# State of Victoria

## Submission to the Senate Environment and Communications Committee inquiry into the status, health and sustainability of Australia's Koala population

### Preamble

Many of the important issues relating to Koala conservation have been carefully considered in the Threatened Species Scientific Committee's (TSSC) recent report to the Minister for Sustainability, Environment, Water, Population and Communities (TSSC 2010). This submission aims to provide additional information or, where considered necessary, an alternative view on particular matters, without repeating the information already provided by the TSSC.

The Victorian Government has been actively managing Koalas in Victoria since the 1920s (see under 1b below). During the past 15 years, the Department of Sustainability and Environment (DSE) has actively participated in the preparation of the National Koala Conservation and Management Strategy 2009-2014 (NRMMC 2009) and its predecessor the National Koala Conservation Strategy (ANZECC 1998). Victoria has prepared a statewide Koala management strategy (DSE 2004) (attachment 1), as required under ANZECC (1998), and is implementing that strategy as resources allow.

It is important to note that the status of the Koala in Victoria is fundamentally different to that in New South Wales and Queensland because the greatest management challenge here relates to over-abundance rather than decline and rarity. Because of an over-abundance of Koalas at a small number of sites in coastal Victoria, the Koala has received more management attention and State resources during the past 15 years than any other Victorian wildlife species, including our threatened species. That is not to say that Koalas are flourishing everywhere in Victoria. The vigor and stability of populations varies with habitat quality and landscape context, such that some populations in fragmented or otherwise sub-optimal habitat may not persist in the long-term; this is a natural consequence of the continuous, dynamic interaction between any population and a changing environment.

Each of the terms of reference of the inquiry is considered below.

### 1. The iconic status of the Koala and the history of its management

#### a. Iconic status

The Koala has achieved iconic status as a very recognizable and well-known Australian faunal species. However, the relevance of this to the conservation attention that the species should receive is questionable. Victorian Government policy is to focus conservation attention and resources where they are likely to achieve the greatest conservation benefit. This includes a greater focus on understanding the ecological processes that sustain species and ecosystems, and working to minimize loss of biodiversity as a whole, while also maximizing the functionality of ecosystems (DSE 2010). The implication of this policy stance for the Koala is to emphasise management of over-browsing to protect vegetation communities from damage.

#### b. History of management

Koalas in Victoria have a unique history that has been well documented (e.g. Martin and Handasyde 1999, Menkhorst 2008 [attachment 2]). This history has, to a large extent, determined the present

conservation status of the Koala in Victoria and needs to be clearly understood when assessing priorities for Koala management in this State (DSE 2004).

Koalas are widespread in lowland and foothill forests and woodlands across southern, central and north-east Victoria where the annual rainfall exceeds about 500 mm. Population densities vary greatly with habitat quality. In some areas, population densities are unsustainably high and serious ecological degradation is caused by Koalas over-browsing their preferred food tree species [see Figure 1 of Menkhorst (2008)]. The broader ecological consequences of over-browsing can include the temporary (or permanent) loss or degradation of local flora and fauna species. High-density, but small (< 3000 individuals) populations on French Island, Raymond Island and at Tower Hill State Game Reserve are now being controlled by very intensive and expensive programs of mass contraception using modified human contraceptive implants adapted for the Koala by DSE and Parks Victoria (Middleton *et al.*. 2004). The efficacy of this approach in the control of large-scale over-browsing, such as that occurring at Mt Eccles National Park and in the Otway Ranges (> 10 000 individuals), is not yet clear, but it would require very high levels of resourcing.

In contrast, Koalas persist at low densities, less than one animal per ha, in drier, inland habitats - for example in box-ironbark forests across central Victoria - and at intermediate and sustainable densities in numerous other forested areas, such as the Strathbogie Plateau, the Lower Glenelg River region, the Ballarat-Bendigo region and South Gippsland.

This distribution is largely the result of a massive re-introduction program carried out by the Victorian Government since the 1920s. At that time the Koala had been reduced to a few small remnant populations. Fortuitously, Koalas introduced by local people to French Island and Phillip Island in the late-nineteenth century had flourished and provided a source of animals for re-introduction to selected forests on the mainland. This re-introduction program has been highly successful, to the extent that we do not know of any extensive area of Koala habitat in this State that does not support a Koala population.

## 2. Estimates of Koala population number

There is no population estimate for the Koala in Victoria – it is impractical to attempt to estimate total population number because the species is so widespread, is difficult to accurately census, and occurs at widely variant population densities.

Koala numbers are monitored at sites where active population management is taking place, but these areas represent only a tiny proportion (< 1%) of the Koala habitat in the State. Data provided to the National Koala Abundance Workshop, convened by the TSSC, was taken to indicate a population estimate of 73 500 koalas (TSSC 2010). However, this figure should not be taken out of context, as it was not meant to be an estimate of the total number of Koalas in Victoria. Furthermore, it is important to note that this estimate is certainly an under-estimate because Koala populations occur in many areas away from those for which population estimates were provided and many of the estimates were highly conservative.

At sites where Koala populations are being treated with contraception, population densities are estimated using a standardized transect count method involving repeated counts with distance sampling along fixed transects. These estimates are considered to be adequately rigorous for monitoring the effectiveness of the population management programs. Considerable improvement in the accuracy of population estimates is unlikely to be achieved until airborne heat sensing devices became available and are calibrated to detect Koalas in the forest canopy. Using this technology, nighttime aircraft transects have potential to accurately sample large areas of habitat.

## 3. Knowledge of Koala habitat

In Victoria, the Koala occupies a broad range of environments, from wet coastal woodlands to foothill forests, plains woodlands and inland riverine flood plains. These environments encompass numerous *Eucalyptus* communities with either an open-forest or woodland structure. DSE (2004) listed 26 *Eucalyptus* species that are known to be important Koala forage species in Victoria, but that list is certainly not exhaustive. Other tree species, including Coast Banksia and some Acacias, are important as shelter sites to reduce exposure to cold and heat when Koalas are not feeding.

It is well known that there is considerable variation in forage quality between *Eucalyptus* species, and between individual trees of a given *Eucalyptus* species, and that Koalas are skilled at detecting such differences (Moore and Foley 2005, Moore *et al.*. 2005). However, there is currently no readily-available means of measuring differences in forage quality across forest stands or landscapes, including how this might change in response to climate change. The development of a means of remotely sensing palatability differences in eucalypt canopies, and how these relate to environmental factors, such as underlying geology, water availability and stand age, would be a major step towards gaining a meaningful understanding of Koala habitat availability. Until such technology is available, the best approach to ensuring adequate habitat availability is to ensure that extensive areas of a range of open-forest and woodland *Eucalyptus* communities are available, growing on fertile soils and including valleys and lower slopes where water is less likely to be limiting. This habitat requirement is most readily met in extensive stands of forest (thousands of hectares in size) but can also be met in a mosaic of forested and cleared country where retained trees provide adequate habitat connectivity. Even isolated paddock trees can provide important refuge and food sources for Koalas inhabiting semi-cleared landscapes.

## 4. Threats to the Koala and its habitat

### a. Tree removal

The major threat to any species is the loss or degradation of its habitat. In the case of the Koala, which has rather simple habitat requirements, habitat loss equates to the removal of trees or a widespread reduction in tree health. One of the main factors causing tree decline in Koala habitat in coastal Victoria is over-browsing by the Koala itself. This issue has been discussed under 1b above.

Victoria has a well-developed vegetation retention policy (DNRE 2002) that includes a target of 'no net loss'. Implementation of this policy has significantly reduced the rate of tree removal on both freehold land and crown land throughout the State. Further, revegetation programs, aimed at restoring connectivity between forest patches at a landscape scale, are increasingly common in regional Victoria, facilitated by the Landcare movement. Restoring connectivity will be of considerable benefit to the Koala, which is particularly susceptible to habitat fragmentation due to its specialisation to a low energy, low nutrient diet that leaves little scope for increasing energy expenditure in order to travel between habitat fragments (Hume 1990).

Cessation of logging in all but the high altitude forests of the Eastern Highlands and forests of East Gippsland means that there is now little interaction in Victoria between the timber industry and the Koala. Over the last decade or so timber harvesting has been phased out of the forests of western and central Victoria, the Otway Ranges and Murray Valley flood plains, which carry the best and most extensive Koala habitat in the State.

One area where Koalas and timber harvesting is an issue is the Strzelecki Ranges where private plantation forestry occurs in areas occupied by the genetically diverse South Gippsland Koala population. However, the timber company involved, HVP Plantations, is well aware of its responsibilities in this area and is in the process of developing a detailed Koala management strategy aimed at minimizing impacts on the Koala.

### b. Disease

The disease *Chlamydiosis*, which can lead to infertility in female Koalas, has been a localized concern in the past, for example at Phillip Island and Halls Gap in the Grampians during the 1970s. While we know that the disease organism *Chlamydia* is present in most Victorian Koala populations (the notable exception being French Island, an important source of disease-free individuals), we are not aware of any current situations or populations where *Chlamydiosis* is affecting population viability. Therefore, we do not consider *Chlamydiosis* to be a significant threat to the conservation of Koala populations in this State.

Colomboma, a genetically transmitted eye condition that can cause blindness, has recently been diagnosed in koalas from Raymond Island in East Gippsland. The Department of Sustainability and Environment has changed the translocation protocols accordingly for this area in line with the Victorian Koala Management Strategy.

Koala retrovirus has been detected in Victorian overabundant koala populations. Its effect on population dynamics is unknown.

### c. Elevated atmospheric $CO_2$ and climate change

A major emerging concern for Koala habitat is the impact of greenhouse gasses and climate change. Increased atmospheric $CO_2$ levels will have a direct impact, regardless of any effects on climate, because they reduce the amount of protein available in *Eucalyptus* foliage and increase the amount of tannin, a toxin for folivorous animals (Lawler *et al.* 1997). Thus, elevated $CO_2$ will trigger a progressive and ubiquitous decline in habitat quality for the Koala (and the other *Eucalyptus* folivore the Greater Glider). Because atmospheric $CO_2$ levels are predicted to continue to rise, even if effective carbon emission controls can be implemented, we currently have no mechanism for eliminating this effect.

Throughout the Koala's Victorian range, climate change predictions suggest drying conditions and higher temperatures, both conditions likely to reduce the moisture content of eucalyptus leaves. This has the potential to cause renal problems in Koalas, and numerous anecdotal reports of this were received during the extreme drought and heat conditions of the 2008/09 summer. Extended periods of extreme weather, for example days over 40 degrees, are also likely to result more directly in the mortality of individuals. Gordon *et al.* (1988) first noted this in Queensland during periods of eucalypt leaf drop, but it was also noted in Victoria in 2009. This is only likely to cause significant population decline in small or otherwise threatened populations, such as those in northern Australia.

Another predicted impact of climate change is an increase the frequency of wildfire, a threat against which the Koala has no defense. Fuel reduction burns designed to limit the impact of wildfire also have potential to deleteriously affect Koalas if the burns are hot enough to scorch the canopy, rendering it unpalatable.

### d. Wildfires

Extensive wildfires in Victoria during the past decade have burnt a significant proportion of Koala habitat, including parts of the foothills of the Eastern Highlands, on both the northern and southern falls, the Strzelecki Ranges, Brisbane Ranges, Grampians, far south-west and Wilsons Promontory. The effect of these fires on Koala population numbers is unknown, but likely to have been significant due to direct mortality and starvation following the widespread removal of the eucalypt canopy. Overlaying a map of potential Koala habitat on a map of areas burnt by wildfire indicates that roughly 15% of Victoria's Koala habitat has been burnt at some level of intensity since 2000. On the plus side, the elevated nitrogen content of the foliage of regenerating eucalypts provides high

quality forage, and remnant Koala populations, surviving in unburnt patches, are capable of rebounding quickly as the habitat regenerates.

**e. Loss of genetic variability**

A particular concern for the Koala in Victoria is the loss of genetic variability due to the low founder base of the island populations used to re-populate the mainland. This lower genetic variability may reduce the capacity of Victorian Koala populations to cope with environmental change, although there is little indication of any particular problems at present. Given the scale of the re-introduction program, there are no practicable responses to overcome this reduced genetic variability. It does, however, highlight the importance of conserving the genetically diverse South Gippsland population which has not been subject to genetic swamping by island-derived animals (DSE 2004).

**f. Dogs, urbanization and vehicle collisions**

While predation by dogs and vehicle collision mortality have been identified as important threats to the Koala in northern parts of its Australian range, these are not known to be significant in Victoria. Loss of habitat due to urbanization is an issue at a local scale (e.g. Inverloch, Macedon and Ballarat/Creswick), but is mitigated by Victoria's native vegetation management policy (DSE 2002). Victoria's park reserve system provides further protection.

**5. Listing the Koala under the *Environment Protection and Biodiversity Conservation Act 1999***

The Victorian Government acknowledges that this decision is the responsibility of the Commonwealth Minister, after considering advice from the TSSC. It is noted that three nominations over a period of only 14 years (1996, 2004, 2010) have not resulted in advice from the TSSC to the Minister to list the Koala. The Victorian Government also notes that the most recent assessment of the conservation status of the Koala by the International Union for the Conservation of Nature (IUCN), at an IUCN Global Mammal Assessment Workshop held in Adelaide in August 2005, determined that the Koala ranked as 'Least Concern' (www.iucnredlist.org).

**6. Adequacy of the National Koala Conservation and Management Strategy**

The Victorian Government considers the National Koala Conservation and Management Strategy to provide an adequate and useful framework that complements Victoria's Koala Management Strategy at the national level. However, as noted in the review of the previous strategy (Parsons Brinckerhoff 2008), without dedicated funding the national strategy is unlikely to be fully implemented and, therefore, is unlikely to reach its potential to improve and secure the conservation status of the Koala.

**7. Appropriate future regulation for the protection of Koala habitat**

For almost a decade, the Victorian Government has been implementing and refining a comprehensive habitat protection policy. The goal of this framework is a reversal, across the entire landscape, of the long-term decline in the extent and quality of native vegetation. The removal of native vegetation is regulated through a permit system. Vegetation clearing is avoided wherever possible. Where clearing is unavoidable, its impact is minimized, and where clearing is permitted its impact must be offset with gains in the extent and quality of vegetation elsewhere. The Victorian Government considers that this policy is an adequate regulatory mechanism for the protection, enhancement and restoration of Koala habitat in the short- to medium-term. However, it will not overcome the longer-term threats posed by elevated atmospheric $CO_2$ or climate change. Actions to restore connectivity of Koala habitats across its range will also be important in securing the long-term future of the species.

**Concluding remarks**

Viewed statewide, the Victorian Government believes that the conservation status of the Koala in Victoria is secure. Its broad distribution and high population densities, combined with habitat protection measures now in place, provide some confidence that the species is buffered against the impacts of the major threats discussed above. The threats are not likely to impact directly on all populations at any one time. In the longer term, however, climate change scenarios that indicate reduced rainfall and increasing threat of wildfire pose serious concerns about the future prospects of the Koala in Victoria.

**The Hon Ryan Smith MP**

Minister for Environment and Climate Change

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