A submission to the Australian Senate Inquiry into the status, health and sustainability of Australia's koala population.

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Background:

- Koala populations are declining in most of the northern range: the koala is extinct in parts of New South Wales, and in the south of its range its conservation is dependent on intensive interventionist management.
- Extrapolating demographic trends from intensive study sites in south-east Queensland across the rest of that state suggest that the koala will continue to move toward extinction in the near future unless significant changes to the way its habitat is managed are implemented - and are effective.
- There is a lack of scientific certainty regarding koala population dynamics in some areas (particularly the north west and mainland south) of the species distribution.
- There are significant differences between the challenges of conserving those koalas that occur in genetically depauperate groupings in southern Australia, those subject to the expanding urban and industrial footprint in coastal eastern Australia, and koalas in the north-west and western parts of the range in habitats affected by resource extraction, agriculture, climate extremes and drought.

The iconic status of the koala and the history of its management:

The koala is an Australian icon; its contribution to our value as a tourist destination and its place in our cultural identity are without question. Described as a flagship species for conservation, its high-end requirements for complex and mature ecosystem elements mean that strategies designed to meet its habitat requirements will result in the accommodation of a range of other species.

The history of the management of koala populations is one of harvesting for pelts, reduced range, declining population numbers and localized extinctions (Melzer *et al.* 2000; Phillips 1990) in the north, contrasting boom-bust cycles in the south. That populations in the south east of Queensland and northern coastal N.S.W. have declined alarmingly or gone extinct reflects poorly on the design and implementation of strategies designed to protect koalas in those areas where members of the public most easily see the species. It was a public campaign that led to the closure of open hunting seasons on koalas in Australia (Phillips 1990).

The declining and fragmented populations of koalas in the south east of Queensland (Lee *et al.* 2009; Preece 2007) would appear to typify the status of koalas elsewhere in that state: where information on population trends is available outside of the south east (Gordon *et al.* 1988; Melzer 1994) the trends and history are of decline. A combination of urban expansion, rural development and unreliable weather appear to have applied significant downward pressure on the capacity of the koala to maintain viable populations in Queensland and northern NSW.

The island populations of koalas in southern Australia appear to express higher reproductive rates than their northern counterparts (Whisson and Carlyon 2010) and deleteriously impact their habitat to the extent that without effective management these populations will follow their habitat into catastrophic decline.

Only on the coastal islands of Queensland: St Bees Island in the north and North Stradbroke in the south, do data suggest that populations may be stable (Ellis *et al.* 2009; Lee *et al.* 2009; Tucker 2009; Woodward *et al.* 2008), but these groups inhabit protected landscapes: National Park in the case of St Bees and a combination of protected and rehabilitated tenures on North Stradbroke Island. Other long-term study sites, such as Clermont, Oakey and Springsure in Queensland, record decreasing populations in modified landscapes.

Estimates of koala populations and the adequacy of current counting methods:

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. The mulgalands of western Queensland are a case in point, where koalas are (or have been) widespread but in low density. Recent work there suggests that either former estimates overstated the population density, or, more plausibly, that there has been a significant decline in population numbers. A similar story exists in central Queensland. A common thread in these areas is that much of the research that has been undertaken has been poorly funded. Were these studies properly funded from the beginning, it is unlikely that the current data gaps would exist. Workers such as Melzer (and before him Gordon, and also Sullivan) established research projects in central and western areas of Queensland, but these have received insufficient funding support to achieve their goals quickly.

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. Again these sites and methods have resulted from the independent efforts of researchers without significant funding support but are likely to yield the most accurate indication of broad koala population dynamics over time.

Knowledge of koala habitat

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. At intensive, long term study sites such as St Bees Island, Clermont, Springsure and Redlands in Queensland, critical elements of the habitat of koalas have been teased out of the environment as a result of a range of projects that investigate the role of space (Ellis *et al.* 2009), shade (Ellis *et al.* 2002b; Ellis *et al.* 1995), diet (Ellis *et al.* 2002b), temperature and water availability (Clifton *et al.* 2007) in koala habitat use. The role of habitat elements in under conditions of changed climate were able to be examined (Ellis *et al.* 2010) and predictions regarding future distributions were made (Clifton *et*

al. 2007), so that knowledge of koala habitat in Queensland is particularly sound. While in southern populations tree use is reported to be equivalent to diet and social factors are not reported to affect tree choice (Moore *et al.* 2010) this is not true in Queensland (Ellis *et al.* 2001; Hasegawa 1995; Pfeiffer *et al.* 2005; Tun 1993) or NSW (Matthews *et al.* 2007), so understanding habitat in the north and south of the koala's range presents different problems. A plethora of studies in Queensland found tree use and diet varied across koala ranges, that the presence of faecal pellets was a poor predictor of diet and that the spatial arrangement and breeding dynamics of koalas were complex (Ellis and Bercovitch 2011; Ellis *et al.* 2002a; Ellis *et al.* 2009). Therefore while concentrating on food trees may be the principal element in management of koalas in the far south, a more detailed approach is required in NSW and Queensland, where non-food trees appear to be critical to koala survival, especially under conditions of extreme heat (Kavanagh *et al.* 2007).

Threats to koala habitat such as logging, land clearing, poor management, attacks from feral and domestic animals, disease, roads and urban development:

There is a clear geographical element to the nature of threats koalas face across their range, with both overt and subtler factors contributing to population dynamics.
In non-urban systems, koalas are impacted by habitat clearing for a range of purposes including extractive industry and agriculture (Kavanagh *et al.* 2007), but in these areas koalas are also subject to diseases, attacks from dogs and road trauma. In the urban landscape cars and dogs contribute to a larger proportion of deaths but disease syndromes - though little more commonly occurring (Weigler *et al.* 1988) - appear to impact more severely on population dynamics there (Ellis *et al.* 1993). Chlamydial infection is endemic in Queensland koalas and in that state 100% of koalas carry Koala Retrovirus (KoRV; Lee 2010). Some populations with Chlamydial infection and KoRV infection appear healthy. KoRV is present on North Stradbroke Island, which has been isolated from the mainland for thousands of years, suggesting that this is not a recent issue for koalas.
The Queensland government has recently implemented a program of strategic revegetation and acquisition of key habitat links for koalas in the south east of that

state – representing the most comprehensive attempt yet to reverse the decline of koala habitat there. However, the koala population is in such severe decline in the target area that these efforts may be in vain. This shows that that even in areas where koalas are highly visible and apparently common (as koalas were classified in that area until recently under Queensland legislation) their decline is difficult to predict or reverse. In other areas of that state and in NSW it is possible that some extinction is yet to be documented, because isolated and remote populations receive less scrutiny from the public or scientific community.

Furthermore, debate continues as to the likely effect of dryer and warmer climatic conditions for koalas (Ellis *et al.* 2010) and how land management practices will exacerbate these effects. It its considered that over 50% of koalas in western Queensland occur in less than 5% of the available habitat (Sullivan *et al.* 2004), but we know little about the relative resilience, in terms of its suitability for use by koalas, of the respective habitats to climate variability. Riparian strips are retained to provide refugia for animals on creek lines, but should these patches of vegetation be less resilient to dry periods than their non-riparian counterparts, the benefit to wildlife of preserving them from clearing will be negated in extreme climatic conditions.

The listing of the koala under the Environment Protection and Biodiversity Conservation Act 1999

The EPBC Act 1999 has enabled the Commonwealth to take responsibility for those elements of the environment that are of national environmental significance. Given that a State based system of legislation appears to date to have failed to protect and conserve one of Australia's key faunal emblems, perhaps it is time for the Commonwealth to have a go. There are several ways this could be done: one would be to amend the Act to include (as well as listed migratory species for example) a category of listed nationally important species – for cultural or other reasons. Thus species with particular significance to Australian people could receive protection this way. However, there is little to be lost by the government invoking the key principle of precaution, and listing this species in light of the evidence on hand of decline, even though there are theoretical gaps in current knowledge. 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. Listing the koala under the EPBC Act 1999 would bring the Commonwealth Government into the decision making process through referrals of activities likely to impact koala populations. This would lead to a more transparent process and also allow the issue of remediation orders for damaged habitat, rather than fines handed down by State Governments for land clearing. Such a listing could recognize the different ecology of the north and south koalas, as well as urban and non-urban koalas: they face different threats so they require different conservation approaches.

The adequacy of the National Koala Conservation and Management Strategy:

This strategy seems to be under resourced, best likely to be implemented on Commonwealth-controlled land but not readily taken up at the State level.

Appropriate future regulation for the protection of koala habitat:

The loss of koala habitat needs to be abated, but strategies that involve offsets, remediation of land, acquisition of property and incorporation of new techniques to accommodate koalas with development should be encouraged through legislation that rewards good performers.

State regulations reflect the history of our federation and especially the perceived need to retain State rights to resources, even where these recourses are apparently vested in The Crown. Development interests are reflected in local government actions as evidenced by the replacement of open space and low-density development with ecological wastelands to meet population growth targets. A large component of the capacity to transition from habitat loss to habitat stability and subsequent habitat gain will be accessing – by koalas – trees on private property. In the rural landscape, protecting native vegetation affects property owners' capacity to earn a living, so this needs to be compensated and value assigned to habitat. Backyard trees in the urban matrix and intervening open space represent a major asset for koala habitat that could

be accessed in the future with clever planning and development guidelines. This "layer" of habitat (urban trees) contained within an otherwise (currently) koala-unfriendly landscape could be utilized if the threats to koala survival (car trauma, dog attack, disease etc) were bought under control. In Queensland, new legislation before parliament threatens urban trees, so this resource may be doomed. Laws that allow or even compel landholders to remove key habitat elements in the urban environment represent a dramatic step in the wrong direction for protecting koala habitat. Accordingly, the Commonwealth could step in and regulate against those acting in short sighted self -interest.

At the State level, inventories of underlying (perhaps historical) habitat elements on private property might reveal significant ecological value hidden within the matrix of development. Accessing this through legislated green paths, modified conditions of development and strategic re-deployment of infrastructure away from key habitat nodes could change the relationship between urban development and koala habitat.

A concerted effort to understand the way koalas use their habitat underpins effective planning for the future of the habitat: complex forest systems are as important in urban as non-urban environments in Queensland, but perhaps less so in southern populations. Structural elements that permit social partitioning of habitat (Ellis *et al.* 2009) will need greater protection in fragmented urban landscapes, but will also be important for microclimate attributes in any warmer environments. The impact of anthropogenic noise on koala breeding, by impacting vocal communication in this species (Ellis *et al.* 2011) is an emerging challenge for research into declining urban populations. Conversely, road impact amelioration may need to increase in non -urban environments, as koala populations have become squeezed into narrow linear landscape elements in those systems.

Interaction of state and federal laws and regulations; and any other related matters:

In Queensland in 2000, environmental management of the minerals sector was removed from the Minerals Resources division and handed to The Department of Environment (Sect 3 EPA Qld). The prior effect of the minerals sector controlling assessment of its own environmental performance was a legacy of poor environmental

management in Queensland. Now, the two parties have been re-merged, with Natural Resources moving into Environment's realm. To ensure that we do not resume the disastrous path along which we were headed in the mid 90's, its imperative that the Commonwealth steps in to lead the way in cases where State legislation has been shown to be inadequate (such as is clearly the case for the koala in Queensland). History shows that we can't expect those State Departments with a fundamental mandate to promote economic growth through resource exploitation to also effectively manage the environment (Ellis 2003). Furthermore, competition between the States to attract economically attractive industry and development works against the National interest in conservation and protection of key ecosystems.

In summary

We submit that there is a strong case for the Commonwealth Government of Australia to recognize that the situation for the koala is dire, and that significant differences in the conservation challenges across the species' range exist. Experts within each state may best determine how these challenges are met, but 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 long enough that, hopefully, in years to come the species will again be common, widespread and not require such a listing.

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