** Vulnerable.

## Regional ecosystem 12.8.3

**Description:** Complex notophyll rainforest on Cainozoic igneous rocks especially basalt and lateritised basalt at about <600m altitude. Characteristic species include *Argyrodendron trifoliolatum*, *Argyrodendron* sp. (Kin Kin W.D.Francis AQ 81198), *Olea paniculata*, *Castanospermum australe*, *Cryptocarya obovata*, *Ficus macrophylla*, *Syzygium francisii*, *Diploglottis*

*cunninghamii*, *Pseudoweinmannia lachnocarpa*, *Podocarpus elatus*, *Bellschmiedia obtusifolia*, *Neolitsea dealbata* and *Archontophoenix cunninghamiana*.

**Provinces:** 1, 3.

**Protected areas:** D'Aguilar NP (440ha), Lamington NP (4600ha), Springbrook NP (970ha); also represented in protected areas <1000ha.

**Extent reserved:** Low.

**Special ecological values:** Habitat for endemic and rare and threatened flora species including *Amorphospermum whitei*, *Austromyrtus fragrantissima*, *A. inophloia*, *Baloghia marmorata*, *Cassia marksiana*, *Choricarpia subargentea*, *Corynocarpus rupestris* subsp. *arborescens*, *Cupaniopsis newmanii*, *Davidsonia* sp. (Mullumbimby G.P.Guymer 1625), *Dendrobium schneiderae*, *Diploglottis campbellii*, *Endiandra globosa*, *Floydia praealta*, *Lepiderema pulchella*, *Macadamia integrifolia*, *M. tetraphylla*, *Muellerina myrtifolia*, *Ochrosia moorei*, *Owenia cepiodora*, *Pandorea baileyana*, *Papillilabium beckleri*, *Plectranthus nitidus* (rocky outcrops), *Planchonella eerwah*, *Randia moorei*, *Rhodamnia maideniana*, *Romnaldia strobilacea*, *Sarcochilus dilatatus*, *S. weinthalii*, *S. fitzgeraldii*, *S. hartmannii*, *Syzygium hodgkinsoniae*, *S. hodgkinsoniae*, *S. moorei*, *S. moorei*, *Marsdenia hemiptera* and *Triunia robusta*.

**Comments:** Lower altitude rainforest type. Extensively cleared. Characteristic localities for this regional ecosystem are lower parts of Lamington–Beechmont, Maleny Plateau with low altitude coastal examples at Burleigh Heads and Buderim. In the D'Aguilar Range at Mount Glorious, the regional ecosystem tends to 12.8.5 at higher altitudes.

**Estimated extent:** 40% remains of a preclearing area of about 26 100ha.

**Conservation status:**

## Regional ecosystem 12.8.4

**Description:** Complex notophyll rainforest with scattered *Araucaria bidwillii* or *A. cunninghamii* on Cainozoic igneous rocks especially basalt and lateritised basalt. Characteristic species include *Argyrodendron actinophyllum*, *Baloghia inophloia*, *Brachychiton acerifolius*, *Dendrocnide excelsa*, *Elaeocarpus kirtonii*, *Diospyros pentamera*, *Dysoxylum fraserianum*, *Toona australis*, *Orites excelsa* and *Sloanea woollsi*.

**Provinces:** 1, 6.

**Protected areas:** Bunya Mountains NP (1030ha), Lamington NP (2530ha), Main Range NP (3090ha), Mount Barney NP (2340ha), Mount Chinghee NP (60ha).

**Extent reserved:** High.

**Special ecological values:** Habitat for rare and threatened flora species including *Pandorea baileyi*, *Sarcochilus weinthalii* and *S. hartmannii*, and cool subtropical species at limits of climatic range.

**Comments:** Characteristic localities for this type are Levers Plateau on the Qld–NSW border and the Bunya Mountains.

**Estimated extent:** 66% remains of a total area of about 25 600ha.

**Conservation status:**

## Regional ecosystem 12.8.5

**Description:** Complex notophyll rainforest on Cainozoic igneous rocks especially basalt and lateritised basalt at >600m altitude. Characteristic species include *Argyrodendron actinophyllum*, *Sloanea australis*, *S. woolfsii*, *Cryptocarya erythroxylon*, *Ficus watkinsiana*, *Dysoxylum fraserianum*, *Caldcluvia paniculosa*, *Geissois benthamii*, *Orites excelsa*, *Acmena brachyandra*, *Syzygium corynanthum*, *S. crebrinerve* and *Citronella moorei*.

**Provinces:** 1, 3.

**Protected areas:** D'Aguilar NP (440ha), Lamington NP (7100ha), Main Range NP (3590ha), Mount Chinghee NP (+), Springbrook NP (70ha).

**Extent reserved:** High.

**Special ecological values:** Habitat for endemic and rare and threatened flora species including *Acacia orites*, *Acronychia baeuerlenii*, *Austromyrtus inophloia*, *Austrobuxus swainii*, *Clematis fawcettii*, *Cordyline congesta*, *Cyathea cunninghamii*, *Dendrobium schneiderae*, *Euphrasia bella*, *Helmholtzia glaberrima*, *Lastreopsis silvestris*, *Muellerina myrtifolia*, *Nothoalsomitra suberosa*, *Pandorea baileyana*, *Pittosporum oreillyanum*, *Sarcochilus fitzgeraldii*, *S. hartmannii*, *S. weinthalii*, *Solanum callium*, *Symplocos baeuerlenii* and *Uromyrtus* sp. (McPherson Range

G.P.Guymer 2000), and cool subtropical species at limits of climatic range.

**Comments:** Mostly restricted to southern border parts of bioregion. High levels of species endemism in McPherson Range.

**Estimated extent:** 97% remains of a total area of about 10 900ha.

**Conservation status:**

## Regional ecosystem 12.8.6

**Description:** Simple microphyll fern forest with *Nothofagus moorei* and/or *Caldcluvia paniculosa*, *Doryphora sassafras*, *Orites excelsa* on Cainozoic igneous rocks at high altitudes.

**Provinces:** 1.

**Protected areas:** Lamington NP (c. 500ha), Mount Barney NP (100ha).

**Extent reserved:** High.

**Special ecological values:** Habitat for rare and threatened flora species including *Aristolochia deltantha* subsp. *laheyana* and *Parsonsia tenuis*, and range limits of temperate adapted species.

**Comments:** All known Queensland occurrences are contained within national parks along the Qld–NSW border.

**Estimated extent:** 100% remains of a total area of about 100ha (naturally rare type).

**Conservation status:** Vulnerable.

## Regional ecosystem 12.8.7

**Description:** Simple microphyll fern thicket with *Acmena smithii* on Cainozoic igneous rocks at high altitudes.

**Provinces:** 1, 6.

**Protected areas:** Bunya Mountains NP (+), Main Range NP (680ha), Mount Barney NP (40ha).

**Extent reserved:** High.

**Comments:** Replaces RE 12.8.6 in drier or more exposed situations. Characteristic localities for this regional ecosystem are Main Range and Mount Kiangarow.

**Estimated extent:** 100% remains of a total area of about 1400ha.

**Conservation status:**

## Regional ecosystem 12.8.8

**Description:** *Eucalyptus saligna* or *E. grandis* tall open forest often with rainforest understorey ('wet sclerophyll') on Cainozoic igneous rocks and areas subject to local enrichment from Cainozoic igneous rocks. Other species include *Eucalyptus microcorys*, *E. acmenoides*, *Lophostemon confertus*, *Syncarpia glomulifera*.

**Provinces:** 1, 6.

**Protected areas:** Lamington NP (450ha), Mount Barney NP (30ha), Springbrook NP (70ha), Tamborine NP (120ha); Main Range NP (patches throughout RE 12.8.14); also represented in protected areas <1000ha.

**Extent reserved:** Low.

**Estimated extent:** 43% remains of a total area of about 14 900ha.

**Conservation status:**

## Regional ecosystem 12.8.9

**Description:** *Lophostemon confertus* tall open forest to open forest often with rainforest understorey ('wet sclerophyll') on Cainozoic igneous rocks. Tends to occur mostly in gullies and on exposed ridges.

**Provinces:** 1, 2, 6.

**Protected areas:** Lamington NP (970ha), Main Range NP (1210ha), Mount Barney NP (850ha), Springbrook NP (250ha).

**Extent reserved:** High.

**Comments:** Tends to occur on exposed ridges among rainforest on basalt and in gullies on lower fertility substrates such as rhyolite. Patches are often too small to map at 1:100 000.

**Estimated extent:** 98% remains of a total area of about 5400ha.

**Conservation status:**

## Regional ecosystem 12.8.10

**Description:** *Eucalyptus laevopinea*, *E. deanei* and *E. andrewsii* subsp. *campanulata* tall open forest on Cainozoic igneous rocks.

**Provinces:** 1.

**Protected areas:** Main Range NP (20ha).

**Extent reserved:** High.

**Estimated extent:** 65% remains of a total area of about 700ha (naturally rare type).

**Conservation status:** Vulnerable.

## Regional ecosystem 12.8.11

**Description:** *Eucalyptus dunnii* ± *E. saligna* and *E. microcorys* tall open forest on Cainozoic igneous rocks and areas subject to local enrichment from Cainozoic igneous rocks.

**Provinces:** 1.

**Protected areas:** Main Range NP (130ha).

**Extent reserved:** High.

**Special ecological values:** Habitat for rare and threatened flora species including Dunn's whitegum *Eucalyptus dunnii*.

**Estimated extent:** 70% remains of a total area of about 300ha (naturally rare type).

**Conservation status:** Vulnerable.

## Regional ecosystem 12.8.12

**Description:** *Eucalyptus obliqua* tall open forest on Cainozoic igneous rocks.

**Provinces:** 1.

**Protected areas:** Main Range NP (5ha).

**Extent reserved:** High.

**Comments:** *Eucalyptus obliqua* is a temperate adapted species that extends from Kangaroo Island to Mistake Plateau. Known from a few patches and other small areas may be located in future.

**Estimated extent:** 100% remains of a total mappable area of about 200ha (naturally rare type).

**Conservation status:** Vulnerable.

## Regional ecosystem 12.8.13

**Description:** Microphyll and microphyll/notophyll rainforest ± *Araucaria cunninghamii* on Cainozoic igneous rocks especially basalt and lateritised basalt. Characteristic species include *Araucaria cunninghamii*, *A. bidwillii*, *Cupaniopsis parvifolia*, *Dendrocnide photinophylla*, *Rhodosphaera rhodanthema*, *Flindersia australis*, *F. schottiana*, *F. xanthoxyla*, *Drypetes deplanchei*, *Olea paniculata*, *Diospyros geminata*, *Austromyrtus bidwillii*, *Excoecaria dallachyana*, *Pleiogynium timorense* (north of bioregion) and *Premna lignum-vitae*. *Argyrodendron trifoliolatum* sometimes present especially in province 6.

**Provinces:** 1, 6, 8, 10.

**Protected areas:** Bunya Mountains NP (3300ha), Mount Barney NP (630ha), Mount Chinghee NP (1000ha), Tarong NP (470ha); also in protected areas <1000ha.

**Extent reserved:** Low.

**Special ecological values:** Habitat for rare and threatened flora species including *Alectryon ramiflorus*, *Cossinia australiana*, *Phyllanthus sauropodoides*, *Sarcochilus dilatatus* and *S. weinthalii*.

**Comments:** Cleared for agriculture. Remnants can be degraded by weed infestation in conjunction with wildfire damage on margins. Characteristic localities for the regional ecosystem are Yarraman–Tarong–Boat Mountain in the south-west, the Isis and Woongarra Scrubs in the central coastal part and Kalpowar in the north of the bioregion.

**Estimated extent:** 20% remains of a preclearing area of about 94 000ha.

**Conservation status:** Vulnerable.

## Regional ecosystem 12.8.14

**Description:** *Eucalyptus eugenioides*, *E. tereticornis*, *E. melliodora*, *E. biturbinata*, *Allocasuarina torulosa*

± *E. moluccana* grassy open forest on Cainozoic igneous rocks especially basalt.

**Provinces:** 1, 2, 6.

**Protected areas:** Bunya Mountains NP (200ha), Lamington NP (3200ha), Main Range NP (5400ha), Mount Barney NP (260ha).

**Extent reserved:** Medium.

**Special ecological values:** Habitat for rare and threatened flora species including *Plectranthus suaveolens* and *Sophora fraseri*. Mapping units associated with this regional ecosystem contain localised occurrences of *Eucalyptus laevopinea* and *E. banksii*.

**Estimated extent:** 82% remains of a preclearing area of about 48 500ha.

**Conservation status:**

## Regional ecosystem 12.8.15

**Description:** *Poa labillardieri* grassland on Cainozoic igneous rocks.

**Provinces:** 1, 6.

**Protected areas:** Bunya Mountains NP (150ha), Main Range NP (30ha).

**Extent reserved:** Medium.

**Special ecological values:** Habitat for rare and threatened flora species including *Bothriochloa bunyensis*.

**Comments:** Grasslands are invaded by woody species in absence of fire.

**Estimated extent:** 75% remains of a total area of about 700ha (naturally rare type).

**Conservation status:** Vulnerable.

## Regional ecosystem 12.8.16

**Description:** *Eucalyptus crebra* and/or *E. tereticornis* grassy woodland on Cainozoic igneous rocks especially basalt. Steep hillsides; also lower slopes and flat areas on relatively young basalt flows. Other species include *Corymbia erythrophloia*, *Eucalyptus melliodora*, *E. moluccana*, *Corymbia tessellaris*, *Angophora floribunda* and *A. subvelutina*. *Eucalyptus*

*moluccana* sometimes on lower slopes and *Allocasuarina torulosa* often in understorey on hillsides. Localised occurrences of *Casuarina cristata* on western margins of bioregion and *Callitris baileyi* in south-west of bioregion.

**Provinces:** 1, 2, 5, 6, 8, 10.

**Protected areas:** Bunya Mountains NP (3200ha), Main Range NP (1700ha includes small areas of RE 12.8.17), Lamington NP (910ha).

**Extent reserved:** Low.

**Special ecological values:** Habitat for rare and threatened flora species including *Callitris baileyi*.

**Comments:** Most extensive occurrences are on basalt in southern part of bioregion.

**Estimated extent:** 26% remains of a preclearing area of about 130 000ha.

**Conservation status:** Vulnerable.

## Regional ecosystem 12.8.17

**Description:** *Eucalyptus melanophloia* and *E. crebra* ± *E. erythrophloia* grassy woodland on Cainozoic igneous rocks especially basalt. Other species as for RE 12.8.16.

**Provinces:** 1, 2, 6.

**Protected areas:** Main Range NP (1530ha); small areas included within other mapping units in other protected areas.

**Extent reserved:** Low.

**Estimated extent:** 51% remains of a preclearing area of about 46 000ha.

**Conservation status:**

## Regional ecosystem 12.8.18

**Description:** Simple notophyll rainforest generally with *Ceratopetalum apetalum* and *Lophostemon confertus* on Cainozoic igneous rocks in particular less fertile substrates such as rhyolite. Other characteristic species include *Caldcluvia paniculosa*, *Geissois benthamii* and *Orites excelsa*.

**Provinces:** 1, 10.

**Protected areas:** Lamington NP (680ha), Springbrook NP (+).

**Extent reserved:** High.

**Special ecological values:** Habitat for rare and threatened flora species including *Aristolochia deltantha* subsp. *laheyana* and *Parsonsia tenuis*, and range limits of temperate adapted species.

**Comments:** Mostly in south of bioregion. There is a disjunct occurrence of *Ceratopetalum apetalum* in gullies at Kroombit Tops (province 10) on volcanics of land zone 12.

**Estimated extent:** >30% remains.

**Conservation status:**

## Regional ecosystem 12.8.19

**Description:** Montane heath and rock pavement with scattered shrubs or low emergent trees on Cainozoic igneous rocks especially rhyolite and trachyte.

**Provinces:** 1, 4.

**Protected areas:** Lamington NP (20ha), Main Range NP (550ha), Mount Barney NP (1260ha), Springbrook NP (10ha); also represented in protected areas <1000ha.

**Extent reserved:** High.

**Special ecological values:** Habitat for rare and threatened flora species including *Acacia saxicola*, *A. melanoxylon*, *Allocasuarina emuina*, *A. thalassoscopica*, *Arundinella grevillensis*, *A. montana*, *Banksia conferta* var. *conferta*, *Callitris monticola*, *Calochilus gracillimus*, *Comesperma breviflorum*, *C. esulifolium*, *Cooperookia scabridiuscula*, *Dodonaea rupicola*, *Doryanthes palmeri*, *Eucalyptus approximans*, *E. kabiana*, *Gahnia insignis*, *Gonocarpus effusus*, *Grevillea linsmithii*, *Helichrysum lindsayanum*, *Kunzea flavescens*, *Leptospermum luehmännii*, *L. oreophilum*, *Leucopogon cicatricatus*, *L. rupicola*, *Phebalium elatius* subsp. *beckleri*, *Plectranthus torrenticola*, *Pomaderris notata*, *Pultenaea whiteana*, *Thelionema grande*, *Westringia blakeana*, *W. rupicola*, *W. grandifolia*, *W. sericea* and *Zieria granulata* var. *adenomata*. Also contains many other species with restricted or disjunct distributions.

**Comments:** Mapped area included bare rock pavement. Montane heaths exhibit a high level of

species endemism. Frequent fire favours fire tolerant species at the expense of fire sensitive species. Often too small to map at 1:100 000 scale.

**Estimated extent:** 90% remains of a total area of about 3200ha.

**Conservation status:**

## Regional ecosystem 12.8.20

**Description:** Low shrubby woodland to open woodland on Cainozoic igneous rocks especially rhyolite. Canopy trees include *Eucalyptus racemosa*, *E. dura*, *E. trachyphloia*, *E. carnea*, *Allocasuarina littoralis*, *Acacia* spp. and *Lophostemon confertus*.

**Provinces:** 1, 2, 4.

**Protected areas:** Lamington NP (120ha), Main Range NP (270ha), Mount Barney NP (700ha); also represented in protected areas <1000ha.

**Extent reserved:** Medium.

**Special ecological values:** Habitat for rare and threatened flora species including *Arundinella grevillensis*, *Comesperma breviflorum*, *Grevillea linsmithii*, *Hibbertia hexandra*, *Melaleuca groveana*, *Phebalium gracile*, *Plectranthus alloplectus* and *Westringia sericea*, and plants with restricted or disjunct distributions e.g. *Grevillea whiteana*.

**Comments:** Frequent fire can favour fire tolerant species at the expense of fire sensitive species.

**Estimated extent:** 78% remains of a total area of about 8400ha.

**Conservation status:**

## Regional ecosystem 12.8.21

**Description:** Low microphyll rainforest and semi-evergreen vine thicket ± *Araucaria cunninghamii* on Cainozoic igneous rocks especially basalt and lateritised basalt. Characteristic species include *Brachychiton rupestris*, *Flindersia collina*, *F. australis*, *Alectryon diversifolius*, *A. subdentatus*, *Elattostachys xylocarpa*, *Erythroxylum australe*, *Canthium buxifolium*, *Diospyros geminata*, *Planchonella cotinifolia*, *Croton insularis*, *Briedelia exaltata* and *Bursaria incana*. *Melaleuca bracteata* is often present along watercourses.

**Provinces:** 2, 6.

**Protected areas:** Bunya Mountains NP (920ha on margins of Brigalow Belt bioregion); also represented in protected areas <1000ha.

**Extent reserved:** Low.

**Special ecological values:** Habitat for rare and threatened flora species including *Callitris baileyi* and *Cryptocarya floydii*.

**Comments:** RE 12.8.21 confined to south of bioregion. Remnants require intensive management because of invasion by weeds and fire damage on margins. Characteristic localities for the regional ecosystem are on basalts in Lockyer Valley and Bunya Mountains.

**Estimated extent:** 11% remains of a preclearing area of about 36 500ha.

**Conservation status:** Vulnerable.

## Regional ecosystem 12.8.22

**Description:** Low microphyll rainforest and semi-evergreen vine thicket on Cainozoic igneous rocks especially basalt and lateritised basalt. Characteristic species include *Brachychiton australe*, *Archidendropsis thozetiana*, *Flindersia australis*, *F. collina*, *Canthium buxifolium*, *C. odoratum*, *Alectryon diversifolius*, *Acacia fasciculifera*, *Turraea brownii*, *Arytera microphylla*, *Atalaya salicifolia*, *Elattostachys xylocarpa*, *Grevillea helmsiae* and *Geijera paniculata*. *Acacia harpophylla* is present on lower slopes and *Melaleuca bracteata* is often present along watercourses.

**Provinces:** 5, 10.

**Protected areas:** Represented in protected areas <1000ha.

**Extent reserved:** Low.

**Comments:** Extensively cleared for pasture and cropping. Occurs in northern half of bioregion. Remnants require intensive management because of weed invasion and fire damage on margins. Characteristic localities for the regional ecosystem are Coalstoun Lakes National Park and Stony Range near Gin Gin.

**Estimated extent:** 1% remains of a preclearing area of about 2400ha.

**Conservation status:** Endangered.

## Regional ecosystem 12.8.23

**Description:** *Acacia harpophylla* ± semi-evergreen vine thicket species ± *Casuarina cristata* ± *Eucalyptus populnea* tall open forest on Cainozoic igneous rocks especially basalt. *Melaleuca bracteata* conspicuous along associated watercourses.

**Provinces:** 2, 5, 6.

**Protected areas:** No representation.

**Comments:** Cleared for pasture and cropping.

**Estimated extent:** 6% remains of a preclearing area of about 6400ha.

**Conservation status:** Endangered.

## Regional ecosystem 12.8.24

**Description:** *Corymbia citriodora*, *Eucalyptus crebra* ± *E. moluccana* open forest on Cainozoic igneous rocks especially lower slopes of rhyolite and trachyte hills.

**Provinces:** 2.

**Protected areas:** Represented in protected areas <1000ha.

**Extent reserved:** Low.

**Estimated extent:** 18% remains of a total area of about 5200ha.

**Conservation status:** Vulnerable.

## Regional ecosystem 12.8.25

**Description:** *Eucalyptus acmenoides* ± *E. crebra*, *E. major* or *E. propinqua* or *E. E. eugenioides*, *Corymbia intermedia*, *E. biturbinata*, *E. moluccana*, *Syncarpia verecunda*, *Lophostemon confertus* open forest on Cainozoic igneous rocks especially trachyte hills.

**Provinces:** 2.

**Protected areas:** Main Range NP (20ha), Mount Barney NP (400ha); also represented in protected areas <1000ha.

**Extent reserved:** Medium.

**Estimated extent:** 55% remains of a total area of about 6100ha.

**Conservation status:**

**Land zone 9:** Cainozoic to Proterozoic consolidated, fine grained sediments with little or no deformation.

**Land zone 10:** Cainozoic to Proterozoic consolidated, medium to coarse grained sediments with little or no deformation.

## Regional ecosystem 12.9/10.1

**Description:** Tall open forest on Cainozoic to Proterozoic sediments. Canopy species include *Eucalyptus resinifera*, *E. grandis*, *E. robusta*, *Corymbia intermedia* ± *E. tindaliae*, *E. microcorys*, *E. trachyphloia*, *E. siderophloia*, *E. acmenoides*, *Syncarpia glomulifera*, *Lophostemon confertus*, *Endiandra sieberi* and *Angophora woodsiana*. *Eucalyptus pilularis* sometimes present but is not a dominant species. Shrubby understorey sometimes includes rainforest species ('wet sclerophyll'). Wet coastal lowlands.

**Provinces:** 4, 9.

**Protected areas:** Great Sandy NP (small area), also represented in some protected areas <1000ha.

**Extent reserved:** Low.

**Special ecological values:** Habitat for rare and threatened flora species including *Boronia keyssii*.

**Comments:** Restricted to wet coastal lowlands north of Brisbane. Subject to increasing pressure from rural subdivision.

**Estimated extent:** 17% remains of a total area of about 7100ha.

**Conservation status:** Vulnerable.

## Regional ecosystem 12.9/10.2

**Description:** Open forest or woodland of *Corymbia citriodora* usually with *Eucalyptus crebra*. Other

species such as *Eucalyptus tereticornis*, *Corymbia intermedia* may be present in scattered patches or in low densities. Understorey can be grassy or shrubby. Shrubby understorey of *Lophostemon* sp. aff. *L. confertus* often present in northern parts of bioregion.

**Provinces:** 1, 2, 6, 8, 10.

**Protected areas:** Mount Barney NP (1850ha); also represented in protected areas <1000ha.

**Extent reserved:** Low.

**Special ecological values:** Habitat for rare and threatened flora species including *Notelaea lloydii*.

**Estimated extent:** 37% remains of a total area of about 220 000ha.

**Conservation status:**

## Regional ecosystem 12.9/10.3

**Description:** *Eucalyptus moluccana* ± *Corymbia citriodora* open forest on Cainozoic to Proterozoic sediments especially shales. Prefers lower slopes. Other species include *Eucalyptus siderophloia* or *E. crebra*. Understorey generally sparse.

**Provinces:** 2, 6, 8.

**Protected areas:** Burrum Coast NP (230ha); also represented in protected areas <1000ha.

**Extent reserved:** Low.

**Comments:** Extensively cleared or thinned for grazing.

**Estimated extent:** 26% remains of a preclearing area of about 84 400ha.

**Conservation status:** Vulnerable.

## Regional ecosystem 12.9/10.4

**Description:** Open forest to woodland with *Eucalyptus racemosa* and/or *E. tindaliae* often with *Angophora leiocarpa* ± *Corymbia intermedia*, *C. gummifera*, *E. seeana*, *E. umbra*, *E. trachyphloia*, *E. siderophloia*, *E. fibrosa* subsp. *fibrosa*, *Angophora woodsiana*, *A. leiocarpa* on Cainozoic to Proterozoic sediments especially coarse grained rocks. *Syncarpia glomulifera*, *Eucalyptus microcorys* and *Lophostemon confertus*

sometimes present in moister areas. Understorey generally shrubby.

**Provinces:** 2, 4, 8, 9.

**Protected areas:** Great Sandy NP (8000ha), Noosa NP (550ha); also represented in protected areas <1000ha.

**Extent reserved:** Medium.

**Special ecological values:** Habitat for rare and threatened flora species including *Acacia attenuata*, *A. perangusta* and *Macrozamia pauliguillemi*.

**Comments:** Occurs on coastal lowlands with some isolated occurrences further inland, for example on the Esk and Biggenden 1:100 000 map sheets. The inland occurrences in particular support disjunct species assemblages of conservation importance for example *Grevillea banksii*. The RE has been extensively cleared and fragmented in lowland areas.

**Estimated extent:** 38% remains of a preclearing area of about 102 000ha.

**Conservation status:**

## Regional ecosystem 12.9/10.5

**Description:** Mixed shrubby open forest complex on quartzose sandstone scarps and crests. More widely distributed and abundant species include *Corymbia trachyphloia*, *C. citriodora*, *Eucalyptus crebra*, *E. fibrosa* subsp. *fibrosa*, *E. major*, *Angophora leiocarpa*, *E. acmenoides*. Understorey of sclerophyllous shrubs. Localised occurrences of *Eucalyptus baileyana*, *E. pilularis*, *E. henryi*, *E. dura*, *E. decorticans* (extreme west of bioregion), *E. taurina*, *Angophora woodsiana* and *Lysicarpus angustifolius*. Tends to shrubland or monospecific woodland of species such as *Eucalyptus dura* on shallow lithosols.

**Provinces:** 2, 6.

**Protected areas:** Crows Nest NP (30ha); also represented in protected areas <1000ha.

**Extent reserved:** Low.

**Special ecological values:** Habitat for rare and threatened flora species including *Eucalyptus curtisii*, *E. melanoleuca*, *Leucopogon recurvisepalus*, *Paspalidium grandispiculatum*, *Phebalium obtusifolium* and *Grevillea singuliflora*.

**Estimated extent:** 59% remains of a total area of about 48 500ha.

**Conservation status:**

## Regional ecosystem 12.9/10.6

**Description:** *Acacia harpophylla* open forest ± *Casuarina cristata* and vine thicket species on Cainozoic to Proterozoic sediments especially fine grained rocks.

**Provinces:** 2.

**Protected areas:** Very small areas in protected areas <1000ha.

**Extent reserved:** Low.

**Comments:** Extensively cleared for pasture and cropping. Only very small areas remain and these are subject to weed invasion, e.g. *Asparagus africanus*.

**Estimated extent:** 4% remains of a preclearing area of about 28 600ha.

**Conservation status:** Endangered.

## Regional ecosystem 12.9/10.7

**Description:** *Eucalyptus crebra* grassy woodland on Cainozoic to Proterozoic sediments. Other species such as *Eucalyptus erythrophloia*, *E. tessellaris*, *Angophora leiocarpa* and *Corymbia citriodora* may be present in low densities or in patches. *Eucalyptus tereticornis* on lower slopes and *Allocasuarina luehmannii* sometimes present in understorey.

**Provinces:** 2, 6, 8.

**Protected areas:** Main Range NP (190ha), Mount Barney NP (120ha), Tarong NP (140ha); also represented in protected areas <1000ha.

**Extent reserved:** Low.

**Comments:** Extensively cleared for pasture.

**Estimated extent:** 17% remains of a preclearing area of about 193 000ha.

**Conservation status:** Vulnerable.

## Regional ecosystem 12.9/10.8

**Description:** *Eucalyptus melanophloia* grassy woodland usually with *E. crebra* on Cainozoic to Proterozoic sediments. Other species as for RE 12.9/10.7.

**Provinces:** 2, 7, 10.

**Protected areas:** No representation.

**Comments:** Extensively cleared for pasture. Sometimes mapped as part of RE 12.9/10.7.

**Estimated extent:** 8% remains of mapped total area of 10 500ha. Some areas have been mapped within 12.9/10.7.

**Conservation status:** Endangered.

## Regional ecosystem 12.9/10.9

**Description:** *Corymbia intermedia*, *Eucalyptus umbra*, *C. trachyphloia* ± *Angophora leiocarpa*, *E. exserta* grassy woodland to open forest on Cainozoic to Proterozoic sediments. Low rises and slopes on undulating coastal plains. Coastal lowlands.

**Provinces:** 8.

**Protected areas:** Burrum Coast NP (20ha).

**Extent reserved:** Low.

**Special ecological values:** Habitat for rare and threatened flora species including *Eucalyptus hallii* and *Macrozamia lomandroides*.

**Comments:** Is being actively cleared for sugar cane and residential development. *Allocasuarina luehmannii* present locally.

**Estimated extent:** 67% remains of a preclearing area of about 36 600ha.

**Conservation status:**

## Regional ecosystem 12.9/10.10

**Description:** *Melaleuca nodosa* low open forest or thicket on Cainozoic to Proterozoic sediments. Medium to coarse grained sedimentary rocks in poorly drained coastal areas. Sometimes on other substrates including seasonally waterlogged Cainozoic alluvial plains.

**Provinces:** 4, 8.

**Protected areas:** Burrum Coast NP (+), Deepwater NP (30ha), Eurimbula NP (80ha).

**Extent reserved:** Medium.

**Comments:** Habitat is being cleared or impacted by rural residential development in some areas. Localised occurrences on other geologies in particular granite (e.g. Rodd's Peninsula). Patches often too small to map.

**Estimated extent:** 85% remains of a mapped total area of about 300ha (naturally rare type).

**Conservation status:** Vulnerable.

## Regional ecosystem 12.9/10.11

**Description:** *Melaleuca tamariscina* subsp. *irbyana* low open forest or thicket on Cainozoic to Proterozoic sediments. Emergent trees may be present e.g. *Eucalyptus moluccana*.

**Provinces:** 2.

**Protected areas:** No representation.

**Comments:** Restricted to Moreton Basin around Ipswich. Being cleared for rural residential development.

**Estimated extent:** 2% remains of a preclearing area of about 1200ha.

**Conservation status:** Endangered and rare due to depletion.

## Regional ecosystem 12.9/10.12

**Description:** *Eucalyptus*–*Melaleuca* shrubby woodland to tall shrubland on Cainozoic to Proterozoic sediments. Coastal lowlands especially lower slopes and seasonally waterlogged areas. Characteristic species include *Eucalyptus umbra*, *E. bancroftii*, *Corymbia intermedia*, *Melaleuca quinquenervia* and *Banksia aemula*.

**Provinces:** 8.

**Protected areas:** Great Sandy NP (60ha), Poona NP (20ha).

**Extent reserved:** Low.

**Comments:** Extensively cleared for exotic pine plantations and rural residential development. Data on clearing rate between 1995-97 indicate that the RE is experiencing a high annual loss and given the restricted nature of the RE a vulnerable status has been assigned.

**Estimated extent:** 62% remains of a preclearing area of about 8500ha.

**Conservation status:** Vulnerable.

## Regional ecosystem 12.9/10.13

**Description:** *Eucalyptus corynodes* tall woodland on Cainozoic to Proterozoic sediments. *Lophostemon* sp. aff. *L. confertus* in understorey.

**Provinces:** 10.

**Protected areas:** Kroombit Tops NP.

**Extent reserved:** Medium.

**Comments:** Extends into adjacent Brigalow Belt bioregion.

**Estimated extent:** 100% remains of a naturally restricted type with a total area in southeast Queensland of about 100ha.

**Conservation status:**

## Regional ecosystem 12.9/10.14

**Description:** *Eucalyptus pilularis* tall open forest with shrubby understorey on Cainozoic to Proterozoic sediments especially quartzose sandstone. Other species include *Syncarpia glomulifera*, *S. verecunda*, *Corymbia intermedia*, *Angophora woodsiana* and *Eucalyptus microcorys* in coastal areas and species of RE 12.9/10.5 in drier subcoastal areas. *Eucalyptus pilularis* sometimes extends onto colluvial lower slopes and margins of alluvium.

**Provinces:** 2, 4, 6, 7, 9.

**Protected areas:** Crows Nest NP (130ha); also represented in protected areas <1000ha.

**Extent reserved:** Low.

**Comments:** Extensively cleared for horticulture, exotic pine plantations and rural residential development in some locations. The clearing has

also resulted in fragmentation. Disjunct subcoastal populations e.g. north of Helidon, west of Gympie.

**Estimated extent:** 56% remains of a total area of 22 800ha.

**Conservation status:**

## Regional ecosystem 12.9/10.15

**Description:** Low microphyll rainforest ± *Araucaria cunninghamii* and semi-evergreen vine thicket on Cainozoic to Proterozoic sediments. Characteristic species include *Brachychiton rupestris*, *Flindersia collina*, *F. australis*, *Alectryon diversifolius*, *A. subdentatus*, *Elattostachys xylocarpa*, *Erythroxylum australe*, *Canthium buxifolium*, *Diospyros geminata*, *Planchonella cotinifolia*, *Croton insularis*, *Briedelia exaltata* and *Bursaria incana*. *Melaleuca bracteata* is often present along watercourses. In places the regional ecosystem grades into RE 12.9/10.6.

**Provinces:** 2.

**Protected areas:** Represented in protected areas <1000ha.

**Extent reserved:** Low.

**Special ecological values:** Habitat for rare and threatened flora species including *Callitris baileyi*.

**Comments:** Extensively cleared for pasture and cropping. Remnants require intensive management because of invasion by weeds and fire damage on margins. Characteristic localities for the regional ecosystem are Lockyer and Fassifern Valleys.

**Estimated extent:** 19% remains of a preclearing area of about 25 000ha.

**Conservation status:** Vulnerable.

## Regional ecosystem 12.9/10.16

**Description:** Microphyll to notophyll rainforest ± *Araucaria cunninghamii* on Cainozoic to Proterozoic sediments. Characteristic species include *Argyrodendron* sp. (Kin Kin W.D.Francis AQ 81198), *Araucaria cunninghamii*, *Agathis robusta*, *Backhousia myrtifolia*, *Cupaniopsis parvifolia*, *Dendrocnide photinophylla*, *Rhodosphaera rhodanthema*, *Flindersia australis*, *F. xanthoxyla*, *Drypetes deplanchei*, *Olea paniculata*, *Diospyros*

*geminata*, *Austromyrtus bidwillii*, *Excoecaria dallachyana* and *Premna lignum-vitae*.

**Provinces:** 2, 7, 8.

**Protected areas:** Tarong NP (300ha), also represented in protected areas <1000ha.

**Extent reserved:** Low.

**Special ecological values:** Habitat for rare and threatened flora species including *Alectryon ramiflorus*, *Alyxia ilicifolia* subsp. *magnifica*, *Corchorus cunninghamii*, *Cupaniopsis shirleyana*, *C. tomentella*, *Hernandia bivalvis*, *Planchonella eerwah*, *Plectranthus omissus*, *Sarcochilus dilatatus* and *Sarcochilus weinthalii*. *Agathis robusta* has a restricted distribution in the bioregion.

**Comments:** Extensively cleared for pasture and cropping. Remnants can be degraded by weed infestation in conjunction with wildfire damage on margins. Characteristic localities for the regional ecosystem are Seaview Range near Brooweena, Tinana Creek and Flinders Peak area.

**Estimated extent:** 39% remains of a preclearing area of about 43 600ha.

**Conservation status:**

## Regional ecosystem 12.9/10.17

**Description:** Tall open forests generally with mix of stringybarks, grey gums, ironbarks and in some areas spotted gum on Cainozoic to Proterozoic sediments. Canopy trees include *Eucalyptus siderophloia*, *E. propinqua* or *E. major*, *E. acmenoides* and/or *E. carnea* and/or *E. microcorys* and/or *Corymbia citriodora*. Hills and ranges. Other species that may be present locally include *Corymbia intermedia*, *C. trachyphloia*, *Eucalyptus tereticornis*, *E. biturbinata*, *E. moluccana*, *E. longirostrata*, *E. fibrosa* subsp. *fibrosa* and *Angophora leiocarpa*. *Lophostemon confertus* or *Lophostemon* sp. aff. *L. confertus* often present in gullies and as a subcanopy or understory tree. Mixed understory of grasses, shrubs and ferns.

**Provinces:** 2, 6, 7, 8.

**Protected areas:** Main Range NP (3820ha), Mount Barney NP (1550ha); also a number of protected areas <1000ha.

**Extent reserved:** Low.

**Estimated extent:** 48% remains of a total area of about 133 000ha.

**Conservation status:**

## Regional ecosystem 12.9/10.18

**Description:** Grassy open forest with *Angophora leiocarpa* on Cainozoic to Proterozoic sediments. Associated species as for RE 12.9/10.2.

**Provinces:** 2, 6, 7, 8.

**Protected areas:** No representation.

**Comments:** This type has a very patchy distribution and often occurs as patches too small to map at 1:100 000 scale. A subcoastal population of *Callitris columellaris* is associated with this regional ecosystem near Coominya in the Lockyer Valley.

**Estimated extent:** 40% remains of a total mapped area of about 9400ha.

**Conservation status:**

## Regional ecosystem 12.9/10.19

**Description:** *Eucalyptus fibrosa* subsp. *fibrosa* ± *Corymbia citriodora* and *E. acmenoides* open forest on Cainozoic to Proterozoic sediments and complex of Cainozoic to Proterozoic sediments and Cainozoic sand plains. Understorey often sparse.

**Provinces:** 2, 6, 7, 8

**Protected areas:** Burrum Coast NP (20ha); also represented in protected areas <1000ha.

**Extent reserved:** Low.

**Comments:** This type has a very patchy distribution and often occurs as patches too small to map at 1:100 000 scale.

**Estimated extent:** 75% remains of a total area of about 65 700ha.

**Conservation status:**

## Regional ecosystem 12.9/10.20

**Description:** *Eucalyptus andrewsii* subsp. *campanulata* or *E. montivaga* shrubby open forest

to tall open forest on Cainozoic to Proterozoic sediments.

**Provinces:** 1, 10.

**Protected areas:** Kroombit Tops NP, Mount Barney NP (localised occurrences only).

**Extent reserved:** Low.

**Estimated extent:** 94% remains of a total area of about 5700ha.

**Conservation status:**

## Regional ecosystem 12.9/10.21

**Description:** *Eucalyptus acmenoides* open forest usually with *Corymbia citriodora* and/or *C. trachyphloia* ± *Angophora leiocarpa*, *E. crebra* or *E. siderophloia*, *E. exserta*, *Lophostemon* sp. aff *L. confertus* on Cainozoic to Proterozoic sediments.

**Provinces:** 7, 8, 10.

**Protected areas:** No representation.

**Comments:** More widespread in northern half of bioregion.

**Estimated extent:** 62% remains of a total area of about 27 500ha.

**Conservation status:**

## Regional ecosystem 12.9/10.22

**Description:** Closed sedgeland to heathland with emergent trees on Cainozoic to Proterozoic sediments. Lower slopes subject to periodic waterlogging. Characteristic species include *Schoenus brevifolius* and/or *Baumea juncea* and/or *Banksia robur* and/or *Melaleuca nodosa*. Sometimes grading into *Banksia aemula* woodland on rises.

**Provinces:** 4, 8, 9.

**Protected areas:** Great Sandy NP (3600ha).

**Extent reserved:** High.

**Special ecological values:** Habitat for rare and threatened flora species including *Melaleuca cheelii* and *Eucalyptus conglomerata*. Under threat of becoming rare locally in some parts of the bioregion.

**Estimated extent:** 64% remains of a preclearing area of about 7200ha.

**Conservation status:**

## Regional ecosystem 12.9/10.23

**Description:** *Eucalyptus melanoleuca* open forest ± *E. major*, *Corymbia trachyphloia*, *E. acmenoides*, *C. citriodora* on Cainozoic to Proterozoic sediments and adjacent Mesozoic to Proterozoic igneous rocks.

**Provinces:** 10.

**Protected areas:** Kroombit Tops NP (1300ha).

**Extent reserved:** Medium.

**Comments:** Extends into adjacent Brigalow Belt bioregion.

**Estimated extent:** 87% remains of a total area of about 4600ha.

**Conservation status:**

## Regional ecosystem 12.9/10.24

**Description:** *Eucalyptus suffulgens* open forest to woodland ± *Corymbia acmenoides* tall woodland on Cainozoic to Proterozoic sediments and adjacent Mesozoic to Proterozoic igneous rocks.

**Provinces:** 10.

**Protected areas:** Kroombit Tops NP (30ha).

**Extent reserved:** Low.

**Comments:** Extends into adjacent Brigalow Belt bioregion.

**Estimated extent:** 100% remains of a total area of about 3700ha.

**Conservation status:**

**Land zone 11:** Moderately to strongly deformed and metamorphosed Mesozoic to Proterozoic sediments and interbedded volcanics.

## Regional ecosystem 12.11.1

**Description:** Evergreen notophyll rainforest and/or *Lophostemon confertus* closed forest in gullies on Mesozoic to Proterozoic moderately to strongly deformed and metamorphosed sediments and interbedded volcanics. *Archontophoenix cunninghamiana* often present in gully floors. The plant families Lauraceae, Myrtaceae and Elaeocarpaceae are characteristic of the type.

**Provinces:** 3, 7.

**Protected areas:** Conondale NP and RR (1900ha), D'Aguiar NP (total area included within RE 12.11.10), Mount Barney NP (750ha); also represented in protected areas <1000ha.

**Extent reserved:** Medium.

**Comments:** Occurs in gully heads and is often too small to map at 1:100 000. Characteristic localities are Conondale Range and Mount Glorious below the Tertiary basalt cap.

**Special ecological values:** Habitat for rare and threatened flora species including *Austromyrtus inophloia*.

**Estimated extent:** 61% remains of a total mappable area of about 18 600ha.

**Conservation status:**

## Regional ecosystem 12.11.2

**Description:** Tall to very tall open forest with rainforest understorey ('wet sclerophyll') on Mesozoic to Proterozoic moderately to strongly deformed and metamorphosed sediments and interbedded volcanics. Canopy species include *Eucalyptus saligna* or *E. grandis*, *E. microcorys*, *E. acmenoides* and *Lophostemon confertus*. Characteristic understorey species include *Caldcluvia paniculosa*, *Pittosporum undulatum*, *Synoum glandulosum* and *Cryptocarya glaucescens*.

**Provinces:** 3, 7.

**Protected areas:** Conondale NP (1800ha), D'Aguiar NP (380ha), Springbrook NP (200ha); also represented in protected areas <1000ha.

**Extent reserved:** Medium.

**Special ecological values:** Habitat for rare and threatened flora species including *Cyperus semifertillis*.

**Estimated extent:** 68% remains of a total area of about 24 500ha.

**Conservation status:**

## Regional ecosystem 12.11.3

**Description:** Tall very tall open forest generally with *Eucalyptus siderophloia* and *E. propinqua* ± *E. microcorys*, *Lophostemon confertus*, *Corymbia intermedia*, *E. biturbinata*, *E. acmenoides*, *C. moluccana*, *Syncarpia verecunda* with rainforest species and *E. grandis* or *E. saligna* in gullies. Occurs predominantly on hills and ranges on Mesozoic to Proterozoic moderately to strongly deformed and metamorphosed sediments and interbedded volcanics but also on alluvium in headwaters of streams and sometimes also on Cainozoic to Proterozoic sediments. *Eucalyptus pilularis* and *E. tindaliae* sometimes present e.g. mid-D'Aguilar Range, Daisy Hill.

**Provinces:** 3, 7.

**Protected areas:** Conondale NP (1600ha), D'Aguilar NP (460ha), Springbrook NP (800ha); also represented in protected areas <1000ha.

**Extent reserved:** Low.

**Special ecological values:** Habitat for rare and threatened flora species including *Acomis acoma*, *Corchorus cunninghamii*, *Marsdenia coronata* and *Sophora fraseri*.

**Comments:** This type develops a dense understorey of Araucarian rainforest species in the absence of fire. Subject also to weed invasion by *Lantana camara*.

**Estimated extent:** 66% remains of a total area of about 149 000ha.

**Conservation status:**

## Regional ecosystem 12.11.4

**Description:** Low microphyll rainforest and semi-evergreen vine thicket on Mesozoic to Proterozoic moderately to strongly deformed and metamorphosed sediments and interbedded volcanics. Characteristic species include *Backhousia kingii*, *Pleiogygium timorense*, *Aidia*

*racemosa*, *Archidendropsis thozetiana*, *Atalaya rigida*, *Barklya syringifolia*, *Briedelia leichhardtii*, *Cassine melanocarpa*, *Choricarpia subargentea*, *Flueggea leucopyrus*, *Homalium alnifolium* and *Terminalia porphyrocarpa*. *Melaleuca bracteata* is often present along watercourses.

**Provinces:** 10.

**Protected areas:** Type contained within protected areas <1000ha and in protected areas in close proximity to boundary of SEQ and Brigalow Belt bioregion (e.g. Rundle Range NP).

**Extent reserved:** Low.

**Special ecological values:** Habitat for rare and threatened flora species including *Rhodamnia* sp. and *Fontainea venosa*.

**Comments:** Occurs on north-west margins of bioregion in Wietalaba area and extends into adjacent Brigalow Belt bioregion. Remnants prone to weed invasion and fire damage on margins.

**Estimated extent:** 96% remains of a total area of about 1300ha.

**Conservation status:**

## Regional ecosystem 12.11.5

**Description:** Mixed tall open forest generally with a mix of stringybarks, grey gums, ironbarks and spotted gum on Mesozoic to Proterozoic moderately to strongly deformed and metamorphosed sediments and interbedded volcanics. Canopy trees include *Corymbia citriodora*, *Eucalyptus siderophloia* (less commonly *E. crebra*, *E. decolor*), *E. major* and/or *E. longirostrata* and *E. acmenoides* and/or *E. carnea* and/or *E. eugenioides*. Hills and ranges. Other species that may be present and abundant locally include *Corymbia henryi*, *C. intermedia*, *C. trachyphloia*, *Eucalyptus tereticornis*, *E. propinqua*, *E. biturbinata*, *E. moluccana*, *E. melliodora*, *E. fibrosa* subsp. *fibrosa* and *Angophora leiocarpa*. *Lophostemon confertus* or *Lophostemon* sp. aff. *L. confertus* often present in gullies and as a subcanopy or understorey tree. Mixed understorey of grasses, shrubs and ferns. Scattered patches of *Eucalyptus racemosa* on the low altitude coastal metamorphics around Brisbane.

**Provinces:** 3, 7.

**Protected areas:** D'Aguilar NP (240ha), Mount Walsh NP (50ha), Tamborine NP (700ha); also represented in protected areas <1000ha.

**Extent reserved:** Low.

**Special ecological values:** Habitat for rare and threatened flora species including *Cycas megacarpa*, *Isotropis foliosa*, *Persoonia amalieae* and *Sophora fraseri*. *Eucalyptus henryi* is endemic to bioregion.

**Comments:** Species composition of canopy can be very mixed — for example in the D'Aguilar Range north-west of Brisbane 10–12 tree species have been recorded in 0.1ha plots. Lower altitude occurrences in south of bioregion are being extensively cleared and fragmented.

**Estimated extent:** 41% remains of a total area of about 194 000ha.

**Conservation status:**

## Regional ecosystem 12.11.6

**Description:** Open forest to woodland of *Corymbia citriodora* generally with *Eucalyptus crebra* on Mesozoic to Proterozoic moderately to strongly deformed and metamorphosed sediments and interbedded volcanics. Other species such as *Eucalyptus fibrosa* subsp. *fibrosa*, *E. exserta*, *E. tereticornis*, *E. moluccana*, *Angophora leiocarpa* may be present in scattered patches or in low densities. Understorey grassy or shrubby.

**Provinces:** 3, 6, 7, 10.

**Protected areas:** Castle Tower NP (140ha), D'Aguilar NP (360ha), Mount Walsh NP (150ha), Tarong NP (60ha).

**Extent reserved:** Low.

**Special ecological values:** Habitat for rare and threatened flora species including *Cycas megacarpa*.

**Estimated extent:** 63% remains of a total area of about 348 000ha.

**Conservation status:**

## Regional ecosystem 12.11.7

**Description:** *Eucalyptus crebra* grassy woodland on Mesozoic to Proterozoic moderately to strongly

deformed and metamorphosed sediments and interbedded volcanics. Steep hills to undulating lowlands. Other species such as *Corymbia erythrophloia*, *C. tessellaris*, *C. citriodora*, *Eucalyptus exserta*, *E. tereticornis* may be present in low densities or in patches. Mid-stratum generally sparse but can include low trees such as *Acacia bidwillii*, *Capparis* spp., *Dodonaea triquetra*, *Alphitonia excelsa* and *Xanthorrhoea* spp.

**Provinces:** 3, 6, 7, 10.

**Protected areas:** Castle Tower NP (60ha), Crows Nest NP (60ha), Kroombit Tops NP (70ha), Mount Walsh NP (120ha).

**Extent reserved:** Low.

**Comments:** Extensively cleared for pasture.

**Estimated extent:** 34% remains of a preclearing area of about 165 000ha.

**Conservation status:**

## Regional ecosystem 12.11.8

**Description:** *Eucalyptus melanophloia* ± *E. crebra* grassy woodland on Mesozoic to Proterozoic moderately to strongly deformed and metamorphosed sediments and interbedded volcanics. Other species such as *Eucalyptus erythrophloia*, *Corymbia tessellaris*, *C. citriodora* may be present in low densities or in patches.

**Provinces:** 3, 6, 7, 10.

**Protected areas:** No representation.

**Comments:** Extensively cleared for pasture. Sometimes mapped as part of RE 12.11.7.

**Estimated extent:** About 26% remains of a preclearing mapped area of about 33 000ha.

**Conservation status:** Vulnerable.

## Regional ecosystem 12.11.9

**Description:** Open forest to tall woodland with *Eucalyptus tereticornis* and *E. melliodora* on Mesozoic to Proterozoic moderately to strongly deformed and metamorphosed sediments and interbedded volcanics. Ridges and upper slopes especially at higher altitudes. Other species include *Eucalyptus biturbinata*, *Corymbia*

*intermedia*, *E. longirostrata*, *E. eugenioides*, *Allocasuarina torulosa*, *E. moluccana*, *E. saligna* and *Angophora subvelutina*.

**Provinces:** 3, 6, 7, 10.

**Protected areas:** Conondale NP (920ha); small patches in other protected areas.

**Extent reserved:** Low.

**Comments:** Often occurs as localised patches on ridge tops that are too small to map at 1:100 000 scale. These occurrences are often associated with small areas of intermediate and basic volcanic rocks.

**Estimated extent:** 79% remains of a total mappable area of about 5000ha.

**Conservation status:**

## Regional ecosystem 12.11.10

**Description:** Notophyll and notophyll/microphyll rainforest ± *Araucaria cunninghamii* on Mesozoic to Proterozoic moderately to strongly deformed and metamorphosed sediments and interbedded volcanics. Characteristic species include *Argyrodendron trifoliolatum*, *Argyrodendron* sp. (Kin Kin W.D.Francis AQ 81198), *Choricarpia subargentea*, *Dissiliaria baloghioides*, *Brachychiton discolor*, *Beilschmiedia obtusifolia*, *Diospyros pentamera*, *Grevillea robusta*, *Gmelina leichhardtii* and *Ficus macrophylla*.

**Provinces:** 3, 7, 10.

**Protected areas:** D'Aguilar NP (300ha), Mount Walsh NP (90ha), Tamborine NP (150ha); also represented in protected areas <1000ha.

**Extent reserved:** Low.

**Special ecological values:** Habitat for rare and threatened including *Alyxia illicifolia* subsp. *magnifolia*, *Arytera dictyoneura*, *Choricarpia subargentea*, *Fontainea rostrata*, *Graptophyllum reticulatum*, *Macadamia integrifolia*, *M. tetraphylla*, *Planchonella eerwah* and *Quassia bidwillii*.

**Comments:** Widely distributed along coastal and subcoastal ranges such as Darlington and D'Aguilar Ranges, upper Mary Valley, Woowoonga Range and Bania. Best developed examples are on moist lower slopes e.g. Mitchell Creek in Imbil area and Enoggera Creek west of Brisbane.

**Estimated extent:** 47% remains of a total area of about 97 000ha.

**Conservation status:**

## Regional ecosystem 12.11.11

**Description:** Microphyll rainforest ± *Araucaria cunninghamii* on Mesozoic to Proterozoic moderately to strongly deformed and metamorphosed sediments and interbedded volcanics. Characteristic species include *Araucaria cunninghamii*, *Cupaniopsis parvifolia*, *Dendrocnide photinophylla*, *Rhodosphaera rhodanthema*, *Flindersia australis*, *F. xanthoxyla*, *Drypetes deplanchei*, *Olea paniculata*, *Diospyros geminata*, *Austromyrtus bidwillii*, *Excoecaria dallachyana* and *Premna lignum-vitae*.

**Provinces:** 3, 6, 7.

**Protected areas:** D'Aguilar NP (120ha), Tarong NP (190ha); also represented in protected areas <1000ha.

**Extent reserved:** Low.

**Special ecological values:** Habitat for rare and threatened flora species including *Alyxia illicifolia* subsp. *magnifica*, *Corchorus cunninghamii*, *Cupaniopsis tomentella*, *Hernandia bivalvis*, *Plectranthus omissus*, *Sarcochilus dilatatus* and *Sarcochilus weinthalii*.

**Comments:** Extensively cleared for pasture and plantations. Occurs in south of bioregion. Remnants can be degraded by weed infestation in conjunction with wildfire damage on margins. Characteristic localities for regional ecosystem are western foothills of D'Aguilar Range, Imbil-Kilkivan and Nanango.

**Estimated extent:** 30% remains of a preclearing area of about 44 700ha.

**Conservation status:** Vulnerable.

## Regional ecosystem 12.11.12

**Description:** Microphyll and microphyll/notophyll rainforest ± *Araucaria cunninghamii* on Mesozoic to Proterozoic moderately to strongly deformed and metamorphosed sediments and interbedded volcanics. Characteristic species include *Archidendropsis thozetiana*, *Argyrodendron* sp. (Kin Kin W.D.Francis AQ 81198), *Croton*

*acronychioides*, *Cupaniopsis simulatus*, *Dendrocnide photinophylla*, *Diospyros geminata*, *Drypetes deplanchei*, *Ficus virens*, *Cryptocarya bidwillii*, *Planchonella myrsinoides*, *Pleiogynium timorense*, *Premna lignum-vitae* and *Vitex acuminata*. In places this regional ecosystem is actively invading adjacent eucalypt forest in absence of fire (e.g. Goodnight Scrub).

**Provinces:** 7, 10.

**Protected areas:** No representation.

**Special ecological values:** Habitat for rare and threatened flora species including *Alyxia ilicifolia* subsp. *magnifica*, *Alyxia sharpei*, *Fontainea venosa*, *Hernandia bivalvis*, *Quassia bidwillii*, *Rhodamnia pauciovulata* and *Sarcochilus dilatatus*.

**Comments:** Cleared for pasture. Occurs in north of bioregion. Remnants can be degraded by weed infestation in conjunction with wildfire damage on margins. Characteristic localities for the regional ecosystem are hills near Woolooga, Woowoonga Range and Goodnight Scrub.

**Estimated extent:** 48% remains of a total area of about 25 600ha.

**Conservation status:**

## Regional ecosystem 12.11.13

**Description:** Low microphyll rainforest ± *Araucaria cunninghamii* and semi-evergreen vine thicket on Mesozoic to Proterozoic moderately to strongly deformed and metamorphosed sediments and interbedded volcanics. Characteristic species include *Brachychiton australe*, *B. rupestris*, *Archidendropsis thozetiana*, *Flindersia australis*, *F. collina*, *Canthium buxifolium*, *C. odoratum*, *Alectryon diversifolius*, *Acacia fasciculifera*, *Turraea brownii*, *Arytera microphylla*, *Atalaya salicifolia*, *Elattostachys xylocarpa*, *Grevillea helmsiae* and *Geijera paniculata*. *Melaleuca bracteata* is often present along watercourses.

**Provinces:** 7.

**Protected areas:** No representation.

**Comments:** Occurs in north of bioregion. Remnants require intensive management because of weed invasion and fire damage on margins.

**Estimated extent:** 81% remains of a preclearing area of about 6100ha.

**Conservation status:** Vulnerable.

## Regional ecosystem 12.11.14

**Description:** *Corymbia clarksoniana*, *Eucalyptus tereticornis* ± *Lophostemon suaveolens*, *C. tessellaris*, *E. acmenoides*, *E. exserta*, *E. crebra*, *C. intermedia*, *E. siderophloia*, *Angophora leiocarpa* tall woodland on crests and upper slopes of gently undulating terrain on Mesozoic to Proterozoic igneous rocks and adjacent Cainozoic to Proterozoic sediments.

**Provinces:** 7, 10.

**Protected areas:** No representation.

**Comments:** Mostly restricted to central part of bioregion. Subject to thinning and grazing.

**Estimated extent:** 52% remains of a total area of about 17 000ha.

**Conservation status:**

## Regional ecosystem 12.11.15

**Description:** Woodland to open woodland on serpentinite. Canopy trees include *Eucalyptus tereticornis*, *E. crebra*, *Corymbia erythrophloia*, *C. clarksoniana*, *E. acmenoides*. *Xanthorrhoea* spp. in understorey.

**Provinces:** 7.

**Protected areas:** No representation.

**Special ecological values:** Habitat for rare and threatened flora species including *Thesium australe*.

**Comments:** Mostly restricted to south-central part of bioregion around Widgee-Kilkivan. Patches of *Leptospermum* shrubland occur in places, for example east of Kilkivan.

**Estimated extent:** 63% remains of a total area of about 16 500ha.

**Conservation status:**

## Regional ecosystem 12.11.16

**Description:** *Eucalyptus cloeziana* ± *E. propinqua*, *E. acmenoides*, *E. microcorys* and *E. grandis* tall open forest on Mesozoic to Proterozoic moderately to strongly deformed and metamorphosed sediments and interbedded volcanics.

**Provinces:** 7, 8.

**Protected areas:** No representation.

**Comments:** *Eucalyptus cloeziana* has a markedly disjunct distribution in eastern Queensland. Areas outside of state forest mostly cleared for agriculture. *Eucalyptus cloeziana* has some potential as a very adaptable plantation hardwood species.

**Estimated extent:** 29% remains of a preclearing area of about 16 600ha.

**Conservation status:** Vulnerable.

## Regional ecosystem 12.11.17

**Description:** *Eucalyptus acmenoides* tall open forest usually with *Corymbia citriodora*, *E. crebra* ± *C. trachyphloia*, *E. fibrosa* subsp. *fibrosa*, *E. exserta*, *Angophora leiocarpa*, *C. intermedia*, *Lophostemon* sp. aff. *L. confertus* on Mesozoic to Proterozoic moderately to strongly deformed and metamorphosed sediments and interbedded volcanics.

**Provinces:** 7, 8, 10.

**Protected areas:** Small areas in Castle Tower NP; also represented in protected areas <1000ha.

**Extent reserved:** Low.

**Comments:** Comparable to RE 12.11.5 but less species rich and *Eucalyptus acmenoides* is predominant. More widespread in northern part of bioregion.

**Estimated extent:** 73% remains of a total area of about 56 500ha.

**Conservation status:**

## Regional ecosystem 12.11.18

**Description:** *Eucalyptus moluccana* tall open forest ± *Corymbia citriodora*, *E. fibrosa* subsp. *fibrosa*, *E. tereticornis*, *E. longirostrata* on Mesozoic to Proterozoic moderately to strongly deformed and metamorphosed sediments and interbedded

volcanics. Occurs as scattered occurrences in a range of topographic positions from ridgetops to lower slopes.

**Provinces:** 3, 6, 7, 8, 10.

**Protected areas:** Small areas in protected areas <1000ha.

**Extent reserved:** Low.

**Comments:** Extensively cleared and thinned for grazing.

**Estimated extent:** 39% remains of a total preclearing area of about 53 300ha.

**Conservation status:**

## Regional ecosystem 12.11.19

**Description:** *Eucalyptus fibrosa* ± *Corymbia citriodora*, *E. crebra*, *E. moluccana*, *E. acmenoides*, *E. tereticornis*, *Angophora leiocarpa*, *E. henryi* (province 3) open forest on Mesozoic to Proterozoic moderately to strongly deformed and metamorphosed sediments and interbedded volcanics. Isolated patches of *Eucalyptus sideroxylon* on western margins of bioregion (e.g. Wondai SF).

**Provinces:** 3, 6, 7, 10.

**Protected areas:** No representation.

**Estimated extent:** 61% remains of a total area of about 17 300ha.

**Conservation status:**

<b>Land zone 12:</b> Mesozoic to Proterozoic igneous rocks.
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## Regional ecosystem 12.12.1

**Description:** Notophyll and notophyll/microphyll rainforest sometimes with *Archontophoenix cunninghamiana* and/or *Lophostemon confertus* closed forest in gullies on Mesozoic to Proterozoic igneous rocks especially granite and rhyolite. The plant families Lauraceae, Myrtaceae and Elaeocarpaceae are diagnostic of the type and *Planchonella laurifolia* is common in the northern half of the bioregion. *Araucaria cunninghamii* is often present on margins.

**Provinces:** 5, 7, 10.

**Protected areas:** Mount Walsh NP (150ha); small areas in protected areas <1000ha.

**Extent reserved:** Low.

**Special ecological values:** Habitat for rare and threatened flora species including *Argophyllum nullumense*.

**Estimated extent:** 71% remains of a total mappable area of about 10 000ha.

**Conservation status:**

## Regional ecosystem 12.12.2

**Description:** *Eucalyptus pilularis* tall open forest with shrubby understorey on Mesozoic to Proterozoic igneous rocks. Other canopy species include *Syncarpia verecunda*, *Angophora woodsiana*, *Eucalyptus microcorys*, *E. resinifera*, *E. tindaliae*, *E. propinqua* and *E. saligna*.

**Provinces:** 3, 4, 7.

**Protected areas:** Conondale NP (480ha), Crows Nest NP (140ha); also in protected areas <1000ha.

**Extent reserved:** Low.

**Estimated extent:** 65% remains of a total area of about 32 200ha.

**Conservation status:**

## Regional ecosystem 12.12.3

**Description:** Tall open forests generally with mix of stringybarks, grey gums, ironbarks and spotted gum on Mesozoic to Proterozoic igneous rocks. Canopy trees include *Corymbia citriodora*, *Eucalyptus crebra* or *Eucalyptus siderophloia*, *E. major* and/or *E. longirostrata*, *E. acmenoides*, *E. eugenioides*. Hills and ranges. Often species that may be present locally include *Corymbia intermedia*, *C. trachyphloia*, *Eucalyptus tereticornis*, *E. propinqua*, *E. biturbinata*, *E. moluccana*, *E. decolor*, *E. melliodora*, *E. fibrosa* subsp. *fibrosa* and *Angophora leiocarpa*. *Lophostemon confertus* or *Lophostemon* sp. aff. *L. confertus* often present in gullies or as a subcanopy or understorey tree or as a canopy tree especially on granite. Mixed understorey of grasses, shrubs and ferns.

**Provinces:** 5, 7, 10.

**Protected areas:** Crows Nest NP (85ha), Mount Walsh NP (900ha).

**Extent reserved:** Low.

**Special ecological values:** Habitat for rare and threatened flora species including *Cycas megacarpa* and *Persoonia amalieae*.

**Estimated extent:** 67% remains of a total area of about 91 000ha.

**Conservation status:**

## Regional ecosystem 12.12.4

**Description:** Tall open forest sometimes with rainforest understorey ('wet sclerophyll') on ranges on Mesozoic to Proterozoic igneous rocks. Canopy species include *Eucalyptus acmenoides*, *E. decolor*, *Corymbia intermedia*, *E. resinifera*, *Syncarpia glomulifera* and *Lophostemon* sp. aff. *L. confertus*. Extends onto lowlands on granite outwash along incised stream channels and merges into RE 12.12.6. *Eucalyptus montivaga* open forest above about >600m.

**Provinces:** 10.

**Protected areas:** Eurimbula NP (600ha), Mount Walsh NP (300ha).

**Extent reserved:** Low.

**Special ecological values:** Habitat for rare and threatened flora species including *Persoonia amalieae*.

**Comments:** Restricted to ranges in the northern half of bioregion.

**Estimated extent:** 95% remains of a total area of about 18 200ha.

**Conservation status:**

## Regional ecosystem 12.12.5

**Description:** Open forest to woodland of *Corymbia citriodora* usually with *Eucalyptus crebra* on hills and ranges on Mesozoic to Proterozoic igneous rocks. Other species such as *Eucalyptus exserta*, *E. moluccana* present in scattered patches or in low densities. Understorey generally grassy.

**Provinces:** 5, 6, 7, 10.

**Protected areas:** Kroombit Tops NP (500ha), Mount Walsh NP (70ha), Tarong NP (250ha); also represented in protected areas <1000ha.

**Extent reserved:** Low.

**Special ecological values:** Habitat for rare and threatened flora species including *Cycas megacarpa*.

**Estimated extent:** 51% remains of a total area of about 296 000ha.

**Conservation status:**

## Regional ecosystem 12.12.6

**Description:** *Eucalyptus montivaga* open forest on Mesozoic to Proterozoic igneous rocks. Altitude >500m. Other canopy species can include *E. trachyphloia*, *E. acmenoides*, *Syncarpia glomulifera* and *Corymbia intermedia*.

**Provinces:** 3, 5, 10.

**Protected areas:** Small areas in D'Aguilar NP, Castle Tower NP, Conondale NP, Mount Walsh NP.

**Extent reserved:** Medium.

**Special ecological values:** Habitat for rare and threatened flora species including *Acomis acoma*, *Comesperma esulifolium* and *Daviesia discolor*.

**Comments:** A vegetation type commonly associated with cooler topographic isolates throughout the bioregion and patches sometimes too small to map. Over frequent fire can promote fire tolerant understorey species such as blady grass at the expense of shrubs.

**Estimated extent:** >90% remains of a mapped area of about 1200ha (naturally rare type).

**Conservation status:** Vulnerable.

## Regional ecosystem 12.12.7

**Description:** *Eucalyptus crebra* grassy woodland on Mesozoic to Proterozoic igneous rocks. Other species such as *Eucalyptus erythrophloia*, *E. exserta*, *E. tereticornis*, *Corymbia tessellaris*, *C. citriodora* may be present in low densities or in patches. Mid-stratum generally sparse but can

include low trees such as *Acacia bidwillii*, *Alphitonia excelsa*, *Allocasuarina luehmannii*, *Petalostigma pubescens*. Small areas of *Callitris glaucophylla* in central western parts of bioregion.

**Provinces:** 5, 6, 7, 10.

**Protected areas:** Castle Tower NP (+), Crows Nest NP (90ha), Eurimbula NP (600ha), Mount Walsh NP (300ha); also represented in protected areas <1000ha.

**Extent reserved:** Low.

**Special ecological values:** Habitat for rare and threatened flora species including *Acacia grandifolia*.

**Comments:** Less steep areas have been extensively cleared for pasture.

**Estimated extent:** 26% remains of a total preclearing area of about 275 000ha.

**Conservation status:** Vulnerable.

## Regional ecosystem 12.12.8

**Description:** *Eucalyptus melanophloia* usually with *E. crebra* ± *E. erythrophloia* grassy woodland on Mesozoic to Proterozoic igneous rocks. Associated species as for RE 12.12.7.

**Provinces:** 5, 6, 7, 10.

**Protected areas:** Small areas in Kroombit Tops NP.

**Extent reserved:** Low.

**Comments:** Less steep areas have been extensively cleared for pasture.

**Estimated extent:** 23% remains of a total area of about 117 000ha.

**Conservation status:** Vulnerable.

## Regional ecosystem 12.12.9

**Description:** Shrubby or grassy woodland to tall woodland (open woodland in rocky areas) with *Eucalyptus trachyphloia*, *E. acmenoides* and/or *E. dura*, *Allocasuarina littoralis*, *E. exserta*. *Acacia* spp., *E. montivaga* (higher altitudes), *E. crebra*. *Lophostemon* sp. aff. *L. confertus* often present in shrub layer.

**Provinces:** 5, 6, 10.

**Protected areas:** Castle Tower NP (650ha), Crows Nest NP, Mount Walsh NP (2000ha); also represented in protected areas <1000ha.

**Extent reserved:** Medium.

**Special ecological values:** Habitat for rare and threatened flora species including *Acacia pubicosta*, *Cassinia collina* and *Comesperma breviflorum*.

**Comments:** Frequent fire can favour fire tolerant species at the expense of fire sensitive species.

**Estimated extent:** 89% remains of a total area of about 14 200ha.

**Conservation status:**

## Regional ecosystem 12.12.10

**Description:** Shrubland (montane heath) associated with rocky soils derived from Mesozoic to Proterozoic igneous rocks.

**Provinces:** 5, 10.

**Protected areas:** Kroombit Tops NP (30ha), Mount Walsh NP (150ha); also represented in protected areas <1000ha.

**Extent reserved:** Medium.

**Special ecological values:** Habitat for rare and threatened flora species including *Acacia pubicosta*, *Callistemon formosus*, *Cassinia collina*, *Comesperma esulifolium*, *Coopernookia scabridiuscula*, *Daviesia discolor*, *Kunzea flavescens* and *Leucopogon rupicola*. Also contains other species with restricted or disjunct distributions.

**Comments:** Montane heaths exhibit a high level of species endemism. Subject to overburning (frequent fire favours fire tolerant species at the expense of fire sensitive species) and habitat sometimes favoured for telecommunication towers and other mountaintop infrastructure. Often too small to map at 1:100 000 scale.

**Estimated extent:** 85% remains of a mapped area of about 900ha (naturally rare type).

**Conservation status:** Vulnerable.

## Regional ecosystem 12.12.11

**Description:** *Eucalyptus acmenoides* usually with *Corymbia citriodora*, *E. crebra* ± *C. intermedia*, *E. exserta*, *C. trachyphloia*. Hillsides on Mesozoic to Proterozoic igneous rocks. *Eucalyptus decolor* sometimes present at higher altitudes. *Lophostemon* sp. aff *L. confertus* often present in understorey.

**Provinces:** 5, 7, 10.

**Protected areas:** Deepwater NP (230ha), Eurimbula NP (1900ha), Kroombit Tops NP (1500ha), Mount Walsh NP (1250ha).

**Extent reserved:** Low.

**Comments:** Mostly in the northern half of bioregion.

**Estimated extent:** 86% remains of a total area of about 99 000ha.

**Conservation status:**

## Regional ecosystem 12.12.12

**Description:** *Eucalyptus tereticornis*, *E. crebra* or *E. siderophloia*, *Corymbia intermedia* ± *Lophostemon suaveolens* ± *C. citriodora* ± *C. tessellaris* tall grassy woodland to open forest. Granite basins and lowlands. *Melaleuca quinquenervia* often present on watercourses.

**Provinces:** 3, 6, 7, 10.

**Protected areas:** Eurimbula NP (1170ha).

**Extent reserved:** Low.

**Comments:** Extensively cleared for pasture. RE is widely distributed but relatively uncommon. Typical localities are around Miriam Vale in north and Samford Valley in south.

**Estimated extent:** 28% remains of a preclearing area of about 39 400ha.

**Conservation status:** Vulnerable.

## Regional ecosystem 12.12.13

**Description:** Microphyll and microphyll/notophyll rainforest ± *Araucaria cunninghamii* on Mesozoic to Proterozoic igneous rocks. Characteristic species include *Argyrodendron trifoliolatum*,

*Argyrodendron* sp. (Kin Kin W.D.Francis AQ 81198), *Dendrocnide photinophylla*, *Diospyros geminata*, *Drypetes deplanchei*, *Ficus virens*, *Cryptocarya bidwillii*, *Planchonella myrsinoides*, *Premna lignum-vitae*, *Hernandia bivalvis*, *Croton acronychioides*, *Flindersia* spp. *Olea paniculata*, *Excoecaria dallachyana*, *Austromyrtus bidwillii* and on northern half of bioregion *Vitex acuminata*, *Archidendropsis thozetiana*, *Pleiogynium timorense* and *Cupaniopsis simulatus*.

**Provinces:** 5, 7, 10.

**Protected areas:** Deepwater NP (60ha), Eurimbula NP (140ha), Kroombit Tops NP (200ha), Mount Walsh NP (40ha); also represented in protected areas <1000ha.

**Extent reserved:** Low.

**Special ecological values:** Habitat for rare and threatened flora species including *Corynocarpus rupestris* subsp. *rupestris*, *Alyxia ilicifolia* subsp. *magnifica*, *Hernandia bivalvis*, *Sarcochilus dilatatus* and *Sarcochilus weinthalii*.

**Comments:** Remnants can be degraded by weed infestation in conjunction with wildfire damage on margins. Characteristic localities for regional ecosystem include hills near Somerset Dam, Burnett Range between Goomeri and Biggenden, Mount Perry and Bucca Range.

**Estimated extent:** 62% remains of a total area of about 65 400ha.

**Conservation status:**

## Regional ecosystem 12.12.14

**Description:** Mixed shrubby woodland on Mesozoic to Proterozoic igneous rocks. Canopy species include *Eucalyptus racemosa*, *Corymbia trachyphloia*, *E. carnea*, *E. tindaliae*, *E. exserta* and *Angophora woodsiana*.

**Provinces:** 4, 7.

**Protected areas:** Conondale NP (40ha).

**Extent reserved:** Low.

**Comments:** Comparable to RE 12.12.9 but occurs in higher rainfall areas.

**Estimated extent:** 42% remains of a total area of about 6100ha.

**Conservation status:** Vulnerable.

## Regional ecosystem 12.12.15

**Description:** Mixed tall open forest with *Corymbia intermedia*, *Eucalyptus microcorys*, *E. acmenoides*, *E. siderophloia* and *E. propinqua* ± *E. moluccana* on Mesozoic to Proterozoic igneous rocks. Patches of *Eucalyptus pilularis* sometimes present. Mostly higher rainfall foothills of coastal ranges and foothills.

**Provinces:** 1, 3, 4, 7.

**Protected areas:** Conondale RR (450ha); also represented in protected areas <1000ha.

**Extent reserved:** Low.

**Estimated extent:** 73% remains of a total area of about 48 700ha.

**Conservation status:**

## Regional ecosystem 12.12.16

**Description:** Notophyll rainforest on Mesozoic to Proterozoic igneous rocks. Characteristic species include *Araucaria bidwillii*, *A. cunninghamii*, *Argyrodendron trifoliolatum*, *Argyrodendron* sp. (Kin Kin W.D.Francis AQ 81198), *Choricarpia subargentea*, *Brachychiton discolor*, *Beilschmiedia obtusifolia*, *Diospyros pentamera*, *Grevillea robusta*, *Gmelina leichhardtii*, *Ficus macrophylla* and *Sloanea woollsi*. *Eucalyptus* spp. especially *E. siderophloia*, *E. propinqua* and *E. grandis* may be present as emergents.

**Provinces:** 3, 4, 7, 10.

**Protected areas:** Noosa NP (100ha), also represented in protected areas <1000ha.

**Extent reserved:** Low.

**Special ecological values:** Habitat for rare and threatened flora species including *Alectryon semicinereus*, *Alyxia ilicifolia* subsp. *magnifolia*, *Arytera dictyoneura*, *Austromyrtus gonoclada*, *Baloghia marmorata*, *Bulbophyllum globuliforme*, *Cassia marksiana*, *Choricarpia subargentea*, *Dendrobium schneiderae*, *Floydia praealta*, *Fontainea rostrata*, *Graptophyllum reticulatum*, *Macadamia integrifolia*, *M. tetraphylla*, *Medicosma elliptica*, *Muellerina myrtifolia*, *Papillilabium beckleri*, *Phyllanthus brassii*, *P. sauropodoides*, *Planchonella eerwah*, *Quassia*

*bidwillii*, *Rhodamnia glabrescens*, *Sarcophilus weinthalii*, *Triunia robusta* and *Xanthostemon oppositifolius*.

**Comments:** Characteristic localities for regional ecosystem include Mount Mee and Yandina areas in south and Bulburin, Krombit Tops and Mount Robert in north of bioregion.

**Estimated extent:** 66% remains of a total area of about 39 200ha.

**Conservation status:**

## Regional ecosystem 12.12.17

**Description:** Low microphyll rainforest ± *Araucaria cunninghamii* and semi-evergreen vine thicket on Mesozoic to Proterozoic igneous rocks. Characteristic species include *Brachychiton rupestris*, *Flindersia collina*, *F. australis*, *Alectryon diversifolius*, *A. subdentatus*, *Elattostachys xylocarpa*, *Erythroxylum australe*, *Canthium buxifolium*, *Diospyros geminata*, *Planchonella cotinifolia*, *Croton insularis*, *Briedelia exaltata* and *Bursaria incana*. *Melaleuca bracteata* is often present along watercourses.

**Provinces:** 5.

**Protected areas:** No representation.

**Comments:** Cleared for pasture and cropping. Occurs in south of bioregion. Remnants require intensive management because of invasion by weeds and fire damage on margins. Characteristic localities include Nangur and Mount Beppo.

**Estimated extent:** 32% remains of a preclearing area of about 6500ha.

**Conservation status:** Vulnerable.

## Regional ecosystem 12.12.18

**Description:** Low microphyll rainforest ± *Araucaria cunninghamii* and semi-evergreen vine thicket on Mesozoic to Proterozoic igneous rocks. Characteristic species include *Brachychiton australe*, *B. rupestris*, *Archidendropsis thozetiana*, *Flindersia australis*, *F. collina*, *Canthium buxifolium*, *C. odoratum*, *Alectryon diversifolius*, *Acacia fasciculifera*, *Turraea brownii*, *Arytera microphylla*, *Atalaya salicifolia*, *Elattostachys xylocarpa*, *Grevillea helmsiae* and *Geijera paniculata*. *Melaleuca bracteata* is often present along watercourses.

**Provinces:** 5, 10.

**Protected areas:** Krombit Tops NP (80ha).

**Extent reserved:** Low.

**Comments:** Cleared for pasture and cropping. Occurs chiefly in central part of bioregion (e.g. Gayndah). Remnants require intensive management because of weed invasion and fire damage on margins.

**Estimated extent:** 80% remains of a preclearing area of about 4000ha.

**Conservation status:** Vulnerable.

## Regional ecosystem 12.12.19

**Description:** Vegetation complex of exposed rocky headlands on Mesozoic to Proterozoic igneous rocks as well as Cainozoic to Proterozoic sediments. Vegetation types include *Themeda triandra* grassland and wind-sheared shrubland and woodland.

**Provinces:** 4, 8, 9, 10.

**Protected areas:** Small areas of Great Sandy NP and Mount Coolum NP.

**Extent reserved:** Low.

**Comments:** Generally too small to map at 1:100 000 scale. Under pressure for tourist development due to prime location and scenic value.

**Estimated extent:** 70% remains of a total mapped area of about 800ha (naturally rare type).

**Conservation status:** Vulnerable.

## Regional ecosystem 12.12.20

**Description:** *Eucalyptus saligna* tall open forest with shrubby or grassy understorey on Mesozoic to Proterozoic igneous rocks.

**Provinces:** 10.

**Protected areas:** Small area in Krombit Tops NP.

**Extent reserved:** Low.

**Comments:** Most of distribution is contained within state forest. Understorey is sometimes grassy.

**Estimated extent:** 100% remains of a total area of about 5800ha.

**Conservation status:**

## Regional ecosystem 12.12.21

**Description:** *Eucalyptus crebra* and/or *E. exserta* ± *Corymbia citriodora* or *C. clarksoniana* or *C. intermedia* grassy woodland on Mesozoic to Proterozoic igneous rocks. *Melaleuca* spp. especially *M. viridiflora* present along minor drainage lines.

**Provinces:** 10.

**Protected areas:** Deepwater NP (110ha), Eurimbula NP (1400ha).

**Extent reserved:** Medium.

**Special ecological values:** Habitat for rare and threatened flora species including *Cycas megacarpa*.

**Estimated extent:** 96% remains of a total area of about 8200ha.

**Conservation status:**

## Regional ecosystem 12.12.22

**Description:** *Corymbia clarksoniana*, *Eucalyptus tereticornis* tall woodland ± *Lophostemon suaveolens*, *C. tessellaris*, *E. acmenoides*, *Angophora leiocarpa* on Mesozoic to Proterozoic igneous rocks and sometimes Cainozoic to Proterozoic sediments. Crests and upper slopes of gently undulating terrain on granite.

**Provinces:** 7, 8.

**Protected areas:** No representation.

**Comments:** Confined to central and northern parts of bioregion. Subject to thinning and grazing.

**Estimated extent:** 44% remains of a total area of about 17 800ha.

**Conservation status:**

## Regional ecosystem 12.12.23

**Description:** *Eucalyptus tereticornis* and/or *Corymbia intermedia* ± *E. acmenoides*, *E. crebra* and/or *Angophora subvelutina*, *E. melliodora*, *E. siderophloia*, *E. eugenoides*, *E. longirostrata*, *E. exserta*, *Lophostemon* sp. aff. *L. confertus* grassy tall woodland on Mesozoic to Proterozoic igneous rocks. Crests and slopes of mountains and steep hills especially on granite.

**Provinces:** 5, 7, 10.

**Protected areas:** Crows Nest NP (400ha), Eurimbula NP (370ha).

**Extent reserved:** Low.

**Comments:** Minor occurrences on other geologies in particular Cainozoic to Proterozoic sediments. Data on clearing rate between 1995-97 indicate that the RE continues to experience an annual loss in excess of 1% of current extent per annum. The area remaining is likely to fall below 30% within 5-10 years.

**Estimated extent:** 31% remains of a total area of about 89 000ha.

**Conservation status:** Vulnerable.

## Regional ecosystem 12.12.24

**Description:** *Angophora leiocarpa* ± *Corymbia intermedia*, *C. trachyphloia* woodland to open forest on Mesozoic to Proterozoic igneous rocks.

**Provinces:** 5, 6, 10.

**Protected areas:** Small area in Eurimbula NP.

**Extent reserved:** Low.

**Estimated extent:** 83% remains of a total area of about 9900ha.

**Conservation status:**

## Regional ecosystem 12.12.25

**Description:** *Eucalyptus fibrosa* subsp. *fibrosa* tall woodland to open forest ± *Corymbia citriodora*, *Angophora leiocarpa*, *E. acmenoides* on Mesozoic to Proterozoic igneous rocks. *Eucalyptus decorticans*, *C. trachyphloia* and *C. watsoniana* in central western part of bioregion.

**Provinces:** 5, 10.

**Protected areas:** Small areas in protected areas <1000ha.

**Extent reserved:** Low.

**Comments:** Regional ecosystem extends into adjacent Brigalow Belt bioregion.

**Estimated extent:** 85% remains of a total area of about 10 500ha.

**Conservation status:**

## Regional ecosystem 12.12.26

**Description:** *Acacia harpophylla* ± semi-evergreen vine thicket ± *Casuarina cristata* ± *Eucalyptus populnea* on Mesozoic to Proterozoic igneous rocks. Lower slopes and valley floors.

**Provinces:** 5.

**Protected areas:** No representation.

**Comments:** Extensively cleared for cropping.

**Estimated extent:** 11% remains of a preclearing area of about 8200ha.

**Conservation status:** Endangered.

## Regional ecosystem 12.12.27

**Description:** *Corymbia trachyphloia* usually with *Eucalyptus acmenoides* grassy tall woodland or open forest ± *E. crebra*, *Angophora leiocarpa*, *C. intermedia*, *E. exserta*, *E. decolor* on Mesozoic

to Proterozoic igneous rocks. Hills and mountains often associated with RE 12.12.9.

**Provinces:** 7, 8, 10.

**Protected areas:** Castle Tower NP (4400ha), Eurimbula NP (70ha), Kroombit Tops NP (230ha).

**Extent reserved:** Medium.

**Comments:** Mostly occurs in northern half of bioregion.

**Estimated extent:** 98% remains of a total area of about 19 500ha.

**Conservation status:**

## Regional ecosystem 12.12.28

**Description:** *Eucalyptus moluccana* ± *E. crebra*, *Corymbia citriodora* tall open forest or woodland on broad ridges and lower slopes on Mesozoic to Proterozoic igneous rocks.

**Provinces:** 5, 6, 7, 10.

**Protected areas:** Small areas in Eurimbula NP and Deepwater NP.

**Comments:** Data on clearing rate between 1995-97 indicate that the RE continues to experience an annual loss in excess of 1% of current extent per annum. The area remaining is likely to fall below 30% within 5-10 years.

**Extent reserved:** Low.

**Estimated extent:** 33% remains of a total area of about 52 000ha.

**Conservation status:** Vulnerable.

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## ABBREVIATIONS

CRA	Comprehensive Regional Assessment
EHTC	Environment and Heritage Technical Committee
GIS	Geographic Information System
REs	Regional ecosystems
RFA	Regional Forest Agreement

**TABLE 1. SEAMLESS VEGETATION UNITS (QUEENSLAND HERBARIUM) AND CORRESPONDING REGIONAL ECOSYSTEMS. THIS TABLE INDICATES THE EXTENT TO WHICH SEAMLESS VEGETATION UNITS HAVE BEEN GROUPED OR SPLIT AND THE BASIS FOR GROUPING AND SPLITTING**

Seamless veg. unit	Regional ecosystem	Comments
B2	12.2.1	
B3	12.2.4	
B4	12.2.3	
B5	12.2.2, 12.2.3	
B6	12.2.2	
B8	12.2.8	
B9	12.2.6	
C2	12.2.7, 12.3.5	Split on land zones.
C3	12.2.7, 12.3.5, 12.3.6	Split on land zones.
C4	12.3.4	
D2	12.5.2	
D3	12.9/10.1	
D4	12.5.11	
D6	12.5.8	
D7	12.9/10.4	
D8	12.5.3, 12.9/10.4, 12.12.14	Split on land zones.
E1	12.3.1	
E3	12.3.1	
E4	12.3.1	
E5	12.3.1	
E7	12.9/10.3, 12.11.18, 12.12.28	Combined with G34 and split on land zones.
E8	12.3.10	
E9	12.3.36, 12.3.11	
E10	12.3.3, rarely 12.12.12	12.12.12 associated with biotite granite basins such as Samford Valley.
E11	12.3.7	
E12		Combined with E11.
E13	12.12.4	Combined with J4 as grows on granite outwash at base of mountains with J4.
F1	12.7.1	
G1	12.8.3	
G2	12.8.5	
G3	12.8.4	
G4	12.8.6, 12.8.18	
G5	12.8.7	
G7	12.8.21, 12.8.22, 12.12.17, 12.12.18	Extends into Brigalow Belt. Split on basis of geographical patterns in species.
G8		Combined with adjoining rainforest types on maps.
G9	12.8.13	Combined with G13, G18.
G10	12.9/10.16, 12.11.10, 12.12.16	Split on land zone and geographical patterns in species.
G11		Combined with G10.
G13	12.8.13, 12.11.12, 12.11.13	Split on land zone and geographical patterns in species.
G16	12.8.4	Combined with G3, G17.
G17		Combined with G3, G16.
G18	12.8.13, 12.9/10.15, 12.11.11	Split on land zones.
G19	12.8.1, 12.9/10.20	Split on land zones.

Seamless veg. unit	Regional ecosystem	Comments
G21	12.8.11	
G22	12.3.2, 12.8.8, 12.11.2	Split on land zones. Majority of occurrences are fringing watercourses (land zone 3).
G23	12.5.6, 12.9/10.14, 12.12.2	Split on land zones.
G24	12.8.8, 12.12.20	Split on land zones.
G25		Combined with G24.
G26	Mostly 12.8.14	Minor occurrences on other land zones e.g. 12.12.23.
G27	12.8.9	
G29	12.5.1	
G30	12.8.10	
G35		Combined with G19.
G32	12.8.16	
G33	12.5.1	Combined with G29 on basis of land zone and characteristic species such as <i>Eucalyptus longirostrata</i> , <i>Corymbia intermedia</i> .
G34		Combined with E7 and split on land zones.
G36	12.3.9	Mostly along watercourses (land zone 3).
G38	12.11.9, 12.12.23	Split on land zones.
G39	12.5.2	Grouped with D2.
G41	12.11.7, 12.11.8, 12.12.7, 12.12.8	Split on land zone and prominence of either <i>Eucalyptus crebra</i> or <i>E. melanophloia</i> .
H1	12.8.23, 12.9/10.6, 12.12.26	Split on land zones.
H4	12.11.4	
H11	12.9/10.14	
H12		Combined with H11
H14	12.9/10.4	Combined with D7 as stands very patchy with local dominance of <i>Eucalyptus racemosa</i> or <i>E. tindaliae</i> .
H16	12.9/10.18, 12.12.24	Where <i>Angophora leiocarpa</i> major species 12.9/10.18; as for H19 where <i>Corymbia citriodora</i> also listed as major species.
H19	12.5.7, 12.9/10.2, 12.11.6, 12.12.5	Split on land zones.
H20	12.9/10.5	
H21		Combined with H39.
H23		Combined with H24.
H24	12.9/10.21, 12.12.27	
H25		Combined with H20.
H26		Combined with G38.
H27	12.5.1, 12.5.5, 12.9/10.18	Split on land zones and species of individual map units.
H29	12.9/10.19, 12.11.19, 12.12.25	Split on land zones.
H30		Combined with H29
H32	12.9/10.23	
H34		Combined with D7, H14
H35	12.7.2	
H36		Combined with D7, H14. <i>Eucalyptus seeana</i> is a conspicuous component of 12.9/10.14 in south of bioregion.
H37	12.9/10.24	
H39	12.9/10.4, 12.9/10.17, 12.11.3, 12.11.5, 12.12.3	Split on land zones. Other REs can be differentiated using finer scale mapping e.g. Brisbane Forest Park.
H40	12.9/10.13	
I1	12.8.13, 12.12.13	Split on land zones. Combined with I6.
I4	12.11.12	
I6	12.12.13	
I7	Mostly 12.11.1	
I8	12.11.16	

Seamless veg. unit	Regional ecosystem	Comments
I10	12.11.5, 12.11.17, 12.12.3, 12.12.27	Split on land zones and species of component map units.
I11	12.9/10.7, 12.9/10.8, 12.11.7, 12.11.8, 12.12.7, 12.12.8	Split on land zones and species of component map units.
I12	12.11.3, 12.12.15	Split on land zones.
I13	Included partly with I11 or 12.11.14, 12.12.12 or 12.12.22	Split on land zones and species of component map units.
J1	12.12.1	
J2	12.11.10, 12.11.12, 12.12.13, 12.12.16	Split on land zone and species composition.
J3	12.12.7	Localised variant that can be treated also as a point location feature of special interest.
J4	12.12.4	
J5	12.8.2	
J6	12.12.14	
J7	12.12.21	
J9	12.12.25	
J11	12.12.23	Combined with G38 on basis of similar species composition and land zones.
J12	12.12.11, 12.12.27	Split on predominance of <i>Eucalyptus acmenoides</i> or <i>Corymbia trachyphloia</i> and tall open forest versus woodland.
J13		Combined with J12
J14	12.8.25	
J15		Combined with J4.
J16	12.8.20, 12.9/10.5, 12.12.9	Split on land zones.
J17	12.5.1, 12.5.5, 12.8.14, 12.12.23	Split on land zones.
J19	12.9/10.20, 12.12.6	
J20	12.12.7	
K1	12.11.15	

Notes: Table does not include non-forest units and units of coastal fringe.

**TABLE 2. REGIONAL ECOSYSTEMS AND CORRESPONDING SEAMLESS VEGETATION UNITS (QUEENSLAND HERBARIUM). THIS TABLE INDICATES THOSE REGIONAL ECOSYSTEMS THAT CAN BE ANALYSED FURTHER TO INVESTIGATE GEOGRAPHICAL AND ENVIRONMENTAL VARIATION IN SPECIES COMPOSITIONS**

Regional ecosystem	Seamless veg. unit	Comments
12.2.1	B2	Wet rainforest type growing on sand.
12.2.2	B5, B6	Commonly referred to as littoral rainforest.
12.2.3	B4, B5	Distinguished by hoop pine that is uncommon on sand.
12.2.4	B3	
12.2.6	B9	
12.2.7	C2, C3	
12.2.8	B8	
12.3.1	E1, E3, E4, E5	E1, E3-5 reflect geographical patterns.
12.3.2	G22	
12.3.3	E9, E10	Grows under broad range of conditions.
12.3.4	C4	
12.3.5	C2, C3	May contain recognisable environmental and geographical patterns at finer scales.
12.3.6	C3	
12.3.7	E11, E12	
12.3.9	G36	Geographically restricted.
12.3.10	E8	Restricted to drier alluvial plains.
12.3.11	E9	
12.5.1	G29, G33, H27, J17	May contain geographical patterns at finer scales.
12.5.2	D2, G39	
12.5.3	D8	
12.5.5	H27, J17	
12.5.6	G23	
12.5.7	H19	
12.5.8	D6	Geographically restricted.
12.5.11	D4	Geographically restricted.
12.5.12	D8	
12.7.1	F1	Geographically restricted.
12.7.2	H35	Geographically restricted.
12.8.1	G19, G35	Geographically restricted.
12.8.2	J5	Geographically restricted.
12.8.3	G1	Geographically restricted.
12.8.4	G3, G16, G17	Rainforest - may contain recognisable geographical patterns at finer scales.
12.8.5	G2	Geographically restricted.
12.8.6	G4	Geographically restricted.
12.8.7	G5	Geographically restricted.
12.8.8	G22, G24, G25	
12.8.9	G27	
12.8.10	G30	Geographically restricted.
12.8.11	G21	Geographically restricted.
12.8.12	no match: localised unit mapped at 1:100 000	Geographically restricted.
12.8.13	G9, G13, G18, I1	Rainforest - may contain recognisable geographical patterns at finer scales.
12.8.14	G26, J17	
12.8.16	G32	
12.8.17	G41	
12.8.18	G4	Geographically restricted.
12.8.20	J16	

Regional ecosystem	Seamless veg. unit	Comments
12.8.21	G7	
12.8.22	G7	
12.8.23	H1	Restricted to dry margins of bioregion.
12.8.24	H19	Geographically restricted.
12.8.25	J14	Geographically restricted.
12.9/10.1	D3	Geographically restricted.
12.9/10.2	H16, H19	Widespread - may be some discernible geographical patterns at finer scales.
12.9/10.3	E7, G34	
12.9/10.4	D7, D8, H14, H21, H34, H36, H39	Widespread - may be some discernible geographical patterns at finer scales.
12.9/10.5	H20, H25, J16	Geographically restricted.
12.9/10.6	H1	Geographically restricted.
12.9/10.7	I11	Widespread.
12.9/10.8	I11	
12.9/10.13	H40	Geographically restricted.
12.9/10.14	G23, H11, H12	May be some geographical patterns especially in response to rainfall.
12.9/10.15	G18	Rainforest - may be some geographical patterns.
12.9/10.16	G10, G11	Rainforest - may be some geographical patterns.
12.9/10.17	H21, H39	Widespread - may be some discernible geographical patterns at finer scales.
12.9/10.18	H16, H27	
12.9/10.19	H29, H30	
12.9/10.20	G19, J19	Geographically restricted.
12.9/10.21	H24	
12.9/10.23	H32	Geographically restricted.
12.9/10.24	H37	Geographically restricted.
12.11.1	I7	
12.11.2	G22	
12.11.3	H21, H39, I12	Widespread - may be some discernible geographical patterns at finer scales.
12.11.4	H4	
12.11.5	H21, H39, I10	Widespread - may be some discernible geographical patterns at finer scales.
12.11.6	H16, H19	Widespread - may be some discernible geographical patterns at finer scales.
12.11.7	G41, I11, I13	Widespread - may be some discernible geographical patterns at finer scales.
12.11.8	G41, I11	
12.11.9	G38, H26	
12.11.10	G10, G11, J2	Rainforest - may include some discernible geographical patterns.
12.11.11	G18	Rainforest - may include some discernible geographical patterns.
12.11.12	G13, I4, J2	Rainforest - may include some discernible geographical patterns.
12.11.13	G13	
12.11.14	I13	
12.11.15	K1	Geographically restricted.
12.11.16	I8	
12.11.17	I10, J13	
12.11.18	E7, G34	
12.11.19	H29, H30	
12.12.1	J1	
12.12.2	G23	
12.12.3	H21, H39, I10	
12.12.4	E13, J4, J15	

Regional ecosystem	Seamless veg. unit	Comments
12.12.5	H16, H19	Widespread - may be some discernible geographical patterns at finer scales.
12.12.6	J19	Geographically restricted.
12.12.7	G41, I11, J3, J20	Widespread - may be some discernible geographical patterns at finer scales.
12.12.8	G41, I11	Widespread - may be some discernible geographical patterns at finer scales.
12.12.9	J16	
12.12.11	J12, J13	Widespread - may be some discernible geographical patterns at finer scales.
12.12.12	E10, I13	
12.12.13	I1, I6, J2	Rainforest - may include some discernible geographical patterns.
12.12.14	J6, D8	
12.12.15	I12	
12.12.16	G10, G11, J2	Rainforest - may include some discernible geographical patterns.
12.12.17	G7	
12.12.18	G7	
12.12.20	G24	
12.12.21	J7	
12.12.22	I13	
12.12.23	G26, G38, H26, J11, J17	Widespread - may be some discernible geographical and topographical patterns at finer scales.
12.12.24	H16	
12.12.25	H29, H30, J9	
12.12.26	H1	Geographically restricted.
12.12.27	H23, H24, I10, J12, J13	
12.12.28	E7, G34	

Notes: Table does not include non-forest units and units of coastal fringe.

**TABLE 3. STATUS OF REGIONAL ECOSYSTEMS**

Regional ecosystem	Preclearing extent (ha)	Current extent	Status (JANIS)	% preclearing extent in protected areas	% in state forests	Comments
12.1.1	13 700	6600	-	10	2	
12.1.2	16 200	14 700	-	11	3	
12.1.3	51 800	46 100	-	6	<1	
12.2.1	4400	4300	-	80	0	
12.2.2	2500	500	Endangered	2	0	Rare due to depletion.
12.2.3	2800	2800	-	42	0	
12.2.4	9800	9700	-	29	0	
12.2.5	33 800	27 500	-	52	2	
12.2.6	77 000	75 200	-	41	<1	
12.2.7	12 700	8700	-	38	0	
12.2.8	20 500	19 800	-	24	4	
12.2.9	59 000	58 100	-	77	<1	
12.2.10	11 600	10 300	-	36	0	
12.2.11	27 500	17 500	-	22	0	
12.2.12	19 400	13 600	-	33	<1	
12.2.13	1600	500	Endangered	23	0	Rare due to depletion.
12.2.14*	2900	2800	-	29	0	
12.2.15*	10 200	10 200	-	52	<1	
12.3.1	23 100	5300	Vulnerable	1	8	
12.3.2*	23 500	13 800	-	6	23	Subject to fragmentation.
12.3.3	694 000	73 000	Vulnerable	<1	2	Subject to fragmentation.
12.3.4	49 200	17 100	Vulnerable	12	2	Subject to fragmentation.
12.3.5	51 000	18 500	Vulnerable	7	2	
12.3.6	28 000	9900	Vulnerable	20	5	
12.3.7*	30 600	13 800	-	<1	2	Subject to fragmentation.
12.3.8*	400	380	Vulnerable	+	+	
12.3.9	900	600	Vulnerable	<1	5	Naturally rare in SEQ.
12.3.10	27 200	200	Endangered	0	0	Rare due to depletion.
12.3.11	129 100	49 800	-	<1	11	
12.3.12	18 900	15 800	-	19	5	
12.3.13	16 100	9400	-	46	6	
12.3.14	11 200	6300	-	28	18	
12.5.1	36 500	1800	-	<1	9	
12.5.2	24 800	7100	Vulnerable	4	5	
12.5.3	51 700	6900	Vulnerable	1	5	Subject to fragmentation.
12.5.4	20 800	6700	Vulnerable	15	11	Subject to fragmentation.
12.5.5	43 300	6500	Vulnerable	0	4	
12.5.6	13 400	3800	Vulnerable	0	13	
12.5.7	39 100	28 000	-	<1	23	
12.5.8	16 400	10 100	-	9	9	Subject to fragmentation.

Regional ecosystem	Preclearing extent (ha)	Current extent	Status (JANIS)	% preclearing extent in protected areas	% in state forests	Comments
12.5.9	9200	5900	-	30	9	
12.5.10	17 200	13 100	-	37	8	
12.5.11	9900	2100	Endangered	<1	7	Subject to fragmentation.
12.5.12	104 000	47 000	-	2	5	Subject to fragmentation.
12.7.1	300	230	-	0	0	Mostly in Brigalow region.
12.7.2	750	750	-	0	54	Mostly in Brigalow region.
12.8.1	10 500	8600	-	36	18	
12.8.2*	370	370	Vulnerable	100	0	Naturally rare.
12.8.3	26 100	10 600	-	23	2	
12.8.4	25 800	17 000	-	35	14	
12.8.5	11 000	10 700	-	78	12	
12.8.6*	100	100	Vulnerable	100	0	Naturally rare.
12.8.7*	1400	1400	-	50	32	
12.8.8	14 900	6400	-	5	5	
12.8.9*	5400	5300	-	62	7	
12.8.10*	700	500	Vulnerable	3	14	Naturally rare.
12.8.11*	300	200	Vulnerable	46	24	Naturally rare.
12.8.12*	200	200	Vulnerable	100	0	Naturally rare.
12.8.13	94 300	19 000	Vulnerable	5	8	
12.8.14	48 500	39 900	-	25	7	
12.8.15*	700	500	Vulnerable	28	38	Naturally rare.
12.8.16	130 000	35 000	Vulnerable	5	3	
12.8.17	46 000	24 000	-	4	0	
12.8.18*	included within RE 12.8.5, 12.8.9	-	-	100	0	
12.8.19*	3200	3000	-	55	5	
12.8.20	8400	6600	-	22	8	
12.8.21	36 500	4200	Vulnerable	3	<1	
12.8.22	2400	50	Endangered	1	0	
12.8.23	6400	400	Endangered	0	0	
12.8.24	5200	1000	Vulnerable	4	1	
12.8.25	6100	3400	-	8	1	
12.9/10.1	7100	2000	Vulnerable	<1	14	
12.9/10.2	220 000	82 000	-	1	4	
12.9/10.3	84 400	22 000	Vulnerable	<1	9	Subject to fragmentation.
12.9/10.4	102 000	39 000	-	9	11	
12.9/10.5	48 500	28 700	-	<1	11	
12.9/10.6	28 600	1200	Endangered	<1	0	
12.9/10.7	193 000	34 000	Vulnerable	<1	2	
12.9/10.8	10 500	900	Endangered	0	0	Rare due to depletion.
12.9/10.9	36 600	24 700	-	<1	34	Subject to fragmentation.

Regional ecosystem	Preclearing extent (ha)	Current extent	Status (JANIS)	% preclearing extent in protected areas	% in state forests	Comments
12.9/10.10*	300	280	Vulnerable	35	0	Naturally rare.
12.9/10.11	1200	50	Endangered	0	0	Rare due to depletion.
12.9/10.12	8500	5300	Vulnerable	<1	6	Rapid loss.
12.9/10.13	100	100	-	100	0	Mostly in Brigalow region.
12.9/10.14	22 900	12 800	-	<1	17	
12.9/10.15	25 000	4900	Vulnerable	3	<1	
12.9/10.16	43 700	17 100	-	1	20	
12.9/10.17	133 000	64 400	-	2	15	
12.9/10.18*	9500	3800	-	0	10	
12.9/10.19	65 700	49 400	-	<1	53	
12.9/10.20	5700	5400	-	2	77	
12.9/10.21	27 500	17 200	-	0	52	
12.9/10.22	7200	4600	-	59	8	
12.9/10.23	4600	3300	-	29	37	
12.9/10.24	3700	3700	-	1	92	
12.11.1	18 600	11 500	-	18	28	
12.11.2	24 500	16 700	-	10	23	
12.11.3	149 000	100 000	-	2	36	
12.11.4	1300	1250	-	0	43	
12.11.5	194 000	80 000	-	<1	15	
12.11.6	348 000	222 000	-	<1	17	
12.11.7	165 000	57 000	-	<1	4	
12.11.8	33 000	8800	Vulnerable	0	2	
12.11.9*	5000	4000	-	12	36	
12.11.10	97 000	46 000	-	<1	29	
12.11.11	44 700	13 900	Vulnerable	<1	19	
12.11.12	25 600	12 400	-	0	10	
12.11.13	6100	5000	-	0	41	
12.11.14	17 000	8900	-	0	2	
12.11.15	16 500	10 500	-	0	16	
12.11.16	16 600	4800	Vulnerable	0	10	
12.11.17	56 500	41 500	-	<1	21	
12.11.18	53 300	21 200	-	<1	8	
12.11.19	17 300	10 600	-	0	36	
12.12.1	10 000	7100	-	<1	51	
12.12.2	32 200	21 200	-	3	42	
12.12.3	91 000	61 900	-	<1	20	
12.12.4	18 200	17 400	-	6	21	
12.12.5	296 000	152 000	-	<1	12	
12.12.6*	1200	1000	Vulnerable	28	34	Naturally rare.
12.12.7	275 000	72 000	Vulnerable	1	12	
12.12.8	117 000	29 800	Vulnerable	<1	3	
12.12.9	14 200	12 700	-	20	11	
12.12.10*	900	800	Vulnerable	20	37	Naturally rare.
12.12.11	99 000	86 000	-	6	19	
12.12.12	39 400	11 100	Vulnerable	3	2	
12.12.13	65 400	40 900	-	<1	40	

Regional ecosystem	Preclearing extent (ha)	Current extent	Status (JANIS)	% preclearing extent in protected areas	% in state forests	Comments
12.12.14	6100	2600	Vulnerable	<1	28	
12.12.15	48 700	35 800	-	1	42	
12.12.16	39 200	26 000	-	<1	53	
12.12.17	6500	2100	Vulnerable	0	20	
12.12.18	4000	3200	Vulnerable	1	19	
12.12.19*	800	500	Vulnerable	0	0	Naturally rare.
12.12.20	5800	5800	-	1	90	
12.12.21	8200	8000	-	18	4	
12.12.22	17 800	7900	-	0	6	
12.12.23	89 000	28 000	Vulnerable	<1	21	Subject to fragmentation.
12.12.24	9900	8200	-	<1	3	
12.12.25	10 500	9000	-	<1	39	
12.12.26	8200	900	Endangered	0	4	Rare due to depletion.
12.12.27	19 500	19 200	-	22	12	
12.12.28	51 700	17 300	Vulnerable	<1	8	

\* high probability that the total is an underestimate as occurs as small patches in remote areas or in linear configuration etc.

Note: Large scale mapping for protected areas including D'Aguiar Range, Conondale Range, Main Range, Mt Walsh NPs has been used in compiling these data.

**TABLE 4. JANIS (1997) CONSERVATION CLASSES, SOUTHEAST QUEENSLAND REGIONAL ECOSYSTEMS**

Endangered regional ecosystems	
12.2.2	Mixed microphyll/notophyll rainforest on beach ridges. Also rare due to depletion.
12.2.13	Dry heath on dunes. Also rare due to depletion.
12.3.10	Poplar box <i>Eucalyptus populnea</i> woodland on alluvial plains and associated lower slopes. Also rare due to depletion.
12.5.11	Turpentine <i>Syncarpia glomulifera</i> open forest on complex of remnant Tertiary surfaces and Tertiary sedimentary rocks.
12.8.22	Softwood scrub (semi-evergreen vine thicket) with <i>Brachychiton australe</i> on Cainozoic igneous rocks.
12.8.23	Brigalow <i>Acacia harpophylla</i> open forest on Cainozoic igneous rocks.
12.9/10.6	Brigalow <i>Acacia harpophylla</i> open forest on sedimentary rocks.
12.9/10.8	Silver-leaved ironbark <i>Eucalyptus melanophloia</i> woodland on sedimentary rocks. Also rare due to depletion.
12.9/10.11	<i>Melaleuca tamariscina</i> subsp. <i>irbyana</i> low open forest on sedimentary rocks. Also rare due to depletion.
12.12.26	Brigalow <i>Acacia harpophylla</i> open forest on Mesozoic to Proterozoic igneous rocks.
Vulnerable regional ecosystems	
12.3.1	Gallery rainforest (notophyll rainforest) on alluvial plains; provinces 1, 2, 3, 4, 7, 8, 10
12.3.3	Forest red gum <i>Eucalyptus tereticornis</i> woodland to open forest on alluvial plains; provinces 1, 2, 3, 4, 5, 6, 7, 8, 9, 10
12.3.4	Paperbark tea-tree <i>Melaleuca quinquenervia</i> , swamp mahogany <i>Lophostemon suaveolens</i> open forest on alluvial plains.
12.3.5	Paperbark tea-tree <i>Melaleuca quinquenervia</i> tall open forest on alluvial plains.
12.3.6	Paperbark tea-tree <i>Melaleuca quinquenervia</i> woodland on alluvial plains.
12.3.8	Freshwater swamps with <i>Cyperus</i> spp., <i>Schoenoplectus</i> spp. and <i>Eleocharis</i> spp.
12.3.9	Manna gum <i>Eucalyptus nobilis</i> tall open forest on alluvial plains. Also naturally rare.
12.5.2	Forest red gum <i>Eucalyptus tereticornis</i> and/or pink bloodwood <i>Corymbia intermedia</i> on remnant Tertiary surfaces, usually near coast.
12.5.3	Scribbly gum <i>Eucalyptus racemosa</i> woodland on remnant Tertiary surfaces
12.5.4	Bloodwood <i>Corymbia</i> spp. — paperbark <i>Melaleuca</i> spp. — <i>Eucalyptus</i> spp. woodland on near coastal remnant Tertiary plains.
12.5.5	Narrow-leaved ironbark <i>Eucalyptus crebra</i> woodland on remnant Tertiary surfaces.
12.5.6	Queensland grey ironbark <i>Eucalyptus siderophloia</i> , grey gum ( <i>E. propinqua</i> , <i>E. longirostrata</i> ) ± blackbutt <i>E. pilularis</i> tall open forest on remnant Tertiary surfaces.
12.8.2	<i>Eucalyptus oreades</i> open forest on Cainozoic igneous rocks. Also naturally rare.
12.8.6	Antarctic beech <i>Nothofagus moorei</i> rainforest. Also naturally rare.
12.8.10	Silver top stringybark <i>Eucalyptus laevopinea</i> tall open forest on Cainozoic igneous rocks. Also naturally rare.
12.8.11	Dunn's white gum <i>Eucalyptus dunnii</i> tall open forest on Cainozoic igneous rocks. Also naturally rare.
12.8.12	<i>Eucalyptus obliqua</i> open forest on Cainozoic igneous rocks. Also naturally rare.
12.8.13	Araucaria microphyll rainforest on Cainozoic igneous rocks.
12.8.15	<i>Poa labillardieri</i> grassland on Cainozoic igneous rocks. Also naturally rare.
12.8.16	Narrow-leaved ironbark <i>Eucalyptus crebra</i> woodland on Cainozoic igneous rocks.
12.8.21	Semi-evergreen vine thicket with <i>Brachychiton rupestris</i> on Cainozoic igneous rocks.
12.8.24	Spotted gum <i>Corymbia citriodora</i> open forest on Cainozoic igneous rocks.
12.9/10.1	Tall mixed open forest on sedimentary rocks.
12.9/10.3	Gum topped box <i>Eucalyptus moluccana</i> on sedimentary rocks.
12.9/10.7	Narrow-leaved ironbark <i>Eucalyptus crebra</i> woodland on sedimentary rocks.
12.9/10.10	Prickly leaved tea tree <i>Melaleuca nodosa</i> low forest or thicket on Cainozoic to Proterozoic sediments. Also naturally rare.
12.9/10.12	<i>Eucalyptus</i> — <i>Melaleuca</i> woodland on seasonally waterlogged sediments.
12.9/10.15	Semi-evergreen vine thicket with <i>Brachychiton rupestris</i> on sedimentary rocks.
12.11.8	Silver-leaved ironbark <i>Eucalyptus melanophloia</i> woodland on metamorphics ± interbedded volcanics.
12.11.11	Araucarian microphyll rainforest on metamorphics ± interbedded volcanics.
12.11.13	Semi-evergreen vine thicket on metamorphics ± interbedded volcanics.
12.11.16	Mixed tall open forest with Gympie messmate <i>Eucalyptus cloeziana</i> on metamorphics ± interbedded volcanics.

- 12.12.6 Queensland ash shrubby forest on Mesozoic to Proterozoic igneous rocks.  
12.12.7 Narrow-leaved ironbark *Eucalyptus crebra* on Mesozoic to Proterozoic igneous rocks.

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**Vulnerable regional ecosystems (cont.)**

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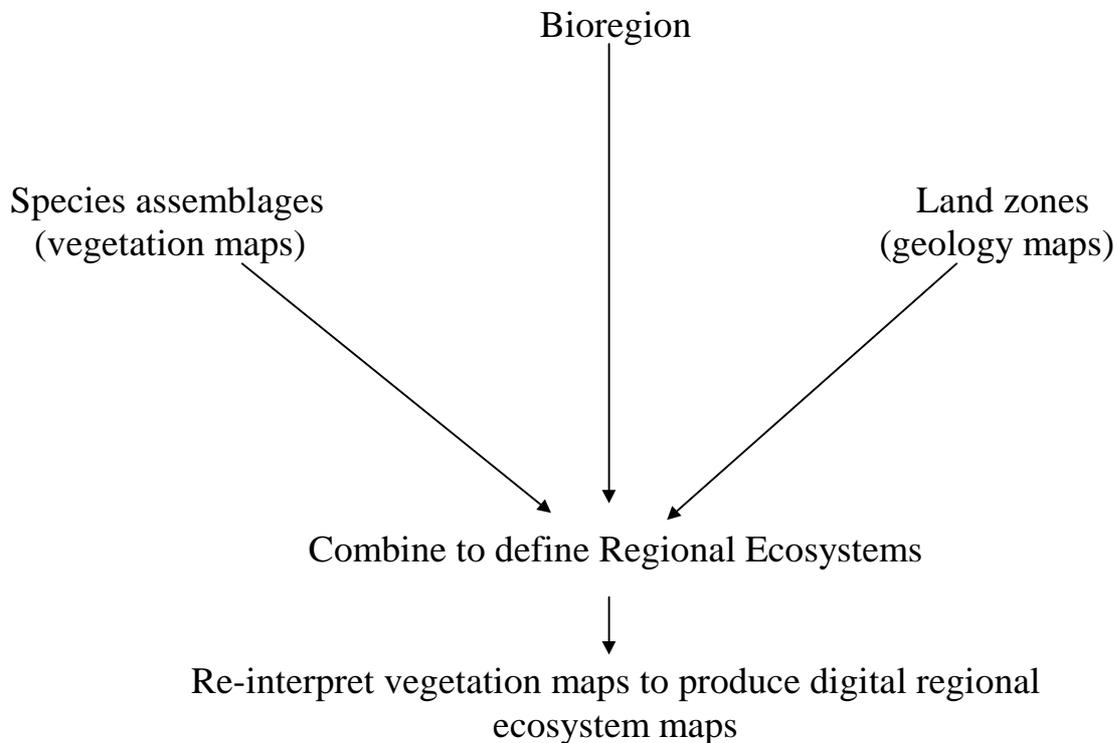
- 12.12.8 Silver-leaved ironbark *Eucalyptus melanophloia* on Mesozoic to Proterozoic igneous rocks.  
12.12.10 Montane shrubland on Mesozoic to Proterozoic igneous rocks. Also naturally rare.  
12.12.12 Forest red gum *Eucalyptus tereticornis*, narrow-leaved ironbark *E. crebra* or *E. siderophloia*, *Lophostemon suaveolens* open forest on granite.  
12.12.14 Scribbly gum *Eucalyptus racemosa* on Mesozoic to Proterozoic igneous rocks.  
12.12.17 Semi-evergreen vine thicket on Mesozoic to Proterozoic igneous rocks.  
12.12.18 Semi-evergreen vine thicket on Mesozoic to Proterozoic igneous rocks.  
12.12.19 Vegetation complex of rocky headlands, predominantly but not exclusively Mesozoic to Proterozoic igneous rocks. Also naturally rare.  
12.12.23 Forest red gum *Eucalyptus tereticornis* and other species on granite hills and mountains.  
12.12.28 Gum topped box *Eucalyptus moluccana* on Mesozoic to Proterozoic igneous rocks.
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**TABLE 5. EFFECT OF CLEARING 1995-1997**

Regional ecosystem		Status	Loss (area in ha)	Loss (% of 1995 area)
12.2.12	closed heath on sand	not of concern	130	1.0
12.3.1	rainforest on alluvium	vulnerable	80	1.7
12.3.2	flooded gum on alluvium	not of concern	160	1.1
12.3.3	forest red gum on alluvium	vulnerable	410	1.9
12.3.4	mixed paperbark on alluvium	vulnerable	340	2.0
12.3.5	paperbark forest on alluvium	vulnerable	700	3.6
12.3.6	paperbark woodland on alluvium	vulnerable	250	2.6
12.3.10	poplar box woodland on alluvium	endangered	10	4.7
12.3.11	coastal forest on alluvium	not of concern	1050	2.1
12.3.12	northern coastal woodland on alluvium	not of concern	360	2.3
12.5.1	inland spotted gum on red soil plateaus	not of concern	320	1.8
12.5.2	forest red gum - pink bloodwood on red soil plateaus	vulnerable	220	3.1
12.5.3	scribbly gum on red soil plateaus	vulnerable	320	4.6
12.5.4	eucalypt-paperbark woodland on coastal plateau remnants	vulnerable	200	2.9
12.5.5	ironbark on red soil plateaus	vulnerable	150	2.3
12.5.6	tall mixed forest on red soil plateaus	vulnerable	40	1.1
12.5.7	lemon-scented gum on red soil plateau	not of concern	310	1.1
12.5.8	Goodwood gum on coastal plateau remnants	not of concern	100	1.0
12.5.11	turpentine on coastal plateau remnants	endangered	110	5.3
12.5.12	northern coastal woodland on plateau remnants	not of concern	1360	2.9
12.8.17	silver-leaved ironbark on basalt	not of concern	290	1.2
12.8.21	microphyll rainforest on basalt	vulnerable	50	1.1
12.8.25	mixed forest on trachyte	not of concern	40	1.3
12.9/10.2	spotted gum on sedimentary rocks	not of concern	1310	1.6
12.9/10.3	gum topped box on sedimentary rocks	vulnerable	580	2.7
12.9/10.5	quartzose sandstone forest	not of concern	320	1.1
12.9/10.6	brigalow on sedimentary rocks	endangered	20	1.4
12.9/10.7	ironbark on sedimentary rocks	vulnerable	340	1.0
12.9/10.9	northern coastal woodland on sedimentary rocks	not of concern	260	1.1
12.9/10.11	<i>Melaleuca tamariscina</i> subsp. <i>irbyana</i> sedimentary rocks	endangered	20	50
12.9/10.12	northern eucalypt-paperbark woodland	vulnerable	200	3.9
12.9/10.16	rainforest on sedimentary rocks	not of concern	240	1.4
12.9/10.17	mixed forest on sedimentary rocks	not of concern	1000	1.6
12.9/10.21	stringybark forest on sedimentary rocks	not of concern	180	1.1
12.11.8	silver-leaved ironbark on metamorphics	vulnerable	300	3.4
12.11.17	stringybark forest on metamorphics	not of concern	430	1.0
12.11.19	broad-leaved red ironbark on metamorphics	not of concern	100	1.0
12.12.3	mixed forest on volcanics	not of concern	650	1.1
12.12.5	spotted gum on volcanics	not of concern	1460	1.0

<b>Regional ecosystem</b>	<b>Status</b>	<b>Loss (area in ha)</b>	<b>Loss (% of 1995 area)</b>
12.12.7 ironbark on volcanics	vulnerable	960	1.3
12.12.8 silver-leaved ironbark on volcanics	vulnerable	1490	5.4
12.12.14 scribbly gum woodland on volcanics	not of concern	60	2.3
12.12.22 woodland with Clarkson's bloodwood on granite	not of concern	360	4.6
12.12.23 forest red gum on granite hills and ranges	not of concern	850	3.1
12.12.24 rusty gum on granite	not of concern	180	2.2
12.12.26 brigalow on volcanics	endangered	30	3.5
12.12.28 gum topped box on volcanics	not of concern	400	2.4

**FIGURE 1 HOW REGIONAL ECOSYSTEMS ARE DEFINED USING VEGETATION MAPS AND GEOLOGY MAPS**

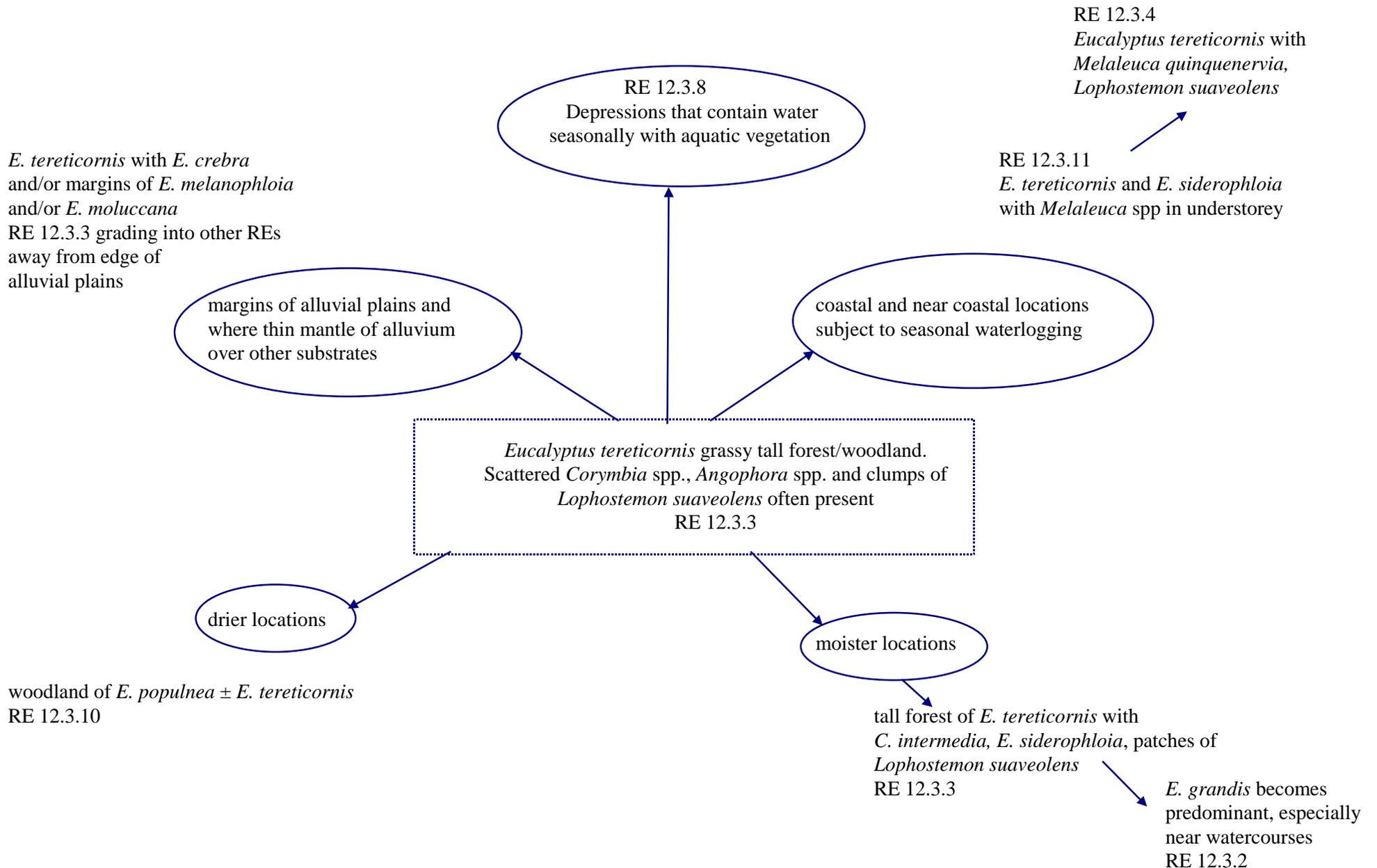


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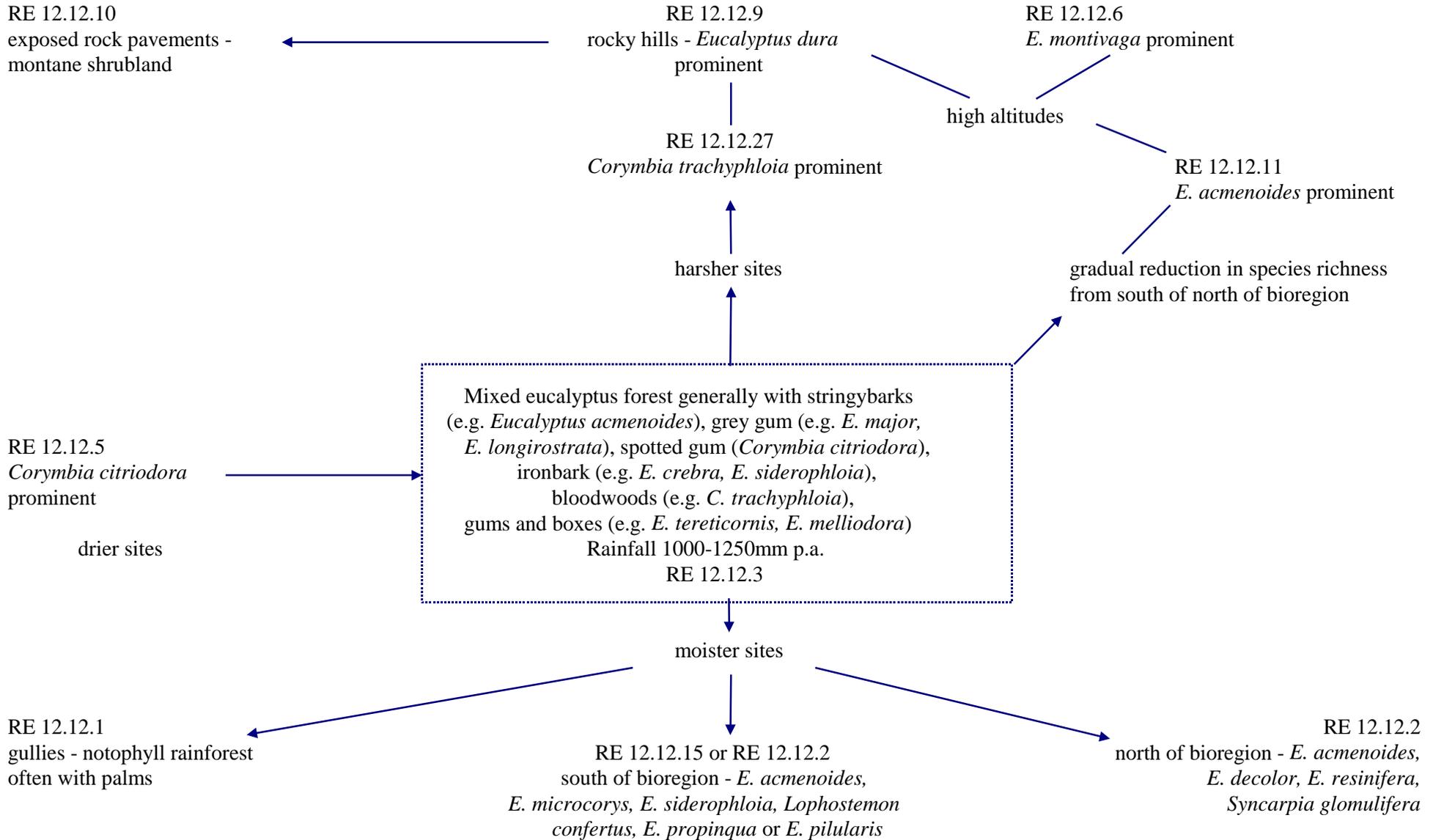
**The twelve land zones defined for Queensland include:**

1. saline muds (estuaries, low energy coasts).
2. coastal dunes and beaches
3. alluvial plains
4. Cainozoic clay plains (e.g. brigalow clay plains)
5. Cainozoic sand plains (e.g. soft mulga country) and remnant surfaces with deep red soils (plateaus)
6. inland dunes (aeolian)
7. duricrusted remnants (mesas etc.) stripped of soil to expose chemically altered rock (inland)
8. Cainozoic igneous rocks - hills and mountains; some limited valley basalt flows
9. fine grained sedimentary rocks - low hills and valleys
10. coarse grained sedimentary rocks - rough broken country
11. older sedimentary rocks that have been subject to folding and metamorphism - hills and ranges
12. pre-Cainozoic igneous rocks - rolling hills and ranges

**FIGURE 2 INTER-RELATIONSHIPS OF SPECIES ASSEMBLAGES AND ASSOCIATED REGIONAL ECOSYSTEMS OF ALLUVIAL PLAINS IN WHICH *EUCALYPTUS TERETICORNIS* IS A MAJOR SPECIES**



**FIGURE 3 INTER-RELATIONSHIPS OF SPECIES ASSEMBLAGES AND ASSOCIATED REGIONAL ECOSYSTEMS OF MIXED FORESTS ON ACID AND INTERMEDIATE VOLCANIC ROCKS**



**FIGURE 4 SOUTHEAST QUEENSLAND BIOREGION SHOWING PROVINCES**