Biodiversity

Biodiversity conservation is an important aspect of forest management. Biodiversity (or biological diversity) refers to the variety and variability among living organisms and the ecological processes on which they depend.

Maintenance of biodiversity depends on a large number of related ecosystem processes.

The Department of Sustainability & Environment applies biodiversity conservation strategies that include:

- *Protection of a significant proportion of all forest ecosystems in conservation reserves or the State forest Special Protection Zone*
- *Management to minimise the adverse effects of processes, activities and uses which potentially threaten either ecosystem, species or genetic diversity. Some areas may be included in Special Management Zones*
- *Specific conservation measures for threatened or management-sensitive flora and fauna to maintain species and genetic diversity.*

Pre-European Flora & Fauna

Research indicates that prior to European settlement, the vegetation of the Midlands area comprised extensive tall open forests in higher rainfall areas, woodlands and open forests in the drier hills and sedimentary plains, and extensive native grasslands and open woodlands on the basalt plains in the south. These communities have been largely cleared or modified for agricultural and urban uses. The majority of the remaining large blocks of forest lie near or straddle the Great Dividing Range. These forests support several hundred species of native plants and animals.

Legislative & Policy Framework

Victorian State Forests, and biodiversity conservation, are managed under a number of different Federal and State statutes, codes and guidelines. These include (but are not limited to):

- *Forests Act (1958)*
- *Flora and Fauna Guarantee Act (1988)*
- *Catchment and Land Protection Act (1994)*
- *Code of Forest Practices for Timber Production (1995)*
- *Midlands Forest Management Plan (1996)*
- *Regional Forest Agreement (2000)*
- *Our Forests Our Future (2002)*

Biodiversity and Fire

Fire is a natural part of the environment and over millio years Australian forests have developed a range of survival mechanisms. Whilst fire can damage large areas of forests it can also be used as a management tool to reduce fuel quantities, assist in seedling regeneration and promote habitat for particular species.

The presence (or lack of) fire has helped the development of the ecosystems that are present now. Many plant communities are adapted to specific fire regimes and depend on the continuation of that regime for their existence. Some faunal species appear to be adapted to survival in vegetation communities at a particular stage of post-fire succession. Fire can be used to achieve biodiversity goals.

Plant adaptations to fire:

Lignotubers
-are swellings at the base of a tree trunk which contain food reserves and dormant growth buds. The buds are activated by fire, grazing or other disturbance, sending shoots out immediately after disturbance to assist the tree in recovery.

Epicormic buds
-are similar to lignotubers, but are present under the bark of the stem of a tree. Epicormic shoots also activited by fire or other disturbance. Their job is to quickly develop into new shoots when foliage is destroyed.

Thick fibrous bark
-many eucalypt species have thick fibrous bark that helps to protect them from the heat of a fire. Although the bark will often burn, it burns slowly, so less damage results.

Hard seed pods/gumnuts
-many local species store seed in hard seed pods and/or gumnuts. Often fire is required to dry out the seed pods and gumnuts, allowing them to release their seed. The fire also provides a 'seed bed" – that is cleared forest floor with little competition whilst the seeds estalish.

Seedlings
-seedlings of some species can only establish in an ash or "seed" bed. This bed is produced by either fire or other ground disturbance. The forest floor has been cleared of other vegatation, allowing the new seedling to more readily access sunlight, nutrients and water.

For further information relating to fire ecology follow the links: www.dse.vic.gov.au/fires/ then click 'Fire and the Environment' link on the left side of the page.

Ecological Vegetation Class Groups

The Wombat State Forest features six main Ecological Vegetation Class Groups comprising Dry Forests – exposed and sheltered, Herb-rich Woodlands, Damp Forest, Riparian Scrubs and Riverine Grassy Woodlands.

Dry Forest communities occupy the gentle slopes and ridges characterising much of this forest. Dry Forest - Exposed communities are found on steep exposed ridges and in areas of lower rainfall including the Hepburn block north of Daylesford and areas near Bullengarook. Dry Forest – Sheltered communities occupy much of the remaining areas of the Wombat State Forest. Both Dry Forest communities are characterised by a low to medium height mixed species eucalypt overstorey with a sparse mid canopy of Acacias, and various understorey structures dominated by shrubs, grasses and herbs.

Four different EVC groups occur in thin bands along drainage lines, gullies and stream beds within the Wombat State Forest. These EVC groups are multilayered with a rich midstorey and dense ground layer. Terrain, soils, streamflow patterns, and climate influence the vegetation composition of these ecosystems. Riparian Forest occurs along the major reaches of perennial streams. Wet or Damp Forest communities occur along the steep sheltered gullies in the wetter parts of the forest. The broad, flat, swampy drainage lines north of the divide feature Riverine Grassy Woodland communities. Herb-rich Woodlands can be found along ephemeral creek terraces in the drier northern parts of the forest.

EVC Information sourced from West Victoria RFA Comprehensive Biodiversity Assessment & Mapshare Interactive maps.

Dry Forests – Exposed



Heathy Woodland EVC

Heathy Woodland – Occurs on exposed ridgetops diverging north off Blackwood Ridge which are characterised by fine white Tertiary clay soils. Often merges into Heathy Dry Forest lower on ridges. Low Broad-leaf Peppermint overstorey, with Silver Banksia, Bundled Guinea-flower, Common Rapier-sedge, Bush Hakea, Prickly Tea-tree, Rosy Baeckea understorey.



Heathy Dry Forest EVC

Heathy Dry Forest – Found in two distinct parts of the Wombat State Forest. Exposed slopes and ridges around the Lerderderg River and in the southern and eastern sections of the Blakeville Block. Graduates into Shrubby Foothill Forest downslope. Dominant community of the slopes and ridges in the Hepburn block north of Daylesford. Graduates into Grassy Dry Forest and Valley Grassy Forest near drainage lines. Low open forest of Broad-leaf Peppermint, Red Stringybark and Red Box. Understorey dominated by low ericoid shrubs (Fabaceae, Proteaceae and Epacridaceae), with sparse layer of limited herbs and grasses.

Grassy Dry Forest – drier areas with moderately fertile soils. 10-15metre tall overstorey of Long-leaf Box, Red Box, Red Stringybark, Yellow Box and Candlebark with a grass dominated understorey of Grey Tussock-grass, Wallaby grass. Generally around dry upper drainage lines in the Hepburn block north of Daylesford, and gentle upper slopes south of Eganstown. Graduates into Valley Grassy Forest downstream



Valley Grassy Forest EVC

Valley Grassy Forest – occurs in alluvial soils of valley floors in dry parts of the forest north of Sailors Falls. Overstorey of eucalypts such as Messmate, Yellow Box, Narrow-leaf Peppermint, Candlebark and Red Box, with Silver Wattle. Shrub layer absent, ground covered in a dense sward of highly diverse grasses and herbs.

Grassy Forest – Several small patches occur around the forest boundary near Bullengarook on infertile soils. 20m tall

overstorey of Messmate, Narrow-leaf Peppermint and Mann Gum, with Blackwood, Black Wattle and Cherry Ballart midlayer. Ground layer dominated by grasses particularly Grey Tussock-grass, Silver-top Wallaby-grass, Weeping Grass and Plume Grass, with few shrubs

Dry Forest – Sheltered



Shrubby Foothill Forest EVC

Shrubby Foothill Forest – Common and widespread in Wombat SF, occurring on moderately fertile soils of Ordovician origin. In high areas it occurs on all slopes and aspects, in drier areas it is restricted to sheltered slopes and gullies. Messmate, Narrow-leaf Peppermint, Candlebark, Mountain Grey Gum overstorey. Low open shrub layer of Narrow-leaf Wattle, Common Heath, Moth Daisy bush, Wombat Bush-pea and Gorse Bitter pea, sparse and species poor ground layer.



Herb-rich Foothill Forest EVC

Herb-rich Foothill Forest – Mostly found on or north of Great Divide in areas of relatively high rainfall and fertility. The dominant community within the Coliban Block, this EVC is also commonly found on more fertile soils near to farmland. Medium to tall open forest of Messmate, Narrow-leaf Peppermint and Manna Gum, with sparse shrub layer and a diverse ground layer of herbs and grasses.

Herb-rich Foothill Forest / Shrubby Foothill Forest Complex – Occurs only within the Barkstead block in a large patch spanning gentle slopes of all aspects. Contains a diverse herb and shrub layer. Dominated by species that occur at the drier end of each EVC.



Shrubby Dry Forest EVC

Shrubby Dry Forest – Occurs on dry gently sloping ridges in the Barkstead, Bullarto and Blakeville Blocks on infertile soils. Graduates downslope into Shrubby Foothill Forest. 20m tall Messmate overstorey with very sparse understorey of shrubs including, Narrow-leaf Hop-bush, Narrow-leaf Wattle, Thin-leaf Wattle, Common Hovea, Black-anther Flax lily, Common Heath and Trailing Ground-berry and Silvertop Wallaby Grass.

Powerful Owl



Powerful Owls occupy and defend large territories. Population density is determined by the population of arboreal mammals, which from a large part of their diet.

Powerful Owls roost in tall trees with dense follage such as Blackwood.They are dependant on large hollows in trees for nesting sites. The species has been recorded in a wide range of forest types ranging from the tall wet forests areas through to open dry forest.

It is the largest owl found in Australia, with an overall head-tail length of 60- 65cm. Adults are mottled dark grey-brown above and white below with bold grey-brown chevrons (chest barrings); legs are feathered to the tarsus (shins), with dull yellow feet. Immature birds (owlets) are whiter, having paler back and wings, a whiter face with dark eye-patches and sparse fine dark streaks and faint barring on the flanks.

The Powerful Owl is listed as a Threatened Species in Victoria.

Riparian Scrubs or Swampy Scrubs and Woodlands



Riparian Forest EVC

Riparian Forest – Occurs in narrow bands along banks and alluvial terraces of major perennial streams including Lerderderg River, Digger Creek, Werribee River, Korweiguboora Creek, Sailors Creek, Coliban River, Distill Creek, Saltwater Creek and Loddon River. Tall, multi-layered, species rich forest. Overstorey of Manna Gum, Narrow-leaf Peppermint, Messmate and Swamp Gum, with mid canopy layer of Blackwood, Silver Wattle and Hazel Pomaderris. Understorey is dominated by sedges (Carex appressa), forbs and ferns (Fishbone Water-fern, Swamp Club-sedge, Rushes). Shrubs commonly include Prickly Currant-bush, Hop Goodenia and Austral Mulberry.

Wet or Damp Forests

Damp Forest – Occurs in steep sheltered gullies in areas of high rainfall on alluvial soils. Mostly found south of the Divide in upper stream tributaries. Graduates upslope into Shrubby Foothill Forest. Tall Messmate overstorey with Blackwood in the mid canopy, and a dense layer of shrubs including Musk Daisy-bush, Prickly Moses, Hazel Pomaderris. Diverse groundcover of ferns, forbs and grasses, Mother Shield-fern, Fishbone Water-fern, Black-anther Flax-lily, Bidgee-widgee, Turquoise Berry and Forest Wire-grass. Associated with Shrubby Foothill Forest.

Riverine Grassy Woodland



Sedgy Riparian EVC

Sedgy Riparian Woodland –occurs in broad flat drainage lines subject to seasonal inundation throughout the Wombat SF. Found most commonly north of the Divide. Features overstorey of Swamp Gum or Yarra Gum, with Blackwood, Prickly Moses, Prickly Tea-tree and Wiry Bossiaea shrub layer. Ground layer varies from dense Red fruit Saw-sedge and Tall Sword-sedge to scattered clumps of Spiny-headed Mat-rush with small sedges, rushes and herbs.

Herb-rich Woodlands

Creekline Herb-rich Woodland – found on creek terraces of ephemeral streams around Dry Diggings, Wallaby Creek and Sailors Creek. Open woodland of Swamp Gum, Yarra Gum, Manna Gum and Narrow-leaf Peppermint overstorey, with Blackwood, Silver Wattle, Large-leaf Bush-pea and Sweet Bursaria shrubs. Ground densely covered with Common Tussock-grass and scattered herbs.

Further information regarding Ecological Vegetation Classes can be found at:
www.dse.vic.gov.au- search for EVC
www.nccma.vic.gov.au- search for EVC

Brushtail Phascogale

These small Greyish marsupials are quickly identified by their long, black bushy tail.



They rarely feed on the ground, preferring to nimbly run along or under major branches often leaping from tree to tree. Cockroaches, beetles, nectar and even small vertabrates form a large part of their diet. They shelter in hollows in trees.

Greater Glider

The Greater Glider ranges from dark brown to grey and have a dark stripe runnuing along their back. They are the largest of the gliding possums, with the ability to glide more than 100 meters.

They feed almost excusively on eucalypt leaves. The Greater Glider usually live alone, except for the onset of the breeding season. Greater Gliders are sensitive to loss of hollow bearing trees and their preferred feed trees.



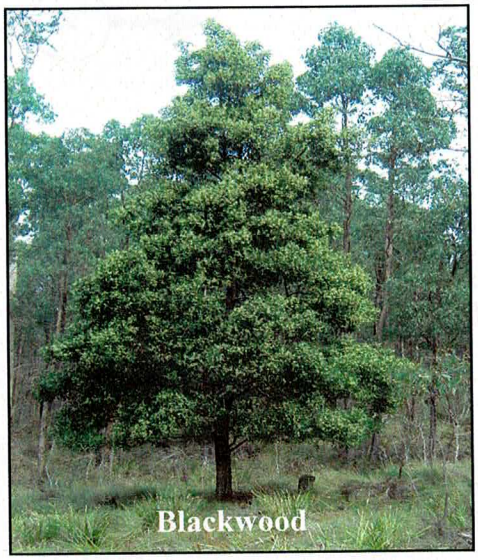
Sugar Glider

A small, nocturnal, arboreal and gliding marsupial. Fur ii grey on head, back and sides with black fur around the eyes, ears and a stipon the head.

Sugar Gliders live in a waide range of woodlands and open forest in higher rainfall areas of the region.

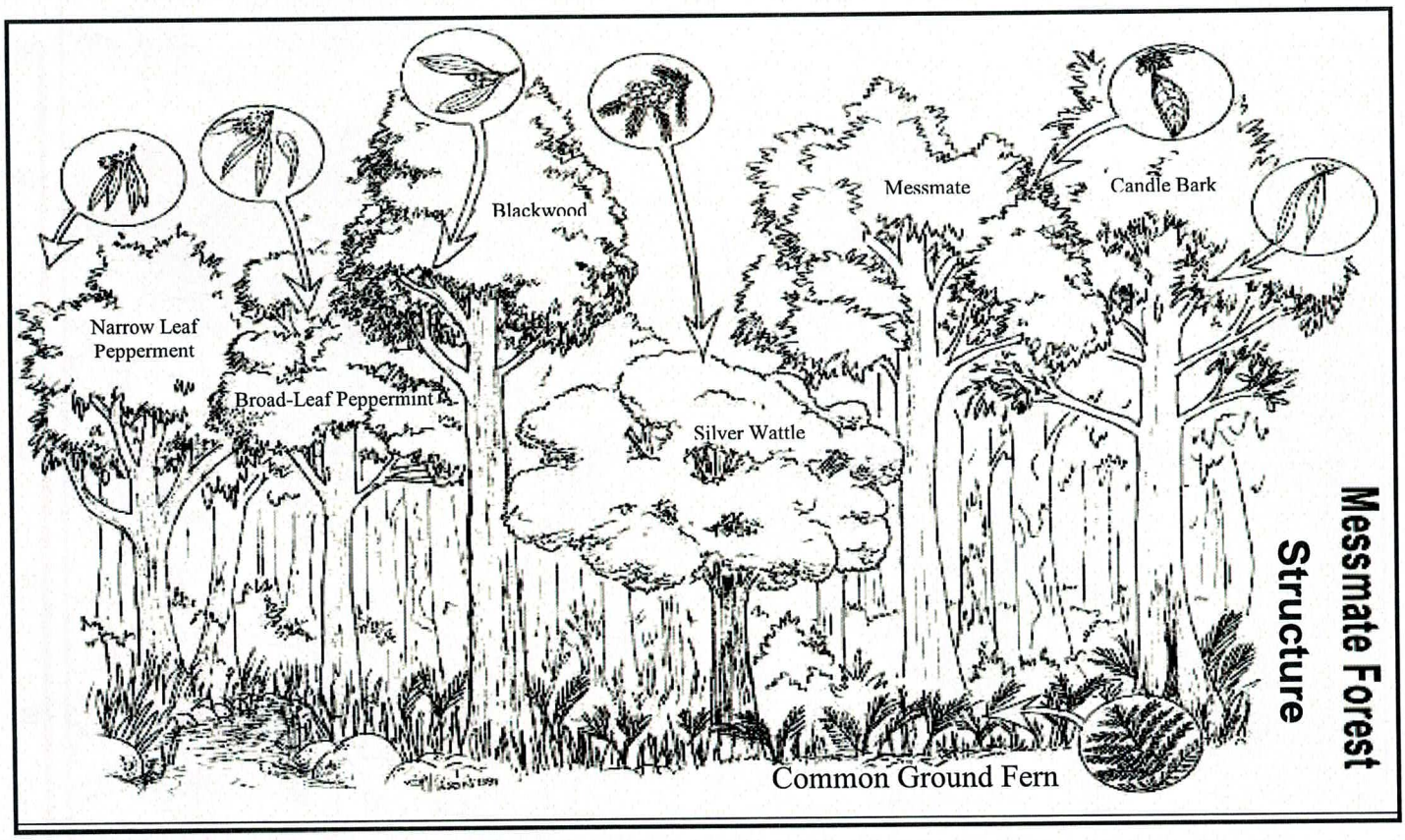
Sugar Gliders generally feed on nectars, pollen, invertabrates, fleshy fruit and seeds.



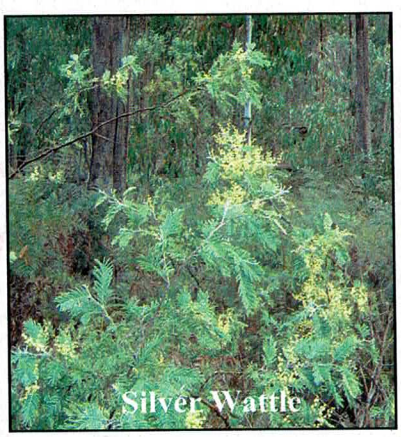

Blackwood

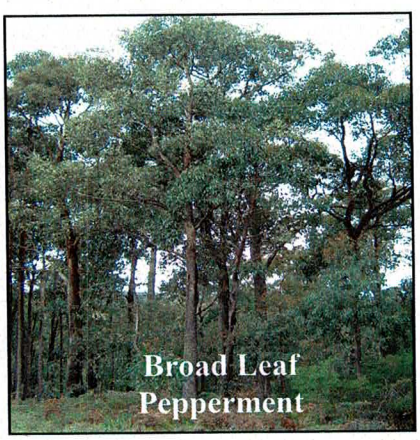

Messmate

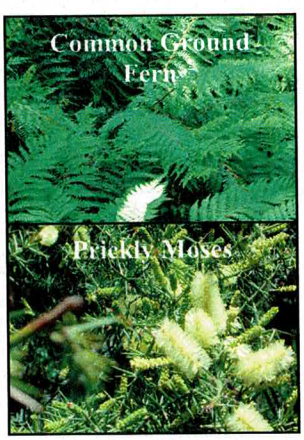

Candlebark


Blackwood
Messmate
Candle Bark
Narrow Leaf Pepperment
Broad-Leaf Peppermint
Silver Wattle
Common Ground Fern
Messmate Forest Structure

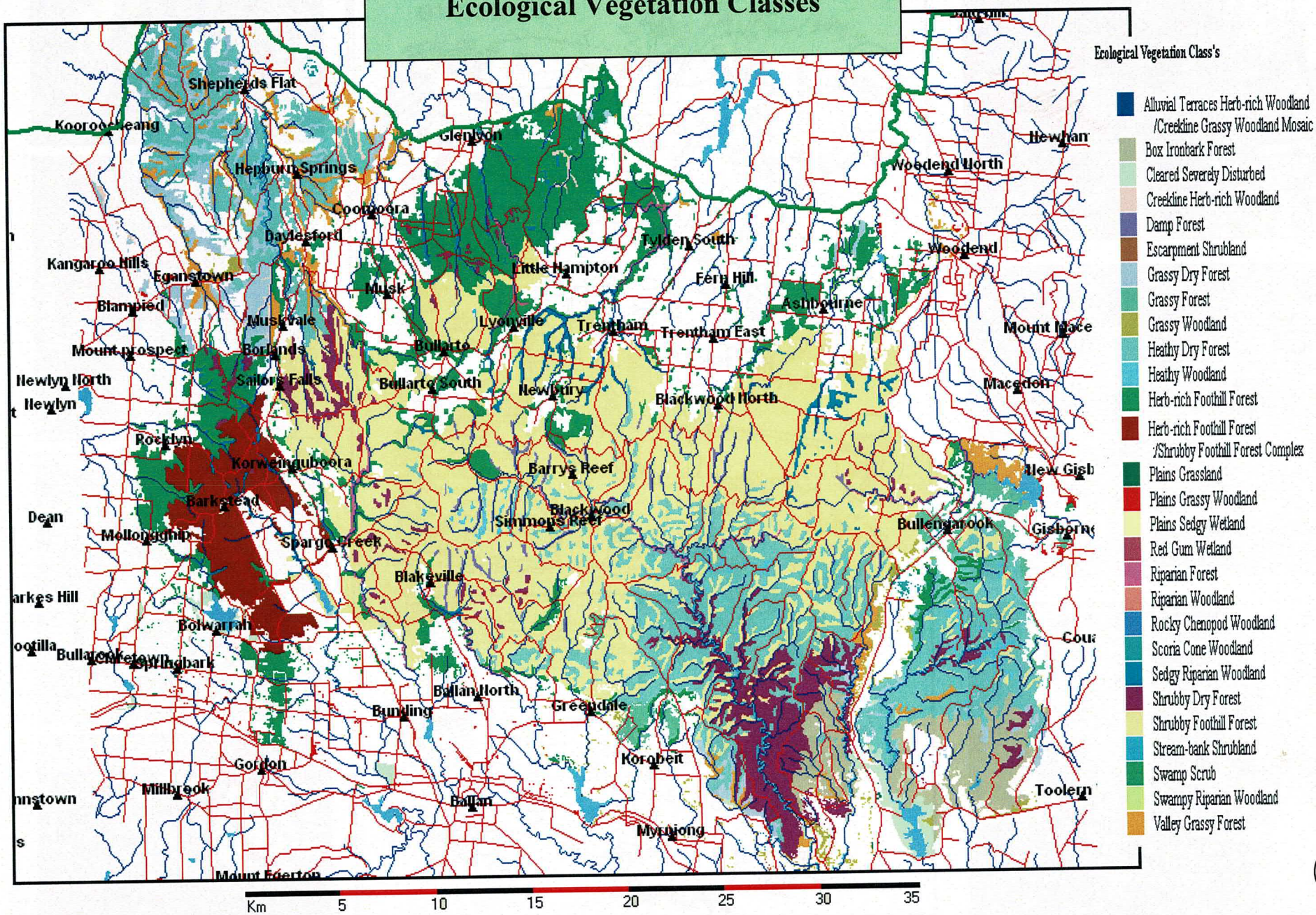

Milkmaid
Gorse Bitter Pea


Silver Wattle


Broad Leaf Pepperment


Common Ground Fern
Prickly Moses

Wombat State Forest
Ecological Vegetation Classes



Structural diversity

The structural diversity of a forest can be considered in terms of growth stages and habitat components. As a forest stand grows its changing structure is reflected by:



- vertical diversity - the different tree, shrub and ground layer components
- increasing size of trees
- the presence of relatively large, dead, standing and fallen trees, which often contain hollows
- cover diversity created by small-scale disturbance and death of individual trees.

Each growth stage contributes to the maintenance of biodiversity through its particular floristic composition and by providing different habitat for different wildlife. Mature forests, for example, provide a range of habitat resources that are utilised by many species including large forest birds and arboreal fauna. Younger, regenerating forest provides various resources utilised by a different suite of species. Some fauna dependent on mature forest can also find suitable foraging resources within regrowth stands, although some of their requirements (eg. nesting sites) may have to be provided by structural attributes of old forest stands (Scotts 1994).

Species & Genetic Diversity

The long-term protection of all forest flora and fauna populations is best achieved by protecting representative examples of all ecosystems, and by taking steps to minimise the impact of threatening processes. These strategies provide a base level of security for populations of most native flora and fauna. Some species, however, occur in very low or isolated populations or may be particularly sensitive to forest management practices. These require specific targeted actions aimed at ensuring the survival of populations and, therefore, the maintenance of biodiversity.

Species known or suspected to be at risk of extinction require greatest attention in the development of management actions and prescriptions. Effective management of such species requires prediction of and control over the types of environmental changes that threaten populations. These, in turn, require detailed knowledge of the ecology of individuals and populations and an understanding of the nature of threatening processes. An integral part of the species management guidelines is to protect a defined number of individuals by providing habitat for their requirements. Depending on the species, these are used in one of two ways:

- **Minimum population level**- establishes a target number of protected records around which key habitat is maintained to ensure the maintenance of viable populations of the species in the FMA.
- **Review level**- establishes a pre-determined number of protected records which, once reached, will trigger a review of the species' forest conservation requirements to ensure their relevance and effectiveness.

The *Flora and Fauna Guarantee Act* 1988 aims to ensure that Victoria's native flora and fauna survive, flourish and retain their potential for evolutionary development. Schedule 2 of the Act comprises a list of species and communities which are threatened. Species and communities are added to the schedule by the Minister for the Environment on the advice of a Scientific Advisory Committee.



The Department has obligations under the Act to manage listed species and communities according to individual action statements that are prepared after species or processes are listed as threatened.

Genetic diversity refers to the variety of genetic information contained in all of the individual plants, animals and micro-organisms that inhabit our planet. Genetic diversity occurs within and between the populations of organisms that comprise individual species as well as among species (Commonwealth of Australia undated).

Genetic diversity can be conserved by protecting multiple populations across a species' range. This may also guard against the risk of isolated populations being destroyed by natural disasters or other factors. In the context of this Plan, genetic diversity is best achieved through the maintenance of populations of all native flora and fauna across their natural range, and through the measures identified to avoid forest fragmentation.

