# Koala Conservation and Habitat Management Plan

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### **Executive Summary**

The protection of native flora and fauna and their habitats is identified as one of the top two environmental priorities in Advance Ipswich. The koala specifically is one of three fauna species selected to be an Iconic Species in the Ipswich Nature Conservation Strategy 2015 (NCS). The Koala Conservation and Habitat Management Plan is one of the key planning documents in implementing the objectives of the NCS.

Koalas are widespread throughout Ipswich and historic records indicate that several large and significant populations exist scattered across the local government area (LGA). Work by Bussey and Ellis (2016) highlights the significance of the Ipswich koala population due to its high numbers, genetic health and potential as a source population for surrounding areas. With the continued decline of koala numbers on the Koala Coast and other areas east of the M1, the koalas in Ipswich, Logan, the Scenic Rim and Lockyer Valley are beginning to be recognised as significant in their own right. As an iconic species under the NCS, koalas are a priority focus for conservation planning. Koalas are also significant for their cultural value, legal status and conservation significance multiple levels of government. In combination, these factors make koalas a suitable species to act as a flagship species to protect native vegetation and fauna habitat for numerous other native fauna.

As a result of the koala's wide distribution across different land tenures and variety of threats, Council has identified a set of prioritised actions for conservation of the species in Ipswich. In developing this plan, a spatial investigation and targeted survey work was undertaken to highlight areas of the city as priorities due to their known populations, existing and future level of threat and opportunity for regional and local connectivity. The result from this investigation has been the creation of Koala Management Areas (KMAs) which form the backbone and key strategic direction for the plan. KMAs represent geographic areas of priority for Council in managing and conserving local koalas and illustrate the types of actions and management necessary to achieve the vision and objectives of the plan.

There are four types of management areas that were identified and are referred to in the plan, including:

- Urban Consolidation Areas
- Core Habitat Areas
- Priority Rehabilitation Areas
- Impact Mitigation Areas.

Management actions have been assigned to each KMA type and have been designed to align with the unique features and circumstances of each area, such as the level of threat from dogs (wild and domestic), road mortality or the current level of conservation management. To implement management actions Council will use a number of available tools to protect, enhance, manage and increase koala habitat across the city.

Key management tools used in the plan include:

- Enviroplan land acquisitions
- private landholder partnerships
- Council's environmental education program
- Council's existing pest and weed management programs
- partnerships with other local conservation organisations and government entities
- regional coordination between Council and other local governments in South-east Queensland.



### 1. Introduction

Three local fauna species have been recognised through the Ipswich Nature Conservation Strategy 2015 (NCS) as priorities for conservation planning due to their iconic nature and elevated levels of threat. The koala (*Phascolarctos cinereus*) is one of the three species, along with the platypus (*Ornithorhynchus anatinus*) and brush-tailed rock wallaby (*Petrogale penicillata*) which is Council's faunal emblem. There are numerous reasons for Council to undertake koala conservation initiatives. One of the key drivers is habitat protection across a range of different land uses and vegetation



communities. The habitat protected for koalas can also be habitat for many other rare, threatened and common species of birds, mammals and other terrestrial fauna.

Council has close to 6,500 hectares of eucalypt and other native forest purchased and managed for the purpose of conservation which forms Council's Natural Area Estate (NAE) network. The NAE can provide safe haven for koalas and other species, away from the threat of urban development or other land use pressure. Notably, White Rock – Spring Mountain (WRSMCE), Mt Grandchester (MGCE) and Flinders – Goolman (FGCE) Conservation Estates form major parts of the NAE comprising bushland habitat suitable for koalas.

The Ipswich Planning Scheme works with compact urban form to reduce the impacts of urban sprawl on natural areas. It recognises that Koalas are also still prevalent in many urban areas, surviving in often small and disconnected remnants of bushland. Suburbs including Collingwood Park and Goodna have recorded koala sightings and present opportunities for long term protection despite a history of urban development. Koalas are also abundant in many rural areas of the city, including Ebenezer, Amberley, Mt Forbes and Purga. The koalas in these areas appear to be well adapted to fragmented and patchy landscapes provided there are no major movement barriers, such as linear infrastructure like roads.

Ipswich koala populations are noted as being significant on a regional scale due to their high population size and genetic uniqueness. It is believed that the koalas within Ipswich act as a source population for some of the surrounding Local Government Areas (LGA). As koalas continue to rapidly decline on the Koala Coast, the conservation of koalas in Ipswich becomes of paramount importance on a regional level.

Areas of Ipswich are currently undergoing large scale urban development with other areas earmarked for industrial development and investigation. These developments are being driven by population growth in South-east Queensland through the western corridor and are identified as areas for growth in the South-East Queensland Regional Plan 2009-2030. Areas such as Ripley Valley, Springfield and some parts of Ebenezer, all of which support or have potential to support koala populations, are likely to see extensive clearing associated with urban and industrial development in the future. These development pressures are likely to place koalas and other species that are reliant on the same habitat types under threat. Flow on effects from urban development such as impenetrable barriers (roads and housing), vehicle collisions and attacks from domestic and wild dogs will compound the pressure on the species.

#### 1.1 Vision

The vision for the conservation and management of koalas in Ipswich is to:

"Protect, enhance, manage and increase the local koala population and koala habitat in Ipswich"

#### 1.2 Objectives

To achieve this vision, the following objectives have been identified:

- Increase the amount and connectivity of koala habitat in rural lpswich to reduce fragmentation of essential habitat.
- Protect and improve habitat value within large areas of intact koala habitat, including the Natural Area Estate.
- Enhance and protect key habitat corridors to maintain or increase regional and local connectivity.
- Understand, identify and reduce the impact of major threats to koalas across all areas of Ipswich.
- Implement mechanisms to increase community engagement in koala conservation, monitoring and citizen science.
- Direct suitable mitigation measures through planning and development assessments.

#### 1.3 Purpose

The protection of native flora and fauna and their habitats is identified as one of the top two environmental priorities in Advance Ipswich.

The Koala Conservation and Habitat Management Plan is also one of the key documents to be delivered in line with the NCS, where the koala was selected as one of the five iconic flora and fauna species of Ipswich. Koala habitat extends across the majority of Ipswich giving koalas a significant local profile, allowing koalas to be used as a flagship species for broader biodiversity outcomes. In addition, koalas have legal requirements for management and protection, hence this plan's high priority in Council's Iconic Species Program.

#### **1.4 Legislative Setting**

Koalas are protected under State and Commonwealth legislation, listed as 'vulnerable' by the Commonwealth Environmental Protection and Biodiversity Conservation Act 1999 (EPBC Act) and the Queensland Nature Conservation Act 1992 (NCA). The conservation significance of koalas is also recognised in the SEQ Regional Plan 2009-2031 where it states that it is important to recognise the need to enhance koala populations in the region through the protection, management and the achievement of net gains in bushland koala habitat, and by managing conflict with urban development.

Under the Sustainable Planning Act 2009 there are several policies that apply directly to koalas. These are the single State Planning Policy (SPP) and the SEQ Koala Conservation State Planning and Regulatory Provisions (SPRP). The single SPP includes mapped koala habitat as a Matter of State Environmental Significance (MSES), meaning that any clearing of this habitat may require an assessment for Significant Residual Impact. Similarly the SPRP defines zones in which any clearing of koala habitat will also require the same assessment.

Under these policies, actions determined as having a significant residual impact may require an area of land to be protected or revegetated by a proponent to offset the initial impact. The delivery mechanisms used to offset removal of koala habitat and other MSES are administered by the State *Environmental Offsets Act 2014* and associated regulations. Koala offsets can also be required for controlled actions assessed under the EPBC Act.

#### 1.5 Koala Expert Panel and State Koala Policy Reviews

This plan was completed with understanding that the State Department of Environment and Heritage Protection have formulated an Expert Panel that will soon make recommendations on the future direction for koala policy in South-east Queensland. At the stage of developing this plan Ipswich City Council are unaware of the specific direction that EHP will take, however it is likely that it will influence koala management in Ipswich. Ipswich City Council has shared a draft version of this plan with EHP to highlight Council's local priorities and will continue to collaborate with the Department and Expert Panel to ensure cohesion between approaches. Areas potentially influenced by the Expert Panels recommendations include:

- Council's Planning Scheme
- the SEQ Regional Plan
- relevant koala policy's and provisions including the State Planning Policy and State Planning Regulatory Provisions
- Nature Conservation Act 1992 (relating to release and care for orphan or injured koalas)
- Koala Habitat Values Mapping and distribution modelling.

#### **1.6 Institutional Arrangements**

Koala conservation has a range of stakeholders. It is necessary to identify key stakeholders up front and outline their individual roles and responsibilities in the context of this plan and its delivery.

#### Federal Government

- Administration of the Environment Protection and Biodiversity Conservation Act 1999 under which the koala is a Matter of National Environmental Significance.
- Assessment and approval of referrals, including approval of koala offsets and other mitigation measures.

#### State Government

- Creation and delivery of koala policy and planning under the Nature Conservation Act 1992.
- Regional coordination and strategic direction/prioritization of conservation initiatives in SEQ.
- Funding support for koala conservation initiatives in priority areas.
- Coordinate regional monitoring and assessment of population trends.
- Delivery of habitat mapping and other decision support tools.

#### **Neighbouring Local Governments**

- Collaboration on cross boundary koala conservation efforts.
- Recognition of key habitat areas and biodiversity corridors and reflection of these in respective planning schemes.
- Co-funding of priority projects and monitoring.

#### **Research Institutions**

- Identification of key management problems and targeted research in attempt to solve these.
- Sharing of knowledge regularly and proactively with other key stakeholders.

#### Non-Government Organisations including Wildlife Care Groups

- Coordinate with Council on trends and observations identified in the local koala population
- Provide expert advice and education to the community
- Keep detailed records of koala incidents (road kill etc) to assist planning and conservation decision making

#### 1.7 Plan Life and Review

The vision of this plan sets long term objectives for managing koala populations and their habitat. Many of the objectives are ongoing and will require long periods of time and dedication to achieve. As such the vision for this plan is 25 years.

The plan will occur in 5 yearly stages with a review every 5 years based on the success of implementation, new knowledge, changes to legislation of policies and monitoring results. In order to complete a review every five year the following schedule will be followed:

- Monitoring completed by the end of the 4th year of adoption.
- Review of findings and revision completed by the middle of the 5th year.
- Revised plan presented to Council for adoption in the second half of the 5th year.
- Implementation of new revised 5 year plan commencing in the 6th year.



### 2.0 Koalas in Ipswich



The koala is an arboreal marsupial that relies almost entirely on trees from the genus Eucalyptus in a variety of dry and wet sclerophyll forests and woodlands. Koalas spend the majority of their time in trees, occasionally coming down to disperse or change trees. Although they prefer to stay in large patches of bushland, koalas can often be found in riparian corridors, in strips of roadside vegetation and even in isolated gum trees in grazing paddocks. Their versatility means that retaining some degree of connectivity across landscapes is crucial to the successful conservation of the species locally and obvious movement barriers should be avoided or mitigated. It also disproves the popular myth that koalas require large corridors of vegetation to move through a landscape, rather it suggests that koalas can move through open space provided they are supported by suitable shelter trees and can move from patch to patch.

While studying in the Mutdapilly area, White (1994) found that koala movements of greater than 2km at a time were common and animals were frequently recorded moving through grazing paddocks, stopping in isolated paddock trees. White (1994) also found that Ipswich koala's home range was larger than their Koala Coast counterparts, although this is highly variable based on the level of intactness or fragmentation in a landscape (Dique et al. 2003). In the Mutdapilly area for example, male home ranges were around 8km<sup>2</sup> in size, whilst female home range was around 3.5km<sup>2</sup> (White, 1994).

All available evidence suggests that koala home ranges are large in Ipswich and thus expected to have a lower population density per unit area. Whilst a census of the entire koala population in Ipswich is not feasible given the size of the LGA, Bussey and Ellis (2016) used all available evidence including scat and other records as a proxy for known koala distributions across the LGA to generate an estimate of koala numbers. Appendix C displays the results from Bussey and Ellis (2016). In summary, the authors under a conservative estimate predict that Ipswich hosts a koala population in excess of 4,000 individuals. This estimate is expected to be lower than the true number of koalas, due to the calculations being mostly based on Regional Ecosystems (RE) and not accounting for non-RE habitat that also has resident koalas. These findings indicate that the koala population in Ipswich is important on the regional scale and Bussey and Ellis (2016) suggest that they may have potential to be listed as significant under the EPBC Act.

Work by Lee et al. (2010) and Kjeldsen et al. (2015) suggests that the koalas within the Ipswich and Beaudesert area are genetically distinct from those on the Koala Coast. Lee et al. (2010) also found that koalas in the Esk area are genetically distinct from the cluster in Ipswich and Beaudesert, suggesting that the Warrego Highway is a permanent barrier for koala movement and has been for some time (See Appendix D). The uniqueness and high genetic diversity within the Ipswich koala population provides further evidence that it is significant Koalas often don't need large tracts of remnant vegetation to be present and can often be found in smaller patches of bushland and even cattle shade trees.

Pastel Morning by S Gardner Enviroplan Photographic Competition Entrant on a regional scale. Genetic variation is crucial in a koala population as it affects the ability to resist disease, successfully reproduce and adapt to threatening processes. Within Ipswich and the surrounding populations (especially south through to Beaudesert) it is of paramount importance to conserve habitat connectivity to sustain current levels of gene flow crucial to the genetic variation and resilience in the population.

Koala populations also face a range of threats across the Ipswich LGA. Several areas of the city are ear-marked for urban and industrial development, hence land clearing remains a key threatening process. Master planned areas such as Springfield and Ripley Valley are in the middle of their development cycle, whilst other future urban or industrial areas are at an investigation stage and won't be developed for some time. In these areas there are opportunities to minimise the impact to local koala populations through proactive investigation.

Secondary impacts from road strikes, fragmentation and dog attacks are also evident in several areas across the city. Detailed sighting records from Ipswich Koala Protection Society have allowed these records to be mapped and analysed spatially, highlighted hotspots of threats. Major highways appear to have a significant impact on the species locally and in some cases creating a permanent barrier. Dog attacks also occur and are most frequently reported in urban areas. This is mostly comprised of domestic dogs in suburban backyards, and whilst domestic dog attacks appear less of threat than road strikes, it is likely that the true number goes underreported. The influence of wild dog predation and rural and bushland areas of Ipswich is largely unknown. Section 7 provides detailed analysis of the available threat data.

Another important threat that is often overlooked is the risk of actions being unable to effectively modify the public's behaviour. Many programs have been implemented across SEQ aimed at modifying behaviour in relation to reducing road kill, creating friendly backyards and reducing domestic dog attacks. While some have produced positive results, the majority have been unsuccessful at influencing people's behaviour. This plan therefore strives to take learnings from both the successes and failures of previous initiatives attempting in SEQ.

In summary, analysis of local knowledge, available data and published literature illustrates the habit and distribution of koalas in Ipswich. The key pieces of knowledge have been combined to create a series of key principles to be used in koala conservation decision making. These are as follows.

#### **Guiding Principles**

Koalas can disperse more than 2km at a time often through a matrix not considered suitable habitat.

Koalas frequently change trees and require suitable ground cover to move between them.

Koalas frequently use trees within corridors but don't show any association with using corridors for movement and dispersal.

The facilitation of corridors in developed landscapes as koala habitat is important for sustaining urban populations.

Reducing stress caused by threatening processes is critical in maintaining genetically health and disease free populations.

Ipswich koalas are known to have larger home ranges and therefore occur at lower densities than other areas of SEQ.

The density and distribution across a landscape is highly variable and dependent on soil nutrition, vegetation type and condition, soil type, parent rock material and drought resilience of food trees.

### **3.0 Opportunities and Existing Tools**

To ensure the goals and outcomes of the plan are achieved, Council has a variety of available tools and mechanisms that can be used to facilitate koala habitat protection and threat mitigation. These tools are diverse and flexible, meaning that koala conservation outcomes can be achieved across the variety of land uses and tailored to site specific requirements. This section goes into detail around what these tools are and how they can contribute to koala conservation outcomes in Ipswich.

#### 3.1 Private Landholder Partnerships

A key tool for delivering outcomes is the ability to conserve koala habitat on private land. Council currently offers six types of partnerships to landholders including Land for Wildlife (LfW) and numerous types of Volunteer Conservation Agreements (VCAs). All of the existing partnerships are focused on protecting intact bushland over one hectare with the exception of Habitat Gardens which is suited to small urban backyards. Partnerships are designed to provide incentives and advice to landholders with high biodiversity on their property, with aim of retaining and improving values.

Private landholder partnerships can be used to protect and enhance koala habitat through the offered incentives, which are:

- rezoning land to Rural E under the ICC Planning Scheme
- increased weed control rebate to control weeds the may impact koalas such as lantana or vine weeds
- Grant funding available for threat management including weed control and vertebrate pest management.
- Land Management payments available to large properties.

#### Koala Conservation Agreement

This partnership is the newest of the six and offers a unique opportunity to assist landholders that don't meet the requirement for intact bushland and require rehabilitation. This agreement offers specialised support for Koalas within Ipswich. The Koala Conservation Agreement is available to landholders whose property has habitat suitable for Koalas or has potential to restore habitat to support iconic species (specifically Koalas). These habitat values can be identified through the SPP Koala Habitat Mapping as well as the Ipswich Nature Conservation Strategy 2015. The integration of conservation with other land use types such as grazing is an important outcome of this agreement, there is an emphasis on exclusion zones for the purpose of habitat rehabilitation and species protection. This agreement is ideally suited to properties of 10,000m<sup>2</sup> (1ha) and above, and includes:

- Ipswich City Council's annual Nature Conservation Grant
- up to \$800 Environmental Weed Control Rebate annually
- a maximum of 500 free trees for the first 12 months, followed by 200 free trees annually

- up to \$3000.00 in grant funding for predator exclusion fencing (applications will be assessed against specific criteria and on ground assessments made by a Council Officer)
- access to newsletters, workshops and more.

Where appropriate, the KCA should be advertised and promoted to landholders in key strategic locations identified in this plan.

#### 3.2 Tools for Mitigating Threatening Processes

#### **3.2.1 Reducing Road Mortality**

In many areas, such as highly urbanised and major transport corridors, there is a varying risk of road kill to koalas and other native fauna. A more detailed threat analysis in Section 7 identifies several areas around the city where high incidences of road kill occur, including the Cunningham Highway and Warrego Highway. Vehicle strikes in suburbia are less common than on major highways although there are certain areas where suitable actions would benefit local populations.

A number of strategies are available to Council and other organisations to attempt to reduce the impact the road kill hotspots are having on the species, including:

- fauna sensitive road design
- exclusion fencing
- speed reducing road design
- innovative road and wildlife signage
- increased advertisement of suitable wildlife carers in case of emergency
- installation of suitable fauna passage infrastructure in road kill hotspots
- retrofitting existing fauna infrastructure or culverts to be koala friendly.

#### **3.2.2 Reducing Dog Predation**

Other key threats that need additional attention in urban areas are the high abundance of domestic dogs. Many domestic dog attacks go unrecorded and the true number of incidents is likely to be higher than indicated by existing historical records (see Section 7). Education will be the key tool in reducing impact of domestic dog attacks using the relevant strategies outlined in Section 3.3.

Council has an existing pest management program that targets wild dogs on Council land. Although wild dogs are primarily a threat in Council's NAE and other rural areas, it is important not to underestimate the number and impacts of wild dogs in urban areas. Where the impact of wild dogs is recognised, additional control programs can be delivered on Council land and working with adjoining landholders.

#### 3.3 Education Program

The significance of the Ipswich koala population on a regional and even state wide level is not well known amongst the community and many underestimate the total number of koalas in the LGA. Likewise many residents are unaware of koalas living in bushland near their property.

As urban development encroaches on these areas the risk of domestic animal escapees rises greatly. To prevent this, education and awareness for new residents on responsible dog and cat ownership are of importance, especially where urban development and koala habitat come into conflict.

The following educational initiatives will be delivered through this plan:

- comprehensive education packages
- awareness of how to best report koala sightings
- updated and interactive information on Councils website
- dog awareness and responsible pet ownership
- interpretive koala signage in strategic locations
- innovative road safety signage
- displays and educational material in the Queens Park Environmental Education Centre
- Habitat Gardens Workshops (koala friendly backyards).

#### 3.4 Citizen Science

Ipswich as a whole is excellent at reporting on koala sightings (be they healthy, injured or deceased). However, there are a number of other tools for reporting koala sightings which don't feed into an appropriate database and occasionally koala sightings go completely unrecorded. As any data of this sort is extremely valuable and has a number of uses, it is important to ensure any koala sightings and data go into the correct databases. Council will actively promote Ipswich Koala Protection Society (IKPS) as the best avenue for recording sightings. IKPS data also feeds into the state Wildlife Online database and becomes available in all development and other planning decisions.

There is also opportunity to use citizen science to proactively monitor trends in koala populations across the city. Citizen run population censuses have been conducted on numerous occasions across the country at different spatial scales. Ipswich has previously had poor representation in these types of census largely due to lack of advertising on behalf of Council. Any future Queensland or National census will be actively advertised by Council to present an opportunity to undertake a yearly assessment of trends and numbers. Data obtained from census should be communicated back to the community through a report and through media publicity.

#### 3.5 Land Acquisition

Council has purchased close to 6,500 hectares of bushland habitat under the Ipswich Enviroplan levy. The funds collected through this levy are used through the Enviroplan Acquisition Program which provides a structured and strategic framework for purchasing land. Land purchased under the program is acquired for the primary purpose of biodiversity conservation using the following criteria:

- the environmental significance of the site or connecting sites
- connectivity of the site to current or future conservation estate
- level of priority as defined in the Nature Conservation Strategy
- the level of threat to the environmental significance of the site
- nature based recreation opportunities offered by the site
- the cultural heritage values of the site
- the benefit to the community if the site was purchased
- the ultimate cost of the purchase (capital and recurrent costs)
- protection and improvement of koala habitat is a strong consideration when assessing both environmental significance and connectivity.

#### 3.6 State and Federal Offsets

Offsetting impacts under the State Environmental Offsets Act 2014 and EPBC Act can have positive outcomes for koala conservation if done appropriately and strategically. Offsets present an opportunity to protect additional patches of koala habitat with funding and support that was otherwise not available. In Ipswich organisations such as Cherish the Environment Foundation are key deliverers of koala offsets and this plan will be used by this organisation to deliver suitable and strategic offsets.

In general, offsetting for koalas should follow these guiding principles:

- Offsetting should not be used to allow an unsuitable development to go ahead.
- Offsets should never be considered as a substitute for existing habitat and populations.
- Offsets should preferably be used to enhance or increase the amount of pre-existing habitat rather than attempt to create habitat from scratch.
- Offsets requiring revegetation components should be delivered on areas of previously high quality koala habitat, as indicated by the SPP Koala Habitat Values Mapping.

### 4.0 Koala Management Areas (KMAs)



#### 4.1 Development of KMAs

Ipswich has a diverse range of land uses and management requirements vary considerably. Koalas are widespread across Ipswich, and over 3,000 sightings recorded since 1997 has illustrated where the hotspots and important populations are. These sightings have been invaluable in spatially investigating where healthy populations are, where dog attacks and disease have been prevalent, and where there are hotspots for road mortality.

Council has conducted additional survey work to confirm koala presence, including assessment of both presence and relative activity levels across many Council parks and reserves. Most notably, Council's NAE had very little evidence of koala presence, despite having suitable habitat. Council surveys and Biodiversity Assessment work throughout 2015 have confirmed that koalas are present in the NAE and are prevalent in:

- Purga Nature Reserve
- Flinders-Goolman Conservation Estate
- White Rock Spring Mountain Conservation Estate.

For the purpose of prioritisation, Council has created a spatial representation of the current koala conservation scenario and management requirements across lpswich. Areas of differing management requirements have been labelled Koala Management Areas (KMAs). The following factors have been considered when investigating areas of the city and determining their level of priority for koala conservation. These factors have also aided in identifying which tools and strategies are likely to be the most effective:

- Planning scheme zoning and other planning legislation.
- Historic data provided by Moggill Hospital and State Government (Section 7).
- Knowledge gained through koala survey work (Section 7).
- Strategic considerations within Councils NCS (Appendix E).
- Current land use and level of protection.
- Level of threat and other influencing trends (Section 7).

Council is aware that the State Government are in the process of reviewing habitat models of the koala at the time of the KMA's initial configuration. Depending on the outcome from the model review KMA's can be adjusted with the presentation of new information.

#### 4.2 Types of KMAs

Four different types of KMA have been developed for this plan and are as follows:

- Urban Consolidated Areas (UCA)
- Core Habitat Areas (CHA)
- Priority Rehabilitation Areas (PRA)
- Impact Mitigation Areas (IMA)

#### 4.2.1 Urban Consolidation Areas (UCA)

UCAs have the potential to provide long term refuges for koalas, despite being located within the urban footprint. UCAs are likely to be somewhat fragmented and have a high level of threats due to being located within urbanised areas. Throughout the urban footprint there are numerous sizeable areas of koala habitat protected through planning scheme zoning, parks and reserves or undevelopable sites. Whilst these areas can often be fragmented there is potential to increase connectivity in key areas. In developing UCAs, areas mapped as Urban Nodes and Urban Corridors under the NCS were consolidated into areas suitable for koala conservation.

In UCAs the focus will be in conserving local koala populations

- by mitigating present threats such as:road crossing and vehicle strikes
- domestic and wild dog control
- habitat fragmentation and edge effect
- landscape level connectivity.

#### 4.2.2 Core Habitat Areas (CHA)

CHAs occur in locations where koalas are known to be present along with a high level of protection through zoning, land acquisition and active management. Threats are likely to be minimal in these areas and as act as 'hubs' for conserving koala populations in the long term. All of the CHAs in this plan are substantial in size, building primarily around Councils NAE, thus attempting to protect and manage areas that are large enough to support multiple breeding populations.

The CHAs mirror the mapped core habitat from Council's NCS as they are both based on the large areas of remnant bushland along with a high level of planning protection. All of the CHAs in this plan also fall within Priority Conservation Areas recognised under the NCS. For more information on the NCS and its contents refer to Appendix E.

#### 4.2.3 Priority Rehabilitation Area (PRA)

Many rural areas of Ipswich have limited large, connected tracts of remnant vegetation, primarily in areas of Rural A and Rural B zoning. Yet koalas often don't need large tracts of remnant vegetation to be present, and can often be found living in smaller patches of bushland and even cattle shade trees. This is particularly the case in the central southern and south-western areas of Ipswich where the vegetation is highly fragmented, yet a few scattered pockets of Eucalyptus tereticornis dominant communities still support koala populations.

Many of the koalas found in these areas are likely to be transient and will require larger patches of habitat to have a sustained long term population. These areas present opportunities for increasing the quality and quantity of koala habitat on a landscape level. Actions for PRAs include a variety of mechanisms and tools to help facilitate rehabilitation in these areas. In addition, the PRAs identified in the plan mirror the Priority Rehabilitation Areas mapped in the NCS (See Appendix E).

PRAs are predominantly located on privately owned land making them ideal areas for attracting new conservation partnerships, as there are already many Voluntary Conservation Agreement (VCA) and Land for Wildlife (LfW) members actively contributing to retention and rehabilitation of koala habitat. Areas with a high proportion of land in a VCA should be recognised as important locations for long term conservation of koalas and koala habitat.

#### 4.2.4 Impact Mitigation Area (IMA)

There are areas of the Ipswich LGA that are earmarked for future urban development, including Greater Springfield and Ripley Valley. Koalas are known to exist in these areas and sporadic historical records have been confirmed in several areas that are likely to be developed in the near future. These areas are likely to develop in a mosaic pattern with several large developments already nearing completion and others in very early stages. Impact Mitigation Areas have been identified for the purposes of this document as either master planned urban development, future urban or investigation areas.

The koala's high consideration in the Queensland planning legislation means that there are numerous opportunities to minimise the impact on the Ipswich koala population and achieve some positive outcomes from these impact mitigation areas.

Retention of linear open space corridors through urban areas can also help mitigate impacts. This can be achieved through planning decisions as well as through the development assessment process. If these are to be effective, these corridors need to ideally be wider than 100m (McAlpine et al. 2006) and link back into existing parks, reserves and remnant habitat patches that are large enough to maintain koala populations in the long term. Koalas are known to temporarily persist in small strips of vegetation all across SEQ and direct linkage to other larger patches of vegetation may allow pockets of koalas to persist in the long term.

#### 4.3 Overview Map

Based on spatial analysis of factors listed in Section 4.1 and KMA types in 4.2 the Ipswich LGA has been split into a variety of KMA's and displayed as a whole in Figure 1.

### Legend



Figure 1: Koala Conservation and Habitat Management Plan Overview Map



### **5.0 KMA Management Actions**

#### 5.1 Key Management Actions for Urban Consolidation Areas

#### Location Description

One UCA has been identified across parts of the suburbs of Redbank, Collingwood Park and Bellbird Park. In total the mapped area for the UCA is over 1400 hectares. This UCA has been selected due to large parts of the area being protected as parks or zoned for conservation. Central to the UCA is the state owned Redbank Rifle Range which is over 140 hectares in size and currently zoned for Conservation. Due to its size and shape, Redbank Rifle Range has the potential to be an urban hub for koalas in the long term. The UCA also contains a number of other Council owned parks and reserves with differing levels of connectedness and fragmentation. Many of the parks and reserves with the area also contain high quality koala habitat and form corridors along Goodna and Six Mile Creek respectively.

#### **Koala Presence**

A number of studies have been conducted in the area to investigate the current status of the local koala populations. Koala presence was confirmed in all of the parks and reserves, with the exception of Rhonda Road Reserve and Bailey Street Reserve in the north-western corner of the UCA. Further assessment of activity levels in December 2015 provided additional evidence that these two parks are currently not used by koalas. However, the activity level surveys also went on to prove that Redbank Rifle Range had high levels of koala activity as did all of the parks and reserves adjoining or semi connected to Redbank Rifle Range, including Goupong Park, Banjo Paterson Park, Tofa Mamao A Samoa Park, Church Street Reserve and Ric Nattrass Environmental Park (See Appendix B).

#### **Key Threats**

Given the urban setting, the area has a high level of threats including roads, habitat fragmentation, poor connectivity, illegal vehicle usage, domestic and feral dog predation, and arson. Given the high level of threat the area has been studied in considerable detail by Council. Through that process, specific locations and actions have been recommended that will assist in minimising risk to local koala populations.

Table 1 identifies and prioritises these actions and also splits them into broader categories of action type.



Figure 2: Snapshot of Redbank and Collingwood Park Urban Consolidation Area.

#### Table 1: Key management actions for implementation of the Redbank and Collingwood Park UCA

Actions	Priority	Timing
Develop educational material to promote koala friendly backyards and other koala conservation issues in the UCA.	High	Design by December 2017, delivery by June 2018
Conduct periodic cool burns in Redbank Rifle Range to reduce risk of severe wildfire decreasing canopy health and direct koala mortality. Successful implementation depending on confirmation of ownership of the property.	High	Program commenced by June 2018
Identify locations for the installation of innovative and effective road management tools to help reduce the impact of roads on koala movement.	High	June 2018
Assess and determine why koalas appear to be absent from Bailey Street Reserve and investigate management actions in accordance with the findings.	High	June 2017
Confirm the ownership and management of Redbank Rifle Range with State Department of Lands.	High	June - December 2018
Assess the impact of wild dogs in Redbank Rifle Range and conduct trapping and control program where necessary. Successful implementation depending on confirmation of ownership of the property.	Medium	Program commenced by June 2018
Control Lantana camara in Tofa Mamao A Samoa Park and Banjo Paterson Park	Medium	June 2018
Conduct further surveys immediately east of Seymour Park to determine whether Koalas are utilising that area.	Medium	June 2018
Provide signage in existing dog off-leash areas in Goodna, Collingwood Park and Bellbird Park to make dog owners aware of the presence of Koalas in the area, asking owners to be mindful and in control of their dog if there is a Koala in or near the dog park and to report any sightings.	Medium	June 2018
Increase habitat values and connectivity along the powerline easement in Banjo Patterson Reserve and Gibbs Avenue Transmission Reserve.	Medium	June 2020
Prioritise properties west of Ric Nattrass Environmental Park, along Eric Street Goodna for acquisition or other tools for habitat protection.	Medium	Ongoing
Target increased participation in the Habitat Gardens Program within the UCA.	Medium	December 2017



#### 5.2 Key Management Actions for Core Habitat Areas

Table 2 below identifies and lists the key management actions for CHAs identified in Figure 1. These include the:

- White Rock Spring Mountain (WRSM)
- Flinders Goolman (FG)
- Woolshed (WS)
- Hiddenvale (HDV).

For CHAs, actions are focused primarily on reducing the risks for individual koalas from predation and fire impacts within the NAE. Ensuring that habitat quality is protected and enhanced in key identified locations is also a focus. As all of these areas are predominantly vegetated and providing suitable habitat, some of the other major threats such as vehicle strikes and physical road barriers are rarely an issue.

The remainder of Section 5.2 analyses each CHA, including why it was selected, what the local scenario is and what is known about the koalas in each specific CHA. All of the individual CHAs are addressed using the key management actions listed in Table 2 below. Additional actions will be identified and highlighted where they are locally specific and not within the broader CHA table (Table 2).

Table	2: Ke	v manaaement	actions for	r implementatio	on in all	beqapm	Core H	abitat A	Areas
		,					00.0		

Actions	Priority	WRSM	FG	WS	HDV	Timing
Conduct ongoing trapping programs targeted at wild dog control within the NAE.	High	1	1	1	×	Ongoing
Conduct a prescribed burn program (3-5 burns a year) aimed at fuel reduction to guard against canopy scorch or koala death during uncontrolled or inappropriate fires.	High	~	1	1	×	Ongoing
Ensure appropriate dog on-leash signage is located within each CHA and scheduled patrols are addressing off-leash domestic dogs.	High	1	1	1	x	June 2018
Provide input into the Development Application process where actions are likely to affect core koala habitat and/or regional connectivity.	High	1	1	1	1	Ongoing
Include considerations and/or provisions to protect koalas within the NAE during prescribed burning program. Monitor local koalas both pre and post burns to investigate relationships and trends with fire.	High	\$	1	1	×	June 2017 + Ongoing
Liaise and work with neighbouring property owners to coordinate approaches to koala threat management and rehabilitation of koala habitat.	High	1	1	1	×	Ongoing
Establish a prioritised list of sites and actions aimed at increasing koala habitat quality to complement the CWP.	High	1	1	1	x	December 2017
Create a list of suitable release sites for koalas within the NAE and advertise the list with relevant parties.	Medium	1	1	1	1	June 2017
Conduct annual assessments of habitat condition including assessment of tree recruitment, tree disease and defoliation.	Medium	1	1	1	x	Yearly (Summer)
Install signage informing people of where to report sightings of healthy koalas and injured koalas.	Medium	1	1	x	x	June 2018
Adopt key guidelines from 'Planning Guidelines for Koala Conservation and Recovery' (McAlpine et al. 2007) as a best practice for all works and recreational development undertaken in the NAE and through the Conservation Works Program.	Medium	\$	1	1	×	June 2019
Identify key patches of koala habitat within the NAE. Assess these for habitat quality in accordance with McAlpine et al. (2007) Guideline 4.1.	Medium	1	1	1	x	June 2019
Continue local government koala conservation working group to coordinate and partner in regional management. Priority local governments are Logan City Council, Scenic Rim Regional Council and Lockyer Valley Regional Council.	Medium	1	1	1	1	6 Monthly

#### 5.2.1 White Rock – Spring Mountain CHA Location Description

The White Rock-Spring Mountain CHA is formed largely by WRSMCE which Council manages for the primary purpose of conservation. WRSMCE is over 2,600 hectares in size, protecting a mix of dry and wet Eucalypt forest types along with small patches of rocky heath vegetation. The estate supports a high diversity of terrestrial flora and fauna species, along with important vegetation communities that provide habitat for significant wildlife. The native vegetation plays a critical role as a habitat link in a recognised bioregional wildlife corridor known as the Flinders Karawatha Corridor. This corridor allows for fauna movement, migration and transference of genetic diversity within the region.

#### Koala Presence

Sightings of koalas are limited within the CHA, due to the limited human presence and no previous koala studies. Survey work conducted in mid-2015 confirmed that koalas are present across the conservation estate with the majority of evidence found along the western boundary. As part of a BioCondition project funded by Council, the Queensland Herbarium has several confirmed sightings of koalas across the estate. When combined with fire history mapping it appears that the current evidence suggests that koalas are more common in areas that were not affected by severe wildfire in 2012. The validity of these findings is inconclusive as negative survey results do not mean that koalas are truly absent from an area.

#### **Key Threats**

Managing threats to the CHA and WRSMCE specifically will become critical in the future, as the estate is expected to become fringed by urban development. The largest impacts will come from Springfield on the eastern and north-eastern boundaries of the CHA as well as developments in Redbank Plains to the north. Whilst there is also development intended for the western side in Ripley Valley, the impact will be lessened by a strip of conservation zoning running adjacent to the boundary of the estate. Threats to koalas within the estate are ongoing and management programs within the estate will require sustained effort. Such threats include feral dog predation, lack of domestic dog compliance, weed infestation, illegal vehicle access, increased visitor presence, poor fire regimes and risk of hot wildfires. Locally the most significant threats to koalas are predation by wild dogs and direct mortality through wildfire.

As the borders to WRSMCE become increasingly encroached by urban development, koalas may become displaced. White Rock – Spring Mountain presents a viable option for release of koalas that are taken into care or move as a result of development. In addition, movement solution and fauna exclusion fencing for koalas is likely to be conditioned through EPBC Act Offset Requirements for any area of interface between the estate and residential development. As such, it is important to monitor what impact this fencing is going to have, as well as any movement solutions or passages.





Figure 3: Snapshot of White Rock Spring Mountain CHA.

#### 5.2.2 Flinders-Goolman CHA

#### **Location Description**

The Flinders-Goolman Conservation Estate (FGCE) CHA is similar to the WRSM CHA in that it is largely comprised of a sizeable conservation estate. FGCE is 2,200 hectares in size and contains a range of vegetation types, from vine scrub thickets to rocky peaks and dry sclerophyll forests. FGCE forms the start of the Flinders Karawatha Corridor (FKC) and is connected to hundreds of hectares of connected bushland to the south in Logan and Scenic Rim, as well as forming a direct link to WRSMCE. FGCE is bordered by several landholders who are engaged in conservation management, including Queensland Trust for Nature (QTFN), RAAF, Ivory's Rock Conference Centre, Sporting Shooters Association of Australia and several other private landholders.

The eastern boundary of the CHA borders Ripley Valley and South Ripley which will be developed for urban residences in the next few decades. Koala populations within the CHA may become more fragmented and isolated, putting a strong emphasis on the importance of the South Ripley PRA as an important link in the FKC.

#### Koala Presence

This CHA is also similar to WRSM in that its large size creates a sampling bias, where highly suitable areas have limited koala records due to their remoteness and distance from high visitor areas. Surveys in the winter of 2015 confirmed that koalas are present and active throughout large portions of the estate, including on the slopes of large mountain peaks such as Flinders Peak. BioCondition monitoring in late 2015 detected multiple koalas in the estate. There has also been evidence of koalas within some vine scrub vegetation in the southern parts of FGCE, although these animals are likely to be moving between two separate patches of Eucalypt forest. Harding's Paddock, in the north of the estate is also used as a release point by IKPS and koalas are often recorded in the picnic area. It is unclear whether these animals are the same individuals that have been released from temporary care or are resident wild koalas.

Contrary to WRSMCE, the majority of koala evidence has been in areas of the estate affected by severe wildfire in 2012. This may indicate that koalas in this area have begun to come back into burnt areas earlier in this estate or that the fire in FGCE was not as severe.

#### **Key Threats**

Predation from wild dogs and foxes on koalas are also key threats in this area, along with the risk of severe wildfire. These impacts are mitigated through Councils management programs with the estate. To reduce the impact on koalas within the entire CHA, consistent cross boundary approaches to targeted pest animal and fire management should be prioritised.



Figure 4: Snapshot of Flinders – Goolman CHA.

#### 5.2.3 Woolshed CHA

#### Location Description

The Woolshed CHA is located in rural Ipswich close to the border with Lockyer Valley Regional Council and encompasses sections of Woolshed, Grandchester and The Bluff. Within the CHA, Council owns Mt Grandchester Conservation Estate (MGCE), and along with numerous LfW and VCA properties, the majority of the area is under some form of conservation management.

MGCE is made up of 984 hectares of former grazing land and is around 50% remnant vegetation. Rehabilitation in the conservation estate is ongoing and has been assisted by various biodiversity and koala offsets. There is also a cluster of landholders in conservation partnerships with Council, together making up around 327 hectares of land managed for conservation at The Bluff to the east of the estate. Several other properties within the CHA are highly suitable as biodiversity and koala offset areas, especially where there is potential to expand MGCE.

#### Koala Presence

Koalas have been recorded in the area, including several in MGCE in 2015. Scat surveys found minimal evidence of koala usage throughout the estate with only 2 out of 14 searches finding indication of presence. This is surprising given that the surrounding landscape is largely intact.

#### **Key Threats**

Whilst wild dogs are frequently seen in the estate, they do not seem to be any more abundant than in other areas of the NAE. It is anticipated that as more of MGCE becomes rehabilitated, local food resources will increase and koalas will become more prevalent in the area.

#### **Additional Actions**

The true value of the Woolshed CHA as key koala habitat is still unclear. As such, it is important to assess the success of offset plantings and other rehabilitation efforts. Therefore, the following additional local actions will be implemented in addition to Table 2 and monitoring requirements in Table 5:

- Conduct 6 monthly scat searches in offset planting sites to monitor the use and movement of koalas in these areas.
- To give koalas the greatest chance of establishing a resident population in MGCE, further tools to undertake revegetation to increase food and shelter resources should be investigated.





Figure 5: Snapshot of Woolshed CHA.

#### 5.2.4 Hiddenvale CHA

#### Location Description

The Hiddenvale CHA is comprised mainly by the Old Hiddenvale Station Nature Refuge. This Nature Refuge is roughly 2,800 hectares in size. The mapped CHA also identifies private land that is not in any partnership with Council and therefore, the level of conservation management is unknown. Yet the majority of this land still contains intact vegetation and other suitable koala habitat as it is part of the Little Liverpool Range and unsuitable for grazing. Whilst highly sloped landscapes are generally thought to be unsuitable for koalas, much of the evidence suggests that koalas in Ipswich are willing to use highly elevated areas. For example, OWAD Environment found strong evidence of koala usage on every aspect around Flinders Peak and on the slopes of Mt Goolman.

#### **Koala Presence**

There are several koala sightings recorded in the area, although these are again limited by the low density of people living in the area. It is also known that koalas are regularly seen along the gullies and low lying areas through the Old Hiddenvale Station, although these sightings have not been recorded in any accessible database.

Council does not currently own any land in this area but provides support through the VCA and LfW program. The long term management and protected area status means that the area is likely to support koala populations in the long term.

#### **Key Threats**

Hiddenvale is actively managed for conservation, including active pest and other threat management.





Figure 6: Snapshot of the Hiddenvale CHA.

#### 5.3 Key Management Actions for Priority Rehabilitation Areas

Table 3 below lists all of the key management actions for identified PRAs. The actions refer to the PRAs identified in Figure 1. These include:

- South Ripley (SR)
- Purga (PUR)
- Mount Walker (MW)
- Mount Mort (MM)
- Pine Mountain (PM).

The remainder of this Section goes into specific details as to why different areas where chosen, what is known about the local

koala population and what are the major threats on a local and regional basis.

PRAs are unlike CHAs as they typically don't have large, connected areas of land with a high level of protection. The PRAs are generally located in the rural areas of Ipswich where there is also a high level of threat from high speed roads and clearing for grazing. The actions in Table 3 are focused on ways to increase vegetation cover and connectivity as well as active conservation management. Reducing the impact of some of the major movement barriers is also a critical component to ensure safe koala movement and facilitate regional gene flow.

#### Table 3: Key management actions for all mapped Priority Rehabilitation Areas.

Actions	Priority	SR	PUR	MW	MM	PM	Timing
Advertise and implement the Koala Conservation Agreement within targeted areas of each PRA.	High	1	1	1	1	1	Yearly and ongoing
Implement mechanisms to reduce risk of vehicle strike for koalas on high impact roads and road kill hotspots. Identify barriers to landscape level koala movement.	High	X	1	1	x	1	June 2019
Share roadkill data with DTMR highlighting hotspots near the Ipswich Motorsport Precinct, Cunningham Highway between Ipswich-Rosewood Road and Middle Road, and Warrego Highway near Ironpot Creek.	High	×	1	×	×	1	June 2017 with 6 monthly updates
Proactively engage and seek appropriate fauna solutions with DTMR and Logan City Council regarding potential upgrades to Ripley Road and Undullah Road.	High	1	x	x	x	X	June 2019
Provide educational material to private residents on the importance of retaining koala habitat on their property and emphasise the benefit of retaining cattle shade trees as temporary habitat for transient koalas.	High	1	1	1	1	1	December 2017
Assess the risk of wild and domestic dog attacks on koalas within Council owned parks and reserves containing koalas.	High	x	1	x	x	1	December 2017
Work with landholders to develop koala/habitat recovery plans incorporated in their farm plans, and tailored to each farm business model and operational practice.	Medium	1	1	1	1	1	June 2020
Prioritise areas for each of the PRAs for rehabilitation and KCA implementation based on SPP Koala Rehabilitation Habitat Mapping and NCS priority areas and corridor mapping.	Medium	1	1	1	1	1	December 2017
Identify and develop a register of properties suitable for acquisition or offsets based on koala habitat values and key regional connectivity values.	Medium	1	1	1	1	X	December 2017
Develop fauna infrastructure and koala crossing guideline for use by Council to reduce the impacts of infrastructure development on koalas and their habitat.	Medium	1	1	1	1	1	June 2018
Continue local government koala conservation working group to coordinate and partner in regional management. Priority local governments are Logan City Council, Scenic Rim Regional Council and Lockyer Valley Regional Council.	Medium	1	1	1	1	1	6 Monthly
Adopt key guidelines from Planning Guidelines for Koala Conservation and Recovery (McAlpine et al. 2007) and develop these into an information package for new landholders in the Koala Conservation Agreement.	Medium	\$	1	\$	1	1	June 2018
Reduce weed infestation to increase koala movement on identified Council land.	Medium	X	1	X	X	1	Ongoing and where funds available

#### 5.3.1 South Ripley PRA

#### **Location Description**

The majority of the South Ripley PRA is owned by the Sporting Shooters Association of Australia and dedicated as the Stewartdale Nature Refuge (SNR). This property and the South Ripley PRA form a key link in the FKC and help increase the size of the corridor between WRSMCE and FGCE. The SNR is currently undergoing extensive revegetation and will soon form an important strategic linkage.

#### Koala Presence

Whilst there hasn't been a koala sighted on SNR for at least 30 years, there is strong evidence of koala usage in WRSMCE adjoining to the north-east and in FGCE to the south-west. As revegetation in the area continues, it is expected that koalas will begin to move into the Nature Refuge and feed on the more nutritious juvenile trees. There are several patches of mature trees on the property that koalas may also begin to use with the increase in available food resources in the area. Due to the highly strategic location of this PRA within the FKC, the potential acquisition or voluntary protection of properties in this area is a high priority action.

#### Key Threats

Development to the north in Ripley Valley and to the south in Logan is likely to trigger an upgrade of Ripley Road and Undullah Road which connect the two development areas. These are currently dirt roads with minimal impacts to the connectivity of the FKC. Should these be upgraded to a 4 lanes or an arterial type road, this is likely to create a barrier and disconnect between WRSMCE and FGCE, thus fragmenting the FKC. As such it is important for ICC and Logan City Council to proactively engage with TMR in mitigating these potential impacts.



Figure 7: Snapshot of South Ripley PRA.

#### 5.4.2 Purga PRA

#### **Location Description**

Despite being fragmented and large proportions of the area being grazed, the Purga and Mutdapilly areas of Ipswich have potential for koala conservation in the long term. This is largely due to the many sufficiently sized patches of alluvial blue gum woodlands and fairly consistent spread of shade and paddock trees. Although not commonly thought of as good koala habitat, all available evidence suggests that the koalas of Ipswich frequently use paddock trees and slightly fragmented woodlands and therefore are reasonably proficient at moving through open space. Given that the koalas of Ipswich are closely linked with those in Boonah and the remainder of the Scenic Rim population, it is likely that koalas in Purga and Mutdapilly are a source population for their more southern neighbours (See Section 7 for more detail).

Council owns several small reserves in the area along with the 140 hectare Purga Nature Reserve. In addition, Cherish the Environment Foundation owns and manages a 97 hectare koala offset in Mutdapilly. Whilst there are relatively few LfW and VCA properties compared to other areas of the city, koala habitat is widespread across the PRA, meaning that there is high potential for a targeted approach to sourcing new VCAs and LfW in the area.

#### **Koala Presence**

Koalas are frequently seen in Purga Nature Reserve and the Mutdapilly offset property. Koalas are also frequently spotted along Purga School Road, Morgan's Road and Middle Road, suggesting a widespread presence across the PRA.

#### **Key Threats**

Despite the high potential of the area for long term koala conservation there are some major threats, most notably in the form of transport infrastructure. IKPS have recorded several dozen records of road kill along the Cunningham Highway with the noticeable hotspots around the Willowbank Raceway. Ipswich-Boonah Road on the other side of the PRA has comparatively few road kill incidents, despite it being a 100km road varying from 2 to 3 lanes. Council pest management officers also frequently record wild dogs in Council reserves and wild pigs are thought to be abundant and transient through the Purga area.



Figure 8: Snapshot of Purga PRA.

#### 5.4.3 Pine Mountain PRA

#### **Location Description**

Pine Mountain forms one of Ipswich's key biodiversity corridors, with a large number of properties in VCAs and LfW as well as several Council conservation reserves and state Nature Refuges along the mid-Brisbane River.

In addition to the numerous parks and reserves in Pine Mountain there are also several other Council owned properties that are currently not managed for conservation but retain suitable habitat. The management and future intent of these properties should be reviewed to see if they have any strategic value for koala conservation.

#### **Koala Presence**

Surveys in August 2015 revealed that koalas were present in a small amount of Council parks, most notably Pine Mountain Bush Reserve. Extensive surveys in December 2015 revealed very low activity levels in most of the Council parks and reserves. Several parks and reserves recorded no koala activity including Kholo Gardens, Kholo Bridge Park and Kholo Road Park, whilst Pine Mountain Bush Reserve and Hillview Drive recorded medium activity levels. This does not reveal any information about population numbers or viability, but it provides a relative comparison to other areas of the city and suggests that there is minimal koala activity in the Pine Mountain area. This may be because there are in fact very few koalas in the area or they are simply transient through the area. Given the significant barrier that the Warrego Highway currently poses the former seems more likely.

Despite the low levels of koala activity in Council parks and reserves, there are still koalas in the PRA along with ample koala habitat. State Planning Policy (SPP) Koala Habitat Mapping identifies the western side as having large areas of medium to high value rehabilitation land that may be suitable as offsets or targets for new partnerships.

#### **Key Threats**

The Warrego Highway is a major barrier to koala movement. This has been confirmed through multiple records of road kill along the highway and through the genetic difference between koalas on either side of highway (Lee et al. 2010, Bussey and Ellis 2016). Ironpot Creek presents an excellent opportunity to provide suitable fauna passage, with parks on either side of the creek underpass. This underpass is also located in a roadkill hotspot and funnelling koalas under the road could reduce this roadkill and reconnect populations north and south of the Warrego Highway.



Figure 9: Snapshot of the Pine Mountain PRA

Beary Nice by A Parker Enviroplan Photographic Competition Entrant

#### 5.4.4 Mount Mort PRA

#### Location Description

Mt Mort PRA encompasses the highly rural south-western Ipswich LGA. The area includes the State owned Mt Beau Brummel as well as over 1,900 hectares of connected land under VCAs and LfW. In addition, QTFN has also acquired a large property in the Mt Mort area that will be managed for conservation and used for ongoing koala research with the University of Queensland. In combination the PRA has a high proportion of its area managed for conservation. living in the area, along with the rugged nature of the Little Liverpool Range. Research conducted through the University of Queensland and QTFN will be ongoing and may begin to shed some light on local koala populations. Council should actively support this research as the Mount Mort PRA along with the Hiddenvale CHA has potential to be a stronghold for koalas within the Ipswich LGA.

#### **Key Threats**

No available information on key threats.

#### Koala Presence

Like several other areas there is a complete absence of koala records in the area. This is likely due to the low density of people



Figure 10: Snapshot of the Mt Mort PRA.

#### 5.4.5 Mount Walker and Ebenezer PRA Location Description

Ebenezer has been zoned for industrial investigation in the 2006 Planning Scheme, with several large areas intended to be left as greenspace in the 'Ebenezer Regional Area Preferred Land Use Concept Master Plan', adopted in March 2014. This is reflected in the most recent NCS where southern Ebenezer is recognised as a Priority Conservation Area. Ebenezer is therefore one of the priority areas for implementing the new Koala Conservation Agreement and implementing other means of protecting koala habitat.

Mount Walker is similar to areas like Purga, where there is limited pressure for urban development. However, the mix of Rural A and Rural B zoning provides little in the way of vegetation protection. Therefore, the Mount Walker area can be considered to be another key area for implementation of the Koala Conservation Agreement and identifying suitable properties for acquisition.

#### Koala Presence

The southern half of Ebenezer is well known as a koala hotspot, with dozens of records over several decades. The area is dominated by Eucalyptus tereticornis open forest and is still mostly intact despite having a number of intersecting roads.

Mount Walker has relatively few koala records, yet still maintains suitable koala habitat and areas ideal for rehabilitation. Mount Walker has fewer people per hectare compared to Ebenezer so it is expected that this is one of the primary reasons for a lack of sightings.

#### **Key Threats**

Disease appears to be quite common through the area, however this may be due to the high volume of sightings in the area. There are no obvious roadkill hotspots and the impact of dogs in the area is unclear.



Figure 11: Snapshot of Mt Walker PRA.

#### 5.5 Impact Mitigation Areas

Table 4 below outlines all of the key actions for the IMAs recognised in Figure 1. A total of seven IMAs have been identified, based largely on the Ipswich Planning Scheme and other strategic planning documentation. The seven IMAs are:

- Springfield (Master Planned Residential)
- Ripley Valley (Master Planned Residential)
- Ebenezer (Industrial Investigation)
- Rosewood (Future Urban)
- Calvert (Investigation)
- Lanefield (Investigation)
- Grandchester (Investigation).

Impacts are not likely to be the same in each IMA outlined as each one is unique, its scope and timing.

Master Planned Residential areas including Ripley Valley and Springfield are already underway. This plan is unlikely to change to scope of development in these areas but can inform ways to mitigate the impacts. This can occur through facilitating and informing safe passage from areas undergoing development to adjacent areas of refuge. Cherish the Environment Foundation also plays a key role in these areas in terms of identifying offsetting opportunities and implementing them strategically in line with this plan.

Future Urban and Urban Investigation areas are set aside to add capacity to the city based on population projections. These areas are not currently undergoing urban development which presents an opportunity to proactively investigate and assess koala populations. This can help inform environmentally intelligent design of the developments and ensure that sufficient knowledge is available to inform decision making. These areas are also key targets for implementing advance offsets that are strategically driven by this plan.



Figure 12: Overview of all IMA's.

Industrial Investigation is similar to Urban Investigation in that broad scale development is not yet occurring and may require several years to commence. Development for industry is driven by demand and while potential developers already own parts of these areas there is no clear timeframe on when they will be commencing. This provides opportunities to consolidate all information known about koalas in these areas and conduct further investigations where required. The actions in Table 4 outline ways to reduce the impact of development on koalas within sites or adjacent to sites, as well as maintaining connectivity and movement between neighbouring CHAs and PRAs. Another key element is to educate residents on a number of koala related issues. The intention of these actions is to familiarise new residents with the koala populations in their area, especially where new developments border large conservation areas of the NAE.

#### Table 4: Key management actions for all mapped Impact Mitigation Areas

Actions	Priority	IMA	Timing
Continue to monitor EPBC Act referrals and identify opportunities to work with developers in seeking good koala outcomes.	High	All	Ongoing
Provide input and consideration to fauna management solutions being implemented in developments adjoining WRSMCE and other Council land.	High	All	Ongoing
Distribute educational material to new residents emphasizing the impact that domestic pets can have on koalas and other wildlife. Also highlight the critical importance of keeping domestic pets outside of the NAE.	High	All	Material by December 2017
Implement mechanisms to reduce risk of vehicle strike for koalas on high impact roads and road kill hotspots. Identify barriers to landscape level koala movement.	High	All	Ongoing
Develop fauna infrastructure and koala crossing guideline for use by Council to reduce the impacts of infrastructure development on koalas and their habitat.	Medium	All	June 2018
Focus on informing new residents to Ipswich's Iconic Species and local koalas that may be in the area.	Medium	All	Material by December 2017
Emphasise the importance of planting native species in local backyards through partnership program and additional educational material.	Medium	All	Material by December 2017
Work in partnership with developers and contractors to monitor the usage and effectiveness of fauna management solutions, including underpasses and retrofitted culverts.	Low	All	Ongoing

#### 5.6 Additional Considerations for KMAs

As new information becomes available or other key drivers have major influences, the identified Koala Management Areas can be adjusted accordingly. As the key management actions are listed by KMA Type in Tables 1-4, these can be implemented over new or changing KMAs, again with consideration of local circumstances.

To ensure that KMAs remain up to date and management actions in a specific area remain relevant, the KMA mapping should be reviewed every year starting from the date of adoption.



### **6.0 Monitoring Program**

To measure the success of this plan and the overall trends in koala populations across Ipswich it is crucial to regularly and consistently monitor them. Now that koala activity has been strongly confirmed in a number of the large conservation estates, including WRSMCE and FGCE, it is important that they continue to be monitored to see whether they are continuing to use the same areas or are moving into new areas. Seasonality is another important factor and monitoring work in both summer and winter is necessary as it is expected that koalas will change their habits accordingly.

Similarly, it is important to continue to monitor koalas in urban areas, most notably within the Redbank and Collingwood Park UCA, where relative activity surveys were conducted in late 2015. Relative activity level surveys have been highly useful across the area and identify which patches are being used. This method also helps illustrate when a larger area is in decline or likely to go locally extinct. It is recommended that this work (detailed in Section 7.3) be repeated to monitor trends and the success of actions in the UCA.

Council cannot physically access large portions of the PRAs, however one of the key things to monitor in these areas is not koala abundance, but rather the extent of available koala habitat. There are a number of tools available to monitor this, including the changes in Regional Ecosystem Mapping and the amount of land being placed under increasing levels of protection through partnership programs.

One of the key resources used in the development of this plan was data collected by IKPS and the associated detailed attribute data with each individual record. As such, records will continue to be collected from IKPS to help inform management decisions across lpswich from education through to mitigating impacts from roads.

#### 6.1 Monitoring Schedule

The table on page 35 outlines the monitoring schedule and actions that will allow Council to monitor the overall trends in koala numbers across the city, along with meeting the goals and purposes of this plan.

#### 6.2 Reporting

There are a number of reporting elements required for determining the success of this plan. The following is list of reporting requirements split by the year after adoption.

#### Year 1

- Annual report to committee on the implementation of the Koala Conservation and Habitat Management Plan.
- Annual census findings reported to the public.

#### Year 2

- Annual report to committee on the implementation of the Koala Conservation and Habitat Management Plan.
- Annual census findings reported to the public.
- Findings from 2 yearly scat surveys made available to committee and the public.
- Report on success and implementation of fauna infrastructure solutions.

#### Year 3

- Annual report to committee on the implementation of the Koala Conservation and Habitat Management Plan.
- Annual census findings reported to the public.
- Findings from BioCondition assessment completed for CHA's and select PRA's.
- Report on success and implementation of fauna infrastructure solutions.

#### Year 4

- Annual census findings reported to the public.
- Findings from 2 yearly scat surveys made available to committee and the public.
- Report evaluating the plan to date including trends indicated by data collected and active monitoring.

#### Year 5

- Revised plan submitted to Committee by the middle of the 5th year adoption.
- Submission of reviewed plan for completion and adoption.

#### Table 5: Monitoring schedule for Koala Conservation and Habitat Management Plan

Monitoring Activity	Purpose	Timing and Frequency
Monitor the loss and/ or increase of habitat and landscape scale linkages through aerial photography and changes to RE mapping + additional sources of information.	Identify losses and / or increases of key koala habitat across Ipswich.	December annually
Monitor changes in habitat condition based on Queensland Herbarium BioCondition monitoring and field observations. Field observations include assessment of food tree recruitment, tree disease and defoliation. Additional assessments conducted periodic intervals after fire.	Understand the current condition of koala habitat in the CHAs and key areas for remedial action.	3-5 yearly for BioCondition and yearly field observations
Maintain koala records database and conduct detailed analysis of trends every two years. Data immediately supplied to IKPS and Moggill Koala Hospital upon acquisition. Acquire updated detailed database from EHP and create spatial file.	Maintain up to date koala database for records across Ipswich. Ensure that decisions and trends are assessed with the most up to date information.	Ongoing + 2 yearly
Monitor the success of fauna management solutions within Springfield, Redbank and Ripley Valley where they border the CHA. Provide report to Council and the public yearly with findings after implementation.	Understand the impact that these solutions are having on the species make up within the estates and whether koalas can effectively use them.	As needs basis + yearly after implementation
Conduct detailed assessments of koala activity using scat surveys pre and post burn. Scat searches coupled with searches for live animals.	Monitor the effects of low intensity burns on local koala populations and identify needs for additional considerations within a planned burn operation.	One month before and after any prescribed burn in koala habitat
Conduct regular assessment of koala activity levels with the Collingwood Park and Redbank UCA.	Monitor the status of the urban koala population assess the influence of implemented management actions and determine changes in population.	2 yearly
Participate in Annual Great Koala Count or Council run Spot-a-Koala Week. Should national census cease to occur, Council should conduct its own annual koala census. Census should occur in coloration with neighbouring local governments where possible. Report from census made available to the public and data provide to relevant state databases.	Encourage local community to look for koalas on their private property and identify koalas in areas where no sightings have been recorded.	Annually
Conduct biennial monitoring of koala activity levels through scat searches in the Natural Area Estate.	Monitor the longer term usage of koalas within the large estates, with focus on CHAs.	2 yearly, with seasonal variation
Combine scat searches with a repeatable transect program using thermal drone technology. Action pending availability of suitable technology.	Two search methods in combination used to obtain a more rigorous idea of koala presence and abundance across the NAE.	Annually with seasonal variation
Conduct additional assessment of impacts to koalas and koala habitat in response to disturbance events.	Obtain further understanding of local koala populations and their reaction to disturbance.	As needs basis



### 7.0 Literature Review and Gap Analysis

#### 7.1 Existing Data

Council has been very fortunate to work with IKPS who has collected in excess of 3,000 records of koalas collected over nearly 20 years (Figure 13). These records have all been made available to the state government and are available through the Wildlife Online Service. These records range from general community sightings to dog attacks and vehicle strikes.

When presented geographically these records display a broad distribution of koalas across the city and can even highlight roads that have high incidences of vehicle strikes. The data illustrates that there are several 'koala hotspots' around the city including a distinct corridor stretching from the RAAF base in Amberley through to Ebenezer and Mutdapilly, along with the significant numbers in the urban areas in the east of the LGA. One of the more interesting trends in this data is the lack of sightings or data in large areas of bushland. In close to 6,500 hectares of bushland habitat within Council's NAE, there is only one recorded sighting, which was in MGCE. This apparent absence is obviously not a true absence as these areas contain plenty of suitable bushland with comparatively fewer threats.

Instead, it is likely that the absence of koala records in these areas is a result of relatively fewer people in these areas, reducing the likelihood of detection. This creates an unfortunate situation where Council does not have a clear idea of what Council's NAE contributes to koala conservation proportional to the rest of the LGA. As such, it is critical that Council take steps to determine whether the NAE has resident koalas, where they are and an indication of how well they are doing.



Figure 13: Overall map of Ipswich with all known koala records.

#### 7.2 Presence/Absence Koala Surveys

Given the almost complete absence of any koala records in Council's NAE, Council contracted OWAD Environment in August-September 2015. OWAD conducted broad scale assessment of presence/absence within Council's NAE using the Koala Rapid Assessment Method (KRAM) with assistance of Taz, the koala scat detection dog. KRAM is outlined in Woosnam-Merchez et al. 2012. This technique was selected as it is fast, efficient and can cover a large number of sites in less time than other scat analysis methods such as Spot Assessment Technique. With the addition of a scat detection dog, the efficiency of the surveys was also increased significantly. Cristescu et al. (2015) reveals that using a detection dog rather than relying on human detection ability increases efficiency by 19 times, whilst also increasing accuracy by 153%.

OWAD were able to survey 155 locations in only 10 days, of which 94 sites were located in the NAE. Scats were found at 69 of the 155 sites at a rate of 44.5%. Results were broken down based on several other factors including park type and name, vegetation type and Regional Ecosystem. A series of results are displayed in Appendix A.

The results also reveal interesting trends when displayed spatially. In certain areas there are clear clusters of where koalas are present and area where koala presence has not been detected. Another major benefit of scats as an indicator of presence is that they can provide evidence of usage for several months prior to them being located. Therefore, it can be assumed that areas where no koalas have been detected have not been used for a couple of months prior. Maps of survey results split by the different reserves are displayed in Appendix A.

#### 7.2.1 WRSMCE Survey

In WRSMCE, Koala presence was found predominantly in the western half of the estate, with a single positive find further east. Koala scats were found at 7 of 25 sites assessed in this estate, or 28% of sites. It may be relevant to note that the vast majority of this park experienced a significant wildfire in 2012. When analysing the extent of this burn, it is interesting to note that 6 of the 7 sites where scats were found, were outside of the mapped edges of this fire. This recent intense burn may explain the relatively low number of sites with Koala scats especially through the central portions of the park. Indeed, during the fire the Koalas that survived would have largely been pushed outside of the parks boundaries or retracted into the few patches that did not burn. Koalas may currently be in the early stages of recolonising the park after the burn.



#### 7.2.2 FGCE Survey

In FGCE, Koala presence was confirmed in the northern quarter and in the southern half of the estate. Koala scats were found at 12 of 30 sites assessed in this estate, or 40% of sites. This park also experienced a significant burn in 2012 in the southern portion. However, Koala presence was confirmed well into burnt areas, which would suggest that Koalas have already recolonised post-fire. The results for FGCE and WRSMCE are very significant as these two estates are key features in the FKC. Confirming Koala presence in these two estates therefore has wider significance for this important wildlife corridor.

#### 7.2.3 Purga Survey

Purga Nature Reserve is located in a landscape that has been extensively cleared in the past for grazing. An abundance of Koala scats of varying ages, sizes and shapes were found throughout this reserve, indicating frequent visitation by several koalas. With its remnant vegetation and its large mature Eucalyptus tereticornis scattered throughout the property, it is unsurprising that local Koalas would be utilising and relying on this reserve. It is understood that there are multiple sightings in this reserve and surrounds, including several dozen sightings by ICC officers since the start of 2014.

#### 7.2.4 Urban Parks Survey

Ric Nattrass Environmental Park and Redbank Rifle Range are located in a highly modified landscape with significant residential, industrial and commercial developments. Numerous koala scats were found throughout these parks, and the varying age and sizes/shapes of the scats indicates frequent visitation by multiple individual koalas. Both these parks are almost entirely composed of remnant vegetation: a scarce resource in this landscape. These two parks would currently be safe havens in a highly modified and fragmented landscape, so it is unsurprising that local Koalas would be utilising and relying on these two parks.

Koala presence was also confirmed in a number of other parks in urban areas. Koala scats were found in the localities of Pine Mountain, Leichhardt, Churchill, Redbank Plains, Goodna, Redbank Plains, Collingwood Park, Redbank, Bellbird Park and Camira. Koala scats were also found in high abundance on the Cherish the Environment Foundation property in Mutdapilly. Live koala sightings were observed by the study team on the day of survey, and the tenant living on this property knows of several individual Koalas that regularly use the property.

#### 7.3 Assessment of Activity Levels

Due to the extremely positive results in urban areas, Council contracted OWAD Environment to do additional surveys to get further understanding of the populations in targeted areas. Rather than further presence/absence surveys, OWAD conducted assessments of relative koala activity levels. This was completed using the widely used and accepted Spot Assessment Technique with slight amendments to suit the use of Taz the detection dog. Surveys of 5 minutes were conducted at each pre-selected site and the number of trees recorded with evidence of koala usage was recorded. The number of positive trees found in the search time was totalled and compared to other areas, thus giving an idea on the level of activity in an area. Distinguishing between different sizes and age classes gave additional valuable information and often gave a rough idea of how many individuals could be in an area.

The following parks were surveyed for relative levels of koala activity:

- Pine Mountain Bush Reserve
- Hillview Drive Reserve
- Kholo Gardens

- Kholo Road Park
- Kholo Bridge Reserve
- Haig Street Quarry Bushland Reserve
- Collingwood Drive Transmission Easement
- Banjo Paterson Park
- Tofa Mamao A Samoa Park
- Ric Nattrass Environmental Park
- Redbank Rifle Range
- Moodai Reserve
- Annabelle Park
- Hawke Avenue Park
- Gibbs Avenue Transmission Reserve
- Rhonda Reserve
- Bailey Street Reserve
- Goupong Park
- Seymour Park
- Church Street Reserve.

Complete results are available in Appendix B. These additional surveys proved invaluable in highlighting which parks are being used by multiple individual koalas and to what extent. As well as also identifying which parks have very little or no usage and are potentially in decline. For example, the surveys identified that Redbank Rifle Range and Ric Nattrass Environmental Park both had high levels of activity, as did the few small parks in between. This suggests that these two larger parks are linked and koalas can successfully move between them all. However, the parks further west of Redbank Rifle Range had no evidence of koala activity.

#### 7.4 Threat Analysis

Using the data from IKPS, a threat analysis was undertaken. Of the several thousand sightings recorded by IKPS 62% of records were of healthy koalas. This result is encouraging as IKPS are wildlife carers and it is anticipated that a large majority of calls they receive would be of koalas that are in need of assistance or have unfortunately been killed. This may mean that koalas are doing quite well in many areas of the city, and there are plenty of healthy koalas in areas for people to see. It is also highly



possible that large portions of the community are invested in koala conservation and report any koala sightings, regardless of health status. The spike and consistent high numbers of healthy koalas after 2004 is likely linked to this, meaning that this year marked a noticeable increase in the level of engagement by the community in koala conservation.

Also of interest is that the number of koalas recorded with sickness and disease had a noticeable drop between 2002 and 2008 before increasing again in 2009. The reason for this is unclear. The number of injured koalas has remained fairly consistent over the data collection period with only a few slight peaks and troughs.

However, the typical threatening processes are active in Ipswich and IKPS data provides valuable insights into the prevalence of these, especially with regards to dog attacks and road mortality.

#### 7.4.1 Roads

In analysing the IKPS data, roads and major highways in particular, present considerable threats for individual koalas attempting to move between patches of habitat that may have once been connected. Figure 15 displays that an average of 17.7 koalas are hit by vehicles on Ipswich roads every year, not including road collisions that go unrecorded. Unsurprisingly vehicle-koala collisions do not appear to be random and are concentrated in certain areas. The reasoning for the concentrated pockets of collisions is due to a number of factors, including speed limits, roadside visibility and proximity to suitable habitat. Appendix F displays a number of hotspots for collisions with koalas, with notable points southbound on the Cunningham Highway and the Warrego Highway near Blacksoil.

The number of road strikes can also be mapped spatially using GPS coordinates associated with each sighting. From detailed analysis of all of these records there were several apparent 'hotspots' where there was a high incidence of koala-vehicle collisions. Five hot spots have been identified on the Cunningham Highway including two large overlapping hotspots at the southward bend next to Willowbank Raceway. Other major hotspots have been identified along the Warrego Highway just before the Brisbane Valley Highway exit and again slightly to the west of this area. It is worth noting that the majority of these hot spots are on highways and main roads and are therefore managed by the Department of Transport and Main Roads (DTMR).





Figure 14: Trends of major statistics from IKPS and State koala records from 1997-2012

#### 7.4.2 Dogs

Another major threat to koalas is attacks from both domestic and wild dogs. Figure 15 shows that the number of recorded dog attacks rarely goes over 5 per year and has an average of 4.6 attacks per year. In comparison to vehicle strikes the number of dog attacks appears significantly lower, however, this may be a misrepresentation of the true number of dog attacks on koalas per year. An estimated 50% of attacks from domestic dogs are not recorded, mainly because the owners are unaware of it occurring or are concerned about sharing this information (Ellis pers comms. 2015). In addition, the number of attacks by wild dogs in large areas of bushland is almost completely undocumented within Ipswich. Council's pest management program consistently identifies wild dog activity within the NAE, although it is unclear how significant the impact of wild dogs is on local koalas. When considering the unreported attacks and wild dog predation it is highly likely that recorded numbers in Figure 15 are lower than the actual numbers.

#### **IKPS Major Threat Data**



Figure 15: Summary of major threat data compiled from IKPS and State government koala data

Koalas by A Carvolth Enviroplan Photographic Competition Entrant

### Appendix A: OWAD Presence/Absence Survey Results





DISCLAIMER: © DWAD Environment, While every care is also no to ensure the accuracy of this data. OWAD Environment readers no momentations or wateration about	LEGEND	FIGURE 8
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Project No.: 150727 Crewind by: OW On: 1505/2015	No Koala scats found	envint



oject No.: 130721 sected by: DW s: 15056201:

Koala scats found

No Koala scats found



roject No.: 150721 realized by: OW In: 15/05/2011

No Koala scats found

### Appendix B: OWAD Koala Activity Survey Results

![](_page_48_Figure_1.jpeg)

Final Score	Koala Activity Level
Score = 0	0 - No activity detected
Score >0 and <2	1 - Low activity detected
Score >2 and <5	2 - Medium activity detected
Score >5	3 - High activity detected

Park Name	Final Score	Koala Activity Level
Ric Nattrass Environmental Park	8	3
Church Street Reserve	5	3
Moodai Reserve	3	2
Annabelle Street Park	3	2
Seymour Park	0.5	1
Hawke Avenue Park	0	0
Gibbs Avenue Transmission Reserve	0	0
Redbank Rifle Range	5.6	3
Goupong Park	6.2	3
Bailey Street Reserve	0	0
Rhonda Reserve	3	2
Collingwood Drive Transmission Easement	2.5	2
Pine Mountain Bush Reserve	2.9	2
Hillview Drive Reserve	3	2
Kholo Gardens	0	0
Kholo Bridge Reserve	0	0
Kholo Road Park	0.5	1
Haig Street Quarry Bushland Reserve	0	0
Tofa Mamao A Samoa Park	5	3
Banjo Paterson Park	6	3

![](_page_49_Picture_0.jpeg)

![](_page_50_Picture_0.jpeg)

![](_page_51_Picture_0.jpeg)

### Appendix C: The Koalas Of Ipswich: Opportunities, Threats And Future Viability

Taken from Bussey and Ellis (2016)

Regional Ecostystem (RE)	Description	Area of RE reported in Ipswich LGA 2011 (HA)	Estimated Koala density (Koalas per ha)	Possible Koala Population Size	Reported Koala Presence in Ipswich LGA
12.5.3	Endangered Eucalyptus tindaliae and/or E.racemosa open forest on remnant Tertiary surfaces	113	Medium	23	No reports
12.8.9	Lophostemon confertus open forest on Cainozoic igneous rocks	113	Low	1	No reports
12.8.16	Eucalyptus crebra, E.tereticornis woodland on Cainozoic igneous rocks	372	Low- Medium	74	Scats
12.8.17	Eucalyptus crebra, E.melanophloia woodland on Cainozoic igneous rocks	1526	Medium	305	No reports
12.8.20	Shrubby woodland with Eucalyptus racemosa or E.dura on on Cainozoic igneous rocks	53	Medium	11	No report
12.8.24	Corymbia citriodora open forets on Cainzoic igneous rocks especially trachyte	455	Low	5	Scats
12.9-10.2	Corymbia ctriodora, Eucalyptus crebra open forest on sedimentary rocks	9988	Low-Medium	1998	Scats
12.9-10.3	Eucalyptus moluccana on sedimentary rocks	513	Low-Medium	103	Scats
12.9-10.4	Eucalyptus rocemosa woodland on sedimentary rocks	1	Medium	0	No reports
12.9-10.5	Open forest complex often with Corymbia trachyphloia, C.citriodora, Eucalyptus crebra, E.fibrosa subsp. fibrosa on quartzose sandstone	154	Low	2	No reports
12.3.3	Eucalyptus tereticornis woodland to open forest on alluvial plains	751	High	225	Scats
12.3.6	Melaleuca quinquenervia, Eucalyptus tereticornis, Lophostemon suaveolens woodland on coastal alluvial plains	21	High	6	No reports
12.3.7	Eucalyptus tereticornis, Callistemon viminalis, Casuarina cunninghamiana fringing forest	279	High	84	Scats
12.3.10	Eucalyptus populnea woodland on alluvial plains	21	Medium	4	No reports
12.3.11	Eucalyptus siderophloia, E.tereticornis, Corymbia intermedia open forest on alluvial plains usually near coast	47	Medium	9	No reports
12.5.1	Open forest complex with Corymbia citridora on subcoastal remnant Tertiary surfaces. Usually deep red soil.	16	Low	0	No reports
12.5.2	Eucalyptus tereticornis, Corymbia intermedia on remnant Tertiary surfaces, usually near coast. Usually deep red soil.	4	High	1	No reports
12.9-10.7	Eucalyptus crebra woodland on sedimentary rocks	3992	Medium	798	No reports
12.9-10.8	Eucalyptus melanophloia, E.crebra woodland on sedimenatary rocks	0	NA	0	No reports
12.9-10.12	Eucalyptus seeana, Corymbia intermedia, Angophora leiocarpa woodland on sedimentary rocks	246	Low-Medium	49	Scats
12.9-10.17	Open forest complex often with Eucalyptus acmenoides, E.major, E.siderophobia +/- Corymbia citridora on sedimentary rocks	701	Low-Medium	140	Scats
12.9-10.19	Eucalyptus fibrosa subsp. fibrosa open forest on sedimentary rocks	2645	Low/ Low-Medium	132	Scats
12.11.5	Open forest complex with Corymbia citridora, Eucalyptus siderophloia, E.major on metamorphics +/- interbedded volcanics	6	Low	0	No reports
Total	-	22,017	-	3970	-

(adapted from City of Ipswich 2015b, p.101 and Woosnam 2015, p.8: Low = 0.01, Low-Medium = 0.2, Medium = 0.2, High = 0.3).

### Appendix D: Genetically Distinct Clades Within South East Queensland Taken from Lee et al. 2010

![](_page_53_Figure_1.jpeg)

### Appendix E: Overall Strategy Map And Priority Areas Map From The Ipswich City Council Nature Conservation Strategy 2015

![](_page_54_Figure_1.jpeg)

### Appendix F: Hot Spots For Road Mortality Identified In Ipswich. Data Credit To IKPS

![](_page_55_Picture_1.jpeg)

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![](_page_56_Picture_15.jpeg)

## **Glossary of Terms**

CHA	Core Habitat Area
EPBC Act	Environment Protection and Biodiversity Conservation Act 1999 (Commonwealth)
FGCE	Flinders-Goolman Conservation Estate (Council)
FKC	Flinders Karawatha Corridor
IKPS	Ipswich Koala Protection Society
IMA	Impact Mitigation Area
KCA	Koala Conservation Agreement
Koala Coast	Regionally Significant Koala Population Comprising Parts Of Redland Bay, Brisbane, Northern Parts Of The Gold Coast
КМА	Koala Management Area
LGA	Local Government Area
LfW	Land for Wildlife
MGCE	Mt Grandchester Conservation Estate (Council)
MLES	Matters of Local Environmental Significance
MNES	Matters of National Environmental Significance
MSES	Matter of State Environmental Significance
NCA	Nature Conservation Act 1992
NAE	Natural Area Estate (Council)
NCS	Ipswich Nature Conservation Strategy 2015 (Council)
PRA	Priority Rehabilitation Area
QTFN	Queensland Trust for Nature
RAAF	Royal Australian Air Force
RE	Regional Ecosystem
SNR	Stewartdale Nature Refuge
SPP	State Planning Policy (State)
SPRP	State Planning and Regulatory Provisions (State)
UCA	Urban Consolidation Area
VCA	Voluntary Conservation Agreement
WRSMCE	White Rock - Spring Mountain Conservation Estate (Council)

The Koala Conservation and Habitat Management Plan aims to protect, enhance, manage and increase Koala habitat.

![](_page_59_Picture_0.jpeg)

![](_page_59_Picture_1.jpeg)

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