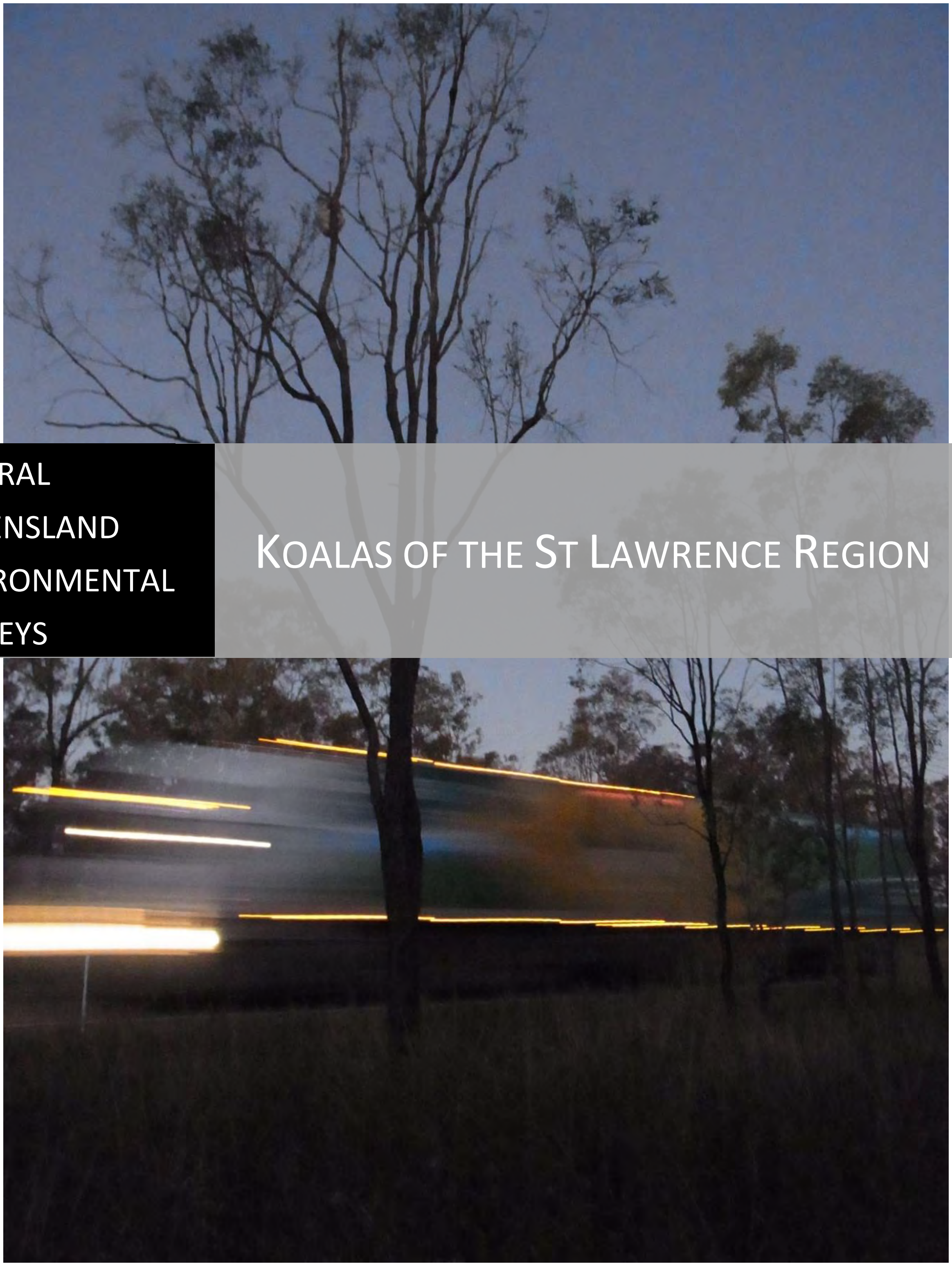
Central Queensland Environmental Surveys

# Koalas of the St Lawrence Region



Report 1: Defining the population | Dr Alistair Melzer

# Koalas of the St Lawrence region of Central Queensland

# Report 1: Defining the population

This report was prepared for the Queensland Department of Transport and Main Roads

by

Central Queensland Environmental Surveys

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August 2011.

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**Acknowledgements**: Gail Tucker, Rolf Schlagloth, Leith Black and Manon Le Couedic assisted with the field program. Gail Tucker liaised with property owners and provided GIS support. Photographs within this report were taken by Gail Tucker on behalf of CQES.

The field surveys were undertaken with the express permission of the relevant property owners. Their support is gratefully acknowledged.

Paul Elliott (Isaac Regional Council) collected and stored specimens for later collection and analysis.

# Koalas of the St Lawrence region of Central Queensland


## Summary

A widespread koala population of moderate density occurs around the Bruce Highway from St Lawrence to Granite Creek. This population almost certainly extends further north and south along the coast wherever suitable habitat remains, and extends west to include the Connors Range at least. This is a regionally significant population and is likely to be a significant element in the long term preservation of the species if climate change predictions occur.

The limited data on the road kills suggests that the majority of deaths are of male koalas killed during the breeding season when on-ground activity is at a maximum. The observations of live animals indicate that the extant population is healthy and breeding actively.

The distribution of sightings, in many places clustered around drainage lines, supports the view that exclusion fences directing koalas to bridges would be a useful strategy but that more widespread installation of exclusion fencing may be required to exclude vehicle related mortality from the processes threatening this population.

There are insufficient data, at this stage, to comment on the impact of road mortality on the structure of the koala population or to investigate the genetic relatedness of this population to greater regional populations.


## Introduction

There is a long history of koala mortality due to collision with motor vehicles on the St Lawrence stretch of the Bruce Highway. Koala warning signs have been in place for many years. However, in recent years (2008 – 2009) there has been a reported increase in the number of animals being killed and local public concern is increasing. This concern is being heightened with rising concerns about the future of the koala nationally – and especially in south east Queensland.

Koala mortality on roads is considered to be a major threat to the persistence of koalas – particularly in urban areas and where roads carry high volumes of traffic at speed. The National Koala Conservation and Management Strategy recognizes this threatening process as one of seven major threats and management issues for koala conservation in Australia (NKCMS 2009). This strategy identifies the management of roads and road designs as a key action (Category 3 Action 3.01) in implementing the national plan for koala conservation.

As a national route the Bruce Highway carries a high volume of commercial and industrial traffic. Unlike domestic traffic the heavy commercial vehicles are active at dusk and dawn and over night. These vehicles are travelling at high speed (up to110 km/hr depending on the speed zones). Koalas are nocturnal and spend considerable time on the ground moving between trees. This nocturnal wandering increases during the breeding season (September to February). Travelling at highway speeds, heavy commercial vehicles cannot safely avoid a small slow moving marsupial. Further, koalas do not exhibit any high-speed avoidance responses to oncoming vehicles. Consequently fatal impacts are inevitable.

The Bruce Highway is a long standing national transport corridor and cannot be reasonably re-routed to avoid this koala population. Further in this region the koala – vehicle impacts are occurring over a 30km (approx.) stretch of highway. The construction of overpasses is not economically feasible. The first step to managing this problem is to understand the issues. This project seeks to address this first step in three ways. Firstly the project seeks to understand the nature of the koala population that is being affected. This will inform decisions about the allocation of resources. Secondly, the project seeks to define the nature of the impact on the population. How is the mortality affecting the demographic structure of the population and is that likely to negatively impact on the population viability? Thirdly the project seeks to explore mitigation measures. Can existing bridge structures be used as overpasses and, if diversion fences are constructed can koalas be directed to these overpasses?

This report presents the results to date on the first stage of this project – understanding the nature of the koala population.

## The local extent of the koala population.

This was investigated in two ways. Firstly, the potential koala habitat was modeled. Secondly, the density of the koala population was estimated.

### Modeling the koala habitat

The extent of remnant vegetation, and associated regional ecosystems, in the region of the Bruce Highway was mapped (data derived from DERM 2011). This extent is shown in Figure 1 and described in Table 1. Each regional ecosystem was then classified and ranked in importance as koala habitat (Table 1). This classification and ranking was derived from the regional experience of koala researchers (Alistair Melzer and Gail Tucker) gained locally since 1989. The discrimination was based on the presence of known koala fodder species and an understanding of the natural history of koalas in regional landscapes. The classification was then applied to the mapped remnant vegetation and a map of predicted koala habitat produced (Figure 2).

Thirty eight terrestrial RE’s were mapped as occurring in the greater study region. Of these 22 were considered to have some likelihood of supporting koalas. Three of these were considered to have a high likelihood of supporting koalas, eight had a moderate likelihood, seven a low likelihood and four a very low likelihood of supporting koalas. Of those considered to have no significant likelihood of supporting koalas the majority were marine or freshwater wetlands or various types of rainforest. Despite that, we know that koalas will take shelter in rainforests and mangroves from time to time and will traverse all types of landscapes and occasionally coastal waters, lakes and rivers. However, such landscape elements do not support koala populations.

This model suggests that the largest extent of high quality habitat is south of Montrose Creek. The greatest areas of moderate koala habitat extend from Heifer Creek to the St Lawrence Creek catchment (Figure 2). The greatest connectivity in habitat is in the region from the St Lawrence Creek to Heifer Creek catchments and extending around the St Lawrence township area (Figure 1). We are aware of greater areas of remnant vegetation to the west incorporating Connors Range and associates hills and ranges. However, this was beyond the area of interest of this study.

Within the study area the distance between habitat fragments was within the range that koalas are known to traverse across open country. We have tracked koalas for around 20km across cultivated or cleared land in the Springsure region. So it is not expected that the gaps between habitat fragments would provide a barrier to movement – especially in the areas north of Heifer Creek.

**Table 1.** Regional ecosystems (RE) and brief descriptions of their constituent plant communities occurring in the study area (**modified from DERM 2011**) as well as the predicted likelihood of koalas occurring in each RE.

(**Koala occurrence ranking: 1 – high likelihood, 2 - moderate likelihood, 3 – low likelihood, 4 – very low likelihood, 0 – koalas are not predicted to use this ecosystem apart from an occasional traverse**)

| RE Code | Plant Community | Predicted Koala Occurrence Likelihood |
|---|---|---|
| 11.3.4 | *Eucalyptus tereticornis* and/or *Eucalyptus* spp. tall woodland on alluvial plains | 1 |
| 11.3.25 | *Eucalyptus tereticornis* or *E. camaldulensis* woodland fringing drainage lines | 1 |
| 11.3.29 | *Eucalyptus crebra*, *E. exserta*, *Melaleuca* spp. woodland on alluvial plains | 1 |
| 11.1.3a | Palustrine wetland (e.g. vegetated swamp). *Melaleuca* spp. and/or *Eucalyptus tereticornis* open-woodland to woodland. Occurs on transition zone between tidally inundated areas and areas under fresh water influence. | 2 |
| 11.3.25b | Riverine wetland or fringing riverine wetland. *Melaleuca leucadendra* and/or *M. fluviatilis*, *Nauclea orientalis* open forest. A range of other canopy or sub canopy tree species also occur including *Pandanus tectorius*, *Livistona* spp., *Eucalyptus tereticornis*, *Corymbia tessellaris*, *Millettia pinnata*, *Casuarina cunninghamiana*, *Livistona decora*, *Lophostemon suaveolens* or *L. grandiflorus*, rainforest species. Often occurs on coarse sand spits and levees within larger river channels | 2 |
| 11.3.29a | *Eucalyptus crebra* + *Corymbia dallachiana* +/- *C. erythrophloia*, *E. moluccana* woodland | 2 |
| 11.5.8a | *Eucalyptus platyphylla*, *Corymbia intermedia*, *Lophostemon suaveolens* +/- *Eucalyptus tereticornis* woodland on rises and low hills | 2 |
| 11.11.15a | *Eucalyptus crebra*, *E. exserta* woodland on undulating rises and low hills | 2 |
| 11.12.1 | *Eucalyptus crebra* woodland on igneous rocks | 2 |
| 11.12.1a | *Eucalyptus crebra* +/- *E. exserta* woodland. Occurs on undulating rises. | 2 |
| 11.12.3 | *Eucalyptus crebra*, *E. tereticornis*, *Angophora leiocarpa* woodland on igneous rocks especially granite | 2 |
| 8.3.5 | *Corymbia clarksoniana* +/- *Lophostemon suaveolens* +/- *Eucalyptus platyphylla* open-forest to woodland, or *E. platyphylla* open-forest to woodland on alluvial plains | 3 |
| 11.3.27b | Lacustrine wetland (e.g. lake). Often with fringing woodland, commonly *Eucalyptus camaldulensis* or *E.* coolabah but also a wide range of other species including *Eucalyptus platyphylla*, *E. tereticornis*, *Melaleuca* spp., *Acacia holosericea* or other *Acacia* spp. Occurs on billabongs no longer connected to the channel flow. | 3 |

| | | |
|---|---|---|
| 11.5.8 | *Melaleuca* spp., *Eucalyptus crebra*, *Corymbia intermedia* woodland on Cainozoic sand plains/remnant surfaces | 3 |
| 11.10.7 | *Eucalyptus crebra* woodland on coarse-grained sedimentary rocks | 3 |
| 11.11.1 | *Eucalyptus crebra* +/- *Acacia rhodoxylon* woodland on old sedimentary rocks | 3 |
| 11.12.6a | *Eucalyptus crebra* + *Corymbia citriodora* and/or *E. acmenoides* + *Lophostemon suaveolens* woodland to open-forest on gently undulating lower lopes | 3 |
| 11.12.13 | *Eucalyptus crebra*, *Corymbia* spp., *E. acmenoides* woodland on igneous rocks. Coastal hills | 3 |
| 8.3.1a | Riverine wetland or fringing riverine wetland. Semi-deciduous (complex) notophyll/mesophyll vine forest. Occurs on Cainozoic alluvial plains fringing or in vicinity of watercourses | 4 |
| 8.12.22 | *Eucalyptus* drepanophylla +/- *E. platyphylla* +/- *Corymbia clarksoniana* +/- *E. exserta* +/- *C. trachyphloia* woodland to open-forest including small stands of *E.* portuensis and *E. melanophloia*. Hills and ranges at low to moderate altitudes, in drier areas | 4 |
| 11.4.2 | *Eucalyptus* spp. and/or *Corymbia* spp. grassy or shrubby woodland on Cainozoic clay plains | 4 |
| 11.10.1 | *Corymbia citriodora* open forest on coarse-grained sedimentary rocks | 4 |
| 8.12.3a | Notophyll rainforest/microphyll rainforest +/- *Araucaria cunninghamii*. Occurs on coastal hills ranges on Mesozoic to Proterozoic igneous rocks. | 0 |
| 8.12.5a | *Lophostemon confertus* and *Eucalyptus portuensis* open-forest to closed-scrub. Occurs on steep upper slopes and spurs on Mesozoic to Proterozoic igneous rocks (subregions 1-3) | 0 |
| 8.12.16 | Low microphyll vine forest to semi-evergreen vine thicket on drier sub coastal hills on Mesozoic to Proterozoic igneous rocks | 0 |
| 11.1.2a | Estuarine wetlands (e.g. mangroves). Bare mud flats on Quaternary estuarine deposits, with very isolated individual stunted mangroves. | 0 |
| 11.1.2b | Estuarine wetlands (e.g. mangroves). Samphire forbland on Quaternary estuarine deposits. Mainly saltpans and mudflats with clumps of saltbush | 0 |
| 11.2.3 | Microphyll vine forest ("beach scrub") on sandy beach ridges and dune swales | 0 |
| 11.2.5 | *Corymbia-Melaleuca* woodland complex of beach ridges and swales | 0 |
| 11.3.1 | *Acacia harpophylla* and/or *Casuarina* cristata open forest on alluvial plains | 0 |
| 11.3.27x1a | Palustrine wetland (e.g. vegetated swamp). Sedgelands to grasslands on old marine planes. | 0 |
| 11.3.27x1c | Palustrine wetland (e.g. vegetated swamp). Sedgelands to grasslands on Quaternary deposits | 0 |
| 11.4.9 | *Acacia harpophylla* shrubby open forest to woodland with *Terminalia oblongata* on Cainozoic clay plains | 0 |
| 11.5.15 | Semi-evergreen vine thicket on Cainozoic sand plains/remnant surfaces | 0 |
| 11.7.2 | *Acacia* spp. woodland on Cainozoic lateritic duricrust | 0 |
| 11.10.8 | Semi-evergreen vine thicket in sheltered habitats on medium to coarse-grained sedimentary rocks | 0 |
| 11.11.5a | Microphyll vine forest +/- *Araucaria cunninghamii* on old sedimentary rocks | 0 |
| 11.11.14 | *Acacia harpophylla* open forest on deformed and metamorphosed sediments and interbedded volcanics | 0 |

## Koala sightings and estimated population density

Random transects were walked through remnant vegetation surrounding the Bruce Highway from about Granite Creek to about Home Creek. Surveys were undertaken in July and August 2011. Up to four people were involved in the surveys. One person followed the search transect while other team members located koalas. When a koala was located, the perpendicular distance from the transect to the koala was measured, and the tree species used was noted. Density estimates (Buckland *et al*. 2001) were derived using Fourier model with a 5% truncation when the number of sightings exceeded 40 animals (*Density from Distance*, Pieces Conservation Ltd 1999).

Just under 64 km were surveyed and 55 koalas were located (Figure 3). The data are summarized in Appendix 1. The regional ecosystems within which koalas were found are shown in table 2. Just under 80% of the sightings were associated with *Eucalyptus crebra, E. exserta* woodlands and open forest. The remainder was in *E. platyphylla* woodlands. The range of tree species within which koalas were sighted was dominated by *E. exserta* (49.1%) and *E. crebra* (41.8%) with *E. tereticornis, E.platyphylla, Croymbia tessellaris* and *Alphitonia excelsa* making up the remaining 9.1% of sightings.

The estimated density was 0.12 koalas/ha (12.1 koalas/km$^2$). The mapped area of predicted habitat (classes 1 – 4) was 11,975 ha. So the estimated population in the vicinity of the Bruce Highway is just under 1440 koalas. Melzer and Houston (2001) summarized the data then available on koala population densities. Queensland population densities ranged from 0.01 koalas/ha to between 1 and 2.5 koalas/ha with most central Queensland populations ranging from 0.01 to 0.4 koalas/ha. So this seems to be a population of moderate density for central Queensland but of low density on a state-wide comparison.

**Table 2.** Koala occurrence in regional ecosystems adjacent to the Bruce Highway between St Lawrence and Granite Creek. Surveyed winter 2011.

**Caution: This table is a summary of koala occurrence as encountered during the estimation of population density. A stratified survey of koala occurrence was not undertaken. There is no correction for the differences in relative area of each ecosystem within the study area. There is no correction for the varying effort applied to each ecosystem.**

| RE Code | Plant Community | Predicted Koala Occurrence Likelihood | Relative frequency (%) of koala occurrence (n = 55) NS = not surveyed |
|---|---|---|---|
| 11.3.29a | *Eucalyptus crebra* + *Corymbia dallachiana* +/- *C. erythrophloia*, *E. moluccana* woodland | 2 | 25.46 |
| 11.5.8a | *Eucalyptus platyphylla*, *Corymbia intermedia*, *Lophostemon suaveolens* +/- *Eucalyptus tereticornis* woodland on rises and low hills | 2 | 21.82 |
| 11.11.15a | *Eucalyptus crebra*, *E. exserta* woodland on undulating rises and low hills | 2 | 40 |
| Non-remnant | Scattered *Eucalyptus crebra*, *E. exserta* | | 12.73 |

Of the 55 koalas sighted 22 were males, 24 were females while gender could not be determined for the remaining nine. Of the identified females 18 had young or showed signs of recently weaning young. So the gender balance is 47.8% male to 52.2% female. Just over 75% of the identifiable females had reared young this year.

### Data from road kills

Four koalas were collected by Isaac Regional Council. Data on a further six animals were available from reference collections. The specimens were examined to determine gender and age. Tissue samples were collected for future genetic analysis. Six were males, three were probably females and one was unidentifiable. Eight were road kills (six males, one female and one indeterminate adult) and one female was diseased. There were no data on the cause of death of the remaining female. There are now six tissue samples in storage for future DNA analysis.

Where data are available on dates of collection almost all were between September and December. This coincides with that part of the breeding season when males are most active on the ground. Also the majority of road kills are males. So, although numbers are small it seems that the road mortality is associated with male koala activity during the breeding season.

We need more data to comment on the cohort of animals impacted by the road mortality.

## Significance of the population

We have identified a widespread koala population of moderate density, in regional terms, in the vicinity of the Bruce Highway south from St Lawrence to Granite Creek in the Styx River catchment. Colloquial accounts indicate that the population, at least, extends west to include the Connors Range and north to include the coast from Clairview to Camilla. Our habitat modeling suggests that it should also extend south to some extent. This suggests that there is a major regional koala population in this section of the Central Queensland coast.

This population has persisted over the long drought of the 1990's. More recently this population has survived some intense dry spells lasting some months when extensive tree mortality occurred throughout Central Queensland and within this survey area. As such the regional koala habitat represents a drought refuge and the population may be important for regional koala conservation – especially as drought frequency and intensity increases. It is predicted that the extent of the koala's distribution will contract towards the coast and be restricted to the coastal ranges and adjacent coastal plains by 2070 (Adams-Hosking *et al*. 2011). So this population is expected to be important for the long term preservation of the species. Road mortality is considered to be a significant factor in the decline of koala populations – especially on coasts and in peri-urban environments. If the distribution of the species contracts to the coast the significance of this mortality will increase. This raises the importance of avoiding road mortality and, probably, designing road corridors to exclude koalas or to direct koalas towards safe passage routes.

## References

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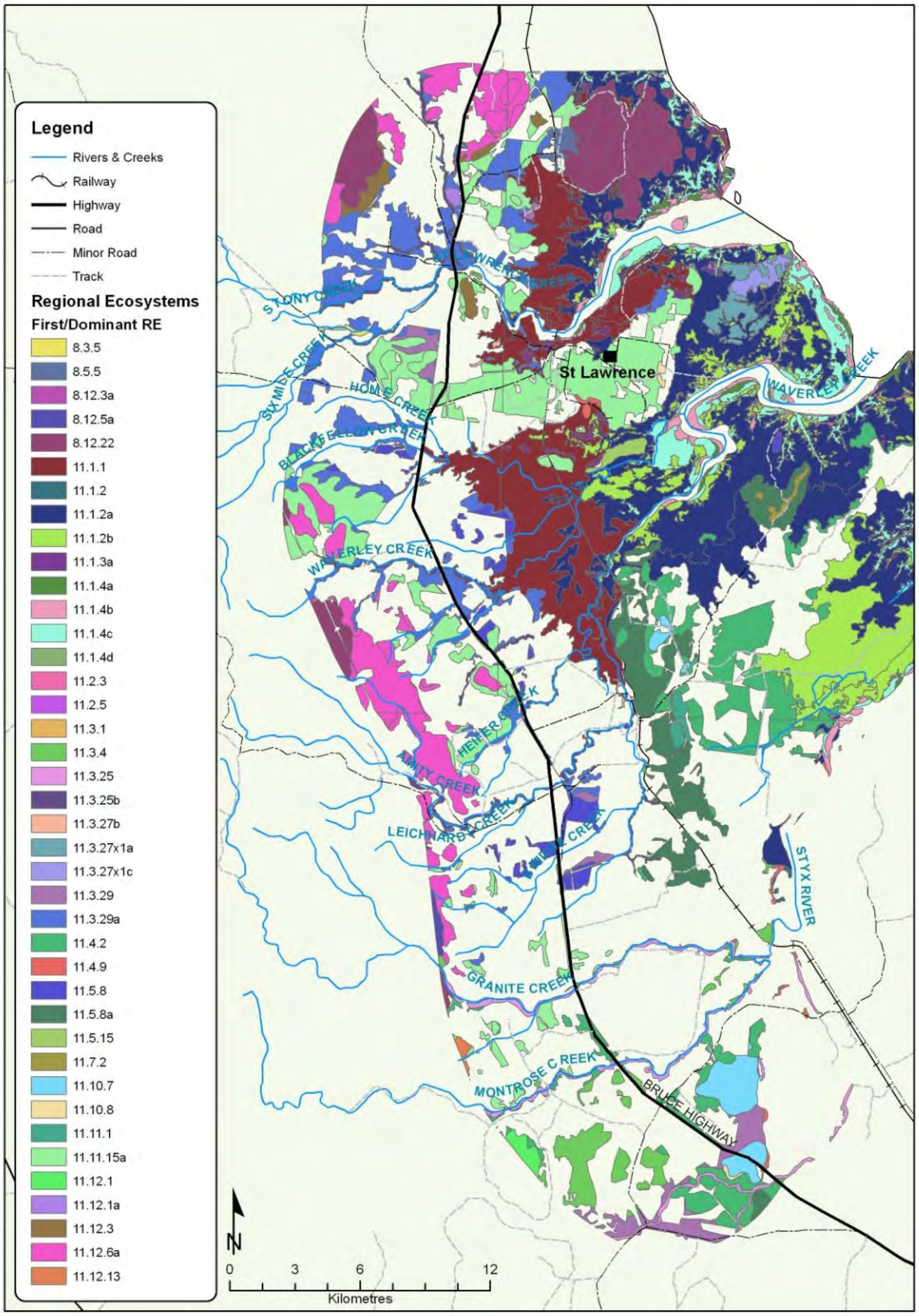


**Figure 1.** The remnant vegetation and associated regional ecosystem (RE) occurring around the Bruce Highway and railway corridors in the St Lawrence coastal region of Central Queensland. Within the study area the land coloured pale green is either non-remnant vegetation or aquatic environments. Descriptions of the RE codes are summarized in Table 1.

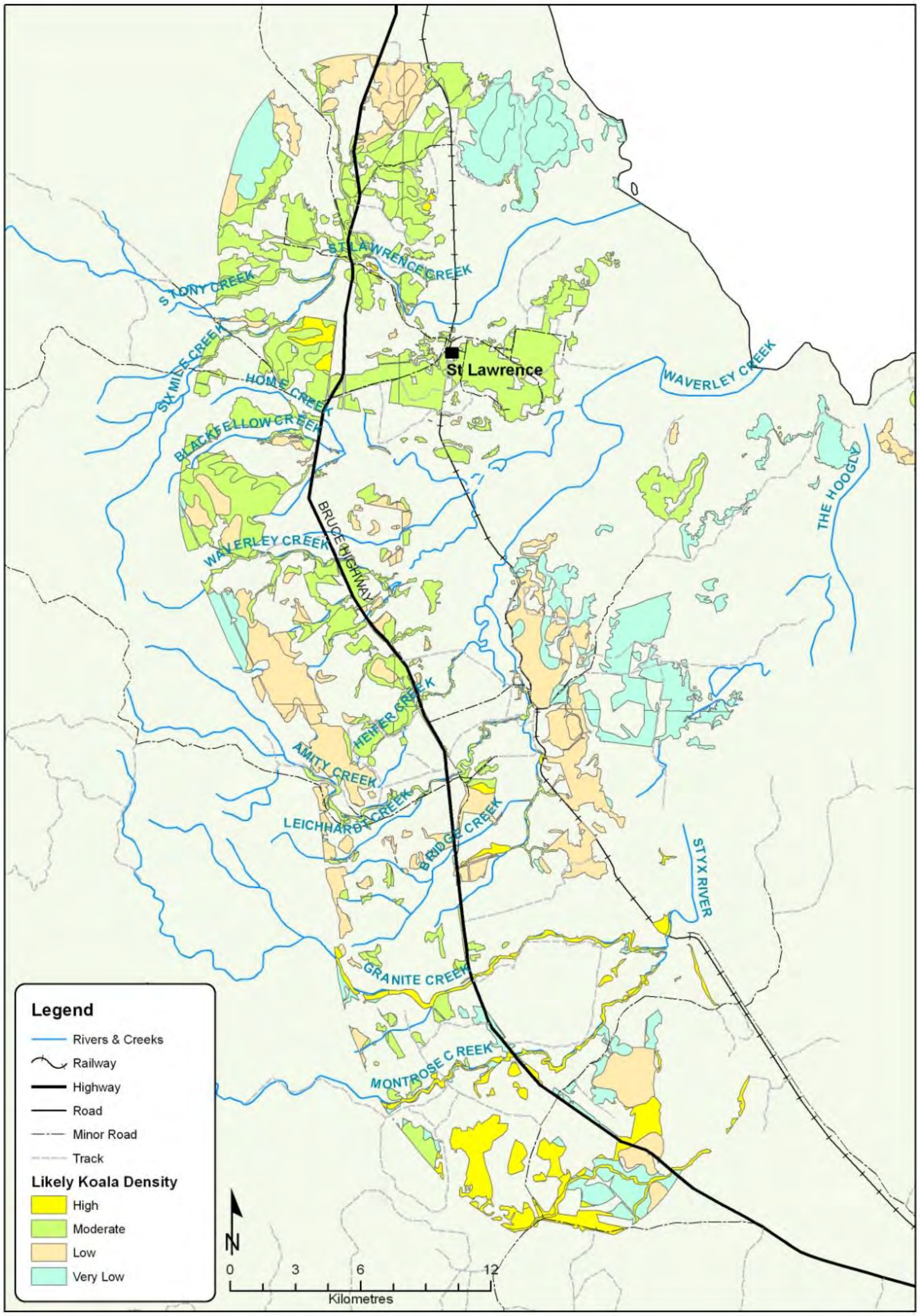


**Figure 2.** Predicted koala habitat occurring around the Bruce Highway and railway corridors in the St Lawrence coastal region of Central Queensland. Within the study area the land coloured pale green is either not predicted to support koalas or aquatic environments. The relationship between the koala habitat classification and the REs codes is summarized in Table 1.

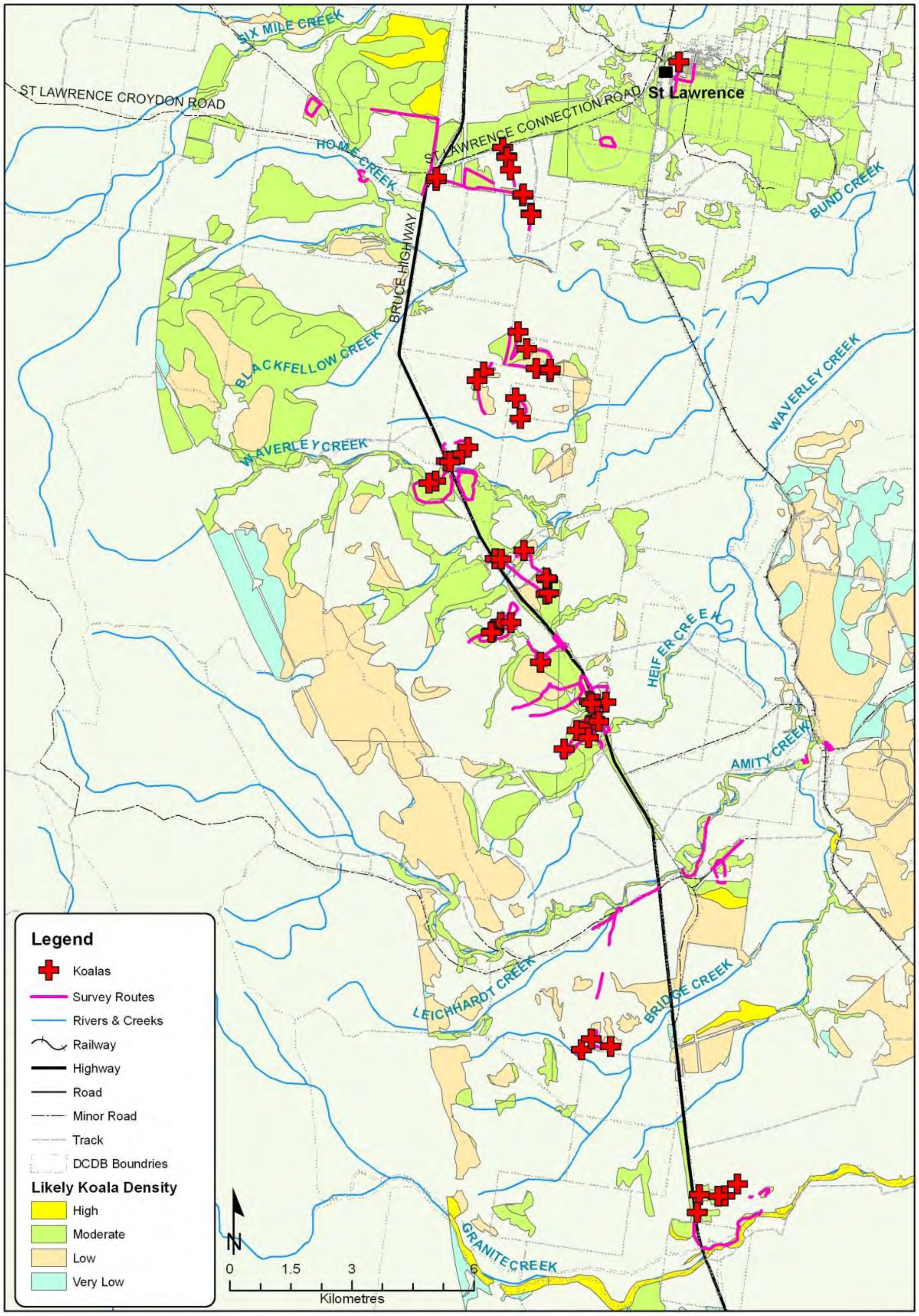


**Figure 3**. General location of koala sightings (July – August 2011)

**Appendix 1.** Data from sightings from the winter 2011 St Lawrence koala survey.

**(Co-ordinates: GDA 1994, degrees, decimal degrees)**

| Distance from transect (m) | Gender | Species | Date | Notes | RE | Longitude | Latitude |
|---|---|---|---|---|---|---|---|
| 12 | Male | *E. crebra* | 6/06/2011 | young | non-rem | 149.5459 | -22.5954 |
| 20 | Unknown | *E. exserta* | 6/06/2011 | ?male | 11.11.15a | 149.543 | -22.5979 |
| 13 | Male | *E. crebra* | 6/06/2011 | big | 11.11.15a | 149.5414 | -22.5981 |
| 18 | Female | *E. exserta* | 6/06/2011 | large pouch young | 11.11.15a | 149.5369 | -22.5977 |
| 32 | Male | *E. exserta* | 6/06/2011 | | 11.11.15a & non-rem | 149.5364 | -22.6018 |
| 2 | Unknown | *E. crebra* | 7/06/2011 | | 11.5.8 & 11.3.29a | 149.4743 | -22.4362 |
| 12 | Male | *E. exserta* | 7/06/2011 | active scent gland | 11.3.29a | 149.4344 | -22.4771 |
| 28 | Unknown | *E. crebra* | 7/06/2011 | ?female | 11.3.29a | 149.4786 | -22.4329 |
| 2 | Female | *E. crebra* | 23/06/2011 | with pouch young | 11.3.29a | 149.471 | -22.4406 |
| 5 | Unknown | *E. crebra* | 23/06/2011 | ?male | 11.3.29a | 149.4694 | -22.441 |
| 26 | Unknown | *E. exserta* | 23/06/2011 | very young - ?male | 11.5.8 | 149.5081 | -22.5661 |
| 10 | Male | *E. crebra* | 24/06/2011 | | 11.5.8 | 149.515 | -22.5653 |
| 23 | Female | *E. crebra* | 24/06/2011 | front riding young | 11.5.8 | 149.5104 | -22.5637 |
| 27 | Female | *E. crebra* | 24/06/2011 | | 11.11.15a/11.5.8 & 11.3.29 & 11.5.8 | 149.5086 | -22.4888 |
| 14 | Male | *E. exserta* | 24/06/2011 | | 11.11.15a/11.5.8 & 11.3.29 & 11.5.8 | 149.5104 | -22.4894 |
| 26 | Female | *E. exserta* | 20/07/2011 | large pouch young | 11.11.15a/11.5.8 & 11.3.29 & 11.5.8 | 149.5099 | -22.4929 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 28 | Female | *E. exserta* | 20/07/2011 | large pouch young | 11.3.29a & 11.11.15a/11.5.8 & 11.5.8 | 149.5028 | -22.4995 |
| 13 | Male | *E. exserta* | 20/07/2011 | active sternal gland | 11.3.29a & 11.11.15a/11.5.8 & 11.5.8 | 149.5058 | -22.4953 |
| 46 | Unknown | *E. tereticornis* | 20/07/2011 | very small - ?female | 11.3.29a & 11.11.15a/11.5.8 | 149.5087 | -22.494 |
| 8 | Male | *E. crebra* | 20/07/2011 | | 11.3.29a & 11.11.15a/11.5.8 & 11.5.8 | 149.5085 | -22.4968 |
| 30 | Male | *E. exserta* | 20/07/2011 | | 11.11.15a/11.5.8 & 11.3.29 & 11.5.8 | 149.5099 | -22.4929 |
| 14 | Female | *E. crebra* | 21/07/2011 | front riding young | 11.11.15a/11.5.8 & non-rem | 149.4872 | -22.4717 |
| 29 | Female | *E. crebra* | 21/07/2011 | recently vacated pouch | 11.11.15a/11.5.8 & non-rem | 149.4853 | -22.4736 |
| 35 | Female | *E. crebra* | 21/07/2011 | large pouch young | 11.11.15a/11.5.8 & non-rem | 149.4896 | -22.4716 |
| 46 | Female | *E. crebra* | 21/07/2011 | recently vacated pouch | 11.11.15a/11.5.8 | 149.4849 | -22.4739 |
| 18 | Male | *E. crebra* | 21/07/2011 | | 11.11.15a/11.5.8 | 149.4968 | -22.4803 |
| 88 | Female | *E. crebra* | 21/07/2011 | large back young | 11.5.8 | 149.5125 | -22.4889 |
| 35 | Unknown | *E. crebra* | 21/07/2011 | sub-adult right on hwy | 11.5.8 | 149.5109 | -22.4933 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 9 | Unknown | *E. exserta* | 22/07/2011 | ?male St Lawrence town | 11.11.15a/11.5.15 | 149.5274 | -22.3466 |
| 10 | Male | *E. exserta* | 22/07/2011 | small right on hwy | 11.5.8 | 149.4856 | -22.4575 |
| 41 | Male | *E. crebra* | 22/07/2011 | inactive scent gland | 11.5.8 | 149.4869 | -22.4575 |
| 21 | Female | *Alphitonia excelsa* | 22/07/2011 | furred pouch young (leg out) | 11.5.8 & 11.11.15a | 149.4978 | -22.4652 |
| 15 | Male | *E. exserta* | 22/07/2011 | sub-adult - inactive sternal gland | 11.5.8 & 11.11.15a | 149.4985 | -22.465 |
| 5 | Female | *E. exserta* | 22/07/2011 | back young | 11.5.8 & 11.11.15a | 149.4982 | -22.4619 |
| 3 | Female | *E. exserta* | 22/07/2011 | large pouch young | 11.5.8 & 11.11.15a | 149.4978 | -22.4616 |
| 0.5 | Female | *E. exserta* | 22/07/2011 | small pouch young | 11.5.8 | 149.4923 | -22.4556 |
| 13.7 | Male | *E. crebra* | 17/08/2011 | large old male | non rem | 149.4863 | -22.366 |
| 0.2 | Male | *E. exserta* | 17/08/2011 | | non rem | 149.4869 | -22.3682 |
| 22 | Female | *E. exserta* | 17/08/2011 | large back young | non rem | 149.4869 | -22.3684 |
| 22 | Female | *E. exserta* | 17/08/2011 | | non rem | 149.4878 | -22.3712 |
| 10 | Unknown | *E. crebra* | 17/08/2011 | ? Male 40m from hwy | 11.11.15a | 149.4698 | -22.374 |
| 41 | Female | *E. platyphylla* | 17/08/2011 | 30m from hwy | 11.11.15a | 149.4701 | -22.3731 |
| 3.8 | Female | *E. exserta* | 17/08/2011 | | 11.11.15a | 149.4907 | -22.377 |
| 46 | Male | *E. crebra* | 17/08/2011 | | 11.11.15a | 149.4907 | -22.377 |
| 67 | Male | *E. crebra* | 18/08/2011 | | 11.5.8 | 149.4821 | -22.4162 |
| 65 | Female | *E. exserta* | 18/08/2011 | | 11.3.29a/11.5.8 | 149.4806 | -22.4181 |
| 64 | Female | *E. crebra* | 18/08/2011 | back young | 11.5.8 | 149.4907 | -22.4264 |
| 86 | Male | *E. tereticornis* | 18/08/2011 | active scent gland | 11.5.8 | 149.4904 | -22.4217 |
| 14.5 | Female | *E. exserta* | 18/08/2011 | back young | 11.3.29a/11.5.8 | 149.4913 | -22.415 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 23.2 | Male | *E. exserta* | 18/08/2011 | active scent gland | 11.3.29a/11.5.8 | 149.4979 | -22.416 |
| 48 | Male | *E. exserta* | 18/08/2011 | looked very old | 11.3.29a/11.5.8 | 149.4982 | -22.4153 |
| 23 | Male | *Corymbia tessellaris* | 18/08/2011 | young (tree intertwined with *E. tereticornis*) | 11.3.29a/11.5.8 | 149.4923 | -22.411 |
| 6.4 | Female | *E. exserta* | 18/08/2011 | | 11.3.29a | 149.4904 | -22.4072 |
| 9.8 | Male | *E. exserta* | 18/08/2011 | | non rem | 149.4928 | -22.3807 |
| 9.9 | Female | *E. exserta* | 18/08/2011 | recently vacated pouch | non rem | 149.4928 | -22.3807 |