

An Ecological History of the Koala *Phascolarctos cinereus* in Coffs Harbour and its Environs, on the Mid-north Coast of New South Wales, c1861-2000

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This paper focuses on changes to the Koala population of the Coffs Harbour Local Government Area, on the mid-north coast of New South Wales, from European settlement to 2000. The primary method used was media analysis, complemented by local histories, reports and annual reviews of fur/skin brokers, historical photographs, and oral histories. Cedar-cutters worked their way up the Orara River in the 1870s, paving the way for selection, and the first wave of European settlers arrived in the early 1880s. Much of the initial development arose from logging. The trade in marsupial skins and furs did not constitute a significant threat to the Koala population of Coffs Harbour in the late nineteenth and early twentieth centuries. The extent of the vegetation clearing by the early 1900s is apparent in photographs. Consistent with the probable presence of Koalas in the Coffs Harbour town centre in the early 1900s, available evidence for the period 1920-1950s strongly suggests that Koalas remained present in the town centre and surrounding area. Large-scale development began in the early 1960s. Comparing aerial photographs allows us to discern the speed of change from a largely rural landscape in 1964 to one that is predominantly urbanised by 2009. The 1999 Comprehensive Koala Plan of Management for Coffs Harbour City Council, drawing on the 1990 Community Survey of Koalas in Coffs Harbour, detailed specific examples of habitat fragmentation through development. Local media coverage offered a wealth of information on the persistence, and rapid eradication, of Koala habitat over the 1970s-2000, in addition to the level of community interest in the issue. Taken collectively, the evidence allows us to draw two main conclusions: that the Koala population of Coffs Harbour was widespread but never abundant, and that habitat loss has been relentless since European settlement. The transformation of a rural-forest to a largely urban landscape, particularly in the south-east of the Local Government Area, over the past four decades is the most recent stage in the incremental loss of habitat since European settlement. Consequently, the conclusion can be drawn that the Koala population had been reduced from its pre-European size by 2000. Concurrent research on the Coffs Harbour Koala population showed that it declined during the 1980s, but was relatively stable and endured over the period 1990-2011. These findings point to the necessity of employing historical analysis to interpret change in Koala populations in Coffs Harbour to complement current assessments of population status.

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Keywords: Bellingen, Coffs Harbour, *The Coffs Harbour Advocate*, ecological history, fur trade, Koala, Orara, *Phascolarctos cinereus*, media analysis, native bear, timber industry, vegetation clearing.

INTRODUCTION

This paper aims to develop an ecological history of the Koala *Phascolarctos cinereus* in Coffs Harbour on the mid-north coast of New South Wales, focusing primarily on changes to its population profile since European settlement in the region. It forms part of

a series of papers that aims to track the population in order to interpret its current ecological status. The first comprehensive, Shire-wide Koala Plan of Management in NSW was prepared for Coffs Harbour City Council in 1999 (Lunney et al. 1999a, 2000, 2002) and adopted in State Parliament in 2000. In evaluating this Plan, we considered it essential to analyse not only the recent profile of

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the Koala population, but also the pattern of long-term change. In order to fully understand the long-term trend as well as to interpret the current status of the Coffs Harbour Koala population, we must adopt both an ecological and an historical approach that goes beyond three Koala generations, which is 20 years (Australian Government Department of the Environment 2011). The historical enquiry undertaken in this paper provides the context within which ecological interpretations of the long-term changes in and current status of the Koala population of Coffs Harbour can be viewed.

In view of a number of methodological challenges and evidentiary deficiencies that emerged in the research process, this paper makes no claim to being exhaustive. Rather, it proposes a thesis of the general pattern of historical change with regard to the Koala population of Coffs Harbour, to complement the intense ecological work currently being undertaken (Lunney et al. 2015). In so doing, it corresponds to an historical approach which aims to track and interpret the long-term pattern of animal population changes in relation to the pattern of human settlement over longer time frames than those generally regarded as long-term in ecological research, i.e. 10 years or more. This framework is far from definitive and one of the objectives of our work is that it may inspire other scholars to refine it in their efforts to trace the elusive changes of animal populations across historical time, with an eye to the interaction between them and human settlement.

Concurrent ecological research has identified that the Koala population of Coffs Harbour has persisted over the period 1990-2011 both in terms of distribution and activity levels, and that it is, surprisingly, relatively stable (Lunney et al. 2015). This follows on from a population decline in the 1980s. These conclusions arose from two independent survey methods (community survey and field survey). There are four possible explanations for the Koala population's stability from 1990-2011: that recent conservation efforts and planning regulations have been effective; that surviving adults are persisting in existing home ranges in remnant habitat; and that the broader Coffs Harbour population is operating as a "source and sink" metapopulation, with nearby higher density populations (such as Bongil Bongil National Park) providing a source of immigrant Koalas; and/or that the standard survey methods employed are not sufficiently sensitive to detect small population changes (Lunney et al. 2015). The present paper is intended to deepen our understanding of the long-term profile of the Coffs Harbour Koala population and extend our focus beyond the last three decades.

Looking at population trends over long time periods provides a deeper understanding of possible drivers of population change, thereby allowing better future management of the remaining population.

METHODOLOGICAL NOTES

Ecological history is a rapidly growing field attracting considerable international attention. Drawing on existing fields such as environmental history and historical geography, ecological history has been recognised as crucial to developing ecological restoration programs and conservation strategies (Foster 2000; Donlan and Martin 2004; Jackson and Hobbs 2009). As a discipline it requires both ecological and historical understanding, utilising the analytical tools and approaches of both ecology and history to shed light on the relationships between humans and the natural environment. Many works in the field adopt a grand-scale approach, examining ecological changes which have taken place over millennia in whole regions (e.g. Vermeij 1987; Flannery 2001; Grove and Rackham 2001). For more localised studies, however, an approach on a smaller scale is equally valuable in capturing the ecological specificities and changes of a given area.

Ecological histories of Australian fauna are rare. Of those that exist, we can discern a number of general approaches and research foci. Studies that examine specific species from a management perspective that takes historical data into account are rare (for example, see Menkhorst 2008). Others examine the impact of a specific exploitative activity on a species, such as the trade in seal skins in south-eastern Australia (Ling 1999) and marsupial furs (Koalas and Brushtail Possums *Trichosurus vulpecula*) in Queensland (Hrdina and Gordon 2004; Gordon and Hrdina 2005). One short essay (Parris 1948) attempts to track changes in Koala abundance on the Goulburn River, Victoria, using historical sources, but it is neither comprehensive in its research nor rigorous in methods. Multiple studies have utilised historical data to assess decline in species distribution (Lunney et al. 1997; Lunney 2001; Gordon et al. 2006). The majority of studies adopt a state-wide scale, aiming to identify general patterns of change and/or infer local population changes from this picture.

While state-wide analyses allow us to contextualise regional changes within broader historical patterns, these broader patterns do not always align neatly with the patterns of specific districts within the state. Following the first, comprehensive state-wide survey of Koalas in New South Wales (NSW)

in 1986-87, Reed and Lunney (1990) concluded that habitat loss was the most decisive factor in the decline of the Koala in NSW. However, as the settlement of NSW varied across localities due to geographical specificities, so did the severity and timing of the impact on fauna and the natural environment. Research on the Koala populations of Campbelltown (Lunney et al. 2010), Port Stephens (Knott et al. 1998) and Bega (Lunney and Leary 1988) indicates that, while Koala populations responded similarly to settlement, the impact differed widely among these districts. Additionally, we must also consider other factors, such as the varying impact of the fur trade, the varying densities of the initial Koala populations, and the extent of Koala occurrence across a given geographic range.

An appreciation of these variables is critical in developing a comprehensive understanding of the management and restoration challenges that face a species. Long-term studies of fauna undertaken prior to 1960 are rare worldwide and, as one recent paper notes, this is particularly the case with regard to quantitative studies in historical ecology more broadly (Zu Ermgassen et al. 2012). Consequently, predictions of a bleak future for a species are generally only based on the analysis of the last 30-50 years of that species' occurrence. The alternative to these alarmist (and, in some cases, fatalistic) assessments is complacency: here, short-term data facilitate the conclusion that continued management and/or restoration programs are unnecessary. In order to avoid potential oversights, we must develop an historical understanding that takes into account the patterns of recent decades, but that is not restricted to them.

Recent advances in our collective knowledge of Koala ecology, and the threats Koalas face, have sharpened our focus as to what environmental and ecological attributes are likely to have influenced the changes to Koala populations. This allows us to be more inclusive in our research, by enabling us to identify and examine factors previously overlooked in considerations of long-term population change, such as the impact of the fur trade. It also allows us to be more precise in our analysis and interpretation of historical sources, and critical of their relative significance in the context of the Koala population. In addition, the Koala has an attribute which makes it a near perfect animal to study historically. There is only one species of Koala, so there is no confusion about what species is mentioned in various historical documents of a non-scientific nature, such as newspaper reports. The Koala is large and slow-moving, so when it is seen, it can be readily identified. As they are obligate tree-dwellers, and as their forest habitat is logged or

cleared for housing, their populations can be tracked by looking at changes to the habitat on which they depend. This makes the Koala an ideal species to look at through indirect evidence from an ecological viewpoint.

However, while the Koala is distinctive, the historical evidence allows limited scope for interpreting change in population size over time. Numerical data, such as might be expected in a scientific study, were not available prior to 1990 when a systematic survey was undertaken across the Coffs Harbour Local Government Area (LGA) (Lunney et al. 1999a). As a result, we can expect only large shifts in numbers to be registered in historical records. As will become apparent, the recorded 'changes' are imprecise, unsystematic, and generally refer to perceived numbers as opposed to distribution. The 1990 study was also the first to determine the range and habitat preferences of the Coffs Harbour Koala population (Lunney et al. 1999a). Prior to 1990, historical sources identify specific locations but do not offer a systematic assessment of distribution across the LGA. Consequently, when we utilise the term "population" in this paper, we refer to numerical size or abundance rather than shifts in distribution, unless otherwise indicated.

In the context of Coffs Harbour, the scarcity of long-term data lends living memory a particular significance. As oral histories of older residents were not conducted until the mid-1990s, the experiences related in their accounts are weighted towards the latter half of the twentieth century. Nevertheless, they comprise an important point of comparison with existing sources from the period. In addition, the 1990 Koala Survey (Lunney et al. 1999a, 2000), conducted by the National Parks and Wildlife Service as a response to recommendations made at the 1988 Koala Summit (Lunney et al. 1990), provides us with a crucial source of perceptions data (i.e. memory and perception of the past and current presence of Koalas locally, and of the issues facing Koalas) for the Coffs Harbour area. As the diversity of most species leads to popular confusion, perceptions data can generally only be utilised for a single species, and usually iconic species at that. Due to its distinctiveness, the Koala is one of the few Australian animals that can be reliably identified by non-specialists. This paper draws heavily from the respondents' comments, particularly those of long-term residents, in order to substantiate its broader analysis of the extent of Koala occurrence in the area over time. Though these comments rest entirely on the respondents' memories, we maintain that, despite the likelihood of potential errors in individual accounts, these comments support

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our general thesis of Koala occurrence when taken in the aggregate. These perceptions data are intended to complement information gleaned from other sources, primarily newspaper reports, historical photographs, and local histories of the area.

The primary method utilised in this study is media analysis. For the purposes of this study, this method involves the comprehensive reading of newspapers from the period in order to gauge the changing profile of the Koala population in the Coffs Harbour area. It also requires us to pay attention to the ratio of information about Koalas in comparison with other animals. In this regard, it is instructive to note the criteria applied to the media coverage of animals, which remains relatively consistent throughout the period examined in this study: generally, animals do not warrant coverage unless they are considered pests (and thereby threaten the stability of human practices), they carry a 'scare value' (and are thereby perceived to threaten human life), or they are commercially important. With this in mind, the relative silence about Koalas in the local print media of the Coffs Harbour area is itself historically interesting, for it suggests that residents did not view Koalas as pests, unlike paddymelons (small members of the kangaroo family) and flying-foxes, nor were they an important trade item in the area. It also suggests that residents were not particularly interested in their welfare until the 'conservation turn' of the late 1960s.

Media analysis also requires us to pay attention to coverage of the practices that affect Koala habitat, such as vegetation clearing, ringbarking, and the fur trade. Shipping reports for the area, and for the steamers which utilised the Coffs Harbour port, could not be located and have presumably been destroyed. As a result, we have had to rely on the reports printed in local newspapers for information regarding the exports that passed through the Coffs Harbour port. These reports take the form of summaries and are intended to publicise the 'going rates' of key exports. However, as Coffs Harbour's local paper, the *The Coffs Harbour Advocate*, began in 1907, the reports up until this point have been drawn from two regional newspapers. These papers are *The Clarence and Richmond Examiner and New England Advertiser* (published 1859-1889) and *The Clarence and Richmond Examiner* (published 1889-1915) [hereafter, in-text citations of these papers will take the forms of CRENEA and CRE, respectively]. Both were published in Grafton, a town on the Clarence River, north of Coffs Harbour. As the distribution of these papers stretched from the Tweed, in the north of the State, to Bellingen, immediately to the south of Coffs Harbour, and included townships as far west

as Tamworth and Armidale, it is difficult to discern precisely from where the skins and furs listed in the shipping reports originated. It is also not known exactly how many skins comprised a bale. As such, these reports give us only a partial indication of the extent of the fur trade in the Coffs Harbour area. Furthermore, as the *The Coffs Harbour Advocate* [hereafter, in-text citations of *The Coffs Harbour Advocate* will take the form of CHA] was issued daily, we have adopted a 'sampling' approach in view of time constraints. By reading the issues for the first year of each decade (e.g. 1910, 1920, 1930), we aim to identify general patterns of change.¹

In view of the limitations of media analysis, we have consulted local histories of Coffs Harbour, in addition to the nearby settlements of Bellingen, Raleigh, and Urunga; histories of the fur trade in Australia; historical photographs; and accounts of shipping on the mid-North Coast. We have also searched other local and regional newspapers for articles on the fur trade, the development of Coffs Harbour, and reports on trips to the mid-North Coast taken by commissioned explorers. In order to situate Coffs Harbour in the broader fur/skin market, we consulted the following annual reviews of fur/skin brokers: Goldsbrough, Mort and Co.; Dalgety and Co.; Winchcombe, Carson and Co.; and Bridge and Co. Regrettably, the archives of the Coffs Harbour Historical Society were inaccessible during the research stage of this paper due to extensive flooding, which forced the Society to store its archival material in shipping containers for an indefinite period.

EARLY HISTORY

Historical sources concerning the fauna of the Coffs Harbour region prior to European settlement are scarce. While scholars of Aboriginal history have identified that the dialects of the Gumbaynggir nation contain multiple words for 'native bear' (Ryan 1988: 23-24), this tells us little about the precise distribution of the Koala in the region, for the speakers of these dialects are located not only in the Coffs Harbour area but also as far as Grafton and Nambucca Heads (a township south of Coffs Harbour) and Bellingen. On a slightly smaller scale, the "tribal territory", or the area of land recognised as the "particular preserve" of the Gumbaynggir nation, has been estimated at 6,000 square kilometres (Ryan 1988: 56, c.f. Tindale 1940). The Coffs Harbour town area tribe was known as 'Womboyneralah', or "where the kangaroos camped" (England 1976: 46). Among the words for 'native bear' in the Gumbaynggir lands are 'Toon-gari',

which is a word specific to the inhabitants of the Orara (Rudder 1899), and ‘Yarrahapinni’, specific to the Macleay and meaning ‘native bear rolling down the hill’ (Tyrrell 1953).

With regard to the cultural practices and beliefs of the Gumbaynggir peoples, multiple sources indicate that they utilised Koala skins to make rugs (McFarlane 1934b; Yeates 1990: 11; Thomas 2013). This is consistent with an 1880 newspaper report on the Australian fur trade, which notes that the best Koala fur was put to this use across Australia (*The Argus* 1880). Yeates (1990: 10) notes that the tribes of the mid-North Coast were versed in a particular method of tree-climbing, which allowed them to obtain “honey, opossums and koalas”. Koalas are prominent in mythologies relating to the North Coast, such as the legend of the “great bear” of Mount Yarrahapinni (Ryan 1988: 114, 125) and the legend of Ulitarra, which is but one of many legends connecting the Koala with water and, at times, salvation from danger (Ryan 1964). Furthermore, it was a totemic animal for at least two tribes in the area (Ryan 1988: 51). It is difficult to discern if the Gumbaynggir peoples commonly ate the Koala and used its skin: while we can assume that it was widely hunted (McFarlane 1934a), it is conspicuously absent from the explorer Clement Hodgkinson’s account of the tribes he encountered along the Bellinger River, in which he noted animals they consumed (Hodgkinson 1845: 43, 45, 58). In an account of the food regulations of the Gumbaynggir, Ryan (1988: 53) notes that, immediately after a young male was admitted to the status of a tribesman, he was “often forbidden to eat the male of the native-bear, kangaroo, opossum, or short-nosed bandicoot”. It is unclear, however, whether this custom was consistent across tribes in the Gumbaynggir lands.

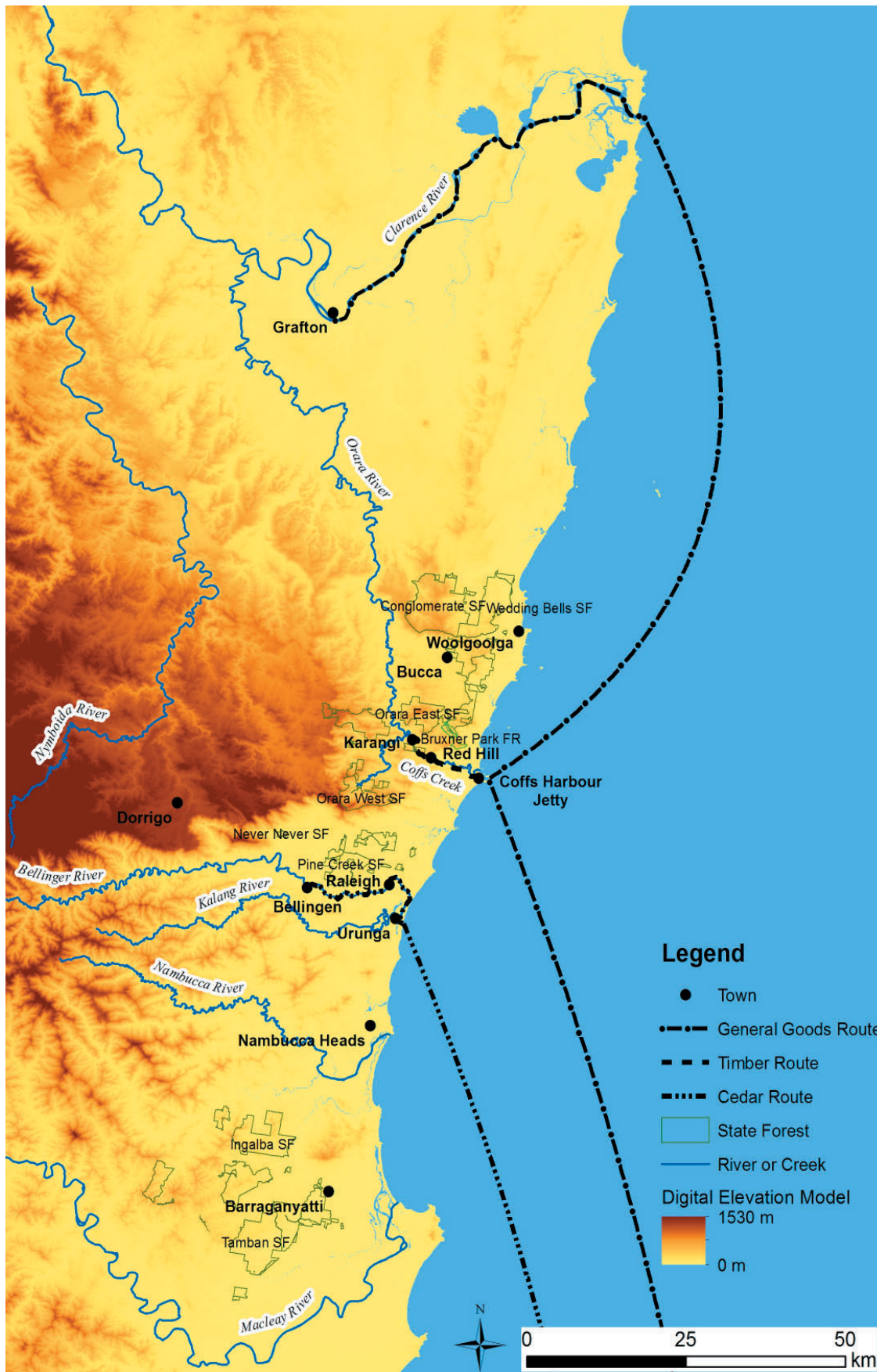
European settlers reached Coffs Harbour relatively late in comparison to other areas of the north coast of New South Wales. The movements of the settlers depended upon their ability to safely transport themselves, their cargo and exports via sail (and later steam) vessels. The absence of a river connecting Coffs Harbour to the sea meant that it was left out of the initial phase of settlement of the North Coast in

the 1830s and 1840s (England 1976: 6). This phase of settlement was confined to Bellingen on the Bellinger River and Grafton on the Clarence River. Until 1830, free settlement to the north of Port Macquarie was prohibited, leaving Bellingen undisturbed. When this ban was lifted, settlers faced the challenge of crossing a “hazardous” bar at the mouth of the Bellinger River and “an almost impenetrable forest” (Pegum and Pegum 2010: 16). In contrast to the flat, fertile country of the Clarence and Bellinger Rivers, Coffs Harbour’s considerable elevation (see Fig. 1) meant that it was largely inaccessible, and poor land for harvesting crops. Geography was thus a primary determinant of the pattern of the initial settlement of the Coffs Harbour area and of the mid-North Coast in general.

The first Europeans in the Coffs Harbour area have been variously reported as escaped convicts “taking refuge” on Muttonbird Island (Rodwell 2011: 27), and two sailors who wandered away from their ship in 1837 and followed the Orara River (Secomb 1986: 4). In 1840, a stockman named William Miles, employed by a Macleay grazier, headed north with the intention of identifying new rivers alongside which cedar grew in abundance. His glowing reports of the cedar near the Bellinger River persuaded Clement Hodgkinson, then the Government Surveyor of the Macleay District, to explore the area for himself (Hobson 1978: 4). Hodgkinson undertook two expeditions to the area in 1841-42, and his account of what he observed later formed Part 1 of his book *Australia from Port Macquarie to Moreton Bay* (Hodgkinson 1845). Fauna is largely peripheral to his account, which focuses on the vegetation and geology of the Bellingen area and, to a lesser extent, the local Aboriginal tribes he encountered along the route. While he is highly attentive to the appearance, abundance, and utility of the natural resources he observes, animals do not receive the same degree of analytical interest: only once does an animal – a kangaroo – appear in the narrative because it constitutes, *in itself*, an interesting feature of the landscape (Hodgkinson 1845: 47). With regard to other passages in which animals are mentioned, the

Fig. 1 (following page). General goods, timber, and cedar transportation routes in the local area, showing elevation and the place names mentioned in the text. These transportation routes were established by the late 1880s. This digital elevation model map shows that the Clarence Valley and the Clarence River were located on a large expanse of low-lying land. Similarly, the Bellinger Valley to the south of Coffs Harbour is on low-lying land. The high elevation of Coffs Harbour, other than the coastal strip, is also evident. The trade routes of the 19th and early 20th centuries are shown, as are key towns in this early trading settlement. This map places Coffs Harbour in its regional context, and allows us to understand why Coffs Harbour, being hilly with no river, was settled much later than the Bellinger and Clarence Valleys. This map is based on information derived from historical sources.

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majority are in connection with commentary on the hunting practices of the Aborigines who accompany Hodgkinson on his expedition (see e.g. Hodgkinson 1845: 45, 58, also Part V). Interestingly, the animals which the Aborigines of the Bellinger area hunt and consume include “a kangaroo”, “a carpet-serpent”, “pademella”, a “brush-kangaroo”, “an opossum and a large dew-lizard”, but not the Koala (Hodgkinson 1845: 28, 30, 33, 43, 45).

IMMEDIATE PERIOD OF EUROPEAN SETTLEMENT: 1870-C.1890

In 1847, shipbuilder John Korff, on his way to the Bellinger River, sought refuge from a gale in a port which he named Korff's Harbour. Although he reported his discovery after returning to Sydney, European settlement of the area did not commence until the mid-1860s. Following the passage of the Robertson Lands Act in 1861, the NSW Government reserved the land adjacent to the Harbour (NSW Government Gazette 1861), evidently recognising its potential as a port. The Bellinger Valley was opened to selection in 1863. While an early pioneer arrived in 1865 to draw cedar (Yeates 1990: 20), the first wave of settlers did not arrive in Coffs Harbour until the early 1880s. Cedar-cutters gradually worked their way up the Orara River in the 1870s, paving the way for selection. The discovery of gold in the Orara Valley in 1881 hastened the arrival of newcomers to the area (Yeates 1990: 23). By 1890, a small but thriving community of selectors, sawmillers and teamsters had developed in Coffs Harbour (Bacon 1926: 96).

Local histories of Coffs Harbour show that, in the early period of settlement, the development of crops was modest (Yeates 1990; England 1976). As a result, much of the initial development of the Coffs Harbour hinterland arose from extractive industries, primarily logging. The timber industry experienced a rapid boom in the early 1880s. By March 1883, the newly-appointed Inspector of Forests noted that the number of sawmills in the area was steadily increasing, with five more about to be established (Secomb 1986: 8). Furthermore, following an inspection of the Orara reserve, he recommended that if the reserve was not to be retained, a “corresponding area” containing a “similar description of brush forest” should be reserved in its place, “otherwise many of the bush timbers are likely soon to become extinct” (Duff 1883, c.f. Secomb 1986: 8). Three years later, merely a few weeks before the Parishes of Coff and Wongawonga were opened to selection, *The Clarence and Richmond Examiner and New England Advertiser* obtained a description of the uncultivated land:

The soil is rich alluvial in the flats, and fair arable land on the lower ridges; the back ridges are generally steep, broken and stony. The whole of the land with the exception of the caps of one or two ridges is covered with scrub dense in the flats and dense to light on the back ridges. The timber is plentiful and good, consisting of flooded and red gum, box, bloodwood, oak, tallowwood, blackbutt, and several varieties of scrub woods (softwoods) [...]. (*CRENEA* 1886)

After the Parish of Coff was opened to selection in July 1886, clearing became more extensive. Settlers often employed local Aboriginal people to assist in clearing the tangled undergrowth, with the animals brought down in the ‘drive’ – primarily hundreds of flying-foxes – serving as recompense (England 1976: 17). The felled timber rapidly became the area's foremost export, shipped via the port of Coffs Harbour to Sydney (Richards 1996: 78-81). The local and statewide timber transportation routes are shown in Figs 1-2.

While the commercial significance of timber for the early Coffs Harbour community is indisputable, it is more difficult to ascertain the importance of the trade in marsupial skins and furs for the settlers. England (1976: 18) notes that the settlers' guns “were seldom idle”, listing the Koala alongside wallabies, possums and kangaroos as an animal killed for its skin in Coffs Harbour, but provides no source for his claim. As Coffs Harbour lacked a local paper at this time, we must turn to regional papers for insight into the magnitude of the fur trade in the area. Commercial and shipping reports published in *The Clarence and Richmond Examiner and New England Advertiser* and *The Clarence and Richmond Examiner* show that there was an active fur trade in the broader region. Due to the wide distribution of these papers, it is difficult to determine the specific import of their commentary for Coffs Harbour. At the very least, the papers publicised the prices for skins, thereby informing settlers of their fluctuating value and allowing them to develop reasonable estimates of the returns they could expect from a hunt. With this function in mind, it is important to note that the commercial reports evince a low ‘going rate’ for Koala skins in comparison to the skins of other marsupials. In one report in late 1889, a fur/skin broker lists the “Bear” at “1d to 3.5”, while a large Grey kangaroo fetches “80d to 95d” and the Swamp wallaby “7d to 19d” (*CRE* 1889j). Kangaroo fur was undoubtedly the most popular and consistently commanded the

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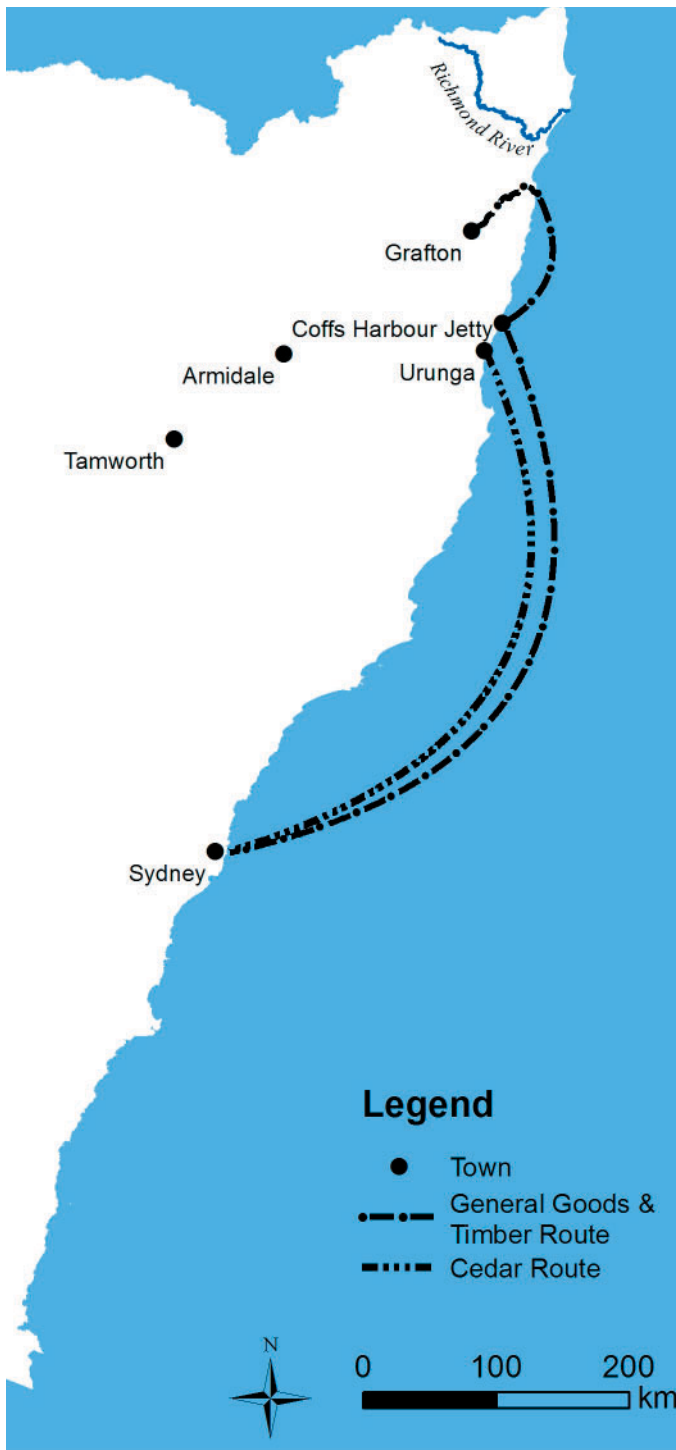


Fig. 2. General goods, timber, and cedar transportation routes between the North Coast townships under examination and Sydney. These routes were established by the late 1880s. Cedar logged in the Bellinger Valley was transported to Coffs Harbour. Urunga is at the mouth of the Bellinger River. Grafton was an important point of mid-north coast settlement. Grafton and Coffs Harbour were linked by trade. This map is based on information derived from historical sources.

highest prices (CRE 1889a,c,e,f,g,h,i,k). Indeed, the demand for kangaroo was so great that some worried it could become extinct in the area and recommended a closed season (CRE 1889b,d). Opossum fur also sold well, though prices were subject to its quality (CRE 1889g,h,j).

Though price was not the sole incentive for hunting a particular animal (Fuchs 1957), the low rate for Koala skins can be considered particularly dissuasive when viewed in conjunction with the relative inaccessibility of Koalas. This is shown in an article originally printed in the *Tenterfield Record* and republished in *The Clarence and Richmond Examiner and New England Advertiser* (1889) under the headline “The Skin Trade”. The correspondent, based in Tabulam on the lower Clarence, writes:

A small party of men from Tenterfield arrived here last Thursday for the purpose of procuring bear (and I believe opossum) skins for one of your storekeepers. They lost no time in commencing their operations, and pitched their camp on the Clarence, at its confluence with the Timbarra, whence they despatched in every direction a number of blackfellows whom they had engaged upon their arrival here. I believe they have not met with any extraordinary amount of success in their undertaking of nabbing the agile koala. Prices do not range very high for the skin of this festive and beautiful creature, and it would require at least 250 or 300 a week to liquidate current expenses; probably more would be necessary.

Contrary to Marshall’s (1966: 26) characterisation of the Koala as a “sitting duck”, the article shows that hunting Koalas required great skill. It also shows that its commercial returns were disproportionate to the effort and resources expended by the hunters, which presumably included a payment, likely of goods, to the Aboriginal people who assisted them. Furthermore, we may surmise that there were enough Koalas readily available across the state to maintain non-competitive prices, in comparison to kangaroos and wallabies, which were the

objects of hunting pressure from the early 1870s in NSW, particularly in the south (Lunney et al. 1997). Here, it is interesting to note that international accounts of the fur trade emphasise that the fur of the Koala is “cheap” (Poland 1892: 365) and “not as important commercially as the Common Phalanger [opossum]”, though useful “where a durable, reasonable priced fur is desired” (Petersen 1914: 263).

It is extremely difficult to develop an historical baseline for the Koala population of Coffs Harbour at European settlement from the extant sources. Indeed, to the best of the authors’ knowledge, there is only one primary source for this period that mentions the Koala specifically *and* is connected to the emerging township of Coffs Harbour. It is a short advertisement placed in *The Clarence and Richmond Examiner* by Hermann Rieck, a selector who settled at Coffs Creek in 1881:

Young native bear for sale. Able to keep himself on gum leaves; very tame, and easy to be transported in a bag on saddle. Will sleep for days without any noise or disturbance. H. Rieck, Coffs Harbour. (*CRE* 1886a)

The advertisement was published in two consecutive issues (*CRE* 1886a,b) after which Rieck’s Koala presumably found a home. It shows that, at this time, Koalas were rare enough – or, alternatively, undesirable enough – in the area to warrant a public attempt to sell them. It is possible that Rieck appealed

to readers of the regional paper because he could not sell the Koala in his immediate vicinity: why, after all, would he pay to place an advertisement in a paper when he could inform his friends and neighbours free of charge? Having been one of the first settlers in Coffs Harbour, he was well known in the area. Regardless, judging by his description of the Koala, it appears to not have occurred to Rieck that he, or others, could sell it on the fur/skin market. Instead of the quality of its fur, its domicile nature takes precedence in his description. Most interestingly, photographs of Rieck’s homestead and banana plantation, taken in the early 1890s, show that both were surrounded by Koala habitat (Figs 3 and 4).

In view of the scarcity of records concerning Koalas for this early period of Coffs Harbour’s history, we can draw few definitive conclusions. We can be fairly certain, however, that the rapid clearing spurred on by the growing timber industry led to the beginning of the fragmentation of Koala habitat in the Coffs Harbour area. Secondly, we may surmise that the trade in marsupial skins and furs, which accelerated in the 1880s and was active in the broader region, produced flow-on effects for the Koala population, though we cannot specify the nature or extent of these effects. While the absence of specific records regarding skins does not permit the conclusion that the trade was minimal in Coffs Harbour, Rieck’s advertisement allows us to assume that, in 1886, the trade was not so prominent in the area as to have precluded an attempt to sell a Koala



Fig. 3. Hermann Rieck’s homestead, Korora, c1890s. Reproduced courtesy of the Coffs Harbour Library and Coffs Harbour Regional Museum. Accession no. 07-4760.

KOALAS IN COFFS HARBOUR



Fig. 4. Hermann and Fanny Rieck on their banana plantation, c1892. Reproduced courtesy of the Coffs Harbour Library and Coffs Harbour Regional Museum. Accession no. 07-2421.

by other means. Drawing on the existing records, we may conclude that Koalas were present in Coffs Harbour in the early period of European settlement, but arguably not in high numbers.

GROWTH AND EXPANSION: 1890-1920

Coffs Harbour's timber industry underwent rapid growth in the 1890s and early 1900s. After the construction of the Coffs Harbour jetty was completed in 1892, facilitating the export of hardwoods, timber-cutters "flocked" to the district (England 1976: 16). Many settled close to the centre of town, building homes of flooded gum and beech, and by late 1892 all of the available flats had been occupied (England 1976: 17). It took nearly a decade, however, before the area's vast resources could be exploited in an efficient and profitable manner. Owing to the lack of modern sawmills in the town and tramways to transport logs from the forests to the township, timber-cutting

remained a laborious task, with hand-cut logs hauled to the jetty by bullock team (Fig. 5). As haulages of over six miles were not viable, "the great hardwood timber reserves of the hinterland remained largely untapped" until the early 1900s (Yeates 1990: 55). In 1902, a representative of the Forestry Department visited Coffs Harbour and noted that "magnificent belts of tallow-wood, ironbark, and pine were in the vicinity" of a site allocated for a sawmill in the town centre. In the view of the representative, it was highly probable that "within a few years Coffs Harbour would be one of the most important timber centres on the north coast, owing to the shipping facilities, and



Fig. 5. 'Transporting timber, Coffs Harbour'. Photograph from "The North Coast District" (Sydney: Government Printing Office, c1905). Reproduced courtesy of the State Library of New South Wales. Call no. X981.8/5A1. Frame no. a4342032.



Fig. 6. ‘Nicholl’s saw-mills, Coff’s Harbour’. Photograph from “The North Coast District” (Sydney: Government Printing Office, c1905). Reproduced courtesy of the State Library of New South Wales. Call no. X981.8/5A1. Frame no. a4342034.

to the presence of untapped virgin forests” (*Evening News* 1902).

The first sawmill in Coffs Harbour opened in 1898 on the north side of the jetty, but for reasons unknown it was relatively short-lived and closed by 1902 (Yeates 1990: 64). In 1903 a major mill opened on the present site of Coffs Harbour High School (Fig. 6). (The location of this site is shown in Fig. 10 and modern views are shown in Appendix 2.) By 1906, there were three sawmills in the area – two in the Coffs Harbour town centre and one in Coramba (England 1976: 18). The growing industry increased the value of town lots, which were “readily snapped up with keen competition” (*CRE* 1905). As a journalist visiting Coffs Harbour in 1905 observed, “Selections have been taken near Coff’s Harbour for timber alone” (*CRE* 1905). The activity appears to have been so rapid that, upon visiting the area the following year, a *Sydney Morning Herald* reporter was moved to remark that “the forests from which supplies are drawn [...] are now almost denuded of suitable timber” (*SMH* 1906). He appears, however, to have been referring to reserves very close to the township, for he notes that “the great forests extending on all sides”, spanning “hundreds of square miles”, contain “timber of every variety of hardwood, of a vastly superior kind” (*SMH* 1906). Yet these forests are not without interference:

Here is a magnificent ironbark, with the deadly mark of the ringbarking axe, and there

is the remnant of a flooded gum or blackbutt tree, from which, probably, 500 9ft rails were split, before the first fork was reached. More often the tree is standing ringbarked, bereft of life and bark, a gaunt, unlovely giant, with bare limbs extended heavenward, as though invoking a curse on its destroyer. (*SMH* 1906)

This practice was a prominent and consistent feature of the landscape: as one journalist observed in 1905, “On quite a number of selections large flooded gums, denuded of their foliage and smaller limbs, stand on the land” (*CRE* 1905). Three years later, a man from Pennant Hills visited Coffs Harbour and Coramba, and reported his observations to the *Cumberland Argus* (1908). The paper noted that, in his view, “no

one makes the slightest endeavour to grow anything for domestic consumption”; instead, extractive industries took precedence in the area: “Another matter which struck him was the ruthless manner in which all settlers destroyed trees. [...] Trees which would be for ever a lasting ornament to the lands are subjected to the ring-barker’s axe, without a thought.” The strength of the industry was such that it even attracted foreign investors, with a South African company obtaining a lease of 60 acres including sites for a sawmill and a tramline in 1909 (*CRE* 1909b).

With the provision of decent roads and the emergence of the British Australian Timber Company tramline, which extended from the jetty to Bucca Creek by 1908, clearing became far more extensive. In particular, the tramline enabled the transportation of logs from the north-western outskirts of Coffs Harbour to the company’s mill in town, thereby facilitating the efficient clearing of this area. From 1908 to 1912, the line was extended as successive areas were logged (Yeates 1990: 65). As a result of the timber industry, Coffs Harbour became “the busiest port on the far north coast of the state”, with an annual average of 399 ships entering from 1909 to 1924 (Coltheart 1997:13). Simultaneously, the growth of the paspalum industry, which accelerated from 1900, introduced further changes to the landscape. The predominant approach to growing paspalum – a newly-introduced genus of the grass family –

KOALAS IN COFFS HARBOUR



Fig. 7. ‘Hoschke’s farm, Orara River’. Photograph from “The North Coast District” (Sydney: Government Printing Office, c1905). Reproduced courtesy of the State Library of New South Wales. Call no. X981.8/5A1. Frame no. a4342037.

required all hardwoods in the area to be ring-barked and all existing scrub to be felled and burnt off before the seed could be sown (Yeates 1990: 59). The result was a landscape of tall grass “growing splendidly, as it does all over this district, killing almost everything else” (*Goulburn Evening Penny Post* 1908).

The extent of the clearing by the early 1900s is apparent in photographs of three farms on the Orara River: the first identified as belonging to the Hoschke family (Fig. 7), the second to the McLeod family (Fig. 8), and the third to John Cochrane (Fig. 9). The location of these sites is shown in Fig. 10 and contemporary views of these sites are shown in Appendix 1. These photographs show that clearing was confined to the river edges on level ground, while the forest on the slopes, which was worthless from a farming perspective, was left relatively intact. In all three photographs, stumps and ringbarked trees are all that remains of the original wilderness on level ground. Drawing on recent Koala surveys (Lunney et al. 1999a), we can assume that the cleared forest would have constituted core Koala habitat.

Furthermore, three panoramic views of Bellingen (Figs 11-13) show that the transformation of the landscape for agricultural purposes was well underway across the broader district. Remnant forest is visible in these photographs, though it appears to have been heavily ringbarked in Fig. 11. Fig. 11 also shows the intensive clearing on the flat fertile lands of Bellingen and the efforts expended in forging roads.

In contrast to the farms on the outskirts, photographs of the original Coffs Harbour town centre show that certain areas retained ample vegetation and, in some areas, Koala habitat. In particular, the village known as ‘Brelsford’, which existed within Coffs Harbour’s original boundaries, and was later renamed ‘Coff’s Harbour’, contained significant Koala habitat. A photograph of the village (Fig. 14), taken in 1903-1905, shows that comparatively heavy vegetation still survived in suburban areas, with the distinctive timber houses nestled among the trees. Although we cannot identify specific tree species in this photograph, we can assume that these trees constituted high-quality Koala habitat, as modern



Fig. 8. ‘M’Leod’s farm, Orara River’. Photograph from “The North Coast District” (Sydney: Government Printing Office, c1905). Reproduced courtesy of the State Library of New South Wales. Call no. X981.8/5A1. Frame no. a4342038.



Fig. 9. ‘Cochrane’s farm, Orara River’. Photograph from “The North Coast District” (Sydney: Government Printing Office, c1905). Reproduced courtesy of the State Library of New South Wales. Call no. X981.8/5A1. Frame no. a4342039.

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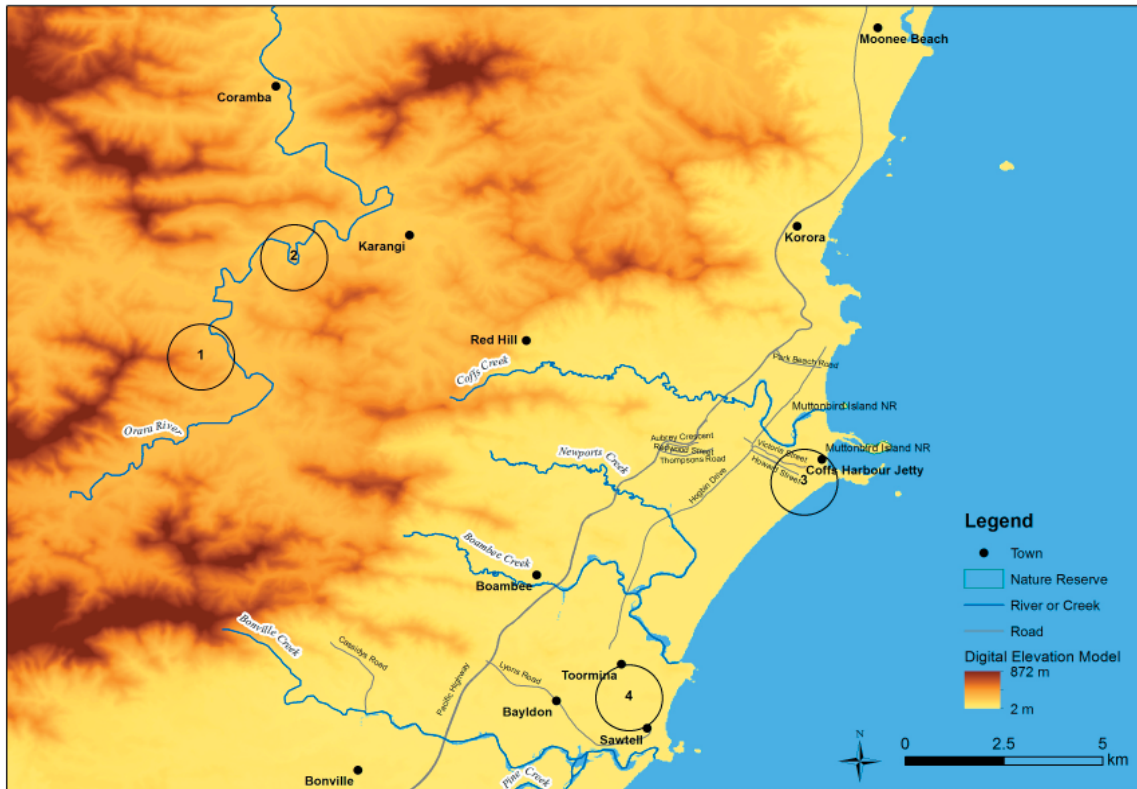


Fig. 10. Historical location map of Coffs Harbour. This map of Coffs Harbour is based on a digital elevation model, which shows that the coastal strip of Coffs Harbour is low-lying and then quickly rises away from the coast, with valleys and rivers shown starkly by the shading. The Great Dividing Range comes closer to the coast at Coffs Harbour than elsewhere in NSW, lending its distinct configuration to the land of this Local Government Area. On the Orara River are sites 1 and 2 in circles: 1 is the ASD40 1, and 2 is ASD40 2, i.e. the original sites of Hoschke's and McLeod's farms in 1, and Cochrane's farm in 2. These circles are given here to help interpret both historical and contemporary photos of the Orara Valley by giving the locations relative to both Coffs Harbour town and jetty (circle 3 showing the original location of Nicholl's saw mill, ADS40 3), and the shape of the landscape. The two thick lines running from circle 3 indicate the original timber transportation routes. Circle 4 indicates the location of the 2009 aerial photograph (Fig 26). This map also includes place names mentioned in the text.



Fig. 11. ‘Part of town and North Arm of Bellinger River, from Mark’s Hill’. Photograph from “The North Coast District” (Sydney: Government Printing Office, c1905). Reproduced courtesy of the State Library of New South Wales. Call no. X981.8/5A1. Frame no. a4342018.



Fig. 12. ‘Rigney’s Farm, near Bellingen’. Photograph from “The North Coast District” (Sydney: Government Printing Office, c1905). Reproduced courtesy of the State Library of New South Wales. Call no. X981.8/5A1. Frame no. a4342012.



Fig. 13. ‘Road scene, near Bellingen (South Arm)’. Photograph from “The North Coast District” (Sydney: Government Printing Office, c1905). Reproduced courtesy of the State Library of New South Wales. Call no. X981.8/5A1. Frame no. a4342010.

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Fig. 14. ‘Village of Brelsford, Coff’s Harbour’. Photograph from “The North Coast District” (Sydney: Government Printing Office, c1905). Reproduced courtesy of the State Library of New South Wales. Call no. X981.8/5A1. Frame no. a4342035.

analyses of the Coffs Harbour region show that the area contains extensive Koala habitat, much of it primary habitat (Lunney et al. 1999a). (Modern views of this site and surrounding areas are shown in Appendix 3.) Moreover, as clearing was restricted next to the river edges due to the high risk of flooding along Coffs Creek, we can also reasonably assume that Koalas were present at Coffs Creek. In 1900, the “land adjacent to the township, on the creek” was described as “occupied, but little cleared” (*Raleigh Sun* 1900), and by 1906 the northern side of the Creek had few settlements (Fig. 15). According to the recollections of a former resident who lived at Coffs Harbour and Bucca Creek over the period 1896-1901, “Birds and animals abounded in the bush and along the river banks” (*CHA* 1950). He names “koalas, wallabies, kangaroo rats and kangaroos” as among the animals he remembers seeing at this time. Another article supports this claim, observing that “There is a ‘call of the wild’ in the air of this district for [...] the wallabies and paddymelons flourish though the

sawyer haunts every woodland” (*CRE* 1909a). It is difficult, however, to determine whether the Koala was abundant: a postcard from 1907 (Fig. 16), featuring the Koala as part of a montage of images of the South Arm of the Bellinger River, indicates that the Koala was sufficiently well-known in the region to be considered representative of its fauna, but provides no further clues. Secomb (1986: 21), a long-term resident of Coffs Harbour, notes in his history of the area that among local men’s responsibilities at this time was “sho[oting] the koalas to feed the dogs”, but provides no source for his claim.

There is little evidence that Coffs Harbour participated heavily in the fur trade in this period, even during the depression of the early 1890s, when the trade presented a valuable source of income (Diarmid 1903). At this time, kangaroos and wallabies remained the most highly valued skins, with the Tanners and Curriers Association recommending that kangaroo farms be set up to ensure the continued supply of skins to America and Europe (*CRE* 1893).

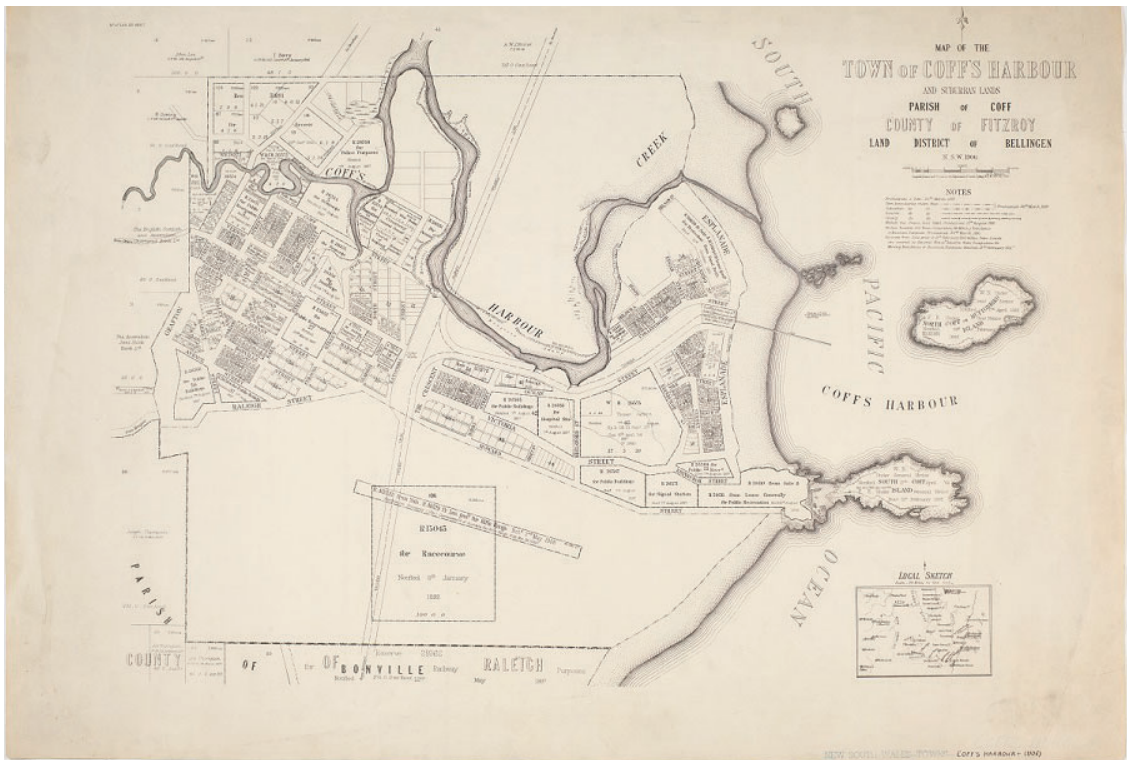


Fig. 15. 'Map of of the town of Coffs Harbour, and suburban lands, Parish of Coff, County of Fitzroy, Land District of Bellinghen', 1906. Reproduced courtesy of the State Library of New South Wales. Call no. a9556001.



Fig. 16. Postcard, 'Greetings from South Arm', May 1907. The small tree growing out of a large stump in the centre of the photograph shows the considerable size of the trees that occurred near the coast, near the mouth of the Bellingher River. Reproduced courtesy of Sheila and Michael Pegum.

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Table 1: Numbers of furred skins sold through Sydney markets. The koala is shown with two other species for a point of comparison: the red kangaroo *Macropus rufus* and the brush-tailed rock-wallaby *Petrogale penicillata*. += Figures only available for first half of year; * = figures only available for second half of year. Numbers were collated by Brad Law and drawn from the Sydney Wool and Produce Journal and the Sydney Wool and Stock Journal.

SPECIES	1891*	1892	1893*	1894	1895	1896+	1897	1898	1899+
Red K	44838	141177	34856	23306	91563	35697		176862	335234
Rock W	42154		13422	9770	10317	2656		19382	9185+
Koala	57208	113629	35464	9588	31744	22563		139136	266535

The numbers of Koala skins on the Sydney market fluctuated throughout the 1890s (Table 1) and peaked after 1900. From 1891-1899 inclusive, the recorded sales of Koala skins through Sydney markets totalled 675,867 (Table 1). In contrast, 600,000 Koala skins were reportedly exported to London in 1902 alone (NSW Native Animals Protection Bill 1903). In 1904, according to fur broker Winchcombe, Carson & Co., Koala skins, alongside those of kangaroo and wallaby, were in “unlimited demand” as recorded in The Sydney Stock and Station Journal (SSSJ 1904). The following year, they reported that with regard to “kangaroo, wallaby and bear there are not nearly enough to go round” (SSSJ 1905).

In view of the demand for their fur, it is unsurprising that Koalas declined rapidly at the turn of the twentieth century in New South Wales. One commentator observed that “native bears are dying out very fast in some districts. I have seen them lying about the bush day after day” (Bellingham 1900). After Koala populations across Australia contracted what was called an ophthalmic disease in 1900-1903, leading to a reduction in numbers (Le Souef and Burrell 1926: 292; Troughton 1948: 136), the Koala was listed as a protected species in New South Wales in December 1903 (NSW *Native Animals Protection Act* 1903). Noting that in New South Wales “bears are nearly exterminated”, one report commented that “it is questionable whether the Act passed recently in New South Wales [...] is not too late to accomplish its purpose” (*The Queenslander* 1905). In 1906, Koalas sold through Sydney by Dalgety & Company Limited were referred to as “Queensland Bears”, a reflection of the scarcity of New South Wales koalas (SSSJ 1906). In 1910, a letter from a Macleay resident appeared in the *Sydney Morning Herald* confirming this view, making specific reference to the Coffs Harbour region:

I have made personal enquiries of surveyors, trappers, and men who spend their days in the bush. All tell the same tale – the bear is not to be seen. [...] The kangaroo, the wallaroo, the bear, and opossum have comparatively disappeared from the mountainous country that runs between the seaboard and New England on the North Coast, where a few years ago they were regarded by some people as a nuisance, so numerous were they. (*SMH* 1910)

But if Koalas declined in the Coffs Harbour area in this period, exactly what caused their demise? Examining export figures published in regional newspapers allows us to gauge the relative significance of the fur trade to Coffs Harbour at this time. While steamers called at the port regularly, with three separate lines loading cargo for Sydney by 1894 (*CRE* 1894), skins were not a major export. Though the town-specific reports in the *The Clarence and Richmond Examiner* were irregular, the available reports for Coffs Harbour indicate that the skin trade was inactive in the area in the mid-to-late 1890s. An annual export report for 1895 lists timber as Coffs Harbour’s primary export, and the list of minor exports does not include skins (*CRE* 1896). Annual reports for 1897 and 1898 also reaffirm the importance of the timber industry in the area, seconded by maize, and skins are absent from their precise lists of exports (*CRE* 1898; 1899). Interestingly, however, skins are listed among the exports for 1901, with the annual total exported from Coffs Harbour “25 bales” (*CRE* 1902).

Monthly breakdowns of the exports from each area of the North Coast allow us to place the Coffs Harbour skin trade in a regional context. In these reports, Coffs Harbour and Woolgoolga (a town to the north of Coffs Harbour and within the current Local Government Area) comprise a single district which,

when compared to other districts, consistently proves a minor contributor to the skin trade. Interestingly, the Bellinger district also proves relatively minor. For the month of December 1906, skin exports from Coffs totalled “2 bags/bundles”, compared to 38 for the Clarence River, 21 for the Richmond River and 1 for the Bellinger districts (*CRE* 1907). For July 1908, Coffs exported “5 bags/bundles”, while the Clarence exported 90, the Richmond River exported 61 and the Bellinger exported 5 (*CRE* 1908a). Though the figures for the surrounding districts fluctuate, Coffs remains generally consistent: for August 1908, it exported “3 bags/bundles”, with the Clarence, Richmond River and Bellinger districts exporting 79, 86, and 14 respectively (*CRE* 1908b). It is important to note that, as these figures were presented in the aggregate, we cannot identify the specific type of skin being exported. Regardless, Coffs Harbour’s low numbers indicate that the trade in the area was minimal. In view of this, advertisements placed in *The Coffs Harbour Advocate* by fur/skin brokers in 1910 (*CHA* 1910a,b) signal an attempt to meet increasing demands for fur at a time when the Koala, alongside other marsupials, was widely perceived to be declining across New South Wales, rather than evidence of an active trade in Coffs Harbour.

Though conservationists at this time generally placed the blame for the Koala’s decline squarely on the fur trade, campaigning for hunting restrictions ranging from closed seasons to absolute protection (Moyal 2008), the effects of the trade on Koala populations appear to have been variable across districts. With regard to Coffs Harbour, it is especially telling that, in the mid-to-late 1890s, timber exports consistently rose while the skin trade remained inactive. In this period, timber exports increased from 106,500 feet in 1895 to 480,510 feet in 1898 (*CRE* 1896; 1898; 1899) [here, ‘feet’ is assumed to denote super feet, with a super foot being a unit of volume of timber in the imperial system of 1 foot x 1 foot x 1 inch]. There is little evidence to suggest that Coffs Harbour participated in the fur trade prior to 1901, and if we take the generality of *The Clarence and Richmond Examiner’s* commercial reports into account, no evidence. Rather, the growth of Coffs Harbour’s timber industry, the speed of land clearing, and the widespread practice of ringbarking would have exerted a far greater effect on the local Koala population than the trade in marsupial furs and skins. Furthermore, it is probable that the departure of many of Coffs Harbour’s men for the First World War diminished this already minor trade.

While we can safely conclude that the timber industry, clearing, and ringbarking would have led

to considerable habitat loss and fragmentation, it is more difficult to ascertain to what extent the Koala population declined over this time. In view of the absence of a population baseline, we can draw few definitive conclusions. However, in light of the available evidence, it appears unlikely that the Coffs Harbour Koala population was rapidly and severely reduced over the period 1890s-c1920s from an initial considerable size at European settlement, such as occurred in the Bega District or Port Stephens Koala populations (Lunney and Leary 1988; Knott et al. 1998). Most likely, the Coffs Harbour Koala population was reduced in numbers as habitat was lost and fragmented. At the close of this period, Koalas remained present in the Coffs Harbour area, particularly the town centre and near waterways, but were not especially plentiful.

1920-1950s

We have been able to identify very little material specifically regarding Koalas for this period of Coffs Harbour’s history. Coverage of animals in *The Coffs Harbour Advocate* over this period consistently focused on those animals considered pests, such as flying-foxes (*CHA* 1920), opossums (*CHA* 1930), and wallabies (*CHA* 1940). However, beyond media analysis, other sources provide us with evidence of both a present Koala population in the Coffs Harbour area, particularly the town centre, and of potential threats to this population.

Consistent with the probable presence of Koalas in the Coffs Harbour town centre in the early 1900s, available evidence strongly suggests that Koalas remained present in the town centre and surrounding area from the 1920s to the late 1950s. A long-term resident of Coffs Harbour, born in 1905 and interviewed for the Coffs Harbour ‘Voices of Time’ project in 1987, recalls seeing Koalas in the town in the late 1920s and early 1930s (Mayers 1987). Evidently, they were still present in the late 1930s: an article, entitled “Koala on Road” and written by a visitor to Coffs Harbour, describes seeing “a large grey koala bear” crossing “one of the main roads leading from Coffs Harbour, only about three-quarters of a mile from the town” (*The North Western Courier* 1939). The land bordering Coffs Creek appears to have retained considerable Koala habitat in the 1920s and 1930s, with photographs taken in this period showing scrub and bushland surrounding the creek (Figs 17-18). Furthermore, a photograph published in Yeates (1993: 8) of a longstanding Aboriginal campsite on land bordering the south bank of Coffs

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Creek testifies to the persistence of core Koala habitat in the area in the late 1930s. A photograph of another Aboriginal campsite near the creek, situated in bush closer to the cemetery, shows that the area contained Koala habitat in the late 1950s (see Yeates 1993: 204). Further photographs show that the township remained surrounded by scrub and bushland from the 1930s through to the late 1950s (Figs 19-20; Yeates 1993: 263). As tree planting programs – part of a town ‘beautification’ initiative – only began in the mid-1950s, we can safely assume that the vegetation featured in these photographs is far older, though the exact age cannot be determined.

The broader area surrounding the township appears to have retained a number of older trees despite comprehensive clearing. Yeates’ comprehensive local history alerts us to the presence of “a Flooded Gum with a girth of 23 feet, and standing 215 feet high beside the road” in the Bruxner Park Flora Reserve in 1961 (Yeates 1993: 324). It appears, however, that such a large tree was a rarity in the town centre at this time, for he notes that it “was admired and often photographed by those who saw it”. In the forests surrounding Coffs Harbour, a number of older blackbutt trees survived the extensive clearing and logging of earlier decades, including one felled in 1950 in the Upper Orara State Forest and measuring 100 feet x16 feet centre girth

(Yeates 1993: 62). Another, processed by sawmillers Seccombe and Forsythe in 1960, was “delivered in three sections, the middle one of which was 18 feet long, 21 feet 6 inch girth at the middle, and assessed at better than 16 tons in weight”. Seccombe, a veteran of the Coffs Harbour timber industry, described it as “just about the biggest he had seen in a lifetime with timber” (Yeates 1993: 273). It had been cut from the Never Never State Forest, now part of Dorrigo National Park.

It is highly unlikely that the fur trade constituted a potential threat to the Koala population of Coffs Harbour in this period. Since the early 1920s, the trade in Koala skins had been centred on Queensland, as Koala populations in the south-eastern states had declined significantly (Marshall 1966; Moyal 2008). Moreover, as we have seen, Coffs Harbour did not have a strong history of participation in the trade. There is no evidence to suggest that Coffs Harbour locals turned to hunting Koalas – or other marsupials – during the Great Depression of the late 1920s and early 1930s, with residents turning to casual jobs such as packing bananas, selling fish caught in local creeks to shops, and tomato-picking at this time (Yeates 1990: 204). Furthermore, human population trends, based on data compiled by Yeates (1993: 338), show a marked decline during the 1920s and Great



Fig. 17. ‘View down Coffs Creek towards town, Coffs Harbour, N.S.W’, by Peter Jensen, 1924. Reproduced courtesy of the Coffs Harbour Library and Coffs Harbour Regional Museum. Accession no. 07-8297.



Fig. 18. ‘View of Coffs Creek, Coffs Harbour, N.S.W.’, c1925. Reproduced courtesy of the Coffs Harbour Library and Coffs Harbour Regional Museum. Accession no. 07-9028.



Fig. 19. ‘View from the Jetty area, looking back towards Coffs Harbour township and Red Hill’, c1920s. Reproduced courtesy of the Coffs Harbour Library and Coffs Harbour Regional Museum. Accession no. 7-1927.

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Fig. 20. 'View of the Jetty area, including the Butter Factory, Memorial Theatre and High School, Coffs Harbour', c1940s. Reproduced courtesy of the Coffs Harbour Library and Coffs Harbour Regional Museum. Accession no. 07-1909.

Depression, with the population only returning to pre-1915 level in the 1940s. Over the late 1940s to 1964, the population steadily increased. Given the slow pace of this demographic shift, we can assume that population growth did not constitute a major threat to the Coffs Harbour Koala population in this period.

Similarly, it is questionable whether bushfires presented a threat to the Koala population of the area. Local and regional newspapers show that there were frequent fires in the area over the late 1930s to mid-1950s. In November 1936, bushfires spread through the hardwood forests of the North Coast, including Tanban, Ingalba, and Barraganyatti State Forests, all south of Coffs Harbour. The damage in the Coffs Harbour area itself was described as "extensive", affecting a number of banana plantations and the "scrub country" on the Dorrigo (*SMH* 1936a). The following month, another wave of bushfires ravaged the townships surrounding Coffs Harbour, including Boambee and the Upper Orara, with firefighters forced to "drive through several miles of blazing scrub" to reach the township of Orara (*SMH* 1936b,c). Bushfires struck again in the late 1940s near the Coffs Harbour aerodrome. In 1951-53, successive bushfires broke out in the area. Fires spread through "thousands of acres of scrub around Coffs Harbour" in late 1951, with an aerial view of the area captioned "smoke from the fires rose over 6,000 feet" (*SMH*

1951c). One blaze "destroyed" 300 acres of timber on Boambee Mountain, south of Coffs Harbour (*SMH* 1951a). One report noted that in Coffs Harbour "fresh fire outbreaks are occurring hourly", quoting the District Forester as stating that "at one period this morning 22 separate fires were burning" in his district, with the worst outbreaks "concentrated in the Conglomerate, Wedding Bell[s] and Orara State Forests" (*SMH* 1951b). In 1953 another wave of fires swept the district, particularly affecting Boambee and Bonville (*SMH* 1953).

However, fire history maps, prepared by the Office of Environment and Heritage, allow us to conclude that fire has been a relatively minor matter over the last 75 years for the Koalas occupying the forested land in and surrounding Coffs Harbour. As shown in Fig. 21, fires have been concentrated on the northern and north-western border and the south-east corner of the Coffs Harbour Local Government Area (LGA). Fig. 22 shows that the majority of the fires have been wildfires, as opposed to prescribed burns, and that these have occurred on the fringes of the LGA. Prior to 2005, the northern tip, consistently the site of wildfires, was not included in the Coffs Harbour LGA. Most importantly, we must take into account recent research which shows that Koalas can re-occupy burnt bushland within months of a fire, and breed in it within a year (Matthews et al. 2007).

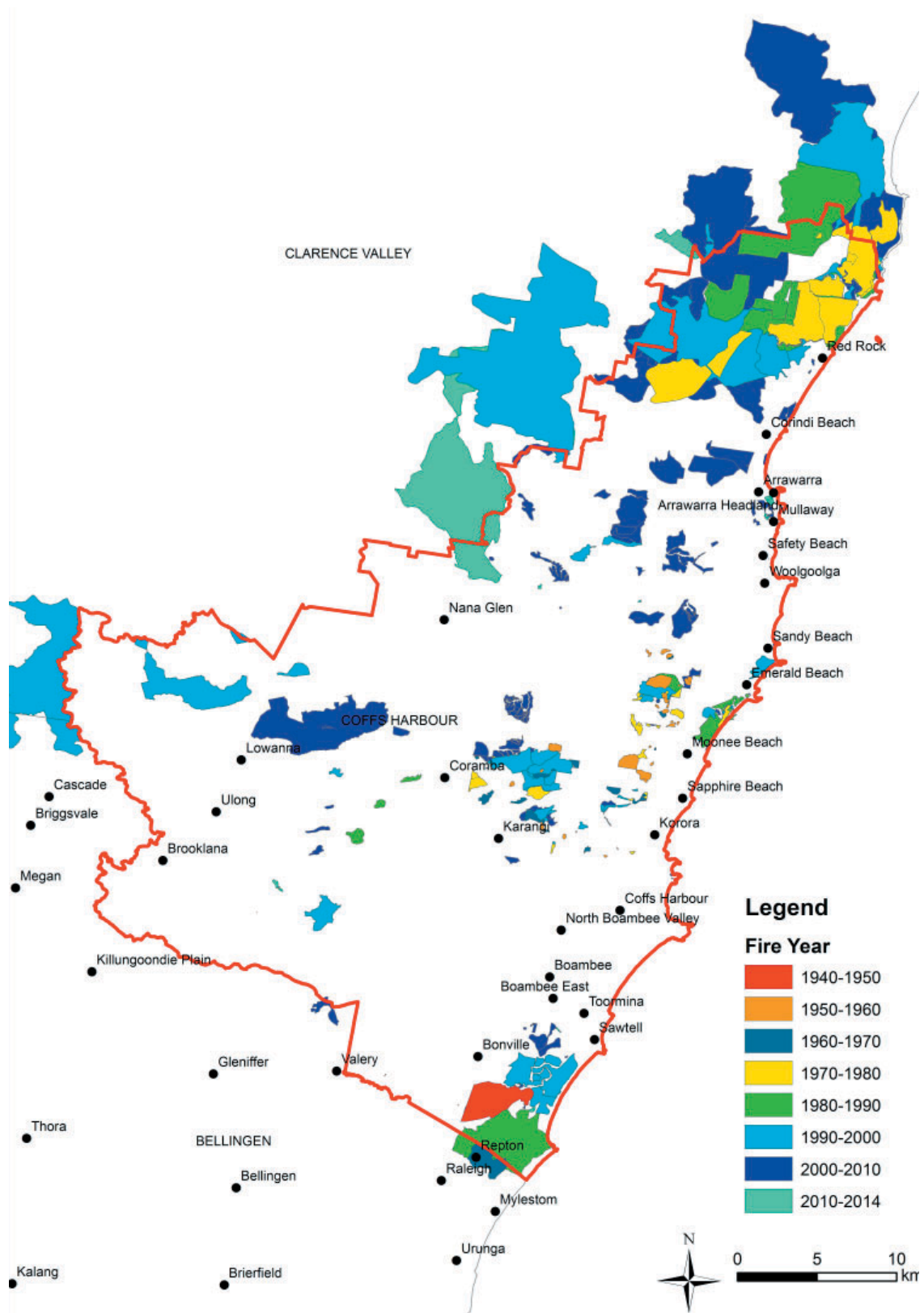


Fig. 21. Fire history of the Coffs Harbour LGA (current boundary), 1940-2014. Produced by the NSW Office of Environment and Heritage and stored in corporate data layers.

KOALAS IN COFFS HARBOUR

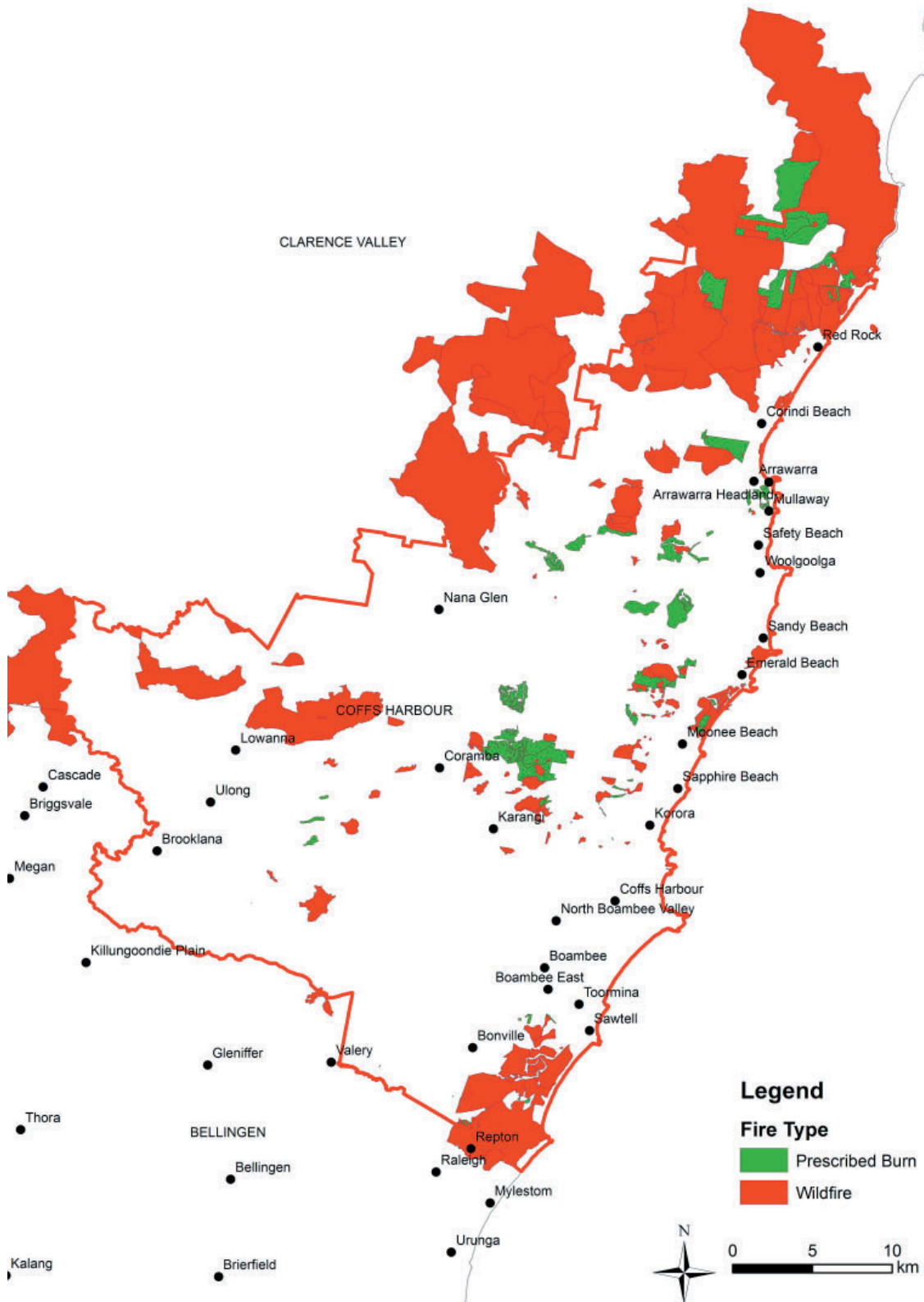


Fig. 22. Fire history of the Coffs Harbour LGA (current boundary), 1940-2014, showing prescribed burns and wildfires. Produced by the NSW Office of Environment and Heritage and stored in corporate data layers.

The fires would have temporarily affected the status of the Koala populations in the forests surrounding Coffs Harbour, insofar as the Koalas inhabiting the areas where the fires occurred would have been killed. However, the long-term impact of the fires on the presence of these populations can be considered negligible due to the rapid rate of recovery of the forest as Koala habitat. As the surrounding unburnt forests were extensive in area, they would have provided a crucial source population for the rapid recolonisation of the burnt areas as these areas recovered.

In contrast, the timber industry continued to present a threat to the Koala population of the area over this period. Although the industry experienced a decline in the late 1920s and early 1930s, largely due to the importation of timber from the United States and the growing popularity of new industries such as banana farming, it regained strength in the mid-1930s (Yeates 1990: 191, 226, 243). As a result of the sharp rise in banana production, the demand for case timber grew, and by 1938 Coffs Harbour had 5 case timber mills and 5 general sawmills (Yeates 1990: 228). Though hardwood remained the key export from the area, Flooded Gum was planted in an effort to maintain the supply of case timber (Yeates 1993: 61-62). The Second World War brought with it a fresh demand for hardwood, with large quantities of blackbutt sent to New Guinea for use by the American Army (Yeates 1990: 243). While exports slumped after 1945, due to the unavailability of coastal shipping vessels, an acute housing shortage in Coffs Harbour generated high local demand (Yeates 1993: 5). In 1949, shipments of timber totalled 11.6 million super feet over nine months, with the chainsaw replacing older cutting methods (Yeates 1993: 62).

During the 1950s, locals developed a number of measures which, though not intended to conserve local fauna, may have inadvertently assisted the continued presence of the Koala in the area. In 1952, presumably as part of its town 'beautification' program, the Coffs Harbour Urban Committee banned the removal of existing trees in the township, and granted exceptions only for "dangerous specimens" (Yeates 1993: 110). The same year, a Forestry Commission representative who had worked in the area since 1912 set the export trade on a path of reform, declaring that by meeting market demands for only the best poles and piles of specified species, the Coffs Harbour area would be denuded of the best timber (Yeates 1993: 151). Furthermore, he publicly stated that "the forests were deteriorating at a faster rate than Nature was able to replace them" (Yeates 1993: 151). Despite this prescient observation, record quantities of timber were exported from Coffs Harbour over the period 1956-

1959 – 80 million super feet in 1958 alone (Coltheart 1997: 15; Yeates 1993: 272). In 1958, in order to meet the demands of the export industry, a local group acquired 1,750 acres of degraded farmland for the purpose of establishing eucalypt and pine plantations. After successive purchases of surrounding tracts, the plantation companies eventually amassed 40,000 acres of land on both sides of the Pacific Highway (Yeates 1993: 273).

A representative of the NSW Office of Environment and Heritage in Coffs Harbour and specialist in Koalas, John Turbill (pers. comm. 2014), states that many of the plantations surrounding Coffs Harbour and Bellingen would have contained remnant forest along creeks and road edges. These remnants would have enhanced the quality of the Koala habitat within the plantation, increasing the likelihood of these plantations serving as habitat corridors for local Koalas. Additionally, as these plantations grew, they would become progressively more likely to attract Koalas. Some Koalas would, over time, include the plantation within their home ranges, which can encompass both plantation and non-plantation forest. Conceivably, a Koala could come to spend some or all of its time in the plantation and adjacent old growth forest. Indeed, Smith (2004) showed that Koalas occurred at low density in the plantations within Pine Creek State Forest (18 km south of Coffs Harbour) at the time of his research in the 1990s. Smith (2004:591) reports that Koala density varied from one Koala per 50 ha in plantation forest to one Koala per 9 ha in high quality native forest. The importance of managing Koalas within Pine Creek State Forest is evident in a Koala Management Plan (State Forests 2000), and Newman and Partners (1996) give a more extensive history of forestry management in this forest. In 2003, the bulk of the prime Koala habitat of Pine Creek State Forest was transferred to Bongil Bongil National Park, which had been established in 1995 [Bongil Bongil National Park is 4233 ha and Pine Creek State Forest is 3511 ha as of February 2015]. With regard to the plantations bordering the Pacific Highway, Koalas have been regularly sighted crossing the Highway. Lassau et al. (2008), in a study aiming to ameliorate the effect of roadkill on Koala populations at Bonville (within the Coffs Harbour LGA), show that fencing had proved an effective barrier to Koalas crossing the Highway.

Relative to the extensive areas of native forest within the Coffs Harbour LGA, however, plantations are a minor feature of the forest estate in the area. Fig. 23 shows that plantations, although extensive, lie to the west and south of the Coffs Harbour LGA. The plantations at the very northern tip of the LGA are

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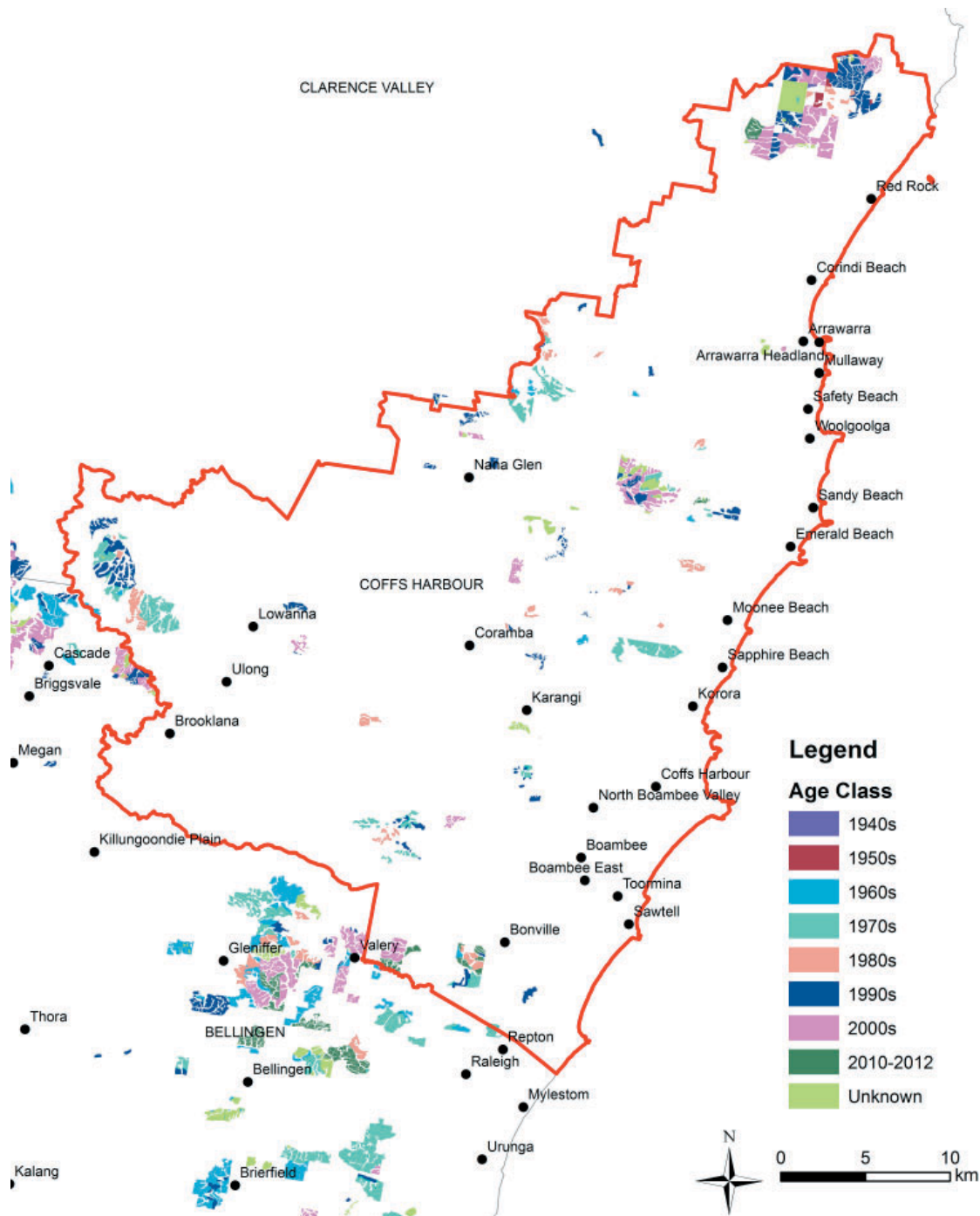


Fig. 23. Plantation history of the Coffs Harbour LGA (current boundary), 1940-2012. Produced by the NSW Office of Environment and Heritage and stored in corporate data layers.

recent, and this northern tip was not in the LGA until 2005. Given that the Koala population of the Coffs Harbour LGA is concentrated in the south-eastern sector (Lunney et al. 2000), and the larger plantations are located to the south and west of the LGA border, particularly in Bellingen LGA, it is apparent that plantations are not a major factor in the current distribution of the local Koala population. However,

we can surmise that the creation of plantations on reclaimed farmland within the Coffs Harbour LGA would have increased the area of low-density Koala habitat.

THE DEVELOPMENT BOOM AND THE
EMERGENCE OF A CONSERVATION ETHIC:
1960-2000

On a statewide basis, Reed et al. (1990) found that the Koala population of north-coast New South Wales remained constant in the postwar decades, whereas losses occurred on the southern half and the western fringe of its former distribution. Focusing on Coffs Harbour allows us to form a refined picture of change that is not discernible from a statewide overview. For our purposes, it is particularly important that, whereas other coastal areas had undergone development earlier in the century due to settlement patterns, Coffs Harbour experienced significant human population growth only since the early 1970s.

Following the revitalisation of local business in the late 1950s, large-scale development began in the early 1960s with the launch of several major subdivisions (Yeates 1993: 247). Amidst increasing coverage of conservation issues, particularly those concerning fauna, in local media (*CHA* 1960a,b,c,e), a representative of the NSW Fauna Protection Panel stated that the Panel was “extremely concerned by the reduction in the numbers of eucalypt trees” in Coffs Harbour, fearing that this would threaten the “numerous koala colonies” it had identified in the area (*CHA* 1960d,b). Despite such warnings, development proceeded. The Jetty area, Coffs Harbour town centre, and the ‘Brelsford’ district underwent extensive development over the late 1960s to 1980s, as town planners sought to accommodate an increasing population, establish industrial estates and associated road infrastructure, and establish the area as a tourist destination. Over these years, development projects consistently received positive coverage in *The Coffs Harbour Advocate* (*CHA* 1970a,c; 1980a,b), with front-page criticism aimed at preserving the tourist hub of the area and not its fauna (*CHA* 1980c). An atypical letter to the paper in mid-1970 prefigures the environmentalist opposition to unchecked development that would dominate the public debates of the late 1980s:

Is there any thought given to the plight of the koalas in all this “progress” which is taking place around Coffs Harbour. There are more koalas in this area than people realise. Does the land developer or bulldozer driver check the gumtrees before commencing to destroy the koalas’ environment, or is it left to “chance” that the koalas will get out of the way in time before it is snatched from underneath him, plus into the bargain, face death or be maimed. [...] This clearing is going on every day of the week. One driver told us that if they would only go to the side, instead, they keep moving in front of

the machines all the time. [...] A cat gets more protection than a koala when he trespasses on private property. The hazards of bushfires, the trigger-happy rifleman and wild dogs are more than enough for them to put up with. (*CHA* 1970b)

Although conservation issues continued to receive occasional attention (*CHA* 1970d,e), this was clearly the minority view. As the development of Coffs Harbour expanded south, beyond the town centre, to envelop the coastal strip east of the Pacific Highway, the high quality Koala habitat in the area was progressively eradicated. The habitat that remained became increasingly fragmented and, as a result, exposed to threats such as motor vehicles and domestic dogs (Lunney et al. 1999a). The current management of the Coffs Harbour Koala population is an attempt to deal with the threats that arose from decades of development and, in particular, the effects of the relentless loss and fragmentation of habitat.

Comparing aerial photographs of the south-eastern sector of the Coffs Harbour LGA, south of the Coffs Harbour township, allows us to discern the speed of change in specific areas over recent decades. Three geo-referenced photographs, showing the same area over 45 years, display the shift from a largely rural landscape to one that is predominantly urbanised. In 1964 (Fig. 24), the area was characterised by large patches of native vegetation interspersed with farmland. The older settlement of Sawtell is distinguished from the surrounding lands by its cluster of houses. By 1984 (Fig. 25), it is evident that housing development is occurring in clusters, consistent with a rapidly urbanising landscape incorporating associated infrastructure such as roads, in addition to electricity and water supplies. Collectively, this infrastructure exacerbates the loss of Koala habitat and increases the threat levels of dog predation and roadkill. Large tracts in the western sector of the LGA largely remain farmland, thereby continuing to support any pre-existing Koala populations. The Koalas that are visible to the residents of the new housing estates could potentially originate from this persisting rural landscape, but their presence in the new urban areas is likely to be short-lived because these areas could not sustain Koala populations.

The development underway by 1984 has been visibly consolidated by 2009, as shown in Fig. 26. This aerial photograph displays a heavily populated landscape, marked by a density of schools, shopping centres, and housing estates, and serves as evidence of the intensity of development since 1964, particularly in the area north of Lyons Road. Patches

KOALAS IN COFFS HARBOUR

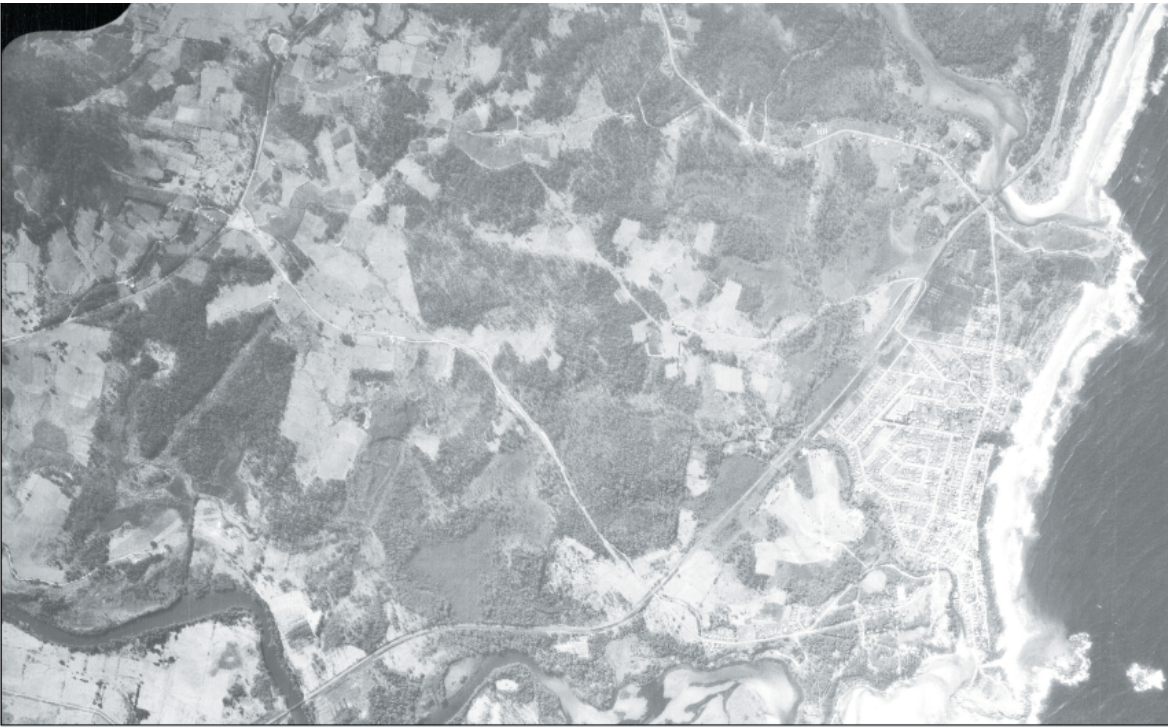


Fig. 24. Geo-referenced 1964 aerial photograph of a portion of the south-eastern sector of the Coffs Harbour LGA. This sector is bounded by the Pacific Ocean to the east, with the well-established village of Sawtell identifiable by its cluster of buildings on the coast. Bonville Creek forms the southern boundary of this photograph, and is identified by the circled area marked '4' in "Fig 10, which gives the general location of the area shown in this photograph. The road pattern is also shown in "Fig. 10".

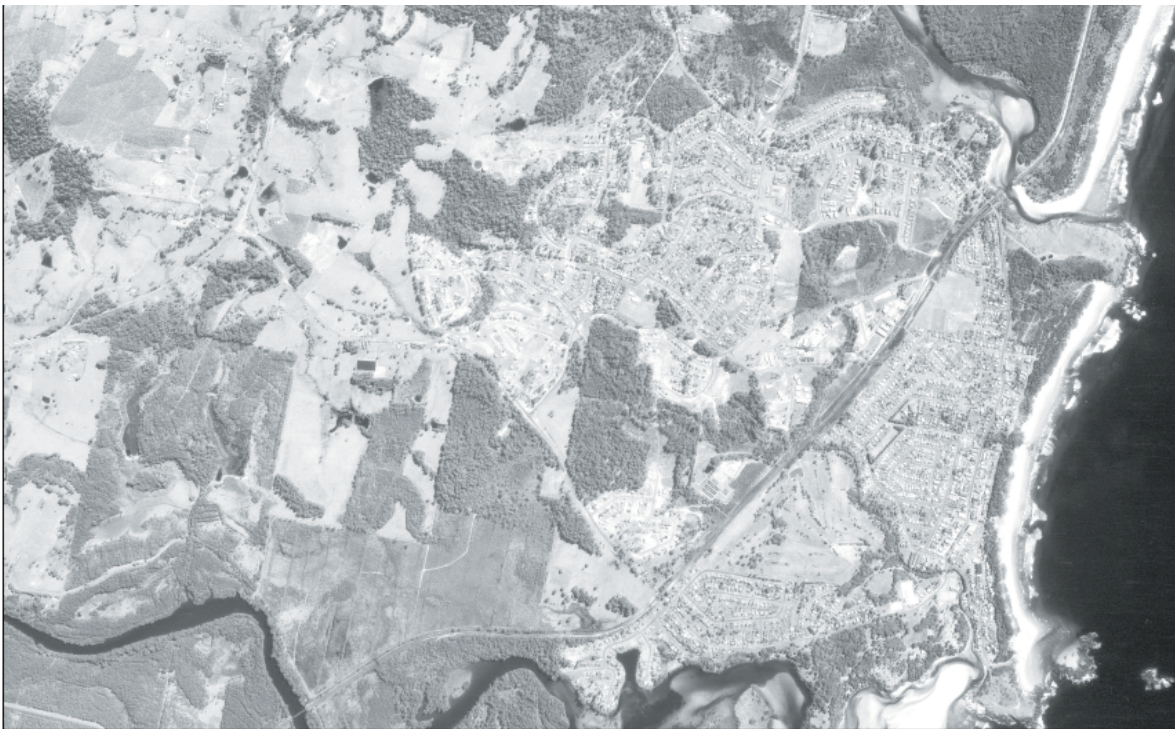


Fig. 25. Geo-referenced 1984 aerial photograph of a portion of the south-eastern sector of the Coffs Harbour LGA. The outline of this aerial photograph exactly corresponds to that of Figs 24 and 26 to enable direct comparison.



Fig. 26. Geo-referenced 2009 aerial photograph of a portion of the south-eastern sector of the Coffs Harbour LGA. The outline of this aerial photograph exactly corresponds to those of Figs 24 and 25 (1964, 1984) to enable direct comparison. This high-resolution ADS40 photograph is much sharper than the previous monochrome aerial photographs, necessitating an element of careful interpretation to the earlier photographs of the same site. However, what is striking is the change over 45 years from an essentially rural and forested landscape to one of high-density housing with isolated patches of forest dissected by roads. Nevertheless, some Koala habitat is still visible, as are connecting links in the landscape, such as the vegetation bordering Bonville Creek, on the southern boundary of the photograph. This explains why some Koalas would occasionally be seen in urban areas.

of vegetation remain throughout the housing estates, explaining why Koalas are still occasionally seen even within urbanised areas. The density of housing and associated infrastructure indicates that this locality is more likely to see more Koala deaths than births. Comparison of these photographs reveals the speed of development in Coffs Harbour in the last three decades of the twentieth century – but the most recent stage in the long-term conversion of Koala habitat to a landscape with more threats than opportunities for Koala populations to be sustained.

The first Comprehensive Koala Plan of Management [CKPOM] in NSW (Lunney et al. 1999a), prepared for Coffs Harbour City Council and adopted in 1999, details specific examples of habitat fragmentation through development. The authors identified a distinct pattern of Koala distribution in the Coffs Harbour area, with the predominant number of records in the south-eastern sector from Moonee to Bonville (Lunney et al. 1999a Part B: 27). This area was also “the most urbanised area”, characterised by “increasing urban expansion and an increasing number of road links between the business

district of Coffs Harbour and the nearby satellites of Bayldon and Toormina” (Lunney et al. 1999a Part B: 27). Furthermore, the report concluded that Preferred Koala Habitat was “highly fragmented due to coastal development and agriculture” (Lunney et al. 1999a Part B: 45). In particular, the developed area of Sawtell, Bayldon and Toormina, to the south of the Coffs Harbour town centre, was found to bisect the area of preferred habitat. Similarly, the authors identified that the Pacific Highway “generally splits the Preferred Habitat - type A on the coast from the Preferred Habitat - type B to the west” (Lunney et al. 1999a Part B: 45). The fragmentation, loss and destruction of habitat are shown in habitat map B7 (Lunney et al. 1999a Part B: 50). In addition to “clearing for urban development, bananas and grazing”, the authors identified further factors which contributed to the degradation of Koala habitat in Coffs Harbour: “clearing or thinning of timber during property development, selective logging, regular burning, pollution and the proliferation of weeds” (Lunney et al. 1999a Part B: 45).

Due to the bisection of Preferred Habitat by

KOALAS IN COFFS HARBOUR

the Pacific Highway, Koala roadkill constitutes a persistent threat to the conservation of the Coffs Harbour Koala population. Over the period 1990-1995, Coffs Harbour WIRES was notified of 85 Koalas involved in road accidents, of which 73 (86%) died (Moon 1995). The CKPoM identified Boambee and Toormina as the worst areas for Koala road accidents, followed by Bonville, Korora and Red Hill (Lunney et al. 1999a Part B: 56). As the authors note, the available figures likely underestimate the true impact on the Koala population, due to the probability of further Koalas being hit and dying on the side of the road or later in the bush from injuries, where they are not visible to motorists (Lunney et al. 1999a Part B: 56). Human population growth is a key factor behind this problem, which has persisted. When the authors of the CKPoM conducted their 1990-91 Koala Survey, the population of Coffs Harbour was 51,520 (ABS 1991). Ten years later it had grown to 61,186 – faster than the growth rate of New South Wales (ABS 2001). Arguably, these statistics allow us to gauge the speed with which Koala habitat was progressively degraded to accommodate housing and urban infrastructure. Additionally, they contextualise the rising threats to Koala conservation associated with the human population, such as the presence of an increasing number of motor vehicles and dogs in the area (Fig. 27).

These threats, among others, were identified by respondents to the 1990 Koala Community Survey conducted in Coffs Harbour by the authors of the CKPoM. Complemented by a field survey, this survey was undertaken in order to identify Koala habitat in the Coffs Harbour LGA and to provide a firm basis for management and planning in the lands over which Council had authority [Coffs Harbour City Council has jurisdiction over private lands. This excludes Crown lands, i.e. State Forests and National Parks. At the time of the Koala Survey in 1990, Crown lands comprised 42% of the Shire]. Its methods are detailed elsewhere (see Lunney et al. 1999a, 2000). Respondents to the survey lived in all areas of the LGA, but there was a higher percentage return from the areas of Coffs Harbour, Sawtell/Bayldon/Toormina and Corindi/Woolgoolga, which are the major centres of the LGA. Koalas were observed frequently in many areas excepting Corindi/Woolgoolga, Lower/Central Bucca and Glenreagh/Nana Glen. A majority of respondents had seen Koalas in the past 12 months in the areas of Dairyville/Fridays Creek, Ulong/Lowanna, Karangi/Coramba/Red Hill and Boambee. The majority of respondents in the areas of Corindi/Woolgoolga, Glenreagh/Nana Glen and Coffs Harbour had not seen Koalas in the past 12 months. In answer

to the question “In the time you have lived in your local area has the number of koalas (a) Increased, (b) Stayed the same, (c) Decreased, or (d) Don’t know?”, the majority of the 1,856 respondents (75%) selected option D. Of those that did have an opinion, most (15%) said that the population had decreased, whereas only 2% of respondents stated that it had increased. This community wisdom has been shown to be effective in describing patterns of population change in Koalas (Predavec et al, in press).

Drawing on the combined results of the community and field surveys, the authors identified that the predominant number of records were in the south-eastern sector of the LGA, from Moonee to Bonville (Lunney et al. 1999a Part B: 27). Specifically, examination of the seven detailed local area maps shows that Coffs Harbour’s main Koala population extended from the southern half of the Korora area, south through Coffs Harbour town area to Bayldon/Toormina and through to Boambee and the northern

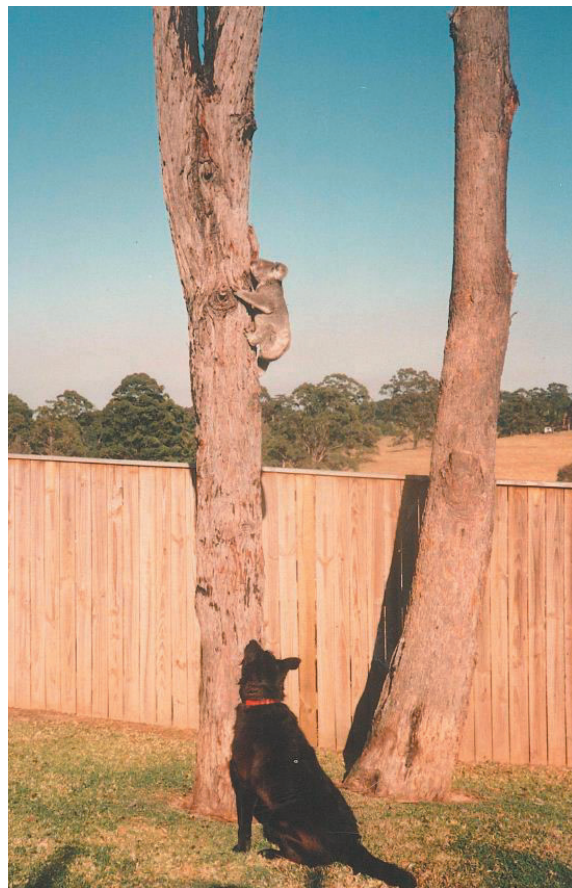


Fig. 27. Dogs are a recognized threat to Koalas. This photograph was taken in 1988 in a backyard in Playford Avenue Toormina. The paddock in the background is now a housing estate. Photograph by John Willoughby.

part of the Bonville local area (Lunney et al. 1999a Part B: 27). It is possible that the Koalas present in this area reflect emigration from Koala habitat elsewhere, and that such new suburban growth areas are 'sinks' for Koalas, i.e. that the local death rate exceeds the birth rate. Additionally, the increasing human population growth in these areas introduces a potential bias in the data. It is also reasonable to speculate that as the housing estates expanded over the late 1970s through to 1990, Koalas would have been more visible, as they spent more time walking between patches of habitat and crossing roads, potentially giving a false impression of a more stable population than is actually the case. However, this distribution bias arising from visibility was mitigated by the field survey, which was independent of human population distribution.

The 1990 community survey provided a section for respondents' comments. Of the 2,018 returned forms, 1,021 (51%) contained a comment. These comments were published as a supplement to the CKPoM (Lunney et al. 1999b) and comprise an important source of perceptions data. Many respondents' comments contained observations and opinions regarding what they saw as the key threats to Koalas in the area. Development was considered to be the principal threat to the Koala population, with 90 respondents of a wide age range mentioning development in terms that convey their awareness of ecological ideas such as habitat, food source, and wildlife corridors.

"Destruction of habitat – over development of Coffs Harbour – main cause of their demise". (Male, 71, Coffs Harbour)

"There seems to be a loss of food for koalas from development such as Pacific Bay Resort". (Female, 27, Mullaway)

"Am very concerned about recent logging in the area that I saw the koala. As it was young and healthy looking I feel there must be a colony out there". (Female, 36, Coramba)

"It was a great joy to sit in the lounge and look out the window and see a koala in a tree with a baby. [...] now we see few. One only, 2 weeks ago - since removing trees which was the corridor to Bruxner Park when the Eden Park Estate was cleared". (Female, 65, Coffs Harbour)

"The majority of the respondents concerned by development mentioned specific examples

of clearing which, in their view, had exerted detrimental effects on Koala populations".

"Koalas disappeared when the land for Fitzroy Gardens and Sunbird Estate was developed" (Female, 65, Toormina)

"Koalas were plentiful near us until the Don Patterson Drive was put through their habitat. None seen since road put there". (Female, 61, Coffs Harbour)

"I have been told recently that trees are being bulldozed in the middle Boambee area for a proposed development, and that residents of that area say that koalas are coming crying to their houses in the night as their trees have been knocked down". (Female, 74, Corindi Beach)

"We live (near to) proposed Bonville Golf Course which was APM land. Since clearing commenced 2 months ago we have not seen any koalas at all, and we are concerned as to where they have gone, as there is not much bush left". (Female, 42, Bonville)

Other specific examples mentioned by respondents include Quinwell Estate (Sawtell), Pacific Bay Resort, the clearing of trees bordering the Coffs Creek tributary, and habitat destruction in Daniels Road, Coramba. Many respondents were sensitive to the connections between development and potential Koala roadkill. 21 respondents mentioned sighting a dead Koala on a road, while others displayed an awareness of potential threat:

"When we moved to Bonville koalas were frequently sighted. Now that residential areas have replaced bushland, we only frequently see koalas dead on the road". (Female, 17, Bonville)

"1981 sighting of koala 9.45pm crossing road slowly from paperbark stand east of Hogbin Drive to west side. [...] I assume that Hogbin Drive, newly made, had cut across the bear's territory". (Male, 67, Sawtell)

"Five koalas have crossed McKays Road during last 12 month period, due mainly to urban development west of McKays Road. This is a high risk area for koalas". (Male, 70, Coffs Harbour)

Respondents also mentioned a variety of other factors that in their view constituted threats to the Koala populations of their area. These included the

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presence of roaming dogs (48 comments), cats (16 comments), wildfires (2 comments), and flow-on effects of development such as noise and smoke (2 comments).

Most interestingly for our purposes, many respondents claimed that Koalas had successively declined over time and utilised a historical frame of reference to substantiate these claims. Of these respondents, many felt that development had been the key factor in their apparent demise. As one male respondent commented, "I have lived in the Karangi area all my life and have seen a decline in koalas mainly due to more traffic, land clearing for bush retreats and power lines" (Male, 33, Coramba). Others observed a decline but did not attribute a reason, with one woman stating, "As a child I saw lots of koalas in this area. Our children haven't seen any" (Female, 43, Nana Glen), and another respondent commenting, "In my last 17 years I've gone from seeing a koala on an average of once a month, to now only seeing them once every two years" (Female, 27, Coffs Harbour). However, it is particularly interesting that multiple respondents observed a decline in what they perceived to be an already small population:

"Koalas were usually seen on the farm round October, where there was still plenty of natural bush. This changed when it was cleared for development in '70. Wouldn't say they were ever plentiful". (Female, 67, Sawtell)

"I am now in my 60th year. In 1937 I saw my first koala in the Conglomerate State Forest where I spent quite a few years riding horseback looking for grazing cattle. I saw another koala crossing the road one night when driving by car from Coffs Harbour at the lower Bucca turn-off. With many hours spent in the bush as a young person these are the only two I have seen in the wild". (Anon., N/A, Coffs Harbour)

A distinct consensus emerged with regard to the pattern of Koala distribution in Sawtell. While one respondent mentioned that "quite a few koalas" were present in the early 1980s between Toormina High School and Sawtell/Toormina Roads, the majority of respondents observed that despite years of residence in the area they had never, or only rarely, spotted a Koala. As one respondent commented, "Yes, we used to have koalas in our area, but they are very hard to find and always have been. Even in trees we know they were feeding in we very rarely ever seen them" (Female, 57, Sawtell).

The comments of residents who had lived in

the area for three decades or more are particularly illuminating:

"My husband owned approximately 300 acres of bushland from the Lyons Railway bridge to Pacific Highway from 1946, felling timber then bulldozer, and in all those years didn't sight one koala, but saw one in Karangi Bush". (Female, 79, Sawtell)

"I always look for koalas when passing through forest areas but have only ever seen the one. I live on the edge of the Sawtell Beach scrub. I have only seen one koala in Sawtell area in my 30 years residence here. It was a fully grown one on Sawtell Reserve about 20 years ago". (Male, 89, Sawtell)

"My family has owned and farmed (since 1932) properties, East Bonville, Lyons Road, Boambee Bridge area, Lamberts Road, and only koala I've seen was in a tree in my backyard in 18th Avenue in 1988, apart from 1 in Botanic Gardens". (Female, 58, Sawtell)

A consensus also emerged with regard to the Koala population of Korora. Older respondents observed a decline in the Koala population beginning in the 1980s:

"We had many koalas on our 5 acres 18 years ago and they went fairly quickly once the western side of Old Coast Road was opened up to more houses, particularly on the southern end of the road". (Female, 49, Korora)

"Koala bears were always round us living in Korora and then from approximately 1987 they disappeared". (Male, 65, Korora)

"I have six acres of trees with plenty of feed trees, also I adjoin the Orara East State Forest, but the amount of koalas seem to have declined over the last 20 years". (Male, 60, Korora)

Consistent with the presence of Koala habitat in the town centre of Coffs Harbour in the first half of the twentieth century, many respondents noted that they had observed Koalas in the town centre, but that their numbers had declined in recent decades. One resident, aged 62, observed that she had seen Koalas "in dense scrub from Sewerage Treatment Works to rail bridge west of railway line in early 40s. In Victoria St. koalas up telegraph poles on several occasions

(approx. 1940-1950)” (Female, 62, Coffs Harbour). Another notes that “There were lots in Korora area where I lived as a kid and also in Bray St. area (1960 to 1970) in old Coffs Motel grounds – there were 32 acres there onto Bray St. and lots of suitable trees for koala round Coffs Creek tributary. Most of this land has been cleared” (Female, 45, Bayldon). Another respondent supports this claim: “Koalas were not infrequent in timber along Coffs Creek adjacent to Zara Pl. in early 70s. They appear to have gradually disappeared with development” (Male, 59, Coffs Harbour). Other comments point to the presence of Koalas in suburban areas:

“During 1960-65 we lived near Halls Road and saw koalas often, high in the trees”. (Female, 70, Coffs Harbour)

“Soon after we moved to our present address about 1974 a koala was right near our front door” (Female, 61, Coffs Harbour)

“As a child living in Pitt Square Coffs Harbour I remember seeing koalas a few times in trees around our home – don’t now”. (Female, 35, Boambee)

Although these comments testify to the declining presence of Koalas in Coffs Harbour’s urban and suburban areas, it is evident that small, semi-isolated populations persisted in these areas into the 1980s. *The Coffs Harbour Advocate* reported that, in late 1980, a Koala was found in the ‘Target’ store located in the town’s central business district (CHA 1980d). However, it would be misleading to claim that such incidents reflected a healthy and stable population. A week after the ‘Target’ piece was published, the paper carried a front-page article entitled “Disappearing Haven”, accompanied by a photograph of a Koala in a tree, which reported one Korora resident calling for a tree preservation order for Coffs Harbour Shire (CHA 1980e). It quoted the resident as stating that, without this, “Coffs Harbour was in danger of looking like one of the treeless Sydney suburbs” due to routine clearing carried out “without a thought for the local wildlife” (CHA 1980e). This view is consistent with the comments of many respondents to the Survey, which indicate a decline in the Koala population of the Coffs Harbour township beginning in the 1980s. As one respondent noted, “We did see koalas when we first lived here, 10 years ago, but not so much the past 2 years” (Female, 41, Coffs Harbour).

The 1980s and 1990s were marked by particularly intense local interest in Koala conservation. Media coverage of the issue went into reached a high point,

with a total of 38 articles, including 3 editorials, in the *Advocate* in 1990 alone (CHA 1990a-al). This raises the possibility of a ‘feedback loop’ between local media and respondents’ comments to the Survey, having taken place in 1990. However, while it is undeniable that intense media coverage of the issue heightened residents’ awareness of Koalas in their area, the specificity of their comments – many detailing personal recollections and instances of habitat destruction – indicates that it is highly unlikely that media scrutiny *determined* these perceptions.

The articles can be broadly divided into four categories. Firstly, a number of articles publicise Local and State Government conservation and research initiatives related, but not limited to, the Coffs Harbour LGA (CHA 1990b,c,k,v,ac,ad,ag,ak). A smaller number of public interest pieces report on Koalas more generally, i.e., without recourse to local debates (CHA 1990e,g). One example of this is a report on the findings of a conference on Koala conservation held in Lismore (CHA 1990e). A third group of articles falls into the ‘community interest’ category, distinguished by an amusing tone and/or a presentation of Koalas as cute and cuddly (CHA 1990w,aj,al). These articles are generally removed from political debates and are accompanied by large photographs. The final group of articles is the largest, and focuses on local debates concerning Koala conservation and the efforts of local activist groups to place Koalas on the political agenda (CHA 1990a,d,f,h-j,l-u,x-z,aa,ab,ae,af,ah,ai).

The articles offer a wealth of information with regard to both the persistence, and rapid eradication, of Koala habitat in the Coffs Harbour LGA, in addition to the level of community interest in the issue. Key focal points include the urbanisation of North Bonville, which involved the illegal logging of live trees (CHA 1990u,x,z,aa); clearing at Bonville West for a golf course (CHA 1990t); and attempts to secure a Koala reserve at Roberts Hill (CHA 1990o). In particular, debates surrounding the development of Bonville made Koala conservation “a key by-election issue” for local government (CHA 1990ah). Landowners and developers labelled attempts by local conservation groups to secure land from development by extending tree preservation orders “play[ing] the koala card” (CHA 1990m). Protests reached their apogee in late 1990 when conservation groups presented Mayor Bernie Malouf with a dead Koala allegedly found floating in Pine Creek at Bonville (CHA 1990r). Malouf was already infamous for his widely publicised stance that private land should constitute an exception from measures intended to conserve Koala habitat (CHA 1988).

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By 1990, as these articles demonstrate, the Koala came to symbolise the helplessness of Australia's native fauna in the face of relentless land clearing. It is important to note that this is merely a change in perception, as clearing at this juncture was no worse, qualitatively speaking, than that of a century earlier. In addition, the sudden increase in interest in Koalas could be mistaken for a rapid increase in the local Koala population. However, this too is misleading. Rather, we can draw two important conclusions from the local media coverage. Firstly, taken collectively, the articles either assume a neutral stance on the subject of Koala decline, or actively point to a decline and attribute this to multiple human-driven threats, primarily unchecked development. Although dissenting voices are present within some articles, not a single article attempts to deny the issue. This indicates that not only had the issue attained a critical political threshold, but that the Koala population was widespread enough throughout the LGA and that there were enough visible individual Koalas for local residents to form an opinion on the basis of personal experience. This does not necessarily point to a high population; rather, it indicates that Koalas were sufficiently present to be noticeable. Indeed, it could indicate a low-density population that was becoming progressively more visible as their habitat was fragmented by roads and clearing.

Secondly, the articles allow us to track the emergence of a preventative, and more holistic, approach to Koala conservation. Whereas development was portrayed in a positive light over the course of the 1960s to mid-1980s, it is considered critical by 1990 to control it utilising legal instruments such as tree preservation orders. Development is by this point perceived as the primary factor underlying all other threats to Koalas in the area. With this in mind, one resident writes, well-intentioned plans to build a hospital for sick and injured Koalas in Coffs Harbour (CHA 1990i) ultimately miss the mark:

Just as preventative medicine is about maintaining good health before sickness occurs, the health of koalas needs to be considered in terms of what are the causes of the major health risks to them. Looking beyond the immediate symptoms of having sick and injured koalas, it becomes necessary to ask what are the reasons behind such 'health problems'. Is it not the destruction of habitat through large scale clearing, encroaching suburban development with its accompanying threats of domestic pets and human traffic? The idea of rescuing sick and injured animals is a noble one, but somewhat naïve and short-sighted if it is not done in conjunction with a commitment to safeguarding viable areas of koala habitat. (CHA

1990f)

A few weeks later, the Editor of the *Advocate* espouses the same view in his editorial. After acknowledging that "Coffs Harbour needs to recognise the responsibility it owes its koalas and other wildlife", he argues that "While the idea of a hospital and wildlife refuge is admirable, it is in itself not a solution to the continuing conflicts between development and wildlife. The very fact that a hospital is needed suggests that strategies must be developed which will keep the animals out of the hospital." In his view, these strategies must include "a thorough audit" of the Koala population of the area, responsible development policies, and controls on domestic cats and dogs. He concludes: "There seems little point in patching up koalas at a hospital only to release them back into an environment in which they cannot survive" (CHA 1990j).

The evolution of this perspective led, in the early 2000s, to important measures designed to safeguard the existing Koala population from further threats. These measures included the ratification of the CKPoM by Coffs Harbour City Council in 1999 and the State Government in 2000 (CHA 2000d), the creation of the Bonville wildlife overpass (CHA 2000a), community initiatives such as planting Koala food trees in Coffs Harbour (CHA 2000h), and attempts to protect Pine Creek State Forest, in the south-western sector of the LGA (CHA 2000b,c). More broadly speaking, the focus of conservation action and population interest lay in the south-east sector of the LGA, which is consistent with ecological studies that identify this as the predominant location of Koalas in the LGA. While the focus of local media coverage lay, in the early 2000s, on a number of specific locations of contention, we can identify from the changing site-specific arguments that Koala populations remained present and still faced challenges. Foremost among these challenges was loss of habitat, with areas marked as primary Koala habitat in the CKPoM cleared in late 2000 (CHA 2000e,f,g).

Loss of habitat remains a key issue in 2015. This issue has two components. One is the 'legacy effect' of habitat loss and fragmentation that took place over previous decades, wherein individual Koalas which stayed in their home ranges will die and will not be replaced. The second is the additional loss of patches of habitat as individual developments proceed on vacant lots within housing estates, making these estates denser and less hospitable to Koalas. With increasing housing density, there is a corresponding increase in vehicle traffic and the presence of domestic dogs. Thus the Koala population becomes increasingly caught in a 'pincer movement' of decreasing habitat



Fig. 28. View of Koala Place, a suburban cul-de-sac located near Boambee Creek, July 2014. Photograph by Dan Lunney.

and increasing threats. As photographs taken in January 2014 (Appendix 1) and July 2014 show, the once rural and forested landscape is now modern and suburban, with traces of Koala habitat remaining alongside creeks and on ridges. This is evident in Fig. 28, which depicts the ironically-named Koala Place, a suburban cul-de-sac located near Boambee Creek, where Koalas are still occasionally heard by residents.

CONCLUSION

As we have acknowledged, it is difficult to ascertain the precise pattern of change in the size of the Koala population of Coffs Harbour, largely due to the scarcity of relevant historical sources. In view of the absence of a population baseline until the late twentieth century, when Koala habitat was identified and mapped in the CKPoM, we must rely on alternative historical sources to trace changes to the Koala population. A general pattern can be drawn of an historical process stretching from the European settlement of Coffs Harbour to 2000 and inclusive of the broader Aboriginal pre-history of the area. The presence of the Koala in the languages, cultural practices and mythologies of the Gumbaynggir peoples indicates that Koalas had been present throughout the broader region prior to European settlement. The

relatively late arrival of European settlers in the Coffs Harbour area meant that Koala habitat was untouched until the early 1880s, when the local timber industry experienced a rapid boom. After the area was opened to selection in 1886, clearing became more extensive and timber rapidly became the area's primary export. In ecological terms, the timber industry presented at this time the dominant factor in the fragmentation and diminution of Koala habitat.

Unlike in Bega, on the far south-coast of NSW, where there were bear-skinning factories (Lunney and Leary 1988), we may conclude that the trade in marsupial skins and furs did not constitute a significant threat to the Koala population of Coffs Harbour in the late nineteenth and early twentieth centuries. While the trade was active in the broader region for a number of decades, it is evident that the industry was not prominent in Coffs Harbour itself. Drawing on the existing records, we may conclude that Koalas were present in Coffs Harbour in the early period of European settlement, but arguably never in high numbers.

In contrast to the fur trade, the timber industry continued to present the most significant threat to the Koala population of the area, expanding with the advent of new technology and the opening of the Coffs Harbour Jetty. As shown in historical photographs, extensive and unchecked vegetation clearing, logging, and ringbarking transformed the

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previously forested landscape into an agricultural landscape surrounded by forested hills. In particular, the pattern of clearing left the vegetation bordering creeks in the Coffs Harbour township, such as Coffs Creek, relatively intact due to the risk of floods. This facilitated the persistence of Koala habitat in these areas well into the 1980s, with some habitat remaining today. In contrast, the lands well above sea level, such as the Orara farms mentioned in this paper, were comprehensively cleared for farming, with little vegetation left along river edges. The forest on the slopes was left relatively intact, though it was progressively diminished throughout the twentieth century.

Our historical analysis has allowed us to determine the extent to which other potential threats affected the Koala population of the area. In particular, it has allowed us to eliminate fire as a major threat to Koala populations in the area over the twentieth century. Mapping the distribution of fires shows that they were scattered and sufficiently infrequent, thereby failing to comprise a major threat. Though fires would have killed Koalas inhabiting the areas where the fires occurred, their long-term impact on the presence of Koala populations can be considered negligible due to the rapid rate of recovery of the forest as Koala habitat. As the surrounding unburnt forests were extensive in area, they would have provided a crucial source population for the rapid recolonisation of the burnt areas as these areas recovered. Historical sources have also enabled us to qualify the extent to which human population growth has constituted a threat to Koalas over time. Following a marked decline in the human population during the 1920s and Great Depression, population growth only began to constitute a threat after 1945 as the population steadily increased. However, given the slow pace of this demographic shift, we can assume that population growth did not constitute a major threat to the Coffs Harbour Koala population prior to the 1960s, when the area experienced a boom. Since then, growth has continued unabated, with the rate of human population expansion in the area exceeding the growth rate of NSW as a whole by 2000.

These population trends provide a context for the increasing degradation and fragmentation of Koala habitat in the area. As a result of the increasing demand, beginning in the mid-1960s, for housing and associated infrastructure to meet the needs of the growing human population, land which is now recognised to have contained Koala habitat was progressively cleared and converted into an urban landscape containing habitat fragments. The glaring transformation of a rural-forest landscape in

1964 to the suburban estates of today, as shown in aerial photography, supports the general thesis of an incremental loss of habitat long before there was ever a scientific definition of Koala habitat. This process was accompanied by a number of associated threats, most significantly the growing presence of vehicle traffic – leading to roadkill – and domestic dogs.

Taken collectively, the evidence allows us to draw a number of conclusions: that the Koala population of Coffs Harbour was widespread but never abundant, that habitat loss has been relentless since European settlement, and that the fur trade in Koala skins was not extensive in the late nineteenth and early twentieth centuries. The transformation of a rural-forest to an urban landscape, particularly in the south-east of Coffs Harbour, over the past four decades is the most recent stage in the incremental loss of habitat since European settlement. Consequently, the conclusion can be drawn that the Koala population had been reduced from its pre-European size by 1990. It is important to recognise that these trends are specific to the Koala population of Coffs Harbour. It is our contention that, in order to fully understand the threats facing Koala populations, we must examine these populations within their local context. The relative significance of different threats, particularly habitat loss, varies among localities (McAlpine et al. 2006, 2008). Our ecological history shows that threats which have exerted a significant effect on Koala populations of other areas, such as the fur trade, are of lesser importance in the Coffs Harbour LGA. By contrast, the single most significant factor in the historical decline of the Koala population in this area has been a continual process of habitat loss and fragmentation, compounded in the late twentieth century by extensive development to accommodate an increasing human population.

As the CKPoM and current ecological research shows, habitat loss and fragmentation continue to present a threat to Koala populations in the area. However, the remaining patches of native forest will continue to attract Koalas because they are core Koala habitat. In our view, the continuing presence of Koalas in suburban areas is a misleading indicator of the survival of the population as a whole, as these individual Koalas are likely to have emigrated from forest elsewhere, such as Bongil Bongil National Park in the south-east of the Coffs Harbour LGA. It is the lethal impact of vehicles and dogs in the exposed stretches between the habitat fragments that will arguably cause relentless loss within the Koala population in the south-east of the Coffs Harbour LGA. A detailed radio-tracking and demographic study of the metapopulation is needed to determine

in what locations the local Koala populations are persisting, declining and migrating, with measures of health, fertility and mortality. Such a study would include Bongil Bongil National Park in conjunction with the urban and peri-urban areas of south-east Coffs Harbour LGA.

The catalogue of new or rising threats, such as roadkill, dogs, and disease (Lunney et al. 2015), in addition to the future threat of climate change, compounds the long-term threatening processes of habitat loss and fragmentation that we have traced in this paper. Studies of Koala populations in other areas, using different methods, have allowed us to gauge the relative significance of these threats for Coffs Harbour. Specifically, a detailed radio-tracking study of Koalas in Port Stephens determined that dogs were a major, but unseen, killer of Koalas (Lunney et al. 2007), whereas fire and roadkill were more conspicuous (Matthews et al. 2007; Rhodes et al. 2014) but not necessarily as significant in the Coffs Harbour context. Population and modelling studies in the Eden region of south-east NSW, Gunnedah in north-west NSW and in Queensland help to determine the impact of climate change on the Koala populations of these areas (Lunney et al. 2012, 2014; Adams-Hoskings et al. 2011, 2014), demonstrating that it presents a widespread and insidious threat, and one that will invariably affect the Koala population of Coffs Harbour.

Proposed actions for reversing the decline of the Koala in NSW are presented in the NSW Koala Recovery Plan (DECC 2008) and the National Strategy for the Conservation and Management of the Koala 2009-14 (Commonwealth of Australia 2009). Despite the apparent clarity of these strategies, ambiguities in our contemporary understanding of the Koala may complicate attempts to reverse their decline. The Senate Committee's report on its 2011 enquiry into the Koala expressed surprise at what it called the "complexity of this multifaceted issue" (Commonwealth of Australia 2011, xv). When the Committee looked into the Koala question, it was inundated with submissions pointing to current problems, but there was not a series of ecological histories of Koala populations to assist in interpreting changes. Nor was the need for an ecological history of the Koala identified in the 19 recommendations of the Senate Committee for action (Shumway et al. 2015). In 2012, the Commonwealth Government listed the Koala as a threatened species in ACT, NSW and Queensland, thereby confirming the decline that had become obvious in many locations, especially along coastal NSW, such as Coffs Harbour, and nearby Iluka, where the population became effectively extinct in

the late twentieth century (Lunney et al. 2002).

In our view, if we limit our focus to contemporary issues facing existing Koala populations, we are likely to overlook the causes of long-term change and to mismanage what remains of our faunal heritage. The threatened species status of Koalas under both Commonwealth and State legislation and the ratification of the 1999 CKPoM for Coffs Harbour all represent moves in the right direction for Koala conservation, but given our interpretation of long-term change, these policy documents alone will not stem the continual contraction of the Koala population of Coffs Harbour. While ecological history is indispensable for deepening our understanding of long-term change, complementary studies are needed to pinpoint the impact of specific threats. There is a pressing need in Coffs Harbour for a population study that moves beyond the identification of shifts in population distribution and habitat mapping, to examining other population attributes such as rates of breeding and mortality, and the dynamics of Koala immigration and emigration. This ecological information is critical in identifying long-term patterns, interpreting current changes to a population profile, and developing strategies to manage threats. It is the interaction of the historical and ecological approaches, as demonstrated in this study, which will allow us to most effectively understand and manage Koala populations of specific regions.

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APPENDIX 1



Fig. 1. This 2009 high-resolution aerial photo, in the ADS40 series, shows the present-day location of both Hoschke's and McLeod's farms. At the centre of the photo is a track that crosses the Orara River. The River runs vertically and centrally through most of the photo, then turns left near the top of the photo. The historical photo of Hoschke's farm (Fig. 7) was taken from just below the main cluster of buildings and to the right of the centre line. McLeod's farm is on the right hand side of the River, and occupies much of the centre of the right of the photo (cf Fig. 8 for historical photo). Note that the land that was well underway to being cleared just over a century earlier is now cleared, green, and bears little trace of its earlier forest origins. The dead, ring-barked trees in the old photo of Hoschke's farm (Fig. 7) are gone, but the new house with the red roof is in a similar location to the wooden house of a century earlier. Also noticeable is that the sharp line of farm and forest, evident during the initial clearing phase, is now even sharper. The only regrowth is on the riparian strip.

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Fig. 2. This 2009 high-resolution aerial photo, in the ADS40 series, shows the present-day location of Cochrane's farm. The most noticeable features of this photograph are the regrowth along the banks of the Orara River, the disappearance of the ring-barked trees, and the stumps. From a Koala ecologist's viewpoint, this is a fragmented and much transformed landscape that would have been prime Koala habitat.



Fig. 3. Bridge across the Orara River, on original site of Hoschke's farm on the other side of the river. Doug Hoschke, grandson of the original farm owner, took Dan Lunney to this site, as he knew both the old photo and the site of what was his grandfather's farm. The farm is no longer in the family. Note the regrowth along the river bank, the cleared land in the background, and the forest on the hills. Photo by Dan Lunney (3 January 2014).



Fig. 4. Doug Hoschke standing on the original site of McLeod's farm. Comparing this photograph to Fig. 8 (historical photo of site) allows us to discern that the modern appearance of the landscape took shape at first settlement, and it has remained very similar today. Photo by Dan Lunney (3 January 2014).



Fig. 5. Contemporary view of the original site of Cochrane's farm. There is now a thin strip of trees growing alongside the riverbank; the land remains cleared in the area adjacent to this strip of trees. In view of identifying Koala habitat, the scene is very similar to that of a century earlier. Photo by Dan Lunney (3 January 2014).

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Fig. 6. Contemporary view of the Upper Orara Road, which runs close the Orara River, between the original sites of Hoschke's and Cochrane's farms. Doug Hoschke pointed out to Dan Lunney that the forested slope in the background is regrowth forest that has developed in Doug's lifetime, i.e. since the late 1930s, and Koalas now occasionally occupy this site. However, Doug Hoschke also pointed out that the Koalas cross the road, and are killed on the road. Photo by Dan Lunney (3 January 2014).



Fig. 7. Contemporary view of a bridge across the Orara River linking the original sites of Hoschke's farm (foreground) and McLeod's farm (background). The primary difference between this photograph and those taken over a century earlier is the growth of a thin strip of trees along the river edge. Otherwise, the farmland that was cleared within decades of first settlement has remained cleared farmland.

APPENDIX 2



Fig. 1. Coffs Harbour High School, next to the Coffs Harbour Jetty Post Office, on Harbour Drive, Coffs Harbour, located within the circle #3, in Fig. 10. The High School was the site of Nicholl's timber mill in Fig. 6. Photo by Dan Lunney (3 January 2014).



Fig. 2. This modern high-resolution aerial photo, in the ADS40 series, shows the present-day location of Nicholl's timber mill, Fig. 6. Near the centre is Coffs Harbour High School, marked by a cluster of red buildings.

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APPENDIX 3



Fig. 1. This photo of modern-day Brelsford Park, Coffs Harbour, shows features identifiable in photos taken over a century earlier. The shape of land, the size and colour of the trees, and the forested hills in the background all help to interpret the use of land at first settlement. Photo by Dan Lunney (2 January 2014).



Fig. 2. The cluster of trees on City Hill, visible to the east of Brelsford Park, Coffs Harbour, is remnant Koala habitat, and modern records of Koalas at this location exist. This photo, combined with earlier photos, modern Koala surveys, and early records, confirms that Koalas were found and still are to be found in Coffs Harbour. Photo by Dan Lunney (2 January 2014).