



Forests with character... The Box-Ironbark region of Victoria

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A Rich Heritage

Certain thoughts spring to mind when the words Box-Ironbark are mentioned. The dark and deeply furrowed bark of the ironbark trees, the light flaky appearance of box trees, golden wattle flowers and the sound of twigs and leaves crackling on the dry forest floor beneath your feet.... These forests are home to not only box and ironbark eucalypt species, but also a vast array of plants and animals.

Key Findings

- The Box-Ironbark region is a distinctive natural area of Victoria. Its diverse vegetation covers at least 17 ecological vegetation classes. It also has a distinctive fauna.
- More than 200 species of birds, 44 species of mammals, 40 species of reptiles and 12 species of frogs are known from the region. The diversity of invertebrates is not known, but ants (>200 species), spiders (>33 families), beetles, flies and bugs are among the most abundant ground-dwelling groups.
- Large areas of forest are essential for fauna and, within these, gully habitats are sites of high faunal richness and abundance. Important habitat resources include large old trees and an undisturbed ground layer.
- Recent studies indicate that the distribution and abundance of the fauna is now strongly influenced by past and present land uses (clearing, mining, fragmentation, forest management), as well as by natural processes. Numerous species are listed as 'threatened' in Victoria, and at least four species are regionally extinct.

Some of the strongest images of our recent history are associated with the Box-Ironbark forests - the 'dry scrub', struggling selectors, bushrangers, the rush for gold - and the gradual assimilation of the settlers into the Australian environment.

Nationwide, the Box-Ironbark forests form a large belt of dry forests extending inland of the Great Dividing Range,

from south-eastern Queensland, down the western slopes of NSW to Victoria. In Victoria, the Box-Ironbark forests occur in the central and north-eastern regions around St. Arnaud, Dunolly, Bendigo, Rushworth, Benalla and Chiltern.

Box-Ironbark forests have experienced a long history of landuse, including extensive and selective clearing taking place on the most fertile soils, and the repeated felling of trees. These activities have greatly altered over 85% of the region in Victoria and modified virtually all vegetation communities.

Recent studies have aimed to discover more about the wildlife and the processes that affect their distribution and abundance within the region. The studies' results are included in information sheets 2 to 10. In these information sheets, the term 'Box-Ironbark region' is used to refer to an area in Victoria primarily encompassing the inland slopes and hills (Figure 1). A related term, 'Box-Ironbark study area', is used by the Environment Conservation Council to refer to the area of the investigation that encompasses both the inland slopes and the adjacent box woodlands of the northern plains.

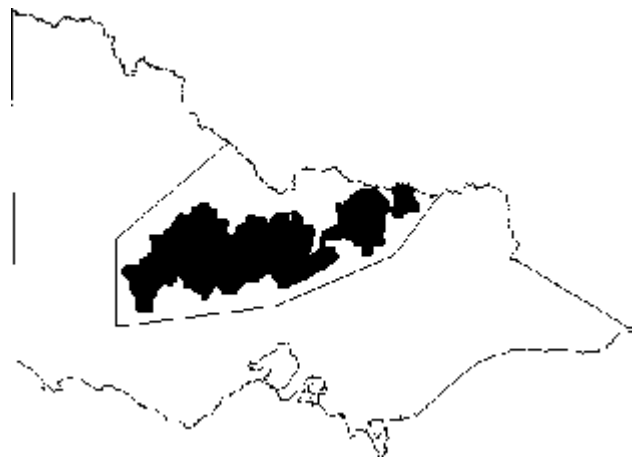


Figure 1. The Box-Ironbark region (shaded) encompasses the dry slopes and hills inland of the Great Dividing Range and was the area used for the current study. The Environment Conservation Council investigation area includes the box woodlands of the northern plains (fixed line).

A diverse landscape

Topography is a major indicator of different types of vegetation. As you travel through the Box-Ironbark region from Stawell to Chiltern, the surrounding landscape gradually becomes flatter so that the inland slopes and hilly regions give way to the plains, with corresponding changes in soil-types and vegetation.

The vegetation types found in the Box-Ironbark region are strongly correlated with soil, geology, rainfall and position within the landscape - including aspect and topography. The term Ecological Vegetation Classes (EVC) is used to describe the differing vegetation. Each EVC includes one or more vegetation communities across their geographic range. For example, the Box-Ironbark Forest EVC near Chiltern has different characteristic species than the Box-Ironbark occurring near Stawell.

Geomorphology and soil

Climatic and geological events have influenced the soils of the Box-Ironbark region over a great period of time. Soils range from relatively rich and fertile in gullies and on alluvial plains, to sandy and gravelly in the west of the region. The majority of the soils in the region are derived from ancient sedimentary rock with low fertility and water-holding capacity.

On the crests and upper slopes of ridges, soils are usually shallow (<10 cm) and stony. They are relatively low in fertility and do not hold water well. Such soils support open, sparse vegetation such as heathy dry forest and grassy dry forest with red stringybark being the dominant species.

As the soils become deeper on the mid to lower slopes, the Box-Ironbark forest EVC takes over. Dominated by grey box, yellow gum and red ironbark, Box-Ironbark forest communities are found on gentle to moderate hills throughout the region.

Soils become more fertile and retain more water as the landscape flattens from undulating rises through to alluvial plains. EVCs such as low rises grassy woodlands, alluvial terraces herb-rich woodland and creekline grassy woodland are found in these areas. To the north of the Box-Ironbark region, the soils of the northern plains have deep profiles with good drainage, high infiltration rates and high permeability. They originally carried grassy woodlands, dominated by grey box, white box and buloke.

A process of disturbance.....

The greatest changes to vegetation communities within the Box-Ironbark region have typically occurred on lower slopes and plains, where the relatively fertile soils are favoured for farming.

Vegetation classes such as creekline grassy woodland, alluvial terraces herb-rich woodland, low rises grassy woodland and northern plains grassy woodland have been largely cleared for agriculture with small areas confined to public land.

The dominant vegetation types now remaining in the region are heathy dry forest and Box-Ironbark forest, that

occur on the hills and slopes with shallow soils of low fertility. These forests, however, have a long history of disturbance associated with gold mining practices and timber cutting, both dating back to the last century.

.....leading to decline

Native vegetation communities in the Box-Ironbark region now mostly occur as remnants of varying size (see information sheet 3). Some of these remnants are small and isolated or linked only by roadside or streamside vegetation (see information sheet 7).

The process of fragmentation and vegetation clearance has been widespread throughout the region. The areas of greater fertility and moisture have been affected the most, and yet, it is these areas that support the greatest diversity and abundance of wildlife (see information sheet 8). Repercussions on wildlife in the region have become evident and declines of some species have been documented (see information sheet 2).

Box-Ironbark wildlife

Wandering through the forests of the Box-Ironbark region, the diverse birdlife is most likely the first thing you will notice. Many species of frogs, reptiles, mammals and invertebrates are also present, though sometimes less conspicuous.

Most species of animals live permanently in the region, while others migrate to and from the region at certain times of the year to make use of seasonal resources such as nectar (see information sheet 4).

Numerous threatened species in Victoria rely on the Box-Ironbark region for vital habitat. Fragmentation of the vegetation and the loss of large old trees for resources, including food and shelter, has led to the decline of such species as the squirrel glider, brush-tailed phascogale, swift parrot and regent honeyeater. While these threats continue, the biodiversity of the region remains at risk.

Frogs

Twelve species of frog are known from the Box-Ironbark region, though none are endemic, occurring widely elsewhere in Victoria. Three species are members of the Tree Frog family, most of which have well developed finger and toe pads for climbing. The other nine species belong to a family that only occurs in Australia - the southern frogs.

The southern frogs have evolved characteristics to cope with a sometimes harsh environment. Some have developed the ability to burrow underground to avoid the summer's heat while others have developed a very short tadpole stage, so they can opportunistically take advantage of temporary water sources, such as puddles, for breeding.

The Box-Ironbark's largest frog is the southern bullfrog, females of which may grow up to about 80 mm in length. The smallest species are the froglets *Crinia spp.* that only grow to about 16 mm (Figure 2).



Figure 2. *These froglets are the smallest frogs in the Box-Ironbark region, growing to about 16 mm. They belong to a family of frogs that occurs only in Australia - the southern frogs.* Photo: © McCann collection, NRE

Frogs are usually found around waterbodies that have dense low vegetation on the banks, or in areas that flood after heavy rain. Males can be heard calling during the breeding season, usually in spring and summer. During dry conditions they use rocks, logs, bark or dense ground cover vegetation as shelter to prevent drying out.

Frog habitat is destroyed by the draining of wetlands and depressions to create more farming land, as well as the conversion of temporary ponds into dams with little or no aquatic vegetation.

Frogs are generally vulnerable to chemical sprays and introduced predators such as the feral mosquito fish. Other processes such as compaction of soil by stock, loss of topsoil, erosion of slopes and stream channels and the rise of saline groundwater also degrade habitats for frogs.

One species of frog in the region, the warty bell frog, is officially listed as 'vulnerable' in Victoria. Its distribution has declined dramatically across its range.

Reptiles

Reptiles of the Box-Ironbark region include some of the best known species in the state, such as the stumpy-tailed lizard and the lace monitor (or tree goanna). About 40 species of reptiles are known from the region, consisting mostly of skinks (17 species) and venomous snakes (8 species), though other types of reptiles such as tortoises, geckoes, legless lizards and dragons also occur.

The reptiles occupy a range of habitats that are used for basking, foraging and sheltering. Although tortoises are typically associated with permanent water-bodies, most reptiles in the region are terrestrial. Blind snakes, legless lizards and a few skink species live within the leaf litter, burrowing into the earth or using rocks and debris for shelter.

The reptile fauna appears to be extremely diminished in extensively cleared farmland. In many areas of remaining native vegetation, activities such as mining, grazing and firewood collection, may simplify and reduce the number of reptile habitats available. As a result, there are a number of threatened reptile species within the Box-

Ironbark region, including the bandy bandy, woodland blind snake, carpet python and pink-tailed worm-lizard.

The pink-tailed worm-lizard is perhaps the rarest reptile in Victoria. It has only been recorded from a handful of sites in Box-Ironbark forests and mallee patches around Bendigo. A small and slender burrowing species, the pink-tailed worm-lizard feeds exclusively on ants and spends the majority of time underground, living beneath stones and in burrows built by ant colonies.

Mammals

Of the 44 species of mammals found in the Box-Ironbark region, insectivorous bats are the most common and widespread, with 13 species occurring (Figure 3). Other mammals, such as the arboreal species, have become more restricted in range to localities that still contain forest habitats with suitable hollows for shelter.



Figure 3. *Insectivorous bats, including this lesser long-eared bat, may play an important role in controlling insect populations of the Box-Ironbark area. They are the most common and widespread mammal group throughout the region.* Photo: © Lindy Lumsden

Box-Ironbark habitat is of critical importance to the survival of a number of mammal species. Within Victoria, the arboreal squirrel glider is almost totally confined to the Box-Ironbark forests and adjacent Northern Plains, while more than half of the Victorian populations of brush-tailed phascogale and yellow-footed antechinus are also found here.

Several species show a geographic trend in their distribution and may only be found in a particular part of the region. The western grey kangaroo occurs west of Bendigo, while two species of bats, Gould's long-eared bat and inland broad-nosed bat are only found in the east.

The Box-Ironbark region lies between the drier inland plains and the wetter forests of the Great Dividing Range. Some mammal species found in the region are more representative of these adjoining areas rather than the dry forest environment. The common wombat and long-nosed bandicoot, for example, have been recorded on the edge of the Box-Ironbark region, but are usually associated with wetter forests.

European settlement and the ensuing increase in habitat loss and alteration, has led to the loss of several ground-dwelling animals from most of the region. Once present in the region, the white-footed rabbit-rat is now extinct. Both the common dunnart and spot-tailed quoll have become rare throughout the area.

In contrast, several ground-dwelling mammals including the eastern grey kangaroo, the short-beaked echidna and the black wallaby, are widespread and common throughout the region.

While currently not considered threatened, some species are in lower numbers throughout the Box-Ironbark region than in other regions in Victoria. This is especially true for many of the hollow-dependent fauna, primarily the arboreal mammals and insectivorous bats (see Information Sheet 5).

Birds

Over 200 bird species have been recorded in the Box-Ironbark region, including waterbirds and other species that visit local wetlands or occur intermittently in Box-Ironbark forests. Over half the species recorded are considered regular visitors or residents in these forests.

Nectar is a major food source in Box-Ironbark forests, with different tree species producing nectar at different times of year. Some of the richest forest areas have different tree species flowering all year, allowing them to support resident populations of honeyeaters, including two species characteristic of Box-Ironbark forests - Fuscous and yellow-tufted honeyeaters (Figure 4).



Figure 4. *The yellow-tufted honeyeater (pictured) is a characteristic species of forests of the Box-Ironbark region. While other bird species move in and out of the region during the year, populations of this bird are permanent residents* Photo: © McCann collection, NRE

When favoured trees such as red ironbark or yellow gum flower, flocks of honeyeaters and lorikeets appear from around Victoria to take advantage of the nectar. Visitors include yellow-faced and white-naped honeyeaters, red wattlebirds and noisy friarbirds, as well as some rare species such as the regent honeyeater.

Conversely, when drought inhibits flowering, normally sedentary species may be compelled to disperse and seek food in new habitats. Even small remnants of forest can

help maintain local populations at such times. The ebb and flow of nectar-feeding birds to and from the region, and within it, contributes to the unique nature of these forests.

Many insect-eating birds are resident throughout the year such as the spotted and striated pardalotes, scarlet robin, weebill, a range of thornbill species, white-throated treecreeper and the brown treecreeper which feeds from open ground as well as tree trunks.

At other times, the appearance of insect-eating birds in the forests coincides with abundance of insects. Flame robins, for example, are winter visitors (March-September). They visit from areas of mountain forest in the ranges to pasture and open woodland in the region. Rufous and golden whistlers swap places seasonally: Rufous whistlers departing for the winter and golden whistlers moving in. Rainbow bee-eaters are summer visitors from north of Australia, breeding in Box-Ironbark forests. Flocks of white-browed woodswallows visit erratically, mainly in response to dry conditions inland during summer.

Evidence is increasing of a general decline in the numbers of birds living in Box-Ironbark forests. While the Australian bustard is the only species extinct from the region, several species have become locally extinct and face uncertain futures. Threatened species, such as the swift parrot and the regent and painted honeyeaters, are forest species that regularly visit the area. Small remnant blocks of forest may play an important role in maintaining food resources for them in times of low eucalypt flowering in the larger blocks of forest.

Areas containing large hollow-bearing trees support several significant species including the powerful and barking owls. Habitat loss and fragmentation have notably reduced their numbers, affecting their long-term survival.

As potential habitat is altered in its structure and expanse, some birds such as the native noisy miner have become more prominent. Noisy miners occupy edges and corridors of native vegetation and exclude insectivorous birds (see information sheet 10).

Invertebrates

Occupying all levels of the forest, from the soil layer to the treetops, invertebrates are a largely overlooked, yet vital component of the ecosystem. Because a great range of sampling techniques is needed to study invertebrates, much still remains to be discovered about the diversity of invertebrates and the role they play in the ecology of the natural environment.

Ants are among the most numerous invertebrates, as well as beetles, flies and bugs. Some invertebrate species are known to be threatened. Two butterflies, the large ant blue butterfly and the eltham copper butterfly have been found in single sites within the region. One species of bull ant is also listed as threatened. Further information about

ground-dwelling invertebrates in the Box-Ironbark region, is provided in information sheet 6.

Further Information

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