

The Senate

Environment and Communications
References Committee

The koala—saving our national icon

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Recommendations

Recommendation 1

2.144 The committee recommends that the Australian Government fund research into the genetic diversity of the koala including a population viability assessment of the southern koala and determining priority areas for conservation nationally.

Recommendation 2

2.147 The committee recommends that the Australian Government fund a properly designed, funded and implemented national koala monitoring and evaluation program across the full range of the koala.

Recommendation 3

2.153 The committee recommends that the Australian Government establish a nationally coordinated and integrated program for population monitoring of threatened species and other culturally, evolutionary and/or economically significant species.

Recommendation 4

2.155 The committee recommends that the Australian Government assist the koala research community and interested organisations to work towards a standardised set of methodologies for estimating koala populations.

Recommendation 5

2.160 The committee recommends that the Threatened Species Scientific Committee provide clearer information to the Environment Minister in all future threatened species listing advices, including species population information, and that the Threatened Species Scientific Committee review its advice to the Minister on the listing of the koala in light of the findings of this inquiry.

Recommendation 6

3.127 The committee recommends that the Australian Government undertake habitat mapping across the koala's national range, including the identification of priority areas of koala conservation, with a view to listing important habitat under the provisions of the *Environment Protection Biodiversity Conservation Act 1999*.

Recommendation 7

3.129 The committee recommends that the habitat maps be used to identify and protect important habitat in known koala ranges.

Recommendation 8

3.131 The committee recommends that the Australian Government review its land holdings which contain koala habitat and consider biodiversity, and specifically koala populations, in the management and sale of Commonwealth land.

Recommendation 9

3.134 The committee recommends that the Australian Government actively consider options for recognition and funding for private land holders for the conservation of koala habitat.

Recommendation 10

4.44 The committee recommends that the Australian Government fund research into koala disease, including the viability of vaccination programs and the effect of changes in leaf chemistry.

Recommendation 11

4.46 The committee recommends that the Australian Government fund the Koala Research Network's request for a Research Liaison Officer.

Recommendation 12

4.77 The committee recommends that the Australia Government consider further wild dog control options in priority koala areas.

Recommendation 13

4.90 The committee recommends that local and state governments:

- introduce appropriate speed limits in priority koala areas; and
- that where appropriate, build or retrofit underpasses or overpasses for major roads in priority koala areas as well as installing koala fencing adjacent to major roads.

Recommendation 14

4.92 The committee recommends where the Australian Government provides funding for roads or other infrastructure in or adjacent to koala habitat, it be contingent on the provision of adequate koala protections.

Recommendation 15

4.94 The committee recommends that the Australian Government work with the states to develop new national guidelines to ensure that all new roads and upgrades in or adjacent to koala habitat are koala-friendly.

Recommendation 16

5.78 The committee recommends that the Environment Minister consider the evidence provided to this inquiry when making his final decision on listing the koala as a threatened species.

Recommendation 17

5.82 The committee recommends the Environment Minister consider options to improve the conservation status of the diverse and rapidly declining koala populations in New South Wales and Queensland to ensure a nationally resilient population is maintained. These options include listing the koala as vulnerable under the EPBC Act in areas where populations have declined significantly or are at risk of doing so.

Recommendation 18

6.46 The committee recommends that an independent external review be conducted on the National Koala Conservation and Management Strategy to monitor the adequacy of progress. The review should assess and report on the progress made at the strategy's midpoint.

6.47 The review must include an assessment of the:

- strategy's implementation to date and prospects into the future;
- strategy's effectiveness in stabilising koala numbers in areas of declining population, and in reducing the pressure of overabundant populations;
- strategy's level of ambition, including whether new elements are required; and
- adequacy of the Commonwealth's and the states' respective roles and funding commitments.

Recommendation 19

6.52 The committee recommends that the Australian Government adequately resource the National Koala Conservation and Management Strategy, and ensure that it is properly implemented through committing to a much stronger leadership role.

Abbreviations and Acronyms

AIDS	acquired immune deficiency syndrome
AKF	Australian Koala Foundation
AZWWW	Australia Zoo Wildlife Warriors Worldwide
CKPoM	Comprehensive Koala Plans of Management
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999</i>
GIS	Geographic information system
HIV	human immunodeficiency virus
Invasive Animals CRC	Invasive Animals Cooperative Research Centre
KHA	Koala Habitat Atlas
KoRV	koala retrovirus
LGA	Local government area
NKCMS	National Koala Conservation and management Strategy 2009–2014
NVIS	National Vegetation Information System
SAT	Spot Assessment Technique
the strategy	<i>National Koala Conservation and Management Strategy 2009–2014</i>
TSSC	Threatened Species Scientific Committee

Executive Summary

Introduction

This report examines the committee's inquiry into the status, health and sustainability of one of Australia's most loved and iconic native animals – the koala. The koala is an instantly recognisable symbol of Australia as well as being an integral part of Australian cultural heritage.

Complexity

The committee was surprised by the complexity of this multifaceted issue. Many features and factors influence Australia's koala population. For instance in some areas (such as Queensland's Mulga Lands) their population is in sharp decline, whilst in others (such as Kangaroo Island in South Australia) their numbers are being actively managed because of an overabundance and resulting over-browsing. A key challenge is the paucity of data on the national koala population. The koala's diversity is another aspect of added complexity, with northern koalas being far more diverse than their southern cousins. The range of threats is also varied, for example habitat loss, disease and motor vehicle strikes. As a result there are no easy solutions.

The duration and level of interest generated by this inquiry is an indication of the complexity of the issues raised. On four occasions the committee extended its reporting timeframe in order to gather more evidence and to conclude its deliberations.

Commitment

The committee was also surprised by the level of commitment and passion openly displayed by koala advocacy groups and concerned individuals. Over 70 of the total 101 submissions received by the committee were from community-based koala conservation organisations and interested individuals. Seating in the public gallery at each of the committee's three public hearings was fully occupied which is not a usual occurrence.

The need for action

The status, health and sustainability of Australia's koala population is not a new issue. It is one that the Environment Minister's chief advisory body on threatened species, the Threatened Species Scientific Committee (TSSC), has formally considered on no less than three occasions in the past 15 years. Without significant commitment and proactive conservation measures, it is the committee's view that the question of the koala's threatened species status will continue to recur.

The committee agrees with the evidence presented to the inquiry on the need for early conservation action. It will be more cost-effective, and more importantly, improves

the ability of species recovery, to act now rather than allow the koala to drift ever closer to the threatened species list.

Threats

The koala population is being impacted by a multitude of threats. The report separates these threats into: threats to koala's habitat (Chapter 3) and threats to individuals (Chapter 4). Threats to habitat include direct human induced pressures such as urban development, forestry, mining, as well as climatic events such as droughts and bushfires. Direct threats to individual koalas also impact the overall koala population include disease, dog attacks and motor vehicle strikes.

Impact of different threats

It was recognised that while these types of threats are common across the koala's range, the relevant importance varies greatly from region to region. As one koala expert put it: 'the major reason for the decline in coastal populations is habitat loss and fragmentation, chlamydia disease, dog attacks and vehicle collisions, with habitat loss the primary causal factor. For western populations the major cause of decline is land clearing, drought, heatwaves and drought stress on eucalypt trees.'¹

Habitat degradation

The committee agrees that habitat degradation is the primary cause of koala population declines and is the major threat to the koala's long-term population viability. In this regard the committee has recommended the Australian Government support habitat mapping in priority areas, a review of Commonwealth land management, and initiatives to encourage private land owners to undertake conservation activities (Recommendations 6–9).

Disease

The committee received evidence from a range of veterinary specialists and academics about the increasing prevalence and impact of disease in koalas. Although there was disagreement on the level of magnitude, the committee notes the significant impact that disease, and in particular chlamydia and the koala retrovirus, is having on the koala population.

It appears that the cumulative impact of the threats faced by koalas is making them more susceptible to disease-related infection. This in turn results in a less resilient koala population and lowers the probability of future recovery. The committee accepts there is an increased prevalence of serious disease-related infections in the koala population.

1 Associate Professor Clive McAlpine, Spokesperson, Koala Research Network, *Committee Hansard*, 3 May 2011, p. 2.

To address this problem the committee has recommended the Australian Government provide funding to koala disease research (Recommendations 10).

Dog attacks

The committee receive evidence about the growing number of fatal domestic dog attacks as well as the body of research about the significant impact of wild dogs. In this regard the committee has recommended the Australian Government consider further wild dog control options in priority koala areas (Recommendations 12).

Motor vehicles

Motor vehicles are also an increasing threat to koalas for two reasons. The committee heard that in some areas direct koala strikes by motor vehicles are the second most common cause of koalas being admitted into care and the second most common cause of mortality.

The committee also heard that roads present an insurmountable physical barrier for koalas to cross leaving them isolated in pockets of bushland.

To reduce the impact of motor vehicles, the committee has made several recommendations including encouraging the building or retrofitting of koala 'friendly' infrastructure (Recommendations 13–15).

Population and threatened species listing

It is clear that Australia's national population has undergone marked decline.² It is also clear that koala numbers in certain areas of its range (including most of Queensland and New South Wales) have experienced much larger declines than the national average. Declines of 80 per cent in some areas and even localised extinctions in other areas have been documented. By contrast, in parts of Victoria and South Australia numbers are flourishing, despite the declining trend nationally.

However, what is not clear, or at least insufficient in the view the TSSC, is the demographic data available on koala numbers. On three occasions the TSSC has advised the Environment Minister that despite significant decreases, koala population data is insufficient to confidently conclude that the declines meet the indicative thresholds required under the Environment Protection and Biodiversity Conservation Act (EPBC Act) and associated guidelines.

In the committee's view it is unsatisfactory for a paucity of population data on a nationally important species such as the koala to stymie an effective threatened species listing assessment. Accordingly, a key recommendation of this report is that

2 Threatened Species Scientific Committee (TSSC), 'Letter to the Minister for Sustainability, Environment, Water, Population and Communities regarding the conservation status of the koala', 30 September 2010, p. 1.

the Australian Government fund a properly designed, funded and implemented koala monitoring and evaluation program across the full range of the koala (Recommendation 2). The committee has also made a number of complementary recommendations including the establishment of standardised methodologies for estimating koala numbers and greater funding for research into the genetic diversity of the koala population (Recommendations 1 and 4). The data deficiencies in these areas make it very difficult to prioritise conservation activities effectively.

The committee has also made a recommendation on the broader subject of monitoring significant Australian species: that the Australian Government establish a nationally coordinated and integrated program for population monitoring of threatened species and other culturally, evolutionary and/or economically significant species (Recommendation 3).

Finally on this topic, the committee carefully examined the 2010 advice from the TSSC to the Environment Minister regarding its assessment of the koala for threatened species listing. The committee expressed concerns about the TSSC's advice which in the committee's view omitted several critical items of information and analysis. Primarily the committee's concerns relate to the fact that the TSSC did not provide to the Minister a national estimate, a 'plausible lower bound', nor the necessary figures for historical comparison, despite providing such information to this inquiry. The committee also noted that there was a range of new information that had emerged since TSSC's advice was prepared, such as the 80 per cent decline in the Mulga Land population.

Accordingly, the committee has recommended that the TSSC provide clearer information in all future threatened species listing advices, review its advice to the Minister, and that the Environment Minister consider the evidence provided to this inquiry when making his final decision on listing the koala as a threatened species (Recommendations 5 and 16). The committee has also recommended that the Environment Minister consider options to improve the conservation status of the rapidly declining koala populations in New South Wales and Queensland to ensure a nationally resilient population is maintained, including the option of listing the koala as vulnerable under the EPBC Act in areas where populations have declined significantly or are at risk of doing so (Recommendation 17).

National Koala Conservation and Management Strategy

The final chapter of the report considers the National Koala Conservation and Management Strategy, which was described as an overarching framework for the national conservation of the koala. However, concerns were raised about the strategy's effectiveness. The committee also received evidence criticising the adequacy of the strategy's identified measures. The committee made two recommendations in this regard:

- that an independent external review be conducted on the National Koala Conservation and Management Strategy to monitor the adequacy of progress (Recommendation 18); and
- that the Australian Government adequately resource the National Koala Conservation and Management Strategy, and ensure that it is properly implemented through committing to a much stronger leadership role (Recommendation 19). and

Conclusion

The most prominent issue raised during this inquiry was whether the koala should be listed as a threatened species. Although the committee does not have the technical expertise of the TSSC, and therefore believes it is not qualified to determine whether or not the koala should be listed as threatened, the committee is deeply concerned about the sustainability of Australia's koala population.

On one hand, the committee is pleased that the koala may not yet be eligible for listing as threatened. The committee believes that to have such a significant Australian icon included on the threatened species list would be a national shame.

On the other hand, the committee believes there are parts of the koala population that require much greater protection. This is occurring to some extent in Queensland and NSW where the koala is listed in some areas under state environment protection legislation. However, state listing has not stemmed the marked decline in the population. If declines continue it will only be a matter of time before the koala is nationally listed as a threatened species.

The EPBC threatened species listing process is reactive and not well suited to the conservation needs of the koala. In the committee's view, there ought to be processes available to enable proactive protection for the koala as well as other significant Australian species. In this regard the committee notes the possible mechanisms announced as part of the government's response to the review of the EPBC Act which could enable a more proactive approach to koala conservation. Perhaps, building on the TSSC's proposal to monitor species of cultural, evolutionary and/or economic significance, there ought to be a category of nationally significant species.

Ultimately, the committee would like to see Australia's koala population return to plentiful numbers of healthy individuals, in resilient habitats, across the koala's natural range.

Chapter 1

Introduction

Conduct of the inquiry

1.1 On 17 November 2010 the Senate referred the matter of the status, health and sustainability of Australia's koala population to the Environment and Communications References Committee (the committee) for inquiry and report by 1 June 2011.¹ The inquiry formally commenced on 8 February 2011. The reporting date was subsequently extended by the Senate to 24 August and later to 20 September 2011.

1.2 The terms of reference required that the committee have regard to:

- (a) the iconic status of the koala and the history of its management;
- (b) estimates of koala populations and the adequacy of current counting methods;
- (c) knowledge of koala habitat;
- (d) threats to koala habitat such as logging, land clearing, poor management, attacks from feral and domestic animals, disease, roads and urban development;
- (e) the listing of the koala under the *Environment Protection and Biodiversity Conservation Act 1999*;
- (f) the adequacy of the National Koala Conservation and Management Strategy;
- (g) appropriate future regulation for the protection of koala habitat;
- (h) interaction of state and federal laws and regulations; and
- (i) any other related matters.

1.3 The committee advertised the inquiry on its website and wrote to relevant organisations inviting submissions by 8 February 2011. The inquiry was advertised nationally in *The Australian* on 8 December 2010 and 2 February 2011. The committee received 101 submissions (see Appendix 1).²

1.4 The committee also received two petitioning documents. The first, received from the Koala Preservation Society of NSW, was signed by 2010 petitioners and called for the protection of existing koala habitat. The second, received from Ms Meghan Halverson, was signed by 427 petitioners and called for the species to be listed as 'endangered' or 'vulnerable'. The text of these two petitions is reproduced in Appendix 2.

1 *Journals of the Senate*, 17 November 2010, pp 318–319.

2 Public submissions are available on the committee's website at:
www.aph.gov.au/Senate/committee/ec_ctte/koalas/submissions.htm.

1.5 The committee held three public hearings: the first in Brisbane on 3 May, the second in Canberra on 19 May and the third in Melbourne on 1 August 2011 (see Appendix 3).³

1.6 The committee also received a large amount of evidence in the form of answers to questions on notice and additional information.⁴ In this regard the committee notes the disappointing contribution provided by the Department of Sustainability, Environment, Water, Population and Communities. Departmental officials gave evidence to the committee on 19 May 2011. Responses were to be returned three weeks later, on 9 June 2011. The department's answers were provided to the committee over two months late, on 12 August 2011. Several of these late responses were evasive or did not attempt to address the question which was asked.⁵ The committee finds the department's performance in this regard unsatisfactory and expects much higher standards in future.

Accessibility trial

1.7 The committee used this inquiry to trial online accessibility arrangements of committee documents for people with vision impairment. Details about the trial, including a report on the trial's outcomes, can be found on the committee's website at: www.aph.gov.au/Senate/committee/ec_ctte/koalas/submissions_accessibility_trial/index.htm.

Report structure

1.8 The remainder of this chapter provides background species information on the Koala and highlights the iconic status of this unique Australian symbol.

1.9 Chapter 2 of this report examines the available information on Australia's koala population, including counting methodologies, historical and current estimates and data deficiencies;

1.10 Chapter 3 considers the various threats to koala habitat, including urban development, forestry, mining, drought, bushfire and climate change, while chapter 4 considers other threats such as disease, dog attacks and motor vehicles.

1.11 Chapter 5 explores the status of the koala under state and federal environmental protection laws, including the current assessment of whether to list the koala as a threatened species under the Environment Protection and Biodiversity Conservation Act; and

1.12 Finally, chapter 6 examines the national strategy designed to conserve and manage koala numbers – the National Koala Conservation and Management Strategy.

3 Transcripts from the public hearings are available on the committee's website at: www.aph.gov.au/Senate/committee/ec_ctte/koalas/hearings/index.htm.

4 Answers to questions on notice and additional information are available on the committee's website at: www.aph.gov.au/Senate/committee/ec_ctte/koalas/submissions.htm.

5 See for example Department of Sustainability, Environment, Water, Populations and Communities, responses to questions on notice, 19 May 2011 (received 12 August 2011), pp 1 and 7 at www.aph.gov.au/Senate/committee/ec_ctte/koalas/submissions.htm.

Acknowledgements

1.13 The committee would like to thank all the individuals, organisations and local, state and federal governments and government departments that contributed to this inquiry. The inquiry generated very strong public interest with many supporters of koala advocacy organisations filling the public gallery at each hearing.

1.14 The committee also notes that the majority of submissions came from individuals and community groups who are passionate about the koala's wellbeing. The committee acknowledges the significant commitment and effort made by these individuals and organisations in submitting evidence and attending the public hearings.

Species information⁶

1.15 The koala is a tree-dwelling, medium sized marsupial with a stocky body, large rounded ears, sharp claws and variable but predominantly grey-coloured fur.

1.16 Koalas in the south of Australia are larger than individuals in the north, with a gradient in body weight from north to south occurring across the koala's range. The average weight of males is 6.5 kilograms in Queensland, compared with 12 kilograms in Victoria. Koalas in the north tend to have shorter, silver-grey fur, whereas those in the south have longer, thicker, brown-grey fur. Males are also generally larger than females.

Genetic variation

1.17 The species is conventionally accepted as *Phascolarctos cinereus* and is the only species in the family Phascolarctidae.

1.18 Three subspecies of koala were proposed by early taxonomists, based on differences in the species' morphology across its geographical range: *Phascolarctos cinereus adjustus* in Queensland, *P. c. cinereus* in New South Wales and *P. c. victor* in Victoria.

1.19 According to the Threatened Species Scientific Committee (TSSC), the state border subspecies boundaries are unlikely to represent natural barriers to koala dispersal.

1.20 Studies by scientists have found relatively low levels of genetic differentiation among the proposed subspecies, suggesting that physical variations across the species' range may reflect different adaptations to different climates rather than separate subspecies.⁷ Southern koalas are able to be distinguished from northern koalas by

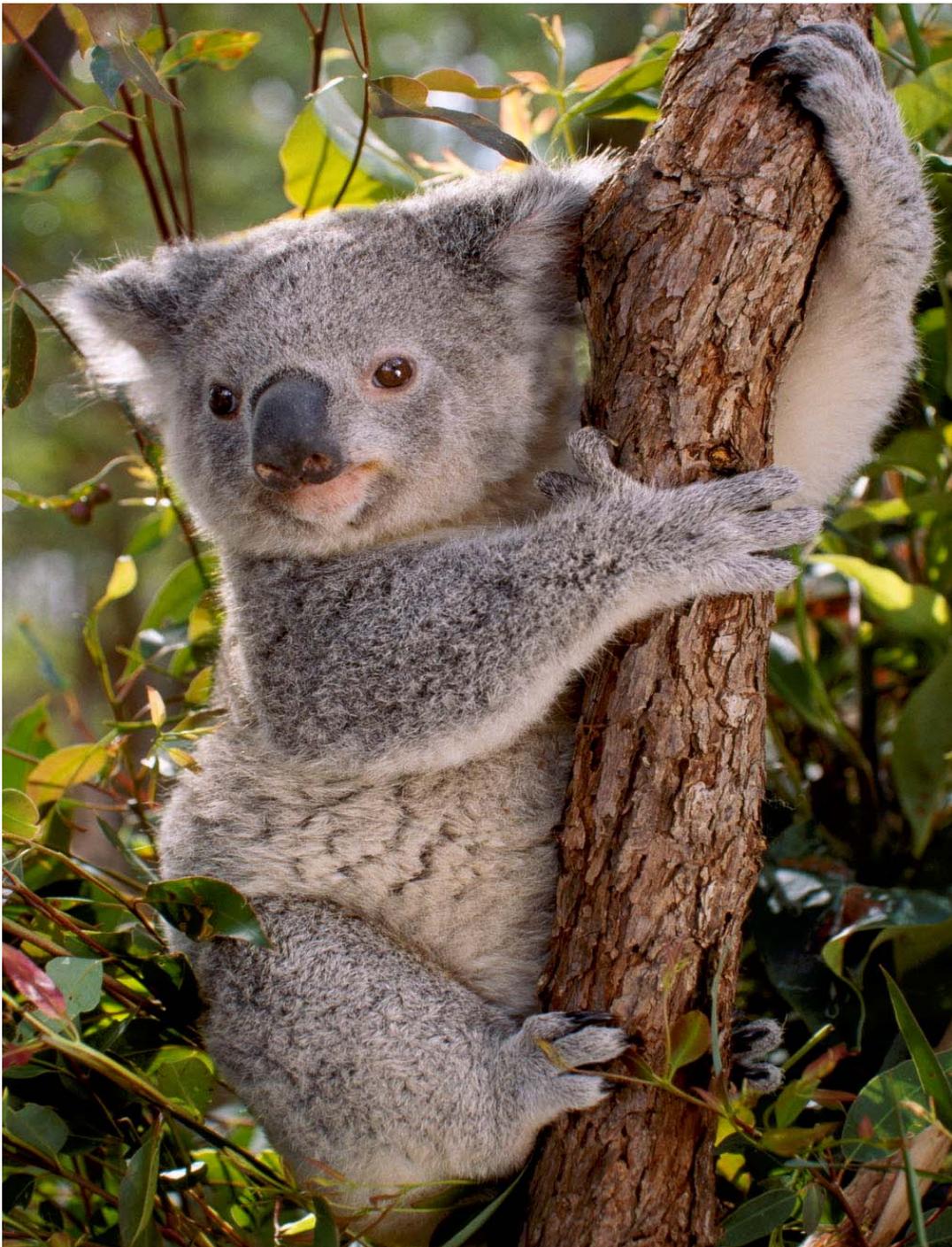
6 Unless otherwise referenced, the scientific information contained in this section is sourced from the Threatened Species Scientific Committee, 'Advice to the Minister for Environment, Protection, Heritage and the Arts from the Threatened Species Scientific Committee on Amendment to the list of Threatened Species under the *Environment Protection and Biodiversity Conservation Act 1999*', pp 1–8.

7 Natural Resource Management Ministerial Council, *National Koala Conservation and Management Strategy 2009–2014*, Department of Environment, Heritage and the Arts, Canberra, 2009, p. 17.

physical features such as fur colour and size. Some regional variation in the species is also apparent.

1.21 This was a matter of considerable contention during the inquiry which is discussed further in chapter 2.

Picture 1.1—The koala



Source: Queensland Department of Environment and Resource Management. Reproduced with the permission of the Queensland Department of Environment and Resource Management.

Life expectancy and reproduction cycle

1.22 In the wild, koalas are estimated to live to 15 years for females and more than 12 years for males. The life expectancy of koalas may be shortened due to the presence of disease and other threats.⁸

1.23 Female koalas can potentially produce up to one offspring each year, with births occurring between October and May. Twins are occasionally recorded.⁹ The gestation period of koalas is 35 days.¹⁰ The newly-born koala lives in its mother's pouch for between 6 to 8 months. The young joey then leaves the pouch and rides on its mother's back. Young koalas are independent from 12 months of age.

Picture 1.2—Koala with joey, Adelaide Hills, South Australia

Source: Australian Koala Foundation. Reproduced with the permission of the Australian Koala Foundation.

8 For further information on the threat of disease for koalas see chapter 4.

9 Dr Jon Hangar, Private capacity, *Committee Hansard*, 3 May 2011, p. 18.

10 Bill Phillips, *Koalas: The little Australians we'd all hate to lose*, Australian Government Publishing Service, Canberra, 1990, p. 27.

Home range

1.24 The koala is not territorial and the home ranges of individuals extensively overlap. Individuals tend to use the same set of trees, but generally not at the same time. Home ranges are variable depending on the location, with those in poorer habitats being larger than those in high quality habitats. On average, males usually have larger home ranges than do females.

1.25 Koalas spend a lot of time alone, devoting little time to social interactions. They do not tend to move much, under most conditions changing trees only a few times a day. There is little evidence of longer movements by individuals, though dispersing individuals, mostly young males, may occasionally cover distances of several kilometres over land with little vegetation.

Diet

1.26 Koalas have complex foraging strategies. The koala is a leaf-eating specialist with its diet mainly restricted to foliage of *Eucalyptus* species.¹¹ Koalas have been observed sitting in or eating the leaves of up to 120 species of eucalypt. Koalas may also consume foliage of related trees including *Corymbia*, *Angophora* and *Lophostemon* and at times supplement their diet with other species such as *Leptospermum* and *Melaleuca*. Preference between tree species may be influenced by factors including region, season, leaf chemistry, elevation, temperature, water content and soil nutrients. Koalas also have a strong preference for individual trees within a species.

1.27 When koala populations reach high densities, their browsing preferences can change the species composition of the local eucalypt community. This is apparent in some areas of Victoria and South Australia where koalas have been introduced and become abundant.

Bark-eating

1.28 The committee heard evidence from Mr Chris Allen, a NSW Parks and Wildlife service ecologist who appeared before the committee in a personal capacity, about the very recent discovery that a koala population in Bredbo, New South Wales eats bark as part of their diet. According to Mr Allen, landowners in the area have been noticing chew marks in trees for over twenty years. A recent study was conducted using infra-red movement sensitive cameras to record nocturnal bark chewing.¹²

1.29 The koalas were observed to chew through to the 'cambium' layer, eating bark up the full height of the tree. The koalas would chew the bark and would eat and digest some it. Mr Allen told the committee that it is currently theorised that the koalas chew the bark of the trees to supplement their diet:

11 For a list of species considered to be primary or secondary koala food trees see Australian Koala Foundation, *Submission 25*, pp 17–20.

12 Mr Chris Allen, Private capacity, *Committee Hansard*, 19 May 2011, p. 17.

Our best guess is that within the sap flow of the tree there is a mix of nutrients, minerals and moisture and probably they are accessing one or a suite of nutrients, minerals and moisture to assist with their digestive process.¹³

1.30 The chewing is strategic on the part of the koala, as they repeatedly target a specific tree species. On some occasions one specific tree would be repeatedly targeted for chewing. Mr Allen told the committee that the frequent chewing of a tree places the tree in a state of stress, changing the chemical content of the tree. The tree then becomes more nutritious, making it an important part of their diet.¹⁴ In some instances trees have died as a result of stress from chewing.

1.31 The bark-chewing phenomenon is currently only recorded on the Monaro plains in NSW, though is speculated to be more wide-spread.¹⁵

Habitat

1.32 Koalas inhabit a range of temperate, sub-tropical and tropical forest, woodland and semi-arid communities dominated by eucalypt species. The distribution of koalas is also affected by altitude (up to 800 metres above sea level), temperature and leaf moisture. A discussion on the threats posed to koala habitat is contained in Chapter 3.

Species range – historic and current

1.33 The koala is endemic to Australia, with its range extending from the south east corner of South Australia to the north coast of Queensland and to the west of the Great Dividing Range (see Figure 1). The range extends over 22° of latitude and 18° of longitude.¹⁶

1.34 According to the *National Koala Conservation and Management Strategy 2009–2014*, prior to European settlement the koalas' natural range occurred throughout:

...the broad band of eucalypt forest and woodland communities extending from north-eastern Queensland to the south-eastern corner of South Australia.¹⁷

1.35 The current distribution of Australia's koala population is scattered throughout a similarly large region of the east-coast of the continent. Their range extends from the

13 Mr Chris Allen, Private capacity, *Committee Hansard*, 19 May 2011, p. 17.

14 Mr Chris Allen, Private capacity, *Committee Hansard*, 19 May 2011, p. 17.

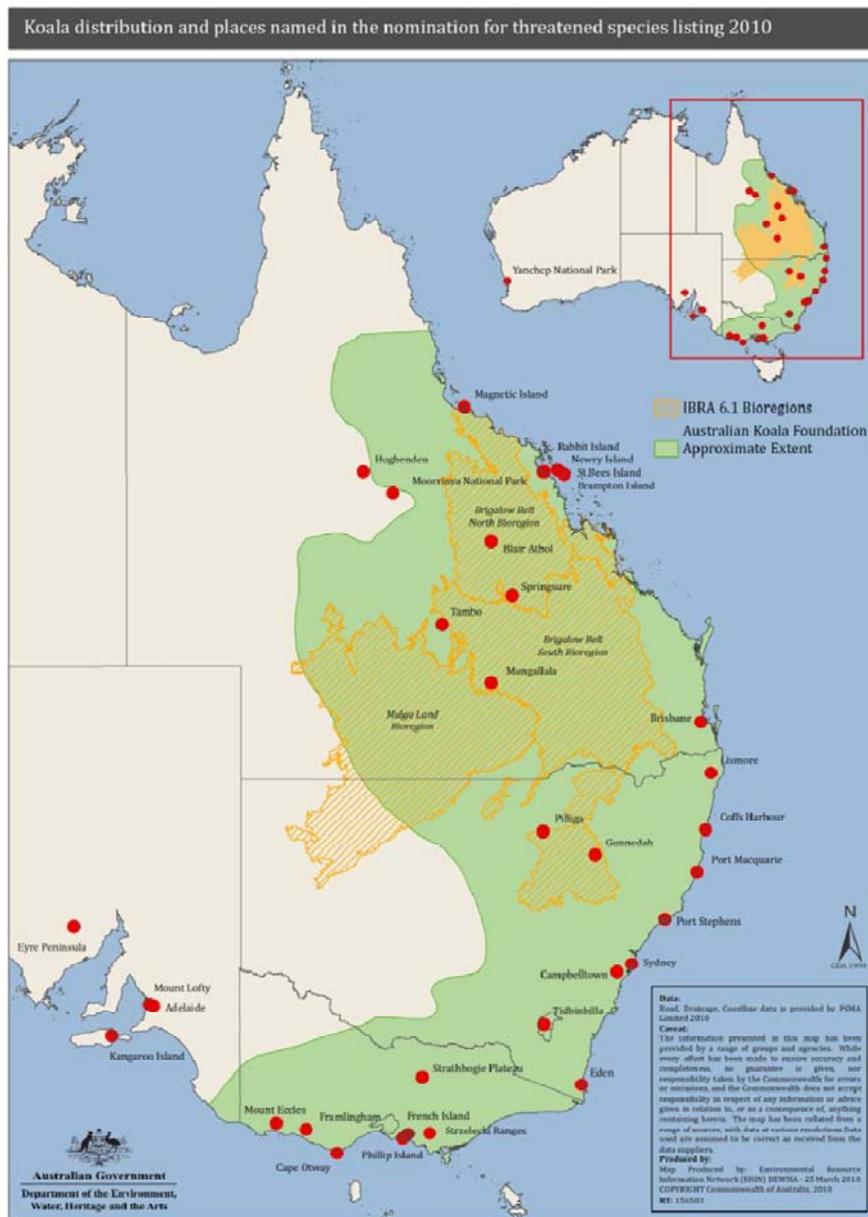
15 Mr Chris Allen, Private capacity, *Committee Hansard*, 19 May 2011, p. 17.

16 Threatened Species Scientific Committee, 'Advice to the Minister for Environment, Protection, Heritage and the Arts from the Threatened Species Scientific Committee on Amendment to the list of Threatened Species under the *Environment Protection and Biodiversity Conservation Act 1999*', p. 2, www.environment.gov.au/biodiversity/threatened/species/pubs/64971-listing-advice.pdf (accessed 28 June 2011).

17 National Resource Management Ministerial Council, *National Koala Conservation and Management Strategy 2009–2014*, December 2009, p. 12.

south-east corner of South Australia, through Victoria, New South Wales and up to the north-east of Queensland. Figure 1 illustrates the approximate extent of the koala's distribution across Australia, an area encompassing more than one million square kilometres.¹⁸

Figure 1.1—Distribution of the koala



Source: Threatened Species Scientific Committee, 'Advice to the Minister for Environment, Protection, Heritage and the Arts from the Threatened Species Scientific Committee on Amendment to the list of Threatened Species under the *Environment Protection and Biodiversity Conservation Act 1999*', p. 38.

18 Threatened Species Scientific Committee, *Advice to the Minister for Environment, Protection, Heritage and the Arts from the Threatened Species Scientific Committee (the Committee) on Amendment to the list of Threatened Species under the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)*, September 2010, p. 2, www.environment.gov.au/biodiversity/threatened/species/pubs/koala-listing-advice.pdf (accessed 12 July 2011).

1.36 As a consequence of translocations, several koala populations also occur outside the species' natural range. These include Kangaroo Island, the Eyre Peninsula and Adelaide Hills in South Australia; and Phillip Island and French Island in Victoria. Similarly there are introduced populations on several islands off the Queensland coast including St Bees Island and Magnetic Island.

1.37 The spread of the koala is not evenly distributed across the species' range. Individual populations are fragmented across the breadth of this range as a result of vegetation clearing, fire, land management practices and unsuitable habitats.¹⁹ Population densities within states range from very high in isolated areas or island populations within Victoria and South Australia to low across parts of New South Wales and Queensland. Detailed information on the natural range of the koala in each east coast jurisdiction is detailed in the Threatened Species Scientific Committee's advice to the Environment Minister of September 2010.²⁰

Iconic status

1.38 A majority of the submissions received by the committee commented on the iconic nature of the species.

1.39 Koalas were variously described as 'an icon of Australia's fauna';²¹ the 'iconic Ambassador for the conservation of Australian native wildlife and habitats';²² 'a symbol of the Australian landscape and culture';²³ and 'a species of international significance'.²⁴

1.40 The koala is the faunal emblem of Queensland and according to the Queensland government 'holds a special place in the hearts of Queenslanders'.²⁵

1.41 Imagery of the koala has permeated Australian cultural heritage for nearly a century. The quintessential Australian children's classic *Blinky Bill* (by Dorothy Wall) and Norman Lindsay's renowned children's book *The Magic Pudding* (which features *Bunyip Bluegum* the koala) are symbolic of the koala's significance to Australia's national identity.

1.42 The koala is also of great cultural significance to many indigenous Australians. For example the Coastwatchers Association told the committee that 'the

19 Dr Alistair Melzer, *Submission 7*, pp 2 and 5.

20 Threatened Species Scientific Committee, *Advice to the Minister for Environment, Protection, Heritage and the Arts from the Threatened Species Scientific Committee (the Committee) on Amendment to the list of Threatened Species under the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)*, September 2010, pp 2–4.

21 Property Council of Australia, *Submission 39*, p. 1.

22 Mr Al Mucci, General Manager, Life Sciences, Dreamworld, *Submission 8*, p. 2.

23 Dr Vanessa Standing, *Submission 60*, p. 1.

24 Koala Action Group Qld Inc, *Submission 17*, p. 3.

25 Department of Environment and Resource Management on behalf of the Queensland Government, *Submission 79*, p. 2.

koala is a highly significant ancestor, a philosopher, astronomer and linguist...' to the indigenous cultures of the Eurobodalla area in NSW.²⁶ Similarly, the Conservation Council ACT Region informed the committee that koalas 'form an important part of the spiritual and cultural life and are central to many Dreamtime stories' for the indigenous people of the far south coast of NSW.²⁷

1.43 Dr Alistair Melzer of the Koala Research Centre of Central Queensland described the power of human's 'deep-seated' emotional connection to the koala as the reason for its iconic status:

The appeal of the koala seems almost primal in humans. This seems to be a consequence of the appearance of the face (large round eyes, round face, soft fur and rounded soft ears), the tendency of the animals to grasp (hug) when held, and the passive response when encountered.²⁸

1.44 This point was driven home by the youngest contributor to this inquiry, 11 year old Ms Sarah Halverson who told the committee:

...I really love the koala. They are such an incredible animal. The first time I met a koala I just gazed into its eyes and I knew that I wanted to protect it from going extinct. We need to list it as critically endangered because they are just the sweetest animal.²⁹

1.45 The impact of the koala's iconic status manifests itself in dimensions of the human realm such as tourism, property values and state election results, as discussed briefly below.

1.46 The iconic status of the koala is particularly important to Australia's tourism sector through its appeal to international visitors. Mr Al Mucci from Dreamworld highlighted the extraordinary level of the koala's recognition internationally:

I can show a picture of a koala to a child in Kenya and he will tell me it is a koala. If I show him a picture of a bilby he will not know what it is. That is the iconic status of the koala...

When the koalas went from Currumbin to China [Guangzhou province]...their visitation went up from 20,000 people a day to 40,000 people a day because six koalas arrived. So I think that that animal internationally has iconic status—has rock star status.³⁰

26 Coastwatchers Association Inc, *Submission 54*, p. 6.

27 Conservation Council ACT Region Inc., *Submission 61*, p. 2, submitted on behalf of the South East Region Conservation Alliance.

28 Dr Alistair Melzer, *Submission 7*, p. 3.

29 Ms Sarah Halverson, *Committee Hansard*, 3 May 2011, p. 68.

30 Mr Al Mucci, General Manager, Life Sciences, Dreamworld, *Committee Hansard*, 19 May 2011, pp 3–4.

1.47 As a result of this high degree of international recognition, an Australian Koala Foundation study estimated that 'the koala creates over 9000 jobs and contributes between \$1.1 billion and \$2.5 billion for tourism per year to Australia.'³¹

1.48 The committee also heard evidence that residential property values are influenced by their proximity to koala habitat. The Mayor of Redland City Council, Councillor Hobson, told the committee of a Queensland University of Technology study which found that:

A koala habitat area would add \$29,600 or about five per cent of the value of an average home. If a koala might move through an area of 10, 15 or 20 homes you can then estimate the value...just to see the koala adds an extra \$3,000 to the value of your property.³²

1.49 Finally, Dr Melzer informed the committee of how public responses to threats to koala populations have influenced state elections:

Our emotional connection to koalas becomes evident when threats to individuals or populations are publicized – and the response is seldom purely rational (Bagust 2010). The classic example is the international and national public outcry to proposals to cull koalas on Kangaroo Island while there has been no widespread mention of culling of other native species on the island. A similar public response (around proposals to build a motorway through known koala habitat) was sufficient to influence state electoral results in Queensland.³³

31 Australian Koala Foundation, *Submission 25*, p. 3.

32 Councillor Hobson, Mayor of Redland City Council, *Committee Hansard*, 3 May 2011, p. 51.

33 Dr Alistair Melzer, *Submission 7*, p. 3.

Chapter 2

Koala population

2.1 It was widely recognised throughout this inquiry that Australia's koala population is in decline.¹ However the overall national picture is far from straightforward. There are remarkable regional differences across the koala's range, with overabundance in certain isolated island or localised populations, at the same time as serious documented declines in populations in certain rural, peri-urban and urban areas.

2.2 This chapter explores the following main issues:

- The importance of koala population data;
- Counting methodologies;
- Historical estimates of Australia's koala population;
- Current estimates of Australia's koala population;
- Population diversity; and
- Problems with current estimates.

2.3 The chapter concludes with the committee's views on the way forward on this important issue.

The importance of koala population data

2.4 The future conservation status and management of Australia's koalas is dependent upon accurate estimates of koala populations. The Conservation Council ACT Region submitted that:

Lack of consensus regarding the size and viability of remaining populations and regarding the extent of and reasons for decline, or even overabundance in some instances, hinders the conservation task.²

2.5 A similar argument was made by the Wildlife Preservation Society of Queensland which submitted that:

It is essential that koala populations are known because if you do not know what you are managing how do you know if your approach is appropriate.

1 For example see: National Resource Management Ministerial Council, *National Koala Conservation and Management Strategy 2009–2014*, December 2009, p. 2; and Threatened Species Scientific Committee, *Advice to the Minister for Environment, Protection, Heritage and the Arts from the Threatened Species Scientific Committee (the Committee) on Amendment to the list of Threatened Species under the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)*, September 2010, p. 20.

2 Conservation Council ACT Region, *Submission 61*, p. 2.

Not only do you need to know the size, an understanding of the age classes is essential for effective conservation and appropriate management.³

2.6 Industry bodies also submitted that scientific estimates of the number of koalas are needed to provide the basis for government action:

The Property Council believes that any decisions made on the future of the koala population must be based on this critical information.

Too much regulation has already been implemented on the basis of anecdotal evidence.⁴

2.7 Native wildlife in Australia can be protected by legislation at both the Commonwealth and state level.⁵ However, for a species to be given legislative protection, evidence of the rate of population decline is necessary.

2.8 In each of the state and territory jurisdictions where koala populations occur, legislation is in place to protect species that are vulnerable or threatened.⁶ One way for species to be given protection under such legislation, is for environment ministers or independent scientific committees to be convinced that the species has undergone, or is likely to undergo, a demonstrable reduction in population size.⁷

2.9 At the Commonwealth level, accurate estimates of population size may assist a species to be 'listed' under the *Environment Protection and Biodiversity Conservation Act 1999* (the EPBC Act).⁸ According to the Commonwealth legislation, for a native species to be considered to be in the critically endangered, endangered, or vulnerable category it needs to meet one of five criteria. All of the criteria are dependent in one way or another on population data. For example several criteria require, amongst other things, data on the estimated total number of mature individuals or the rate of population decline.⁹ The key EPBC Act conservation status criterion relevant to koalas (criterion one) requires not only current population data,

3 Wildlife Preservation Society of Queensland, *Submission 15*, p. 4.

4 Property Council of Australia, *Submission 39*, p. 4.

5 For details see Chapter 5: The status of koalas under the law.

6 Threatened species are protected in New South Wales by the *Threatened Species Conservation Act 1995*, in Victoria by the *Flora and Fauna Guarantee Act 1988*, in Queensland by the *Nature Conservation Act 1992*, in South Australia by the *National Parks and Wildlife Act 1972* and in the Australian Capital Territory by the *Nature Conservation Act 1980*.

7 For example see New South Wales Office of Environment and Heritage, 'The listing process', 15 June 2011, www.environment.nsw.gov.au/threatenedspecies/listingts.htm (accessed 30 June 2011).

8 Under the EPBC Act the Threatened Species Scientific Committee advises the Environment Minister on which species to list as threatened. However ultimately it is the minister who decides which species should be listed. See Chapter 5: The status of koalas under the law.

9 Environment Biodiversity and Conservation Regulations 2000, section 7.01.

but also population data from three generations past, which according to the Threatened Species Scientific Committee (TSSC) is 20 years.¹⁰

2.10 In its letter to the minister on the listing of the koala under the EPBC Act, the TSSC emphasised the importance of robust population data:

...the koala population has undergone a marked decline over three generations, due to the combination of a range of actions. The [TSSC] therefore considers the koala to be potentially eligible for listing as vulnerable. However, better demographic data are needed to make this judgement with confidence.¹¹

2.11 Further information about the deficiencies in koala population data is presented later in this chapter. The possible listing of the koala under the EPBC Act is further considered in Chapter 5: The status of koalas under the law.

2.12 Estimates of koala population numbers are also valuable in helping local governments to formulate and implement koala management policies.¹² For example Redland City Council submitted to the inquiry that estimates of low koala numbers and community concern prompted the council to develop and endorse a koala conservation and management policy.¹³

Counting methodologies

2.13 Due to their natural tendency for dwelling high in the tree tops, koalas are inherently difficult to find in the wild.¹⁴ Koalas are not territorial and the home ranges

10 Threatened Species Scientific Committee, answer to question on notice, 1 August 2011 (received 10 August 2011), p. 2, www.aph.gov.au/Senate/committee/ec_ctte/koalas/submissions.htm (accessed 30 August 2011). Criterion 1 of the *Guidelines for Assessing the Conservation Status of Native Species according to the Environment Biodiversity and Conservation Act 1999 (the EPBC Act) and EPBC Regulations 2000*, specifies the period to be 'over the last 10 years or three generations, whichever is longer', p. 3. See: www.environment.gov.au/biodiversity/threatened/pubs/guidelines-species.pdf (accessed 21 July 2011).

11 Threatened Species Scientific Committee (TSSC), 'Letter to the Minister for Sustainability, Environment, Water, Population and Communities regarding the conservation status of the koala', 30 September 2010, p. 1, www.environment.gov.au/biodiversity/threatened/species/pubs/koala-tssc-letter.pdf (accessed 27 June 2011).

12 For example see: Sunshine Coast Regional Council, *Submission 24*, p. 1; Port Stephens Comprehensive Koala Plan of Management Steering Committee, *Submission 38*, pp 1–5; Coffs Harbour City Council, *Submission 45*, p.1; and Redland City Council, *Submission 46*, p. 1.

13 Redland City Council, *Submission 46*, p. 1.

14 Koala Research Network, *Submission 29*, p. 2.

of individuals extensively overlap.¹⁵ Koalas also tend to move little under most conditions, changing trees only a few times each day.¹⁶ Therefore exact counts of koalas are usually conducted in relatively small and discrete localities. Estimates of koala numbers in larger areas are typically achieved by extrapolation using a number of different methodologies, some of which are outlined below.

Absolute counts

2.14 Small areas with defined boundaries can be examined systematically with line searchers to count all koalas. Each tree and shrub capable of supporting a koala is examined and marked so as not to double count animals.

2.15 According to Dr Alistair Melzer, the critical assumption of this methodology is that all animals are found and counted.¹⁷ The search area must also be surveyed in one day to avoid complicating the count as animals move overnight. This limits the size of the area that can be searched.

Mark-resight

2.16 Koalas in a search area are caught and tagged with coloured ear tags before being released. After some period of time the habitat is surveyed and koalas are sighted with the number of tagged and untagged animals recorded. In its simplest form the proportion of re-sighted tagged animals to the total number of animals tagged is assumed to be the same as the proportion of all koalas sighted to the unknown total koala population, thus estimating the total population.¹⁸

2.17 Depending on the time between tagging and surveying, account needs to be taken of the death or emigration of tagged animals and the birth or immigration of new animals.¹⁹ The method assumes that an even mixing of animals occurs across the extent of the habitat. In theory this method can be used to estimate populations across relatively large areas but is limited by resources, access and infrastructure.

15 William Ellis, Alistair Melzer and Fred Bercovitch, 'Spatiotemporal dynamics of habitat used by koalas: The checkerboard model', *Behavioural Ecology and Sociobiology*, vol. 63, March 2009, p. 1181.

16 Threatened Species Scientific Committee, 'Advice to the Minister for Environment, Protection, Heritage and the Arts from the Threatened Species Scientific Committee on Amendment to the list of Threatened Species under the *Environment Protection and Biodiversity Conservation Act 1999*', p. 7, www.environment.gov.au/biodiversity/threatened/species/pubs/64971-listing-advice.pdf (accessed 28 June 2011).

17 Dr Alistair Melzer, *Submission 7*, p. 6.

18 Dr Alistair Melzer, *Submission 7*, pp 6–7.

19 Dr Alistair Melzer, *Submission 7*, p. 7.

Density from distance

2.18 Koalas are spotted during a systematic transect-based search of the target habitat. When a koala is sighted on or at a distance from the search route the perpendicular distance from the route to the koala is measured and recorded. The density of koalas is estimated from an analysis of the distances from the route to the koalas and the length of the route. It is assumed that animals above the transect will be detected and that detection declines with distance from the survey transect. The probability of detecting an animal with distance from the transect can be calculated.

2.19 According to Dr Melzer, koalas are suited to this survey method as they do not flee from the observer.²⁰ However skilled observers are required and a reasonable number of sightings is needed for meaningful estimations of density to be made. The method is suitable for surveying moderately large areas, though it is likely to be less useful or impractical in areas with low koala densities.²¹

Koala Habitat Atlas²²

2.20 The Australian Koala Foundation (AKF) has sought to formulate a repeatable methodology for calculating estimates of koala population size and distribution across eastern Australia. By developing a repeatable methodology the AKF hopes to produce 'baseline figures with which future population estimates could be compared and monitored'.²³

2.21 To this end the AKF has developed the Koala Habitat Atlas (KHA) for improving identification and ranking of koala habitat throughout New South Wales, Queensland and Victoria.²⁴

2.22 The KHA mapping is based on the Native Vegetation Information System (NVIS). The NVIS is a comprehensive database that provides information on the extent and distribution of vegetation types across the Australian landscape down to one square kilometre. The NVIS Version 1 that is used in the KHA delineates 23 major vegetation groups around Australia. Five of the major vegetation groups include tree species used by koalas: Eucalypt tall open forests, Eucalypt open forests, Eucalypt woodlands, Eucalypt open woodlands and Callitris forests and woodlands.²⁵ These five vegetation groups are then classified as potential koala habitat.

20 Dr Alistair Melzer, *Submission 7*, p. 7.

21 Dr Alistair Melzer, *Submission 7*, p. 7.

22 For further information on koala habitat see Chapter 3: Threats to koala habitat.

23 Australian Koala Foundation, *Submission 25*, Appendix 4, p. 3.

24 For an overview of the modelling process used to create the Koala Habitat Atlas see Australian Koala Foundation, *Submission 25*, Appendix 3: Revised koala status estimate June 2010, pp 1–16.

25 Australian Koala Foundation, *Submission 25*, Appendix 4, p. 4.

2.23 Using data on average koala home range size collected by the AKF or published in scientific papers, an estimate of koala abundance in potential koala habitat is achieved. This information is then used to create a population estimate.²⁶

2.24 According to the AKF, their scientific staff and assistants have compiled a database of 80 000 individually measured trees from 2000 field sites across the natural range of the koala.²⁷ The AKF also submitted that their database which is made available to all researchers is unprecedented in size and is a resource that 'does not come close to existing in the Government'.²⁸

2.25 The AKF stated that the both the NSW and Victorian governments have acknowledged the Koala Habitat Atlas.²⁹

2.26 The AKF acknowledged the use of 'fairly broad-scale data' in developing the KHA, because 'in some places in the country there is very little data'.³⁰ Respected koala expert, Dr Melzer, who reviewed the methodology, supported the AKF's broad method, stating that 'I am firmly of the view that the general approach taken here [the AKF's koala population methodology] is the only way to assess potential koala habitat on a continental basis'.³¹

2.27 Whilst commending the work of the AKF in compiling the Koala Habitat Atlas, Dr Melzer submitted that the data need to be treated with caution:

In general terms this [the Koala Habitat Atlas] is to identify discrete bioregional units, obtain available data on population density within the units and then extrapolate to the area of the mapped koala habitat within each unit. While there are many limitations to this approach *it remains the only effective approach to deriving such estimates*. However the results must be interpreted cautiously because the data behind the estimates is uncertain.³²

2.28 It has been argued that the mapping achieved through the NVIS does not resolve riparian communities adequately and some acacia communities that have a

26 Australian Koala Foundation, *Submission 25*, Appendix 4, p. 14.

27 Australian Koala Foundation, *Submission 25*, Appendix 3: Revised koala status estimate June 2010, p. 3.

28 Australian Koala Foundation, *Submission 25*, Appendix 3: Revised koala status estimate June 2010, p. 4.

29 Australian Koala Foundation, *Submission 25*, p. 6.

30 Ms Deborah Tabart, Australian Koala Foundation, *Committee Hansard*, 3 May 2011, p. 23.

31 Dr Alistair Melzer, quoted in Australian Koala Foundation, *Submission 25*, Appendix 6: Revised koala status estimate June 2010, p. 15.

32 Dr Alistair Melzer, *Submission 7*, p. 11. Italics in original. Associate Professor Clive McAlpine, Spokesperson, Koala Research Network also noted the uncertainties around the estimates: *Committee Hansard*, 3 May 2011, p. 3.

eucalypt component have been excluded.³³ According to Dr Melzer, 'as a result the approach will underestimate the extent of koala habitat – albeit expected to support low density populations'.³⁴

2.29 Dr Melzer also submitted that the AKF's use of data from a range of published and unpublished sources that use different methodologies also present issues of comparability. The use of data sources from different time periods fails to take into account changes to population size since the data was published.³⁵

2.30 In response to a question on notice, the TSSC described the KHA methodology as 'complex' but noted that this may be necessarily so:

This is a complex approach, with many assumptions for each step, and where the consequences of inaccuracies or flawed assumptions may be magnified in subsequent steps of the calculations. Again, to be fair, any attempt at national population estimate for koalas may necessarily be complex and require a series of potentially flawed and compounding assumptions.³⁶

2.31 The AKF acknowledged these sorts of criticisms, noting that:

Whilst the methodology is open to criticism and will require ongoing refinement, the AKF holds that it draws credibility by incorporating the best available data from a wide range of sources. It provides a starting point for future monitoring programs and a sound basis for refining population estimates in collaboration with koala researches through the koala's remaining geographic range.³⁷

Geo-plotting

2.32 The committee received evidence from Ms Carolyn Beaton, a former employee of the Australia Zoo Wildlife Hospital, who has created a website that uses geographic information system (GIS) software to capture data of koala sightings Australia-wide.³⁸ Once registered with the website 'Koala Diaries', members of the public are able to pinpoint the exact location of a koala sighting and then load this information onto a central database and map. Since the creation of the website in

33 Dr Alistair Melzer, *Submission 7*, p. 11. A riparian community is a plant habitat that occurs on the banks of water courses.

34 Dr Alistair Melzer, *Submission 7*, p. 11.

35 Dr Alistair Melzer, *Submission 7*, p. 11.

36 Threatened Species Scientific Committee, answer to question on notice, 1 August 2011 (received 10 August 2011), p. 4. Further commentary by the TSSC about the AKF's population estimate is included below.

37 Australian Koala Foundation, *Submission 25*, Appendix 3: Revised koala status estimate June 2010, p. 15.

38 Ms Carolyn Beaton, *Submission 32*, p. 1.

February 2010, the website has recorded 2087 sightings mainly from South-East Queensland.³⁹

2.33 This method of surveying koalas does not attempt to provide an estimate of the national koala population. Individual koalas may be counted and plotted several times under this methodology. However the aim of the website is to utilise 'community knowledge and grassroots efforts' to better understand koalas and their habitat in a single national database of koala sightings.⁴⁰

Anecdotal evidence

2.34 Due to the difficulty, cost and logistics of conducting extensive counts of koala numbers across more than one million square kilometres of the koalas range, the committee received many anecdotal examples of the decline of regional koala populations.⁴¹ The University of Queensland Koala Ecology Group stated that:

Koala population estimates have, in the past relied generally on indirect methods of assessment, probably as a result of a lack of funding limiting more comprehensive investigations.⁴²

2.35 Often community members who had resided in the same location for a number of years would quote a decline in hearing and seeing koalas. For example, the Port Stephens Comprehensive Koala Plan of Management Steering Committee submitted that:

Anecdotally, many long term residents of Port Stephens LGA note that they would frequently see koalas on and around their properties 5–7 years ago and for the last two years koalas have rarely been sighted.⁴³

2.36 The federal and state governments, research scientists, industry peak bodies and the Australian Koala Foundation have all recognised the need to move away from anecdotal estimates of koala populations.⁴⁴ The Koala Research Network put to the

39 Ms Caroline Beaton, Co-founder and Administrator, Koala Diaries, *Proof Committee Hansard*, 3 May 2011, p. 37.

40 Ms Caroline Beaton, Co-founder and Administrator, Koala Diaries, *Proof Committee Hansard*, 3 May 2011, p. 37.

41 For example see: Mrs Vicki Green, *Submission 21*, p. 1; Mr Steve Morvell, *Submission 28*, p. 2; Mr Ian Pratt, *Submission 30*, p. 2; Port Stephens Comprehensive Koala Plan of Management Steering Committee, *Submission 38*, p. 4; Mr Ian Harling, *Submission 40*, p. 1; Ms Iris Bryce, *Submission 43*, p. 1; Mr Chris Degenhardt, *Submission 44*, p. 1; Name withheld, *Submission 59*, p. 4; and Mr Ian Bridge, *Submission 66*, p. 2.

42 University of Queensland Koala Ecology Group, *Submission 42*, p.2.

43 Port Stephens Comprehensive Koala Plan of Management Steering Committee, *Submission 38*, p. 2.

44 For example see: Australian Koala Foundation, *Submission 25*, p. 4; Koala Research Network, *Submission 29*, p. 2; Property Council of Australia, *Submission 39*, p. 4; University of Queensland Koala Ecology Group, *Submission 42*, p.2; and Department of Environment and Resource Management, Queensland Government, *Submission 79*, p. 5.

committee that 'it is becoming increasingly important to develop national standards and guidelines for assessing...koala populations'.⁴⁵

Air-borne tracking

2.37 Developments in technology may allow for air-borne tracking of koala populations using infrared detectors. This technique may have benefits for assessing koala populations over large areas and in habitats where density is low.⁴⁶

Community involvement

2.38 Many of the methods used for counting koalas and estimating population numbers require many hours of fieldwork. The committee received a number of submissions demonstrating the high degree of community interest and involvement in undertaking this work.⁴⁷ For example, Mr Chris Allen, who has a long history of involvement in koala conservation in NSW, submitted that:

The level of voluntary involvement in agency-managed koala surveys in the [southern NSW] region, in which more than 300 volunteers have contributed to more than 800 days of fieldwork since 2007, is a testament to the local community's commitment to the koalas...Survey teams have searched for koala pellets through bush litter under more than 27 000 trees at more than 900 grid sites, enabling assessment of koala distribution and abundance over more than 35 000 ha of public and privately owned forests.⁴⁸

Spot Assessment Technique – a habitat mapping methodology

2.39 In contrast to the various counting techniques listed above, the Spot Assessment Technique (SAT) was developed by the AKF in 1995 to determine preferred tree species for koalas and to measure koala activity at a particular site.⁴⁹

2.40 The method involves assessing koala activity within the immediate area surrounding a preferred koala food tree. A tree with a breast height diameter of at least 100 millimetres is selected as the centre of the search plot. The 29 nearest trees with a similar minimum size are also included in the plot. A systematic search for koala

45 Koala Research Network, *Submission 29*, p. 2.

46 Dr Alistair Melzer, *Submission 7*, p. 7.

47 For example see: Mr Robert Summers, *Submission 19*, p. 2; Mr Chris Allen, *Submission 35*, p. 5; Ms Deborah Tabart OAM, Chief Executive Officer, Australian Koala Foundation, *Proof Committee Hansard*, 5 May 2011, p. 21.

48 Mr Chris Allen, *Submission 35*, p. 5.

49 Stephen Phillips and John Callaghan, 'The Spot Assessment Technique: Determining the importance of habitat utilisation by koalas (*Phascolarctos cinereus*)', Australian Koala Foundation, Brisbane, p. 3.

faecal pellets within a one metre radius of each tree is then conducted. The search for faecal pellets continues for two minutes, or until evidence of koalas is found.⁵⁰

2.41 The activity level for a SAT plot is expressed as a percentage equivalent of the number of surveyed trees that had evidence of koalas. For example, a sample of 30 trees of which 15 showed evidence of koalas, the resulting activity level would be determined as 50 per cent. Trees are then able to be ranked as either a primary or secondary koala tree species or a supplementary species.

2.42 According to the AKF, this method 'does not attempt to predict the abundance or density of local koala populations'.⁵¹ Instead the SAT is:

...suitable for use in conjunction with land-use planning activities and/or policies that require Koalas and their habitat to be assessed, especially where identification of important areas for protection and management is required.⁵²

2.43 The Port Stephens Comprehensive Koala Plan of Management Steering Committee criticised the SAT methodology as it indicates the presence of koalas in the past but gives no indication of more recent activity.⁵³ Koala scats are also difficult to age and are affected by rain and decomposition.⁵⁴

2.44 Koala researchers at the University of Queensland also raised concerns about the SAT technique:

Recent data confirm that reliance on scat presence to estimate tree species preference by koalas is not sufficient and in many cases inaccurate (Ellis et al. 1998; Matthews et al. 2007) and unfortunately this condemns some former research and predictions based on this principle. With the greater sophistication and the use of appropriate methods such as diet determination from faecal pellet analysis (Ellis et al. 1999), there is greater confidence in habitat predictions from recent studies.⁵⁵

50 For further information on the Spot Assessment Technique see: Stephen Phillips and John Callaghan, 'The Spot Assessment Technique: determining the importance of habitat utilisation by koalas (*Phascolarctos cinereus*)', Australian Koala Foundation, Brisbane.

51 Australian Koala Foundation, 'Koala Habitat Atlas', www.savethekoala.com/kha.html (accessed 30 June 2011).

52 Stephen Phillips and John Callaghan, 'The Spot Assessment Technique: determining the importance of habitat utilisation by koalas (*Phascolarctos cinereus*)', Australian Koala Foundation, Brisbane, p. 7.

53 Port Stephens Comprehensive Koala Plan of Management Steering Committee, *Submission 38*, p. 4.

54 Port Stephens Comprehensive Koala Plan of Management Steering Committee, *Submission 38*, p. 4.

55 University of Queensland Koala Ecology Group, *Submission 42*, p. 3.

2.45 The AKF submitted that whilst there has been some criticism of the SAT methodology in the literature:

...given the desire to develop a rapid and cost effective assessment methodology, and given that the results of SAT sampling generally reflect the scientific consensus with regards to important koala habitats, we feel that the SAT has merit.⁵⁶

Preferred method

2.46 Many submitters stated that there is no best method for counting koala populations. According to the Koala Research Network, 'the selection of the method depends upon the questions being asked'.⁵⁷

2.47 In a similar vein, the University of Queensland Koala Ecology Group advised the committee that a combination of a number of methods is sometimes the most accurate way of determining koala activity and populations size:

The indirect methods of estimating koala demographics – e.g. using scat presence – are limited and unreliable, but they still provide unequivocal evidence of koala presence. Newer survey methods that combine scats, signs, sounds, visual confirmation (e.g. density from distance, airborne heat detection) are being applied in a few long term reference sites across the range of the koala.⁵⁸

Historical estimates of Australia's koala population

2.48 It is estimated that the koala population prior to European settlement was in the order of up to 10 million koalas.⁵⁹

2.49 Not long after European settlement, koala numbers experienced a 'severe decline'. According to the *National Koala Conservation and Management Strategy 2009–2014*:

...clearing of habitat for agriculture in combination with hunting, disease, fire and drought resulted in a severe population decline. By the late 1930s they were considered extinct in South Australia and severe declines had occurred in New South Wales, Victoria and Queensland. However, in the

56 Australian Koala Foundation, *Submission 25*, Appendix 4: Koala Population Estimates Explanation of Methodology & Recommendations to the Threatened Species Scientific Committee (TSSC) Threatened Species Assessment of *Phascolarctos cinereus* (Koala), 2010, p. 7.

57 Koala Research Network, *Submission 29*, p. 2.

58 University of Queensland Koala Ecology Group, *Submission 42*, p. 3.

59 See: Australian Koala Foundation, *Submission 25*, p. 3; and Bill Phillips, *Koalas: The little Australians we'd all hate to lose*, Australian Government Publishing Service, Canberra, 1990, pp 20–26.

late 1930s the fur trade ceased and state governments were introducing protective measures...⁶⁰

2.50 In his book *Koalas: The little Australians we'd all hate to lose*, author Bill Phillips provides a detailed picture of the reasons for the decline in the koala population following European settlement. Phillips states that '...during the late nineteenth and early twentieth centuries the fur trade was responsible for the death of several million koalas'.⁶¹ The poisoning and wire snaring of koalas devastated populations in South Australia and Victoria and numbers in New South Wales were declining.⁶²

2.51 Open hunting seasons on the koala were declared in Queensland in 1915, 1917 and 1919. Between 1 April and 30 September 1919 it was estimated that one million koala skins were gathered.⁶³ The last open season on koalas occurred in Queensland in 1927 with approximately 584 000 koalas killed.⁶⁴

2.52 According to Phillips, by the 1930s the state of the koala population had been severely depleted such that:

...koalas were considered extinct in South Australia. There were apparently only hundreds in New South Wales, thousands in Victoria, and but ten thousand left in Queensland. While the accuracy of these estimates is uncertain, they give an indication of the extent to which koalas were decimated by the fur trade, disease and the clearing of forests for grazing and cultivation.⁶⁵

2.53 By the late 1930s the fur trade had ceased and state governments had introduced legislation to provide limited protection to koalas. The first state to introduce protective measures for koalas was Victoria in 1898. New South Wales

60 National Resource Management Ministerial Council, *National Koala Conservation and Management Strategy 2009–2014*, December 2009, p. 12.

61 Bill Phillips, *Koalas: The little Australians we'd all hate to lose*, Australian Government Publishing Service, Canberra, 1990, p. 25.

62 According to Phillips, the poisoning and snaring of koalas was the method preferred by hunters for collecting koala pelts as shooting koalas would damage their fur. See Bill Phillips, *Koalas: The little Australians we'd all hate to lose*, Australian Government Publishing Service, Canberra, 1990, p. 21.

63 Bill Phillips, *Koalas: The little Australians we'd all hate to lose*, Australian Government Publishing Service, Canberra, 1990, p. 22.

64 Bill Phillips, *Koalas: The little Australians we'd all hate to lose*, Australian Government Publishing Service, Canberra, 1990, p. 22.

65 Bill Phillips, *Koalas: The little Australians we'd all hate to lose*, Australian Government Publishing Service, Canberra, 1990, p. 26.

followed suit in 1903 with the Native Animals Protection Act. In South Australia koalas became protected under the Animals Protection Act of 1912.⁶⁶

2.54 Translocation programs were also used to re-establish koala colonies in their former range. Animals from French Island and Phillip Island were used to reintroduce populations to mainland Victoria and to a lesser extent South Australia and the Australian Capital Territory.⁶⁷ In South Australia, populations were also introduced at various stages during the twentieth century to regions outside their original distribution: Kangaroo Island in the 1920s, Adelaide Hills in the 1930s to 1970s and the Eyre Peninsula in 1969.⁶⁸

Historical variations

2.55 According to Dr Alistair Melzer, the uneven distribution of the national koala population probably predates European settlement of the Australian landscape and likely 'reflects the variability in plant communities and associated nutrient and moisture regimes'.⁶⁹ Historically, the koala has also been known to go through fluctuations in its population. The TSSC gave the specific example of the Federation drought:

The koala recovered from the “Federation” drought across central Queensland with sufficient speed and extent to be the subject of intensive hunting and harvesting programs within 20–30 years of the drought’s cessation. In that region, the Federation drought was at least comparable – if not more extreme – than the most recent drought...

In addition, there was substantial land clearance (by extensive ring-barking), hunting and poisoning immediately prior to and following the Federation drought. It is therefore reasonable to assume that the koala has evolved to cope with considerable climatic fluctuation, and should recover from this most recent drought.⁷⁰

66 Bill Phillips, *Koalas: The little Australians we'd all hate to lose*, Australian Government Publishing Service, Canberra, 1990, p. 22.

67 Natural Resource Management Ministerial Council, *National Koala Conservation and Management Strategy 2009–2014*, Department of Environment, Heritage and the Arts, Canberra, 2009, p. 12, www.environment.gov.au/biodiversity/publications/koala-strategy/pubs/koala-strategy.pdf (accessed 30 June 2011).

68 Natural Resource Management Ministerial Council, *National Koala Conservation and Management Strategy 2009–2014*, Department of Environment, Heritage and the Arts, Canberra, 2009, p. 12.

69 Dr Alistair Melzer, *Submission 7*, p. 5.

70 Threatened Species Scientific Committee, answer to question on notice, 1 August 2011 (received 10 August 2011), p. 9. The footnotes that appear in the original quote have not been reproduced.

2.56 However, Dr John Woinarski, who appeared before the committee as a member of the TSSC, qualified the comparison between the Federation drought and the most recent one, saying:

All such climatic fluctuations are different. Immediately following the Federation drought there was a series of hunting episodes and episodes of clearing in Queensland as well. It is likely that the cocktail of factors this time around [increasing human population, land clearance, dog numbers] may be more damaging, yes.⁷¹

2.57 A number of koala specialists, Professor Frank Carrick, Dr Alistair Melzer, Dr Bill Ellis and Dr Sean Fitzgibbon, disputed the TSSC's characterisation of the fluctuation of the koala population:

Whilst we concur [with the TSSC's evidence that] "Assessment of the koala is neither straightforward nor simple", the assertion that "historically, koala populations have shown very substantial fluctuations" neglects the context that most of the observed "fluctuations" have been population crashes associated with anthropogenically driven factors such as profligate hunting and major disease epizootics [a disease that rapidly affects many animals in a specific area at the same time] following hard on the heels of major habitat destruction episodes...⁷²

Early population surveys

2.58 The first national survey of the koala population was conducted from 1986 to 1987 by the National Parks and Wildlife Service. The *National Koala Survey* did not set out to estimate the total number of koalas in the wild. Rather it was designed to pin point locations where koalas warranted special attention and to make an informed assessment of the conservation status of the species on a national basis. The survey also collected information on the preferred tree species of koalas, the dominant land use surrounding koala habitat and the prevalence of disease in koalas.⁷³

2.59 The *National Koala Survey* identified a total of 3145 sites where koalas were either observed or thought to be present from tell-tale signs.⁷⁴ The survey found that in the southern states, koalas had recovered from being extinct in South Australia and near-extinct in Victoria to have flourishing populations. The survey noted that the

71 Dr John Woinarski, Member, Threatened Species Scientific Committee, *Committee Hansard*, 1 August 2011, p. 47.

72 Professor Frank Carrick, Dr Alistair Melzer, Dr Bill Ellis and Dr Sean Fitzgibbon, *Submission 101*, p. 6.

73 For further information on the National Koala Survey see Bill Phillips, *Koalas: The little Australians we'd all hate to lose*, Australian Government Publishing Service, Canberra, 1990, pp 31–50.

74 Bill Phillips, *Koalas: The little Australians we'd all hate to lose*, Australian Government Publishing Service, Canberra, 1990, p. 49.

Kangaroo Island and French Island populations had to be reduced through translocations and that 'the future of koalas in southern Australia should be assured'.⁷⁵

2.60 The survey identified that at the northern end of their range, koalas are most abundant in the north-east corner of New South Wales and the south-east corner of Queensland. The survey further noted that:

Both areas have rapidly expanding urban centres likely to threaten habitat occupied by koalas. Unless land management practices takes account of the habitat needs of koalas then local extinctions are inevitable.⁷⁶

2.61 However for the species to survive in the long-term, the *National Koala Survey* believed that the ability of koalas to repopulate in southern Australia was evidence that koala populations 'can be managed, if necessary, to augment dwindling populations or to recolonise areas which once supported koalas'.⁷⁷

Current estimates of Australia's koala population

National estimates

2.62 More recently, and despite the cessation of the koala fur trade, Australia's koala population has 'undergone marked decline over three generations'.⁷⁸ These marked population declines are due to '...extensive habitat clearing and fragmentation...disease, fire, drought and, more recently road deaths and predation by dogs'.⁷⁹

2.63 However despite widespread recognition of this worsening trend, the 'national population of the koala remains unclear...'⁸⁰ According to their most recent advice to the Commonwealth environment minister in 2010, the Threatened Species Scientific Committee stated that:

75 Bill Phillips, *Koalas: The little Australians we'd all hate to lose*, Australian Government Publishing Service, Canberra, 1990, p. 49.

76 Bill Phillips, *Koalas: The little Australians we'd all hate to lose*, Australian Government Publishing Service, Canberra, 1990, p. 49.

77 Bill Phillips, *Koalas: The little Australians we'd all hate to lose*, Australian Government Publishing Service, Canberra, 1990, p. 49.

78 Threatened Species Scientific Committee, letter to Minister for Sustainability, Environment, Water, Population and Communities, September 2010, Department of Sustainability, Environment, Water, Population and Communities, *Submission 73, Attachment C*, p. 1.

79 National Resource Management Ministerial Council, *National Koala Conservation and Management Strategy 2009–2014*, December 2009, p. 2.

80 National Resource Management Ministerial Council, *National Koala Conservation and Management Strategy 2009–2014*, December 2009, p. 18.

There is at present no published scientifically peer-reviewed estimate of the total number of koalas in Australia and no definitive past estimate within an appropriate timeframe to enable comparison.⁸¹

2.64 The *National Koala Conservation and Management Strategy 2009–2014* notes that 'deriving reliable broad-scale koala population estimates remains very difficult, so the national population of the koala remains unclear at this stage'.⁸² The strategy notes that:

At a national level, it may be more realistic to estimate the extent of habitat loss, fragmentation and modification and declines in distribution as indicators of koala population declines rather than population *per se*.⁸³

2.65 Whilst the overall size of the national population appears to be uncertain, it was widely stated by the majority of submitters that a significant number of local and regional koala populations are declining.⁸⁴ Drought, climatic extremes, loss of critical habitat, urbanisation and disease were the main reasons quoted for the decline of koala numbers.⁸⁵

2.66 Estimates of koala numbers have been gathered at specific locations rather than across the nation as a whole and have used a variety of different counting methods. Professor McAlpine, spokesperson for the Koala Research Network, explained to the committee:

We do not know confidently the number of the overall koala population in Australia. There are estimates of regional populations which we know reasonably well, such as in parts of south-east Queensland and in western Queensland, but overall I do not think we can confidently say what the numbers are.⁸⁶

2.67 Dr Bill Ellis explained to the committee the funding constraints faced by researchers in estimating koala numbers:

81 Threatened Species Scientific Committee, *Advice to the Minister for Environment, Protection, Heritage and the Arts from the Threatened Species Scientific Committee (the Committee) on Amendment to the list of Threatened Species under the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)*, September 2010, p. 20.

82 Natural Resource Management Ministerial Council, *National Koala Conservation and Management Strategy 2009–2014*, Department of Environment, Heritage and the Arts, Canberra, 2009, p. 18.

83 Natural Resource Management Ministerial Council, *National Koala Conservation and Management Strategy 2009–2014*, Department of Environment, Heritage and the Arts, Canberra, 2009, p. 18.

84 For example see: Koala Research Network, *Submission 29*, p. 2.

85 For further information on drought and climatic extremes see Chapter 3: Threats to koala habitat.

86 Associate Professor Clive McAlpine, Spokesperson, Koala Research Network, *Committee Hansard*, 3 May 2011, p. 3.

The issue for us there is that we do not have the resources to go out and count all of the koalas to get that sort of a number. All of our studies are focused on particular areas...⁸⁷

2.68 The most widely quoted estimate of the national koala population comes from the AKF which estimates that there are between 43 515 and 84 615 koalas left in the wild.⁸⁸ This range was broadly supported by Professor McAlpine, Spokesperson, Koala Research Network, who stated:

There were once millions of koalas in Australia; now there are probably no more than somewhere between 50,000 and 100,000, but we cannot confidently say what those numbers are.⁸⁹

2.69 As noted above, koala experts such as Dr Melzer submitted that the AKF figure must be 'interpreted cautiously because the data behind the estimates is uncertain.'⁹⁰

2.70 While recognising and welcoming 'the attempt by the AKF to provide a national, systematic and integrated approach to koala distributional modelling, habitat preference and population assessment' the TSSC critiqued the AKF's estimate saying that it was not based on peer reviewed science. Other concerns raised by the TSSC were that the AKF's population estimate excludes all koalas living in South Australia and, as discussed above, the methodology used to arrive at the overall estimate.⁹¹

2.71 The AKF disputed the TSSC's claim that it did not rely on peer reviewed science, submitting that:

In designing the methodological steps outlined below, AKF has drawn on the collective research funded and managed by the AKF under the auspices of many eminent koala scientists...in Australia.⁹²

2.72 The Commonwealth government does not have a definite estimate of the national koala population as an alternative to the AKF's estimate.⁹³ In its advice to the Environment Minister the TSSC estimated the koala population is 'greater than 200 000 individuals, with large populations in a number of locations over four

87 Dr Bill Ellis, Koala Specialist, Koala Research Network, *Committee Hansard*, 3 May 2011, p. 4.

88 Australian Koala Foundation, *Submission 25*, p. 4.

89 Associate Professor Clive McAlpine, Spokesperson, Koala Research Network, *Committee Hansard*, 3 May 2011, p. 3.

90 Dr Alistair Melzer, *Submission 7*, p. 11.

91 Threatened Species Scientific Committee, answer to question on notice, 1 August 2011 (received 10 August 2011), pp 4–5.

92 Australian Koala Foundation, *Submission 25*, p. 4.

93 Australian Koala Foundation, *Submission 25*, p. 3. Appendix 2 of the AKF submission provides a list of koala research funded by the foundation.

states.⁹⁴ However, other than some sporadic information about individual regional or state populations, the TSSC provided the environment minister with very little other information about the national koala population.

2.73 During the inquiry the committee sought further information from the TSSC on this important issue. In response to questions on notice, the TSSC indicated that:

Based on information presented at our commissioned workshop, and published and unpublished information, we estimated the koala abundance across all regions within their range, at the time of assessment and about 20 years previously. We concluded that the national koala population in 1990 was about 430,000, and in 2010 was about 300,000, a decline of about 31%. Based on more recent information made available since our assessment, we estimate that a plausible lower bound for the current national koala population is about 200,000 individuals. If regions in which the recent koala decline has been driven primarily by drought are excluded from consideration, we estimate that the decline over the rest of the range between 1990 and 2010 is about 16%.⁹⁵

2.74 Several state governments have prepared state-wide population estimates which are mentioned below.

2.75 The problems with current estimates of koala population numbers are discussed in later in this chapter.

Queensland

2.76 The Threatened Species Scientific Committee noted that the current koala population estimate in Queensland is 'problematic because of the koala's wide distribution to the north and west, and the lack of quantitative data in those regions'. The TSSC judged that 'a reasonable estimate baseline (i.e. three generations ago) figure for Queensland is approximately 300 000 koalas with a plausible range of 180 000 to 550 000'.⁹⁶ The TSSC did not provide a comparable figure for the current Queensland koala population.

2.77 Since 1994 the Queensland state government has solely or jointly funded research into estimating koala populations in the south-east of the state. Surveys of

94 Threatened Species Scientific Committee, *Advice to the Minister for Environment, Protection, Heritage and the Arts from the Threatened Species Scientific Committee (the Committee) on Amendment to the list of Threatened Species under the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)*, September 2010, p. 28.

95 Threatened Species Scientific Committee, answer to question on notice, 1 August 2011 (received 10 August 2011), p. 2.

96 Threatened Species Scientific Committee, *Advice to the Minister for Environment, Protection, Heritage and the Arts from the Threatened Species Scientific Committee (the Committee) on Amendment to the list of Threatened Species under the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)*, September 2010, p. 25.

koala populations have concentrated on the 'Koala Coast'⁹⁷ and Pine Rivers areas. Data are not available for other significant populations in the state, although the government believes that:

...in areas where land use is undergoing similar changes to those occurring in the south-east, it is expected that koala population dynamics will reflect those of the Koala Coast and Pine Rivers.⁹⁸

2.78 The survey method used by the Queensland government includes habitat stratification and intensive, systematic daytime searches of strip transect. Geographic information system and remote sensing methodologies are also used to assess the koala habitat component of the regional koala abundance estimates. According to the government:

This approach allows for the identification and determination of habitat areas for conservation based on where koalas actually occur rather than identifying distributions of 'preferred' tree species or community reports.⁹⁹

2.79 The 2008 Queensland government survey of the Koala Coast koala population estimated a 51 per cent decline in just three years and a 64 per cent decline in ten years. Koala numbers have dropped from an estimate of 4611 koalas in 2005–2006 to just 2279 in 2008.¹⁰⁰ An earlier survey in 1996–1999 estimated that there were 6246 koalas.¹⁰¹

2.80 A mapping and surveying project found that koala densities in the Pine Rivers area had declined by 45 per cent in urban areas and by 15 per cent in bushland sites.¹⁰²

2.81 The Queensland government has committed \$2.5 million in funding over five years to expand the surveying and monitoring of koala populations across the south-east Queensland region.¹⁰³ Monitoring of koala populations will also commence at Ipswich and Oakey.

97 The Koala Coast encompasses most of the local government area of Redland City Council, along with parts of Brisbane City Council and Logan City Council.

98 Department of Environment and Resource Management, Queensland Government, *Submission 79*, p. 3.

99 Department of Environment and Resource Management, Queensland Government, *Submission 79*, p. 7.

100 Department of Environment and Resource Management, Queensland Government, *Submission 79*, p. 6.

101 Department of Environment and Resource Management, Queensland Government, *Submission 79*, p. 6. See also Redland City Council, *Submission 46*, p. 1.

102 Department of Environment and Resource Management, Queensland Government, *Submission 79*, p. 6.

103 Department of Environment and Resource Management, Queensland Government, *Submission 79*, p. 6.

2.82 The Threatened Species Scientific Committee made the following assessment of the broader coastal south east Queensland region:

Koala populations in all SEQ coastal local government areas (Sunshine Coast; Moreton Bay; Brisbane; Redland; Logan; and Ipswich) appear to be following a similar downward trend to the Koala Coast and Pine Rivers populations, as evidenced by a rapid increase in the numbers of sick, injured and dead koalas, followed by a decline in koala numbers. Further north, koala populations are less well known, often becoming known as a result of development applications, but are generally considered to be at low density (<0.2 koalas/ha) (White et al. 2005; Queensland EPA 2006).¹⁰⁴

2.83 In other parts of the state, Dr Gregory Baxter of the Koala Research Network informed the committee of an 80 per cent population decline in the western mulga regions of Queensland:

...where we do have good estimates, like in the mulga lands in western Queensland, we found that there was probably about 60,000 koalas there in the mid-90s. We have just gone back and done the methodology in the same way and there are probably only about 11,000 or 12,000 there now in the same place. So everywhere we do have good data we find the same trend—it is going down—so there is no reason to expect that in places where we do not have the data there is something different going on. I think it is probably uniform across the country.¹⁰⁵

2.84 The committee also heard evidence from Dr Bill Ellis of a koala population in Springsure where current surveys indicate that koala numbers have declined by 95 per cent as compared to figures from the 1970s.¹⁰⁶

New South Wales

2.85 Koalas were formerly widespread in New South Wales. According to the former NSW Department of Environment, Climate Change and Water, remaining populations are now concentrated on the central, mid-north and north coasts, and in the north-west part of the state.¹⁰⁷ Small and isolated populations also occur on the south and far south coasts, and on the table lands of the Great Dividing Range.

104 Threatened Species Scientific Committee, *Advice to the Minister for Environment, Protection, Heritage and the Arts from the Threatened Species Scientific Committee (the Committee) on Amendment to the list of Threatened Species under the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)*, September 2010, p. 25.

105 Dr Gregory Baxter, Koala Research Network, *Committee Hansard*, 3 May 2011, p. 3.

106 Dr William Ellis, Koala Specialist, Koala Research Network, *Committee Hansard*, 3 May 2011, p. 4.

107 New South Wales Department of Environment, Climate Change and Water, *Submission 78*, p. 1. In April 2011, most of the functions of the Department of Environment, Climate Change and Water were transferred to the Office of Environment and Heritage within the NSW Premier's department.

2.86 Submitters such as Professor Carrick drew the committee's attention to a series of documented local extinctions in NSW.¹⁰⁸ The *NSW Recovery Plan for the Koala* also states that 'surveys in New South Wales indicate that since 1949, populations of koalas have been lost from many localities, particularly on the southern and western edges of their distribution'.¹⁰⁹

2.87 According to the *NSW Recovery Plan for the Koala*, 'there have been no studies to estimate the size of the NSW koala population'.¹¹⁰ The population estimates that do exist for the state are described as being 'reasonable guesses and each can be justified'.¹¹¹

2.88 It has been speculated that the koala population in New South Wales could be between 1000 and 10 000 individuals however this figure is disputed.¹¹² The TSSC told the committee that their estimates for the koala population in the state was 'at least 30 000 on public land'.¹¹³ The TSSC however did not reveal how they arrived at this figure.

2.89 The *NSW Recovery Plan for the Koala* recognises the value of estimating the population size in NSW, however of a higher priority to the New South Wales government is assessing changes in distribution and not numbers.¹¹⁴

Australian Capital Territory

2.90 The committee did not receive any specific evidence on the state of the koala population in the ACT. According to the Threatened Species Scientific Committee, the koala population of the ACT is likely to be very small.¹¹⁵ There have been at least

108 Professor Frank Carrick, *Submission* 86, p. 26. See also Dr Jon Hanger, *Committee Hansard*, 3 May 2011, p. 15.

109 Department of Environment and Climate Change NSW, *NSW Recovery Plan for the Koala*, Department of Environment and Climate Change NSW, November 2008, p. 1.

110 Department of Environment and Climate Change NSW, *NSW Recovery Plan for the Koala*, Department of Environment and Climate Change NSW, November 2008, p. 10.

111 Department of Environment and Climate Change NSW, *NSW Recovery Plan for the Koala*, Department of Environment and Climate Change NSW, November 2008, p. 11.

112 Department of Environment and Climate Change NSW, *NSW Recovery Plan for the Koala*, Department of Environment and Climate Change NSW, November 2008, p. 11.

113 Dr John Woinarski, Member, Threatened Species Scientific Committee, *Proof Committee Hansard*, 1 August 2011, p. 50.

114 Department of Environment and Climate Change NSW, *NSW Recovery Plan for the Koala*, Department of Environment and Climate Change NSW, November 2008, p. 11.

115 Threatened Species Scientific Committee, *Advice to the Minister for Environment, Protection, Heritage and the Arts from the Threatened Species Scientific Committee (the Committee) on Amendment to the list of Threatened Species under the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)*, September 2010, p. 25.

six introductions from Victoria but no large or dense populations have ever become established.

Victoria

2.91 According to the Victorian government, there is currently no accurate estimate for the koala population in the state because the species is 'so widespread, is difficult to accurately census, and occurs at widely variant population densities'.¹¹⁶

2.92 The TSSC estimated that there are approximately 73 500 koalas in Victoria and this population is largely 'a function of the translocation program that has been operating for several decades.'¹¹⁷

2.93 In its submission the Victorian government noted the TSSC's estimate of the state population. The government however stated that monitoring sites in Victoria currently represent less than 1 per cent of the total koala habitat in the state and that the TSSC 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 these estimates were highly conservative.¹¹⁸

2.94 The Victorian government also submitted that at sites where koala populations are overabundant, animals are being treated with contraception to limit their numbers:

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 contraception implants adapted for the Koala...¹¹⁹

2.95 Despite the overabundance of koalas in certain parts of Victoria (such as French Island, Raymond Island, the Otway Ranges and Mt Eccles), the government recognised that koalas are not 'flourishing everywhere in Victoria'.¹²⁰

116 State of Victoria, *Submission 97*, p. 2.

117 Threatened Species Scientific Committee, *Advice to the Minister for Environment, Protection, Heritage and the Arts from the Threatened Species Scientific Committee (the Committee) on Amendment to the list of Threatened Species under the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)*, September 2010, p. 21.

118 State of Victoria, *Submission 97*, p. 2.

119 State of Victoria, *Submission 97*, p. 2.

120 State of Victoria, *Submission 97*, p. 2.

2.96 Koala populations with less than one animal per hectare exist across central Victoria, the Strathbogie Plateau, the lower Glenelg River region, the Bendigo-Ballarat region and in south Gippsland.¹²¹

2.97 The committee also received evidence of the rapidly declining koala populations on the once over-populated Phillip Island. Phillip Island Nature Parks submitted to the committee that the koala population on Phillip Island has declined dramatically over the past three decades from 847 koalas in 1973 to 13 koalas in 2006.¹²²

2.98 The committee also heard that a genetically diverse and significant koala population resides in the Strzelecki Ranges:

The Strzelecki koala population has high levels of genetic variability which have been detected by rare and unique genetic markers. These animals are statistically differentiated from other Australian populations and therefore constitute a separate management unit.¹²³

2.99 No population surveys have been conducted on the Strzelecki population.¹²⁴

South Australia

2.100 In South Australia, the natural range of the koala is restricted to the south-east of the state. After being presumed extinct in the state in the 1920s, the koala population was reintroduced to its natural range with animals from Victoria.¹²⁵ Koalas were also translocated to areas outside of their natural range, namely to: Kangaroo Island, Lower Eyre Peninsula, Adelaide's Mount Lofty Ranges and the Riverland regions. Today in some areas they are increasing in number and overabundant in other areas.¹²⁶ For example the TSSC stated that the density of the koala population on

121 Mr Peter Menkhorst, Department of Sustainability and Environment, *Proof Committee Hansard*, 1 August 2011, p. 30.

122 Phillip Island Nature Parks, *Submission 80*, p. 2.

123 Friends of the Earth Melbourne, *Submission 50*, p. 6.

124 Mr Anthony Amis, Land Use Researcher, Friends of the Earth, *Proof Committee Hansard*, 1 August 2011, p. 9. More information on the Strzelecki koalas is included in chapter 3.

125 Threatened Species Scientific Committee, *Advice to the Minister for Environment, Protection, Heritage and the Arts from the Threatened Species Scientific Committee (the Committee) on Amendment to the list of Threatened Species under the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)*, September 2010, p. 4.

126 Department of Environment and Natural Resources, Government of South Australia, *Submission 77*, p. 1.

Kangaroo Island is putting 'unsustainable browsing pressure' on preferred tree species.¹²⁷

2.101 Koalas in South Australia are genetically very closely related – generally descended from the very small numbers that were introduced onto Kangaroo Island.¹²⁸

2.102 The koala population on Kangaroo Island increased dramatically between the 1920s and the 1990s. In 1997 the South Australian environment department commenced a program to reduce the population on Kangaroo Island to sustainable levels through surgical sterilisation and translocation.¹²⁹ According to the government this was necessary because the highly selective browsing of koalas represented a significant threat to Kangaroo Island's unique vegetation, in particular the Manna Gum.¹³⁰ Consistent with the *National Koala Conservation and Management Strategy 2009–2014*, the South Australian government has not considered culling as an appropriate management option for koalas.¹³¹

2.103 In 2001 an island wide survey estimated a population of 27 000 koalas on Kangaroo Island.¹³² This survey was repeated in 2006 with a revised population of 16 000 koalas. The latest island wide survey took place in 2010 and preliminary results indicate that the population continues to decrease.¹³³

2.104 According to the South Australian government, the poor genetic quality of koalas in South Australia and their overabundance has meant that:

Management is generally directed towards the maintenance of the existing populations for their contribution to national rather than State goals.¹³⁴

127 Threatened Species Scientific Committee, *Advice to the Minister for Environment, Protection, Heritage and the Arts from the Threatened Species Scientific Committee (the Committee) on Amendment to the list of Threatened Species under the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)*, September 2010, p. 4.

128 Department of Environment and Natural Resources, Government of South Australia, *Submission 77*, pp 1–2.

129 Department of Environment and Natural Resources, Government of South Australia, *Submission 77*, p. 2.

130 Department of Environment and Natural Resources, Government of South Australia, *Submission 77*, p. 2.

131 Department of Environment and Natural Resources, Government of South Australia, *Submission 77*, p. 2.

132 Department of Environment and Natural Resources, Government of South Australia, *Submission 77*, p. 2.

133 Department of Environment and Natural Resources, Government of South Australia, *Submission 77*, p. 2.

134 Department of Environment and Natural Resources, Government of South Australia, *Submission 77*, p. 2.

Population diversity

2.105 A recurring theme throughout this inquiry was the varying levels of genetic diversity of koalas from different regions. With a few notable exceptions, for example the Strzelecki koala in Victoria's Gippsland region, there was a general recognition of a north-south divide – with north koalas possessing greater genetic diversity than their southern cousins.

2.106 Whilst the koala populations in Victoria and South Australia are more numerous than those in New South Wales and Queensland, they are not genetically diverse.¹³⁵ This is the result of the large reintroduced populations of koalas in the southern states originating from only a very few individuals.¹³⁶ The TSSC described 'the majority of Victorian koalas, and all South Australian koalas' as representing 'little genetic capital.'¹³⁷ The TSSC observed that the low genetic variability of koalas in these areas also 'reduces the population's ability to adapt to change, which may exacerbate the effects of disease, over-browsing or climate change.'¹³⁸

2.107 Whilst recognising the potential threat posed by low genetic diversity, the TSSC indicated that 'other than isolated reports of individual deformities that may or may not be due to inbreeding, there is no evidence at present that population growth is being impacted by low genetic diversity.' Indeed, the TSSC noted the somewhat counterintuitive fact that 'these [southern] populations are mostly showing far greater levels of population increase than is the case for the more genetically variable populations in parts of Queensland and New South Wales.'¹³⁹

2.108 The TSSC went on to explain that:

...we do not know what impact there may have been on the functional variation that will determine how a population responds to new environmental challenges. To be able to quantitatively assess viability of southern koalas over a particular timeframe a population viability analysis

135 Dr Alistair Melzer, *Submission 7*, p. 1.

136 Threatened Species Scientific Committee, *Advice to the Minister for Environment, Protection, Heritage and the Arts from the Threatened Species Scientific Committee (the Committee) on Amendment to the list of Threatened Species under the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)*, September 2010, p. 18.

137 Threatened Species Scientific Committee, *Advice to the Minister for Environment, Protection, Heritage and the Arts from the Threatened Species Scientific Committee (the Committee) on Amendment to the list of Threatened Species under the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)*, September 2010, p. 19.

138 Threatened Species Scientific Committee, *Advice to the Minister for Environment, Protection, Heritage and the Arts from the Threatened Species Scientific Committee (the Committee) on Amendment to the list of Threatened Species under the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)*, September 2010, p. 19.

139 Threatened Species Scientific Committee, answer to question on notice, 1 August 2011 (received 10 August 2011), pp 6–7.

(PVA) model would need to be developed, taking into account all threats including low genetic diversity.¹⁴⁰

2.109 Despite the TSSC's rejection of a north-south genetic divide, several submitters contended that such a divide does in fact exist. For example Professor Frank Carrick informed the committee that the historic:

Near extinction (VIC) or complete extinction (SA) of Southern Koalas coupled with widespread translocation from genetically impoverished source populations has produced severe genetic homogenisation & loss of diversity. In QLD by contrast, even the small & artificially established St Bees Island population (small population & small island) has about twice the allelic diversity of the most diverse VIC population and is more than [three times] as diverse as the much larger (population & island) Kangaroo Island population in SA.¹⁴¹

2.110 The Australian Koala Foundation argued that these [southern] populations have been through 'at least 3–6 genetic bottlenecks and cannot be considered to have a long term genetic viability'.¹⁴² Concerns about the sustainability of the 'southern' koala were shared by several other submitters.¹⁴³

2.111 Finally, Professor Carrick and other koala experts argued that there has been little or no genetic interactions between the northern and southern populations:

...mitochondrial DNA (mtDNA) data show that there has been little or no gene flow between some populations for probably a few thousand years. There is now essentially almost zero probability of gene flow between the major Koala populations and there is compelling evidence that neutral nuclear markers can differentiate in decades, not centuries.¹⁴⁴

Concerns with current estimates

2.112 Due to a number of factors, such as the wide-range of the koala and the inherent difficulty in counting the tree-dwelling marsupials, conducting population surveys of koalas is difficult and expensive. Neither the Commonwealth government, nor the state governments in jurisdictions where the koala occurs has conducted extensive surveys of substantial koala populations.

140 Threatened Species Scientific Committee, answer to question on notice, 1 August 2011 (received 10 August 2011), p. 7.

141 Professor Frank Carrick, *Submission 86*, p. 14.

142 Australian Koala Foundation, *Submission 25*, p. 5.

143 See for example Dr Joanne Loader, *Submission 22, Attachment 1*, p. 37.

144 Professor Frank Carrick, Dr Alistair Melzer, Dr Bill Ellis and Dr Sean Fitzgibbon, *Submission 101*, p. 6.

2.113 It is clear from the evidence provided to the committee that there are significant deficiencies in current population estimates. Advice from the TSSC to the environment minister highlights this fact:

There is at present no published scientifically peer-reviewed estimate of the total number of koalas in Australia and no definitive past estimate within an appropriate timeframe to enable comparison.¹⁴⁵

2.114 Members of the TSSC elaborated on this point in their evidence before the committee. Professor Peter Harrison told the committee that the most formidable obstacle to the TSSC's task of assessing whether or not the koala should be listed as threatened is the:

...insufficient data on population size and trends across many areas of the range of the koala. The lack of consistent long-term monitoring populations throughout the range of this large, unmistakable diurnal mammal clearly indicates that our nation has a long way to go to adequately monitor and manage its biodiversity.¹⁴⁶

2.115 The lack of a published scientifically peer-reviewed estimate of the national koala population is a cause of frustration for conservationists, scientists, government environment agencies and industry bodies.

2.116 For example, Koala Action Pine Rivers submitted that they 'consider that estimates of koala populations are inaccurate in all the states of Australia...' and 'question whether in fact the species is sustainable anywhere in its natural range under current management practices'.¹⁴⁷

2.117 Similarly, Professor Frank Carrick submitted:

...anyone who purports to give an accurate figure for the koala population of Australia should be treated with deep scepticism (the data does not exist) – BUT this is not really the key issue: the population trend is far more important than absolute abundance and there are reliable data available. Apart from the abnormal southern populations in Victoria and South Australia, almost all other wild populations that we know about are in decline...¹⁴⁸

2.118 Industry groups informed the committee that inadequate data on koala numbers were creating poor planning outcomes and impacting negatively on businesses. The Property Council of Australia argued that current broad based

145 Threatened Species Scientific Committee, *Advice to the Minister for Environment, Protection, Heritage and the Arts from the Threatened Species Scientific Committee (the Committee) on Amendment to the list of Threatened Species under the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)*, September 2010, p. 20.

146 Professor Peter Harrison, Member, Threatened Species Scientific Committee,

147 Koala Action Group Pine Rivers, *Submission 41*, p. 2.

148 Professor Frank Carrick AM, *Submission 86*, p. 4. Emphasis in original.

mapping of koala habitat and populations 'have proved false upon further investigation by the private sector'.¹⁴⁹

2.119 According to the Property Council the poor surveying of koalas has led to significant costs to the industry, including:

...substantial project delays, increased holding costs, business uncertainty and substantial additional consultancy fees which have had a direct impact on the ability to deliver affordability.¹⁵⁰

2.120 The Urban Development Institute of Australia (Queensland) similarly disputed the accuracy of current estimates of koala population numbers:

...in Queensland, issues around Koala population protection are very substantially affected by emotional or other views based on values which can lead to incorrect outcomes. It is critical that this hyperbole is stripped away and true scientific measures utilised.¹⁵¹

2.121 In its most recent consideration of listing the koala as vulnerable under the EPBC Act, the TSSC stated that 'better demographic data are needed' to determine whether the koala is indeed vulnerable.¹⁵² According to the TSSC:

The body of data on the status of koala populations is patchy, often sparse and not nationally comprehensive or coordinated. The data quality is also variable. There has been only limited improvement in quality, relevance and integration of these data over the 15 years that the koala has been considered by this Committee and its predecessor. This situation is not unusual for the Committee but what is unusual is the huge area of occurrence and variability that the koala demonstrates. I[n] addition there is a lack of any consistent reliable methodology for population monitoring of the koala.¹⁵³

2.122 The TSSC commented that whilst there are some regions that have high quality population data (such as south-east Queensland and some areas of coastal New South Wales), many other regions have estimates based on anecdotes or opinions, or are extrapolated from adjoining areas.¹⁵⁴

149 Property Council of Australia, *Submission 39*, p. 4.

150 Property Council of Australia, *Submission 39*, p. 4.

151 Urban Development Institute of Australia (Queensland), *Submission 52*, p. 1.

152 Threatened Species Scientific Committee (TSSC), 'Letter to the Minister for Sustainability, Environment, Water, Population and Communities regarding the conservation status of the koala', 30 September 2010, p. 1.

153 Threatened Species Scientific Committee (TSSC), 'Letter to the Minister for Sustainability, Environment, Water, Population and Communities regarding the conservation status of the koala', 30 September 2010, p. 2.

154 Threatened Species Scientific Committee (TSSC), 'Letter to the Minister for Sustainability, Environment, Water, Population and Communities regarding the conservation status of the koala', 30 September 2010, p. 2.

2.123 It was recognised that on the best available information presented to the TSSC that koala populations in south east Queensland and northern New South Wales have experienced 'a generally consistent pattern of decline in recent years'.¹⁵⁵ However, some populations in South Australia and Victoria are increasing.¹⁵⁶ The main threats to koala populations were recognised to be habitat loss and disruption, impacts associated with cars and dogs and disease.¹⁵⁷

2.124 In its professional judgement, the TSSC did consider 'that the national population may have declined by about 30 per cent over three koala generations'.¹⁵⁸ However it went on to say:

Despite this the Committee has considerable uncertainty that the figure it has reached and recommends that a final conclusion would require that critical data gaps are filled.

The Committee recommends that this could be achieved by giving urgent attention to koala population distribution and demographics in Queensland and New South Wales.¹⁵⁹

2.125 Professor Frank Carrick told the committee that the current situation in which the TSSC requests additional data on koala populations without the Commonwealth providing funding is proving to be the 'ultimate catch-22':

The Commonwealth authorities have persistently refused applications to provide funding for koala surveys and establishment of long-term monitoring sites. They then use the absence of detailed quantitative data at intervening points on a broad scale as a reason to refuse to recognise the clear evidence of the decline in those populations we do have hard data for. Then they use that to justify failing to list the koala under the EPBC Act, so

155 Threatened Species Scientific Committee, 'Letter to the Minister for Sustainability, Environment, Water, Population and Communities regarding the conservation status of the koala', 30 September 2010, p. 2.

156 Threatened Species Scientific Committee, 'Letter to the Minister for Sustainability, Environment, Water, Population and Communities regarding the conservation status of the koala', 30 September 2010, p. 2.

157 Threatened Species Scientific Committee, 'Advice to the Minister for Environment, Protection, Heritage and the Arts from the Threatened Species Scientific Committee on Amendment to the list of Threatened Species under the *Environment Protection and Biodiversity Conservation Act 1999*', pp 10–17.

158 Threatened Species Scientific Committee, *Advice to the Minister for Environment, Protection, Heritage and the Arts from the Threatened Species Scientific Committee (the Committee) on Amendment to the list of Threatened Species under the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)*, September 2010, p. 27.

159 Threatened Species Scientific Committee, *Advice to the Minister for Environment, Protection, Heritage and the Arts from the Threatened Species Scientific Committee (the Committee) on Amendment to the list of Threatened Species under the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)*, September 2010, p. 27.

this restricts access to survey and monitoring funds and so it ever goes on. Move over, Joseph Heller! This is the ultimate catch-22.¹⁶⁰

The way forward

2.126 The vast extent of koala range (over 1 million square kilometres), the frequent low density of populations, as well as issues such as the sufficiency of monitoring resources and access to remote regions, make large scale assessment of the status of koala populations extremely difficult. To fill the gaps in population data, it was suggested by koala researchers that long-term monitoring of key koala populations (such as the Mulga Lands of western Queensland and Mumbulla State Forest on the south coast of New South Wales) be established.¹⁶¹

2.127 Dr Alistair Melzer recommended that koala ecology monitoring stations in key biogeographic regions and zones of interest be established to monitor trends over a number of years.¹⁶²

2.128 The Koala Research Network believes that key long-term monitoring stations would give more accurate and diverse data on koala populations which is required for their conservation:

Long term monitoring data to estimate trends are much more important than just knowing how many animals there are because this tells something about the direction and rate of change.¹⁶³

2.129 A second priority raised by the Koala Research Network in conducting population research was for the koala research community to adopt a national approach to koala monitoring:

It is becoming increasingly important to develop national standards and guidelines for assessing and comparing the overall health status of koala populations and for deriving meaningful population estimates. This work will be vital for ongoing prioritisation of recourses and conservation programs, for monitoring trends, and for evaluating the performance of conservation measures.¹⁶⁴

160 Professor Frank Carrick AM, Private capacity, *Committee Hansard*, 1 August 2011, p. 4.

161 For example see: Dr Alistair Melzer, *Submission 7*, p. 8; Koala Research Network, *Submission 29*, p. 2; University of Queensland Koala Ecology Group, *Submission 42*, pp 1–3; and Conservation Council ACT Region, *Submission 61*, p. 2.

162 Dr Alistair Melzer, *Submission 7*, p. 8. Dr Melzer has maintained long-term monitoring stations in Queensland for periods up to 12 years.

163 Koala Research Network, *Submission 29*, p. 2.

164 Koala Research Network, *Submission 29*, p. 2.

2.130 The Conservation Council ACT Region also agreed with the need to develop better standards for monitoring population trends while acknowledging the legitimacy of different perspectives.¹⁶⁵

2.131 A lack of funding was also highlighted by the University of Queensland Koala Ecology Group as hindering the gathering of accurate data on koala populations. According to the group:

Koala population estimates have, in the past, relied generally on indirect methods of assessment, probably as a result of a lack of funding limiting more comprehensive investigations. As a result, there is some uncertainty about the extent of koala declines in areas of their range...Were these studies properly funded from the beginning, it is unlikely that the current data gaps would exist.¹⁶⁶

2.132 The *National Koala Conservation and Management Strategy 2009–2014* contains as one of its outputs the need to develop a better understanding of koala population requirements and maintain an information network to guide planning and natural resource management processes.¹⁶⁷ Two direct actions are listed in the strategy to achieve this output:

- develop standard monitoring/habitat assessment protocols to enable population numbers or density to be compared between the same place at the same time; and
- establish a national database of koala population distribution and density to facilitate planning at all scales that is accessible by relevant authorities.¹⁶⁸

2.133 The first implementation report of the *National Koala Conservation and Management Strategy 2009–2014*, showed that apart from some limited activity in NSW, nothing is being done to develop standard monitoring protocols.¹⁶⁹ The major

165 Conservation Council ACT Region, *Submission 61*, p. 2.

166 University of Queensland Koala Ecology Group, *Submission 42*, pp 1–3.

167 Output C, Natural Resource Management Ministerial Council, *National Koala Conservation and Management Strategy 2009–2014*, Department of Environment, Heritage and the Arts, Canberra, 2009, p. 4.

168 See Action 1.06 and Action 1.07, 'Appendix 1: Implementation plan', Natural Resource Management Ministerial Council, *National Koala Conservation and Management Strategy 2009–2014*, Department of Environment, Heritage and the Arts, Canberra, 2009, pp 25–26.

169 Natural Resource Management Ministerial Council, *National Koala Conservation and Management Strategy 2009–2014, First Implementation Report to the National Resources Management Ministerial Council*, April 2010, p. 12, www.environment.gov.au/biodiversity/publications/koala-strategy/implementation-report.html, (accessed 21 July 2011).

activity listed to establish a national koala database is ongoing discussions between the Australian Government and the Atlas of Living Australia.¹⁷⁰

2.134 The TSSC has also advocated for a national koala monitoring and evaluation program:

A properly designed, funded and implemented national koala monitoring and evaluation program across the full range of the koala is imperative. This should be part of the proposed *National Environmental Reporting System* and would coincidentally provide valuable data on a number of other important species, and areas of key habitat for achieving conservation objectives.¹⁷¹

2.135 The TSSC identified priority areas as:

...(1) broad-scale sampling/survey (to provide distributional and abundance information) in those regions for which koala occurrence is least known (particularly including Desert Uplands, Brigalow Belt, Einasleigh Uplands, and central coast of Queensland, as well as inland NSW). The public mail survey method (or an online equivalent) used by Lunney et al. (2009) may provide a useful initial mechanism for this inventory. (2) continue to monitor koalas (and their food trees) in the Mulga Lands region, to assess the extent of recovery (if any) following the cessation of the drought.¹⁷²

Committee comment

Difficulties measuring koala numbers

2.136 The committee acknowledges the inherent difficulties in measuring koala numbers. Making an accurate count of these tree-dwelling marsupials which remain motionless for large parts of the day and which are scattered throughout a range of more than one million square kilometres will always prove highly challenging. In the committee's view this will be an ongoing aspect of determining koala numbers and assessing their status under the EPBC Act (discussed in chapter 5). The committee accepts that the exact koala population is unknown and that there has been no comprehensive counting of koala numbers across the country.

2.137 For this reason the committee believes it is preferable to focus on an estimated population range rather than a precise population number. In this regard the committee notes the most often quoted national estimation of koala populations comes from the

170 Natural Resource Management Ministerial Council, *National Koala Conservation and Management Strategy 2009–2014, First Implementation Report to the National Resources Management Ministerial Council*, April 2010, p. 13.

171 Threatened Species Scientific Committee (TSSC), 'Letter to the Minister for Sustainability, Environment, Water, Population and Communities regarding the conservation status of the koala', 30 September 2010, p. 3.

172 Threatened Species Scientific Committee, answer to question on notice, 1 August 2011 (received 10 August 2011), p. 7.

Australian Koala Foundation which estimates a minimum of 43 000 koalas left in Australia and a maximum of 84 000. The committee also notes the TSSC's alternative estimate of the national koala population in 2010 was 'about 300 000', with a 'plausible lower bound' of 'about 200 000 individuals'.¹⁷³

2.138 These figures compare with the TSSC's 1990 estimate of the national koala population of 430 000 individuals.¹⁷⁴

2.139 The committee accepts the 'data-interpretation challenges' faced by the TSSC and its observation that the species 'lacks precise population trend data in significant parts of its range'.¹⁷⁵ These challenges in population data were also expressed by the TSSC in the 2006 attempt to list the koala.¹⁷⁶

Marked decline

2.140 The committee agrees that the available scientific research points to a marked decline in the overall koala population,¹⁷⁷ with several important areas suffering very significant declines. However the committee accepts that the extent of this decline across the country is not fully known and also that some koala populations, primarily in southern Australia, appear to be stable or increasing. The committee notes however that in many areas across its range the koala population is expected to continue to decline.

Regional trends

2.141 From the evidence presented to the committee two generalised regional trends in the koala population are apparent. Broadly speaking, koala populations scattered throughout parts of Queensland and New South Wales are showing 'a consistent pattern of decline'. This trend was anticipated as far back as the mid-1980s by the National Parks and Wildlife Service in the *National Koala Survey*. Koala numbers in some regions, such as south eastern Queensland and parts of coastal New South Wales,

173 Threatened Species Scientific Committee, answer to question on notice, 1 August 2011 (received 10 August 2011), p. 2. The TSSC declined to provide the committee with an upper bound.

174 Threatened Species Scientific Committee, answer to question on notice, 1 August 2011 (received 10 August 2011), p. 2.

175 Threatened Species Scientific Committee (TSSC), 'Letter to the Minister for Sustainability, Environment, Water, Population and Communities regarding the conservation status of the koala', 30 September 2010, p. 1.

176 Threatened Species Scientific Committee, 'Advice to the Minister for Environment and Heritage from the Threatened Species Scientific Committee (the Committee) on Amendments to the list of Threatened Species under the *Environment Protection and Biodiversity Conservation Act 1999*', 2006, p.14.

177 Threatened Species Scientific Committee, letter to Minister for Sustainability, Environment, Water, Population and Communities, September 2010, Department of Sustainability, Environment, Water, Population and Communities, *Submission 73, Attachment C*, p. 1.

have been accurately counted. In these populations it is clear that koala populations are declining significantly. The committee also notes that koalas in Queensland and New South Wales provide the highest genetic diversity across the species range.

2.142 By contrast the populations in Victoria and South Australia are in general relatively abundant and stable, with certain populations increasing and requiring active management to prevent habitat destruction through over-browsing. In areas where koala numbers have become overabundant, such as Kangaroo Island in South Australia and French Island, Raymond Island and Tower Hill State Game Reserve in Victoria, state governments have implemented sterilisation and translocation programs to mitigate these impacts. The committee notes that koalas in these areas originate from limited genetic stock and consequently display much lower genetic diversity, with some submitters questioning their long-term viability. The committee also notes that the abundant populations in Victoria are largely 'a function of the translocation program that has been operating for several decades.'¹⁷⁸

2.143 To resolve this situation, and to address the potential for large depauperate southern populations from skewing the national koala estimate, the committee believes there is a need for further scientific research into the genetic diversity of the koala. This should include a population viability assessment as recommended by the TSSC for the southern koala as well as a thorough genetic analysis across the entire range of the population. The committee notes the difficulties expressed by submitters and witnesses in previously securing such funding and accordingly recommends that the Australian Government fund this important research. Such a study would allow an assessment to be made about the viability of the bottlenecked populations of the south and better identification of priority conservation areas, such as the Strzelecki and Mumbulla populations.

Recommendation 1

2.144 The committee recommends that the Australian Government fund research into the genetic diversity of the koala including a population viability assessment of the southern koala and determining priority areas for conservation nationally.

Population data deficiencies

2.145 The committee is concerned about the deficiencies in koala population data, both current and historical. More robust information on the koala's population status will necessarily lead to better decision-making about the most important and effective conservation and management strategies.

178 Threatened Species Scientific Committee, *Advice to the Minister for Environment, Protection, Heritage and the Arts from the Threatened Species Scientific Committee (the Committee) on Amendment to the list of Threatened Species under the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)*, September 2010, p. 21.

2.146 In the committee's view, if the koala's long-term viability is to be secured for future generations, then there is a critical need for better population information. Clearly, more resources and dedicated commitment are needed to achieve this outcome and the committee recommends greater Commonwealth involvement in this area, including through the provision of financial support. In this regard the committee supports the TSSC's call for 'a properly designed, funded and implemented national koala monitoring and evaluation program across the full range of the koala is imperative.'¹⁷⁹

Recommendation 2

2.147 The committee recommends that the Australian Government fund a properly designed, funded and implemented national koala monitoring and evaluation program across the full range of the koala.

2.148 This could be facilitated as part of the Koala Research Network's integrated research proposal which is supported by the committee and which is discussed further in Chapter 4.

2.149 To effectively implement such a program, the government must encourage relevant state and local governments as well as community and business organisations to participate fully in this initiative. The government should also give preference to 'critical data gaps' such as those identified by the TSSC in Queensland and New South Wales.¹⁸⁰ In particular, urgent priority should be given to 'broad-scale sampling/survey...in those regions for which koala occurrence is least known (particularly including Desert Uplands, Brigalow Belt, Einasleigh Uplands, and central coast of Queensland, as well as inland NSW)' and to 'continue to monitor koalas (and their food trees) in the Mulga Lands region [in Queensland], to assess the extent of recovery (if any) following the cessation of the drought'.¹⁸¹

Availability of biodiversity information

2.150 On the related matter of the availability of biodiversity information more generally, the committee notes the TSSC's statement to the Environment Minister that:

...the interpretative challenge of determining the status of the koala is a symptom of a more general problem. Biodiversity in Australia is in decline but the available data to inform priorities and actions are generally

179 Threatened Species Scientific Committee (TSSC), 'Letter to the Minister for Sustainability, Environment, Water, Population and Communities regarding the conservation status of the koala', 30 September 2010, p. 3.

180 Threatened Species Scientific Committee, *Advice to the Minister for Environment, Protection, Heritage and the Arts from the Threatened Species Scientific Committee (the Committee) on Amendment to the list of Threatened Species under the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)*, September 2010, p. 27.

181 Threatened Species Scientific Committee, answer to question on notice, 1 August 2011 (received 10 August 2011), p. 7.

inadequate, being both insufficient and uncoordinated. A consequence is that we are not making well informed investment decisions. The Committee would welcome a formal request from you to provide an advice on this critical issue.¹⁸²

2.151 The TSSC elaborated on this point in its response to the committee's questions on notice:

We recommend a nationally coordinated integrated program for population monitoring of threatened plant and animal species (and other species of cultural, evolutionary and/or economic significance). Such monitoring should (i) provide timely warning of unacceptable declines that automatically triggers alerts that require immediate management actions to ameliorate or halt the decline to enable population recovery, (ii) measure the effectiveness of conservation management responses (and hence help continually refine and adapt that management), and (iii) provide a headline index of the nation's environmental progress that can be counterpointed with more traditional economic and human demographic indices.¹⁸³

2.152 The committee supports this perspective, and in particular the TSSC's caution regarding poorly informed investment decisions and the need for a nationally coordinated and integrated program for population monitoring of threatened species and other culturally, evolutionary and/or economically significant species.

Recommendation 3

2.153 The committee recommends that the Australian Government establish a nationally coordinated and integrated program for population monitoring of threatened species and other culturally, evolutionary and/or economically significant species.

Standardised counting methodologies

2.154 The committee notes the range of methods used by different researchers and organisations to count koalas. The committee acknowledges that there may be preferred methods depending on the location and population density as well as other relevant factors. However, in the committee's view the suite of different methodologies has led to a degree of unwanted and unnecessary uncertainty regarding koala population estimates. The committee supports the consolidation of counting methods, and encourages researchers and other interested organisation to collaborate in order to agree to a set of standardised counting methods. This is not an endorsement of a single methodology to be used across the entire country, but instead a proposal for

182 Threatened Species Scientific Committee (TSSC), 'Letter to the Minister for Sustainability, Environment, Water, Population and Communities regarding the conservation status of the koala', 30 September 2010, p. 3.

183 Threatened Species Scientific Committee, answer to question on notice, 1 August 2011 (received 10 August 2011), p. 8.

an agreed set of methodologies, with each to be used in an agreed set of circumstances.

Recommendation 4

2.155 The committee recommends that the Australian Government assist the koala research community and interested organisations to work towards a standardised set of methodologies for estimating koala populations.

TSSC advice

2.156 In addition to supporting the gathering of better population data and the adoption of standardised counting methodologies, the committee believes that the Environment Minister must be presented with the best available information upon which to base his or her listing decision. In this regard the committee has some concerns about the TSSC's advice provided to the Minister in September 2010.

2.157 For example, on the critical question of the current koala population, the TSSC simply advised the Minister that 'the koala population is greater than 200 000 individuals'. However it is unclear from the TSSC's analysis of the existing population data, how it determined this figure.¹⁸⁴ Although it did provide a national estimate (300 000) and a 'plausible lower bound' (200 000) for this inquiry, the TSSC did not provide either of these figures to the Minister. Similarly, the TSSC did not provide the necessary figure for historical comparison to the Minister, despite providing it (430 000 in 1990) to the committee for this inquiry.

2.158 It is surprising to the committee that nowhere in its advice to the Environment Minister, did the TSSC include its conclusion that the national koala population in 2010 was 300 000. The only figure that was included was the figure of 'greater than 200 000 individuals' which itself was included at page 27 of its advice. In the committee's view, whilst acknowledging the complexity of its task of assessing the conservation status of species against the detailed EPBC Act criteria, the TSSC must be far clearer in its future advice to the Environment Minister. Headline information, such as species population figures, must be presented in an easily understandable manner and in a prominent position within the advice.

2.159 In the committee's view it is imperative that the statutory body, which has a legislated role to provide advice to the Minister on the conservation status of species being considered for listing as threatened,¹⁸⁵ provides its assessment of the population

184 In its advice to the Environment Minister the TSSC sets out the following state-based figures (pp. 20–27): South Australia – between 12 000 and 16 000 in 2006; Victoria – roughly 73 500' date unspecified; NSW – 1000 to 10 000 in 2008; Queensland – approximately 39 753 in 2007 to 2010 (derived from 29 050 in 2010 from Southwest Queensland and 10 703 in 2007 and 2008 from Southeast Queensland) which totals a range of between approximately 126 000 to 139 000.

185 *Environment Protection and Biodiversity Conservation Act 1999*, s. 503.

range (both current and historical) based on the best available information. The committee acknowledges that the constraints of current best available information may lead to a wide population estimate range. However, without such a range, it must be very difficult for the Minister to make an informed decision on the current listing assessment for the koala as well as other listing decisions. Given the inherent difficulties in obtaining accurate koala numbers, without clear TSSC guidance on an estimated population range, the Minister is put in a very difficult position. As data deficiencies are not unique to the koala's circumstances, it is vital that for all future listing assessments, the TSSC provide the Minister with the clearest information possible, based on the best available information.

Recommendation 5

2.160 The committee recommends that the Threatened Species Scientific Committee provide clearer information to the Environment Minister in all future threatened species listing advices, including species population information, and that the Threatened Species Scientific Committee review its advice to the Minister on the listing of the koala in light of the findings of this inquiry.

2.161 Further discussion on the related matter of the threatened listing of the koala is included in chapter 5.

Chapter 3

Threats to koala habitat: urban development, forestry, mining, drought, bushfire and climate change

3.1 Clearly, suitable habitat is critical for the survival of any species. Many submitters identified loss or degradation of koala habitat as the key threat to the species' survival.¹ The Australian Koala Foundation explained the importance of suitable koala habitat:

Stable koala populations can only persist if suitable habitat is available. Natural population densities are directly related to the quality of habitat which is in turn determined by the presence and density of primary and secondary food trees.²

3.2 The *National Koala Conservation and Management Strategy 2009–2014* identified the significance of habitat loss on the koala:

Loss of habitat is the major threat to the koala in Queensland and New South Wales, and is the primary factor responsible for declining populations in those states. This continuing problem, which results mainly from clearing or fragmentation of forest and woodland, must be addressed...

Habitat loss is the most significant cause of koala population declines and reductions in long-term population viability...³

3.3 The strategy further identified that fragmentation and degradation of habitat can result from:

- property development;
- linear infrastructure such as roads, railways and powerlines;
- agricultural development in inland regions;
- some logging regimes; and
- regular fuel reduction burning.⁴

1 See for example Associate Professor Clive McAlpine, Spokesperson, Koala Research Network, *Committee Hansard*, 3 May 2011, p. 2; and Professor Frank Carrick AM, Private capacity, *Committee Hansard*, 1 August 2011, p. 6.

2 Australian Koala Foundation, *Submission 25*, p. 6.

3 Natural Resource Management Ministerial Council, *National Koala Conservation and Management Strategy 2009–2014*, Department of Environment, Heritage and the Arts, Canberra, 2009, p. 19, www.environment.gov.au/biodiversity/publications/koala-strategy/pubs/koala-strategy.pdf (accessed 30 June 2011).

3.4 The committee received much evidence concerning the loss of koala habitat due to urban development and forestry practices. Concerns were also raised over the impact of mining on koala populations west of the Great Dividing Range in Queensland. Additional threats to koala habitat included environmental factors such as drought, bushfires and climate change. Accordingly, this chapter discusses the following issues:

- urban development;
- forestry;
- mining; and
- drought, bushfires and climate change.

3.5 Other threats to koalas, such as disease, dog predation and car strikes are discussed in chapter 4.

Urban development

3.6 Koala habitat encompasses more than one million square kilometres of eastern Australia, occurring in large part in coastal areas.⁵ Much of the koala's natural range is also highly utilised, developed and modified by and for the expanding human population. The species' range includes approximately 300 local government areas (LGAs) and 30 catchment management authorities.⁶ It was recognised by the Koala Action Group that:

The koala had the disadvantage of having preferred habitat and being most numerous in the areas that were highly sought after for human settlement...⁷

3.7 Population growth, particularly in the south east corner of Queensland, is requiring further development and infrastructure projects which have the potential to impact on koala habitat. The Australian Bureau of Statistics indicates that the three most populous local government areas in Australia are located in south east Queensland: Brisbane, Gold Coast and Moreton Bay.⁸ These LGAs also had three of

4 Natural Resource Management Ministerial Council, *National Koala Conservation and Management Strategy 2009–2014*, Department of Environment, Heritage and the Arts, Canberra, 2009, p. 19.

5 Australian Koala Foundation, *Submission 25*, p. 6.

6 Natural Resource Management Ministerial Council, *National Koala Conservation and Management Strategy 2009–2014*, Department of Environment, Heritage and the Arts, Canberra, 2009, p. 18.

7 Koala Action Group Queensland, *Submission 17*, p. 3.

8 Australian Bureau of Statistics (ABS), *3218.0 Regional Population Growth Australia 2009–10*, ABS, Canberra, 31 March 2011, www.abs.gov.au/AUSSTATS/abs@.nsf/Latestproducts/3218.0Main%20Features62009-10?opendocument&tabname=Summary&prodno=3218.0&issue=2009-10&num=&view= (accessed 28 July 2011).

the four largest increases in population in Australia between June 2009 and June 2010.⁹ South east Queensland is also home to one of the largest natural koala populations in the wild and has the greatest densities of koalas in the state.¹⁰

3.8 The *National Koala Conservation and Management Strategy 2009–2014* identified habitat loss and fragmentation in areas of high development as the 'primary threat to koalas', particularly in the south east corner of Queensland.¹¹

Impact of development on koala populations

3.9 Urban development can have a significant impact on koala habitat through the loss of food trees, fragmentation of home ranges and the severance of movement corridors.¹² Development may impact on previously untouched koala habitat occurring on urban fringes or by removing remnant koala food and shelter trees existing in built-up areas.

3.10 The fragmentation and removal of koala habitat may also occur outside of the urban environment with small rural holdings subject to subdivision and associated clearing of trees for roads, fences, stock corridors and powerlines.¹³

3.11 In urban areas koalas have traditionally utilised and moved between parks, suburban bushland, creek areas and gardens to reach food.¹⁴ The University of Queensland Koala Ecology Group identified these urban environments as an important part of koala habitat.¹⁵

3.12 The removal of trees from gardens and the thinning of bushland may fragment this habitat and cause large gaps to open up in previously maintained koala corridors. Individual trees often form part of a longer chain of trees to additional koala habitat further away. According to the Koala Action Group Queensland, the removal of even one tree can break a chain making it difficult for koalas to visit the next link.¹⁶ Similarly, the Humane Society International submitted that:

9 Australian Bureau of Statistics (ABS), *3218.0 Regional Population Growth Australia, 2009–10*, ABS, Canberra, 31 March 2011.

10 Department of Environment and Resource Management, Queensland Government, *Submission 79*, p. 2.

11 Natural Resource Management Ministerial Council, *National Koala Conservation and Management Strategy 2009–2014*, Department of Environment, Heritage and the Arts, Canberra, 2009, p. 23.

12 Wildlife Preservation Society of Queensland, *Submission 15*, p. 5.

13 Mr Robert Summers, *Submission 19*, p. 2.

14 Ms Margaret Hardy, *Submission 3*, p. 1.

15 University of Queensland Koala Ecology Group, *Submission 42*, p. 7.

16 Koala Action Group Queensland, *Submission 17*, p. 4.

Koalas have highly specific habitat requirements and are particularly sensitive to changes and disruptions to their surrounding habitat. Their limited movement capability means that they are unable, or reluctant, to cross gaps in vegetation and move within or among fragmented habitats.¹⁷

3.13 Urban development may also present additional barriers for koalas such as the erection of concrete walls, solid-paling timber fences or Colorbond sheeting for privacy and the reduction of traffic noise.¹⁸ Such barriers to movement limit dispersal routes for koalas and force them into contact with vehicles and dogs.¹⁹

3.14 Additionally, those animals that are displaced by clearing in urban areas may move into nearby parks and reserves already supporting a residential koala population. Koala Action Pine Rivers stated that:

...competition for the remaining resources of food and shelter then takes place stressing the new comers and residential [koala] population alike'.²⁰

3.15 The committee also received evidence from koala shelters of a significant number of displaced animals that are taken into care each year.²¹

3.16 Urban development and associated operational works may also cause direct injuries or death to koalas.²²

3.17 It has been suggested that a loss of habitat may stress koalas and impact on their ability to recover from disease (see Chapter 4: Other threats).

3.18 The Property Council of Australia submitted to the committee that the property industry has in fact created developments that enhance and protect high-value koala habitat.²³ The council put forward the example of Koala Beach, a 365 hectare koala-friendly development on the north coast of New South Wales. To protect the resident koala population, and other important wildlife, a number of development initiatives were created and enforced, including:

- the prohibition of cats and dogs from the estate;
- the inclusion of speed humps near known koala home ranges;

17 Humane Society International, *Submission 26*, p. 3.

18 See: Ms Margaret Hardy, *Submission 3*, p. 1; and Port Stephens Comprehensive Koala Plan of Management Steering Committee, *Submission 38*, pp 5–6.

19 Port Stephens Comprehensive Koala Plan of Management Steering Committee, *Submission 38*, pp 5–6.

20 Koala Action Pine Rivers, *Submission 41*, p. 3.

21 See: Name withheld *Submission 20*, p. 2; and Ms Paulette Oldfield, *Submission 64*, p. 4.

22 Ms Carolyn Beaton, *Submission 32*, p. 2.

23 Property Council of Australia, answer to question on notice, 19 May 2011, p. 1.

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- a requirement that fencing be koala-friendly to allow uninhibited access to the estate;
 - the requirement that no koala food tree be removed for development purposes; and
 - the establishment of a Wildlife and Habitat Management Committee funded from an environment levy paid by rate payers.²⁴

Habitat mapping

3.19 It was suggested by community groups, research organisations and development industry bodies that accurate habitat mapping is required to identify areas of key koala habitat. This mapping would form the basis for planning and management decisions regarding urban development in habitat areas.

3.20 Ms Deborah Tabart, Chief Executive Officer of the Australian Koala Foundation told the committee that:

What I would like to table with this committee is that the vegetation data of Australia is appalling...if you are going to find out where koalas are you have to know where their habitat is, and you can only do that with good vegetation data. I think the Australian government in general has no understanding of how important mapping is and how good mapping needs to be done.²⁵

3.21 The Urban Development Institute of Australia (Queensland) (UDIA) similarly called for comprehensive mapping of habitat to be undertaken:

Mapping process based on thorough scientific analysis be undertaken which identifies a robust network of ecological reserves and corridors which are intended to provide the ecological function/foundation for maintained and improved biodiversity outcomes over future generations.²⁶

3.22 Evidence already exists of tree species preferred by koalas, however much of this information is not aligned with surveying to ensure that all areas of koala habitat have been examined and classified accordingly. The UDIA suggested that more scientific mapping of habitat needs to be undertaken:

This mapping could be comprehensively ground-truthed and allow for updates and amendments over time to address errors or when more detailed ground-truthed data and scientific analysis is available. Such mapping could identify core habitats and corridors as well as supplementary habitats to provide the organising basis for optimising protection, acquisition and rehabilitation efforts, including strategic location of biodiversity offset

24 Property Council of Australia, answer to question on notice, 19 May 2011, p. 1.

25 Ms Deborah Tabart OAM, Chief Executive Officer, Australian Koala Foundation, *Committee Hansard*, 3 May 2011, p. 21.

26 Urban Development Institute of Australia (Queensland), *Submission 52*, p. 3.

rehabilitation programs and planting undertaken for carbon bio-sequestration programs.²⁷

3.23 The committee was informed that ideal mapping would show the abundance and distribution of koala habitat across eastern Australia.²⁸ Friends of the Koala argued that it is important that the size of the habitat is known as well as the degree of connectivity that the area has with other koala habitat.²⁹

3.24 It was suggested by community organisations that any vegetation that could be associated with koalas is recorded.³⁰ For example paddock trees and planted windbreaks that allow koalas to keep off the ground and move across the landscape should be included in mapping.

3.25 The UDIA disagreed with the categorising and mapping of such a broad sweep of the landscape stating that:

...further investigation should be made of the broader landscape matrix to ensure that larger core bushland habitat areas are protected and embellished as a high priority, consistent with landscape ecology principles. This would take precedence over seeking to maintain small and less viable habitat links/patches across the region and adjacent areas, dependent on the broader landscape context and the level of threats to koalas in areas that adjoin connecting habitat.³¹

3.26 The Australian Koala Foundation's Koala Habitat Atlas (KHA) was identified as being one example of published habitat mapping.³² According to the AKF, 335 000 square kilometres of habitat in New South Wales, Queensland and Victoria has been mapped representing just 21 per cent of the koalas range.³³ According to the foundation:

The Koala Habitat Atlas relies on accurate vegetation mapping which clearly identifies the percentages of Primary and Secondary food trees within each distinctive forest or woodland community. This information is not included in any mapping carried out by State or Federal agencies...³⁴

27 Urban Development Institute of Australia (Queensland), *Submission 52*, p. 3.

28 Friends of the Koala, *Submission 58*, pp 2–3.

29 Friends of the Koala, *Submission 58*, pp 2–3.

30 Friends of the Koala, *Submission 58*, pp 2–3.

31 Urban Development Institute of Australia (Queensland), *Submission 52*, p. 3.

32 For an overview of the Koala Habitat Atlas see chapter 2.

33 Australian Koala Foundation, *Submission 25*, p. 7.

34 Australian Koala Foundation, *Submission 25*, p. 7.

3.27 The lack of understanding and mapping of habitat across the koala's range was concerning for many submitters.³⁵

Planning and regulation

3.28 Many submitters voiced their concern that poor development and planning regulation were responsible for the destruction of key koala habitat in urban areas.³⁶ For example, the Australian Koala Foundation stated that the destruction of koala habitat has arisen from a 'lack of understanding and inadequate planning'.³⁷

3.29 The Koala Action Group Queensland was concerned that it is currently too easy for developers to avoid regulations and that state planning policies are easily able to be overridden.³⁸

3.30 The committee received evidence from a submitter, who wished to have their name withheld, regarding the inadequacies of current planning regulation to protect urban koala habitat. The submitter spent two years as a self-represented appellant in the Queensland Environment and Planning Court appealing a decision by the Brisbane City Council to approve a subdivision of one block into twelve blocks. The submitter stated:

Our particular concern with this approval related to the failure by the local (Brisbane City Council) and the Queensland Government (Department of Planning and Infrastructure) to ensure the Developer complied with careful design measures to protect the koalas and their habitat. Brisbane City Council approved the developer's application for subdivision without a detailed ecological assessment and without a detailed vegetation plan. Further measures are necessary within our State and Local planning systems to ensure land clearing approval processes protect the koala and its habitat.³⁹

3.31 The submitter summarised that:

There is no clear accountability or responsibility in our local and state government systems for ensuring systematic and ecologically friendly development happens in suburban areas where koalas, their habitat and wildlife corridors are present...⁴⁰

35 For example see: Koala Research Network, *Submission 29*, p. 4; Australian Koala Foundation, *Submission 25*, p. 8; and Sunshine Coast Environmental Council, *Submission 65*, p. 4.

36 For example see: Ms Margaret Hardy, *Submission 3*, p. 1; Koala Action Group Queensland, *Submission 17*, p. 4; Australian Koala Foundation, *Submission 25*, p. 8; Koala Action Pine Rivers, *Submission 41*, p. 3; Friends of the Koala, *Submission 58*, pp 2–3; and Sunshine Coast Environmental Council, *Submission 65*, p. 4.

37 Australian Koala Foundation, *Submission 25*, p. 10.

38 Kola Action Group Queensland, *Submission 17*, p. 6.

39 Name withheld, *Submission 33*, p. 1.

40 Name withheld, *Submission 33*, p. 2.

3.32 Concerns were also raised over the ability of state koala planning regulation to be overridden by other planning decisions.⁴¹ For example, submitters highlighted the ability for areas identified as Koala Conservation Areas in south-east Queensland under the state koala planning policy to be overridden by other state planning policies identifying key resource areas (such as mining and quarrying).⁴² Additional concerns were raised over the ability of koala habitat areas to be re-zoned for industrial use.⁴³

3.33 Property and development industry peak bodies informed the committee that there is already adequate planning regulation at a state and local level for the protection of the koala and its habitat.⁴⁴

3.34 It was argued by these peak bodies that any additional regulation of planning and development would have the effect of extending development timeframes and impact on the ability of industry to deliver affordable and sustainable communities to Australians.⁴⁵

3.35 The Property Council of Australia informed the committee that any future regulation of planning and development at the Commonwealth level would 'amount to increased overregulation and create inefficiencies in the nation's planning framework'.⁴⁶

3.36 Similarly the UDIA argued that:

Given the significant investment in both time and money in the planning, marketing and delivery (including infrastructure delivery) that the development industry, relevant local governments and State agencies have already invested in many projects across South-East Queensland (and other areas of Australia), any new requirement for an additional layer of environmental assessment at the Commonwealth level would be unreasonable for existing developments which have been identified as necessary to meet the urban development needs of the region...⁴⁷

3.37 If further regulation of koala habitat were to occur the Property Council believed that compensation of land owners and developers would be required:

41 For example see: Koala Action Group Queensland, *Submission 17*, p. 4; Mr Robert Summers, *Submission 19*, p. 2; and Mr Rod McKelvey, *Submission 16*, pp 1–2; Name withheld, *Submission 31*, pp 1–2; Ms Paulette Oldfield, *Submission 64*, p. 1; Fair Go Committee, *Submission 68*, pp 1–3; and Name withheld, *Submission 81*, pp 1–7.

42 For example see: Name withheld, *Submission 31*, pp 1–2; and Name withheld, *Submission 81*, pp 1–7.

43 Fair Go Committee, *Submission 68*, pp 1–3.

44 See: Property Council of Australia, *Submission 39*, p. 5; and Urban Development Industry of Australia (Queensland), *Submission 52*, p. 1.

45 Property Council of Australia, *Submission 39*, p. 5.

46 Property Council of Australia, *Submission 39*, p. 5.

47 Urban Development Industry of Australia (Queensland), *Submission 52*, p. 4.

If further regulation is seen as the appropriate mechanism, it needs to protect and not interfere with existing land use entitlements and development rights, whether or not further development approvals are required. It is unacceptable for existing land use entitlements and development rights to be eroded without just compensation.⁴⁸

3.38 The UDIA supported the call for 'fair and appropriate' compensation, stating:

...if there are existing property rights taken away as a result of the legislation [to protect the koala] there can be no issue from the developer if there is a level of fair and appropriate compensation.⁴⁹

3.39 In contrast to this view, Redland City Council submitted research indicating that the property value that is derived from living next to koala habitat is approximately \$29 600 and the ability to view a koala is valued at another \$3100.⁵⁰

3.40 The Property Council argued that completely halting development in key koala habitat areas is draconian and an ineffectual method of creating sustainable development:

Prohibition has a number of unintended consequences, including land degradation, unintegrated land uses and poorly planned communities. Prohibitions have the effect of sterilising and devaluing large areas of land, with no compensation being made available to land owners for loss of existing rights and entitlements.⁵¹

Habitat offsets

3.41 Habitat offsets occur when parcels of land are purchased, and if required rehabilitated, to ensure that there is no net loss of koala habitat. The use of habitat offsets as a method of continuing development in areas of key koala habitat was a contentious issue with submitters.

3.42 Some wildlife organisations, such as the Wildlife Preservation Society of Queensland, believed that offsets are not a suitable method of conservation.⁵² In areas of high development, habitat offsets were seen to be ineffectual as there is very little suitable habitat remaining to act as an offset.⁵³ The Sunshine Coast Environmental Council stated that in areas of high development, 'the opportunity for "like for like or

48 Property Council of Australia, *Submission 39*, p. 5.

49 Mr Brian Stewart, Chief Executive Officer and General Counsel, Urban Development Industry of Australia (Queensland), *Committee Hansard*, 3 May 2011, p. 45.

50 Redland City Council, *Submission 46*, p. 4.

51 Property Council of Australia, *Submission 39*, p. 5.

52 Wildlife Preservation Society of Queensland, *Submission 15*, p. 8.

53 Wildlife Preservation Society of Queensland, *Submission 15*, p. 8.

better" offset parcels or compensatory habitat decreases'.⁵⁴ Accordingly, this may increase the chance of koala populations becoming locally extinct.⁵⁵

3.43 Concerns were also raised over the possible lag time between the development of the key koala habitat and the maturing of vegetation in a rehabilitated parcel of land used as an offset. The Sunshine Coast Environment Council submitted that:

Offset requirements offer little in the way of habitat values with the abrupt loss of mature trees and reinstatement taking decades. In the interim, the resilience of native fauna such as the koala is sorely tested. Displacement, forced behavioural change and the ability to manage within disturbed and highly modified landscapes puts the koala under incredible stress.⁵⁶

3.44 It was the opinion of some environmental groups that habitat offsets should only be used as a method of last resort.⁵⁷

3.45 The development and property industries stated that habitat offsets are one method of allowing sustainable development.⁵⁸ The UDIA stated that:

Given the importance of connectivity between habitat patches for koala populations, habitat and land acquisition, along with managed connections is paramount to the sustainable conservation of the species. Therefore, any decision-making in relation to the Koala at the Commonwealth level should allow for offsets that include the opportunity for contributions to an initiative such as Ecofund to ensure the best areas of koala habitat and connectivity can be acquired and protected.⁵⁹

3.46 The Property Council of Australia stated that certainty is required in the drafting of habitat offset provisions and that the ratio of cleared land to re-vegetated land 'needs to be commensurate'.⁶⁰

Habitat acquisition and rehabilitation programs

3.47 Closely related to habitat offsets is the topic of habitat acquisition programs. These involve government-funded acquisitions of existing koala habitat without that area being used to offset a new land use.

54 Sunshine Coast Environment Council, *Submission 65*, p. 6.

55 Sunshine Coast Environment Council, *Submission 65*, p. 6.

56 Sunshine Coast Environment Council, *Submission 65*, p. 6.

57 For example Sunshine Coast Environment Council, *Submission 65*, p. 6.

58 See: Property Council of Australia, *Submission 39*, p. 6; and Urban Development Industry of Australia (Queensland), *Submission 52*, pp 2–4.

59 Urban Development Industry of Australia (Queensland), *Submission 52*, p. 4.

60 Property Council of Australia, *Submission 39*, p. 6.

3.48 One notable koala habitat acquisition program is the Queensland government's *Koala Habitat Acquisition and Rehabilitation Program*—a \$48 million program to protect and rehabilitate land in South East Queensland for koala habitat. In 2010, 135 hectares of koala habitat were purchased including the expansion of Daisy Hill Conservation Park in the Koala Coast by 30 per cent.⁶¹

3.49 Another example is in the Redland City Council area where the council purchases land in urban areas for the protection of koala habitat. The council stated that since 1993 over 800 hectares of land has been purchased, with a recent focus on purchases of koala habitat.⁶² The council is currently achieving over 5 hectares of revegetation of koala habitat, and planting over 8000 koala food trees per annum.⁶³

3.50 Professor Frank Carrick also highlighted for the committee the recent successes in re-establishing koala habitat on rehabilitated mine sites:

We know that 'build it and they will come' actually works, because we have been monitoring what happens with mine site rehabilitation both in Central Queensland and on North Stradbroke Island. The rehabilitated mining areas now have koalas in them...⁶⁴

3.51 Professor Carrick also informed the committee of the habitat restoration work that has been carried out in Gunnedah, NSW:

Gunnedah tells us two things. It tells us that, if you do restore habitat of the koala populations—they have problems with dogs, cars and disease in Gunnedah as well—the sum is positive. More koala babies get born and survive than get chomped by dogs, hit by cars or die from disease if we put the habitat back, as long as we do not push the population to unrecoverable levels where there are just not enough koalas to be able to respond.

Voluntary private agreements

3.52 As well as promoting the direct purchase of koala habitat, the Redland City Council promotes private citizens to sign-up to voluntary koala conservation agreements:

'This has been undertaken through the creation of the Koala Conservation Agreement Program; this is an extension program where residents with properties larger [than] 1000m² get advice and funding to carry out replanting, weeding, construct fauna friendly fences and build dog enclosures.⁶⁵

61 Department of Environment and Resource Management on behalf of the Queensland Government, *Submission 79*, p. 10.

62 Redland City Council, *Submission 46*, p. 3.

63 Redland City Council, *Submission 46*, p. 3.

64 Professor Frank Carrick AM, Private capacity, *Committee Hansard*, 1 August 2011, p. 7.

65 Redland City Council, *Submission 46*, p. 3.

Government-owned land

3.53 The committee received several suggestions about the protection of koala populations on government-owned land (outside publicly-owned forestry areas which is discussed below). For example the Redland City Council submitted:

An immediate action could be the investigation of land parcels owned and managed by all tiers of government to investigate opportunities for the protection and enhancement of habitat. An example of this would be that the Federal Government currently owns 98ha of land in the suburb of Birkdale which contains large areas of koala habitat. Council has written to the relevant departments seeking opportunity for these parcels to be transferred to, or purchased by Council for the protection and management of koala habitat.⁶⁶

3.54 Along similar lines, Professor Carrick suggested that opportunities should be explored with the proposed sale of 'surplus' defence land. Professor Carrick submitted that the Australian Defence Force 'has some of the best biodiversity left in Australia' and that '[t]he Commonwealth must not be allowed to dispose of such assets without assessing and protecting biodiversity (particularly Koala habitat) values.'⁶⁷

Forestry

3.55 The logging of native forests was raised by many submitters as being a significant threatening process for koalas.⁶⁸ The loss of food trees, destruction of home ranges and death or injury from the felling of trees were seen as threats to the survival of forest-dwelling koala populations.

3.56 In particular the committee received examples of the impact of logging on koala populations on the south coast of New South Wales and in the Strzelecki forest in the Gippsland region of Victoria which are discussed below.

3.57 Submitters were also concerned about the apparent lack of monitoring of forestry operations, the planning and approval process for the logging of state forests and the exclusion of forestry activities undertaken in accordance with a Regional Forest Agreement (RFA) from the approvals and enforcement provisions of the *Environment Protection and Biodiversity Conservation Act 1999*.

3.58 This section considers each of these items in turn.

66 Redland City Council, *Submission 46*, p. 4.

67 Professor Frank Carrick AM, *Submission 86*, p. 24.

68 See: Ms Cassandra Primavera, *Submission 10*, p. 1; Mr Lincoln Young, *Submission 11*, p. 1; Ms Vivienne Jones, *Submission 12*, p. 1; Mr Robert Summers, *Submission 19*, p. 2; Name withheld, *Submission 20*, p. 1; Koala Research Network, *Submission 29*, p. 3; Mr Chris Allen, *Submission 35*, p. 18; Friends of the Earth Melbourne, *Submission 50*, p. 1; Dr Vanessa Standing, *Submission 60*, pp 3–4; Conservation Council ACT Region, *Submission 61*, p. 7; Name withheld, *Submission 83*, p. 1; and Dr Bronte Somerset, *Submission 96*, p. 1.

Impacts of forestry on koala habitat

3.59 Many submitters drew the committee's attention to the impact of logging native forests on koala populations which was stated to be degrading koala habitat, including the loss of koala food trees and the disruption caused to their home ranges. For example the Conservation Council ACT Region stated that:

Industrial level logging causes great destruction of forest habitat and it is unlikely that many koalas would survive in logging coupes. The level of logging activity is also likely to have some impact upon any koalas in adjacent unlogged coupes, through noise and human presence.⁶⁹

3.60 In addition to the direct impact of loss of food trees, the logging of koala habitat in native forests may cause fragmentation of koala home ranges and disruptions to migration and breeding corridors.⁷⁰ Other associated impacts of forestry operations may be the loss and compaction of topsoil, the reduction in species diversity and structural complexity, and an increased fire hazard associated with the drying out of the forest floor.⁷¹

3.61 The committee also received evidence of koalas being directly killed by the felling of trees and logging trucks.⁷²

3.62 In its 2010 listing advice to the minister, the Threatened Species Scientific Committee found that the level of impact depended on the type of logging regime:

Koala habitat may also be lost due to logging, however the effect at the population level is a function of the management regime. For example, while clear felling will remove habitat, koalas may persist in selectively-logged forests (Kavanagh et al. 1995; Kavanagh et al. 2007). Thus the level of threat posed by logging is situation-specific and is determined by the appropriateness of the management regime, and adherence to its prescriptions. Koalas have also been recorded to have established home ranges within revegetated eucalypt woodlands.⁷³

69 Conservation Council ACT Region, *Submission 61*, p. 7.

70 Mr Robert Summers, *Submission 19*, p. 2.

71 Mr Chris Allen, *Submission 35*, p. 18.

72 See: Name withheld, *Submission 20*, p. 1; and Australian Koala Foundation, *Submission 25*, p. 10.

73 Threatened Species Scientific Committee, *Advice to the Minister for Environment, Protection, Heritage and the Arts from the Threatened Species Scientific Committee (the Committee) on Amendment to the list of Threatened Species under the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)*, September 2010, p. 11, www.environment.gov.au/biodiversity/threatened/species/pubs/koala-listing-advice.pdf (accessed 12 July 2011).

3.63 The *National Koala Conservation and Management Strategy 2009–2014* also recognised the point that 'some logging regimes' cause the degradation of koala habitat.⁷⁴

3.64 The National Association of Forest Industries (NAFI) (now known as the Australian Forest Products Association) responded to the above criticisms by stating that the industry is committed to constructively working with stakeholders 'to improve the health and status of Australia's koala population'.⁷⁵ The forest industry was keen to point out that sustainable forest harvesting practices, such as the renewable harvest and regeneration of forest for timber, should not be confused with habitat loss and fragmentation through land clearing.⁷⁶

3.65 NAFI highlighted that Australia has 147.7 million hectares of native forest with 23 million hectares in conservation reserves and 9.4 million hectares in public forests where timber harvesting may be permitted subject to environmental regulation.⁷⁷ A further 2 million hectares of Australia's native forests are plantation timbers. According to NAFI:

The sustainable harvesting of forests represents less than one per cent annually of the forest estate potentially available for wood production in any one year (in all states and territories) and may enhance the habitat for a range of species through the provision of a diversity of mixed age classes, forest structure and food resources across the landscape.⁷⁸

3.66 The committee was informed that under current forestry guidelines, forests are harvested and replanted in small patches to maintain a mosaic ecosystem.⁷⁹ Areas where it has been identified koalas are inhabiting are retained and corridors between those trees are created.⁸⁰

3.67 NAFI also explained that 'where there is evidence of the presence of koalas in areas nominated for harvest through pre-harvest koala surveys, there are requirements for the setting aside of additional minimum exclusion zones for their individual

74 Natural Resource Management Ministerial Council, *National Koala Conservation and Management Strategy 2009–2014*, Department of Environment, Heritage and the Arts, Canberra, 2009, p. 19.

75 National Association of Forest Industries, *Submission 56*, p. 8.

76 National Association of Forest Industries, *Submission 56*, p. 8.

77 National Association of Forest Industries, *Submission 56*, p. 2.

78 National Association of Forest Industries, *Submission 56*, p. 2.

79 Mr Allan Hansard, Transitional Chief Executive, Australian Forest Products Association, *Committee Hansard*, 19 May 2011, p. 53.

80 Mr Mick Stephens, Manager, Strategic Policy, Australian Forest Products Association, *Committee Hansard*, 19 May 2011, p. 55.

protection.⁸¹ Forests NSW's regional ecologist, Mr Peter Kambouris, explained that the exclusion zone for the Eden region is 50 metres.⁸²

3.68 The peak forestry body told that committee that whilst it is unlikely that timber harvesting is taking place in koala habitat of sufficient quality to be a concern to its long term survival, it is 'not to say that koalas do not occur from time to time in areas scheduled for harvest, given their ability to feed on a range of eucalypt species'.⁸³

3.69 NAFI submitted to the committee that forestry operations may have a positive impact on native forests through fuel reduction, vegetation thinning and related activities such as maintenance of access trails and fire breaks.⁸⁴

3.70 Forests NSW provided published forestry research which details the koala's preference for logged coupes:

On the north coast, koalas are significantly associated with heavily logged areas, with a 22 per cent detection rate, rather than unlogged or selectively logged areas, which have a five per cent detection rate...Studies at Eden showed that koalas preferentially use logged coupes in logged/unlogged mosaics and that koalas were found in the same coupes before and after logging.⁸⁵

3.71 Along a similar vein, NAFI representatives informed the committee of scientific research which was said to demonstrate the koala's preference for young trees, implying that:

Koalas obviously like variability, as do other species, in relation to age of forests. What forestry can do through its practices is create a situation where you have a varied-age forest and therefore koalas can appropriately source younger trees with younger leaves—which we hear from the scientists that they prefer—and also have older trees in the forest to have as

81 Australian Forest Products Association (formerly National Association of Forest Industries), Answer to a question taken on notice, 19 May 2011, p. 4.

82 Mr Peter Kambouris, Regional Ecologist, Southern, Forests NSW, *Committee Hansard*, 1 August 2011, p. 43.

83 Australian Forest Products Association (formerly National Association of Forest Industries), Answer to a question taken on notice, 19 May 2011, p. 4.

84 See: National Association of Forest Industries, *Submission 56*, p. 3; and Australian Forest Products Association (formerly National Association of Forest Industries), Additional information on fuel reduction burning, pp 11–15.

85 Mr James Stirling, Manager, Planning and Environment, Native Forests Operations, Forests NSW, *Committee Hansard*, 1 August 2011, p. 37. See also Forests NSW response to questions on notice at: www.aph.gov.au/senate/committee/ec_ctte/koalas/submissions.htm.

their habitat shelters and things like that. So we are providing a more diverse range of habitat than a single-age forest would.⁸⁶

Logging in specific koala habitats – Mumbulla and Strzelecki

3.72 Concerns over the impact of logging on key koala habitat were highlighted in the example of Mumbulla State Forest on the far south coast of New South Wales. Mr John Hibberd of the Conservation Council ACT Region Inc, told the committee that the Mumbulla State Forest koala population 'is the last vestige of the once great koala populations that ran throughout the Bega Valley' and that '[i]ntensive logging in Mumbulla State Forest is absolutely imminent any day.'⁸⁷

3.73 According to Mr Chris Allen, a NSW government expert on koala conservation and who appeared in a private capacity, the forest is home to a population of approximately 21 to 42 koalas and is the only koala community persisting in the Eden region.⁸⁸ The area that the koalas inhabit is committed to the forest industry under a Regional Forest Agreement with approximately 40 000 cubic metres of saw logs to be felled.⁸⁹ Mr Allen told the committee that 'anything less than a substantial reduction in the extent of logging activity in that area will almost certainly make that [koala] population go extinct'.⁹⁰

3.74 Mr Hibberd told the committee that in his view the reason that the logging of the Mumbulla State Forest was proceeding was because of the:

...interagency conflict that exists between Forests New South Wales and the Office of Environment and Heritage in New South Wales. There is a draft Koala Management Framework that was produced in 2008, I believe, which tried to lay down some prescriptions for how we deal with this particular issue. As I said in my submission, this has now sunk without trace into the bureaucracy. The local community has been totally frozen out of any consultation in this process. We have no idea where those negotiations are at, except that we have heard informally that they continually break down because the environment department and the forestry department cannot agree on an effective koala management strategy for Mumbulla State Forest.⁹¹

86 Mr Allan Hansard, Transitional Chief Executive, Australian Forest Products Association (formerly National Association of Forest Industries), *Committee Hansard*, 19 May 2011, p. 58. Despite undertaking to do so, NAFI did not provide this research to the committee.

87 Mr John Hibberd, Executive Director, Conservation Council ACT Region Inc, *Committee Hansard*, 19 May 2011, p. 30.

88 Mr Chris Allen, *Submission 35*, p. 13.

89 Mr Chris Allen, Private capacity, *Committee Hansard*, 19 May 2011, p. 16.

90 Mr Chris Allen, Private capacity, *Committee Hansard*, 19 May 2011, p. 16.

91 Mr John Hibberd, Executive Director, Conservation Council ACT Region Inc, *Committee Hansard*, 19 May 2011, p. 32.

3.75 Forests NSW's regional ecologist, Mr Peter Kambouris, informed the committee that although there 'are koalas scattered throughout the park and forest estate in that region' in the areas of the Mumbulla State Forest where Forests NSW have conducted preharvest surveys there were no signs of koalas found. Mr Kambouris explain that 'it is because the areas earmarked for logging have been spotted gum, and that does not appear to be a preferred browse species for koala in that vicinity.'⁹²

3.76 The Strzelecki ranges in South Gippsland, Victoria was another area where concerns were raised about forestry activities within or near koala habitat. The Strzelecki koala population is unique to the koalas of Victoria as it is the only grouping that has not been translocated from the depauperate stock of French Island or Phillip Island. The committee heard that a soon to be published study found that Strzelecki koalas exhibit a much higher genetic diversity than other Victorian koalas; one that is comparable to the highest levels of genetic diversity in any koala population reported so far in Australia.⁹³ The present number of Strzelecki koalas is unknown.⁹⁴

3.77 In particular, concerns were raised about the impact of post-harvest replanting and regeneration of Strzelecki forest areas. There were claims that logged koala food trees were not being replanted with the same species.⁹⁵ Friends of the Earth Melbourne claimed that in the Strzelecki Ranges the popular koala food tree Mountain Ash has been logged and replaced with Shining Gum which is not endemic to the region nor a koala food tree leading to a 'massive conversion in the area from koala feed to non-koala feed'.⁹⁶

3.78 Hancock Victorian Plantations manages both the plantation (including both radiata pine and native species plantations) and native forested areas that cover the Strzelecki area. The company's CEO, Miss Linda Sewell, explained the company's approach to managing its impact on koalas within its estate:

It is a proactive approach. In formal terms it comprises five elements: monitoring, operating standards, research, recovery and enhancement. There are a range of initiatives within each of these five elements that have been detailed to the commission previously. We have spent years mapping our estate, and this knowledge has enabled us to identify prime koala

92 Mr Peter Kambouris, Regional Ecologist, Southern, Forests NSW, *Committee Hansard*, 1 August 2011, p. 40.

93 Mr Anthony Amis, Land Use Researcher, Friends of the Earth Melbourne, *Committee Hansard*, 1 August 2011, p. 8.

94 Mr Anthony Amis, Land Use Researcher, Friends of the Earth Melbourne, *Committee Hansard*, 1 August 2011, p. 9.

95 See Ms Vivienne Jones, *Submission 12*, p. 1; and Friends of the Earth Melbourne, *Submission 50*, p. 1.

96 Friends of the Earth Melbourne, *Submission 50*, p. 1; and Mr Anthony Amis, Land Use Researcher, Friends of the Earth Melbourne, *Committee Hansard*, 1 August 2011, p. 10.

habitat, which, together with expert guidance, allows us to manage our operations accordingly. Our research program includes a partnership with Monash University to improve knowledge of the health and genetic diversity of the koala population. We train our field staff and contractors on the company's operating standards for the management and protection of koalas. On the ground, we are working with local groups on a number of cooperative projects that enhance the quality of the koala habitat. That work takes place on both HVP land and on adjacent land.⁹⁷

3.79 The committee questioned Hancock Victorian Plantations on its training program for logging machinery operators. Miss Sewell told the committee that of the company's total staffing numbers of about 100, six employees work specifically on environmental issues, and with machinery operators having 'a level of training in environmental matters'.⁹⁸

3.80 Miss Sewell also detailed the company's 'koalas operating standard' which guides on-the-ground harvesting activities:

We have developed a koala operating standard, which dictates our planning and operations around the areas that are viewed as being koala habitat. For example, we go in and have a look immediately prior to the logging to determine whether there are koalas in that plantation at that particular time. If there are, we withdraw from that area until such time as they have passed through it.⁹⁹

3.81 The importance of migration corridors was also raised by supporters of the Strzelecki koalas. For example, Mr Amis of Friends of the Earth Melbourne told the committee:

It is essential that logging plans incorporate measures to maintain koala gene flow between populations in logging areas...Such measures need to include substantial migration corridors. Previous studies indicate that a variety of landscape features can present barriers to koala gene flow in the Sydney region and therefore that the corridors will need to take into account the presence of roads or housing and contain preferred koala habitat.¹⁰⁰

97 Miss Linda Sewell, Chief Executive Officer, Hancock Victorian Plantations, *Committee Hansard*, 1 August 2011, p. 18.

98 Miss Linda Sewell, Chief Executive Officer, Hancock Victorian Plantations, *Committee Hansard*, 1 August 2011, p. 19.

99 Miss Linda Sewell, Chief Executive Officer, Hancock Victorian Plantations, *Committee Hansard*, 1 August 2011, p. 21. Ms Sewell agreed to table a non-confidential version of the operating standard which can be found at: www.aph.gov.au/senate/committee/ec_ctte/koalas/submissions.htm.

100 Mr Anthony Amis, Land Use Researcher, Friends of the Earth, *Committee Hansard*, 1 August 2011, p. 37.

3.82 Miss Sewell informed the committee that if wildlife corridors exist in forests classified as 'plantations' then those areas are available for commercial use and are not protected.¹⁰¹

Regulation of forestry activities

3.83 Several submitters raised the issue of the approval process for logging in areas of key koala habitat. The industry indicated that forestry operations in Australian forests are well regulated through conservation assessments such as:

- the national forest policy framework established under the 1992 National Forest Policy Statement;
- state level sustainable forest management systems; and
- Regional Forest Assessments which require:
 - the establishment of comprehensive, adequate and representative (CAR) forest reserve systems;
 - pre-harvesting flora and fauna surveys and the creation exclusion zones if evidence of koalas is found in areas intended for harvest;
 - the use of environmental management systems by forest agencies that are certified to international standards; and
 - regulatory codes of practice for the retention of identified habitat (such as tree ferns) in coupe where timber harvesting takes place.¹⁰²

3.84 Forests NSW informed the committee of the regulatory framework it operates under:

Apart from the Forestry Act, the main regulatory framework governing the way Forests NSW manages the public native forests is comprised of the regional forests agreements, the NSW forest agreements and the integrated forestry operations approvals and their embedded threatened species licences...The threatened species licences are designed to protect threatened species and the habitat of threatened species from forestry activities. In relation to koalas, the licences prescribe the way in which Forests NSW must conduct surveys for the detection of koalas, signs of their presence and signs of their preferred habitat. The licences also prescribe the measures that must be put in place to protect them.¹⁰³

101 Miss Linda Sewell, Chief Executive Officer, Hancock Victorian Plantations, *Committee Hansard*, 1 August 2011, p. 20.

102 Australian Forest Products Association (formerly National Association of Forest Industries), Answer to a question taken on notice, 19 May 2011, pp 1–2.

103 Mr James Stirling, Manager, Planning and Environment, Native Forests Operations, Forests, *Committee Hansard*, 1 August 2011, p. 37.

3.85 The listing of the koala under the *Environment Protection and Biodiversity Conservation Act 1999* would have varying implications for the forestry industry depending upon the type of listing. However, in general the listing of the koala would require the preparation of a species recovery plan and a risk assessment. According to the forestry peak body, cost implications of any revised changes for koala species protection would be 'incurred by the forest manager or grower and typically passed on through the industry supply chain as higher costs'.¹⁰⁴

3.86 However, several witnesses pointed out that public state-owned forests, which are managed under Regional Forest Agreements, would not be covered by the protections provided by the EPBC Act, if the koala were to be listed. For example Mr Hibberd of the Conservation Council ACT Region Inc explained that:

The other problem [with the EPBC Act] is that the regional forest agreements are specifically excluded from consideration under the Environment Protection and Biodiversity Conservation Act. This is a real problem as well. The [Integrated Forestry Operations Approvals], which are the key operational regulatory instruments under the regional forest agreements, are not protecting threatened species or ecosystem processes.¹⁰⁵

3.87 Concerns were also raised about the management of koala habitat on private land, where according to the AKF 80 per cent of koalas live.¹⁰⁶ According to the Friends of Gippsland Bush, although logging in state forests and in those managed under a Regional Forest Agreement is required to meet certain codes of practice, forestry on private lands is not subject to such rigorous guidelines:

The timber growing and harvesting operations of private forestry are not subject to the same scrutiny or protection as the operations of public forestry. This has meant that in private forestry, protection of biological values in particular has been left largely to the discretion of the landowner or forest manager.¹⁰⁷

3.88 The Coffs Harbour City Council was concerned about the ability of state governments to grant logging approvals over council approved koala management plans. The council submitted that areas identified as key koala habitat under a Koala Plan of Management (KPoM) were approved for logging by the New South Wales

104 Australian Forest Products Association (formerly National Association of Forest Industries), Answer to a question taken on notice, 19 May 2011, pp 1–2.

105 Mr John Hibberd, Executive Director, Conservation Council ACT Region Inc, *Committee Hansard*, 19 May 2011, p. 33.

106 Ms Deborah Tabart, Chief Executive Officer, Australian Koala Foundation, *Committee Hansard*, 3 May 2011, p. 26.

107 Friends of Gippsland Bush, *Submission 69*, p. 4. See also Humane Society International, *Submission 26*, p. 2. Hancock Plantation Victoria's land management practices are detailed above.

Department of Environment, Climate Change and Water (now the Office of Environment and Heritage).¹⁰⁸

3.89 According to the council, a KPoM was prepared in accordance with the *State Environment Planning Policy (SEPP) 1995 No. 44 – Koala Habitat Protection*. The Management Plan was designed to provide a strategic framework for the conservation and management of koala habitat. The mapping undertaken as part of the KPoM also identified areas meriting protection through the council's Local Environment Policy. The council stated that:

The KPoM identifies and ranks core koala habitat into primary, secondary and tertiary zones on private land in the [Local Government Area] LGA. In many cases, Council is the principle consent authority for development activities. However, almost half the land in the LGA is State Forests or National Parks, and as such, is not under council's jurisdiction. An even greater and ongoing concern has been the granting of logging approvals by the Private Native Forestry (PNF) a division of the Department of Environment, Climate Change and Water (DECCW). Currently DECCW has issued approvals in over 2,277 ha of the 19,000 ha of core koala habitat in the Coffs LGA.¹⁰⁹

3.90 The Coffs Harbour City Council suggested that all core koala habitat identified through Koala Plans of Management should be excluded from existing Forest Operation Plans and proposed changes to the plans should be referred to local governments for assessment.¹¹⁰

Mining

3.91 The committee heard evidence on the impact of mining on koala habitat. In particular, evidence was received from the Darling Downs region of Queensland concerning the impact of open-cut coal mining on the local koala population.¹¹¹

3.92 The New Acland Coal Mine is an open-cut coal mine situated approximately 40 kilometres northwest of Toowoomba. The mine comprises two mining leases granted in 2001 and 2006. A new mining lease application is currently subject to a development approval process. If approved, the current 2278 hectare lease area for the mine's operations would be expanded to 7347 hectares.¹¹² Coal is currently mined, processed and dispatched from the site.

108 Coffs Harbour City Council, *Submission 45*, p. 1.

109 Coffs Harbour City Council, *Submission 45*, p. 1.

110 Coffs Harbour City Council, *Submission 45*, p. 3.

111 See Friends of Felton, *Submission 13*, pp 4–8; Sunshine Coast Environment Council, *Submission 65*, p. 10; Dr Nicola Laws and Glenn Beutel, *Submission 74*, pp 1–41; and New Hope Group, *Submission 91*, pp 1–13.

112 New Hope Group, *Submission 91*, p. 3.

3.93 According to anecdotal evidence provided by the local residents of Acland, the area the mine would occupy is home to approximately 100 koalas.¹¹³ As the koalas on the Darling Downs occur outside the south east Queensland bioregion they are classified as a 'species of least concern'.¹¹⁴ The mine occurs in the area of popular box and forest red gum woodland which according to the Friends of Felton, is important koala habitat.¹¹⁵

3.94 Local residents have raised issues over the impact of the mine on koala habitat including the loss of suitable food trees and the destruction of corridors for movement.¹¹⁶ Also of concern are the associated effects of mining on koalas, such as an increased risk of death from heavy vehicles and an increased risk of disease from stress.¹¹⁷

3.95 New Hope Group, owners of the New Acland Coal Mine, submitted that a rigorous environmental impact assessment process has been conducted at the site, including an Environmental Impact Statement (EIS) to address the requirements of the *Environmental Protection Act 1994* (Qld) and the *Environment Protection and Biodiversity Conservation Act 1999* (Cth).¹¹⁸

3.96 Fauna surveys conducted at the site by New Hope Group indicated that koalas are present, however an exact population count could not be established.¹¹⁹

3.97 New Hope Group has prepared a Conservation Management Plan for the site to protect, rehabilitate and manage vegetation occurring within some operational areas of the mine. There is to be no impact on koala habitat in the northern parts of the mine which support koalas.¹²⁰ The mine's environmental management is also facilitated by two on-site environmental officers.

3.98 To date, the New Acland Coal Mine has not been required to address any major issues of non-compliance in relation to its environmental approvals.¹²¹

Changes to mining approvals and operations

3.99 For the community action group Friends of Felton, the issue of mining and its impact on koala habitat raised a number of questions about the environmental

113 Dr Nicola Laws, Private capacity, *Committee Hansard*, 3 May 2011, p. 61.

114 See Chapter 5: The status of koalas under the law.

115 Friends of Felton, *Submission 13*, pp 6–7.

116 Dr Nicola Laws and Mr Glenn Beutel, *Submission 74*, p. 25.

117 Dr Nicola Laws and Mr Glenn Beutel, *Submission 74*, p. 25.

118 New Hope Group, *Submission 91*, p. 1.

119 New Hope Group, *Submission 91*, p. 5.

120 New Hope Group, *Submission 91*, p. 2.

121 New Hope Group, *Submission 91*, p. 2.

approval process for such projects.¹²² Environmental impact statements were seen to be ineffectual at accurately assessing the importance of habitat areas. In particular the ability for the proponent to employ consultants to conduct the EIS was not seen as transparent and thorough.¹²³

3.100 The Sunshine Coast Environment Council highlighted the ability of certain industrial projects to be exempt from state environmental law:

Mining and state significant projects, which are increasingly being applied to residential and commercial development, are largely exempt from State law. The environmental costs of a project and the impact on native fauna are only really tested against Federal law.¹²⁴

3.101 In the example of mining in the Darling Downs, the Friends of Felton argued that even Commonwealth legislation provides inadequate protection for koalas:

Currently, the EPBC Act 1999 provides no mechanisms for the impacts of mining on the koala to be considered because the species is not listed as threatened and often, as in the case of Felton, nor are the vegetation communities.¹²⁵

3.102 It was suggested that changes to the status of the koala at a national level, or in Queensland in areas outside of the south east bioregion, would ensure viable koala populations and habitat are better protected from mining.¹²⁶

3.103 Evaluating and approving mining applications in isolation was seen to be problematic for ensuring the overall protection of koalas and their habitat. According to the Friends of Felton:

...to our knowledge, none of the planning legislation adequately addresses the issue of incremental loss of habitat due to the cumulative impact of multiple development approvals. Unless there is adequate protection for habitat areas (and critical linkages between these across the landscape) from such development activity, clearing of remnant vegetation for mining within the district could reach a point where it threatens the survival of koala populations on the eastern Downs...¹²⁷

3.104 Dr Nicola Laws, a resident of Acland, also called for annual koala audits to be conducted by independent experts in key koala habitat areas where mining is taking place.¹²⁸ According to Dr Laws, this would show proof of habitat protection and

122 Mr Ian Whan, Committee member, Friends of Felton, *Committee Hansard*, 3 May 2011, p. 59.

123 Mr Ian Whan, Committee member, Friends of Felton, *Committee Hansard*, 3 May 2011, p. 59.

124 Sunshine Coast Environmental Council, *Submission 65*, p. 10.

125 Friends of Felton, *Submission 13*, p. 3.

126 Dr Nicola Laws, Private capacity, *Committee Hansard*, 3 May 2011, p. 59.

127 Friends of Felton, *Submission 13*, p. 3.

128 Dr Nicola Laws, Private capacity, *Committee Hansard*, 3 May 2011, p. 60.

revegetation programs. It was also suggested that a koala levy on mining companies could be established to fund these measures and penalties could be applied when numbers fall below an agreed level.¹²⁹

3.105 It was also raised by the Friends of Felton that responsibility for conducting koala surveys in proposed development areas should lie with the government and not left to local community groups or consultancy firms.¹³⁰

Drought, bushfires and climate change

3.106 Natural stochastic events such as droughts and bushfires pose an additional threat to koala populations. These events can impact koalas both directly (through animal mortality) and indirectly (by destroying habitat or reducing it to remnant patches).¹³¹

Bushfire

3.107 Several submitters recalled their personal stories of the devastating Black Saturday fires in 2009. For example, Ms Vicki Hams, a volunteer at the Southern Ash Wildlife Shelter in Victoria, recounted her experience:

The shelter received 101 koalas during the [Black Saturday] bushfires (including the now iconic “Sam” the koala). The koalas suffered varying degrees of burns. One of the most moving stories was a young female joey found in the hunched over burned body of her mother. The mother had wrapped her arms around the joey and hunched over her thus sacrificing her life to save her joey. (The joey had minor burns and was successfully released 12 months later). This is the character of these wonderful animals.¹³²

3.108 Ms Vivienne Jones relayed the damage she had witnessed to koala habitat in the South Gippsland region:

A huge number of koalas were killed in the Strzelecki Ranges during the Black Saturday fires. When driving through the Calignee area you can see just how much of their habitat has been wiped out.¹³³

3.109 The TSSC noted that the overall impact of the Black Saturday fires was large:

129 Dr Nicola Laws, Private capacity, *Committee Hansard*, 3 May 2011, p. 60.

130 Mr David Allworth, Researcher, Biodiversity, Friends of Felton, *Committee Hansard*, 3 May 2011, p. 61.

131 National Resource Management Ministerial Council, *National Koala Conservation and Management Strategy 2009–2014*, December 2009, p. 20.

132 Ms Vicki Hams, *Submission 20*, p. 1.

133 Ms Vivienne Jones, *Submission 12*, p. 1.

The mortality of koalas resulting from these fires has not been quantified, but loss of habitat was extensive and koalas are particularly exposed to injury in crown fires that occur in these intense bushfires.¹³⁴

3.110 Mr Chris Allen also raised the related issue of fuel reduction burning:

Fuel reduction burning is considered to be [a] threat to Koalas in the NSW Koala Recovery Plan (DECCW 2008). Fire applied in dense regrowth areas is likely to be more of a threat [than wildfires] because of the difficulty in keeping flame height low in these areas.

With governments requiring an increase in the extent of fuel reduction burning, the associated risks to Koalas are likely to increase.¹³⁵ (Chris Allen, p. 18).

3.111 The ACT Conservation Council also touched on this issue:

Wildfire has always been a major threat to koalas due to their slow movement response to such a threat. Changing climate in the region is likely to lead to more frequent severe fire events with subsequent impacts on koala populations. Agencies need to incorporate the location of koala population cells into fire management planning so as to be capable of mounting a strategic defense of known activity areas in the event that they are threatened by wildfire (Phillips 2007)...Phillips (2007) has recommended that fire management practices including the use of low intensity burns for the purposes of hazard reduction should not be undertaken within areas of known koala activity.¹³⁶

Drought

3.112 Droughts can also have a devastating impact on koala populations. The Conservation Council ACT Region submitted that:

Drought is clearly a factor in the growth or decline of koala populations, as it can substantially affect the level of foliar nutrients available. However, it is a factor over which we have no control, unlike many of the other potential threats. The only way the potential effects of drought can be effectively mitigated is to provide suitable landscape-scale movement corridors for koalas consisting of a range of tree species with high foliar nutrient leaves.¹³⁷

134 Threatened Species Scientific Committee, *Advice to the Minister for Environment, Protection, Heritage and the Arts from the Threatened Species Scientific Committee (the Committee) on Amendment to the list of Threatened Species under the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)*, September 2010, p. 17.

135 Mr Chris Allen, *Submission 35*, p. 18.

136 Conservation Council ACT Region Inc, *Submission 61*, p. 7.

137 Conservation Council ACT Region Inc, *Submission 61*, p. 9.

3.113 Although the impacts of drought on koala populations are considered by the TSSC to be 'reversible',¹³⁸ their immediate impact can result in dramatic population declines. This impact is most vividly demonstrated by the recent population collapse in central Queensland. Professor McAlpine told the committee that:

The koala populations in the Mulga Lands region, centred on Charleville [Queensland], are estimated to have declined from 50,000 to 60,000 in 1996 to 10,000 to 12,000 in 2009. Work by Dr Alistair Meltzer and Dr Bill Ellis in [Springsure] in central Queensland and Oakey on the eastern Darling Downs also show a substantial decline in the population due to drought and drought induced dieback.

The trees became stressed during the drought and they lost their foliage and the health of the canopy, which affected the nutritional value of those leaves. The evidence that Alistair Melzer has found in Springsure showed that that was an important factor there. Those populations at Springsure have also experienced a fairly substantial crash due to the drought.¹³⁹

3.114 Dr Bill Ellis elaborated on the situation in the areas surrounding Springsure and Oakey:

...what happened [in Springsure in central Queensland] was that the koalas did retreat to the riverine communities but the drought was so bad and the amount of water that was available got so low that most of the riverine trees died as well. The collapse in that population has just been dramatic. A similar picture is out at Oakey as well. The only way you can get the really good long-term data on those sites is to look at them pretty intensively as opposed to looking over the whole of the state less intensively. That is where we found these fine-scale, cascade effects. When the riverine communities supplying the best habitat and supporting the highest populations suffer, they really suffer. The trees there cannot survive through the real extended droughts. That was a really good study population that just totally crashed.¹⁴⁰

Climate change

3.115 Climate change is forecast to increase the frequency and intensity of both bushfires and droughts, as well as other climatic extremes. In this regard the TSSC has stated that:

Climate change is a potential threat to the koala, as it is expected to lead to increased temperatures, changes to rainfall, increasing frequency and

138 Threatened Species Scientific Committee, answer to question on notice, 1 August 2011 (received 10 August 2011), p. 3.

139 Associate Professor Clive McAlpine, Spokesperson, Koala Research Network, *Committee Hansard*, 3 May 2011, p. 4.

140 Dr Bill Ellis Koala Specialist, Koala Research Network, *Committee Hansard*, 3 May 2011, p. 4.

intensity of droughts and increased fire risk over much of the koala's range.¹⁴¹

3.116 In addition to the climatic variability expected from climate change, elevated carbon dioxide levels may alter leaf chemistry resulting in decreased nutritional value for koalas:

Increasing atmospheric CO₂ will have effects independent of climate change *per se*. When eucalypts are grown under elevated CO₂ the ratios of carbon to nitrogen in the foliage increase such that concentrations of carbon-based anti-herbivore compounds like tannins increase while nitrogen (protein) decreases. It has recently been shown that the balance between tannins and proteins determines protein digestibility and that subtle differences may have profound effects for reproductive success of eucalypt folivores...Koala population dynamics could be negatively impacted by the changes in leaf chemistry induced by elevated CO₂. It is not yet possible to assess forest nutritional quality over much of the koala's range, and thus to quantify the effect described above.¹⁴²

Committee comment

3.117 The committee received evidence of the range of potential threats to koala habitat including urban development, forestry and mining.

3.118 The committee agrees that the loss, degradation and fragmentation of koala habitat is the most significant cause of koala population declines and reductions in long-term population viability. This is not to diminish other threats, such as disease, drought, dog predation and car strikes, which when combined with habitat loss, place even greater pressure on the species. Addressing habitat loss, degradation and fragmentation is particularly critical to koala populations in Queensland and New South Wales.

3.119 It is imperative that developers, forestry operators and mining companies act as responsible stewards of the land they occupy and manage. This must involve effective engagement and consultation with local communities, thorough training of staff, minimisation of any negative impacts on koala populations and habitats, and promotion of positive impact which support the wellbeing of the koala.

141 Threatened Species Scientific Committee, *Advice to the Minister for Environment, Protection, Heritage and the Arts from the Threatened Species Scientific Committee (the Committee) on Amendment to the list of Threatened Species under the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)*, September 2010, p. 15. Citations have been removed. See also Associate Professor Clive McAlpine, Spokesperson, Koala Research Network, *Committee Hansard*, 3 May 2011, p. 2.

142 Threatened Species Scientific Committee, *Advice to the Minister for Environment, Protection, Heritage and the Arts from the Threatened Species Scientific Committee (the Committee) on Amendment to the list of Threatened Species under the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)*, September 2010, p. 17.

3.120 The committee recognises that protecting koala habitat also provides protection benefits to a range of other plant and animal species that share such areas.

3.121 The committee notes that policy responsibility for many of the activities that pose a potential threat to koala habitat, for example urban development and forestry, are primarily matters for state and local government.

Habitat mapping

3.122 However, there are areas where Commonwealth involvement and leadership is needed. There are various initiatives already underway which strive to map the koala's habitat. The AKF's Koala Habitat Atlas covers approximately 21 per cent of the koala's national range, while the mapping activities listed under the National Koala Management and Conservation Strategy cover a small number of specific locations.

3.123 In the committee's view there is a much greater need for a national approach to habitat mapping. The committee recommends that the Commonwealth undertake national koala habitat mapping, designed to support the committee's recommendations (contained in chapter 2) aimed at addressing the deficiencies in koala population data and genetic information.

3.124 Initially, koala habitat mapping would concentrate on identified priority conservation areas as well as areas where there is a lack of robust population and habitat data (such as those listed in the TSSC's answers to questions on notice).

3.125 A national koala habitat mapping program would also allow information on the impact of elevated CO₂ levels on leaf nutrients and the resulting changes to koala habitat to be monitored. The committee makes a recommendation in relation to changes in leaf chemistry at Recommendation 10 of this report at paragraph 4.43.

3.126 Such an initiative would clearly require the cooperation and active involvement of state governments as well as koala advocacy groups such as the AKF.

Recommendation 6

3.127 The committee recommends that the Australian Government undertake habitat mapping across the koala's national range, including the identification of priority areas of koala conservation, with a view to listing important habitat under the provisions of the *Environment Protection Biodiversity Conservation Act 1999*.

3.128 In this regard the committee notes that if Parliament supports a related aspect of the recently released *Australian Government response to the report of the Independent Review of the Environment Protection and Biodiversity Conservation Act*

1999, the identification of critical koala habitat would be required under the EPBC Act, if the koala was listed as a threatened species.¹⁴³

Recommendation 7

3.129 The committee recommends that the habitat maps be used to identify and protect important habitat in known koala ranges.

Commonwealth land

3.130 The committee heard that there are parcels of Commonwealth land which comprise significant areas of koala habitat. The Commonwealth could show leadership in protecting the koala by actively managing its land holdings, such as parts of the defence estate, which contain koala habitat.

Recommendation 8

3.131 The committee recommends that the Australian Government review its land holdings which contain koala habitat and consider biodiversity, and specifically koala populations, in the management and sale of Commonwealth land.

Private land

3.132 Much of the koala's habitat lies within privately owned land. The National Koala Management and Conservation Strategy lists a number of state-based programs designed to promote habitat protection on private land, however there are no such Commonwealth activities.

Picture 3.1—An Acland koala, Queensland



Source: Dr Nicola Laws and Mr Glenn Beutel, *Submission 74*, p. 3. Reproduced with the permission of Dr Nicola Laws and Mr Glenn Beutel.

143 The government response to *the Independent Review of the Environment Protection and Biodiversity Conservation Act 1999* accepted the review's recommendation to 'require the identification of critical habitat for listed threatened species at the time of listing' (p. 31).

3.133 In this regard, the committee believes that the Commonwealth should actively explore ways to support private land holders to protect koala populations. For example supporting conservation covenants over existing habitat, establishing connectivity corridors between areas of existing habitat, and the revegetation of former habitat or the rehabilitation of degraded landscapes.

Recommendation 9

3.134 The committee recommends that the Australian Government actively consider options for recognition and funding for private land holders for the conservation of koala habitat.

Chapter 4

Other threats: disease, dogs and motor vehicles

4.1 As part of its inquiry the committee heard evidence that, aside from habitat loss and degradation, Australia's koala population is under pressure from threats such as disease, dogs and car strikes.

4.2 Chlamydial disease and an AIDS-like syndrome referred to as the koala retrovirus (KoRV) are prevalent amongst koala populations. Both these diseases are impacting on the general health of the koala population and may be limiting the species' ability to recover from other environmental stressors such as habitat loss and extreme climatic events such as droughts or bushfires.¹

4.3 The increasing urbanisation of koala habitat in areas of human population growth is also bringing koalas in closer contact with domestic dogs and motor vehicles. In addition, recent research conducted by the Invasive Animals Cooperative Research Centre has highlighted wild dog predation as a significant and previously under-recognised threat to koalas.

4.4 This chapter discusses each of these threats sequentially.

Disease

4.5 According to the *National Koala Conservation and Management Strategy 2009–2014*, the most well known diseases present in koala populations until recently are associated with chlamydia infection.² The recently discovered koala retrovirus is also having a significant impact on koala populations.³

Chlamydia

4.6 Chlamydial infection is common amongst the broader koala population however not all animals show clinical symptoms. The symptoms often include eye infections (such as conjunctivitis), respiratory tract and reproductive tract infections as well as urinary tract infections which can cause the condition referred to as 'dirty tail'

1 For further information on the threat of droughts, bushfires and climate change on koalas see Chapter 3: Threats to koala habitat.

2 Natural Resource Management Ministerial Council, *National Koala Conservation and Management Strategy 2009–2014*, Department of Environment, Heritage and the Arts, Canberra, 2009, p. 20.

3 Paul Young, Rachael Tarlinton and Joanne Meers, 'Virus invades the koala genome', *Australian Science*, June 2008, p. 31.

or 'wet bottom'.⁴ Reproductive tract infections in koalas often results in infertility in female koalas.⁵ Chlamydia can be transmitted through mating and passed from an infected mother to her joeys at birth.

Retrovirus

4.7 Retroviruses are the same class of virus that include HIV. They have a unique lifecycle that allows them to integrate a copy of their own genome into the genetic material of their host.⁶ In doing so they are able to hijack host cell processes to produce many more virus particles, in effect turning the host cell into a virus factory.⁷ Whilst this process is designed to promote the production of virus particles it may also switch on genes of the host cell, which in turn may cause cancer. Conversely, the viral DNA may disrupt a host cell gene leading to the death of the cell or altered cell function.⁸

4.8 Koalas with the retrovirus usually present with ulcers in the mouth and generally poor body condition. According to Dr Jon Hanger, the koala veterinary specialist credited with discovering the koala retrovirus,⁹ the disease is considered responsible for causing the following medical conditions in koalas:

- leukaemia (a cancer of the blood forming cells);
- myelodysplasia (abnormalities in production of blood cells);
- immunodeficiency syndrome (an AIDS-like condition in koalas); and
- other cancers including lymphoma, osteochondroma and mesothelioma.¹⁰

4.9 The koala retrovirus (KoRV) is also believed to affect the way that koalas are able to respond to infections.¹¹ For example, chlamydia should be a relatively minor

4 W. Ellis, A. Girjes, F. Carrick and A. Melzer, 'Chlamydial infection in koalas under relatively little alienation pressure', *Australian Veterinary Journal*, vol. 70, no. 11, November 1993, p. 427.

5 Natural Resource Management Ministerial Council, *National Koala Conservation and Management Strategy 2009–2014*, Department of Environment, Heritage and the Arts, Canberra, 2009, p. 20.

6 Paul Young, Rachael Tarlinton and Joanne Meers, 'Virus invades the koala genome', *Australian Science*, June 2008, p. 30.

7 Dr Jon Hanger, *Submission 34*, Attachment 1, Jon Hanger and Jo Loader, 'Infectious Disease in Koalas: Implications for Conservation', p. 2.

8 Dr Jon Hanger, *Submission 34*, Attachment 1, Jon Hanger and Jo Loader, 'Infectious Disease in Koalas: Implications for Conservation', p. 2.

9 Paul Young, Rachael Tarlinton and Joanne Meers, 'Virus invades the koala genome', *Australian Science*, June 2008, p. 31.

10 A range of other conditions may be associated with koala retrovirus infections. Dr Jon Hanger, *Submission 34*, Attachment 1, Jon Hanger and Jo Loader, 'Infectious Disease in Koalas: Implications for Conservation', p. 2.

11 Dr Jon Hanger, Private capacity, *Committee Hansard*, 3 May 2011, p. 15.

infection in koalas however death from the disease is now common as a result of the increasing prevalence of the retrovirus.¹² Dr Jon Hanger told the committee:

Koalas we think should not get so sick from chlamydia but they do. One of the hypotheses about why they do is that the koala retrovirus is affecting the way they respond to that infection so they get more severe disease. They can potentially die from it when really they should not die from those sorts of infections. Then there are a whole range of primary diseases like leukaemias and cancers that might be directly caused by the virus rather than secondarily associated with immune suppression. My gut feeling is that it is a significant cause of premature death in koalas.¹³

4.10 In New South Wales and Queensland the koala retrovirus is transmitted genetically by inheritance from parents to offspring making it endogenous in koalas.¹⁴ Although this is a known mechanism of transmission, koala retrovirus may also spread from koala to koala by close contact and from infected mothers to their joeys via the milk, similar to other viruses.¹⁵ It may also be possible for the virus to be vectored between koalas by insects.¹⁶

Prevalence of disease in the koala population

Chlamydia

4.11 According to Dr Jon Hanger and Jo Loader, 'chlamydial infection in koalas is common and affects most mainland and many island populations'.¹⁷ Prevalence of the disease varies between populations with severe disease more common in northern koalas in Queensland than in southern koalas in Victoria and South Australia. The TSSC stated that the South Australian and French Island (Victoria) populations are thought to be chlamydia-free.¹⁸

4.12 However the committee was informed that as research on koalas is conducted much more extensively in Queensland, evidence of the disease is much more common in the state. Professor Peter Timms told the committee that chlamydial infection rates

12 Dr Jon Hanger, Private capacity, *Committee Hansard*, 3 May 2011, p. 17.

13 Dr Jon Hanger, Private capacity, *Committee Hansard*, 3 May 2011, p. 17.

14 Dr Jon Hanger, *Submission 34*, Attachment 1, Jon Hanger and Jo Loader, 'Infectious Disease in Koalas: Implications for Conservation', p. 2.

15 Dr Jon Hanger, *Submission 34*, Attachment 1, Jon Hanger and Jo Loader, 'Infectious Disease in Koalas: Implications for Conservation', p. 2.

16 Professor Paul Young, Koala Research Network, *Committee Hansard*, 3 May 2011, p. 11.

17 Dr Jon Hanger, *Submission 34*, Attachment 1, Jon Hanger and Jo Loader, 'Infectious Disease in Koalas: Implications for Conservation', p. 2.

18 Threatened Species Scientific Committee, *Advice to the Minister for Environment, Protection, Heritage and the Arts from the Threatened Species Scientific Committee (the Committee) on Amendment to the list of Threatened Species under the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)*, September 2010, p. 13.

of koalas in southern states could therefore be just as great as those in northern Australia.¹⁹

4.13 The Australia Zoo Wildlife Warriors Worldwide (AZWWW) submitted results of a trial conducted in conjunction with a number of research institutions into the health of wild koalas in south-east Queensland. The study looked at koala populations in Brendale, Narangba, East Coomera and Clagiraba. Ancillary tests and health examinations were conducted on 113 koalas under general anaesthesia.²⁰ Of the 113 wild koalas examined, 42 per cent were infected with chlamydia and/or other diseases.²¹ According to the AZWWW:

The proportion of koalas with detectable reproductive disease in each of these populations is remarkably high. This would unquestionably have serious implications for the viability of these koala populations.²²

4.14 The study also found that a large proportion of koalas surveyed had no overt physical signs of illness and it was only by using thorough veterinary investigative techniques that disease was detected.²³

19 Professor Peter Timms, Koala Research Network, *Committee Hansard*, 3 May 2011, p. 6.

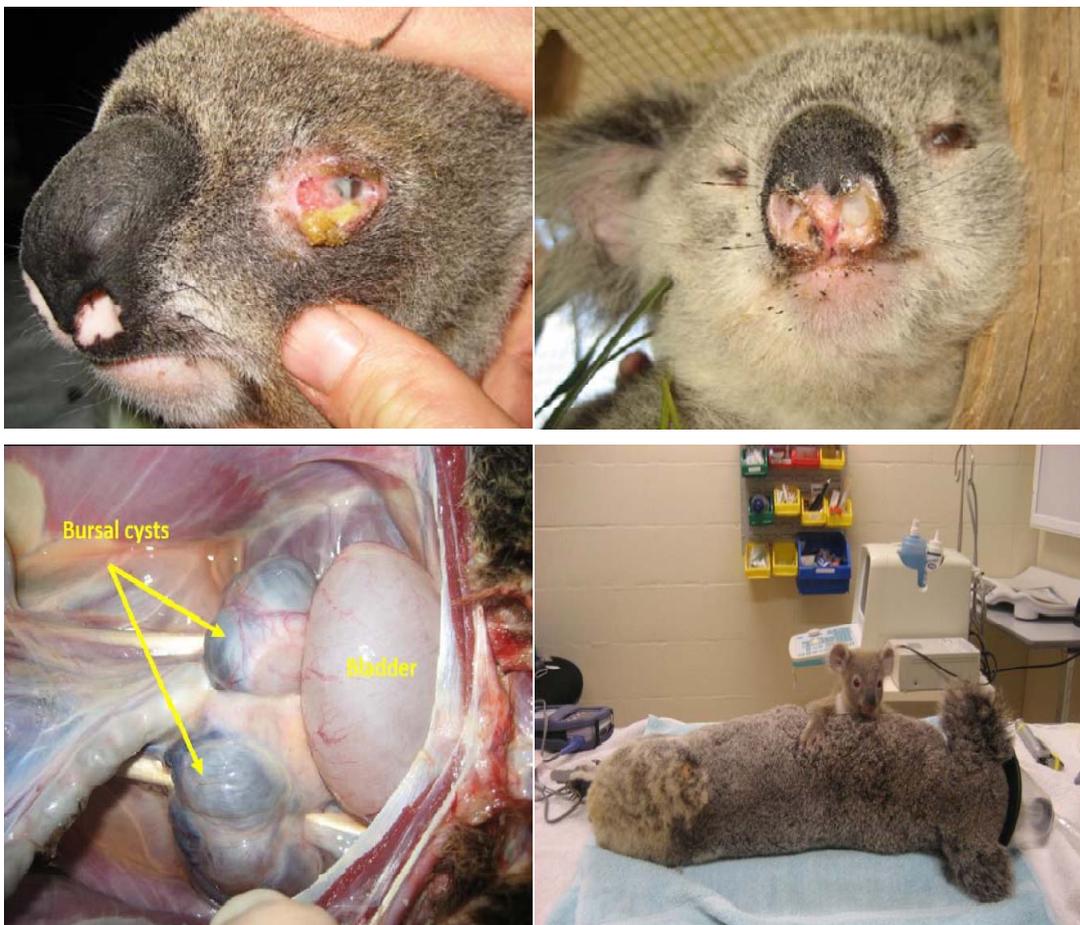
20 Australia Zoo Wildlife Warriors, *Submission 22*, p. 2.

21 Australia Zoo Wildlife Warriors, *Submission 22*, p. 2.

22 Australia Zoo Wildlife Warriors, *Submission 22*, p. 3.

23 Australia Zoo Wildlife Warriors, *Submission 22*, p. 2.

Picture 4.1—Diseased koalas (clockwise from top left: Anatomical Chlamydia Disease Score (Eyes) Chronic kerato-conjunctivitis with active inflammation and muco-purulent discharge; Chlamydial rhinitis characterised by nasal discharge; Veterinary health examination of a female koala (with a joey) under general anaesthesia; and Anatomical Chlamydia Disease Score (Urogenital tract) Cystic ovarian bursitis - overall this koala was in good health and body condition)



Source: Australian Zoo Wildlife Warriors Worldwide, *Submission 22, Attachment A*, pp 75, 102 and 115. Reproduced with the permission of Ms Jo Loader, Research Scientist, Endeavour Veterinary Ecology.

4.15 The committee also received data from the Port Stephens Comprehensive Koala Plan of Management Steering Committee concerning rates of diseased koalas. A study of over 500 koalas admitted to two koala care organisations and three veterinarian clinics in Port Stephens between 2005 and 2008 showed that approximately 10 per cent were diseased.²⁴ Of those koalas that were diseased, approximately 85 per cent showed signs of chlamydia. The Steering Committee's data

24 Port Stephens Comprehensive Koala Plan of Management Steering Committee, *Submission 38*, pp 6–7.

also indicated that instances of chlamydia have increased from 13 per cent in 2005 to 25 per cent in 2008.²⁵

4.16 The Friends of the Koala also highlighted the high occurrence of disease amongst koalas on the north coast of New South Wales. Approximately 54 per cent of the 894 koalas admitted into care between 2007 and 2008 had diseases.²⁶ Euthanasia was commonplace for admitted diseased koalas, accounting for over 80 per cent of disease mortalities.²⁷ The Friends of the Koala stated that:

Disease is without doubt the most common cause of koalas being admitted into care by Friends of the Koala and also the most common cause of mortality. While it may be a fundamental element of Koala population dynamics we see so much disease that in our view it is a significant threatening process.²⁸

Koala retrovirus

4.17 It is assumed that the koala retrovirus is spreading from the north of Australia to the south.²⁹ It is estimated that almost 100 per cent of the koala population in Queensland and New South Wales are infected with the virus.³⁰ In Victoria and South Australia incidence of the disease appears to be lower.³¹

4.18 However, the committee did hear evidence from the Koala Research Network that the virus is currently sweeping through the koala population on Kangaroo Island. According to Professor Paul Young the island:

...went from a situation in 2004 where we did a population analysis and there were no infections on the island to a situation two years later where there were 15 per cent, and three years after that it was upwards of 36 per cent.³²

25 Port Stephens Comprehensive Koala Plan of Management Steering Committee, *Submission 38*, p. 7.

26 Friends of the Koala, *Submission 58*, p. 4.

27 Friends of the Koala, *Submission 58*, p. 5.

28 Friends of the Koala, *Submission 58*, p. 4.

29 See: Professor Paul Young, Koala Research Network, *Committee Hansard*, 3 May 2011, p. 11; and Dr Jon Hanger, *Committee Hansard*, 3 May 2011, p. 17.

30 Dr Jon Hanger, *Submission 34*, Attachment 1, Jon Hanger and Jo Loader, 'Infectious Disease in Koalas: Implications for Conservation', p. 2.

31 Dr Jon Hanger, *Submission 34*, Attachment 1, Jon Hanger and Jo Loader, 'Infectious Disease in Koalas: Implications for Conservation', p. 2.

32 Professor Paul Young, Koala Research Network, *Committee Hansard*, 3 May 2011, p. 11.

4.19 It is not known how the koala retrovirus reached the island, however it is speculated that it may have been vectored between individuals or arrived from an infected animal that was translocated to Kangaroo Island.³³

4.20 It is uncertain how long the koala population has been infected by the virus. Dr Jon Hanger told the committee that the way the virus is acting in the population indicates that it is a fairly recent incursion. However he noted that it is difficult to estimate when the disease entered the population due to the difficulties in dating such viruses with molecular clocks.³⁴

4.21 The University of Queensland Koala Ecology Group suggested that koalas have long been infected with koala retrovirus, citing the presence of the virus on North Stradbroke Island which has been separated from the mainland for thousands of years.³⁵

The effect of disease on the koala population

4.22 The extent of the impact of disease on the koala population is debated by koala scientists. It is considered by some experts that diseases, particularly the koala retrovirus, have been present in koalas for the thousands of years and are not population limiting. Others speculate that the disease is a recent incursion on the koala population and has the capacity to have a significant impact on koala numbers.³⁶

4.23 Professor Frank Carrick and Dr Alistair Melzer both submitted to the committee that they believe there is no evidence to suggest that the koala population will become extinct from chlamydia or the koala retrovirus.³⁷ Dr Melzer argued that:

There are a wide range of diseases and “ill health” that can be found among wild koalas when examined intensively. I argue, however, that this is the normal state of any wild population and such disease profiles may well have an ecological role of keeping populations in check.³⁸

4.24 To Dr Melzer, the influence of overt chlamydiosis in northern koala populations seems to be associated with primary environmental stressors. The consequence however may be 'to reduce the resilience of the populations and lower the probability of future recovery'.³⁹

33 Professor Paul Young, Koala Research Network, *Committee Hansard*, 3 May 2011, p. 11.

34 Dr Jon Hanger, *Committee Hansard*, 3 May 2011, p. 17.

35 University of Queensland Koala Ecology Group, *Submission 42*, p. 4.

36 For example see: Dr Jon Hanger, *Submission 34*, p. 1; and Australia Zoo Wildlife Warriors, *Submission 22*, p. 1.

37 See Dr Alistair Melzer, *Submission 7*, p. 14; and Professor Frank Carrick AM, *Submission 86*, p. 6.

38 Dr Alistair Melzer, *Submission 7*, p. 14.

39 Dr Alistair Melzer, *Submission 7*, p. 14.

4.25 Professor Carrick submitted that the evidence indicates that koalas have co-evolved with both chlamydia and retrovirus for at least a few million years.⁴⁰ Professor Carrick went on to point out that:

There is a difference between being infected and being sick.

Can these organisms lead to sickness and death in Koalas? In the case of chlamydial disease, certainly but NOT inevitably. In the case of KoRV probably yes, but situation is still being clarified (and more work needs to be done).⁴¹

4.26 Conversely, the AZWWW submitted that diseases have the potential to wipe out the koalas population:

It is our view that both KoRV and Chlamydia are highly significant in both their potential impacts on individuals, and on populations. We believe that, in respect of Queensland and NSW koala populations, both should be considered critical threats to long-term viability. It is likely that it is only a matter of time before the same can be said of the Victorian and South Australian koala populations.⁴²

4.27 According to the AZWWW the disease not only presents a threat to koalas that may die of the disease, but population viability becomes threatened due to the high level of infertility that may result from chlamydia.⁴³

4.28 Dr Jon Hanger told the committee that:

...the koala declines that we are seeing, according to the scientific evidence and also the anecdotal evidence that is before us, are far more dramatic than can be explained by habitat loss alone. In other words, even in areas of apparently good koala habitat that are not badly affected by urbanisation pressures or other pressures, we are still seeing dramatic declines of koalas.⁴⁴

Vaccination and funding

4.29 The committee heard evidence from Professor Peter Timms of the Koala Research Network that good progress is currently being made towards developing a vaccination for chlamydial infections in koalas. Trials are currently being conducted on animals at the Lone Pine Koala Sanctuary and Australia Zoo with field trials expected to be conducted soon.⁴⁵

40 Professor Frank Carrick AM, *Submission 86*, p. 6.

41 Professor Frank Carrick AM, *Submission 86*, p. 6. Emphasis in original.

42 Australia Zoo Wildlife Warriors, *Submission 22*, p. 4.

43 Australia Zoo Wildlife Warriors, *Submission 22*, p. 4.

44 Dr Jon Hanger, Private capacity, *Committee Hansard*, 3 May 2011, p. 14.

45 Professor Peter Timms, Koala Research Network, *Committee Hansard*, 3 May 2011, p. 6.

4.30 It is anticipated that to deploy the vaccination through field trials, wild koala populations that are under active management would be targeted for the vaccine. Individual koalas in these populations would be caught and injected. Koalas would need to be recaptured and vaccinated after the initial injection to deliver the full course of the vaccination.⁴⁶

4.31 In the longer term it is hoped that small capsules may be injected into koalas that would release after 60 days or 120 days to eliminate the need to recapture them. Professor Timms told the committee:

...I think we are in a situation now that we can probably manage tens of thousands of koalas actively by using, potentially, a vaccine.⁴⁷

4.32 Scepticism was raised over the possibility of administering a vaccination to a significant number of koalas for it to be effective. Professor Frank Carrick told the committee that:

It is difficult enough to deploy vaccines to people, where they want to get vaccinated and they will queue up at a medical facility to get vaccinated. To deploy this in a wild population is going to be a big ask. The other thing is: would you really want to do it? You would lose the ability to monitor which koalas are naturally infected and which have been successfully vaccinated. Again, they are not closed populations. If you actually successfully achieve vaccination, you are going to have to do it forever.⁴⁸

4.33 The committee heard that whilst a vaccination for chlamydia is nearing field trials, a vaccination for the koala retrovirus is further away. Dr Hanger informed the committee that developing a vaccination for the koala retrovirus is problematic as has been shown in developing vaccines for HIV and AIDS.⁴⁹ However success has been made in developing a vaccine for feline leukaemia virus giving cause for hope that something similar could be developed for koalas.⁵⁰

4.34 A recurring recommendation from submitters was for funding to be made available for combating disease in koala populations.⁵¹ For example the Sunshine Coast Regional Council submitted that:

Significant funds need to be allocated to further understand the health of koala populations within South East Queensland and in particular the diseases they are susceptible to.⁵²

46 Professor Peter Timms, Koala Research Network, *Committee Hansard*, 3 May 2011, p. 6.

47 Professor Peter Timms, Koala Research Network, *Committee Hansard*, 3 May 2011, p. 6.

48 Professor Frank Carrick AM, Private capacity, *Proof Committee Hansard*, 1 August 2011, p. 6.

49 Dr Jon Hanger, Private capacity, *Committee Hansard*, 3 May 2011, p. 19.

50 Dr Jon Hanger, Private capacity, *Committee Hansard*, 3 May 2011, p. 19.

51 For example see: Australia Zoo Wildlife Warriors, *Submission 22*, p. 5; Sunshine Coast Regional Council, *Submission 24*, p. 1; Port Stephens Comprehensive Koala Plan of Management Steering Committee, *Submission 38*, p. 8; Dr Jon Hanger, *Submission 34*, p.1;

4.35 Submitters compared the disease in the koala population to the plight of the Tasmanian devil but without the associated funding. For example Dr Hanger and Jo Loader argued that:

The koala retrovirus has the potential to be one of the most significant factors in the severity and prevalence of serious disease in koalas, and yet the funding allocated to better understanding it has been pitiful. It is our opinion that this virus may be as devastating to koalas as the Tasmanian devil facial tumour disease in devils or chytrid fungus disease in frogs. Both have received orders of magnitude more funding than has research on the koala retrovirus.⁵³

4.36 It was estimated by Professor Timms that between \$2 million and \$5 million in funding would be required to create a program to administer a vaccination for chlamydia to koalas in Queensland.⁵⁴

4.37 Dr Jon Hanger told the committee that for a vaccination for the koala retrovirus to be researched, developed and distributed to infected animals in Queensland and New South Wales, funding in the order of \$20 million would be required.⁵⁵

4.38 The Koala Research Network submitted to the committee that a holistic approach to koala population, conservation and disease research is needed. The network stated:

Arguably the koala decline is much more complex and difficult to address than the Tasmanian devil facial tumour disease, and hence the level of funding should reflect that, but with a similar urgency.⁵⁶

4.39 The Koala Research Network estimated that in order to address the research priorities identified in the *National Koala Conservation and Management Strategy 2009–2014*, including disease research and vaccination, funding in the region of \$36.5 million over a five year period is required.⁵⁷

4.40 The committee has also received correspondence from the Koala Research Network, outlining the funding it is seeking (\$120 000 for one year) for a Research Liaison Officer.⁵⁸

52 Sunshine Coast Regional Council, *Submission 24*, p. 1.

53 Dr Jon Hanger, *Submission 34*, p. 1.

54 Professor Peter Timms, Koala Research Network, *Committee Hansard*, 3 May 2011, p. 6.

55 Dr Jon Hanger, Private capacity, *Committee Hansard*, 3 May 2011, p. 19.

56 Koala Research Network, Additional information, p. 2.

57 Koala Research Network, Additional information, p. 2; available from www.aph.gov.au/senate/committee/ec_ctte/koalas/submissions.htm.

58 Correspondence, Associate Professor Clive McAlpine, Koala Research Network, p. 2, available from www.aph.gov.au/senate/committee/ec_ctte/koalas/submissions.htm.

Committee comment

4.41 The committee notes the significant impact that disease, and in particular chlamydia and the koala retrovirus, is having on the koala population. The committee also notes that there is some disagreement amongst koala researchers about the level of the threat posed by disease.

4.42 The committee accepts that the prevalence of serious disease-related infections is increasing and that this is an indication of the generally poor state of health of individual koalas and of large sections of the overall koala population. In the committee's view the cumulative impact of disease and other threats, such as habitat degradation, results in a less resilient koala population and lowers the probability of future recovery.

4.43 The committee also notes the paucity of funding for koala disease research. The committee supports the integrated research proposal developed by the Koala Research Network which includes a research theme dedicated to koala disease. Not only would this five year research project supply vital information on the mitigation of disease impacts in the koala population, it also would provide critical data on koala population numbers and trends as well as establishing a national koala monitoring program. The committee notes the estimated cost of the project of \$36.5 million over five years, and believes this should be a Budget priority for the government.

Recommendation 10

4.44 The committee recommends that the Australian Government fund research into koala disease, including the viability of vaccination programs and the effect of changes in leaf chemistry.⁵⁹

4.45 The committee also supports the Koala Research Network's funding request to engage a Research Liaison Officer.

Recommendation 11

4.46 The committee recommends that the Australian Government fund the Koala Research Network's request for a Research Liaison Officer.

Predation by dogs

4.47 The committee received evidence that indicated that certain feral and domestic animals, in particular dogs, are having a significant impact on the koala population.

4.48 In the *National Koala Conservation and Management Strategy 2009–2014*, it was noted that:

59 Changes in leaf chemistry is discussed at paragraphs 3.116 and 3.125

Dog attacks primarily occur mainly where koalas use habitat in urban areas, on small rural holdings close to urban centres and in semi-urban areas. They also occur in the wider landscape in areas such as national parks, reserves and on a range of rural holdings.⁶⁰

4.49 Submitters to the inquiry gave evidence of dog attacks on koalas in urban areas in the south-east region of Queensland and northern New South Wales.⁶¹ The committee heard that in areas of urban expansion, corridors of koala food trees are becoming blocked by barriers such as fences and roads.⁶² The fragmentation of their natural habitat has meant that koalas have to search across wide distances for food and are increasingly coming into contact with domestic dogs as well as cars.⁶³ Koalas are also tempted to use food trees in properties that contain domestic dogs.⁶⁴

4.50 According to the Queensland Department of Environment and Resource Management, 1306 koalas were attacked by dogs in south-east Queensland between 1997 and 2009.⁶⁵ As a result of these attacks 954 koalas were either killed or euthanased due to their injuries.

60 Natural Resource Management Ministerial Council, *National Koala Conservation and Management Strategy 2009–2014*, Department of Environment, Heritage and the Arts, Canberra, 2009, p. 21.

61 For example see: Wildlife Preservation Society of Queensland, *Submission 15*, p. 6; Koala Action Group Queensland, *Submission 17*, p. 5; Invasive Animals Cooperative Research Centre, *Submission 18*, pp 1–2; Australian Koala Foundation, *Submission 25*, p. 9; Redland City Council, *Submission 46*, p. 3; Friends of the Koala, *Submission 58*, p. 6; and Department of Environment and Resource Management, Queensland Government, *Submission 79*, pp 12–13.

62 Port Stephens Comprehensive Koala Plan of Management Steering Committee, *Submission 38*, p. 5.

63 Port Stephens Comprehensive Koala Plan of Management Steering Committee, *Submission 38*, p. 5.

64 Ms Vanda Grabowski, Secretary, Koala Action Pine Rivers, *Committee Hansard*, 3 May 2011, p. 30.

65 Queensland Department of Environment and Resource Management, 'Summary of koala hospital presentations, releases and major causes of death, 1997 to beginning of September 2009 – Southeast Queensland', p. 1, www.derm.qld.gov.au/register/p02476aa.pdf (accessed 7 July 2011).

Picture 4.2—Koala with left forepaw injury as a result of a domestic dog attack



Source: Ms Jo Loader, Research Scientist, Endeavour Veterinary Ecology. Reproduced with the permission of Ms Jo Loader.

4.51 The committee also received evidence from the Friends of the Koala in northern New South Wales indicating that approximately 5 per cent of the 894 animals admitted into their care between 2007 and 2010 were attacked by dogs.⁶⁶

4.52 Submitters also highlighted that a significant number of dog attacks on koalas may go unreported. The Friends of the Koala informed the committee that many dog attacks occur at night and in bushland largely unfrequented by people.⁶⁷ Koala Action Pine Rivers also submitted that perhaps only one in every two dog attacks is reported.⁶⁸

4.53 In its consideration for listing the koala as vulnerable under the EPBC Act, the Threatened Species Scientific Committee (TSSC) noted that data on mortality of koalas is often collected by koala care groups and 'demonstrates that mortality from dogs and cars occurs wherever koala habitat is in proximity to urban environments'.⁶⁹

66 Friends of the Koala, *Submission 58*, p. 6.

67 Friends of the Koala, *Submission 58*, p. 6.

68 Koala Action Group Queensland, *Submission 17*, p. 5

69 Threatened Species Scientific Committee, 'Advice to the Minister for Environment, Protection, Heritage and the Arts from the Threatened Species Scientific Committee on Amendment to the list of Threatened Species under the *Environment Protection and Biodiversity Conservation Act 1999*', p. 11.

However, the TSSC noted that there are difficulties associated with the use of the data for several reasons including:

- the area over which the data is collected is often not defined;
- it is unclear what proportion of incidents go unreported;
- the size of the population from which the incidents are drawn are often unknown; and
- there may be considerable overlap in the areas for which different groups report.⁷⁰

Local government response

4.54 The management of domestic dogs in Australian states is largely undertaken by local government.

4.55 The committee heard evidence from a number of local government bodies regarding measures that can be taken to prevent dog attacks on native wildlife in urban areas.⁷¹ For example local governments may require:

- the compulsory 'denning' of dogs at night in areas of known koala habitat;
- the creation of pet-free developments in key habitat areas; and
- the creation of local laws penalising owners of animals that kill native wildlife.⁷²

4.56 Redland City Council told the committee that there are some difficulties associated with creating pet-free developments. According to Mayor Melva Hobson, such developments are not always popular with developers or home owners:

...we have looked at the possibility of inviting some areas to be dog free. That, again, is a negotiation that we would have with the developers. But as you say, there is not a lot of love in some areas, but in other areas people

70 Threatened Species Scientific Committee, 'Advice to the Minister for Environment, Protection, Heritage and the Arts from the Threatened Species Scientific Committee on Amendment to the list of Threatened Species under the *Environment Protection and Biodiversity Conservation Act 1999*', p. 11.

71 For example see: Port Stephens Comprehensive Koala Plan of Management Steering Committee, *Submission 38*, pp 5–6; Redland City Council, *Submission 46*, p. 3; Mayor Melva Hobson PSM, Mayor, Redland City Council, *Committee Hansard*, 3 May 2011, pp 56–57; and Dr Stephen Skull, Manager, Environment Policy Branch, Sunshine Coast Regional Council, *Committee Hansard*, 3 May 2011, pp 56–57.

72 Mayor Melva Hobson PSM, Mayor, Redland City Council, *Committee Hansard*, 3 May 2011, pp 56–57; and Dr Stephen Skull, Manager, Environment Policy Branch, Sunshine Coast Regional Council, *Committee Hansard*, 3 May 2011, pp 56–57.

are quite delighted not to have dogs because of associated things with barking.⁷³

4.57 Local laws that regulate domestic pets are also problematic for local government to enact and enforce. The committee heard evidence concerning the difficulties local government bodies have in enforcing the Queensland *Animal Management (Cats and Dogs) Act 2008* (the Act). The Act is designed in part to provide for the effective management of regulated dogs and prohibits anyone from allowing or encouraging a dog to attack or cause fear to people or other animals.⁷⁴ Under the Act, a fine of up to \$10 000 may be imposed on the owner of any animal that causes the death of another animal.⁷⁵ All animals are classed the same under the Act with no additional penalties applied for the killing of native wildlife.

4.58 Sunshine Coast Regional Council informed the committee that it is extremely problematic to prosecute animal owners under the Act. According to Dr Stephen Skull, the Manager of the Council's Environment Policy Branch, photographic or video evidence is essentially required to prove a domestic animal committed an offence.⁷⁶

4.59 The Threatened Species Scientific Committee also noted that despite growing awareness of the problems of dog attack and the attempts to address them, 'there is little evidence that such management responses have been effective thus far'.⁷⁷

Wild dogs

4.60 The committee also heard evidence about the possible impact of wild dogs on the koala population. The Invasive Animals Cooperative Research Centre (Invasive Animals CRC) informed the committee that whilst the economic impact of wild dogs on agriculture and industry is known, the impacts on biodiversity are often overlooked.⁷⁸ According to Mr Greg Mifsud, National Wild Dog Facilitator with

73 Mayor Melva Hobson PSM, Mayor, Redland City Council, *Committee Hansard*, 3 May 2011, p. 56.

74 *Animal Management (Cats and Dogs) Act 2008* (Queensland), sections 3 and 4.

75 *Animal Management (Cats and Dogs) Act 2008* (Queensland), section 194.

76 and Dr Stephen Skull, Manager, Environment Policy Branch, Sunshine Coast Regional Council, *Committee Hansard*, 3 May 2011, p. 57.

77 Threatened Species Scientific Committee, 'Advice to the Minister for Environment, Protection, Heritage and the Arts from the Threatened Species Scientific Committee on Amendment to the list of Threatened Species under the *Environment Protection and Biodiversity Conservation Act 1999*', p. 13.

78 Mr Greg Mifsud, National Wild Dog Facilitator, Invasive Animals Cooperative Research Centre, *Committee Hansard*, 19 May 2011, p. 7.

Invasive Animals CRC, until recently researchers have underestimated the impacts of wild dogs on the koala populations.⁷⁹

4.61 Most state regulations consider that any dog not under the control of a human to be a wild dog, including: dingos, dingo hybrids, feral domestic dogs and roaming domestic dogs that are causing impact.⁸⁰

4.62 Wild dogs populate rural areas, national parks, peri-urban and semi-urban environments around the country. The Invasive Animals CRC estimate that from anecdotal evidence of livestock attacks around the country, the distribution and densities of wild dogs are increasing nationally.⁸¹ This is in part due to the success of wild dogs at adapting to modified environments.

4.63 Wild dogs also prefer habitat that is favoured by koalas such as established timber forests and vegetated areas around water courses.⁸² They use the cover of the forests to hide and are fond of soft ground to protect their feet. Wild dogs will use the easiest route to travel from point to point, including fire trails and dry creek beds.⁸³

4.64 The committee heard evidence from the Invasive Animals CRC of the increasingly shared habitat of koalas and wild dogs. In August 2009, the Australian Koala Foundation and the University of Queensland conducted a koala survey in the Charleville-area of south-west Queensland. The survey failed to yield a sighting of a single koala in an area where they were once commonly observed. During the same period, the Murweh Shire Council Wild Dog Committee initiated a large scale wild dog control programme across the shire, including areas previously surveyed for koalas. The programme resulted in the trapping of 1400 wild dogs in the Charleville area.⁸⁴

4.65 The committee received advice from the Invasive Animals CRC that several studies conducted across Eastern Australia have already identified the impacts of wild dog predation on koala populations. These studies were said to have demonstrated:

79 Mr Greg Mifsud, National Wild Dog Facilitator, Invasive Animals Cooperative Research Centre, *Committee Hansard*, 19 May 2011, p. 7.

80 Mr Greg Mifsud, National Wild Dog Facilitator, Invasive Animals Cooperative Research Centre, *Committee Hansard*, 19 May 2011, p. 7.

81 Invasive Animals Cooperative Research Centre, *Submission 18*, p. 1.

82 Mr Greg Mifsud, National Wild Dog Facilitator, Invasive Animals Cooperative Research Centre, *Committee Hansard*, 19 May 2011, p. 11.

83 Mr Greg Mifsud, National Wild Dog Facilitator, Invasive Animals Cooperative Research Centre, *Committee Hansard*, 19 May 2011, pp 11–12.

84 Invasive Animals Cooperative Research Centre, *Submission 18*, p. 1.

...the potential to cause local extinctions within fragmented landscapes and to prevent populations from re-establishing and reaching natural densities following catastrophes such as fire and drought.⁸⁵

4.66 The Invasive Animals CRC also informed the committee of wild dog populations that exist in bushland in south-east Queensland and on the outskirts of suburbs in Brisbane, the Gold Coast and the Sunshine Coast. These animals often go unnoticed and are mistaken by residents as domestic dogs without collars.⁸⁶ The Invasive Animals CRC therefore raised the possibility that wild dog attacks on koalas in south-east Queensland are incorrectly attributed to domestic dog attacks.⁸⁷

4.67 Wild dog presence in high densities may also be 'modifying koala behaviour and impacting on the health of individuals by limiting their movement on the ground between habitat trees'.⁸⁸ As a result, wild dogs may also be having an impact on koala populations through starvation. It was suggested by the Invasive Animals CRC that the presence of wild dogs in the habitat preferred by koalas has forced koalas to remain in trees when otherwise they would have come to the ground.⁸⁹ To escape from heat and to move to new food trees, koalas periodically come to the ground. The high densities of wild dogs may therefore be forcing koalas to remain in trees to avoid the predators, resulting in starvation.

4.68 Management of wild dogs currently involves a number of different methods depending upon the situation and location.⁹⁰ Baiting, trapping, fencing and shooting are all options used to control the population.

4.69 In response to a question on notice, the Invasive Animals CRC informed the committee of the potential for a research project to investigate the impacts of wild dogs on koalas. This would initially involve a mapping exercise to overlay the current extent of koala habitat with information on wild dog distribution and activity across Eastern Australia. For a modest outlay of around \$55 000, this mapping exercise would provide the basis for prioritisation of areas requiring immediate management of wild dogs.

4.70 The project's second stage would involve the implementation of intensive wild dog control in the priority areas identified in Stage 1. Professional wild dog

85 Invasive Animals Cooperative Research Centre, answer to question on notice, 19 May 2011, p. 1.

86 Invasive Animals Cooperative Research Centre, *Submission 18*, p. 1.

87 Invasive Animals Cooperative Research Centre, *Submission 18*, p. 1.

88 Invasive Animals Cooperative Research Centre, *Submission 18*, p. 1.

89 Mr Greg Mifsud, National Wild Dog Facilitator, Invasive Animals Cooperative Research Centre, Committee Hansard, 19 May 2011, p.12.

90 Mr Greg Mifsud, National Wild Dog Facilitator, Invasive Animals Cooperative Research Centre, Committee Hansard, 19 May 2011, pp 13.

controllers would be employed at a cost of around \$120 000 per local government area.⁹¹

4.71 Given that wild dogs conservatively cost the Australian agricultural industry \$48 million, the project could be expected to provide broader financial gains through increased production from the grazing industry in eastern Australia and a major benefit to rural communities.⁹²

Feral cats

4.72 Feral cats were not considered to be a direct threat to koalas as they are a 'critical weight specialist'.⁹³ Feral cats prey on mammalian species between approximately 10 grams and 500 grams with a rabbit being at the upper-end of the prey that they could physically take. The committee heard that apart from preying on juveniles, cats would not pose a direct threat to koalas.⁹⁴

Foxes

4.73 Dr Melzer drew the committee's attention to two anecdotal accounts of predation by foxes on koalas.⁹⁵

Committee comment

4.74 The committee notes the significant impact domestic and wild dog predation has on koala populations. The committee also notes the various state-government koala protection measures which are included in the National Koala Conservation and Management Strategy. However, the committee believes that more needs to be done to combat the threat posed by dog attacks.

4.75 Firstly, the committee encourages state governments and local councils in priority koala areas to implement dog predation mitigation options.

4.76 The committee also support the Invasive Animals CRC's proposal to assist koala conservation through wild dog control.

Recommendation 12

91 Invasive Animals Cooperative Research Centre, answer to question on notice, 19 May 2011, pp 1–4.

92 Invasive Animals Cooperative Research Centre, answer to question on notice, 19 May 2011, p. 4.

93 Mr Greg Mifsud, National Wild Dog Facilitator, Invasive Animals Cooperative Research Centre, *Committee Hansard*, 19 May 2011, p. 9.

94 Mr Greg Mifsud, National Wild Dog Facilitator, Invasive Animals Cooperative Research Centre, *Committee Hansard*, 19 May 2011, p. 9.

95 Dr Alistair Melzer, Additional information, p. 1; available from www.aph.gov.au/senate/committee/ec_ctte/koalas/submissions.htm.

4.77 The committee recommends that the Australia Government consider further wild dog control options in priority koala areas.

Motor vehicles

4.78 The high incidence of koalas being killed by road vehicles was raised as a significant threat to their survival. The Friends of the Koala submitted that car strikes are the second most common cause of koalas being admitted into care and the second most common cause of mortality.⁹⁶ The Sunshine Coast Environment Council believes that there is little capacity for resilience with car strikes and recovery options must be urgently investigated.⁹⁷ According to the Queensland Department of Environment and Resource Management, there were 4553 reported motor vehicle strikes in south-east Queensland between 1997 and 2009, resulting in more than 3400 koala fatalities.⁹⁸

Picture 4.3— Koala road fatality in East Coomera, South-East Queensland



Source: Ms Jo Loader, Research Scientist, Endeavour Veterinary Ecology. Reproduced with the permission of Ms Jo Loader.

4.79 The increasing fragmentation of both the landscape and the home ranges of koalas with road infrastructure has brought koalas into close contact with vehicles.⁹⁹

96 The most common cause of koalas being admitted into care and most common cause of mortality was disease. See Friends of the Koala, *Submission 58*, p. 6.

97 Sunshine Coast Environment Council, *Submission 65*, p. 7.

98 Queensland Department of Environment and Resource Management, 'Summary of koala hospital presentations, releases and major causes of death, 1997 to beginning of September 2009 – Southeast Queensland', p. 1, www.derm.qld.gov.au/register/p02476aa.pdf (accessed 7 July 2011).

99 Sunshine Coast Environment Council, *Submission 65*, p. 7.

Roads also present an insurmountable physical barrier for koalas to cross leaving them isolated in pockets of bushland.

4.80 The Koala Action Group Queensland gave an example of two major arterial roads in the Redland area of south-east Queensland being upgraded to four lanes in the last five years due to increases in traffic volume. According to the group this is 'one of the main causes of catastrophic decline in koala numbers' in the area.¹⁰⁰

4.81 As part of its *Koala Response Strategy* the Queensland Government has committed to the use of koala-friendly design for all new main road construction and upgrades. It is also piloting the retrofitting of koala crossings at mortality hotspots on existing main roads.¹⁰¹

4.82 Associated with the impact of motor vehicles and road infrastructure on koalas is the prevalence of anthropogenic noise on koalas breeding. According to the University of Queensland Koala Ecology Group car noise impacts on the vocal communication of koalas is an emerging area of research into declining koala urban-based populations.¹⁰²

Proposed solutions

4.83 The committee heard evidence of a number of methods that have been used to varying degrees of success in protecting koalas from car strikes.

4.84 Fauna crossings which create passages for koalas to move under or over roads are used in some areas of koala habitat in south-east Queensland. Redland City Council gave the example of two koala underpasses that were constructed with the help of federal funding on roads in the Koala Coast area.¹⁰³ Koala exclusion fencing has also been used along some major roads.

Picture 4.4—Koala infrastructure, Karuah Bypass, Pacific Highway, New South Wales



Source: http://karuah.thiess.com.au/html/gallery_a.html.

100 Koala Action Group Queensland, *Submission 17*, p. 5.

101 Queensland Department of Environment and Resource Management, *Submission 79*, p. 12.

102 University of Queensland Koala Ecology Group, *Submission 42*, p. 7.

103 Redland City Council, *Submission 46*, p. 3.

4.85 Redland City Council told the committee of a trial of flashing LED signs to warn drivers of koalas crossing. Whilst the results of the trial were unclear it was suggested that the option be reinvestigated with the ability to change speed limits during certain hours when koalas are known to be on the move (for example at night).¹⁰⁴

4.86 Other solutions that have been suggested include the lowering of speed limits on roads located near or within koala habitats and the installation of speed cameras in known koala areas.¹⁰⁵ The Wildlife Preservation Society of Queensland submitted that koalas injured in car accidents at a speed of 60 km/h or lower have a greater chance of recovery for release in the wild.¹⁰⁶

4.87 It was also recommended by submitters that koala friendly design be incorporated at the planning stage of all new main roads and main road upgrades.¹⁰⁷

Committee comment

4.88 The committee notes the significant impact road trauma has on koala populations and the various solutions proposed by submitters.

4.89 The committee is of the view that in priority koala areas, state governments and local councils can actively contribute to better road planning, infrastructure and regulation. In order to minimise the impact of motor vehicles on koalas, the committee makes the following recommendations.

Recommendation 13

4.90 The committee recommends that local and state governments:

- **introduce appropriate speed limits in priority koala areas; and**
- **that where appropriate, build or retrofit underpasses or overpasses for major roads in priority koala areas as well as installing koala fencing adjacent to major roads.**

4.91 The committee also believes that the Commonwealth should use its road and infrastructure funding to encourage koala protection measures such as land bridge overpasses and underpasses, and koala exclusion fencing.

104 Mr Daniel Carter, Principal Adviser, Natural Environment, Redland City Council, *Committee Hansard*, 3 May 2011, p. 57.

105 Redland City Council, *Submission 46*, p. 3; and Ms Diana Tomkins, *Submission 23*, p. 4.

106 Wildlife Preservation Society of Queensland, *Submission 15*, p. 6.

107 Wildlife Preservation Society of Queensland, *Submission 15*, p. 6.

Recommendation 14

4.92 The committee recommends where the Australian Government provides funding for roads or other infrastructure in or adjacent to koala habitat, it be contingent on the provision of adequate koala protections.

4.93 The committee notes that of the four koala states, only Queensland has committed to any activities related to motor vehicles under the National Koala Conservation and Management Strategy, including ensuring all new state roads and upgrades are koala-friendly. The committee would like to see this initiative rolled out in priority koala areas across the eastern seaboard and expects the Commonwealth to take a leading role in the development of these national arrangements.

Recommendation 15

4.94 The committee recommends that the Australian Government work with the states to develop new national guidelines to ensure that all new roads and upgrades in or adjacent to koala habitat are koala-friendly.

Chapter 5

The status of koalas under the law

5.1 There was considerable support amongst submitters for the koala to be given protection under national legislation. In particular there was overwhelming support for the koala to be listed as a threatened species under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*.¹

5.2 The impetus to protect the koala under legislation has arisen from a view that there are insufficient mechanisms and management plans to adequately respond to the decline in koala numbers.

5.3 A number of submitters expressed the view that delaying the listing of koalas under threatened species legislation until their population is in crisis is counterintuitive to their survival. A submitter who requested their name be withheld outlined these concerns:

Attempts to 'save' species facing extinction usually come at a point when it is too late to do anything significant as far as natural populations of the species is concerned; rather it is our final forced gesture of 'stewardship' to save us from the shame of having yet another species added to the "species now extinct" list.²

5.4 It was suggested that the current lack of accurate estimates of koala numbers also reinforced the need to urgently protect koalas under legislation. The Humane Society International argued that:

1 See for example: Mrs Margaret Hardy, *Submission 3*, p. 1; Ms Susan Lyle, *Submission 4*, p. 1; Ms Vivienne Jones, *Submission 12*, p. 1; Friends of Felton, *Submission 13*, p. 7; Koala Action Group Queensland, *Submission 17*, p. 6; Robert Summers, *Submission 19*, p. 3; Ms Diana Tomkins, *Submission 23*, p. 3; Australian Koala Foundation, *Submission 25*, p. 12; Humane Society International, *Submission 26*, p. 1; Mr Ian Pratt, *Submission 30*, p. 4; Name withheld, *Submission 33*, p. 5; Mr Roger Park, *Submission 36*, p. 2; Mr John Callaghan, *Submission 37*, p. 1; Port Stephens Comprehensive Koala Plan of Management Steering Committee, *Submission 38*, p. 8; University of Queensland Koala Ecology Group, *Submission 42*, p.8; Redland City Council, *Submission 46*, p. 4; Friends of the Koala (Phillip Island), *Submission 47*, p. 3; Logan and Albert Conservation Association, *Submission 49*, p. 2; Birkdale Progress Association, *Submission 51*, p. 2; The Coastwatchers Association, *Submission 54*, p. 13; Wildlife Preservation Society of Queensland Logan Branch, *Submission 57*, p. 6; Friends of the Koala, *Submission 58*, p. 9; Dr Vanessa Standing, *Submission 60*, p. 5; Conservation Council ACT Region, *Submission 61*, p. 9; Ms Paulette Oldfield, *Submission 64*, p. 6; Sunshine Coast Environment Council, *Submission 65*, p. 9; Mr Ian Bridge, *Submission 66*, p. 2; Ms Colleen Wood, *Submission 71*, p. 4; Wildlife Queensland, *Submission 76*, p. 6; Name withheld, *Submission 81*, p. 2; Hunter Koala Preservation Society, *Submission 82*, p. 1; and Professor Frank Carrick AM, *Submission 86*, p. 27.

2 Name withheld, *Submission 5*, p. 1.

With a lack of estimates of current total numbers of koalas in Australia, and no direct measurement of past national population sizes, there is a greater need to be precautionary in managing the national populations.³

5.5 Some submitters also raised concerns about the uncertainty about how low the koala population must fall before it becomes unviable.⁴

5.6 The Australian Koala Foundation argued that whilst domestic animals receive protection under the law, koalas are ignored by federal and state legislation and suffer from a lack of a custodian:

If you can imagine 25,000 cats and dogs being starved to death, ripped apart by predators, or run over by cars over a lengthy period, you would imagine that “someone”, the RSPCA, would find someone to prosecute or blame. This is not the case with native wildlife. When a developer cuts down a koala tree and the animal is subsequently killed because it is homeless, nothing happens. It is the view of the AKF that the Australian Federal Government should declare itself the custodian of the koala and ensure its protection. Repeatedly the koala “falls between the stools”. Council’s blame State Governments and State Government’s tell the Federal Government they have it under control.⁵

5.7 This chapter considers the protections afforded to koalas under state law, and then the threatened species assessment process under the national environmental law.

Conservation status of the koala

5.8 The koala has received varying degrees of protection under legislation across its range which extends from the south-east corner of South Australia, through Victoria, New South Wales, the Australian Capital Territory, and up to the north-east of Queensland.

5.9 There have been three attempts to list the koala nationally under Commonwealth legislation however the koala is currently not protected under national environmental law.

5.10 Internationally, the koala has been listed as a species of least concern by the International Union for the Conservation of Nature and conversely as a threatened species by the United States Government.⁶

3 Humane Society International, *Submission 26*, p. 3.

4 For example Port Stephens Comprehensive Koala Plan of Management Steering Committee, *Submission 38*, p. 8

5 Australian Koala Foundation, *Submission 25*, p. 15.

6 Professor Peter Harrison, Member, Threatened Species Scientific Committee, *Committee Hansard*, 1 August 2011, p. 46; and the Australian Koala Foundation, *Submission 25*, p. 5.

5.11 Currently, the Commonwealth, States and Territories each maintain separate lists of threatened species and ecological communities. Table 1 sets out the listing status of the koala across relevant Australian jurisdictions. A brief outline of the listing status in each jurisdiction follows.

Table 1—Listing status of the koala in Australian jurisdictions

Jurisdiction	Legislation	Listing status	Year listed
New South Wales	<i>Threatened Species Conservation Act 1995</i> (NSW)	Vulnerable	1992
	<i>National Parks and Wildlife Act 1975</i> (NSW)	Protected	1975
Victoria	<i>Flora and Fauna Guarantee Act 1988</i> (Vic)	Not listed	N/A
	<i>Wildlife Act 1975</i> (Vic)	Protected wildlife	1975
Queensland	<i>Nature Conservation (Wildlife) Regulation 1994</i> (Qld)	Vulnerable in south-east Queensland; a species of least concern elsewhere	2004
South Australia	<i>National Parks and Wildlife Act 1972</i> (SA)	Protected	1972
Australian Capital Territory	<i>Nature Conservation Act 1980</i> (ACT)	Not listed	N/A
Commonwealth	<i>Environment Protection and Biodiversity and Conservation Act 1999</i>	Not listed	N/A

Source: National Resource Management Ministerial Council, National Koala Conservation and Management Strategy 2009–2014, December 2009, p. 16.

New South Wales

5.12 Under the *Threatened Species Conservation Act 1995* (NSW) the koala is listed as a vulnerable species in New South Wales.⁷ Two specific koala populations in the state are also listed as endangered under the Act: one in the Hawks Nest and Tea

7 New South Wales Department of Environment, Climate Change and Water, *Submission 78*, p. 1. In April 2011, most of the functions of the former NSW Department of Environment, Climate Change and Water were transferred to the Office of Environment and Heritage within the NSW Premier's department.

Gardens region (north-east of Newcastle) and the other in the Pittwater area (north of Sydney).

5.13 For a species to be listed under the NSW Act, an independent scientific committee must recommend listing to the minister if, in its opinion, the species is facing: an extremely high risk of extinction, a very high risk of extinction or a high risk of extinction in New South Wales in either the immediate future, near future or medium-term future.⁸

5.14 In listing the koala as vulnerable in New South Wales in 1992, it was considered that the population was between 1001 and 10 000 individuals and 'rapidly declining in specific regions'.⁹

5.15 As with all native animals in New South Wales, the koala is also a protected species under the *National Parks and Wildlife Act 1974* (NSW). This provides that koalas cannot be harmed or held in captivity without proper authorisation from the government.¹⁰

5.16 Koala habitat is also given some limited protection under the *Native Vegetation Act 2003* (NSW). This Act aims to minimise the effect of land clearing and fragmentation of habitat for wildlife, including the koala.¹¹

5.17 The *State Environment Planning Policy 44 – Koala Habitat Protection* (SEPP 44) also aims to encourage the proper conservation and management of areas of natural vegetation that provide habitat for koalas.¹² The SEPP 44 requires the preparation of plans of management before development consent can be granted in relation to areas of 'core koala habitat'.¹³ It also encourages the creation of Comprehensive Koala Plans of Management (CKPoM) for local government areas, for example the Coffs Harbor City Council plan discussed in Chapter 3.

8 *Threatened Species Conservation Act 1995* (NSW), section 10.

9 Department of Environment and Climate Change NSW, 'Appendix 4: Biological scores used for evaluation of the status of the koala in New South Wales', *Recovery plan for the koala (Phascolarctos cinereus)*, Department of Environment and Climate Change NSW, Sydney, November 2008, p. 95, www.environment.nsw.gov.au/resources/threatenedspecies/08450krp.pdf (accessed 13 July 2011).

10 Section 120, *National Parks and Wildlife Act 1974* (NSW).

11 New South Wales Department of Environment, Climate Change and Water, *Submission 78*, p. 1.

12 Department of Environment and Climate Change NSW, *Recovery plan for the koala (Phascolarctos cinereus)*, Department of Environment and Climate Change NSW, Sydney, November 2008, p. 4, www.environment.nsw.gov.au/resources/threatenedspecies/08450krp.pdf (accessed 13 July 2011).

13 'Core Koala Habitat' is defined under regulation 4 of SEPP 44 as "an area of land with a resident population of koalas, evidenced by attributes such as breeding females (that is, females with young) and recent sightings of and historical records of a population."

Victoria

5.18 As with most native wildlife in Victoria, the koala is considered to be protected wildlife under the *Wildlife Act 1975* (Vic).¹⁴

5.19 Victoria has a large and thriving koala population which is widespread throughout the state (for details of the Victorian koala population see chapter 3).¹⁵ As a result, the species is not listed under the *Victorian Flora and Fauna Guarantee Act 1988* (Vic) which provides categories of threatened species and has the conservation of Victoria's threatened wildlife as its main objective.

Queensland

5.20 In Queensland the koala is classified under the *Nature Conservation Act 1992* (Qld) as being a species of least concern throughout the state, except for the south-east Queensland bioregion where it has been listed as vulnerable since 2004.¹⁶ The south-east bioregion extends from the New South Wales border in the south, north to Gladstone and west to Toowoomba and Kingaroy.¹⁷

5.21 For a species to be considered vulnerable under the Act, the government-appointed Species Technical Committee must assess whether:

- the population size or distribution of the species has declined, or is likely to decline, to an extent that it may become endangered because of a threatening process; or
- the population size of the species has been seriously depleted and future protection is not secure; or
- the population of the species is low or localised and its habitat is likely to be adversely affected in terms of quantity or quality by a threatening process.¹⁸

5.22 The Species Technical Committee must also follow guidelines for assigning species to classifications which state that:

14 *Wildlife Act 1975* (Vic), section 3.

15 Victorian Department of Sustainability and Environment, *Victoria's koala management strategy*, Victorian Department of Sustainability and Environment, Brunswick, 2004, p. 4, www.dse.vic.gov.au/_data/assets/pdf_file/0004/106852/Koala.pdf (accessed 14 July 2011).

16 The koala is classified according to the criteria set out in the *Nature Conservation Act 1992* (Qld) and listed in the *Nature Conservation (Wildlife) Regulation 2006* (Qld).

17 See Queensland Department of Environment and Resource Management, 'Biodiversity in SEQ bioregion', www.derm.qld.gov.au/parks_and_forests/managing_parks_and_forests/forest_transfer_processes_in_queensland/south_east_queensland_forests_agreement_seqfa/about_seqfa/biodiversity_in_the_seq_bioregion.html (accessed 13 July 2011).

18 *Nature Conservation Act 1975* (Qld), section 78.

- the committee, as much as possible, be consistent with the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* listing for the species;
- the committee consider the Queensland population of the species as a whole; and
- if the species also occurs in other parts of Australia, then the overall national population is taken into consideration.¹⁹

5.23 Whilst there are many regulations and planning policies covering koalas and their habitat in south-east Queensland where they are listed as vulnerable, there is little protection of their habitat outside of this region. Areas outside the south-east Queensland bioregion are protected under legislation such as the Nature Conservation Act however these laws do not specifically protect koala habitat or food trees, except where a tree is being used to rear a koala joey.²⁰

South Australia

5.24 As with all native Australian wildlife, the koala is protected in South Australia under the *National Parks and Wildlife Act 1975 (SA)*.²¹ This allows for the protection of wildlife and habitat and controls the possession and trade of native fauna through licensing and permits. The koala was previously listed as rare, but was de-listed in 2008.

Australian Capital Territory

5.25 In the Australian Capital Territory the koala is not listed under the *Nature Conservation Act 1980 (ACT)*. The Act does however impose penalties on people found to have killed or taken native wildlife.²²

5.26 There have been no sightings of koalas in the territory since severe bushfires burnt much of their habitat in 2003.

International

IUCN Red List of Threatened Species

5.27 In 2008 the International Union for the Conservation of Nature (IUCN) listed the koala as a species of least concern on the Red List of Threatened Species.²³

19 Queensland Department of Environment and Resource Management, 'Guidelines for assigning different classes to a recognisable taxon within a species', www.derm.qld.gov.au/wildlife-ecosystems/wildlife/threatened_plants_and_animals/guidelines.html (accessed 14 July 2011).

20 Ms Larissa Waters, *Submission 90*, pp 2–3.

21 *National Parks and Wildlife Act 1975 (SA)*, section 5.

22 *Nature Conservation Act 1980 (ACT)*, section 44.

United States of America

5.28 In 2000, the koala was listed as threatened under the United States *Endangered Species Act 1973*.²⁴ Under the Act, the United States government is legally bound to consider a species for listing if a petition has been lodged. The Act is not restricted to species native to the United States and whilst acknowledging national boundaries in the nomination of a species, 'makes that consideration secondary to the concern for the survival of species'.²⁵

5.29 For a species to be listed under the Act, a petition must first be lodged.²⁶ If within 90 days significant information is submitted to the government concerning the status of the species, a 12 month review commences proposing to list the species as threatened. A final determination on the listing is then made based on five listing factors: threats to the species habitat, decimation of the population, disease or predation; inadequacy of existing regulatory mechanisms, and other manmade or natural factors threatening its existence.

5.30 In listing the koala as threatened, the United States Fish and Wildlife Service found that the eucalyptus forest and woodland ecosystems on which koalas depend 'have been greatly reduced'.²⁷ They also found that the species is threatened by the fragmentation of habitat, disease, loss of genetic variation and death by dogs and motor vehicles.²⁸

5.31 Amongst other things, the listing of a species under the Act provides protection by:

- requiring United States federal agencies to ensure that any activities they undertake do not jeopardise the continued existence of the species or destroy its critical habitat;

23 ICUN Red List of Threatened Species, 'Phascolarctos cinereus', Version 2011.1, www.iucnredlist.org/apps/redlist/details/16892/0 (accessed 14 July 2011).

24 United States Government, 'Department of the Interior, Endangered and Threatened Wildlife and Plants; Final Determination of Threatened Status of the Koala', *Federal Register*, vol. 60, no. 90, 9 May 2000, p. 26762.

25 United States Government, 'Department of the Interior, Endangered and Threatened Wildlife and Plants; Final Determination of Threatened Status of the Koala', *Federal Register*, vol. 60, no. 90, 9 May 2000, p. 26762.

26 For further information on the *Endangered Species Act 1973*(United States) see United States Fish and Wildlife Service, 'Endangered Species Act', www.fws.gov/endangered/laws-policies/esa.html (accessed 14 July 2011).

27 United States Government, 'Department of the Interior, Endangered and Threatened Wildlife and Plants; Final Determination of Threatened Status of the Koala', *Federal Register*, vol. 60, no. 90, 9 May 2000, p. 26762.

28 United States Government, 'Department of the Interior, Endangered and Threatened Wildlife and Plants; Final Determination of Threatened Status of the Koala', *Federal Register*, vol. 60, no. 90, 9 May 2000, p. 26762.

- authorising the Secretary of the Interior to provide limited financial assistance for the protection of the species in foreign countries; and
- prohibiting the import or export of the species without proper licensing.²⁹

5.32 In response to a question on notice, the Department of Sustainability, Environment, Water, Populations and Communities provided some context surrounding the US listing decision:

The criteria for listing threatened species under the United States' Endangered Species Act 1973 are less specific than the guidelines used by the Threatened Species Scientific Committee. For example, the United State's criteria do not specify a quantitative decline in population, nor the timeframe over which a decline must occur. The United State's 2000 listing was based on historical decline in habitat since European settlement, ongoing (at the time of listing) habitat clearance in Queensland and low genetic diversity of Victorian and South Australian populations.³⁰

Listing under the *Environment Protection and Biodiversity Conservation Act*

5.33 The koala is not listed as a threatened species under the Commonwealth's national environmental law – the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). The koala has been nominated for protection under Commonwealth legislation three times: in 1996, 2006 and a current assessment commenced in 2010.

5.34 Many submitters called for the koala to be listed as vulnerable under the Act to guarantee its future survival. The Humane Society International summed up the views of many submitters in stating:

An important advantage of a vulnerable listing under the EPBC Act is that it would safeguard populations from increasing threats by triggering intervention from the Federal Environment Minister in the approval of actions that significantly impact on the species.³¹

5.35 The University of Queensland Koala Ecology Group agreed that listing of the species would slow the decrease in the size of the koala population:

...listing the species under the EPBC Act (1999) would provide at least a speed bump in the road to extinction, one that may delay this process for

29 United States Government, 'Department of the Interior, Endangered and Threatened Wildlife and Plants; Final Determination of Threatened Status of the Koala', *Federal Register*, vol. 60, no. 90, 9 May 2000, p. 26769.

30 Department of Sustainability, Environment, Water, Populations and Communities, answer to question on notice, 19 May 2011, (received 12 August 2011), p. 11.

31 Humane Society International, *Submission 26*, p. 2.

long enough that, hopefully, in years to come the species will again be common, widespread and not require such a listing.³²

5.36 It was also argued that if the koala was listed as a vulnerable species, additional protection would flow on to other species that share koala habitat.³³ The National Koala Conservation and Management Strategy also recognises the 'significant benefits' to other species:

Protecting, restoring and managing koalas and their habitat will have significant benefits for a wide range of other species and ecological communities which also share the koala's habitat.³⁴

5.37 Some submitters however were less optimistic about the benefits of listing the koala. For example the Wildlife Preservation Society of Queensland stated:

Undoubtedly the listing of the koala and its habitat would draw attention to their status but would it achieve an arrest to the decline of the koala let alone reverse the trend. Wildlife Queensland has reservations unless an appropriate recovery plan was not only developed but fully funded and implemented.³⁵

5.38 The development industry was also wary of the effects that listing would have on duplicating existing regulation:

The listing would create a difficult regulatory load that is particularly of concern given the ailing state of development activities and construction employment in Queensland and particularly is unnecessary at this time as a consequence of recent new controls for SEQ applied by the Queensland government.³⁶

5.39 The Property Council of Australia argued that current listings under the Act fail to have adequate regard to social and economic concerns.³⁷

5.40 Finally on this note, the Threatened Species Scientific Committee reminded the committee of the negative implication of a threatened species listing:

...it is by no means a Holy Grail to be listed as threatened. In fact, it is very much a situation we would like not to be in for most species. It is sort of a house of last resort and we would rather not that.³⁸

32 University of Queensland Koala Ecology Group, *Submission 42*, p. 8.

33 For example Port Stephens Comprehensive Koala Plan of Management Steering Committee, *Submission 38*, p. 12.

34 National Resource Management Ministerial Council, *National Koala Conservation and Management Strategy 2009–2014*, December 2009, p. 2.

35 Wildlife Preservation Society of Queensland, *Submission 15*, p. 7.

36 Urban Development Institute of Australia (Queensland), *Submission 52*, p. 2.

37 Property Council of Australia, *Submission 39*, p. 2.

The Environment Protection and Biodiversity Conservation Act 1999

5.41 The *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) is the nation's primary piece of environmental legislation that gives the Commonwealth responsibility for eight matters of national environmental significance including:

- world heritage properties;
- national heritage properties;
- nuclear actions;
- the Commonwealth marine environment; and
- listed nationally threatened species and communities.³⁹

5.42 The EPBC Act replaced the former *Endangered Species Protection Act 1992* as the primary piece of Commonwealth legislation that provides for a threatened species list.

Ministerial responsibilities

5.43 Amongst other things, Part 13 of the EPBC Act provides for the listing of nationally threatened species and ecological communities, migratory species and key threatening processes. The responsible minister⁴⁰ is required to establish a list of native threatened species divided into the following six categories:

- (a) Extinct;
- (b) Extinct in the wild;
- (c) Critically endangered;
- (d) Endangered;
- (e) Vulnerable; or
- (f) Conservation dependent.⁴¹

5.44 The minister is also empowered under the Act to amend the threatened species list. In doing so the minister must only consider matters relating to:

38 Dr John Woinarski, Member, Threatened Species Scientific Committee, *Committee Hansard*, 1 August 2011, p. 54.

39 In 2009 the Senate Standing Committee on Environment, Communications and the Arts conducted an inquiry into the operation of the *Environment Protection and Biodiversity Act 1999*. Information on the inquiry and a copy of the report is available at: www.aph.gov.au/senate/committee/eca_ctte/epbc_act/index.htm (accessed 15 July 2011).

40 Under the Administrative Arrangements Order of 14 October 2010, the Minister for Sustainability, Environment, Water, Population and Communities is responsible for the administration of the EPBC Act.

41 *Environment Protection and Biodiversity Conservation Act 1999*, section 178.

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- whether the native species or ecological community is eligible to be included in that category; or
 - the effect that including the native species or ecological community in that category could have on the survival of the native species or ecological community.⁴²

5.45 The minister must also obtain and consider advice from the Threatened Species Scientific Committee (TSSC) on the proposed listing.⁴³ The minister may also seek and have regard to information or advice from any other source.⁴⁴

5.46 In all but the most exceptional circumstances, the minister would be expected to act consistently with the expert advice. However the prospect remains that in rare circumstances a minister may depart from expert advice.⁴⁵

The listing process

5.47 In practice the process for listing a threatened species occurs during an annual assessment cycle and involves a number of steps:

- (a) The minister may determine conservation themes (optional).
- (b) The minister invites people to make nominations for inclusion on the lists for threatened species, threatened ecological communities or key threatening processes. Nominations require supporting evidence such as information on the taxonomy, legal status and ecology of the nominated species. These nominations are provided to the TSSC.
- (c) The TSSC prepares and provides to the minister a proposed priority assessment list. The proposed priority assessment list developed by the TSSC must include an assessment completion time for each item.
- (d) The minister finalises the list of items that are to be assessed ('finalised priority assessment list'). In finalising the priority assessment list, the minister may add or omit any item, or make any other change(s) in accordance with the regulations to the Act.
- (e) The TSSC invites people to provide comments about the items in the finalised list.

42 *Environment Protection and Biodiversity Conservation Act 1999*, subsections 186(2) and 187(2).

43 *Environment Protection and Biodiversity Conservation Act 1999*, section 189.

44 *Environment Protection and Biodiversity Conservation Act 1999*, paragraph 194Q(6)(b).

45 According to the Australian National Audit Office the minister has disagreed with TSSC recommendations to list two species: the Southern Bluefin Tuna and the Murray-Darling River Snail. See Australian National Audit Office (ANAO), *The conservation and protection of national threatened species and ecological communities*, Audit Report No. 31 of 2006–2007, p. 52, www.anao.gov.au/uploads/documents/2006-07_Audit_Report_311.pdf (accessed 20 July 2011).

- (f) The TSSC assesses the items in the finalised list and gives the assessments to the minister. If the TSSC's advice recommends that the species is eligible to be included in a threatened species category, then the advice must include the grounds on which the species is eligible to be included in a category, and the main factors that are the cause for it to be listed.
- (g) The TSSC must assess the items in the finalised priority assessment list by the time specified in that list or by that time as extended under section 194P of the Act. In total, the minister may grant extensions of time up to but not beyond five years.
- (h) The minister decides whether an assessed item should be included in the relevant list. The minister must decide whether or not to include an assessed item on a list under the Act within 90 days of receiving the assessment. This period can, however, be extended indefinitely.⁴⁶

Threatened Species Scientific Committee's assessment guidelines

5.48 The TSSC has established *Guidelines for assessing the conservation status of native species* (the guidelines) for it to follow in assessing the conservation status of native species according to the EPBC Act and the *Environment Protection and Biodiversity Conservation Regulations 2000*.⁴⁷

5.49 For the purposes of assessing the listing of the koala given its current population attributes, the first criterion, which relates to a species population decline, is most relevant. There are four other criteria, relating to issues such as 'a precarious geographic distribution' and 'the probability of extinction', which are not currently relevant to the koala's circumstances (see Appendix 4).⁴⁸

5.50 For the purpose of the guidelines, there are three categories of threat level for which a species can be listed under the EPBC Act – vulnerable, endangered and critically endangered. The category will depend on the severity of the risk to a species. The guidelines set out indicative thresholds for each category and each criterion, which the TSSC is informed, but not bound by. When assessing the eligibility of a

46 *Environment Protection and Biodiversity Conservation Act 1999*, subsections 194A and 194Q.

47 See: *Environment Protection and Biodiversity Conservation Act 1999*, section 179; and *Environment Protection and Biodiversity Conservation Regulations 2000*, regulation 7.01; and Department of Sustainability, Environment, Water, Population and Communities (DSEWPaC), *Guidelines for assessing the conservation status of native species*, p. 2, www.environment.gov.au/biodiversity/threatened/pubs/guidelines-species.pdf (accessed 14 July 2011).

48 More detailed information is available in the Department of Sustainability, Environment, Water, Population and Communities, *Guidelines for assessing the conservation status of native species*, pp 2–5.

species against the criteria, the TSSC 'exercises its judgement to give practical meaning to the subjective terms' (terms such as 'very high', 'high' or 'substantial').⁴⁹

5.51 The indicative thresholds have been adapted from the IUCN Red List Categories and Criteria Version 3.1 2001.⁵⁰ According to the guidelines, when considering whether to use the IUCN thresholds, the TSSC must judge whether they are appropriate for the species in question.⁵¹ The TSSC uses the information provided to it via the nomination process and through public and expert consultation to make its decisions.

5.52 The three attempts to list the koala as a threatened species are discussed below.

Protections received by listed threatened species

5.53 A species that is placed on the threatened species list receives certain protections under the EPBC Act, including:

- Proposals that have, will have or are likely to have a significant impact on a listed threatened species require approval from the Environment Minister (sections 18 and 19)
- A person found guilty of killing or injuring a listed threatened species in a Commonwealth area may be fined and/or imprisoned (subsection 196(1));
- A person convicted of unlawfully taking a listed threatened species may be fined and/or imprisoned (subsection 196B(1));
- The minister must create a register in which critical habitat for the survival of the listed threatened species is identified (section 207A);
- A person that knowingly damages critical habitat in a Commonwealth area may be fined and/or imprisoned (section 207B);
- The sale or lease of Commonwealth land containing critical habitat requires a contract that includes a covenant to protect critical habitat (section 207C);
- The minister must ensure that there is approved conservation advice for each listed threatened species (section 266B);
- The minister may create a recovery plan or threat abatement plan to provide for the protection of a listed threatened species (section 269); and

49 Department of Sustainability, Environment, Water, Population and Communities, *Guidelines for assessing the conservation status of native species*, p. 3.

50 Department of Sustainability, Environment, Water, Population and Communities, *Guidelines for assessing the conservation status of native species*, p. 3. For complete definitions of the indicative thresholds see Department of Sustainability, Environment, Water, Population and Communities, *Guidelines for assessing the conservation status of native species*, pp 3–5.

51 Department of Sustainability, Environment, Water, Population and Communities, *Guidelines for assessing the conservation status of native species*, p. 3.

- The minister may make financial assistance available to state governments and individuals to implement recovery plans and threat abatement plans (section 281).

Previous attempts to list the koala under Commonwealth legislation

5.54 The koala has been considered for listing under the EPBC Act three times in the past 15 years: in 1996, 2006 and the current process in 2010.

1996 listing attempt

5.55 In July 1995 the Australian Koala Foundation and the Humane Society International made a joint application for listing of the koala as vulnerable under the *Endangered Species Protection Act 1992*.⁵² In April 1996 the Commonwealth Environment Minister, Senator the Hon Robert Hill, rejected the application to list the koala. The legislation at the time did not require the minister to publicly release advice on the nomination.

2006 listing attempt

5.56 In 2006 the koala was again nominated for listing as a threatened species, on this occasion under the EPBC Act. In its advice to the minister the TSSC recommended that the koala was not eligible for listing. The TSSC concluded that:

The Koala has a widespread distribution in coastal and inland areas of eastern Australia and the total population size is estimated to be in the order of hundreds of thousands of individuals. Current evidence indicates that the Koala population has declined in numbers in recent years. However, it is not likely that the decline in Koala numbers across the species' national or natural range has been substantial. Therefore, the Koala is not eligible for listing under any of the EPBC Act criteria.⁵³

5.57 At that time the TSSC recognised that the koala population had declined substantially since the early twentieth century however available evidence indicated that the koala had not undergone a substantial reduction in numbers over the past three

52 Australian Koala Foundation, 'The koala: Endangered or not?', Website accessed through the National Library of Australia's internet archive, <http://pandora.nla.gov.au/nph-arch/O1998-Nov-2/http://www.akfkoala.gil.com.au/danger.html> (accessed 15 July 2011).

53 Threatened Species Scientific Committee, 'Advice to the Minister for Environment and Heritage from the Threatened Species Scientific Committee (the Committee) on Amendments to the list of Threatened Species under the *Environment Protection and Biodiversity Conservation Act 1999*', 2006, p.15, www.environment.gov.au/biodiversity/threatened/species/pubs/koala.pdf (accessed 15 July 2011).

generations (as required by the Act).⁵⁴ It was also stated that it is unlikely that the rate of population decline would increase in the near future.⁵⁵

5.58 The TSSC acknowledged that, 'notwithstanding the large amount of information available on the koala, there are still information gaps regarding the species' conservation and status'.⁵⁶

5.59 Modelling used by the TSSC during the 2006 nomination process predicted that koala populations in south east Queensland and northern New South Wales may become extinct in the future, however these results could not be 'extrapolated to determine the probability of extinction across the koala's national or natural range of the koala'.⁵⁷

5.60 The TSSC did note that there are some local koala populations subject to severe localised threats which are likely to decline if not properly managed. The TSSC therefore recommended that:

...there are adequate management regimes and conservation initiatives in place at a local and regional level, to ensure the long-term survival of these populations.⁵⁸

2010 listing attempt

5.61 In 2010 the koala was again considered for listing as vulnerable under the EPBC Act.

5.62 The TSSC explained the difficulties associated with its assessment task:

54 Threatened Species Scientific Committee, 'Advice to the Minister for Environment and Heritage from the Threatened Species Scientific Committee (the Committee) on Amendments to the list of Threatened Species under the *Environment Protection and Biodiversity Conservation Act 1999*', 2006, p. 13.

55 Threatened Species Scientific Committee, 'Advice to the Minister for Environment and Heritage from the Threatened Species Scientific Committee (the Committee) on Amendments to the list of Threatened Species under the *Environment Protection and Biodiversity Conservation Act 1999*', 2006, p. 13.

56 Threatened Species Scientific Committee, 'Advice to the Minister for Environment and Heritage from the Threatened Species Scientific Committee (the Committee) on Amendments to the list of Threatened Species under the *Environment Protection and Biodiversity Conservation Act 1999*', 2006, p. 5.

57 Threatened Species Scientific Committee, 'Advice to the Minister for Environment and Heritage from the Threatened Species Scientific Committee (the Committee) on Amendments to the list of Threatened Species under the *Environment Protection and Biodiversity Conservation Act 1999*', 2006, p. 14.

58 Threatened Species Scientific Committee, 'Advice to the Minister for Environment and Heritage from the Threatened Species Scientific Committee (the Committee) on Amendments to the list of Threatened Species under the *Environment Protection and Biodiversity Conservation Act 1999*', September 2010, p. 14.

Assessment of the koala [as a threatened species] is neither straightforward nor simple. The koala occurs across a very extensive area and a wide range of habitats. It faces a range of threats. Some populations are obviously in severe decline. Other populations are over-abundant and require active management to reduce or constrain their abundance. And historically, koala populations have shown very substantial fluctuations. This set of factors complicates assessment, but they are not of themselves the most formidable obstacle. Instead, we found our assessment to be most complicated by insufficient data on population size and trends across many areas of the range of the koala. The lack of consistent long-term monitoring populations throughout the range of this large, unmistakable diurnal mammal clearly indicates that our nation has a long way to go to adequately monitor and manage its biodiversity.⁵⁹

5.63 Chapter 2 of this report covered in detail the TSSC's assessment of the national koala population. In a letter accompanying its advice to the minister, the TSSC stated the eligibility for listing of the koala is totally dependent on criterion one, relating to the extent of population decline over the past 20 years.⁶⁰ The TSSC concluded that 'the koala population has undergone a marked decline over three koala generations, due to the combination of a range of factors.'⁶¹ However, despite this, the TSSC stated that its ability to assess the koala against this criterion was extremely difficult due 'to a lack of consistent high quality demographic data across the geographic range of the koala'.⁶²

5.64 The TSSC ultimately concluded that 'the koala approached, but did not reach, the threshold required to qualify for listing as vulnerable...'⁶³ Accordingly, the TSSC

59 Professor Peter Harrison, Member, Threatened Species Scientific Committee, *Committee Hansard*, 1 August 2011, p. 45.

60 Threatened Species Scientific Committee (TSSC), 'Letter to the Minister for Sustainability, Environment, Water, Population and Communities regarding the conservation status of the koala', 30 September 2010, p. 1, www.environment.gov.au/biodiversity/threatened/species/pubs/koala-tssc-letter.pdf (accessed 27 June 2011).

61 Threatened Species Scientific Committee, 'Advice to the Minister for Environment and Heritage from the Threatened Species Scientific Committee (the Committee) on Amendments to the list of Threatened Species under the *Environment Protection and Biodiversity Conservation Act 1999*', September 2010, p. 29.

62 Threatened Species Scientific Committee, 'Letter to the Minister for Sustainability, Environment, Water, Population and Communities regarding the conservation status of the koala', 30 September 2010, p. 1.

63 Professor Peter Harrison, Member, Threatened Species Scientific Committee, *Committee Hansard*, 1 August 2011, p. 46.

recommended to the Environment Minister that the koala not be listed as a vulnerable species.⁶⁴

Alternatives to vulnerable listing

5.65 The TSSC recommended that if better data were available and an adequate plan in place for the *National Koala Conservation and Management Strategy 2009–2014*, then serious consideration could be given to a listing of Conservation Dependent under the EPBC Act. The TSSC told the committee that:

We looked at [the strategy] as the potential option as a plan of management under the act that might qualify the koala as conservation dependent. We...decided that at its present stage of development it lacked sufficient detail for us to be confident that, even though the local or regional populations that were most threatened have been identified, how it would be implemented to act in a conservation dependent manner would ensure that the decline in those populations would be halted and recovery enabled. We considered it, as we said, a positive first step to provide an overall framework. It recognises the importance of the koala and the importance of the threats that are operating in different ways across its jurisdiction, and we would hope that an implementation strategy could be developed which would allow it to truly effective and focused on those populations in dire need of better management.⁶⁵

5.66 As part of its threatened species listing assessment process the TSSC also considered listing the koala as vulnerable in certain bioregions.⁶⁶ However the TSSC explained that this option was not justifiable based on the evidence presented:

In the case of the koala, the widespread and continuous nature of its habitat prior to anthropogenic disturbance, lack of obvious barriers to koala dispersal throughout its range, and lack of genetic evidence for long-term isolation of sampled populations led us to conclude that no population qualified for separate consideration...

...there is no sound biological or evolutionary grounds for considering separate population/s – in essence, the koala is distributed continuously and varies continuously and only slightly across its vast range.⁶⁷

64 Threatened Species Scientific Committee, 'Advice to the Minister for Environment and Heritage from the Threatened Species Scientific Committee (the Committee) on Amendments to the list of Threatened Species under the *Environment Protection and Biodiversity Conservation Act 1999*', September 2010, p. 29.

65 Professor Peter Harrison, Member, Threatened Species Scientific Committee, *Committee Hansard*, 1 August 2011, p. 51.

66 Threatened Species Scientific Committee (TSSC), 'Letter to the Minister for Sustainability, Environment, Water, Population and Communities regarding the conservation status of the koala', 30 September 2010, p. 3.

67 Threatened Species Scientific Committee, answer to question on notice, 1 August 2011 (received 10 August 2011), pp 10–11.

5.67 Nevertheless, several koala experts contested the TSSC's approach. For example, Professor Carrick told the committee that the minister may declare a separate subspecies as the Chief Taxonomist:

As I understand it, the minister is the chief taxonomist and chief ecologist of Australia and a species is, for the purposes of the act, what the minister declares it to be. So it is well within the power of the minister—as I understand it as a cheap constitutional lawyer—to declare that northern and southern koalas are different and that therefore the EPBC Act could be applied to both but in quite different ways.⁶⁸

5.68 Professor Carrick noted that such an approach would overcome the difficulties that listing may pose in parts of Victoria and South Australia where some koala populations are classed as overabundant.⁶⁹

New information since listing advice

5.69 The committee received evidence that there has been new information on the national koala population that has become available since the TSSC finalised its advice to the Environment Minister in September 2010. The committee has already discussed the fact that in its advice to the Minister the TSSC did not include a national estimate, a 'plausible lower bound' nor the necessary figures for historical comparison, despite providing such information to this inquiry (see chapter 2).

5.70 There are other instances of new information. For example, the TSSC expressly indicated in its response to the committee's questions on notice, that it has received 'more recent information made available since our [2010] assessment' regarding an estimated plausible lower bound for the current national koala population (of about 200 000 individuals).⁷⁰

5.71 Similarly, the committee was told that for the purpose of its 2010 assessment, the TSSC received 'early information on [the recent drought-induced decline in koala numbers in the mulga lands of Queensland] which indicated a decline of 50 per cent... The more recent analysis indicates that the decline was more precipitous even than that.'⁷¹

5.72 Another area where this inquiry may have uncovered new information relates to predation by wild dogs, as discussed in chapter 4. In its advice to the minister, the

68 Professor Frank Carrick AM, Private capacity, *Committee Hansard*, 1 August 2011, p. 4.

69 Professor Frank Carrick AM, Private capacity, *Committee Hansard*, 1 August 2011, p. 4.

70 Threatened Species Scientific Committee, answer to question on notice, 1 August 2011 (received 10 August 2011), p. 2.

71 Dr John Woinarski, Member, Threatened Species Scientific Committee, *Committee Hansard*, 1 August 2011, p. 46.

Threatened Species Scientific Committee considered domestic dogs as a threat to koalas, it did not mention predation by wild dogs.⁷²

5.73 Professor Carrick and Drs Melzer, Ellis and Fitzgibbon provided the committee with further areas where new information is available:

Since [the TSSC] advice was provided [in September 2010], the Mulgaland decline has been revised from 50% to 80%; it has become clear that the coastal South East Queensland (SEQ) declines have not been stabilised, let alone reversed; 'Myrtle Rust' has emerged as a significant new threat to Koala habitat; a probably congenital eye disease is emerging in the VIC populations; and an unusually early and severe bushfire season in QLD (as a consequence of vegetation growth following the recent La Niña event – which itself must have directly caused Koala mortality in many areas) is threatening the recovery of severely drought affected populations.⁷³

Committee comment

5.74 The committee notes the three occasions the TSSC has assessed the koala for threatened species listing. In particular, in the instances where the TSSC advice has been publicly released, it shows a consistent pattern of a declining national koala population and deficiencies in population data.

5.75 The committee also notes the new information that has become available since the TSSC's 2010 assessment. The committee has not cross-checked the information relied on by the TSSC with the information received as part of this inquiry. Therefore there may be other areas where new information has become available since the TSSC's assessment.

5.76 In the committee's view the Environment Minister must have the best available information upon which to make his or her threatened species listing decision. The committee notes that the current Environment Minister, the Hon Tony Burke MP, has made several public statements, acknowledging this inquiry and indicating that he would work through the committee's recommendations before deciding whether or not to list.⁷⁴

5.77 Accordingly, the committee recommends that the Environment Minister consider the evidence presented to the committee when making his final determination on listing the koala. In this regard, the committee notes that the EPBC Act empowers

72 Threatened Species Scientific Committee, 'Advice to the Minister for Environment, Protection, Heritage and the Arts from the Threatened Species Scientific Committee on Amendment to the list of Threatened Species under the *Environment Protection and Biodiversity Conservation Act 1999*', pp 11–13.

73 Professor Frank Carrick, Dr Alistair Melzer, Dr Bill Ellis and Dr Sean Fitzgibbon, *Submission 101*, p. 3.

74 For example, the Hon Tony Burke MP, Minister for Sustainability, Environment, Water, Populations and Communities, *House of Representatives Hansard*, 14 June 2011, p. 6023.

the Environment Minister to have regard to information or advice from any other source.⁷⁵

Recommendation 16

5.78 The committee recommends that the Environment Minister consider the evidence provided to this inquiry when making his final decision on listing the koala as a threatened species.

5.79 The committee has recommended earlier in this report (Recommendation 5) that the TSSC review its advice to the Minister on the listing of the koala in light of the findings of this inquiry. This should include providing the Minister with an updated koala population estimate range (both baseline and current) based on the best available information.

5.80 Furthermore, the committee has concerns that the genetically depauperate populations of Victoria and South Australia may not provide adequate cover against the recent declines in the genetically diverse koala populations of Queensland and New South Wales (this issue is discussed in chapter 2). The TSSC told the committee that 'it would be fairly generally agreed that a population with lower genetic diversity has lower evolutionary potential and lower potential to adapt to new challenges.'⁷⁶

5.81 The committee therefore recommends that the Environment Minister consider the available options to improve the conservation status of the koala populations in New South Wales and Queensland. The committee notes that acting early to halt the decline will be more successful and cost effective than trying to return a much diminished population to sustainable levels at some stage in the future.

Recommendation 17

5.82 The committee recommends the Environment Minister consider options to improve the conservation status of the diverse and rapidly declining koala populations in New South Wales and Queensland to ensure a nationally resilient population is maintained. These options include listing the koala as vulnerable under the EPBC Act in areas where populations have declined significantly or are at risk of doing so.

Deficiencies in the EPBC Act listing process

5.83 It was felt by a number of submitters that the EPBC Act's current threatened species listing process is deficient at providing adequate protection for the koala.⁷⁷

75 *Environment Protection and Biodiversity Conservation Act 1999*, paragraph 194Q(6)(b).

76 Dr Andrea Taylor, Member, Threatened Species Scientific Committee, *Committee Hansard*, 1 August 2011, p. 51.

77 For example see: Dr Alistair Melzer, *Submission 7*, p. 16; Koala Research Network, *Submission 29*, p. 3; and University of Queensland Koala Ecology Group, *Submission 42*, pp 5–6.

5.84 Professor Carrick summed the situation up succinctly stating that 'the [TSSC] is hamstrung by process and precedent...'⁷⁸

5.85 Scientific researchers submitted that reliance on the IUCN guidelines to define indicative thresholds is not well suited to Australian wildlife. For example the University of Queensland Koala Ecology Group stated that:

Criteria developed in overseas jurisdictions may be inappropriate to test the suitability of Australian fauna for listing under our statutes. Widely distributed but ecologically and physiologically distinct species such as koalas present a conundrum for categorization under IUCN guidelines, yet the evidence on the ground is quite compelling.⁷⁹

5.86 The Koala Research Network believed that the lack of adequate data to meet the IUCN definitions is jeopardising future recovery of koala populations:

Currently, there is not adequate national data to address the IUCN criteria in any consideration of the formal status of the koala. Delaying any reclassification until data meets IUCN criteria will inevitably produce a crisis driven response with limited capacity to recover the species.⁸⁰

5.87 Dr Alistair Melzer similarly argued that flexibility is required in assessing listing thresholds:

Both state and federal governments rely on the IUCN guidelines...to trigger decisions on the classification of the koala. Absolute reliance on these guidelines means that a species needs to be measurably in trouble before a classification can be changed and regulations invoked.⁸¹

5.88 Peak industry groups also raised issues of uncertainty with the EPBC Act. The Property Council of Australia submitted that:

The experience of the [property] industry with the EPBC Act has been a demonstrated lack of clear definitions, rules, and tests which has resulted in broad interpretations over the last ten years, giving little consistency or certainty for stakeholders.

This is often due to the overlapping and disconnected nature of the implementation of the EPBC Act as well as a failure to ensure that there is necessary regard for state and local planning rules.⁸²

5.89 The EPBC Act was also criticised for its ad hoc approach to protecting threatened species and ecological communities. The Urban Development Institute of

78 Professor Frank Carrick AM, *Submission 86*, p. 10.

79 University of Queensland Koala Ecology Group, *Submission 42*, pp 5–6.

80 Koala Research Network, *Submission 29*, p. 3.

81 Dr Alistair Melzer, *Submission 7*, p. 16.

82 Property Council of Australia, *Submission 39*, p. 2.

Australia (Queensland) argued that there is no unified approach to habitat and species protection:

The current framework provided by the [EPBC] Act for the conservation of Australia's biodiversity appears to be driven on a project by project basis without sufficient understanding of the broader status of the listed species, which limits its effectiveness. The [EPBC] Act tends to focus on habitat retention at all costs rather than the current and future needs of the species in question.⁸³

5.90 The National Association of Forest Industries further argued that the present narrow focus of the EPBC Act on listed threatened species and ecological communities 'is an out-dated and static approach to biodiversity conservation, particularly at a broader ecosystem and landscape scale'.⁸⁴

Reform of the EPBC Act

5.91 It was suggested by a number of industry peak bodies that the listing process for threatened species under the EPBC Act should be simplified. According to the Property Council of Australia future listings under the Act need to be addressed in a pragmatic way that does not 'increase the regulatory burden and in a manner that balances environmental and economic needs'.⁸⁵

5.92 The Koala Research Network recommended to the committee that the listing process should move away from the IUCN criterion-based assessment for particular species.⁸⁶ In particular for the koala, the Koala Research Network recommended that:

A strategic review of the approach to managing the koala and its habitat is required taking account of the distinctly different needs in: (a) the over-abundant, genetically depauperate race of the koala in South Australia and Victoria, (b) the expanding urban and industrial footprint in predominantly coastal eastern Australia, and (c) the rural and regional western and northern habitats affected by climate extremes, fire and drought.⁸⁷

5.93 Professor Carrick also highlighted the need to amend the act in order to address the north-south koala divide:

...if we look at the coastal Queensland population and the coastal New South Wales population, they are being hammered. They are in evident decline. They are also the stronghold of koalas in those two states, so if the bulk of the koalas in the two states are under severe threat and those two states have most of the koalas in Australia, how this is not of national

83 Urban Development Institute of Australia (Queensland), *Submission 52*, p. 2.

84 National Association of Forest Industries, *Submission 56*, p. 18.

85 Property Council of Australia, *Submission 39*, p. 3.

86 Koala Research Network, *Submission 29*, p. 3.

87 Koala Research Network, *Submission 29*, p. 3.

significance, to me, defies the common-sense test. However, if that is a genuine problem with the act then the act needs to be amended so that it is clear that where a significant part of a species is in trouble then that species can enjoy the protection of the act. We were told in Queensland that this was not possible under the Nature Conservation Act, but it turned out that it is—it was possible to define the South-East Queensland bioregion koalas as an entity and to treat them and list them separately from the rest of Queensland.⁸⁸

Committee comment

5.94 The committee notes the concerns expressed about the limitations of the threatened species listing process under the EPBC Act. The committee also acknowledges that the TSSC is constrained in the advice it prepares for the Minister by the provisions of the Act, the EPBC Regulations and the guidelines. The committee believes that this is the correct approach. Without these constraints, the assessment of Australia's unique fauna and flora as a potentially threatened species would become a haphazard and arbitrary affair.

5.95 The committee endorses the comments made the TSSC that 'it is by no means a Holy Grail to be listed as threatened. In fact, it is very much a situation we would like not to be in for most species.'⁸⁹ In this regard, the committee would far prefer to see a healthy and abundant koala population than to have it listed as a threatened species.

5.96 The committee believes that the EPBC Act threatened species listing process is reactive and not well suited to the conservation needs of the koala. There is little doubt that koala numbers are in marked decline⁹⁰ and that significantly more needs to be done to ensure the long-term preservation of this unique Australian species.

5.97 The committee is of the view that unless new conservation measures are implemented, the koala population will continue to decline until it eventually satisfies the EPBC Act threatened species criteria. To have such significant Australian iconic on the threatened species list would be a national shame.

5.98 The committee advocates a more proactive approach to the conservation of the koala. The committee concurs with witnesses such as Mr Al Mucci from Dreamworld, who stated that 'the further we move the koala in the direction of extinction, the more difficult and costly it will be to reverse the trends.'⁹¹

88 Professor Frank Carrick AM, Private capacity, *Committee Hansard*, 1 August 2011, pp 4–5.

89 Dr John Woinarski, Member, Threatened Species Scientific Committee, *Committee Hansard*, 1 August 2011, p. 54.

90 Threatened Species Scientific Committee, letter to Minister for Sustainability, Environment, Water, Population and Communities, September 2010, Department of Sustainability, Environment, Water, Population and Communities, *Submission 73, Attachment C*, p. 1.

91 Mr Al Mucci, Dreamworld, *Submission 8*, p. 3.

5.99 This view is in accordance with the recently released *Australian Government response to the report of the Independent Review of the Environment Protection and Biodiversity Conservation Act 1999* (the response). The preamble to the response states: '[w]e need to shift our management approaches to be preventative and proactive'. The preamble goes on to say that 'In the long run, identifying and avoiding likely environmental harm early in the process will be much more cost effective than trying to fix damage after it has occurred.'⁹²

5.100 Two possible mechanisms announced as part of the response could potentially facilitate a more proactive approach to koala conservation. Firstly, there is the possibility of having certain koala habitat listed as an 'ecosystem of national significance'. The response states that:

A key benefit of listing an ecosystem of national significance is that it will provide a significant new tool to conserve healthy ecosystems and the ecosystem services they provide. This is in contrast to the existing provisions to list threatened species and ecological communities, which are focused on protecting and recovering species and communities already in decline. The government considers that a preventative approach is more likely to be a cost-effective conservation measure, addressing cumulative impacts and achieving good environmental outcomes for ecosystems while providing more certainty for business. Therefore, while the threatened status of an ecosystem is of obvious concern, it should not be a criterion for listing as an ecosystem of national significance.⁹³

5.101 A second possibility is the greater emphasis on landscape scale regional environment plans (formerly known as 'bioregional plans') which will focus on identifying ecologically sustainable land uses in a particular geographical area.⁹⁴

5.102 The response explains the regional environment plans process in the following way:

Regional environment planning and the strengthened process for strategic assessments will provide an effective means to integrate both long-term and short-term environmental, economic and social considerations, consistent with the principles of ecologically sustainable development. This integrated planning and assessment will support the maintenance of ecosystem services and achieve conservation outcomes across the landscape and marine environment...

92 Department of Sustainability, Environment, Water, Population and Communities, *Australian Government response to the report of the Independent Review of the Environment Protection and Biodiversity Conservation Act 1999*, August 2011, p. 4.

93 Department of Sustainability, Environment, Water, Population and Communities, *Australian Government response to the report of the Independent Review of the Environment Protection and Biodiversity Conservation Act 1999*, August 2011, p. 25.

94 Department of Sustainability, Environment, Water, Population and Communities, *Australian Government response to the report of the Independent Review of the Environment Protection and Biodiversity Conservation Act 1999*, August 2011, p. 19.

As with current regional environment plans and strategic assessments, the minister will be able to approve classes of actions that are consistent with the regional environment plan or the strategically assessed policy, plan or program, without further assessment under the Act. Neither regional environment plans nor strategic assessments will impose additional obligations on private landholders. Rather, they will avoid the need for proponents to submit an individual referral provided their action is in accordance with an approved class of action. Where that is not the case, then the proponent could use the existing individual referral processes under the Act to seek an environmental approval.⁹⁵

5.103 The committee acknowledges that it may be some time before these new arrangements are legislated. In the interim, there is a need to properly implement and strengthen the National Koala Conservation and Management Strategy which is the topic of the next and final chapter.

95 Department of Sustainability, Environment, Water, Population and Communities, *Australian Government response to the report of the Independent Review of the Environment Protection and Biodiversity Conservation Act 1999*, August 2011, p. 16.

Chapter 6

The National Koala Conservation and Management Strategy

6.1 This chapter discusses the national strategy designed to conserve and manage Australia's koalas as well as several state-based strategies.

The National Koala Conservation Strategy 1998

6.2 The first national koala management strategy was released in January 1998.¹ The *National Koala Conservation Strategy* was developed jointly by the Commonwealth, state and territory governments through the Australian and New Zealand Environment and Conservation Council (ANZECC).

6.3 The document was prepared in response to concern over the declining koala population. A nomination in 1996 to list the koala under the Commonwealth government's species protection legislation, the *Endangered Species Protection Act 1992*, found that whilst the koala was still widespread on a national basis, it was declining in parts of its range and because of its cultural significance there was much public and scientific concern about its conservation.² The koala however did not qualify for listing at the time.

6.4 The aim of the strategy was to 'provide a national framework for the conservation of koala' and identified the major threats to koalas as land clearing, habitat fragmentation, disease, natural disasters, roads, dogs and over-browsing.³ The strategy addressed these issues with six objectives to:

- conserve koalas in their existing habitat through habitat identification, monitoring and local government planning;
- rehabilitate and restore koala habitat through revegetation;
- develop a better understanding of the conservation biology of koalas through mapping and assessment of koala populations and assessment of population dynamics;
- ensure the community has access to factual information about the distribution, conservation and management of koalas;
- manage captive, sick or injured koalas to ensure consistent and high standards of care; and

1 Australian and New Zealand Environment and Conservation Council (ANZECC), *National Koala Conservation Strategy*, January 1998, pp 1–2.

2 Australian and New Zealand Environment and Conservation Council (ANZECC), *National Koala Conservation Strategy*, January 1998, p. 5.

3 Australian and New Zealand Environment and Conservation Council (ANZECC), *National Koala Conservation Strategy*, January 1998, pp 1–2.

- manage over-browsing to prevent koala starvation and ecosystem damage.⁴

6.5 The guiding principles of the strategy were to integrate the conservation of koalas with pre-existing measures to protect Australia's biodiversity and to apply the precautionary principle to avoid, wherever practicable, serious or irreversible damage to the environment.⁵

6.6 The 1998 strategy identified that the implementation of the objectives would have financial costs to governments, industry, businesses and the community. The costs however would substantially reduce over time due to 'timely investment in conservation measures'. The strategy also stated that the benefits from the conservation of nature would produce sustainable land use practices and enhanced opportunities for ecotourism.⁶

6.7 It was further recognised that the conservation of koalas is a complex task requiring an integrated management approach requiring input from the community and from all levels of government.⁷

Review of the implementation of the 1998 strategy

6.8 In 2006 the Natural Resource Management Ministerial Council agreed to review the strategy with a view to updating the objectives for the protection and management of koala populations.

6.9 Since the release of the strategy significant changes had occurred in the legislative context, including the listing of koalas under state species protection legislation.⁸ It was also observed that there had continued to be 'significant local declines in koala populations and koala habitat in Queensland, New South Wales and Victoria'.⁹ The koala was also nominated for listing in 2006 under the Commonwealth's revised species protection legislation, the *Environment Protection and Biodiversity Conservation Act 1999*. The koala was not listed on that occasion.

6.10 The review summarised that:

In general, there has been some work completed towards achieving the aim and objectives of the Strategy, but the Strategy itself has not been properly

4 Australian and New Zealand Environment and Conservation Council (ANZECC), *National Koala Conservation Strategy*, January 1998, pp 10–14.

5 Australian and New Zealand Environment and Conservation Council (ANZECC), *National Koala Conservation Strategy*, January 1998, p. 9.

6 Australian and New Zealand Environment and Conservation Council (ANZECC), *National Koala Conservation Strategy*, January 1998, p. 9.

7 Australian and New Zealand Environment and Conservation Council (ANZECC), *National Koala Conservation Strategy*, January 1998, p. 7.

8 For example the koala was listed as vulnerable in the south east Queensland bioregion under the *Nature Conservation (Wildlife) Regulation 1994* (Qld).

9 M. Predavec, *Review of progress in implementing the 1998 National Koala Conservation Strategy*, Report prepared by Parsons Brinckerhoff for the Commonwealth Department of Environment, Water, Heritage and the Arts, Canberra, September 2008, p. iii.

implemented. There is little evidence to demonstrate that the Strategy has driven any of the achievements over the last 10 years. Although connections can be drawn between the Strategy and some state-based initiatives, such as the koala management and conservation plans in Victoria, New South Wales and Queensland, these connections have not been widely promoted and appear not to be coordinated through the Strategy.¹⁰

6.11 The review found that the strategy worked well as an overarching framework for the protection of koalas however it needed to be supported by action plans to ensure its effectiveness.¹¹ It was found that integration of the strategy needed to occur across all levels of government and should meld with existing government frameworks such as the Native Vegetation Framework and the National Biodiversity Strategy.

6.12 The Commonwealth government was seen to be the most appropriate driver of the strategy however much of the responsibility for its implementation rested with the state governments. It was recommended that a committee or secretariat be established with the authority to drive the implementation of the strategy.¹² Such a committee should be 'charged with ensuring that the strategy is better understood by all stakeholders, that action plans are developed and that monitoring takes place.'¹³

6.13 The review also came to a number of conclusions to improve the strategy including the need to:

- properly fund the strategy in a transparent manner;
- recognise the future threat of climate change on koala populations;
- conduct future study on the genetics of koalas Australia-wide to establish genetic management units across its distribution and assist with a possible regional listing of the koala under the EPBC Act; and
- identify and deal with diseases at an early stage.¹⁴

10 M. Predavec, *Review of progress in implementing the 1998 National Koala Conservation Strategy*, Report prepared by Parsons Brinckerhoff for the Commonwealth Department of Environment, Water, Heritage and the Arts, Canberra, September 2008, p. iii.

11 M. Predavec, *Review of progress in implementing the 1998 National Koala Conservation Strategy*, Report prepared by Parsons Brinckerhoff for the Commonwealth Department of Environment, Water, Heritage and the Arts, Canberra, September 2008, p. 43.

12 M. Predavec, *Review of progress in implementing the 1998 National Koala Conservation Strategy*, Report prepared by Parsons Brinckerhoff for the Commonwealth Department of Environment, Water, Heritage and the Arts, Canberra, September 2008, p. 43.

13 M. Predavec, *Review of progress in implementing the 1998 National Koala Conservation Strategy*, Report prepared by Parsons Brinckerhoff for the Commonwealth Department of Environment, Water, Heritage and the Arts, Canberra, September 2008, p. 43.

14 M. Predavec, *Review of progress in implementing the 1998 National Koala Conservation Strategy*, Report prepared by Parsons Brinckerhoff for the Commonwealth Department of Environment, Water, Heritage and the Arts, Canberra, September 2008, pp 44–49.

The National Koala Conservation and Management Strategy 2009–2014

6.14 On 5 November 2009 the Natural Resource Management Ministerial Council endorsed the *National Koala Conservation and Management Strategy 2009–2014* which replaced the 1998 strategy.

6.15 Similar to the 1998 strategy, the new strategy aims to 'conserve koalas by retaining viable populations in the wild throughout their natural range'.¹⁵ The strategy acknowledged the findings of the review and includes updated objectives to protect koalas. Specifically, it establishes an implementation plan as well as an implementation team to coordinate the identified actions. The strategy has also recognised climate change as a threat to koalas and increased focus on multi-species and landscape-scale protection and recovery.

6.16 The strategy identifies habitat loss, fragmentation and degradation as the major threat to koalas in key parts of their range. Over-browsing, natural disasters, disease, vehicle collisions, predation by dogs and climate change were also identified as threatening processes for koalas.

6.17 The long-term objectives of the strategy, to be met within 50 years, are to ensure that koalas are not nationally threatened and to stabilise koala populations by increasing numbers in identified priority areas and reducing numbers in areas of overabundance.¹⁶

6.18 The short term objectives of the strategy, to be achieved within the next 10 years, are to protect remaining koala habitat, increase consideration of koala habitat in development planning and increase community involvement in the conservation and care of koalas.¹⁷

6.19 To achieve these objectives an implementation plan with six categories of actions has been developed. These categories and actions are designed to:

- identify and protect habitat;
- monitor over browsed habitats and develop translocation guidelines;
- develop national guidelines for road design in koala habitat, create strategies for dog management and address the issue of disease;
- provide for greater community involvement in conserving koalas;
- develop guidelines for caring for koalas in captivity; and

15 Natural Resource Management Ministerial Council, *National Koala Conservation and Management Strategy 2009–2014*, Department of Environment, Heritage and the Arts, Canberra, 2009, p. 4.

16 Natural Resource Management Ministerial Council, *National Koala Conservation and Management Strategy 2009–2014*, Department of Environment, Heritage and the Arts, Canberra, 2009, p. 4.

17 Natural Resource Management Ministerial Council, *National Koala Conservation and Management Strategy 2009–2014*, Department of Environment, Heritage and the Arts, Canberra, 2009, p. 4.

- conduct further research on koala populations.¹⁸

6.20 The strategy noted that there will be a financial cost to implement the strategy and that:

While there are already resources directed to koala conservation and management, resources will be required to implement this strategy. Resources from governments at all levels will be supplemented by ongoing and potentially increased commitments from community organisations, the private sector and philanthropists to assist the achievement of the strategy's objectives.¹⁹

6.21 Under the strategy a cross-jurisdictional implementation team is to be established to 'promote and coordinate the actions identified in the plan'.²⁰ The implementation team is to be an advisory body under the Natural Resources Management Ministerial Council which will determine operational requirements and composition of the team.

6.22 The implementation team is required to discuss progress against performance targets at least every 12 months and report annually to the Natural Resource Management Ministerial Council on progress against these targets. These reports are to be publicly available and provided to interested stakeholders.²¹

6.23 The implementation team is to consult with an advisory group that consists of Australian, state and territory government members with direct involvement with koala conservation, in addition to a range of stakeholders such as local government, conservation groups and researchers. The advisory group is to meet annually and consider progress on the strategy and distribute new information to interested parties.²²

18 Natural Resource Management Ministerial Council, *National Koala Conservation and Management Strategy 2009–2014*, Department of Environment, Heritage and the Arts, Canberra, 2009, pp 23–32.

19 Natural Resource Management Ministerial Council, *National Koala Conservation and Management Strategy 2009–2014*, Department of Environment, Heritage and the Arts, Canberra, 2009, p. 7.

20 Natural Resource Management Ministerial Council, *National Koala Conservation and Management Strategy 2009–2014*, Department of Environment, Heritage and the Arts, Canberra, 2009, p. 7.

21 Natural Resource Management Ministerial Council, *National Koala Conservation and Management Strategy 2009–2014*, Department of Environment, Heritage and the Arts, Canberra, 2009, pp 8 and 10.

22 Natural Resource Management Ministerial Council, *National Koala Conservation and Management Strategy 2009–2014*, Department of Environment, Heritage and the Arts, Canberra, 2009, p. 8.

6.24 The implementation team and the advisory group are supported by a secretariat provided by the Australian government.²³ The secretariat is to arrange meetings of the implementation team and advisory group and coordinate reports, including annual performance reporting. On behalf of the implementation team, the secretariat will also arrange workshops and develop draft national guidelines.

6.25 The strategy is to be monitored and evaluated annually by the implementation team. An independent external review will also be conducted after five years.²⁴

First report of the implementation team

6.26 The first report of the implementation team to the Natural Resources Management Ministerial Council was released in 2010. The report identified that a secretariat to the implementation team had been established within the Commonwealth environment department.²⁵

6.27 The report provides a brief overview of koala conservation measures in each jurisdiction and then details actions that are planned or underway as indicated in the implementation plan. The review does not provide any conclusions or evaluate the progress of the strategy.

Evaluation of the National Koala Conservation and Management Strategy

6.28 The committee received evidence from the Koala Research Network that the strategy was successful at providing an overarching framework for the national conservation of the koala. The Koala Research Network stated that:

The great advantage of the National Koala Conservation and Management Strategy is that it was carefully negotiated and formally signed off. This represents a high level of agreement, sets a framework that is so hard to obtain for any species, and gives clear direction for the way forward.²⁶

6.29 The TSSC was also supportive of the National Koala Management and Conservation Strategy:

We feel that [the development of the National Koala Management and Conservation Strategy] is a positive step in creating an overarching strategy that could be used to enhance management of the koala by trying to

23 Natural Resource Management Ministerial Council, *National Koala Conservation and Management Strategy 2009–2014*, Department of Environment, Heritage and the Arts, Canberra, 2009, p. 9.

24 Natural Resource Management Ministerial Council, *National Koala Conservation and Management Strategy 2009–2014*, Department of Environment, Heritage and the Arts, Canberra, 2009, p. 9.

25 Implementation Team, *National Koala Conservation and Management Strategy 2009–2014: First Implementation Report to the Natural Resources Management Ministerial Council*, National Koala Conservation and Management Strategy Secretariat, Department of Sustainability, Environment, Water, Population and Communities, Canberra, 2010, p. 2, www.environment.gov.au/biodiversity/publications/koala-strategy/pubs/koala-strategy-first-implementation-report.pdf (accessed 3 August 2011).

26 Koala Research Network, *Submission 29*, p. 4.

nationally coordinate information, resources, implementation of the strategy and also to coordinate in some research, hopefully having sufficient long-term resources that would go into monitoring of key populations. That monitoring should feed back in an adaptive management framework into the strategy so that the strategy can be continually reappraised and therefore evolve over time to become more effective.²⁷

6.30 However, there was scepticism amongst a number of submitters that whilst providing a framework, the strategy is inefficient at having any meaningful effect on the long-term survival of the koala. For example, Dreamworld submitted that:

The National Koala Conservation and Management Strategy is a policy document. While it notes that its successful implementation depends on sustained commitment by a variety of stakeholders, the Strategy is still weak in not setting out more clearly the steps and mechanisms to ensure the required degree of cooperation and commitment is secured and sustained.²⁸

6.31 Concerns were similarly raised over the impact that the strategy would have on community action. Mrs Margaret Hardy stated:

There is no indication from a local experience that the National Koala Conservation and Management Strategy is anything other than a guidance document that does not translate into any effective action.²⁹

6.32 It was also suggested that the strategy has not been widely publicised, with koala wildlife shelters unaware of its existence.³⁰

6.33 The strategy was also criticised for not being able to direct specific actions to key parts of the koalas range.³¹ The Koala Research Network submitted to the committee that:

Koala conservation status varies regionally and this impacts on their direct management as well as that of the habitat. Regional strategies need to be developed within a national policy to address important regional issues.³²

6.34 Finally, Professor Carrick, and Drs Melzer, Ellis and Fitzgibbon provided a withering assessment of the effectiveness of the NKCMS:

...examination of its own implementation reporting shows most 'initiatives' are really 're-badged' existing responses – largely from the States and driven by State priorities, not the National Strategy.

27 Professor Peter Harrison, Member, Threatened Species Scientific Committee, *Committee Hansard*, 1 August 2011, p. 51.

28 Dreamworld, *Submission 8*, p. 3.

29 Mrs Margaret Hardy, *Submission 3*, p. 3.

30 Ms Colleen Wood, *Submission 71*, p. 4.

31 For example see: Dr Alistair Melzer, *Submission 7*, p. 15; and Koala Research Network, *Submission 29*, p. 4.

32 Koala Research Network, *Submission 29*, p. 4.

...in reality, the [NKMCS] contains no commitment to tangible action or resource provision by the Commonwealth, the previous version was shown to be ineffective and irrelevant and it is now almost halfway through its present incarnation with precious little of practical benefit to Koalas that can be attributed to the strategy.³³

Improvements to the strategy

6.35 A major concern of submitters was the lack of funding and resourcing set aside for the strategy.³⁴ According to the Wildlife Preservation Society of Queensland, the strategy will 'achieve nothing' unless properly resourced and implemented and consequently the strategy 'must be adequately resourced and firm commitments made by all levels of Government for its implementation.'³⁵

6.36 The Koala Research Network recommended that the Commonwealth government should take the lead in implementing the strategy with the resourcing of research and community organisations pursuing the objectives of the strategy.³⁶

6.37 Similarly the Coastwatchers Association put to the committee that funding and resources should also be made available to local government and community groups with 'an emphasis on joint ventures and negotiating and implementing solutions with private and public landholders.'³⁷

6.38 Some submitters also argued that greater coordination between the Commonwealth, state and territory governments and local governments needs to occur to better achieve the strategy objectives.³⁸ For example the Australian Koala Foundation stated:

No formal mechanism exists to incorporate the outputs of the strategy into koala management practices at a State or Local level.³⁹

6.39 To improve the effectiveness of the strategy a number of submitters recommended that it be given legislative grounding.⁴⁰ The Koala Action Group

33 Professor Frank Carrick, and Dr Alistair Melzer, Dr Bill Ellis and Dr Sean Fitzgibbon, *Submission 101*, pp 2 and 10.

34 For example see: Dr Alistair Melzer, *Submission 7*, p. 18; Wildlife Preservation Society of Queensland, *Submission 15*, p. 7; Australian Koala Foundation, *Submission 25*, p. 14; Koala Research Network, *Submission 29*, p. 4; Friends of Felton, *Submission 13*, p. 8; and The Coastwatchers Association, *Submission 54*, p. 5.

35 Wildlife Preservation Society of Queensland, *Submission 15*, pp 7–8.

36 Koala Research Network, *Submission 29*, p. 4.

37 The Coastwatchers Association, *Submission 54*, p. 5.

38 For example see: Australian Koala Foundation, *Submission 25*, p. 14; and Mr Chris Allen, *Submission 35*, p. 20.

39 Australian Koala Foundation, *Submission 25*, p. 14.

40 For example see: Wildlife Preservation Society of Queensland, *Submission 15*, p. 7; Koala Action Group Queensland, *Submission 17*, p. 6; and Koala Research Network, *Submission 29*, p. 4.

Queensland summarised that 'it is at the end of the day only a strategy with its main output to "provide policy advice" and thus lacks the strength of legislative instruments.'⁴¹

6.40 The Koala Research Network suggested that the strategy currently lacks the legislative powers to enforce consistent identification and protection of key koala habitat areas.⁴² It recommended that the strategy should include national standards for koala habitat identification, rating and mapping and that federal and state legislative powers be put in place to protect habitat. Local government koala conservation plans should also be required in accordance with such established national standards.

Committee comment

6.41 Although recognising the National Koala Conservation and Management Strategy has some merit, the committee agrees with the concerns raised about the strategy's effectiveness. In particular, the committee believes that progress is too slow, that the identified measures may not be adequate, and that there is insufficient national leadership.

6.42 In the committee's view it is necessary to implement the strategy effectively in an attempt to halt the decline in koala numbers rather than to allow the population to continue to slide inevitably towards threatened species listing. The committee has stated previously that it is preferable to take early and proactive action. In the committee's view this will give the best chance to secure the long term viability of the species. It is likely that this is the last opportunity to properly conserve Australia's koala population before its threatened species listing becomes a *fait accompli*.

Progress and level of ambition

6.43 The committee is concerned about the slow progress in implementing the strategy. While acknowledging the achievements listed in the first implementation report, for a five year strategy there are several items that do not appear to have made any progress and too many items that are categorised as 'planned', 'in progress' or 'underway'.⁴³

6.44 The committee notes that although it is unclear how many meetings or discussions the implementation team has had, the minimum number is specified as at least one per annum. This would appear to be entirely inadequate for serious progress to be made.

6.45 The committee also notes that 'an independent external reviewer will be contracted to review and evaluate the strategy and its implementation within five

41 Koala Action Group Queensland, *Submission 17*, p. 6.

42 Koala Research Network, *Submission 29*, p. 4.

43 See page 24 for examples of items not yet commenced and pp 7–24 for other examples: Implementation Team, *National Koala Conservation and Management Strategy 2009–2014: First Implementation Report to the Natural Resources Management Ministerial Council*, National Koala Conservation and Management Strategy Secretariat, Department of Sustainability, Environment, Water, Population and Communities, Canberra, 2010.

years.⁴⁴ In the committee's view this could be too late to address any substantial issues that may arise and which may require a redirection of the strategy and/or new elements to be added. Accordingly, the committee recommends that an intermediate external review to assess progress at the strategy's midway point be conducted.

Recommendation 18

6.46 The committee recommends that an independent external review be conducted on the National Koala Conservation and Management Strategy to monitor the adequacy of progress. The review should assess and report on the progress made at the strategy's midpoint.

6.47 The review must include an assessment of the:

- **strategy's implementation to date and prospects into the future;**
- **strategy's effectiveness in stabilising koala numbers in areas of declining population, and in reducing the pressure of overabundant populations;**
- **strategy's level of ambition, including whether new elements are required; and**
- **adequacy of the Commonwealth's and the states' respective roles and funding commitments.**

National leadership

6.48 One reason behind the strategy's apparent lack of progress is the low level of Commonwealth involvement. Aside from 'exploring the development' of a project to evaluate koala conservation actions, and the establishment of a secretariat to support the implementation team and to improve coordination between states, there appears to be little commitment from the Australian Government.⁴⁵

6.49 Despite the evaluation of the former strategy recommending that governments 'properly fund the strategy in a transparent manner', there is no information in the strategy about the Commonwealth or the states funding commitments. The only mention is that:

In some cases additional funding and resources will be required to complete actions. Decisions about resourcing need to be made by jurisdictions bearing in mind the priorities identified in the strategy.⁴⁶

44 Natural Resource Management Ministerial Council, *National Koala Conservation and Management Strategy 2009–2014*, Department of Environment, Heritage and the Arts, Canberra, 2009, p. 9; note that the strategy states on page 3 that it will be reviewed 'after five years'.

45 Natural Resource Management Ministerial Council, *National Koala Conservation and Management Strategy 2009–2014*, Department of Environment, Heritage and the Arts, Canberra, 2009, p. 2.

46 Natural Resource Management Ministerial Council, *National Koala Conservation and Management Strategy 2009–2014*, Department of Environment, Heritage and the Arts, Canberra, 2009, p. 5.

6.50 The committee considers this to be inadequate.

6.51 The committee is concerned that without concerted national leadership from the Australian Government, the National Koala Conservation and Management Strategy will suffer the same fate as its predecessor, the National Koala Conservation Strategy. Accordingly, the committee recommends that the government adequately resource the strategy and commit to a much stronger leadership role.

Recommendation 19

6.52 The committee recommends that the Australian Government adequately resource the National Koala Conservation and Management Strategy, and ensure that it is properly implemented through committing to a much stronger leadership role.

State-based koala management plans

6.53 In addition to the national strategy, each state which has a koala population has a state-based strategy, which are outlined briefly below.

New South Wales

6.54 The New South Wales government has prepared the *Recovery plan for the koala* which was released in 2008. The plan 'identifies actions to be taken to ensure the long-term viability of the koala in nature and the parties who are responsible for undertaking these actions.'⁴⁷ The recovery plan establishes a conservation framework using existing legislation and aims to:

- update and facilitate the implementation of existing legislation to improve conservation of koalas and their habitat;
- identify areas of koala habitat and prioritise on-ground management actions;
- identify research actions; and
- increase awareness in the community and amongst all levels of government regarding the management of koalas.⁴⁸

Victoria

6.55 In 2004 the state government released *Victoria's Koala Management Strategy*. The aim of the strategy is to 'conserve koalas by retaining viable populations in the wild throughout their natural range'.⁴⁹ The strategy recognises that the koala population in Victoria is more secure than other states and accordingly the

47 Department of Environment and Climate Change NSW, *Recovery plan for the koala (Phascolarctos cinereus)*, Department of Environment and Climate Change NSW, Sydney, November 2008, p. vii.

48 Department of Environment and Climate Change NSW, *Recovery plan for the koala (Phascolarctos cinereus)*, Department of Environment and Climate Change NSW, Sydney, November 2008, p. vii.

49 Victorian Department of Sustainability and Environment, *Victoria's koala management strategy*, Victorian Department of Sustainability and Environment, Brunswick, 2004, p. 6.

government has a responsibility 'to ensure that the species continues to flourish in the wild without damaging other natural values'.⁵⁰ Conservation and management of the koala is integrated with other biodiversity measures and relies on community and local government input.⁵¹

Queensland

6.56 In October 2006 the Queensland government released a state-wide conservation plan for the koala: the *Nature Conservation (Koala) Conservation Plan 2006 and Management Program 2006–2016* (the Koala Plan). As the title suggests, the Koala Plan is made up of two parts: the conservation plan and the koala management program.

6.57 The conservation plan is subordinate legislation made under the state Nature Conservation Act 'to promote the continued existence of viable koala populations in the wild'.⁵² To this end, the conservation plan divides the state into three koala districts:

- District A in the southern portion of the south-east Queensland bioregion (including Brisbane, the Gold Coast and the Sunshine Coast) where there is the highest threat level;
- District B in the northern portion of the south-east Queensland bioregion (north of the Sunshine coast nearly to Gladstone) where there is a moderate to high threat level; and
- District C comprising the remainder of the state where there is the lowest threat level.⁵³

6.58 The conservation plan also:

- prescribes criteria against which certain developments in koala habitat must be assessed;
- requires the state government to prepare a map showing koala habitat areas; and
- prescribes restrictions on the granting of permits for handling koalas.⁵⁴

6.59 The koala management program aims to complement the conservation plan by providing policy direction and management approaches to address the key threatening

50 Victorian Department of Sustainability and Environment, *Victoria's koala management strategy*, Victorian Department of Sustainability and Environment, Brunswick, 2004, p. 5.

51 Victorian Department of Sustainability and Environment, *Victoria's koala management strategy*, Victorian Department of Sustainability and Environment, Brunswick, 2004, p. 5.

52 *Nature Conservation (Koala) Conservation Plan 2006* (Qld), section 4.

53 Queensland Government, *Nature Conservation (Koala) Conservation Plan 2006 and Management Program 2006–2016*, Queensland Government – Environmental Protection Agency, Brisbane, 2006, pp 13–16.

54 *Nature Conservation (Koala) Conservation Plan 2006* (Qld), section 4.

process to koalas. The management plan includes policies on habitat protection and vegetation clearing; development; State Government infrastructure; vehicle-related mortality; dog attacks; research; public education and the rehabilitation of injured koalas.⁵⁵

6.60 The land use and planning objectives that are outlined in the Koala Plan have also been incorporated into the preparation of the *South East Queensland Regional Plan 2005–2026*. The 2010 *Koala Conservation State Planning Policy* (SPP) and the *SEQ Koala Conservation State Planning Regulatory Provisions* (SPRP) also aim to protect koala habitat and provide habitat offsets.⁵⁶

6.61 In 2008, two years after the Koala Plan was established, the Queensland government conducted a population survey of koalas in the Koala Coast and found a continuing substantial decline in the numbers of koalas.⁵⁷ As a result the *Koala Crisis Response Strategy* was released in December 2008 outlining a number of actions to be taken to halt the decline of the koala population in south-east Queensland. Measures outlined in the strategy include:

- creating new state planning instruments;
- ensuring land offsets create a net gain for koala habitat;
- securing additional koala habitat for conservation;
- undertake an extensive koala habitat mapping; and
- ensuring state roads are koala-friendly.⁵⁸

6.62 In June 2010 the Queensland government budgeted \$45.5 million over five years towards implementing the *Koala Crisis Response Strategy*.⁵⁹

55 Queensland Government, *Nature Conservation (Koala) Conservation Plan 2006 and Management Program 2006–2016*, Queensland Government – Environmental Protection Agency, Brisbane, 2006, pp 17–28.

56 For an overview of legislation and planning policies in Queensland that protect the koala see: Ms Larissa Waters, *Submission 90*, pp 1–18; and Department of Environment and Resource Management, Queensland Government, *Submission 79*, pp 9–12.

57 Queensland Government, *Decline of the Koala Coast Koala Population: Population Status in 2008*, Queensland Department of Environment and Resource Management, Brisbane, April 2009, p. 8, www.derm.qld.gov.au/register/p02966aa.pdf (accessed 14 July 2011). The Koala Coast encompasses Redlands Shire and parts of Brisbane City, Logan City and Pine Rivers Shire.

58 Department of Environment and Resource Management, 'Koala response strategy', www.derm.qld.gov.au/wildlife-ecosystems/wildlife/koalas/koala_crisis_response_strategy/#ban_on_bushland_habitat_clearing (accessed 14 July 2011).

59 Department of Environment and Resource Management, Queensland Government, *Submission 79*, p. 5.

South Australia

6.63 According to the South Australian government, the protection and management of abundant koala populations in the state is a complex task with much of their suitable habitat occurring on private land or in peri-urban environments.⁶⁰ As such:

Management is generally directed towards the maintenance of the existing populations for their contribution to national rather than State goals...In effect, the main threats identified and being acted upon in South Australia are the grazing impact caused by abundant and increasing population size relative to available habitat...⁶¹

6.64 A policy framework has been developed to guide the actions which may be taken to respond to koalas which are posing a safety hazard to members of the public or are in dangerous situations.⁶²

Senator Doug Cameron Acting Chair

Picture 6.1—An Acland koala, Queensland



Source: Dr Nicola Laws and Mr Glenn Beutel, *Submission 74*, p. 40. Reproduced with the permission of Dr Nicola Laws and Mr Glenn Beutel.

60 Department of Environment and Natural Resources, Government of South Australia, *Submission 77*, p. 2.

61 Department of Environment and Natural Resources, Government of South Australia, *Submission 77*, p. 2.

62 Department of Environment and Natural Resources, Government of South Australia, *Submission 77*, p. 2.

Appendix 1

Submissions, tabled documents, additional information and answers to questions taken on notice

Submissions

- 1 Name Withheld
- 2 Ms Gabrielle Ryan
- 3 Ms Margaret Hardy
- 4 Ms Susan Lyle
- 5 Name Withheld
- 6 Ms Caitlin Evans
- 7 Dr Alistair Melzer
- 8 Dreamworld
- 9 Conservation of North Ocean Shores
- 10 Ms Cassandra Primavera
- 11 Mr Lincoln Young
- 12 Ms Vivienne Jones
- 13 Friends of Felton Inc
- 14 Mr Robert Bertram
- 15 Wildlife Preservation Society of Queensland
- 16 Mr Rod McKelvey
- 17 Koala Action Group Qld Inc
- 18 Invasive Animals Cooperative Research Centre
- 19 Mr Robert Summers
- 20 Ms Vicki Hams
- 21 Mrs Vicki Green
- 22 Australia Zoo Wildlife Warriors Worldwide
- 23 Ms Diana Tomkins
- 24 Sunshine Coast Regional Council
- 25 Australian Koala Foundation
- 26 Humane Society International
- 27 Name Withheld

- 28 Mr Steve Morvell
- 29 Koala Research Network
- 30 Mr Ian Pratt
- 31 Name Withheld
- 32 Ms Carolyn Beaton
- 33 Name Withheld
- 34 Dr Jon Hanger
- 35 Mr Chris Allen
- 36 Mr Roger Park
- 37 Mr John Callaghan
- 38 Port Stephens Comprehensive Koala Plan of Management Steering Committee
- 39 Property Council of Australia
- 40 Mr Ian Harling
- 41 Koala Action Pine Rivers Inc
- 42 UQ Koala Ecology Group
- 43 Ms Iris I Bryce
- 44 Mr Chris Degenhardt
- 45 Coffs Harbour City Council
- 46 Redland City Council
- 47 Friends of the Koalas Inc
- 48 Ms Diana Palmer
- 49 Logan and Albert Conservation Association
- 50 Friends of the Earth Melbourne
- 51 Birkdale Progress Association Inc
- 52 Urban Development Institute of Australia (Queensland)
- 53 Ms Jenny Spinks
- 54 The Coastwatchers Association Inc
- 55 Powerlines Action Group Eumundi (P.A.G.E.)
- 56 National Association of Forest Industries
- 57 Wildlife Preservation Society of Queensland Logan Branch Inc
- 58 Friends of the Koala
- 59 Name Withheld
- 60 Dr Vanessa Standing
- 61 Conservation Council ACT Region Inc

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- 62 Mr Yuri Wiedenhofer
- 63 Tregeagle Landcare Group
- 64 Ms Paulette Oldfield
- 65 Sunshine Coast Environment Council
- 66 Mr Ian Bridge
- 67 Mr James Barrow
- 68 Fair Go Committee
- 69 Friends of Gippsland Bush
- 70 National Parks and Wildlife Far South Coast Advisory Committee
- 71 Ms Colleen Wood
- 72 The Sandy Point Community
- 73 Department of Sustainability, Environment, Water, Population and Communities
- 74 Dr Nicki Laws and Mr Glenn Beutel
- 75 Mr Bill Parke
- 76 Wildlife Queensland
- 77 Department of Environment and Natural Resources, Government of South Australia
- 78 New South Wales Department of Environment, Climate Change and Water
- 79 Department of Environment and Resource Management, Queensland Government
- 80 Phillip Island Nature Parks
- 81 Name Withheld
- 82 Hunter Koala Preservation Society Inc
- 83 Name Withheld
- 84 Ms Prue Acton OBE
- 85 Australian Wildlife Services
- 86 Professor Frank N Carrick AM
- 87 Wildlife Preservation Society of Queensland Bayside Branch (Qld) Inc
- 88 Mrs Julie Pryor
- 89 Mr Josh Halverson
- 90 Ms Larissa Waters
- 91 New Hope Group
- 92 Mrs Dawn Gray
- 93 Ms Pam Whiteley
- 94 Morton Bay Regional Council
- 95 Dr Julie Cox

- 96 Dr Bronte Somerset
97 State of Victoria
98 Department of Agriculture, Fisheries and Forestry
99 Ms Katie Milne
100 Ms Meghan Halverson
101 Professor Frank Carrick, Dr Alistair Melzer, Dr Bill Ellis and Dr Sean Fitzgibbon

Tabled documents

Koala Research Network:

Opening statement and Map: *Predicted koala distributions under climate change scenarios* (from public hearing, Brisbane, 3 May 2011)

Australian Koala Foundation:

Opening statement and paper: *Carbon and Koalas Collide: The science of trees, mapping and the carbon economy* (from public hearing, Brisbane, 3 May 2011)

Koala Action Group Queensland:

Opening statement and map: *Dog attacks on koalas in the Redland City Council area* (from public hearing, Brisbane, 3 May 2011)

Redland City Council:

Opening statement, four maps indicating federal land within the council area and paper: *Silkwood News* autumn 2011, Edition 1 (from public hearing, Brisbane, 3 May 2011)

Friends of Felton:

Map: Mining Exploration Permits or Applications for Permits near Acland since February 2011 (from public hearing, Brisbane, 3 May 2011)

Invasive Animals Cooperative Research Centre:

A submission to: Mr Peter Kenny's review of the 2002 Queensland Wild Dog Strategy and 2005 Memorandum of Understanding (from public hearing, Canberra, 19 May 2011)

Paper and maps: *Potential for wild dogs to impact on Koalas – an example from western Queensland* (from public hearing, Canberra, 19 May 2011)

Department of Sustainability, Environment, Water, Population and Communities:

Opening statement (from public hearing, Canberra, 19 May 2011)

Friends of the Earth Melbourne:

Two press clippings; Statement from Dr John Butler, Animal Clinic Morwell; Paper: *Observed differences between Island and Isolate populations in Victoria and Strzelecki/South Gippsland koala*, Colleen Wood; Three photos of injured Koalas (from public hearing, Melbourne, 1 August 2011)

Phillip Island Nature Parks:

Amendment to e. the listing of the koala under the *Environment Protection and Biodiversity Conservation Act 1999*; and Book: *An Island Worth Conserving, A History of the Phillip Island Conservation Society*, Christine Grayden (from public hearing, Melbourne, 1 August 2011)

Dr Bronte Somerset:

Opening Statement (from public hearing, Melbourne, 1 August 2011)

Victorian Department of Sustainability and Environment:

Paper: *Hunted, marooned, re-introduced, contracepted: a history of Koala management in Victoria*, Peter Menkhorst; and *Victoria's koala management strategy*, Department of Sustainability and Environment (from public hearing, Melbourne, 1 August 2011)

Forests NSW:

Opening Statement (from public hearing, Melbourne, 1 August 2011)

Additional information

Statement from Ms Vanda Grabowski, Koala Action Pine Rivers Inc

Additional statement from Lynn Roberts, Koala Action Group Qld Inc

Example of koala overpass design, Ms Gail Bruce

Additional information on fuel reduction burning, Australian Forest Products Association

Threats to koala populations in south-eastern Australia and the impacts of forestry activities on koalas and their habitat, Australian Forest Products Association

EnviroDevelopment Technical Standards, Urban Development Institute of Australia (Queensland)

Conserving koalas in rural and regional Australia with particular attention to rural Queensland, Koala Research Centre of Central Queensland

Fox predation on koalas, Koala Research Centre of Central Queensland

Executive summary, Koala Research Network

Answers to questions taken on notice

Mr Al Mucci, Dreamworld – Answer to question taken on notice (from public hearing, Canberra, 19 May 2011)

Mr Chris Allen – Answers to questions taken on notice (from public hearing, Canberra, 19 May 2011)

Queensland Parks and Wildlife Service – Answer to a question taken on notice from Senator Bob Brown (from public hearing, Canberra, 19 May 2011)

Queensland Parks and Wildlife Service – Answer to a question taken on notice from Senator Doug Cameron (from public hearing, Canberra, 19 May 2011)

Australian Forest Products Association – Answers to questions taken on notice (from public hearing, Canberra, 19 May 2011)

Mr Greg Mifsud, National Wild Dog Facilitator, Invasive Animals Cooperative Research Centre – Answer to a question taken on notice from Senator Cameron (from public hearing, Canberra, 19 May 2011)

Property Council of Australia (Residential Development Council) – Answer to a question taken on notice (from public hearing, Canberra, 19 May 2011)

South Australian Department of Environment and Natural Resources – Answer to a question taken on notice (from public hearing, Melbourne, 1 August 2011)

Victorian Department of Sustainability and Environment – Answer to a question taken on notice (from public hearing, Melbourne, 1 August 2011)

Dr Bronte Somerset – Answer to a question taken on notice (from public hearing, Melbourne, 1 August 2011)

HVP plantations – Covering letter regarding answers to questions taken on notice (from public hearing, Melbourne, 1 August 2011)

HVP plantations – Answers to questions taken on notice (from public hearing, Melbourne, 1 August 2011)

HVP plantations – Monash University submission to Australian Research Council

HVP plantations – Koala habitat atlas for HVP Plantations custodial estate Gippsland

HVP plantations – Forest Stewardship System – Policy and Procedure for the Management and Protection of Koalas

HVP plantations – Forest Stewardship System – Operating Standard for Management and Protection of Koalas

HVP plantations – Looking after our Koalas

HVP plantations – The Strzelecki Koala

Forests NSW – Answers to questions taken on notice (from public hearing, Melbourne, 1 August 2011): Koala Records Map, compiled by Forests NSW from the Koala Records data

Forests NSW - Koala records: extracted from the Office of Environment and Heritage's Wildlife Atlas database

Forests NSW - Document referred to by Mr Kambouris (from public hearing, Melbourne, 1 August 2011): Wildlife Research, Volume 24, 1997 providing more recent information about the status of koalas in the south-east of NSW

Forests NSW - Document referred to by Mr Kambouris (from public hearing, Melbourne, 1 August 2011): Combining a map-based public survey with an estimation of site occupancy to determine the recent and changing distribution of the Koala in New South Wales

Forests NSW - A 1986-1987 survey of the koala (Goldfuss) in New South Wales and an ecological interpretation of its distribution (cited in Forests NSW opening statement, public hearing, Melbourne, 1 August 2011)

Forests NSW - Distribution of Nocturnal Forest Birds and Mammals in north-eastern NSW: Relationships with Environmental Variables and Management History (cited in Forests NSW opening statement, public hearing, Melbourne, 1 August 2011)

Forests NSW - Koalas continue to occupy their previous home-ranges after selective logging in Callitris-Eucalyptus forest (cited in Forests NSW opening statement, public hearing, Melbourne, 1 August 2011)

Forests NSW - Koala Surveys: Ecology and Conservation at Eden (cited in Forests NSW opening statement, public hearing, Melbourne, 1 August 2011)

Forests NSW - Burning Issues (cited in Forests NSW opening statement, public hearing, Melbourne, 1 August 2011)

Forests NSW - Proposed forestry operations in the Urbenville Management Area: Environmental Impact Statement (cited in Forests NSW opening statement, public hearing, Melbourne, 1 August 2011)

Threatened Species Scientific Committee - Answers to questions taken on notice (from public hearing, Melbourne, 1 August 2011)

Department of Local Government and Planning, Queensland Government – Answers to questions taken on notice (from public hearing, Canberra, 19 May 2011)

Forests NSW – Answers to questions taken on notice (from public hearing, Melbourne, 1 August 2011)

Department of Sustainability, Environment, Water, Population and Communities – Answers to questions taken on notice (from public hearing, Canberra, 19 May 2011)

Response from Australian Koala Foundation to answers to questions taken on notice from the Threatened Species Scientific Committee (from public hearing, Melbourne, 1 August 2011)

Response from Threatened Species Scientific Committee to response from the Australian Koala Foundation to answers to questions taken on notice (from public hearing, Melbourne, 1 August 2011)

Response from Department of Sustainability and Environment, State of Victoria to response from the Australian Koala Foundation to answers to questions taken on notice (from public hearing, Melbourne, 1 August 2011)

Response from Minister for Environment and Conservation, Government of South Australia to response from the Australian Koala Foundation to answers to questions taken on notice (from public hearing, Melbourne, 1 August 2011)

Appendix 2

Petitioning documents

Petition from Koala Preservation Society of NSW Inc

We, the undersigned state that the Koala (*Phascolarctos cinereus*) must be managed so that existing koala habitat is protected from development throughout Australia and that large tracts of new habitat areas are created, protected and managed to ensure that koala numbers increase to healthy sustainable levels. We also state that current laws and regulations be reviewed (eg: SEPP 44) and changed so that future legislation actually protects the koala whether the koala is living in an urban or rural environment.

Signed by 2,010 petitioners

Petition from Ms Meghan Halverson

We, the undersigned, are concerned about the status, health and sustainability of Australia's koala population across their natural range in Queensland, New South Wales, Victoria and South Australia. Please refer this petition to those responsible for addressing this situation at a Federal level. We request in the strongest possible terms that the classification of koalas be changed to 'endangered' or at the very least 'vulnerable' across their natural range.

Signed by 427 petitioners

Appendix 3

Public hearings

Tuesday, 3 May 2011 – Brisbane

Koala Research Network

Ms Christine Adams-Hosking
Dr Gregory Baxter
Dr William Ellis, Koala Specialist
Associate Professor Clive McAlpine, Spokesperson
Professor Peter Timms
Professor Paul Young, Member

Australia Zoo Wildlife Warriors Worldwide

Miss Joanne Loader, Research Scientist

Dr Jonathan Hanger, Private Capacity

Australian Koala Foundation

Ms Deborah Tabart OAM, Chief Executive Officer

Koala Action Pine Rivers

Ms Vanda Grabowski, Secretary

Koala Action Group Queensland

Ms Lynn Roberts, Vice President

Koala Diaries

Ms Carolyn Beaton, Co-founder and Administrator

Urban Development Institute of Australia

Mr Peter Sippel, Chair
Mr Brian Stewart, Chief Executive Officer and General Counsel

Redland City Council

Mrs Melva Hobson PSM, Mayor
Mr Daniel Carter, Principal Adviser, Natural Environment

Sunshine Coast Regional Council

Dr Stephen Skull, Manager
Mr Charles Hammond, Coordinator, Biodiversity Team

Friends of Felton

Mr David Allworth, Researcher, Biodiversity
Mr Ian Whan, Committee Member

Mr Glenn Beutel, Private Capacity

Dr Nicola Laws, Private Capacity

Open microphone session

Mrs Megan Aitken, President, Moreton Bay Koala Rescue
Dr Janice Aldenhoven, Member, Wildlife Research Group, Wildlife
Queensland
Mr Col Bowman, Private Capacity
Mrs Gail Bruce, Koala Action Group Redlands
Mrs Meghan Halverson, Private Capacity
Ms Sarah Halverson, Private Capacity
Ms Paulette Oldfield, Private Capacity

Thursday, 19 May 2011 – Canberra

Dreamworld

Mr Al Mucci, General Manager, Life Sciences

Invasive Animals Cooperative Research Centre

Mr Greg Mifsud, National Wild Dog Facilitator

Mr Chris Allen, Private Capacity

Property Council of Australia

Ms Caryn Kakas, Executive Director, Residential Development Council

Queensland Property Council

Mr Paul Engerman, State Operations Manager

Mr Rod McKelvey, Private Capacity

Conservation Council ACT Region Inc

Mr John Hibberd, Executive Director

Koala Research Centre of Central Queensland, Central Queensland University

Dr Alistair Melzer, Program Leader and Adjunct Research Fellow

Queensland Department of Environment and Resource Management

Ms Andrea Leverington, Assistant Director-General, Queensland Parks and Wildlife Service

Mr Wade Oestreich, Director, Koala Policy and Operations Branch

Queensland Department of Local Government and Planning

Mr Gary White, Government Planner

Australian Forest Products Association (formerly National Association of Forest Industries)

Mr Allan Hansard, Transitional Chief Executive

Mr Mick Stephens, Strategic Policy

Department of Sustainability, Environment, Water, Population and Communities

Ms Kimberley Dripps, Deputy Secretary

Dr Michael Deering, Director, Species Listing

Ms Deb Callister, Acting Assistant Secretary, Wildlife Branch

Monday, 1 August 2011 – Melbourne

Professor Frank Carrick AM, Private Capacity**Friends of the Earth Melbourne**

Mr Anthony Amis, Land Use Researcher

Phillip Island Nature Parks

Dr Rosalind Jessop, Environment Manager

Mr Ashley Reed, Senior Ranger

Ms Julia Greenfield, Environmental Ranger

Friends of the Koalas, Phillip Island

Ms Patricia Hunt, President

Hancock Victorian Plantations

Miss Linda Sewell, Chief Executive Officer

Dr Bronte Somerset, Private Capacity

Department of Environment and Natural Resources, Government of South Australia

Mr Brenton Grear, Director, Natural and Cultural Resources

State of Victoria

Mr Peter Menkhorst, Department of Sustainability and Environment

Forests NSW

Mr Peter Kambouris, Regional Ecologist

Mr James Stirling, Manager, Planning and Environment, Native Forests Operations

Threatened Species Scientific Committee

Professor Peter Harrison, Member

Dr Bill Humphreys, Member

Dr Andrea Taylor, Member

Dr John Woinarski, Member

Appendix 4

Environment Protection and Biodiversity Conservation Regulations 2000, Regulation 7.01: Criteria for listing threatened species

	Criterion	Critically Endangered	Endangered	Vulnerable
1	It has undergone, is suspected to have undergone or is likely to undergo in the immediate future:	a very severe reduction in numbers	a severe reduction in numbers	a substantial reduction in numbers
2	Its geographic distribution is precarious for the survival of the species and is:	very restricted	Restricted	limited
3	The estimated total number of mature individuals is: and either (a) or (b) is true:	very low	Low	limited
(a)	evidence suggests that the number will continue to decline at: or	a very high rate	a high rate	a substantial rate
(b)	the number is likely to continue to decline and its geographic distribution is:	precarious for its survival	precarious for its survival	precarious for its survival
4	The estimated total number of mature individuals is:	extremely low	very low	low
5	The probability of its extinction in the wild is at least:	50% in the immediate future	20% in the near future	10% in the medium-term future

