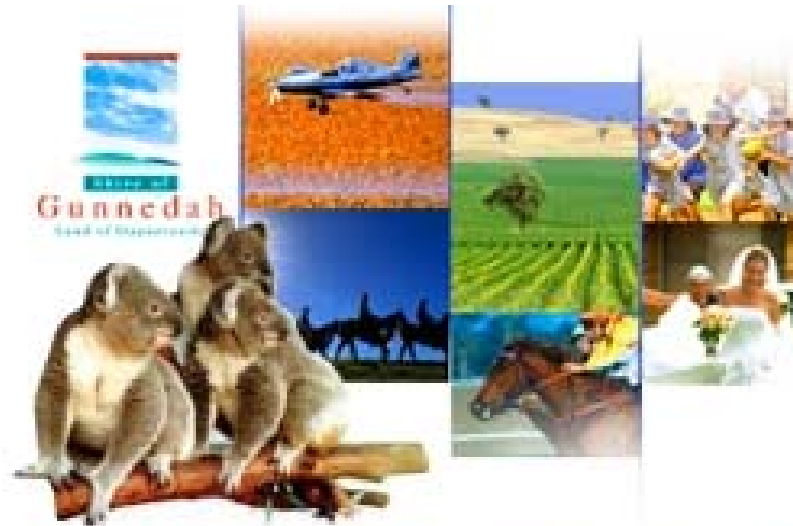


GUNNEDAH KOALA STRATEGY



Koala Capital of the World



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Background and Acknowledgements

Gunnedah Shire Council engaged Greenloaning Biostudies to prepare a Comprehensive Koala Plan of Management (CKPoM) for an area covering approximately one third of the Gunnedah Shire Local Government Area (LGA). The draft CKPoM plan covered an area of approximately 2,172 square kilometres, encompassing the main extent of known Koala occurrence and occupying the central portion of the Gunnedah LGA, as shown in Figure A. Two development areas, one encompassing the Gunnedah urban area and adjoining lands to the west and south, the other at Curlewis to the south of Gunnedah (refer to Figure B), were identified as focus areas for more detailed surveys.

The CKPoM was co-funded through the Caroon Coal Project (BHP Billiton) Community Fund. A draft CKPoM was prepared and publicly exhibited.

Following exhibition period, the draft CKPoM was amended in consultation with the Department of Planning and Environment. Council resolved to re-exhibit the draft CKPoM. However, prior to re-exhibition and following recent discussions with the Department of Planning and Environment, Council resolved to prepare a Koala Strategy instead of a re-exhibiting the draft Gunnedah LGA (Part) CKPoM. The Koala Strategy will apply all of the Gunnedah LGA and has utilized the information from the draft CKPoM prepared by Greenloaning Biostudies.

Figure B Distribution and Classification of Regional Vegetation Communities across the Gunnedah Study Area in terms of Koala Habitat Classifications (Greenloaning Biostudies)

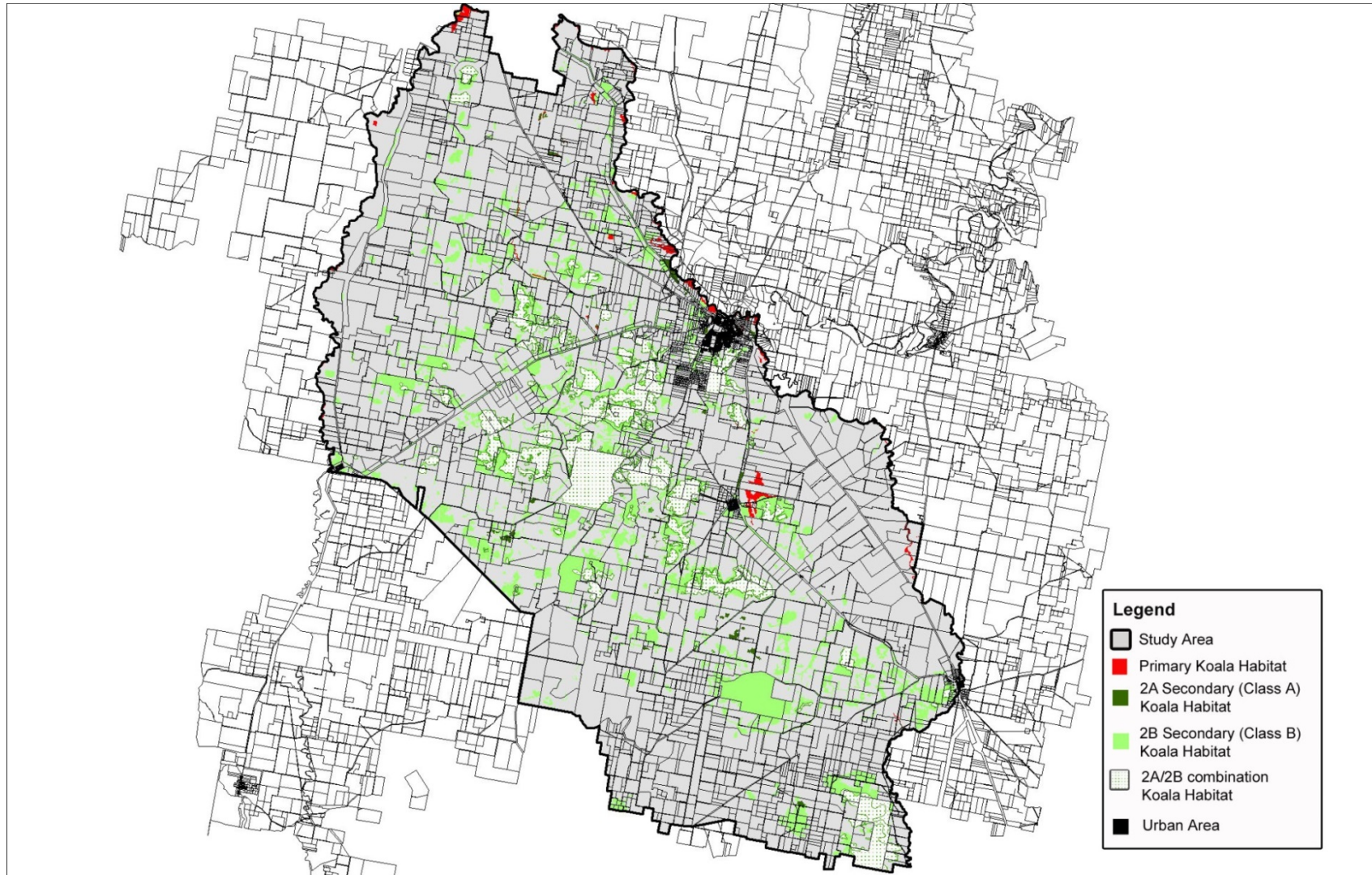
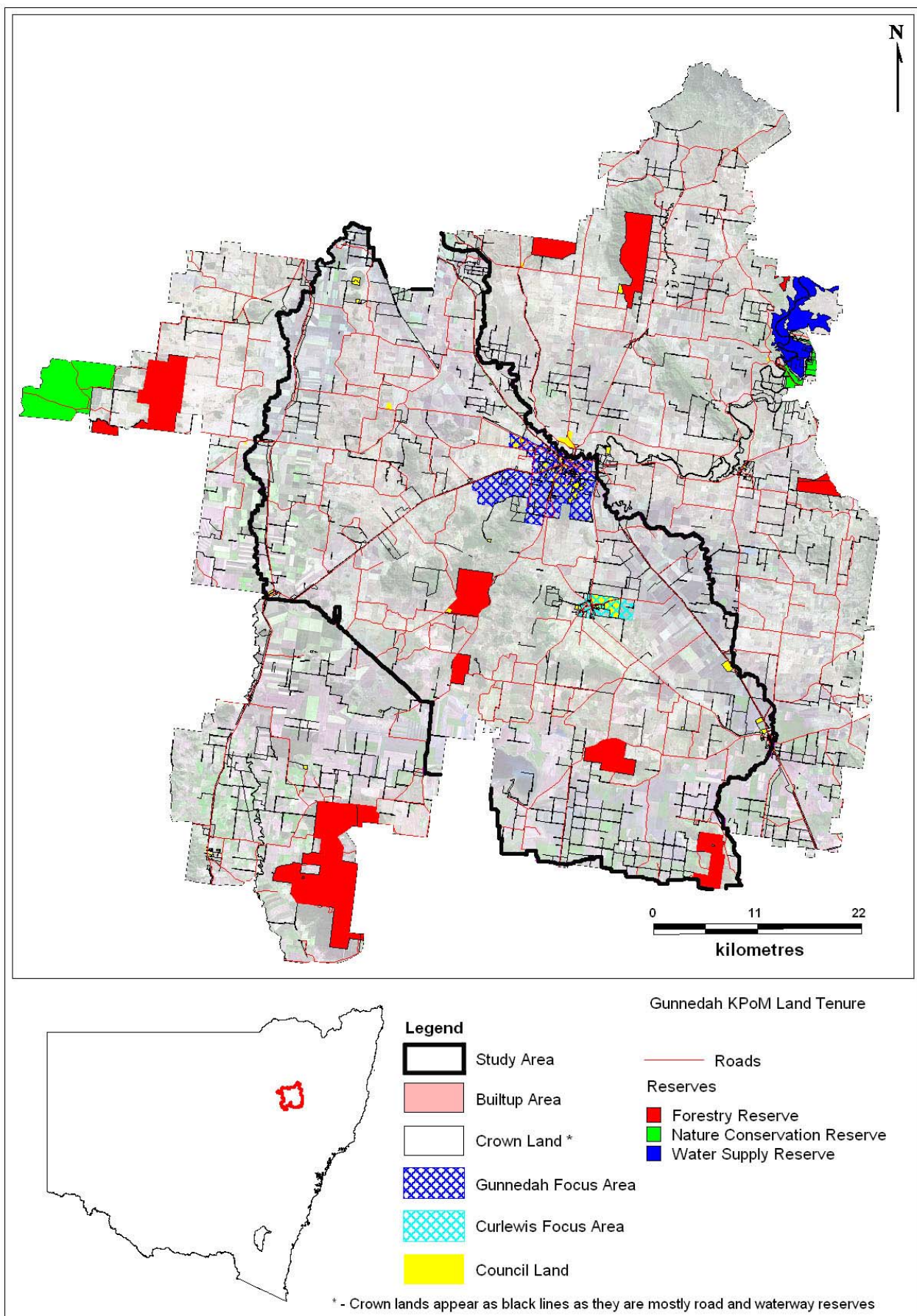


Figure C Gunnedah and Curlewis Focus Areas and Land Tenure within the Study Area (Greenloaning Biostudies)



1. Introduction

Council resolved to prepare a Koala Strategy for the Gunnedah Local Government Area (LGA).

Koalas (*Phascolarctos cinereus*) are tree-dwelling, medium-sized marsupials that have an iconic status in Australia. Within New South Wales (NSW), Koalas are listed as vulnerable under the *Threatened Species Conservation Act 1995* and core koala habitat is protected under State Environmental Planning Policy No. 44 – Koala Habitat Protection (SEPP44).

The Koala Strategy aims to guide development and encourage the conservation and management of Koala habitat through land use planning and other appropriate measures.

To achieve the aim, the Strategy objectives comprise:

- Encourage management of areas of Koala habitat and associated Koala populations;
- Increase community and public awareness concerning Koala conservation and management;
- Reduce Koala road mortalities;
- Increase habitat linkage opportunities; and
- Establish a Koala habitat regeneration and/or rehabilitation program.

It should be noted that this Koala Strategy does not however represent a Koala Plan of Management under SEPP44.

1.1 Gunnedah Shire

Gunnedah Shire is located in north western New South Wales. It sits at the southern end of the Nandewar Range and lies within the upper catchment area of the Namoi River. The Local Government Area (LGA) has an area of 4,992 square kilometres and is the centre of the highly productive Liverpool Plains area. The LGA comprises a predominantly rural environment, with Gunnedah being the predominant urban settlement. Outlying villages include Curlewis, Mullaley, Carroll, Breeza and Tambar Springs.

The original inhabitants of Gunnedah were the Gunn-e-darr people of the Kamilaroi tribe, with European settlement commencing in the 1830's. The township of Gunnedah itself was gazetted in 1856. Although the Gunnedah area has a strong agricultural background, mining has also formed an important part of the area's development history and there have been continuous coal mining operations for 130 years. There are a number of current and proposed coal mining operations within the LGA, as well as Coal Seam Gas exploration. These two industries, together with agricultural enterprises, are important drivers of the local economy, as well as having the potential to contribute to impacts on Koalas and their habitat. Tourism, led by Gunnedah's "Koala Capital" status is also a large and growing industry.

Whilst there are important areas of Koala habitat under public ownership and subject to various levels of protection, by far the greater proportion of Koala habitat within the Gunnedah study area (identified within the draft CKPoM, Greenloaning Biostudies) is privately owned. This pattern of land tenure means that controls on Koala habitat vary throughout the study area as a reflection of differing legislative requirements that affect planning bushfire and clearing controls. It also means that effective Koala conservation and management is a responsibility spread across the entire community.

The LGA is located within the Liverpool Plains sub-catchment of the Brigalow Belt South Bioregion, which has variable soils and vegetation. Basalt capped outcrops are a visual feature of the landscape in many sectors in the form of conical or flat-topped hills rising out of the surrounding plains, these hills typically supporting remnant woodland. Dominant vegetation over the LGA comprises various types of eucalypt woodlands, common species including White Box (*Eucalyptus albens*), Poplar Box (*E. populnea*), Tumbledown Gum (*E. dealbata*), White Cypress Pine (*Callitris glaucophylla*), ironbarks and River Red Gum (*E. camaldulensis*) along drainage lines.

In total, over 80 per cent of the vegetation within the LGA has been cleared, most of this clearing occurring by 1920 (Smith 1992). The more fertile floodplains been more extensively cleared, which form part of the Upper Namoi Valley Basin, encompassing the Liverpool Plains, renowned for the rich black soils and valued for agricultural uses (Edge Land Planning 2007).

2. Relevant legislation and plans

Community and political interest in the management of Koalas is reflected by a range of Commonwealth, State and Local-based statutory measures that are generally intended – in the broader context of sustainability principles - to minimise impacts upon Koalas and their habitat. Environmental legislation and policies create the framework for which Council makes planning and land use decisions and considerations of the effects on threatened biodiversity, including the Koala and their habitat.

A brief summary of the relevant tiers of legislation and planning instruments for Koalas and their habitat is provided below.

2.1 Commonwealth Legislation

2.2.1 Environment Protection and Biodiversity Conservation Act 1999 (EPBC)

The provisions of the *Environment Protection and Biodiversity Conservation Act 1999* are triggered by developments that may have a significant impact on Matters of National Environmental Significance including threatened species.

The Koala is now listed under the EPBC Act as a Vulnerable Species throughout NSW, Qld and the ACT. This ‘part-range’ listing of the species recognises that, whilst at the national level the eligibility criteria for listing as threatened is not met, there are major conservation problems across much of the Koala’s range, and the outlook is bleak within many areas of NSW/Qld, with potential extinction in the ACT (TSSC 2012). The EPBC Act has the ability to over-ride the majority of State legislation detailed below and the Gunnedah LGA does contain “important” Koala populations as defined by this legislation. As a consequence of this listing, there may be some large-scale development applications/re-zonings that have the potential to impact upon Koalas and/or their habitat within the Gunnedah LGA at a scale that require referral to the Federal Government; Significant Impact Guidelines (DEWHA 2009) are available to assist this process.

The preparation of a recovery plan for the Koala has been recommended under the EPBC Act Approved Conservation Advice and will be prepared following the expiration of the National Koala Conservation and Management Strategy in 2014.

2.1.2 National Koala Conservation Strategy

The Australian and New Zealand Environment and Conservation Council has prepared a *National Koala Conservation Strategy* (Australian and New Zealand Environment and Conservation Council 1998) that highlights the cultural significance of the species, while at the same time recognizing that it doesn’t meet the criteria listing as Threatened. The strategy includes the following objectives:

- Conserve Koalas in their existing habitat
- Rehabilitate and restore Koala habitat and populations
- Develop a better understanding of the conservation biology of Koalas
- Ensure that the community has access to factual information about the distribution, conservation and management of Koalas at the national, state and local scale
- Manage captive, sick or injured Koalas and orphaned wild Koalas to ensure consistent and high standards of care
- Manage over-browsing to effectively prevent both Koala starvation and ecosystem damage in discrete patches of habitat.

2.2 State Legislation

2.2.1 Threatened Species Conservation Act 1995 (TSC)

The TSC is the Act under which Threatened species, population and communities are listed. Listing under the Act provides statutory protection for these species and communities and provides a mechanism by which impacts are assessed during the development application process.

The Koala is listed under the TSC Act as a Vulnerable Species throughout NSW. Part 4 of the TSC deals with the preparation of recovery plans. The object of a recovery plan is to promote the recovery of the Threatened species, population and ecological community to which it relates to a position of viability in nature. A draft recovery plan has been prepared for the Koala (NSW National Parks and Wildlife Service 2003). The objectives of the *National Koala Conservation Strategy* have been adopted as the specific objectives of the recovery plan.

Part 5A of the TSC provides for the preparation of *Threatened Species Priority Action Statements*. These statements set out the strategies to be adopted for promoting the recovery of each Threatened species. Fifteen broad strategies and associated actions have been developed to help threatened species recover, including the koala.

As a consequence of TSC Act amendments to other legislation, the potential for negative impact upon Koalas must be assessed under Part 5A of the Environmental Planning & Assessment Act 1979 (NSW) (EPAA), the assessment process generally being known as the 7-part test of significance. A Species Impact Statement may be required for any development application and/or rezoning that is assessed as having the potential for significant impact.

2.2.2 Environmental Planning & Assessment Act 1979 (EPAA)

The EPAA is the overarching piece of legislation that makes provision for a range of environmental planning instruments, which additionally provide for protection of Koala habitat, including State Environmental Planning Policies (SEPPs) and Local Environmental Plans (LEPs). The aim of the EPAA is to encourage the proper management, development and conservation of natural and artificial resources, including agricultural land, natural areas and forests, while at the same time promoting the orderly and economic use and development of land.

2.2.3 National Parks and Wildlife Act 1974 (NPWA)

The NPWA contains provision that relate to the protection of native terrestrial fauna and some flora as well as Endangered Ecological Communities.

2.2.4 Native Vegetation Act 2003 (NVA)

The NVA regulates the clearing of native vegetation and the activity of Private Native Forestry through the preparation of Property Vegetation Plans (PVPs), except for excluded land listed in Schedule 1. The Act encourages the preparation of Regional Vegetation Management Plans (RVMP), while the Private Native Forestry Code of Practice requires exclusion of areas of Core Koala Habitat from timber harvesting practices.

2.2.5 State Environmental Planning Policy No. 44 (Koala Habitat Protection)

This policy “aims to encourage the proper conservation and management of areas of natural vegetation that provide habitat for Koalas to ensure a permanent free-living population over their present range and reverse the current trend of Koala population decline:

- (a) by requiring the preparation of plans of management before development consent can be granted in relation to areas of core Koala habitat, and
- (b) by encouraging the identification of areas of core Koala habitat, and

(c) by encouraging the inclusion of areas of core Koala habitat in environment protection zones”.

The Policy only applies to land in relation to which a development application has been made that has an area (or together with any adjoining land in the same ownership) of more than one hectare. It specifically excludes land dedicated or reserved under the National Parks and Wildlife Act 1974 or to land dedicated under the Forestry Act 1916.

2.3 Local Legislation

2.3.1 Gunnedah Local Environmental Plan 2012

The Gunnedah Local Environmental Plan 2012 (GLEP 2012) does not contain any specific provisions for the protection of Koala or Koala habitat, although Part 5 Cl 5.9 has the objective of preserving “the amenity of the area, including biodiversity values, through the preservation of trees and other vegetation.” The “trees and other vegetation” that are the subject of this provision however, also must be prescribed by a development control plan (DCP) prepared by Council (cl 5.9 (2)). The restrictions do not apply to the clearing of native vegetation otherwise authorized under the NV Act or Forestry Act 1916 (LEP cl 5.9 (8)).

2.3.2 Gunnedah Development Control Plan 2012

The current Gunnedah DCP does not contain specific provisions for the protection of Koalas or Koala habitat, the only relevant prescription being that subdivisions are required to accommodate “the retention of significant trees and vegetation.”

3. Koala

The following is a brief summary of the biology and ecology of the Koala. A more detailed summary can be found in the draft recovery plan (NSW National Parks and Wildlife Service).

3.1 Species description

The Koala (*Phascolarctos cinereus*) is an arboreal, medium-sized marsupial. It has a stocky body, sharp claws and fur ranging in colour from grey to brown above with a consistently white under belly.

There is a gradient in body weight from north to south across their range. Adult males in the south (Victoria) range from 9 to 15 kg whereas adult males in the north are much smaller ranging from 4 to 9 kg. Males tend to be larger than females (NSW National Parks and Wildlife Service 2003).

3.2 Distribution

The Koala is distributed widely throughout eastern Australia from the temperate southern climate of South Australia and Victoria to the Northern tropical regions of Queensland. In New South Wales, Koalas are mainly distributed in the central and north coast regions, with some fragmented populations occurring in the west (NSW National Parks and Wildlife Service 2003).

The distribution of Koalas Australia wide is driven by the preferred climatic conditions along the east coast whilst the distribution of localized populations is driven by resource availability primarily the occurrence of specific eucalyptus species (NSW National Parks and Wildlife Service 2003). The Koala's distribution is not continuous across its range and occurs in a number of populations separated by cleared land or unsuitable habitat (Martin & Handasyde 1999; NSW National Parks and Wildlife Service 2003).

3.3 Habitat

In New South Wales, the Koala is known to inhabit a range of eucalypt forest and woodland communities. These include coastal forests, the woodlands of the tablelands and slopes and riparian communities of the western plains (NSW National Parks and Wildlife Service 2003).

The quality of forest and woodland communities as habitat for Koalas is influenced by a range of factors, but primarily it is the presence of particular *Eucalyptus* species that determines habitat quality. Koalas prefer to feed on only a few specific *Eucalyptus* species which form the bulk of the diet and utilize other species including non-eucalypts for shelter and a supplementary diet.

Quality of Koala habitat is also influenced by a number of other factors including the size of trees (White 1999), the structural and species diversity of vegetation within the area (NSW National Parks and Wildlife Service 2003), soil nutrients (Cork et al. 1990) and the presence of suitable shelter or shade trees in harsh environments (NSW National Parks and Wildlife Service 2003). A recent study of Koalas in Noosa Shire, indicated that the presence of Koalas best predicted by a multilevel model that included the proportion of the landscape occupied by high quality habitat, the neighbourhood effect, the mean nearest neighbor distance between forest patches, the density of forest patches and the density of sealed road (McAlpine et al. 2006).

Habitat use by Koalas can change in relation to climate, season and time of day (Ellis et al. 1995, Ellis et al. 1998). For example, Koalas may use different trees by day and night, change vegetation community preferences seasonally or modify their habitat use based on temperature.

The draft LGA (Part) CKPoM (prepared by Greenloaning Biostudies) identified a total of 42,492ha of Preferred Koala Habitat, based on Namoi CMA's RVC mapping (refer to Figure B). Eleven of the currently recognized vegetation communities qualify as Koala habitat and all three habitat categories recognised by the Recovery Plan, are represented. A special category containing elements of Secondary A and B Koala habitat is also present. The Koala Management Study from which the preceding information has been extracted (Greenloaning Biostudies 2012), found there was an optimal level of occupancy by resident koala

populations of approximately 50% of the available habitat, implying a 3-fold increase in the occupancy rate above that of approximately 15% estimated through analysis of historical Koala records. Data analysis also yielded a density estimate of approximately 0.3 Koalas ha across the study area, implying a population size estimate of approximately 12,753 Koalas for the study area. This estimate is conservative, given that it is based on mappable units of vegetation only, but confirms that the Gunnedah area supports a Koala population of State and National significance such that promotion of Gunnedah as the 'Koala Capital of the World' appears justified.

Population modelling based on Koala activity data in the two focus areas at Curlewis and Gunnedah has resulted in identification of substantive areas of Core Koala Habitat being identified in both areas.

Whilst both the extent of habitat occupancy and the number of animals comprising the Gunnedah Koala population is positive, much of the habitat exists as islands in a largely rural landscape. While this offers the advantage of a lower risk of catastrophic fire event, much of the woodland habitat is at risk of long term degradation through weed invasion and through the combined impacts of a lack of fire and grazing - low recruitment levels of food tree species. Thus, the enhancement of existing habitat and the consolidation of habitat linkages to allow dispersal of individuals and gene flow between populations are perceived to be fundamental tools for increasing the probability of long-term persistence of the Koala in the Gunnedah area.

3.4 Diet

Koalas rely primarily on the foliage of *Eucalyptus* species for their diet. Throughout New South Wales, Koalas utilize up to 70 different eucalypt species; however there are marked differences in the preferred tree species consumed among local populations (NSW National Parks and Wildlife Service 2003).

In any one area, Koalas feed almost exclusively on a small number of preferred tree species. These species are known as primary feed trees and vary widely on a regional, local and seasonal basis (Hindell et al. 1985). Gunnedah Shire is located within the Western Slopes and Plains Koala Management area (NSW National Parks and Wildlife Service 2003) and Table 3-1 lists primary, secondary and supplementary species for that region. Primary food trees exhibit a level of use that is significantly higher than that of other *Eucalyptus* species and independent of tree density. The use by Koalas of secondary and/or supplementary food trees is generally less than that of primary food trees (except where primary food trees are absent) and appears to be dependent on both the density and/or size of the trees (NSW National Parks and Wildlife Service 2003; Phillips & Callaghan 2000). Significantly higher levels of use of other (non-food) tree species has been observed when they occur in close proximity to a preferred food tree species (Lunney et al. 1998; Phillips et al. 2000).

Table 3.1 Koala feed tree species in the Western Slopes and Plains Koala Management area

Primary Food Tree Species	Secondary Food Tree Species	Stringybarks/Supplementary Species
River Red Gum <i>E. camaldulensis</i>	Dirty Gum <i>E. chloroclada</i>	Red Stringybark <i>E. macrorhyncha</i>
Coolibah <i>E. coolabah</i>	Bimble Box <i>E. populnea</i>	Narrow-leaved Stringybark <i>E. sparsifolia</i>
	Pilliga Box <i>E. pilligaensis</i>	
	Fuzzy Box <i>E. conica</i>	
	Western Grey Box <i>E. macrocarpa</i>	
	Yellow Box <i>E. melliodora</i>	
	White Box <i>E. albens</i>	
	Dwyer's Red Gum <i>E. dwyeri</i>	
	Tumbledown Gum <i>E. dealbata</i>	
	Blakey's Red Gum <i>E. blakelyi</i>	
	Apple-topped Box <i>E. bridgesiana</i>	
	Black Box <i>E. largiflorens</i>	
	Mallee Red Gum <i>E. nandewarica</i>	
	<i>E. vicina</i>	
	<i>E. volcanica</i>	
	Red Box <i>E. polyanthemos</i>	
	Orange Gum <i>E. prava</i>	

Notes: Information from NSW National Parks and Wildlife Service 2003

3.5 Breeding

Although Koalas are often regarded as solitary animals, they live in complex social groups where individual home ranges overlap (Martin & Handasyde 1995). Koalas live in breeding aggregations, generally comprised of a dominant male, a small number of mature females and juveniles of various ages.

Koalas generally reach sexual maturity at approximately two years of age. Females can produce one offspring each year, with the breeding season between October and May (Martin & Handasyde 1990, 1995). Gestation lasts up to 35 days, with the young then living in the pouch for up to 6 months. The young are dependent on the mother up to 12 months.

Juvenile Koalas may remain in their mother's home range for 2 to 3 years. After this period, the young disperse to establish an individual home range which may vary from 1 to 11 to 50km (Gall 1980; Mitchell & Martin 1990). Once Koalas mature and become incorporated in stable breeding aggregations, they generally exhibit long term fidelity to their individual home range areas (Mitchell & Martin 1990).

3.6 Threats

Throughout their range Koalas are subject to a number of threats including:

- Habitat loss
- Habitat fragmentation and degradation
- Vehicle collision
- Predation by dogs, cats and foxes
- Disease, including chlamydia and conjunctivitis
- Starvation due to over-browsing
- Fires
- Drought
- Reduced genetic variability (NSW National Parks and Wildlife Service 2003; Threatened Species Scientific Committee 2006).
- Certain projects may require translocation of Koalas. The preferred method is to adjacent land with desired habitat allowing Koalas to translocate under their own volition, rather than physically capturing

and physically translocating them.

Because of the wide distribution of the Koala, the presence and severity of the various threats vary across their range (Threatened Species Scientific Committee 2006). Threats are discussed in more detail in the draft Recovery Plan (National Parks and Wildlife Service 2003).

The Koala Habitat Management Report (prepared by Greenloaning Biostudies in 2012) identified a number of issues that needed to be addressed in order to ensure a sustainable future for Koalas inhabiting the Gunnedah area:

- Existing fragmentation of Koala habitat;
- Long term degradation of Koala habitat through weed invasion and/or tree dieback;
- Potential lowering of the Koala carrying capacity of woodland habitat as larger trees are lost from the landscape;
- Isolation of the population and potential problems arising from inbreeding;
- The potential for increased domestic dog attack rates with increased urban development, such as in the two focus areas of west Gunnedah and Curlewis;
- Increasing heavy industrial development within the Gunnedah LGA and region, potentially resulting in a commensurate increase in vehicle movements and thus koala road mortalities; and
- Susceptibility of Koalas to stochastic events such as drought and fire, some aspects of which may be elevated by the uncertainty associated with climate change.

4. Koalas in Gunnedah Shire

In recent studies undertaken within the Gunnedah LGA, the local Koala population numbers has been calculated as approximately 12,700 animals (Greenloaning Biostudies 2012), this number being the result of population growth and an increase in the habitat occupancy rate over the last 3 – 5 Koala generations. While such a population size may appear reassuring, there remains the potential for only minor changes in population trends to reverse this circumstance, given that an increase in Koala mortality rate of as little as 2 – 3% (as a function of total population size) can be demonstrated as sufficient to initiate and drive population decline (Phillips et al. 2007). In the face of increasing climatic uncertainty for example, there is already evidence that some range contraction and associated reduction in population size is likely (Lunney et al. 2012).

Increases in the Koala population in the Gunnedah area over the last 20 – 30 years, as reported by Greenloaning Biostudies (2012), can in part be attributed to recovery and associated expansion of relic populations following the widespread clearing of Koala habitat early in the twentieth century reported by Smith (DATE). Recovery has no doubt been assisted by an increased level of interest in individual animals and local sub-populations evident amongst both rural and urban residents of the LGA. Thus, during the drought conditions and associated periods of hot dry weather, many residents reported providing water bowls for Koalas, with individuals accessing water daily. Such actions serve to reduce the risk of dehydration and contribute to the survival of Koalas. Rural residents have also contributed to Koala habitat enhancement in some areas, with additional plantings of food trees reported by landowners to have resulted in increased sightings of Koalas as the plantings matured. Substantial plantings of food trees have also been carried out on a regular basis since the early 1990s at the Gunnedah Research Centre, with positive results for Koalas utilising the planted vegetation (J. Lemon pers.com. July 2012; Greenloaning Biostudies (2012).

4.1 Draft LGA (Part) CKPoM

Greenloaning Biostudies prepared a draft LGA (Part) CKPoM for an area of approximately 2,172 square kilometres. The area was considered to encompass the main extent of known Koala occurrence and occupying the central portion of the LGA, as shown in Figure A. Two development areas, one encompassing the Gunnedah urban area and adjoining lands to the west and south, the other at Curlewis to the south of Gunnedah (refer to Figure C), were identified as focus areas for more detailed surveys.

4.1.1 Gunnedah Focus Area

4.1.1.1 Location and Area

The Gunnedah Focus Area covers an area of 6,850ha encompassing the existing Gunnedah urban area and areas to the west and south of the existing areas of urban development, as shown on Figure A and Figure C. The current main land uses within this study area comprise:

- Urban development;
- Rural residential subdivision;
- Parks and reserves;
- Mining rehabilitation;
- Agricultural activities
- Research; and
- Active recreational pursuits (such as trail bike riding, bush walking).

4.1.1.2 Management Objectives

Management objectives for the Gunnedah Focus Area are intended to inform broader management and conservation efforts to ensure persistence of koalas and to guide future development within this area in this context. Key objectives comprise:

- Creating or enhancing habitat connectivity between this area and other habitat areas;
- Increasing community awareness and knowledge regarding the threats to Koalas and habitat usage in the area;

- Maximising protection of remaining Koala habitat areas through appropriate development controls;
- Requiring best practice assessment and development standards so as to minimise the potential for negative impacts arising from development; and
- Where best practice development standards cannot be met, providing alternative options with positive outcomes in terms of Koala management.

4.1.2 Curlewis Focus Area

4.1.2.1 Location and Area

The Curlewis Focus Area covers an area of 2,150 ha, encompassing the existing Curlewis urban area, the Curlewis Common to the east of the Kamilaroi Highway and Main Western Rail Line, and areas to the south of the existing urban development, as shown on Figure A and Figure C. The current main land uses within this area comprise:

- Urban development;
- Parks and reserves;
- Agricultural activities;
- Cemetery;
- Water treatment works; and
- Active recreational pursuits (such as trail bike riding).

4.1.2.2 Management Objectives

Management objectives for the Curlewis Focus Area are intended to guide future development within this area to ensure persistence of existing koala populations in the area and to provide management options to achieve this outcome. Key objectives comprise:

- Creating or enhancing habitat linkages between this area and other habitat areas to the east, north and south;
- Increasing community awareness and knowledge regarding the threats to Koalas and habitat usage in the Curlewis area and encouraging further community involvement in Koala management;
- Maximising protection of remaining Koala habitat areas through appropriate development controls;
- Developing additional compensatory Koala habitat areas;
- Requiring best practice assessment and development standards so as to minimise the potential for negative impacts arising from development; and
- Where best practice development standards cannot be met, provide alternative options with positive outcomes in terms of Koala management.

Figure 4.1 Gunnedah and Curlewis Focus Areas and Land Tenure within the Study Area (Greenloaning Biostudies)

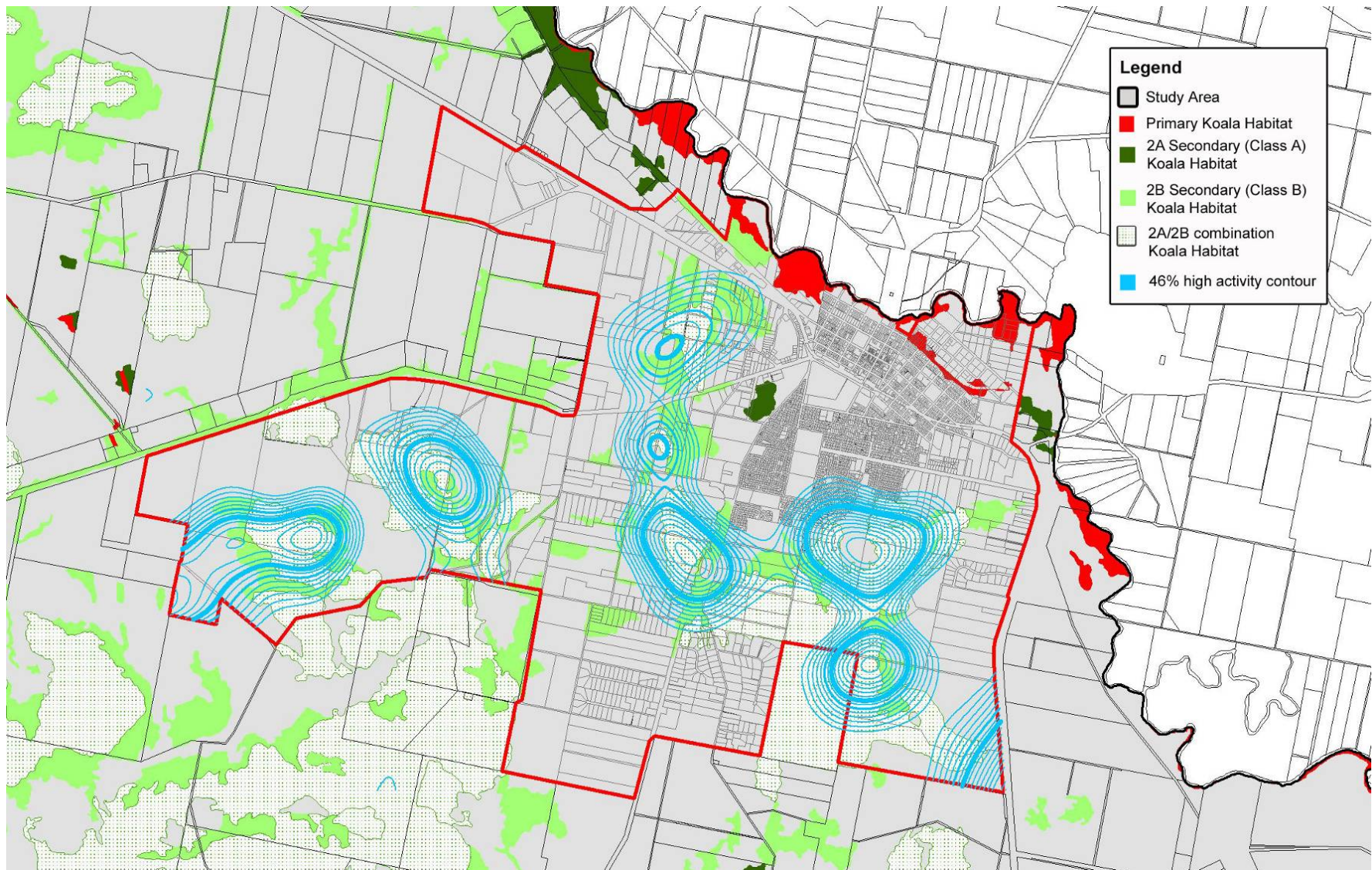
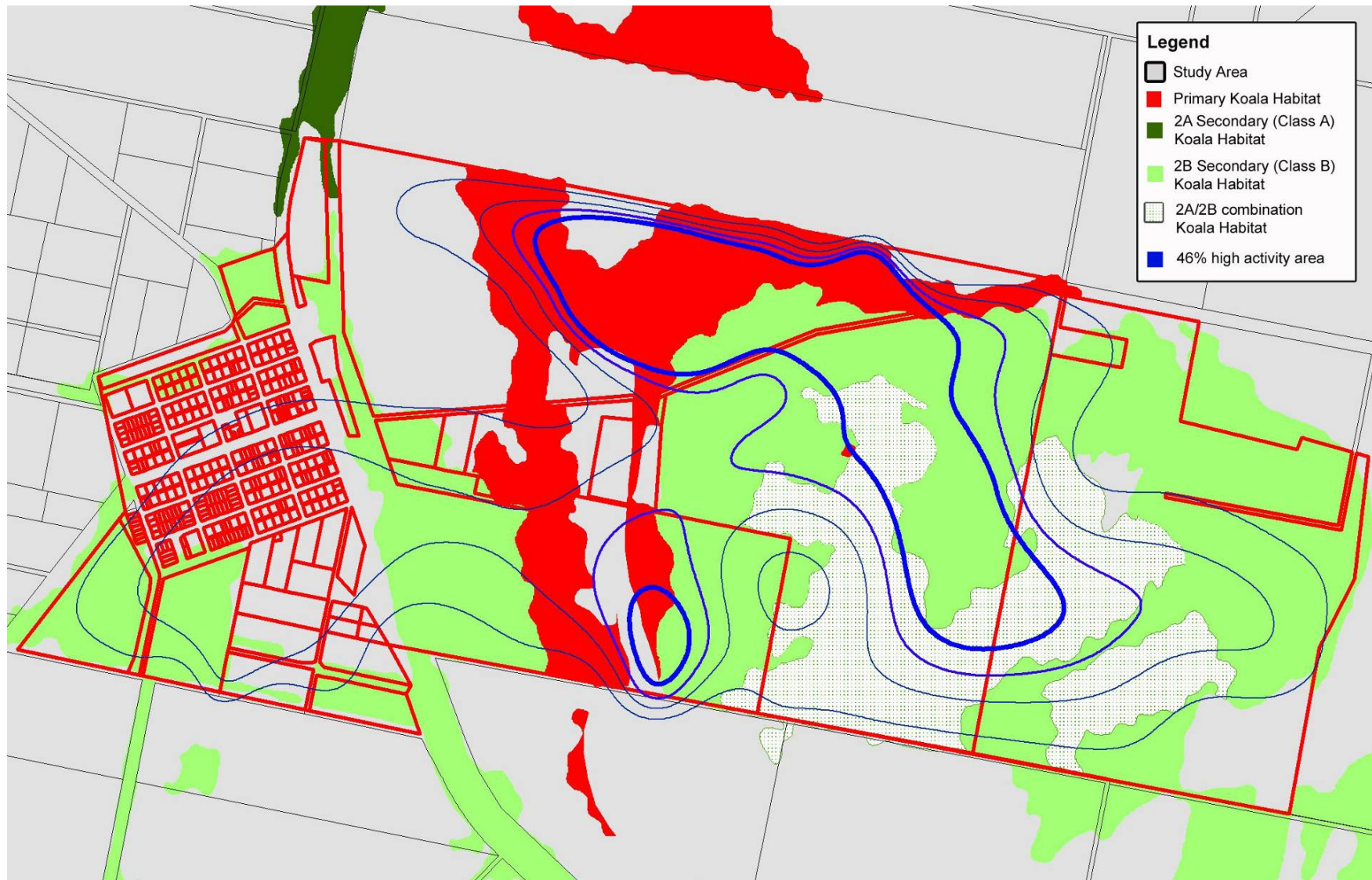


Figure 4.2 Distribution of Koala Activity in the Curlewis Focus Area (Greenloaning Biostudies)



5. Planning and management recommendations

5.1 Relationship of the Koala Strategy to SEPP44

The determination of potential Koala habitat under SEPP44 relates to the presence of feed tree species listed in Schedule 2 of the SEPP. The Gunnedah LGA contains feed tree species that are listed in Schedule 2 of SEPP44. Consequently, an investigation into Koala habitat is to be undertaken for all development.

5.2 Planning Controls

The Gunnedah LGA contains large areas of potential Koala habitat, which should be taken into consideration in terms of future land use planning within the Shire. In areas proposed for rezoning of future development, Council should take into consideration the presence of potential Koala habitat within the area and should be confident that the rezoning or development would:

- be consistent with SEPP44 in that development in core Koala habitat, must follow a plan of management prepared in accordance with SEPP44
- not result in development within areas of Primary Koala habitat or within secondary habitat with an important role in connectivity
- allow only low impact development in other areas of secondary habitat
- minimize the removal of preferred Koala food trees
- not result in the severance of Koala movement across the site

In areas of Koala Habitat, a survey for Koalas should be completed and in areas where Koalas are found to be present, representing core Koala habitat, Council should request:

- A plan of management for the area as well as appropriate development controls.
- Comprehensive assessment of the likely impacts of the proposal under the *Threatened Species Conservation Act 1995* and the *Environmental Planning and Assessment Act 1979*. This assessment should demonstrate that alternatives that do not including clearing of primary Koala habitat are not available and that the activity has been located so as to minimize the loss of Koala habitat.

5.2.1 Recommended Development Considerations for areas of Koala Habitat

The following development considerations are highlighted any new residential or rural-residential subdivisions on lands that have been identified as containing significant Koala activity and/or habitat:

- Retention of Preferred Koala Food Trees (PKFTs) particularly PKFT's $\geq 250\text{mm dbh}$
- Containment of domestic dogs to ensure protection of Koalas as they move across properties
- Fencing of properties, including swimming pool fencing to enable the movement of Koalas
- Road design which enables the safe movement of Koalas and to reduce road kill. This may include vehicle calming devices, floppy-top (or other approved wildlife exclusion fencing or cattle-grids), Koala underpasses
- Protection of Koalas from disturbance during construction or ensuring appropriate clearing of vegetation prior to the commencement of construction works
- Replacement of PKFT of the same species, sourced from seed stock of the local area and planted in a cluster
- Habitat Connectivity and Enhancement
- Supporting Koala Welfare Groups

5.3 Buffers

It is recommended that as a minimum, a buffer of 50m is applied to all areas identified as Koala habitat where evidence of Koala activity has been found. In cases that show evidence of Koala activity, it should be the responsibility of the proponent to demonstrate the extent of Koala activity and the need for larger or smaller buffers. The consideration of buffers should include:

- the size of the mapped area of habitat
- the nature of adjoining vegetation
- connectivity of the mapped area to the other mapped areas
- the presence of Koala activity both in and adjacent to the mapped habitat.

5.4 Further recommendations

To ensure that the current population's status is not reversed and that population levels are sustainable in the long term, actions will be required that encourage the following:

- Recognition of the importance of habitat linkages within the LGA in the context of both general movement corridors and isolated patches of Koala habitat, supported by appropriate planning measures;
- Coordinated action regarding Koala management across all processes of governance;
- Incorporation of best-practice habitat assessment procedures in relation to Koala habitat within development areas;
- Effective resourcing of Gunnedah Shire Council to enable it to be the lead agency in terms of implementing required management actions on lands under its governance; and
- Facilitating adequate communication processes and engagement of all sectors of the community in the process of sustainable Koala management.

6. References

6.1 Primary References

To ensure that the current This Koala Strategy has been prepared utilizing the draft Gunnedah LGA (Part) Comprehensive Koala Plan of Management 2013 prepared by Greenloaning Biostudies Pty Ltd (in conjunction with Dr S Phillips – Biolink Ecological Services Pty Ltd).

The Strategy has also utilized the information and format of the Moree Plains Shire Koala Habitat Mapping prepared by Parsons Brinckerhoff Australia Pty Ltd, June 2008).

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