



Byron Coast Comprehensive Koala Plan of Management



Traditional home of the Bundjalung people

This plan was adopted by Council at the Ordinary Meeting on 4 August 2016.

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Acknowledgements

Byron Shire Council engaged Biolink Ecological Consultants to prepare a Comprehensive Koala Plan of Management for the Byron Coast, which also involved completion of the Byron Coast Koala Habitat Study. Working with Council's Koala Plan of Management Project Reference Group, Stephen Phillips and Douglas Jardine from Biolink Ecological Consultants prepared a draft Comprehensive Koala Plan of Management.

Dr Stephen Phillips is a research scientist and consultant ecologist with nearly 40 years of experience in the conservation and management of free-ranging koala populations. Douglas Jardine is a town planner with over 35 years experience in local government in the UK, ACT and NSW.

Following public exhibition the draft was amended by staff from Council's Environment and Economic Planning section in response to submissions received during the public exhibition, in consultation with NSW Department of Planning and Environment, NSW Office of Environment and Heritage and the CKPoM Project Reference Group. Further amendments were also made following receipt of legal advice, a second public exhibition and an ecological peer review.

Other Contributors

Preparation of the Byron Coast Comprehensive Koala Plan of Management Plan has benefitted from input and discussions with the Plan's Project Reference Group. Key members of the PRG include Cr Simon Richardson, Cr Duncan Dey, Angus Underwood (Byron Shire Council), John Turbill (Office of Environment & Heritage), Steve Jensen (Department of Planning & Environment), Lorraine Vass (Friends of the Koala Inc.), and Jan Olley (Community Representative).

A series of formal workshops that included other stakeholders and which focused on themes relevant to the Plan's development were also held during the course of the Plan's development.

Others who have assisted during the course of the project include Byron Shire Councillors and staff including Jan Barham MLC, Ray Darney, Sharyn French, Eli Szandala, Emma-Jayne Leckie, Sandra Pimm, as well as Bob Ohlman (CONOS), Wendy Gibney (Landcare), Zophie Lahodny-Gecso (RFS), John Turnbull (Fire & Biodiversity Consortium), Mark Kingston and Marama Hopkins (Tweed Shire Council).

Development of this Plan also benefitted from review of previously approved Comprehensive Koala Plans of Management particularly those prepared for Lismore City Council, Coffs Harbour City, Kempsey Shire Council, Port Stephens Council as well as draft Plans for Tweed Shire Council and Bellingen Shire Council.

Funding for this CKPoM and the underlying koala habitat study was provided by the NSW Office of Environment and Heritage under the NSW State Government's "Saving Our Species" program funding.

Executive Summary

A koala habitat and population assessment of the 13,790ha coastal portion of the Byron Local Government Area was completed in 2012. The assessment reported the presence of a relatively small population estimated to be approximately 240 koalas currently utilising about 2,000ha of highly fragmented habitat. While the estimated number of koalas was both unexpected and encouraging, the low habitat occupancy rate and apparent isolation of sub-populations suggested that the population as a whole may be unsustainable over the longer-term in the absence of improved connectivity and an increase in habitat cover. Based on an optimal occupancy rate of approximately 50% of available habitat, a minimum area of approximately 2,800ha of well-connected koala habitat was estimated to be required in order to ensure a long-term sustainable future for koalas inhabiting the Byron coast.

State Environmental Planning Policy No. 44 (Koala Habitat Protection) came into effect in 1995 with the aim of reversing trends in koala population decline by encouraging better management of habitat that supports the species. One of the proposed ways of achieving this outcome was for a Comprehensive Koala Plan of Management (CKPoM) to be prepared for part or all of a given LGA so as to enable a consistent, landscape-based approach to matters relating to how koalas and their habitat are managed. This document is thus intended to serve as a CKPoM for the Byron Coast. The recent listing of koalas as a threatened species for purposes of the Federal Government's *Environment Protection and Biodiversity Conservation Act 1999* is also particularly relevant given a capacity in the context of 'important' koala populations to potentially over-ride many aspects of State legislation.

The manner in which this Plan is used will depend on the purpose and does not necessarily need to be read from cover to cover. Much of the content of the Plan has been informed by the Byron Coast Koala Habitat Study (2012) which is available at www.byron.nsw.gov.au and this study should be referred to for further information.

This Plan is divided into two (2) parts:

Part 1 – The Strategy

Section A - Introduction

This section provides the background to the Plan describing the human and natural environment of the planning area, including the status of koalas within this area. It defines the planning area and gives a description of the community consultation activities undertaken as part of the Plan's development.

Section B - General Provisions and Koala Management Framework

This section sets out the general provisions of the Plan, outlines the Vision, Aims and Objectives and the roles and responsibilities for Council, landholders, developers and the Byron Community. This section also details the planning framework, and includes classification of koala habitat, identification of areas containing resident koala populations, koala management areas and precincts, corridors and buffers. Detail is also provided on how the Plan informs local policy and planning instruments.

Section C - Management Activities

This section of the Plan provides details of the management activities to be undertaken by Council and the community aimed at enhancing koala habitat and managing the threats koalas face including roads, dogs, fire, koala health and research. It also outlines the community education activities and long term monitoring of koala populations. These non-regulatory activities provide an opportunity for Council to proactively collaborate with the community towards conserving koala populations on the Byron coast.

Part 2 - Development Assessment and Control

This section provides the development assessment and control provisions to satisfy the statutory requirements of SEPP44. This part of the Plan must be referred to when preparing or assessing development applications under the *Environmental Planning and Assessment Act*. Council will be unable to grant consent to development applications which have not met the requirements of this Part.

Definitions & Acronyms

The following definitions and acronyms are used throughout this document and are listed here along with their associated meanings. A word or expression used in this definition has the same meaning as it has in the Standard Instrument – Principles Local Environmental Plan in force immediately before this Plan commenced.

APZ means Asset Protection Zone.

assisted regeneration means the process of managing degraded land to reduce threats such as weeds, grazing or inappropriate fire regime with the aim of promoting the regeneration of native vegetation.

BLEP means Byron Local Environmental Plan.

BLGA means Byron Local Government Area.

BSC means Byron Shire Council

building envelope means a defined area which identifies the location where future building can be located on a lot. The building envelope is defined by building height and front, side and rear boundary setbacks.

CKPoM means Comprehensive Koala Plan of Management.

complying development means development that can be carried out in accordance with a Complying Development Certificate issued by Council or an accredited private certifier. Complying development provisions are contained in SEPP (Exempt and Complying Codes) 2008.

core koala habitat means an area of land with a resident population of koalas, evidenced by attributes such as breeding females (that is, females with young) and recent sightings of and historical records of a population.

Council means Byron Shire Council.

DBH means (tree) diameter at breast height, this being a measurement around the tree trunk at a height of 1.3 metres off the ground.

development footprint means the area of land to be developed inclusive of dwellings and all other associated infrastructure including but not limited to roads, driveway, waste water systems, landscaping, asset protection zones, removal of vegetation, phone and electricity connection.

DP&E means the Department of Planning & Environment.

EPA Act means the *Environmental Planning and Assessment Act 1979*.

EPBC Act means the *Environment Protection and Biodiversity Conservation Act 1999*.

FoK means the Friends of the Koala Inc.

habitat buffer means a 50m wide strip of land adjoining koala habitat that is intended to be managed to avoid negative environmental impacts on any habitat area

IKPoM means an Individual Koala Plan of Management prepared in accord with SEPP 44.

KMA means Koala Management Area.

KMC means Koala Management Committee.

KMP means Koala Management Precinct.

koala planning area means the area marked as *koala planning area* on Figure 1

koala corridor means vegetation that links one area of habitat with another and therefore provides habitat for movement, linkage and dispersal. Koala corridors can include linear

connections or vegetation providing 'stepping stone' connectivity between larger areas of koala habitat such as isolated clumps of vegetation or scattered trees.

large development means development that has the potential for moderate to significant adverse impacts on koala populations because of its size, type or location. Large development includes development which requires an Assessment of Significance (Section 5A EP&A Act, Section 94 TSC Act). Large development includes but is not limited to subdivision of land resulting in the creation of additional lots (including rural community title subdivision), multiple occupancy, rural tourist and eco-tourist accommodation, animal boarding or training establishments, industrial retail outlets, depots, warehouse or distribution centres, airstrip, transport depots, truck depots, extractive industries, flood mitigation works and open cut mining.

LEP means Local Environmental Plan.

minor development means development that is not *large development* and has potential for minor impacts on koala populations. Minor development includes but is not limited to alteration or additions to existing lawfully erected building, dwelling houses, rural worker's dwelling, bed and breakfast accommodation, dual occupancies, secondary dwelling, neighbourhood shop, recreation area, pool, fence or boundary adjustment that does not result in the creation of additional lots.

NV Act means the *Native Vegetation Act 2003*.

OEH means the NSW Office of Environment & Heritage.

Patch means a spatially discrete and mappable area of native vegetation.

preferred koala food tree means a primary or secondary food tree as defined in the table below:

	Common name	Scientific name
Primary	Tallowwood	<i>Eucalyptus microcorys</i> *
	Forest Red Gum	<i>Eucalyptus tereticornis</i> **
	Swamp Mahogany	<i>Eucalyptus robusta</i> **
Secondary	Small fruited Grey Gum	<i>Eucalyptus propinqua</i>
	Scribbly Gum	<i>Eucalyptus racemosa</i> <i>subsp racemosa</i>

* Tallowwood *Eucalyptus microcorys* is considered a secondary food tree on lower nutrient erosional soils – see Habitat Study.

** includes naturally occurring *E. tereticornis* x *E. robusta* hybrid.

potential koala habitat means any area identified as either Primary, Secondary (A) or Secondary (B) as defined in the table below:

Primary Habitat	means areas of forest and/or woodland wherein <u>primary</u> food tree species comprise the dominant or co-dominant (i.e ≥50%) overstorey tree species.
Secondary (Class A) Habitat	means areas of forest and/or woodland wherein primary koala food tree species form 15-50% of the overstorey tree species; or primary and secondary food tree species combine to form > 15% of the overstorey tree species
Secondary (Class B) Habitat	means areas of forest and/or woodland wherein primary food trees species are absent and secondary food tree species form >15% of the overstorey tree species.

PRG means Project Reference Group

RFS means the NSW Rural Fire Service.

RMS means Roads & Maritime Services.

SCU means Southern Cross University.

study area means the allotments to which the development application relates and any additional areas likely to be directly or indirectly impacted by a development including any asset protection zone, ancillary and off site works.

suitably qualified and/or accredited means an individual with tertiary qualifications in environmental science (or equivalent) and relevant demonstrated work experience. For undertaking koala activity assessments, a person must have demonstrated work experience or accreditation in koala ecology and surveys. For undertaking vegetation assessment, a person must have demonstrated experience in undertaking vegetation assessment and knowledge of vegetation plants and communities of Northern NSW/ South East Queensland.

SEPP 44 means *State Environmental Planning Policy No. 44 (Koala Habitat Protection)*.

TSC Act means the *Threatened Species Conservation Act 1995*.

wildlife corridor means the areas identified as wildlife corridors in the Byron Biodiversity Conservation Strategy as shown in Figure 9.

Vegetation removal means any activity or work that affects vegetation and includes the undertaking of any of the following actions with regard to vegetation: burning, clearing, cutting down, destroying, felling, injuring, killing, logging, lopping, poisoning, pruning, removing, ringbarking, slashing, thinning, topping, digging up or uprooting.

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Part 1: The Strategy

Section A – Background Information

1 Introduction



The aim of *State Environmental Planning Policy No. 44 – Koala Habitat Protection* (SEPP 44) is to encourage the conservation and management of areas of natural vegetation that provide habitat for koalas so as to ensure a permanent free-living population over the species' present range and reverse a State-wide trend of population decline. Amongst measures proposed to assist this process is the preparation of Koala Plans of Management such as this.

In addition to conservation measures enacted by SEPP 44, the NSW Government's *Threatened Species Conservation Act 1995* additionally lists koalas as a Vulnerable species in NSW and in December 2008 a Koala Recovery Plan was approved by the NSW Government (DECC 2008). Objectives of the approved Recovery Plan include:

- the integration of koala habitat conservation into local and state government planning processes;
- development of appropriate road risk management in areas of koala habitat;
- implementation of strategies which minimise the impacts of domestic dogs on free ranging koalas;
- development and implementation of strategies to reduce the impact of fires on koala populations; and
- rehabilitation and restoration of koala habitat and populations.

In 2012 koalas were similarly listed as Vulnerable in Queensland, New South Wales and the Australian Capital Territory for purposes of the Federal Government's *Environment Protection and Biodiversity Conservation Act 1999*.

Management of koalas

Given the recent Federal listing and a history of statutory protection in NSW that extends back nearly 50 years, it is arguable that little has really been achieved in terms of sustainable management of free-ranging koala populations. Indeed, mitigating the processes that threaten the viability and survival of free-ranging koala populations is not a straightforward task. However, we do know what the problems are and the knowledge to enable rectification is available.

In this context the recent Byron Coast Koala Habitat Study (Hopkins & Phillips 2012) identified 5 key issues that needed to be addressed in order to ensure a sustainable future for koalas inhabiting the Byron Coast planning area:

1. Better control and management of fire,
2. A need to assertively deal with incidental koala mortalities,
3. A co-ordinated program of habitat restoration/rehabilitation works,

4. High standards of koala habitat assessment, and
5. Effective development controls.

The abovementioned issues are not unique to the Byron Coast, nor are they the result of recent events, although the extent and severity of their impact has accelerated over the last two decades as koalas have expanded their range across the Byron local government area (Hopkins and Phillips 2012). Whilst a number of actions have been taken by Council and others to address some issues it is clear that additional measures will be required if the population is to be placed on a long-term sustainable management footing. Indeed, to achieve such a goal will require actions that:

- treat the Byron Coast environment and its remaining koalas holistically and not just in terms of ‘Core Koala Habitat’;
- encourage coordinated action across all processes of governance;
- effectively resource Council to enable it to be the lead agency in terms of implementing required management actions on lands under its governance; and
- adequately inform and engage all sectors of the community in the processes of sustainable koala management.

1.1 The Planning Area

The Byron coast *koala planning area* comprises approximately 13,790 hectares of land located along the coastal portion of the Byron Local Government Area (BLGA), extending from the BLGA’s boundary with Tweed Shire in the north to its boundary with Ballina Shire in the south. The western boundary is an arbitrarily defined line earlier identified by Council, OEH and DP&E officers that served to delimit that area within which development pressure and other land uses with the potential to impact upon koalas were perceived to be greatest. The Pacific Highway bisects the *koala planning area* between Brunswick Heads – Billinudgel in the north to where the highway currently exits the planning area boundary in the vicinity of Bangalow to the southwest. Figure 1 details the boundaries of the *koala planning area*.

1.1.1 The Human Environment

The Byron Shire has been experiencing significant growth since the mid 1970s and over the 30 year period from 1976 to 2006 the human population increased by 177%. At the time of preparing this plan the BLGA has a current population of approximately 32,000 people, the majority of which reside within the urban centres of Byron Bay/Suffolk Park, Mullumbimby, Brunswick Heads, Bangalow and Ocean Shores/South Golden Beach/New Brighton. With the exception of the village of Bangalow, all of the aforementioned urban centres are within the boundaries of the *koala planning area*.

Estimates of human population growth to 2026 have been prepared for the BLGA (Byron Shire Council Section 94 Contributions Plan), the outcomes from which predict a further population growth of some 7,000 people, the majority of which will be accommodated in new urban release areas and brown-field redevelopments. Most urban development will be focused around hubs at West Byron, Mullumbimby and Bayside at Brunswick Heads.

While there are important areas of koala habitat in public ownership, the greater proportion within the *koala planning area* is privately owned. This pattern of land tenure means that controls on koala habitat vary throughout the *koala planning area* as a reflection on differing legislative requirements that *inter alia* affect planning, bushfire and clearing controls; it also means however that meaningful koala conservation and management is a responsibility spread across the entire community.

1.1.2 The Natural Environment

The BLGA is diverse in terms of landform and topography, bordered in the east by the Pacific Ocean and rising to more than 800m above sea level along the Koonyum Range to the west. A diverse variety of vegetation communities and fauna habitats are supported; at least 38 distinct vegetation associations are recognised including rainforests, coastal heathlands and wetlands, mangroves, eucalypt forests and woodlands, many of which are depleted, inadequately conserved and/or listed as Endangered Ecological Communities for purposes of the *Threatened Species Conservation Act 1995* (Landmark 1999).

Excluding National Park estate, approximately 50% of the BLGA is vegetated, the majority of forest cover occurring outside the *koala planning area*. Severance of the coastal strip from the hinterland forests has resulted from large-scale historical clearing for agriculture; the remaining vegetation along the coastal plain now mostly presenting as isolated fragments and narrow, linear strips. Native vegetation remnants in general are highly disturbed and are strongly influenced by the presence of exotic species, particularly Camphor Laurel *Cinnamomum camphora*.

Status of koalas on the Byron Coast

The Byron Coast Koala Habitat Study (Hopkins & Phillips 2012) identified a relatively small population of approximately 240 koalas to be currently utilising about 2,400ha of highly fragmented habitat distributed patchily along the coast and adjacent hinterland. This habitat estimate has subsequently been revised downwards to approximately 1750ha following a comprehensive review of the mapping and additional ground-truthing work undertaken during the course of preparing this CKPoM. Amongst other things, the Habitat Study considered the presence of an apparently viable coastal koala population: surprising given the extent of habitat fragmentation so evident on the coastal plain, together with barriers presented by the Pacific Motorway, associated road-kill and the extensively cleared hinterland to the west. More than 75% of the *koala planning area*'s resident koalas are located centrally in the area between the Brunswick River in the north and St. Helena in the south.

While the number of animals occupying central areas of the *koala planning area* is encouraging, the low habitat occupancy rates in the Ocean Shores – Billinudgel area and to the south around Broken Head implies that the broader coastal metapopulation may be unsustainable over the longer-term in the absence of assertive recovery actions and improved connectivity, while an increase in habitat cover in more central areas also appears desirable. Based on a minimum viable population size of approximately 180 koalas, an average home range size of 5ha for each animal and an optimal occupancy rate of approximately 50% of available habitat, a minimum area of approximately 1,800ha of well-connected koala habitat is required in order to ensure a long-term sustainable future for koalas within the *koala planning area* south of the Brunswick River alone; unfortunately, existing knowledge indicates that only 1400ha of habitat is present in this area. Thus the establishment of additional areas of koala habitat, coupled with enhancement and/or creation of habitat linkages to better facilitate koala movements and gene flow between subpopulations are perceived to be the fundamental tools for increasing the probability of long-term persistence.

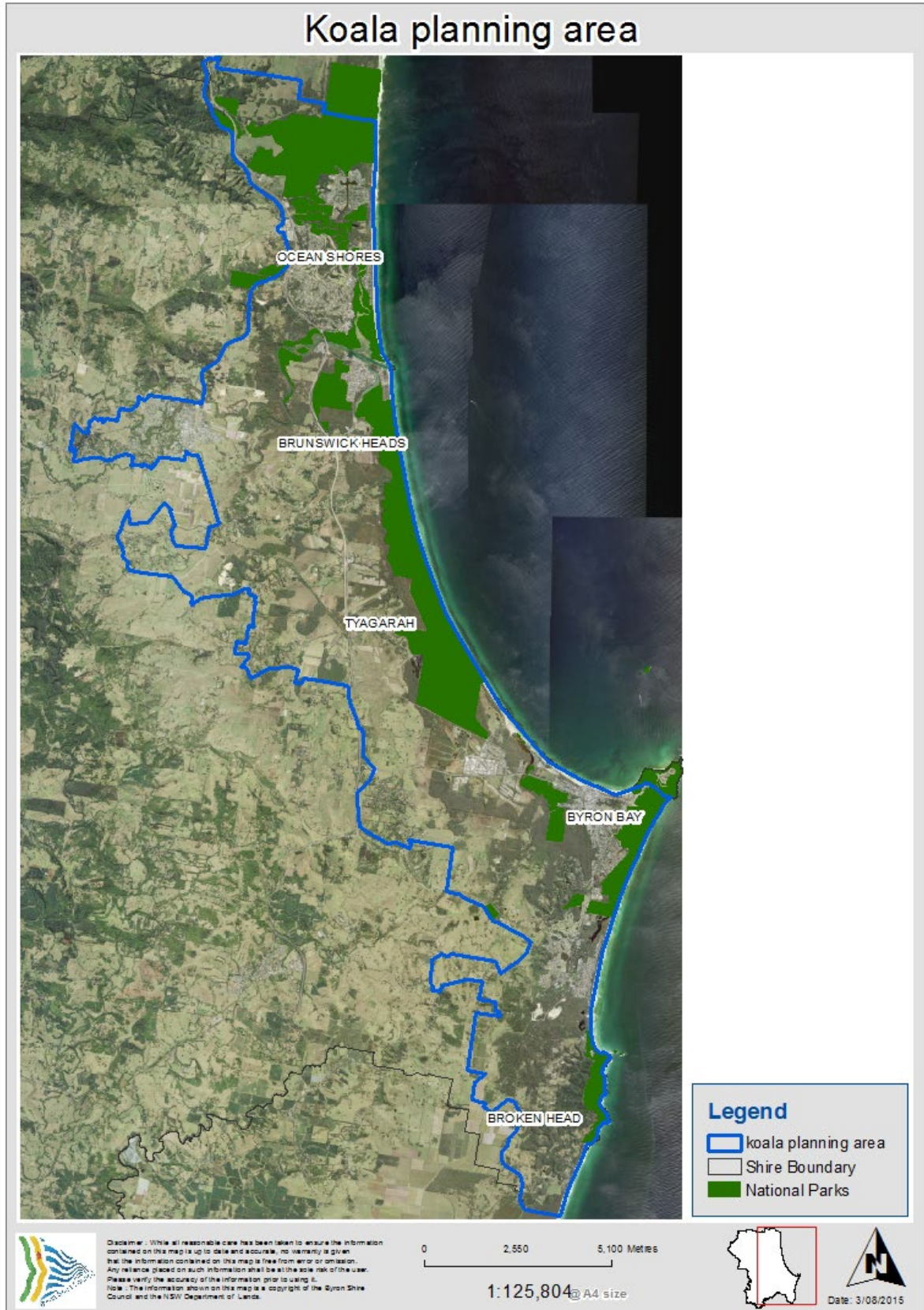


Figure 1: Koala planning area

1.2 Community Consultation

Community consultation has occurred during the Plan's development through the formation of a Project Reference Group (PRG), stakeholder workshops and public exhibition. Preparation of the draft Plan benefited from input and discussions with the Plan's PRG which held ten (10) meetings during the preparation of the Plan. A series of formal workshops were also held prior to and during the development of the Plan that included additional key stakeholders from government agencies and community groups and which focused on themes of relevance to the Plan's development including landscape connections, development controls, fire management and music festivals.

The draft Plan was placed on public exhibition from 11 February 2014 to 21 March 2014. During the exhibition period media exposure of the Plans exhibition was gained via local newspapers, radio and television. Community engagement activities were undertaken as part of the exhibition including a practitioner's workshop for consultant planners and ecologists, two (2) public information sessions and information stalls at two (2) farmers markets. Council staff were also available to speak with landholders via phone calls and face-to-face meetings. A mail-out to over 800 landholders within Koala Management Precincts was also conducted to advise of the Plans development and invite them to attend an information session or contact Council staff to discuss how the Plan may impact them.

In response to public exhibition a total of 57 submissions were received from individuals, community groups, consultant planners and consultants on behalf of landowners, and government agencies. The submissions fell into three main groups:

- Individuals, community groups and government agencies in support of the draft Plan based on the urgency of the need to address koala recovery (56%)
- Individuals, community groups or practitioners generally supportive but requesting specific amendments to the draft (9%)
- Landowners and/or their consultants, who, whilst generally accepting of the need to address koala recovery, were not supportive of the draft Plan for a variety of reasons (35%).

Following the review of submissions, and subsequent consultation with the PRG, Councillors and DP&E, amendments were made to the draft Plan in response to issues raised in submissions and during consultation activities.

In September 2015 an additional 2 weeks was provided for interested parties to make submissions on the revised CKPOM. During this second exhibition period a total of 33 submissions were received. 27 submissions (82%) supported the adoption of the KPOM. Six of these submission objected to the weakening of the Plan since the 2014 version. Four submissions (12%) provided comments. Two submissions (6%) objected to certain parts of the Plan.

Section B – General Provisions

2 Preliminaries

2.1 Name of Plan

- (i) This document is called the *Byron Coast Comprehensive Koala Plan of Management 2015* (hereafter referred to as “the Plan” or “this Plan”).

2.2 Area to which the Plan applies

- (i) The Plan applies to those lands within the *koala planning area* identified by Figure 1.
- (ii) The Plan does not apply to National Parks Estate.

2.3 Supporting documentation

- (i) The Plan should be read in conjunction with the *Byron Coast Koala Habitat Study* prepared for Byron Shire Council in 2012 by Biolink Ecological Consultants (hereafter referred to as “the Habitat Study”) and any associated Addenda.

2.4 Interpretation

- (i) The Definitions and Acronyms section defines words, expressions and acronyms for the purposes of this Plan.

2.5 Commencement date

- (i) The Plan was adopted by resolution of Council on 4 August 2016 and approved under State Environmental Planning Policy SEPP (Koala Habitat Protection) 2021 which commenced 17 March 2021.

2.6 Life of Plan

- (i) The envisaged life span will be a minimum of eighteen (18) years (3 koala generations) from date of commencement.

2.7 Relationship to other Koala Plans of Management

- (i) The Plan does not supersede any other approved Individual KPoM that has been prepared in accordance with SEPP 44 and which is currently in force on lands to which the Plan applies unless there is provision within that Individual KPoM for ongoing amendment and/or revision, in which case relevant provisions of the Plan must be applied and incorporated.

2.8 Severability

- (i) Any provision of this Plan which is invalid or unenforceable is to be read down, if possible, so as to be valid or enforceable.
- (ii) If any such provision is not capable of being read down then it is to be severed from this Plan to the extent of the invalidity or unenforceability, without affecting the remaining provisions of this Plan.

3 Vision, Aims & Objectives



3.1 Vision & Aims

- (i) The overall vision of the Plan is to enable a long-term, sustainable future for koala populations inhabiting the *koala planning area*. This vision is envisaged to be realised by way of the following aims:
- a) an increase in the total area of *potential koala habitat* in central parts of the *koala planning area* by a minimum of 20% to at least 1,800ha, including consolidated linkages within and beyond the *koala planning area*;
 - b) the presence of a self-sustaining, stable koala population of 250 - 300 individuals distributed equitably along the Byron Coast; and
 - c) a community that is collectively informed and committed to a sustainable future for the Byron Coast koalas.

3.2 Objectives

- (i) The Aims of the Plan will be realised by way of the following objectives:
- a) establishment of a framework for the identification and management of areas of koala habitat and associated koala populations (Section 4 & 5);
 - b) a strategic program of koala habitat regeneration and/or rehabilitation (Section 6);
 - c) an increase in community and public awareness through education programs concerning koala conservation and management (Section 7);
 - d) identification of koala welfare and research needs intended to improve and inform long-term management of the koala planning area's resident koala population(s) (Section 8)
 - e) to outline non-binding activities related to issues such as road kill and fire management that are intended to encourage better networking and cooperative management between other agencies whose activities can have a significant influence on koala conservation in the planning area (Section 9).
 - f) establishment of procedures for long-term monitoring of the conservation status of the Byron Coast koalas so as to assess the efficacy of the Plan and enable regular review (Section 10);
 - g) incorporation of standardised assessment procedures to ensure that adequate detail is provided with development applications, along with an accompanying set of development controls and standards (Section 12);
 - h) the provision of requirements for koala habitat compensation for any development that results in unavoidable loss of native vegetation cover (Section 13);

4 Roles and Responsibilities



Responsibilities for management of koalas and their habitat are spread widely across the community. Whilst some land tenures (such as National Park estate) and activities (such as fire hazard reduction) are excluded from the provisions of SEPP 44, it is important that all authorities strive to manage remaining areas of habitat in the *koala planning area* without detriment to koalas. Other agencies (such as RMS), whilst not having specific koala-related responsibilities, have carriage for activities which can have significant consequences for koala management. Each agency, in addition to the wider community, must take a share in the responsibilities for ensuring effective implementation of the Plan. To facilitate this commitment a lead agency is essential.

Overall objective: To create the framework for coordination and integration of the actions of all agencies responsible for land management on the Byron Coast and ensure broad community representation and inter-agency involvement in the processes of koala management.

4.1 Establishment of Lead Authority

Council will be the lead authority to champion sustainable koala management within the *koala planning area* by:

- enforcing planning controls, particularly regarding the clearing of koala habitat;
- facilitating or supporting appropriate training for personnel dealing with koala related issues;
- undertaking and encouraging habitat rehabilitation;
- supporting koala welfare groups;
- preparing and implementing education programs;
- monitoring koala populations and the effectiveness of the Plan; and
- integrating the provisions of the Plan into relevant plans and policies associated with governance of the area to which the Plan applies.

Council will seek the support of **Government Agencies** in managing the *koala planning area* koala population, particularly with respect to those elements of the Plan which fall outside Council's responsibility.

Council will advise and work with **Landowners** who will be encouraged to review their land management practices in light of the Plan and examine the potential of their holdings to assist with koala management and/or habitat rehabilitation measures.

Council will advise and work with **Developers** to ensure adoption of best practice measures to accommodate and/or assist koala management in the context of development proposals.

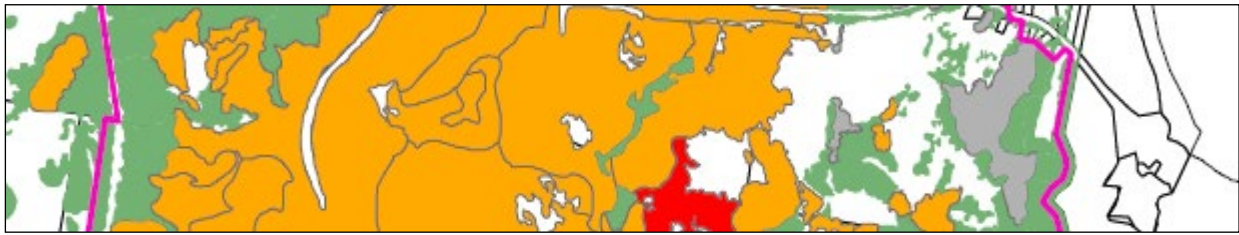
Council will assist the **Byron Shire Community** to become more actively involved with the management effort through participation in habitat regeneration/rehabilitation programs and assisting licensed welfare activities, being better informed about koala management issues, and increasing levels of vigilance and engagement with koalas.

4.2 Establishment of a Koala Management Committee (KMC)

Council shall establish a KMC to assist with implementation of the Plan.

- (i) Within the first 12 months following commencement of the Plan, Council shall have drafted and adopted Terms of Reference for the KMC and arranged the first meeting.
- (ii) The Terms of Reference shall include the following:
 - minimum representation by BSC, OEH, RFS, Friends of the Koala (FoK) and a minimum of 2 persons from the local community.
 - a Chairperson elected from amongst the members who shall retain that position for a period of no greater than 12 months.
 - a minimum of 3 meetings a year for the first 5 years of the plan, and thereafter as required but no less than twice a year.

5 Koala Management Framework



Achieving the vision of the Plan requires a clearly enunciated framework for koala management. In order to achieve the Aim of SEPP 44 the framework must adopt a multifaceted approach which identifies and protects:

- areas of habitat containing a resident koala population
- areas of currently unoccupied habitat important for koala dispersal and population expansion over time
- connections between areas of habitat important for dispersal and recruitment of koalas

Objective

To set out a strategic framework for koala management that will:

- focus, prioritise and direct the management actions required to achieve the objectives of the Plan, and
- allow Council to respond to specific opportunities for better habitat management and enhanced community participation in koala recovery as they arise.

5.1 Introduction

The Koala Management Framework is expressed in this Plan through:

- the identification & classification of koala habitat
- the identification of areas known to contain resident koala populations
- the division of the *koala planning area* into Koala Management Areas (KMAs) and Koala Management Precincts (KMPs)
- management principles for habitat buffer areas and koala corridors.

5.2 Classification of Koala Habitat

Under SEPP 44, *potential koala habitat* means “areas of native vegetation where the trees of the types listed in Schedule 2 constitute at least 15% of the total number of trees in the upper or lower strata of the tree component”.

The Habitat Study included the classification and identification of local koala habitat mapping using the terms Primary and Secondary (A & B) Habitat.

The ecological based criteria upon which the Primary and Secondary habitat classifications from the Habitat Study are based have been combined with the ‘15% rule’ from SEPP 44 to identify *potential koala habitat* for the purposes of this Plan (Table 1).

Table 1 Potential koala habitat

Potential koala habitat	Primary Habitat	means areas of forest and/or woodland wherein <u>primary</u> food tree species comprise the dominant or co-dominant (i.e ≥50%) overstorey tree species.
	Secondary (Class A) Habitat	means areas of forest and/or woodland wherein: <ul style="list-style-type: none"> • <u>primary</u> koala food tree species form 15-50% of the overstorey tree species, or • <u>primary</u> and <u>secondary</u> food tree species combine to form > 15% of the overstorey tree species
	Secondary (Class B) Habitat	means areas of forest and/or woodland wherein <u>primary</u> food trees species are absent and <u>secondary</u> food tree species form >15% of the overstorey tree species.

Subsequent to the koala habitat mapping completed during the Habitat Study, Council undertook a comprehensive review of the vegetation mapping on which the koala habitat maps were derived. Koala habitat mapping in this Plan is based on new 2015 fine scale vegetation maps which use the Vegetation Classification for the Northern Rivers Catchment Management Area (OEH 2012).

Each mapped unit of vegetation was ranked into Primary, Secondary (Class A) and Secondary (Class B) or other. This classification process has additionally been informed by direct field observation of forested areas undertaken during field surveys; vegetation survey data from a range of sources available to council; and the vegetation descriptions for the relevant plant community types (OEH 2012 and 2014).

Based on the classification in Table 1, 19 plant community types were identified as *potential koala habitat* within the *koala planning area*. Appendix 4 provides details of plant communities identified as *potential koala habitat* and their extent in the *koala planning area*.

A total of 1748 hectares of *potential koala habitat* has been identified, including 235 hectares of Primary Habitat; 852 hectares of Secondary (Class A) Habitat; and 661 hectares of Secondary (Class B) Habitat.

As with all landscape scale spatial mapping, further property level validation may be required to confirm the assigned vegetation communities and associated koala habitat category. The mapping has been completed without regard to property boundaries, instead identifying homogenous areas of vegetation. Natural variation in the distribution of koala food trees may occur within each mapping unit, therefore a mapped vegetation community may extend over multiple properties but the distribution of koala feed trees may vary within this area.

Additionally some areas of important koala habitat, such as scattered individual koala food trees, or areas containing koala food trees but not meeting the SEPP 44 definition will not be included in the koala habitat maps.

- (i) For the purposes of this Plan, *potential koala habitat* includes any vegetation community categorised as Primary, Secondary (Class A) or Secondary (Class B) habitat, in accordance with Table 1. Provisional *Potential koala habitat* is identified in Figure 2.

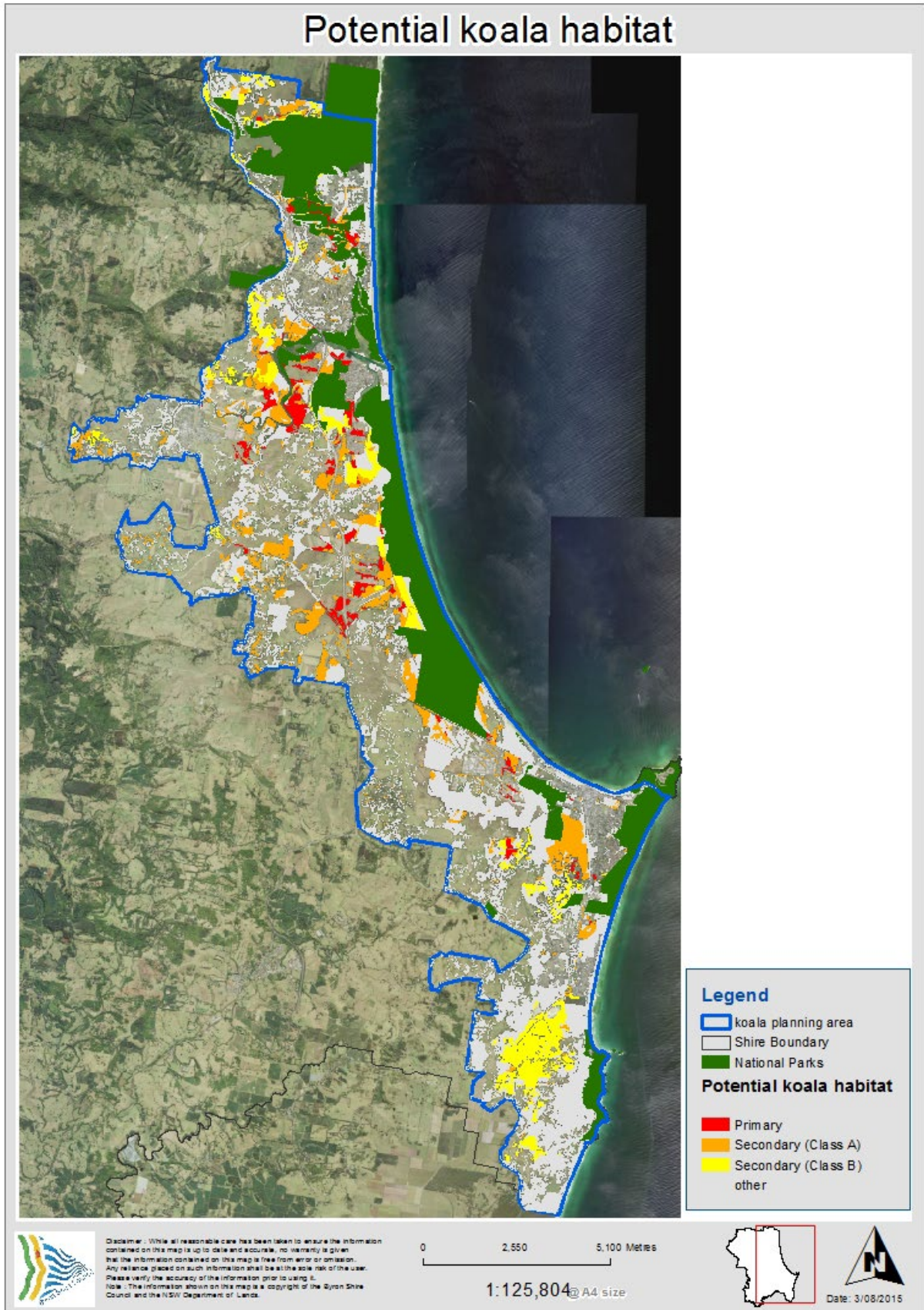


Figure 2: Provisional potential koala habitat

5.3 Koala Management Areas (KMAs)

Informed by the Habitat Study, the *koala planning area* has been divided into two (2) Koala Management Areas recognising two distinct koala populations. Genetic studies have established that differences occur between koala populations on either side of the Brunswick River, those to the north being affiliated with the Tweed – Southeast Queensland koala genome, while those to the south represent a different genetic lineage most likely associated with or derived from populations in the Lismore – Ballina area. The genetic barrier thus represented by the lower reaches of the Brunswick River within the *koala planning area* and the associated presence of two genetically discrete populations requires recognition which is achieved through identification of related Koala Management Areas (KMAs).

The following KMAs are established for the purposes of the Plan, the boundaries of which are detailed in Figure 3.

5.3.1 North Byron Coast KMA

The North Byron Coast KMA encompasses an area of approximately 2,814ha located to the north of the Brunswick River and which includes the Billinudgel Nature Reserve along with the localities of South Golden Beach, Ocean Shores and Billinudgel as indicated by Figure 3 of the Plan.

The North Byron Coast KMA represents the southern-most extension of habitat known to be occupied by the Tweed & Brunswick Coast Population of the Koala. The Tweed & Brunswick Coast Population of the Koala has been much reduced by bushfire events in 2004 and 2009, so much so that its long-term survival is now questionable. While the northern boundary occupied by this population is the Tweed River, that area of habitat within the Byron Coast *koala planning area* contains a large area of *potential koala habitat* capable of supporting a resident population upwards of 50 animals; the recovery and sustainable management of which would make an important contribution to the long term viability of koalas on the Tweed and Byron Coastal areas generally.

The management aim for the North Byron Coast KMA is to recover this important sub-population of the Tweed & Brunswick Coast Population of the Koala.

5.3.2 South Byron Coast KMA

The South Byron Coast KMA encompasses an area of 10,980ha located to the south of the Brunswick River, bounded in the west and south by the *koala planning area* boundary and including the localities of Brunswick Heads, Mullumbimby, Byron Bay and Suffolk Park as indicated by Figure 3 of the Plan

The South Byron Coast KMA contains the bulk of the *koala planning area*'s koalas, occupying some relatively large areas of habitat embedded in a matrix of mostly rural and rural-residential lands. The Pacific Highway effectively bisects the KMA, contributing further to the extent of habitat fragmentation and impeding the successful dispersal and/or recruitment of koalas between the otherwise widely scattered sub-populations that occur between Brunswick Heads and Mullumbimby through Tyagarah, West Byron and Broken Head.

The management aim for the South Byron Coast KMA is to enable consolidation of the existing koala population(s) with a view to ensuring their long-term persistence, a key element of which is also to increase the extent of *potential koala habitat* in the Suffolk Park – Broken Head area that is currently occupied by koalas.

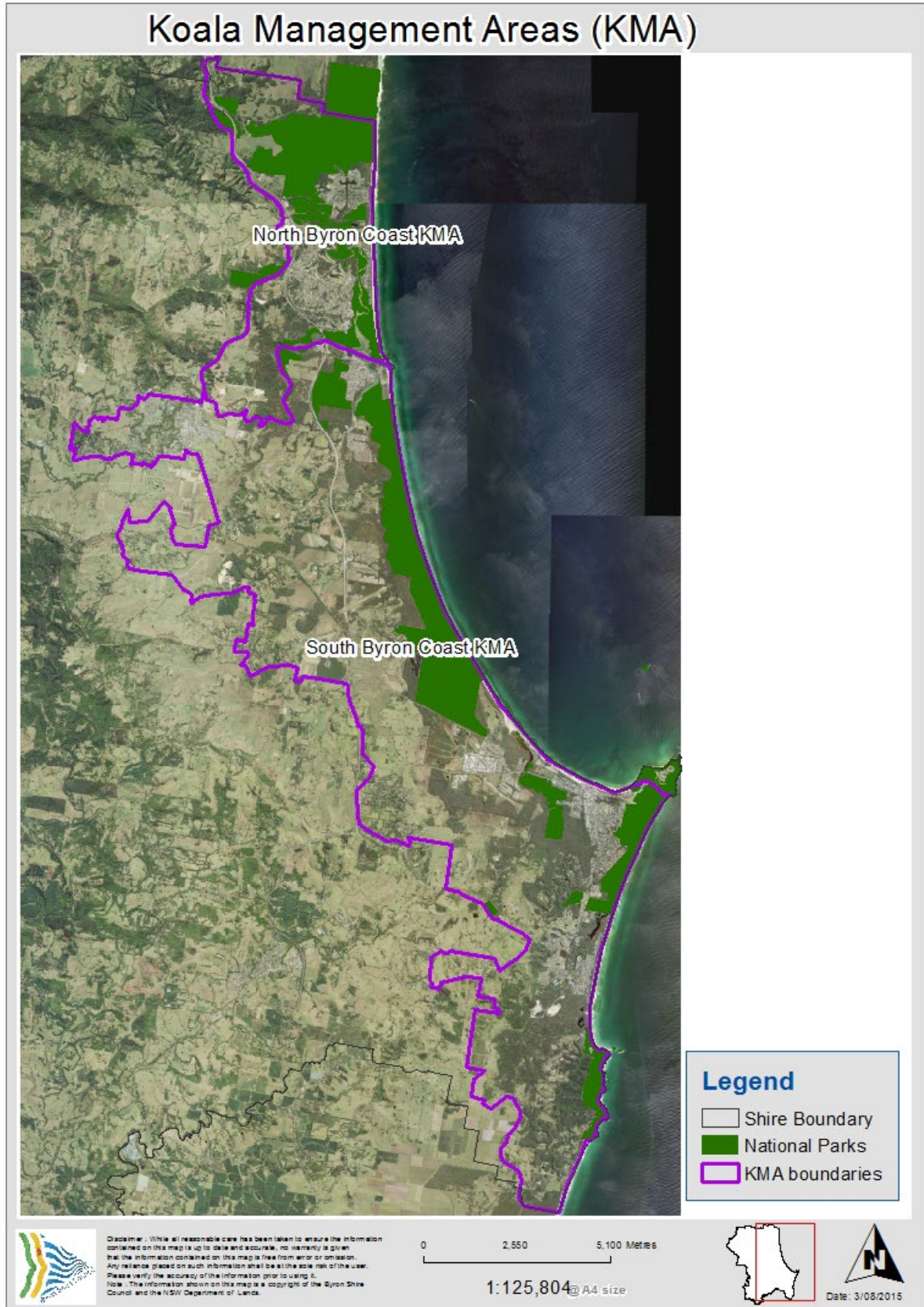


Figure 3: Koala management areas

5.4 Koala Management Precincts (KMPs)

Within the two KMAs there is a need to be able to focus management effort into those areas wherein resident koala populations and their habitat are located, while also enabling the dynamic between occupied and unoccupied areas of koala habitat in such areas to be managed as a single landscape unit for planning purposes. The best way to achieve this is to use a precinct-based approach. Informed by the Habitat Study, precinct boundaries have generally been aligned with property boundaries to encompass one or more resident koala populations considered capable of long-term survival given effective management of their habitat, protection from threats such as dogs and cars and enhancement of a suitable network of corridors to assisting the free movement of animals. The key determinants of such areas are based on the underlying principles of *core koala habitat* as defined by SEPP 44, i.e.:

- evidence of generational persistence (i.e. historical koala records) for at least the 3 most recent koala generations and/or
- evidence indicating the presence of one or more resident koala populations (including breeding females).

In addition to these criteria it is essential the KMPs include a sufficiently large enough area of suitable koala habitat so as to enable long-term survival of the resident population(s).

Management Objectives

The following management objectives will be used to guide this Plan in relation to Koala Management Precincts:

1. to actively reduce threats to resident koalas
2. to increase the area and quality of koala habitat within each KMP
3. to increase the connectivity between and within each KMP
4. to ensure new development within KMP's minimises the impacts on koalas and their habitat
5. to encourage landholders and stakeholders to positively contribute to koala conservation

Five (5) KMPs are established for purposes of the plan. Changes to the boundaries of KMPs established by this Part and/or the creation of new KMPs can only be enacted through the procedures detailed in Part 10 (Monitoring, Reporting and Review) of the Plan.

5.4.1 North Ocean Shores KMP

Focal Issues: population recovery, habitat and fire management.

The North Ocean Shores KMP covers an area of 1,268ha within the North Byron Coast KMA as indicated in Figure 4 of the Plan.

The underlying objectives for this KMP are to inform and assist broader management and conservation efforts related to recovery of the nominated Endangered Tweed & Brunswick Coast Population of the koala.

5.4.2 West Mullumbimby KMP

Focal Issues: population recruitment/dispersal, connectivity, dog attack and habitat loss.

The West Mullumbimby KMP covers an area of approximately 329ha within the South Byron Coast KMA and extends to the western boundary of the *koala planning area* as indicated in Figure 5 of the Plan.

The underlying objective for this KMP is to ensure persistence of this important genetic outlier and enable dispersal from it into more eastern areas of the *koala planning area*.

5.4.3 Brunswick Heads – Tyagarah KMP

Focal Issues: population recruitment, inbreeding, road-kill, habitat loss and/or fragmentation.

The Brunswick Heads – Tyagarah KMP covers an area of approximately 4,005ha within the South Byron Coast KMA as indicated in Figure 6 of the Plan.

The objectives for this KMP are to consolidate the existing sub-populations and improve the exchange of genetic material with populations to the west of the *koala planning area*.

5.4.4 West Byron KMP

Focal Issues: urbanisation, population recruitment/dispersal, habitat loss and/or fragmentation.

The West Byron KMP covers an area of approximately 1,303ha within the South Byron Coast KMA as indicated in Figure 7 of the Plan.

The management objectives for this KMP are to consolidate the existing sub-populations and improve the exchange of genetic material with other KMPs to the north and south.

5.4.5 Suffolk Park – Broken Head KMP

Focal Issues: population recruitment, habitat and fire management.

The Suffolk Park – Broken Head KMP covers an area of approximately 929ha within the South Byron Coast KMA as indicated in Figure 8 of the Plan.

The management objective for this KMP is to enable an increase in the habitat occupancy rate by koalas.

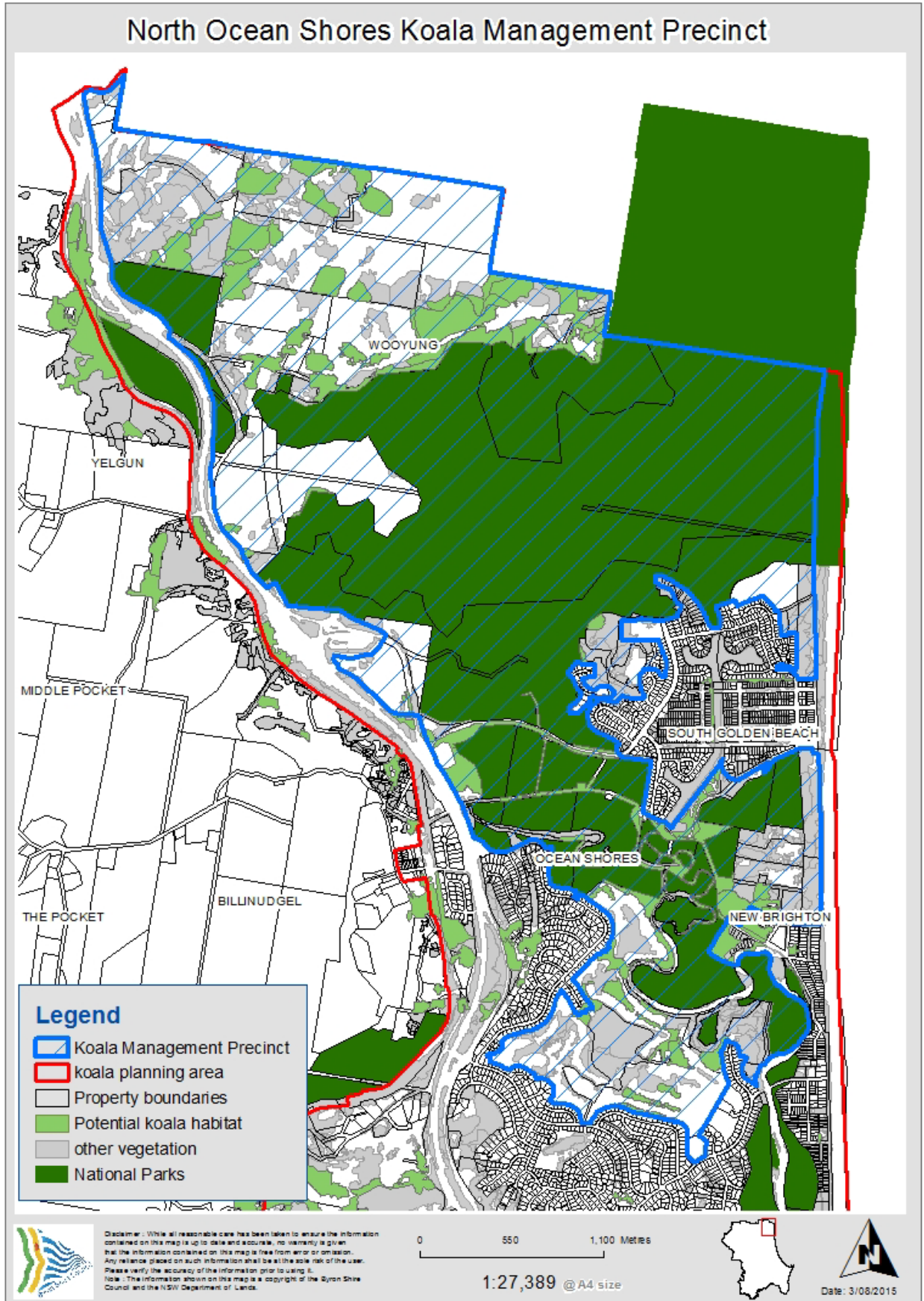


Figure 4: North Ocean Shores KMP

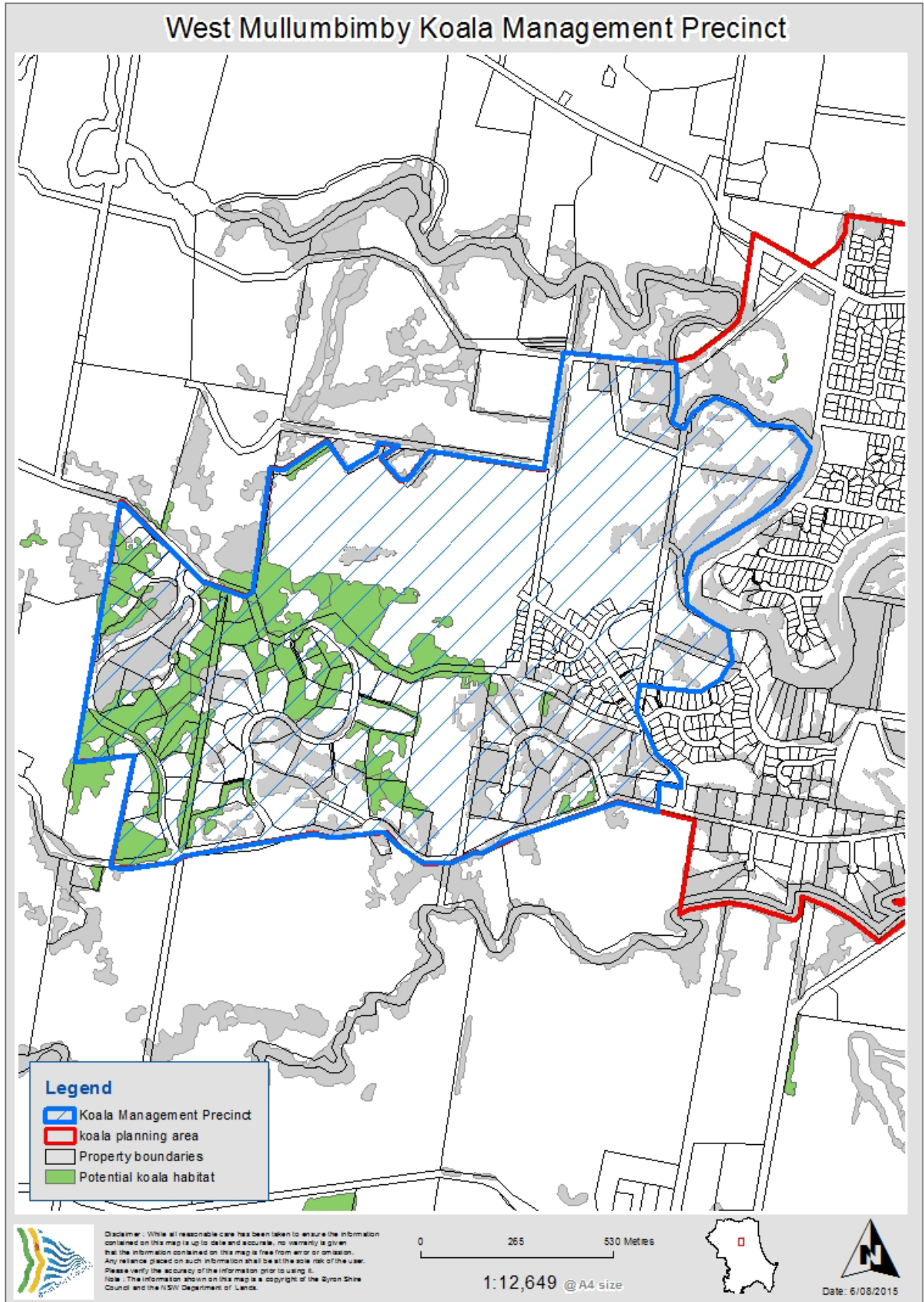


Figure 5: West Mullumbimby KMP

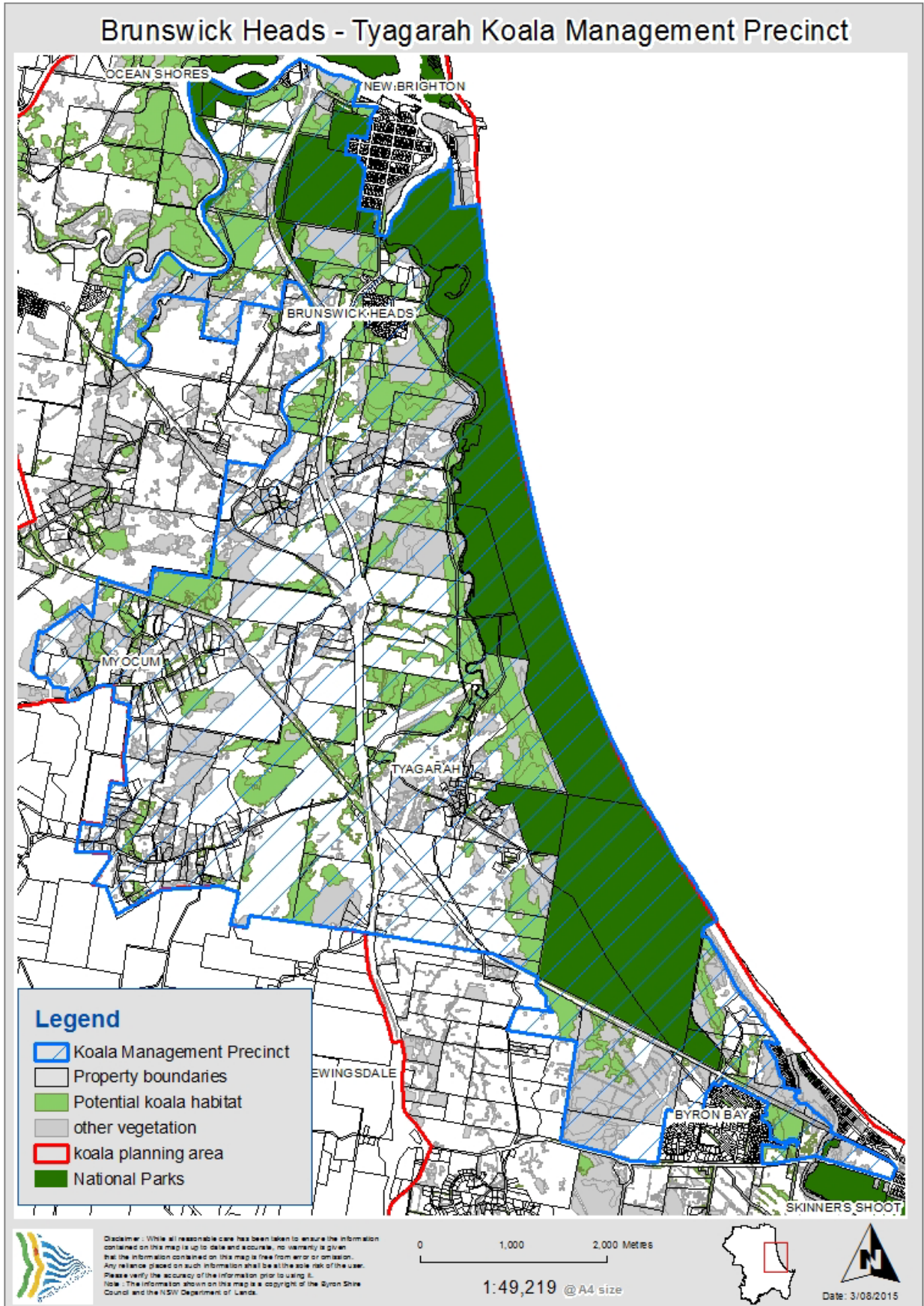


Figure 6: Brunswick Heads - Tyagarah KMP

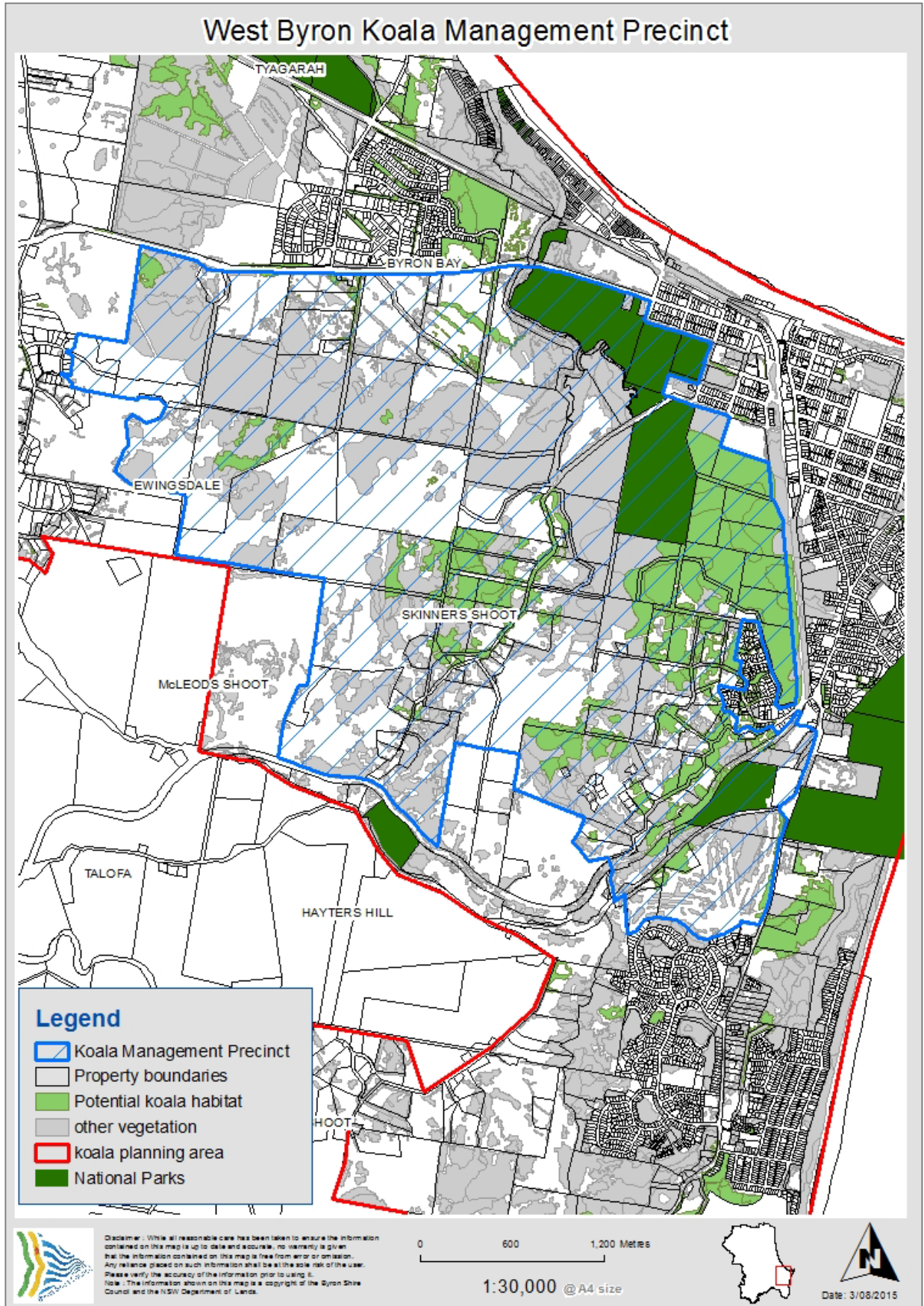


Figure 7: West Byron KMP

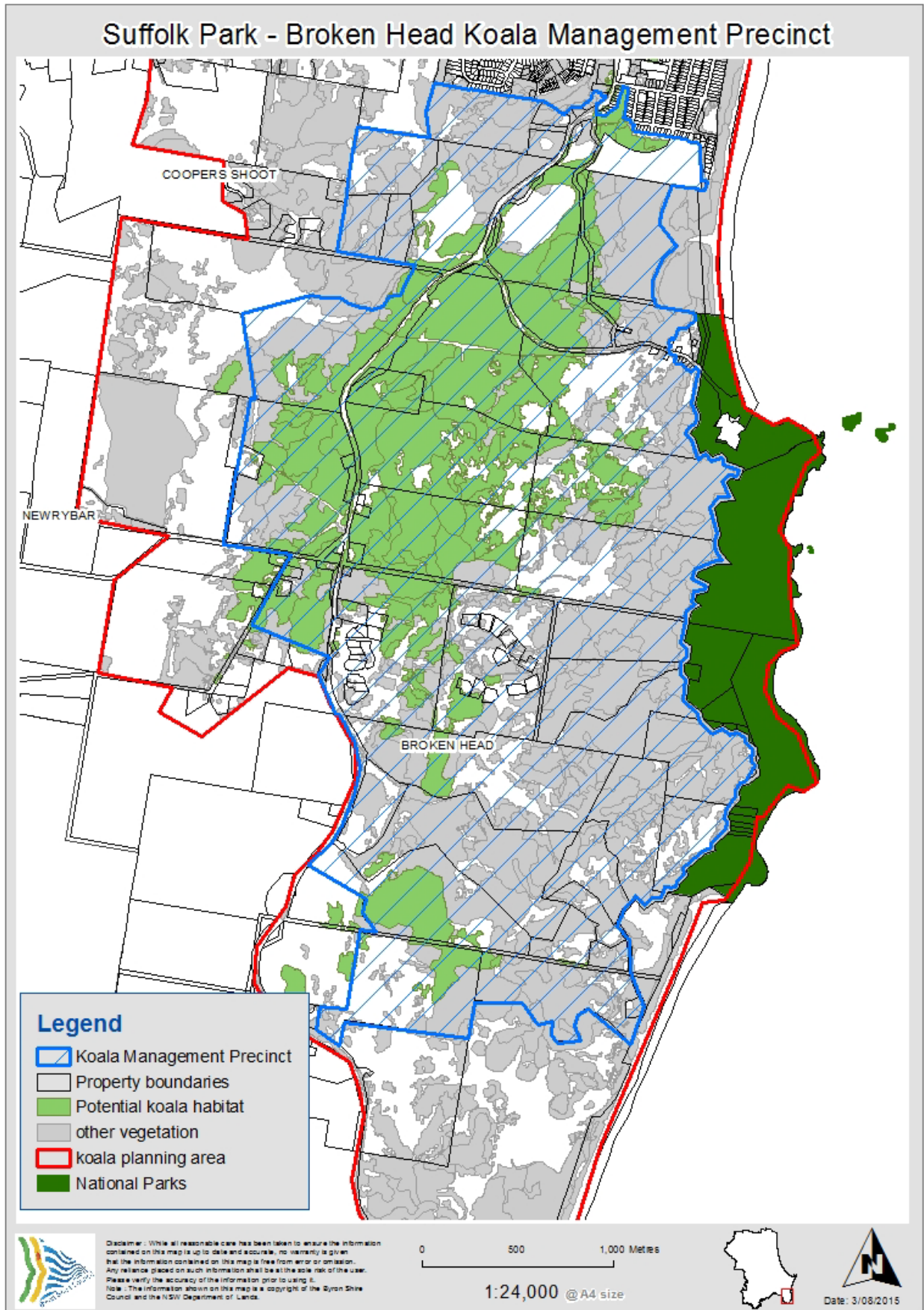


Figure 8: Broken Head KMP

5.5 Local Policy and Provisions

This section includes provisions relating to Council's planning instruments and policies as required by Clause 15 of SEPP 44, as well as the management of lands not defined as *potential koala habitat* but which are important to the conservation of koalas.

The management of lands beyond the boundaries of *potential koala habitat* that are important to the conservation of the koala such as vegetation forming corridors for the movement of koalas are essential to meet the Aims of SEPP 44.

5.5.1 Local Environment Plan

In order to give effect to the Aims of SEPP 44, Clause 15 of the SEPP encourages Councils to make or amend a local environmental plan to include land identified as *core koala habitat* within an environmental protection zone, and give consideration to preparing an appropriate development control plan for land that is or adjoins *core koala habitat*.

- (i) Council shall amend Byron LEP 2014 to zone for Environmental Protection areas of *core koala habitat*.
- (ii) To inform such amendments Council will:
 - a. Undertake additional ground truthing to validate the mapping of *potential koala habitat*
 - b. Undertake additional koala population monitoring
 - c. Establish and maintain a register of landowners who are supportive of having mapped areas of *core koala habitat* that occur on their land being zoned for Environmental Protection.
- (iii) Council shall amend Byron LEP 2014 to incorporate a clause and associated overlay map that identifies *potential koala habitat*, and to outline consent considerations for development within those areas.
- (iv) Planning proposals to amend Byron Local Environmental Plan 2014 that apply to land within the *koala planning area* should demonstrate consistency with Part 2 of this Plan so as to identify the likely impact on koala habitat and populations by the type of development to be facilitated by the LEP amendment.

5.5.2 Development Control Plan

- (i) Council shall amend the Byron Shire Development Control Plan 2014 to ensure consistency with this Plan and BLEP 2014 (when amended in accordance 5.5.1).
- (ii) Council shall amend the Byron Shire Development Control Plan 2014 to include properties under one hectare in size with owners willing to include their land as Potential Koala Habitat.

5.5.3 Section 149 Certificates

- (i) Pursuant to Section 149(5) of the EPA Act, Council shall include advice relating to the presence of mapped areas of *core koala habitat* identified in this Plan or subsequent revisions of mapping associated with this Plan.

5.5.4 Register of Development

- (i) Council shall establish and maintain a register of development and/or rezoning applications that have been given approval under the Plan. The register must include a mechanism to ensure that any matters concerning koala habitat arising from the development can be tracked and mapped for monitoring and review purposes. This includes nominated actions in any Statement of Environmental Effects and compliance with associated consent conditions.

- (ii) The register must also include details of any lands with an associated program of habitat restoration and/or rehabilitation that is being undertaken as a consequence of compensation for loss of koala habitat.
- (iii) A summary of items entered into the register must be provided to each meeting of the Koala Management Committee.
- (iv) The register shall be available for public inspection at any time during normal office hours.

5.5.5 Habitat buffer areas

Habitat buffers adjoin areas of *core* and *potential koala habitat* and can provide for the likely extension of koala activity and help protect areas from external impacts. Habitat buffer areas are defined in this Plan and are important areas to manage strategically over the long term so that existing koala habitat is retained and where possible expanded. These areas may include vegetated areas, semi-vegetated areas or cleared land.

Management Objectives

1. To identify and manage buffers to maintain the integrity of *core* and *potential koala habitat*.
2. To ensure development within a habitat buffer avoids impacts on *core koala habitat* and koala populations.
3. To encourage all stakeholders, including private landholders, managing habitat buffers to contribute to koala conservation.

Habitat Buffer Management Principles

- (i) Due to their role in protecting and allowing expansion of existing habitat, buffers should be considered a priority for habitat restoration work.
- (ii) Council will support and encourage landholders across the *koala planning area* to establish additional vegetation cover within habitat buffers by providing advice and financial assistance, where available, from available funding sources such as environmental grants.
- (iii) Where buffers are not fully vegetated the establishment of scattered *preferred koala habitat trees* that provide a discontinuous canopy (at a minimum) is encouraged.
- (iv) Development within habitat buffers should be sensitively designed and managed based on site characteristics thereby avoiding or otherwise minimising and mitigating any negative impacts.
- (v) The nature and scale of development to be undertaken should be low impact ensuring that the extent and/or quality of adjacent habitat is maintained or enhanced.
- (vi) Where vegetation restoration works have occurred to restore a buffer area, further development considerations will not apply to the buffer (i.e. an additional buffer should not apply to a restored buffer)

5.5.6 Koala Corridors

Koala corridors provide a landscape scale approach to managing local koala populations by facilitating the recruitment and dispersal of koalas between areas of *core* and *potential koala habitat*. Koala corridors are made up of vegetation that links one area of koala habitat with another and therefore provides habitat for movement, linkage and dispersal. Koala corridors can include linear connections or vegetation providing 'stepping stone' connectivity between larger areas of koala habitat such as isolated clumps of vegetation or scattered trees.

Koala corridors are an important part of the Koala Management Framework and often form part of the wildlife corridors from the Byron Biodiversity Conservation Strategy, as shown in Figure 9. In a heavily fragmented landscape (such as the *koala planning area*), there are also a limited number of localities that can potentially facilitate safe passage for koalas under the Pacific Highway (see Habitat Study). Such areas are highly significant key focal points for long-term habitat connectivity.

Management Objectives

1. To improve landscape connectivity by increasing the area and quality of koala habitat between Koala Management Precincts and areas of *potential koala habitat*.
2. To ensure development within *koala corridors* are designed to maintain or improve connectivity of koala habitat and contribute to long term koala conservation.
3. To encourage all stakeholders including private landholders within a *koala corridor* to contribute to koala conservation.
4. To improve and enhance the potential for koalas to safely cross roads located within koala corridors, install traffic calming measures and/or provide other mitigating measures.

Koala Corridor Management Principles

- (i) Koala corridors may exist at a variety of scales ranging from large intact areas of native vegetation to scattered trees within a rural/urban landscape.
- (ii) Due to their importance to the movement of koalas, corridors should be a priority for habitat restoration programs, particularly where the corridor is fragmented.
- (iii) Across the *koala planning area* Council will encourage and where possible support the rehabilitation of wildlife corridors through revegetation of cleared land and restoration of degraded areas of existing vegetation.
- (iv) Council will support and encourage landholders to rehabilitate koala corridors through advice and financial assistance, where available, from available funding sources such as environmental grants.
- (v) Development within koala corridors should be sited, designed and carried out to maintain or enhance landscape connectivity to ensure negative impacts, such as the fragmentation of koala habitat or severance of movement of koalas is avoided. Depending on the nature and scale of development and site characteristics a range of developments may be sensitively undertaken in koala corridors.

5.5.7 Monitoring and review of habitat mapping & corridors

- (i) Council will update the mapping of areas of *potential koala habitat* when new data becomes available and with each review of the Plan as required by Section 10 *Monitoring Reporting and Review of the Plan*.
- (ii) As part of the ongoing monitoring of the Plan, the location of wildlife corridors will be evaluated to ensure they include mapped *koala corridors*, are aligned with features such as highway underpasses and overpasses, and are informed by koala observations and survey data identifying koala activity and movement across the *koala planning area*.

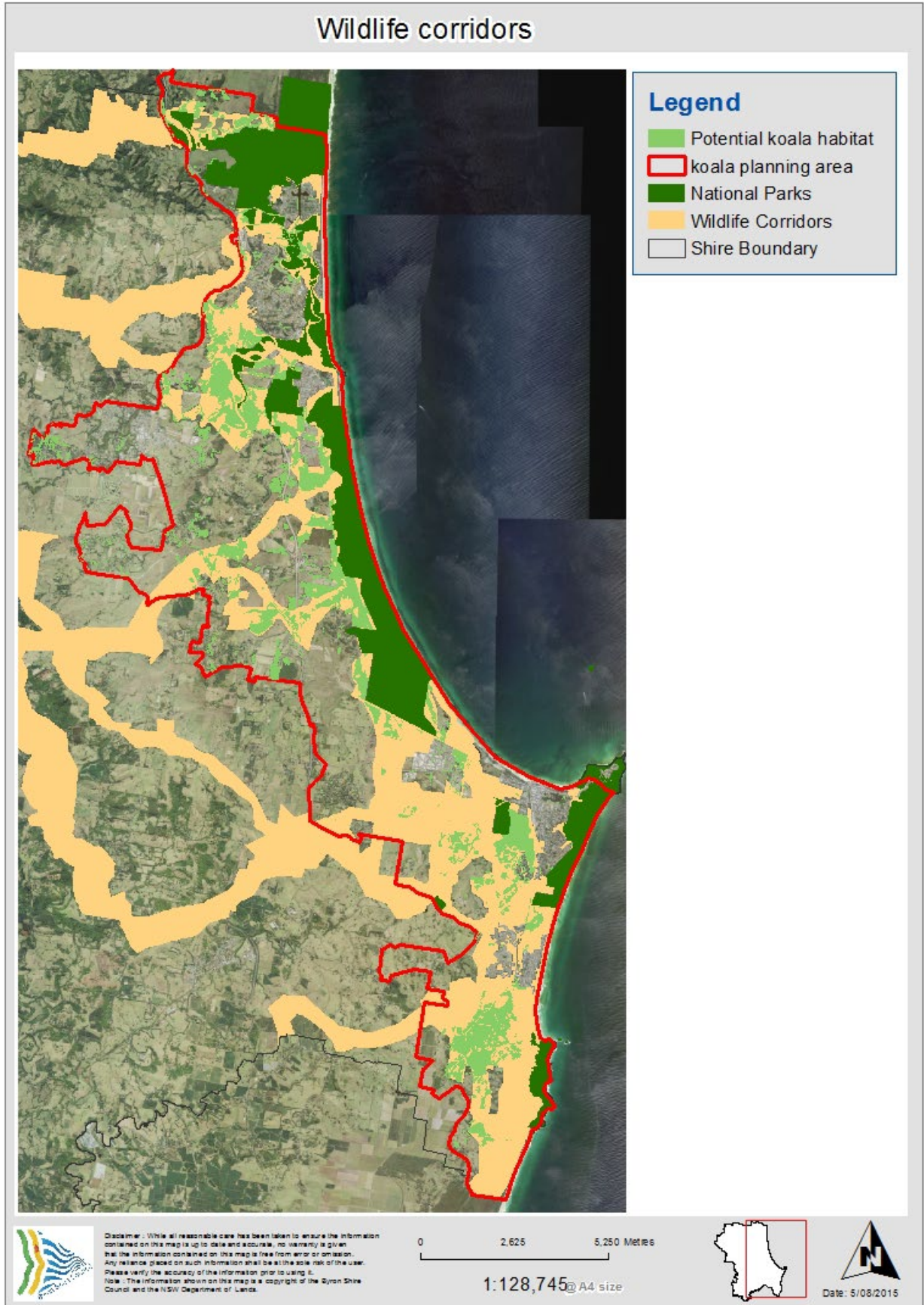


Figure 9: Wildlife corridors from the Byron Biodiversity Conservation Strategy

Section C – Management Activities

6 Habitat Restoration and Conservation



Restoration of koala habitat is essential to increase the area and condition of available koala habitat and to improve connectivity between areas of vegetation in order to sustain a free-ranging koala population in perpetuity.

The overall aim of this Plan is to increase the area of *potential koala habitat* by 200ha within 10 years. Much work has already been achieved towards this goal through Council's Koala Connection project which has involved work with over 70 landholders between 2013 and 2015 to improve management across 41 hectares in the planning area. Work has included planting of 34,500 trees creating 23 hectares of new koala habitat, and assisted regeneration through weed control to restore 18 hectares of existing degraded koala habitat.

Habitat restoration may include revegetation using suitable local species, as well as management that increases natural regeneration of koala habitat through bush regeneration, stock exclusion and fire management. Habitat restoration work ideally includes the in-filling of gaps within and adjoining existing areas of *potential koala habitat*, in addition to buffers and koala corridors. It is important that resources are used effectively to increase koala habitat and that it is available in perpetuity for the koala population. The best means of achieving this is for Council to take an overseeing role for rehabilitation and/or revegetation works where possible, and to support and encourage the community to manage *potential koala habitat* and other areas of vegetation to improve its condition and extent.

The Habitat Study reported a high level of isolation of koala sub-populations within the *koala planning area* likely to be contributing to inbreeding and a high level of disease. Improving connectivity of vegetation will assist effective dispersal of sub-adult koalas between breeding populations, improving long term population sustainability. The Habitat Study recommends primary consideration of improving connectivity between West Byron, Tyagarah and Brunswick Heads, and should also enhance connectivity towards the west of the LGA through the West Mullumbimby KMP and Myocum areas.

Objective: To provide a coordinated program that will increase the amount of habitat available for koalas through habitat restoration and corridor enhancement.

6.1 Habitat Restoration

- (i) Council will support and participate in the restoration of koala habitat associated with this Plan within the *koala planning area*. Council will seek partners and funding to secure the restoration.
- (ii) In consultation with the KMC, Council shall prepare a Koala Habitat Restoration Program (the Program) for the *koala planning area* with a particular focus on the Central Byron Coast KMA. The Program must;

- a) identify and prioritise areas of *potential koala habitat* for habitat restoration purposes,
 - b) identify and prioritise largely un-vegetated areas with a secure conservation tenure for habitat restoration purposes,
 - c) include *a priori* consideration of koala corridors taking into consideration existing mapped wildlife corridors, highway underpass and overpasses and data on koala occurrence and movement,
 - d) establish standards for undertaking habitat restoration and/or rehabilitation, and
 - e) estimate the necessary resource requirements to enable a minimum of 200ha of koala habitat to be created within the first 10 years of the Plan.
- (iii) As a component of (ii) above, Council will actively seek interest from Government agencies and private landholders within KMPs, habitat buffers and koala corridors to have their land considered for restoration purposes.
- (iv) Council will use the funds obtained by external grant funding, Council's Environmental Levy and other such funding sources as may be available from time to time to resource the program.
- (v) A Koala Habitat Restoration Plan should be prepared for each rehabilitation project and include the following information:
- a) a map identifying the location and total area proposed for restoration/ revegetation;
 - b) a description of current vegetation cover and condition;
 - c) the number of trees to be planted, species planting list, and plantings densities;
 - d) details of the sourcing of all seedlings (demonstrating local seed stock will be used);
 - e) a description of the management techniques to be use when restoration through assisted regeneration is being employed;
 - f) a schedule of management, monitoring and maintenance activities to ensure establishment and ongoing protection and management of planting(s);
 - g) the length of proposed monitoring and management periods, the timing of key milestones, and reporting requirements. As a minimum a 5 year implementation and maintenance program, or longer when required in order to meet specific performance measures;
 - h) responsible parties for the undertaking of all works and activities included in the plan; and
 - i) if the revegetation is to take place on other than public land, how the revegetation will be maintained in perpetuity for the benefit of koala recovery must be specified.

Further information on preparing and implementing a Koala Habitat Restoration Plan can be seen in Byron Shire Bush Regeneration Guidelines 2010, available at <http://www.byron.nsw.gov.au/publications/bush-regeneration-guidelines>

- (vi) As a general rule, *preferred koala food trees* must comprise no less than 25% of the tree species used for rehabilitation purposes.
- (vii) Council will identify an officer to be made responsible for overall planning, supervision, resourcing and coordination of revegetation works. This officer will liaise with the KMC regarding the Program.
- (viii) Where priority areas for koala habitat restoration are identified on land managed by Council, provision should be made in the relevant Plan of Management for this work.

- (ix) New Koala food tree planting provides an important element in habitat restoration due to recognised rapid uptake by Koalas.

6.2 Habitat Conservation

- (i) Council will promote voluntary conservation partnerships to provide long term protection of koala habitat on private land including:
- conservation agreements and wildlife refuge proclamations under the *National Parks and Wildlife Act 1976*;
 - conservation covenants under the *Nature Conservation Trust Act 2001*;
 - non binding conservation agreements such as Land for Wildlife.



Plate 1: Land for Wildlife sign provided to participants in Byron Shire

7 Community Education



In Byron Shire there is widespread community support for koala conservation and a general appreciation of the threats they face. Groups such as Friends of the Koala and Landcare actively undertake education and awareness programs about koala conservation issues and the measures required to ensure longer-term sustainable management of existing populations. Council contributes to and supports these programs and this section of the Plan seeks to build on this work by outlining specific actions in regard to the development of a community awareness and education strategy to direct and support future work in this area.

Overall objective: To increase the wider community's awareness of threats to koala habitat and populations, together with measures required to better manage the species and to facilitate active engagement of the community with koala management.

7.1 Education Strategy

- (i) In conjunction with the KMC, Council will prepare a Community Awareness and Education Strategy aimed at raising awareness about the need for the involvement of the Byron community in the management of the Byron Coast population of the koala. Measures may include, but are not limited to:
 - a) a brochure aimed at visitors to the *koala planning area*;
 - b) a brochure aimed at dog owners within KMPs or areas containing *potential koala habitat* to be distributed through Council and real estates;
 - c) a program targeted at providing information sessions at schools;
 - d) signage on roads through areas known to be occupied by koalas and on the approach to the *koala planning area*;
 - e) regular workshops for the community on measures necessary to assist the broader koala conservation and recovery effort;
 - f) a web-based mechanism allowing residents to record koala sightings and other incidents of interest to koala management; and/or
 - g) a koala management page or pages on the Council website that provides access to the Plan and associated Habitat Study, along with details of koala management measures and actions that residents and landowners can take to assist longer-term koala conservation efforts including:
 - reducing impacts by domestic dogs through responsible dog ownership
 - reducing road mortalities
 - habitat restoration, management and protection
 - fire management
 - h) biannual media releases promoting koala conservation measures, educational/extension opportunities and initiatives.
- (ii) In addition to the measures to encourage habitat restoration on private lands Council will promote discussions with private landholders about options for conservation of

koala habitat on their lands, including offering incentive instruments such as Voluntary Conservation Agreements to assist in conservation of koala habitat.



Plate 2: Koala habitat revegetation in Myocum as part of Koala Connections project.



Plate 3: Primary koala habitat in Brunswick Heads dominated by Forest Red Gum (*Eucalyptus tereticornis*)

8 Koala Welfare, Research & Assisted Recovery



An important aspect of koala management within the *koala planning area* is the care and rehabilitation of koalas. This is undertaken in a voluntary capacity by the Lismore-based Friends of the Koala (FoK). There is an increasing workload for bodies such as FoK and hence a need for stronger ties and liaison with Council in the context of koala welfare and the management and rehabilitation of wild koalas. The fragmented nature of the *koala planning area* also presents a number of unique challenges best addressed through processes of ongoing habitat assessment and research programs. There is also a need to raise the matter of the rescue, care and rehabilitation of the *koala planning areas* wild koala population, while also identifying future research needs and the possible need for an assisted recovery effort north of the Brunswick River.

Overall objective: Identification of koala welfare and research needs intended to improve and inform long-term management of the *koala planning areas* resident koalas, while also recognising and activating the possible need for management intervention to avoid a localised extinction event in the North Byron Coast KMA.

8.1 Koala Care

- (i) Council will liaise with FoK regarding the identification of lands within the *koala planning area* that may be suitable for the establishment of one or more *preferred koala food tree* plantations to assist with the care and welfare of rehabilitated koalas.
- (ii) To assist the rapid rescue of koalas in the Byron LGA a direct link to the emergency contact details of the FoK website will be provided through Council's website.
- (iii) Council will consult with FoK to determine how Council may best support FoK with the care and welfare of koalas across the BLGA, including support for the koala care facility in Lismore.

8.2 Koala Research

- (i) The highly fragmented nature of vegetation patches that occur on land to which the Plan applies make any broad-scale koala habitat categorisations such as have been applied in the Plan problematical. To this end Council will encourage further research, investigations and assessments into the vegetation mapping layer which otherwise informs the Plan, the intent to establish presence/absence of *preferred koala food trees* within individual patches and so enable accurate habitat categorisations.
- (ii) In collaboration with RMS, Council will encourage further and ongoing research into how best to facilitate road-crossings by koalas and other wildlife with a view to reduce the potential for koala road-strike and associated mortalities.

- (iii) In collaboration with OEH, FoK, SCU and other research organisations, Council will encourage further and ongoing research into disease management, gene flow and the associated genetic makeup of koala populations inhabiting the land to which the plan applies.
- (iv) Through processes of the KMC, the status of koalas within the North Ocean Shores KMP shall be closely monitored with a view to, if necessary, augmenting or re-establishing a free-ranging koala population in the Billinudgel Nature Reserve within the first 5 years of the plan.
- (v) Council will establish permanent vegetation growth and koala use monitoring plots within any area replanted and/or rehabilitated for the purposes of improving habitat connectivity within the lands to which the plan applies.
- (vi) Council will continue to work closely with RFS on issues associated with fire management, in addition to supporting ongoing research and associated objectives of the North Rivers Fire and Biodiversity Consortium.

8.3 Assisted Recovery

- (i) If, at the first major review of the Plan, there has been no measureable increase in the habitat occupancy rate within the North Byron Coast KMA, the population will be deemed in need of supplementation
- (ii) For the purposes of this Plan, a measurable increase in the habitat occupancy rate means evidence of habitat use by koalas being recorded in two or more spatially independent permanent monitoring sites over the two preceding monitoring events within the North Byron Coast KMA.
- (iii) In the event that supplementation is deemed necessary and in collaboration with the KMC, Council will initiate and facilitate a stakeholder workshop with NPWS, OEH, relevant koala researchers and/or research institutions, the objective to establish a formal population augmentation/supplementation program that will see the controlled introduction of koalas into the Billinudgel Nature Reserve.
- (iv) Preparation of documentation related to the above-mentioned program must be guided by the NSW Government's Policy on the Translocation of Threatened Wildlife to which end a formal proposal must be completed and submitted for approval within 6 months of the workshop referred to in 8.3 (iii) above with a view to then being implemented over the ensuing 4 – 5 years.



9 Other Key Threats



Road-kill, dogs and the threat of wildfire are significant threats to long-term koala population viability across the *koala planning area*. While responsibility for the Pacific Motorway and the management of fire is outside of the control of Council, it is to be hoped that through the workings of the Plan, Council will be able to influence the management of fire to reduce the impact of the threats. Council does have the ability to influence the management of dogs through the Companion Animals Act and the development approvals process.

Overall objective: Improve Council's management of dogs to reduce impacts on koalas. Highlight the issues of road-kill, and fire management through (essentially aspirational) provisions intended to result in engagement with key agencies involved.

9.1 Road-strike

The Pacific Motorway creates a significant barrier to the movement of koalas within the *koala planning area*, thus the means by which koalas are able to safely migrate across or under roads is critical to the success of any habitat linkage. The Habitat Study identified 'blackspots' where road mortalities were high. This includes 3 locations along the Pacific Hwy between Brunswick River in the north and Greys Lane in the south where the Hwy intersects a resident koala population. Additional locations of road strikes are identified on various Council managed roads as seen in Figure 5.3 of the Habitat Study. A large investment has been made in wildlife underpasses along the Hwy, including the overpass within the wildlife corridor at Billinudgel Range, however appropriate management is needed to ensure these crossings remain functional.

Koala road kill occurs when home ranges are intersected by roads, or when dispersing animals need to cross roads. The ranging of koalas cannot be modified therefore it is appropriate to design roads in areas of koala activity to reduce koala mortality.

In addition to the requirement for road construction in Section 7.4 the following actions are to be undertaken:

- (i) Council will establish formal liaison with RMS to discuss the ongoing issue of koala road kill along sections of the Pacific Motorway as identified by the Habitat Study, along with a prioritised list of requirements related to the task of how best to maximise koala use of existing underpasses, overpasses and other "under highway" options.
- (ii) Council will prepare a koala road-kill mitigation strategy for those roads within the *koala planning area* (other than the Pacific Highway) identified by the Habitat Study as koala black spots, notably in the Gulgan Rd/Mullumbimby Road intersection and Ewingsdale Road adjacent to the West Byron Urban Release area.
- (iii) The strategy referred to in (ii) above must include a prioritised 5 year program of works intended to reduce koala road mortalities. Solutions and considerations should include, but not be limited to:
 - a) traffic calming measures to reduce speed

- b) innovative Koala warning signs
- c) lighting
- d) road verge management including vegetation management
- e) fauna exclusion fencing and underpasses
- f) driver education.

9.2 Dog Management

Beyond the development approval process Council plays the lead role in management of domestic dogs through the Companion Animal Act, while management of wild dogs is supported by the Local Land Services. The risk of dog attack to koalas is heightened in areas where urban development adjoins rural and bushland areas, which is a common situation for many residential areas on the Byron Coast.

9.2.1 Domestic dogs

- (i) Council will amend the Byron Shire Council Companion Animals Management Plan to include specific measures to reduce the impact of domestic dogs on koalas. This should include the following as a minimum:
 - a) investigating the merit of designating public parks, reserves and recreational areas within KMPs as dog-free;
 - b) increasing compliance to respond to roaming domestic dogs in areas with a resident koala population;
 - c) education and extension to promote responsible dog ownership and koalas;
 - d) incentives and support for responsible dog owners;
 - e) Council will seek to create a map layer identifying high risk areas where high levels of dog ownership coincide with or are adjacent to Core Koala Habitat.

9.2.2 Wild dogs

- (i) Council will encourage research and gather reliable information about the distribution and impacts, if any, of wild dogs on koalas on the Byron Coast.
- (ii) Council will use data collected to undertake a comparison of wild dog activity with current koala populations to identify potential areas of management focus.
- (iii) Council will review the Byron Shire Feral Animal Management Plan to ensure consideration is given to recent research into the impacts of wild dogs on koalas and the ecological role of wild dogs in the environment.

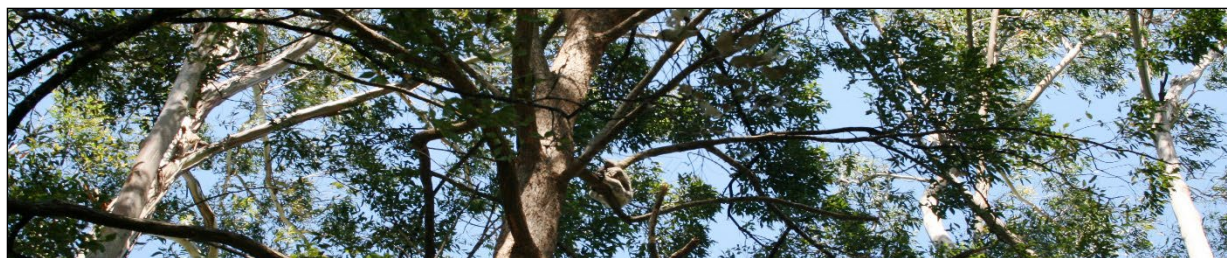
9.3 Fire Management

Fire has been identified as the key contributing factor in the decline of the endangered Tweed & Brunswick Coast population of the koala, most likely as a result of high frequency, high intensity fires. However, fire is a natural part of koala habitat and appropriately managed fire is important to ensure the long term conservation of these areas. This Plan makes the distinction between 'bush fire' which refers to unplanned and potentially difficult to control fires, and 'hazard reduction burns' which is the deliberate use of fire for reduction of fuel loads and is assumed to be of low intensity.

- (i) Council will encourage all relevant authorities and landowners to adopt a 'minimal use of fire' policy within KMPs identified by the Plan by way of:
 - a) any bush fire to be extinguished at the first practical opportunity; *and*

- b) where hazard reduction burns are undertaken, appropriate measures are used to avoid impacts on koalas.
- c) bush fire hazard reduction using mechanical means within *core koala habitat*
- (ii) Council will seek amendment of the Far North Coast Bush Fire Risk Management Plan such that:
 - a) the inclusion of all *potential koala habitat* within KMPs, as mapped in this Plan, to be included on the Assets Register or as Strategic Fire Advantage Zones; and
 - b) appropriate treatments for areas included on the Assets Register are included on the Treatment Register
- (iii) Council will ensure that all Maps detailing the location of resident koala populations within the *koala planning area* are made available to all RFS stations.
- (iv) Council will collaborate with stakeholders, particularly through the Northern Rivers Fire and Biodiversity Consortium to develop fire management strategies within koala habitat which may include:
 - a) maintenance to fire trails within KMPs;
 - b) options for vegetation management techniques to achieve hazard reduction within KMPs;
 - c) identification of strategic locations for hazard reduction or ecological burns;
 - d) development and implementation of best practice hazard reduction burn operational guidelines for all land managers.
- (v) Council encourage and assist with appropriate koala awareness training for relevant RFS members, Council staff and others involved with the preparation of the Far North Coast Bush Fire Risk Management Plan, assessing development applications and approving hazard reduction certificates.
- (vi) Council will assist the RFS in conducting community education in respect to the processes required to manage bush fires and hazard reduction in KMPs.
- (vii) Council will encourage and assist in the preparation of protocols for land management agencies and the RFS to co-operate with the local wildlife carer groups and OEH concerning fauna welfare issues following bushfires.

10 Monitoring, Reporting & Review



Appropriate measures are required to inform stakeholder interests in the distribution, abundance and conservation status of the *koala planning area's* resident koala population(s), assess the effectiveness of the Plan's working provisions, and if necessary identify if and how they should be amended.

Overall objective: To monitor the koala population(s) and ensure that the Plan remains relevant and that the actions and development standards are regularly reviewed so as to achieve the Vision and Aims of the Plan.

10.1 Population Monitoring

- (i) Within the two KMAs recognised for purposes of the Plan, Council will monitor the amount of habitat being utilised by koalas by reassessing the occupancy rate and levels of koala activity, initially within the first year following commencement of the Plan, and thereafter at intervals of every two years.
- (ii) For the purposes of the monitoring program, a series of 70 field sites that include the 63 sampled by the Habitat Study have been identified as permanent monitoring points, the locations of which are known to Council.
- (iii) Each monitoring event must involve an assessment of koala habitat use at each of no less than 40 sites that have been randomly selected from the 70 identified by 10.1 (ii) above.
- (iv) Where one or more randomly selected sites may be unavailable for assessment at any given monitoring event, the equivalent number must be randomly selected as replacement sites from those that were not randomly selected in the first instance.
- (v) The minimum data set to be collected from each field site that is sampled for purposes of (iii) above must include either:
 - a) the preferred option comprising a full measure of koala activity (i.e. application of SAT methodology) from a central point located within a 50m radius of the site coordinates, along with the number of koalas sighted in a 250m x 40m (1ha) transect, or
 - b) the less preferred option comprising a determination as to whether koalas are using the site based on a 10 person minute search for koala faecal pellets around the base of and/or beneath the canopies of any *preferred koala food trees* that are similarly located within a 50m radius of the site coordinates (or other tree species if no *preferred koala food trees* are present).
- (vi) A determination as to which of the two preceding options will be utilised will be made on the basis of resources available to Council at each monitoring event.
- (vii) For the first monitoring event at a given field site, coordinates for the centre of the site must be documented and the precise location permanently identified so as to enable it to be found for the purpose of subsequent monitoring events.
- (viii) Monitoring and any associated data analysis must be undertaken by suitably qualified and/or accredited Council officers or other individuals who must also liaise with the FoK

so as to gather data on any koala incidents that may have occurred in the time period that has elapsed since the previous monitoring event.

10.2 Performance Indicators

- (i) For monitoring purposes the benchmark habitat occupancy rate to be achieved for koala populations inhabiting both KMAs will be 50% of available habitat in each instance.
- (ii) Notwithstanding the influence of events beyond the control of Council, the Plan can only be deemed successful if the extent of habitat being utilised by koalas across the *koala planning area*:
 - a) progressively increases in the North Byron Coast KMA; and
 - b) increases towards the benchmark in the South Byron Coast KMA or does not deviate significantly from the estimate of approximately 40% established by the Habitat Study.
- (iii) Generally, conclusions relating to changes in the occupancy rate across the *koala planning area* should only be undertaken at every third monitoring event (i.e. every 6 years) by examining both the occupancy trend over the intervening 6 year period and by a direct comparison to the occupancy estimate of 6 years previous.
- (iv) Any statistically significant reduction¹ in the habitat occupancy rate when compared to that estimated by the previous monitoring period will warrant further investigation as to cause and so trigger a review of the Plan.

10.3 Reporting

- (i) A report detailing the results of the field survey must be prepared by the person or organisation referred to above and forwarded to Council and the KMC within one month following completion of the field assessment.
- (ii) Amongst other things the report must include the following:
 - a) a comparison of the extent of koala activity using baseline data from the Habitat Study and that of any preceding surveys undertaken in accord with this part, including consideration of the performance indicators;
 - b) a review of koala incidents obtained as a result of 10.1 (viii) above;
 - c) in relation to koalas and their habitat, a breakdown of the number and outcomes of development and/or rezoning applications that have been approved in accordance with Part 2 of the Plan;
 - d) the area of koala habitat restoration achieved in areas identified for restoration in *Section 6 Habitat Restoration*;
 - e) any other observations and data of relevance to koala management; and
 - f) recommendations for any amendment of the Plan by Council.

10.4 Review

- (i) At every third reporting event the KMC must undertake a major review of the Plan by considering the reports referred to in 10.3 above, along with any associated recommendations for amendment of the working provisions.
- (ii) At every major review the KMC will consider and evaluate the need to incorporate additional survey techniques such as use of specialised telephone applications, phone-in surveys and/or annual koala census days to augment the field survey component.

¹ Analysis based on use of Log-likelihood ratios (number of active sites/number of inactive sites) with alpha set at 0.10

11 Summary of Actions

A summary for the actions from Section C are listed below along with target timeframe for commencement of activity, resources required and potential funding sources..

Timeframes: Short term - within 2 years; Medium term - within 5 years; Ongoing – for the life of the Plan

	Action	Timeframe	Resources required	Potential funding source
	Koala Management Framework			
1	Establishment and servicing of Koala Management Committee	Short term	Staff time	Existing Council budget
2	Update koala habitat mapping	Short term/ ongoing	Staff time for opportunistic amendments. Est. \$20K every 5 years for substantial review.	Existing Council budget, or external funding
3	LEP amendment to include clause and overlay to identify koala habitat.	Short term	Staff time	Existing Council budget
4	LEP amendment to zone for Environmental Protection all areas of <i>core koala habitat</i> .	Short term (subject to E zone review)	Staff time	Existing Council budget
5	Amend DCP to incorporate relevant sections of Plan	Short term	Staff time	Existing Council budget
6	Establish and maintain register of landowners within KMPs who are supportive of having mapped areas of <i>potential koala habitat</i> that occur on their land being zoned for Environmental Protection.	Short term	Staff time	Existing Council budget
7	Investigate and further refine the locations of wildlife corridors across the <i>koala planning area</i> .	Medium term	Staff time	Existing Council budget
8	Include advice relating to the presence of mapped areas of <i>core koala habitat</i> in Section 149(5) Certificate.	Short term/ ongoing	Staff time	Existing Council budget
9	Establish and maintain a Register of development and/or rezoning applications available for public inspection	Short term/ ongoing	Staff time	Existing Council budget
	Habitat Restoration			
10	Prepare Koala Habitat Restoration Program	Short term	Staff time	Koala Connection project

	Action	Timeframe	Resources required	Potential funding source
11	Seek partners and funding to implement Koala Habitat Restoration Program	Short term/ Ongoing	Staff time	Existing Council budget
12	Implement Koala Habitat Restoration Program	Ongoing	To be determined once program is developed.	External grant funding or Environmental Levy
12	Seek interest from interested public and private landowners within KMPs to have their land included in the Koala Habitat Rehabilitation Program.	Short term/ ongoing	Staff time	Existing Council budget and Koala Connection funding.
Community Education				
14	Preparation and Implementation of Community Awareness and Education Strategy and material	Medium term	\$5K initially, remainder to be determined once Strategy adopted by Council.	External grant funding or Environmental Levy.
15	Promote discussions with private landholders about options for conservation of koala habitat on their lands.	Ongoing	Staff time	Existing Council budget and Koala Connections funding.
Monitoring, Reporting and Review				
16	Implement monitoring program of the Byron coast koala population	Short term/ ongoing	\$45- 90K over life of Plan (\$5-10K every 2 years, dependant on methodology)	Existing Council budget and Koala Connections funding.
17	Assess efficacy of the Plan, along with any associated recommendations for amendment (if necessary) of the working provisions at every 5 yearly review.	Medium term/ ongoing	Staff time and KMC	Existing Council budget
Koala Welfare, Research and Assisted Recovery				
18	Liaison with FoK regarding the identification of lands that may be suitable for the establishment of one or more <i>preferred koala food tree</i> plantations	Short term	Staff time	Existing Council budget
19	Seek a formal submission from FoK as to how - on an annual basis - Council may best materially or financially assist FoK with the care and welfare of koalas across the BLGA.	Short term	Staff time	Existing Council budget

	Action	Timeframe	Resources required	Potential funding source
20	In collaboration with RMS, Council will encourage further and ongoing research into how best to facilitate road-crossings by koalas and other wildlife with a view to reduce the potential for koala road-strike and associated mortalities.	Medium term/ ongoing	Staff time	Existing Council budget
21	In collaboration with OEH, FoK, SCU and other research organisations, Council will encourage further and ongoing research into disease management, gene flow and the associated genetic makeup of koala populations inhabiting the land to which the plan applies.	Medium term/ ongoing	Staff time	Existing Council budget
22	Establish permanent vegetation growth and koala use monitoring plots within any area replanted and/or rehabilitated for the purposes of improving habitat connectivity within the lands to which the plan applies.	Medium term/ ongoing	Staff time/ partnership with stakeholders	Existing Council budget
23	Assess the need for assisted recovery of the koala population in North Byron Coast KMA as per 12.3.	Medium term	Staff time with support from other stakeholders	Existing Council budget
	Other threats – Roads, Fire and Dogs			
24	Establish formal liaison with RMS to discuss the ongoing issue of koala road kill along sections of the Pacific Motorway	Short term	Staff time	Existing Council budget
25	Prepare a koala road-kill mitigation strategy for those roads within the <i>koala planning area</i> (other than the Pacific Highway) identified by the Habitat Study as koala blackspots	Medium term	\$10K	External grant funding or Environmental Levy
26	Amend the Byron Shire Council Companion Animals Management Plan to include specific measures to reduce the impact of domestic dogs on koalas	Medium term	Staff time	Existing Council budget
28	Council to work closely with RFS on issues associated with fire management, in addition to supporting ongoing research and associated objectives of the North Coast Fire and Biodiversity Consortium.	Ongoing	Staff time	Existing Council budget

	Action	Timeframe	Resources required	Potential funding source
29	Seek amendment of the Far North Coast Bush Fire Risk Management Plan (BFRMP).	Medium term	Staff time	Existing Council budget
30	Ensure that all Maps detailing KMP boundaries are made available to all RFS stations.	Short term	In house	Existing Council budget
31	Instigate appropriate koala awareness training for relevant RFS members, Council staff and others involved with the preparation of the Far North Coast Bush Fire Risk Management Plan, assessing development applications and approving hazard reduction certificates.	Medium term	TBA on investigation	Existing Council budget, external grant funding
33	Assist in the preparation of protocols for land management agencies and the RFS to co-operate with the local wildlife carer groups and OEH concerning fauna welfare issues following bushfires.	Medium term	Staff time	Existing Council budget

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**Part 2:
Development
Assessment and
Control**

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12 Development Assessment and Control

As required by SEPP44 before a Council may grant consent to an application to carry out development on land within the koala planning area, council must satisfy itself whether or not the land is *core koala habitat*.

This part of the Plan provides:

- details of the information required to be submitted when preparing a development application for land subject to the provisions of SEPP44 within the *planning area*.
- the development standards that are required to be met for development on land containing *core koala habitat*.

Part 2 of SEPP44 outlines the 'triggers' for the application of SEPP44, and therefore this Plan, including the identification of *potential koala habitat* and *core koala habitat*.

Potential koala habitat

Potential koala habitat is defined in SEPP44 as:

“areas of native vegetation where the trees of types listed in Schedule 2 constitute at least 15% of the total number of trees in the upper or lower strata of the tree components.”

As required by SEPP 44 an assessment must be carried out by a suitably qualified person to confirm if *potential koala habitat* occurs on the land. Council's koala habitat mapping identifies indicative *potential koala habitat* and this mapping is available on council's website <http://www.byron.nsw.gov.au/> or on request.

Determining whether *potential koala habitat* is present applies at any scale on the property(s) in question, from small patches to the entire property. This means that all of the property(s) may be determined to constitute *potential koala habitat* where plant community types are fairly homogenous, or only one patch or area of vegetation within the property(s) may exhibit the required criteria to be considered *potential koala habitat*. Both situations (and other variations) require the next step to be taken to determine whether the site constitutes *core koala habitat*.

Core koala habitat

SEPP44 defines *core koala habitat* as:

“an area of land with a resident population of koalas, evidenced by attributes such as breeding females (that is, females with young) and recent sightings of and historical records of a population.”

The overall aim of SEPP 44 is also relevant to consider:

“This Policy aims to encourage the proper conservation and management of areas of natural vegetation that provide habitat for koalas to ensure a permanent free-living population over their present range and reverse the current trend of koala population decline.”

Taking this into account it is evident that in order to meet the Aim of SEPP44 the identification of *core koala habitat* should include sufficient habitat to ensure a permanent free living population.

The Habitat Study was completed in accordance with Clause 15 (a) of SEPP44 and provides the scientific basis that Council resolved to use to inform the development of this Plan. The landscape scale approach used in this Plan enables identification of *core koala habitat* that is more reflective of current knowledge of koala ecology including home range size, habitat requirements and use and is therefore better able to meet the Aim of SEPP44, in comparison to an approach that is restricted to a property scale.

In this Plan *potential koala habitat* within a Koala Management Precinct is considered to meet the definition of *core koala habitat*. This determination is based on the Habitat Study findings which involved:

- Analysis of 1471 koalas records in Byron Shire recorded between 1901 and 2011
- Generational persistence analysis showing areas containing repeated records of koalas over 3 koala generations (18 years), which is considered to identify the presence of a resident and/or source koala population.
- Systematic koala surveys using a standard methodology which identified areas of high activity, indicative of the location of koala sub-populations at West Byron, Tyagarah, Brunswick Heads and West Mullumbimby.

The development assessment flowchart (Figure 10) indicates the pathway to be used when determining the requirements of this Plan and has been developed in accordance with SEPP44. Development on land containing *core koala habitat* is required to meet the Development Standards in Section 12.3 which for many development types will be easily achieved.

If, for the purposes of a development application, a landholder within a Koala Management Precinct does not consider *potential koala habitat* on their property/s to meet the definition of *core koala habitat* they may choose to undertake their own koala habitat assessment. It is essential that assessment of land for the purpose of identifying *core koala habitat* be undertaken using a methodology which is robust, standardised and repeatable and which provides Council with sufficient detail to support any determination in regard to the presence of *core koala habitat*. Appendix 2 provides details of Council's preferred field survey methodology. Koala habitat assessments for the purposes of identifying areas of *core koala habitat* that differ from this Plan should include koala survey details and a discussion of the result, having regard to the Habitat Study or any subsequent koala monitoring carried out as part of this Plan.

12.1 Application

- (i) This Part applies:
 - a) to development applications for land within the *koala planning area* that either singly or together with any adjoining land in the same ownership has an area greater than 1 hectare whether or not the development application applies to the whole or only part of the land.
- (ii) This Plan does not apply to exempt and complying development within the meaning of *State Environmental Planning Policy (Exempt and Complying Development Codes) 2008* or land subject to an existing approved Individual Koala Plan of Management.
- (iii) For developments requiring approval under this Plan Council cannot approve a development application that does not conform to the required controls and standards arising from this Part.

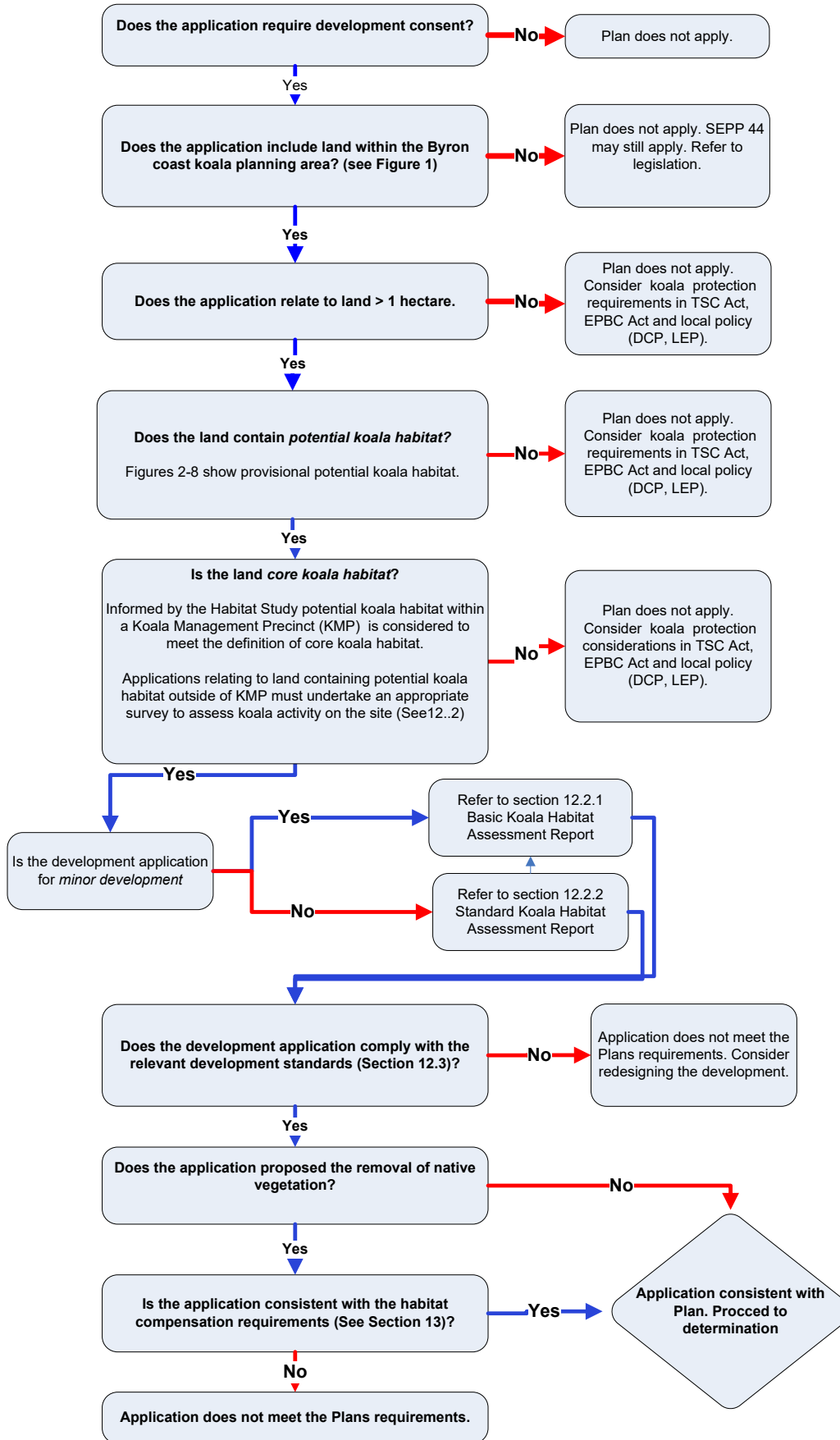


Figure 10 Development Assessment Flowchart

12.2 Koala Habitat Assessment Reports

This section provides detail on the information required to be submitted with a development application on land identified as *core koala habitat*.

12.2.1 Basic Koala Habitat Assessment Report

A Basic Koala Habitat Assessment Report is required for development applications for *minor development* on sites containing *core koala habitat* which involve *vegetation removal*, including when clearing of a bush fire asset protection zone is required. A Basic Koala Habitat Assessment Report must be undertaken by a suitably qualified person and contain the following information:

- (i) A map or site plan showing the location and types of vegetation on site, highlighting areas of *core koala habitat* and isolated *preferred koala feed trees*.
- (ii) For land outside a KMP include results of the koala survey used to identify *core koala habitat* using the methodology outlined in Appendix 2 or any other suitable method approved by Council. This should include a map or site plan showing the location of sampling sites and results, highlighting areas of koala activity.
- (iii) Identification of likely direct and indirect impacts on koalas, *core koala habitat* or *preferred koala food trees*.
- (iv) When vegetation removal is proposed the following information is required to be submitted:
 - a) A map of site plan showing the location of the vegetation and its position in relation to dwelling or other buildings, roads or driveways, bush fire asset protection zones or any other infrastructure.
 - b) A table detailing species names (common and/or botanical), height and DBH.
 - c) A Koala Habitat Restoration Plan meeting the requirements of Section 13.4.1 when clearing of *core koala habitat* is proposed.

12.2.2 Standard Koala Habitat Assessment Report

A Standard Koala Habitat Assessment is required for all development identified as *core koala habitat* per SEPP 44, with the exception of *minor development*.

A Standard Koala Habitat Assessment includes the development footprint as well as other areas that may be directly or indirectly impacted by the proposed development, defined as the *study area*. A Standard Koala Habitat Assessment must be undertaken by a suitably qualified and/or accredited person.

The following activities are required to be carried out:

- (i) An assessment to identify vegetation communities occurring on site and the composition, extent and condition of koala habitat occurring within the *study area* including identification of any isolated “paddock” trees on partially cleared lands.
- (ii) For land outside a KMP include results of the koala survey used to identify *core koala habitat* using the methodology outlined in Appendix 2 of the Plan or any other suitable method approved by Council. This should include a map or site plan showing the location of sampling site and results, highlighting areas of koala activity.
- (iii) A desktop review to identify previous records of koalas within 2.5km of the site.
- (iv) A stadia-metric survey that identifies the precise location, identity and DBH of all preferred koala feed trees proposed to be removed, or that occur within 50m of the proposed dwelling.
- (v) A report adopting the structure and content shown in Table 2.

Table 2 Content and structure of Standard Koala Assessment Report

Study area	
<ul style="list-style-type: none"> (i) Identification of the location and extent of the <i>study area</i>. (ii) map or site plan showing the location and type of vegetation communities and areas of koala habitat in the <i>study area</i> and their context and connections in the broader landscape, (iii) a description of the composition, extent and condition of koala habitat occurring within the <i>study area</i> (iv) identification of any isolated “paddock” trees on partially cleared lands; (v) a stadia-metric survey that identifies the precise location, identity and DBH of all <i>preferred koala food trees</i> proposed to be removed, or that occurs within 20m of the proposed development footprint. 	
Methods	
<ul style="list-style-type: none"> (i) A description of the methodology used to assess the vegetation within the <i>study area</i> (ii) Justification for any variation in the methodology used to carry out the Koala Habitat Assessment. 	
Results	
<ul style="list-style-type: none"> (i) A map or site plan showing: <ul style="list-style-type: none"> a. the location of survey sites and the activity levels for each field site and any areas determined to be <i>core koala habitat</i>. b. The proposed development footprint including the results of stadia-metric survey that identifies the precise location of all native vegetation proposed to be removed, and <i>preferred koala food trees</i> that occur within 50m of any proposed dwellings. (ii) a table detailing the species name (common and/or botanical), height and DBH for all trees proposed to be removed and/or total area of <i>core koala habitat</i> proposed to be clear (if applicable). (iii) a map or site plan showing the location of any proposed compensation works if koala habitat or <i>preferred koala food trees</i> are being cleared. 	
Discussion	
<ul style="list-style-type: none"> (i) Interpretation and discussion of the results and consideration of the direct and indirect impacts of the development on koala habitat within the study area and broader landscape (ii) A discussion of how the results of the assessment have been considered in the design and layout of the development. Include discussion of alternative options and why these have been rejected. (iii) Identification of any limitation in methods and results (iv) Discussion and recommendations of compensatory works, if required. 	
References	

12.3 Development Standards

This section outlines development standards that must be achieved for development on land identified as containing *core koala habitat*. The intent of these standards is to ensure koala friendly development occurs within these areas which eliminates or minimises threats to koalas.

12.3.1 Development standards for *minor development*

This Section applies to all *minor development* on land identified as *core koala habitat*:

Retention of *potential koala habitat*

The principles of avoidance, minimisation and mitigation of impacts on *core koala habitat* and koala feed trees must be applied.

- (i) Approval for clearing of vegetation will only be granted if Council is satisfied:
 - a) all feasible ways of avoiding the removal of the *core koala habitat* and/or *preferred koala food trees* have been examined and demonstrated to be unachievable;
 - b) the removal of vegetation is to be undertaken to the minimal possible extent;
 - c) priority has been given to the retention of *preferred koala food trees* >250mm DBH;
 - d) where the applicant has demonstrated to Councils satisfaction that removal of *core koala habitat* or *preferred koala food trees* is unavoidable then the development applicant must be consistent with habitat compensation provisions as per Section 13 of this Plan.

Protection of koalas from disturbance

- (i) Any clearing of land must not commence until the area proposed for clearing has been inspected for the presence of koalas and approval given in writing by a suitably qualified and/or accredited individual.
- (ii) Clearing of native vegetation and/or earthworks as part of any development consent from Council must be temporarily suspended within a range of 25m from any tree which is concurrently occupied by a koala and must not resume until the koala has moved from the tree of its own volition.
- (iii) Approval to proceed with the clearing of vegetation in accordance with this section is only valid for the day on which the inspection has been undertaken.
- (iv) The individual referred to in (i) above, or a nominated representative, must remain on site during any approved clearing of vegetation.

Bush Fire Asset Protection Zones

- (i) Bush Fire Asset Protection zones required for development must not require clearing of *core koala habitat* or result in the removal of individual *preferred koala food trees*.

Swimming pools

- (i) So as to enable egress by koalas, all new swimming pools must incorporate a design component such as a shallow ramp and/or a stout rope (minimum 50mm diameter), one end of which must be secured to a stable poolside fixture, the other end of which must trail in the pool at all times.
- (ii) Without contravening provisions of the Swimming Pools Act 1992, fencing must also be of a type that prevents access to the pool area by koalas (e.g. not be of timber or have timber posts or have shrubs and trees within 1m of either side of the fence that would allow koalas to climb over).

Fencing

- (i) Fencing of residential lots must not impede the movement of koalas. Fences that do not impede koala movement may include:
 - a) hedges or screens of trees and/or shrubs;
 - b) fences where the bottom of the fence is a minimum of 300 mm above the ground to allow koalas to freely move underneath;
 - c) open post and rail fences;
 - d) post and 4 or 5 strands of plain wire, barbed wire or some combination of plain and barbed wire, where the bottom strand of wire is a minimum 300 mm above the ground at any in-line fence post and/or dropper.

12.3.2 Development Standards for *Large Development*

This Section applies to all *large development* on land identified as *core koala habitat*.

- (i) For all development applications:
 - a) The principles of avoidance, minimisation and mitigation of impacts on core koala habitat and preferred koala feed trees must be applied.
 - b) The applicant must demonstrate by way of stadia survey that removal and/ or impact on core koala habitat and preferred koala feed trees has been avoided to the maximum extent possible through the development location, design, construction and management of development activities.
- (ii) Approval for clearing of vegetation will only be granted if Council is satisfied:
 - a) all feasible ways of avoiding the vegetation removal have been examined and demonstrated to be unachievable. Appropriate documentation must be submitted with the development application;
 - b) the clearing will not increase fragmentation, sever or otherwise disturb vegetated linkages between areas of core or potential koala habitat;
 - c) the removal of vegetation is to be undertaken to the minimal possible extent;
 - d) priority has been given to the retention of preferred koala food trees >250mm DBH;
 - e) where the applicant has demonstrated to Councils satisfaction that removal of core koala habitat or preferred koala food trees is unavoidable then the development applicant must be consistent with habitat compensation provisions as per Section 13 of this Plan.
 - f) the applicant has demonstrated to the satisfaction of Council that the protection of all vegetation to be retained is consistent with the requirements of AS 4970-2009 (Protection of Trees on Development Sites).
 - g) any clearing does not include trees that a koala habitat assessment has demonstrated are used by koalas.

Bush Fire Asset Protection Zones

- (i) Bush Fire Asset Protection zones required for development must not require clearing of *core koala habitat*.

Protection of koalas from disturbance

- (i) Any clearing of land must not commence until the area proposed for clearing has been inspected for the presence of koalas and approval given in writing by a suitably qualified and/or accredited individual.
- (ii) Clearing of native vegetation and/or earthworks as part of any development consent from Council must be temporarily suspended within a range of 25m from any tree which is concurrently occupied by a koala and must not resume until the koala has moved from the tree of its own volition.
- (iii) Approval to proceed with the clearing of vegetation in accordance with this section is only valid for the day on which the inspection has been undertaken.
- (iv) The individual referred to in (i) above, or a nominated representative, must remain on site during any approved clearing of vegetation.

Swimming pools

- (i) So as to enable egress by koalas, all new swimming pools must incorporate a design component such as a shallow ramp and/or a stout rope (minimum 50mm diameter), one end of which must be secured to a stable poolside fixture, the other end of which must trail in the pool at all times.
- (ii) Without contravening provisions of the Swimming Pools Act 1992, fencing must also be of a type that prevents access to the pool area by koalas (e.g. not be of timber or have timber posts or have shrubs and trees within 1m of either side of the fence that would allow koalas to climb over).

Fencing

- (i) Fencing of residential lots must not impede the movement of koalas. Fences that do not impede koala movement may include:
 - a) hedges or screens of trees and/or shrubs;
 - b) fences where the bottom of the fence is a minimum of 300 mm above the ground to allow koalas to freely move underneath;
 - c) open post and rail fences;
 - d) post and 4 or 5 strands of plain wire, barbed wire or some combination of plain and barbed wire, where the bottom strand of wire is a minimum 300 mm above the ground at any in-line fence post and/or dropper.

Road design

- (i) Road design standards and/or approved vehicle calming devices must be incorporated such that motor vehicles are restricted to a maximum speed of 40km/hour within the development area.
- (ii) Outside of residential subdivisions, where new roads are proposed that traverse areas of *core koala habitat* and are predicted to accommodate in excess of 1,500 vehicle movements/day the following standards will apply:
 - a) Floppy-top or other approved wildlife exclusion fencing must be installed along both sides of the road, the lower half of which must be clad with galvanised tin sheeting on the outside face.
 - b) Round pipe cattle-grids or other approved devices must be installed at fence-ends and driveways and other access points to prevent koala access to the exclusion area.

- c) Where possible, koala underpasses comprising a minimum of 1.2m X 2.1m reinforced concrete box culverts must be installed at regular intervals that approximate one underpass per 250m of exclusion fencing.
 - d) In areas where the installation of exclusion fencing and underpasses has been demonstrated, through engineering design, not to be possible due to topographical or engineering constraints, signage, street lighting and appropriate vehicle calming devices such as speed humps, roundabouts and/or chicanes must be deployed.
- (iii) Detailed design in accordance with (i) and (ii) above must be prepared in consultation with a suitably qualified and/or accredited person.

12.3.3 Subdivision layout and design

This section applies to development applications involving the subdivision of land and multiple occupancies/rural land sharing communities.

These standards apply in addition to the development standards in Section 12.3.2 above. Where there is any inconsistency between these standards and those in Section 12.3.2, these standards shall prevail.

Retention and protection of koala habitat

- (i) There shall be no removal of any *preferred koala food tree* >250mm DBH as a consequence of new subdivisions.
- (ii) *preferred koala food trees* may only be retained within allotments arising from the subdivision of land if they are protected by an effective restriction on the user on title of the land.
- (iii) A suitable management arrangement must be in place to ensure the condition and extent of retained areas of *core koala habitat* are enhanced and protected. Council will require:
 - a) preparation and implementation of a Koala Habitat Rehabilitation Plan consistent with requirements in Section 13.4.1;
 - b) a suitable legal mechanism to ensure protection of core koala habitat which may include:
 - restrictive covenant under Section 88 of the Conveyancing Act;
 - a Voluntary Conservation Agreement (VCA), or equivalent, under the *National Parks and Wildlife Act 1974 or Nature Conservation Trust Act 2001*;
 - transfer of land ownership to the crown for dedication as a conservation reserve under the *National Parks and Wildlife Act*;
 - rezoned for environmental protection under the Local Environment Plan.

Layout and design

- (i) Subdivision and multiple occupancy layout must include areas which enhance connectivity and allow free and safe movement and dispersal of koalas between areas of *core koala habitat* and other areas of vegetation.
- (ii) Development within a *core koala habitat* buffer must be low impact and designed and positioned in a way to avoid or otherwise minimise and mitigate any potential adverse impacts on areas of *core koala habitat*.

Building envelopes

- (i) Where *core koala habitat* occurs on or within 20 meters of a new lot, building envelopes must be defined to ensure dwellings and associated development avoids impact to koalas. Building envelope location must avoid all areas of *core koala habitat* and *preferred koala food trees* by a minimum of 15 metres from the trunk of the retained trees with the aim of ensuring retained trees do not pose a future hazard to property.
- (ii) Building envelopes are to be defined by restrictive covenant under Section 88 of the *Conveyancing Act* for all residential lots.

Domestic dogs

- (i) For subdivisions in urban zoned areas, the keeping of domestic dogs on any new residential lots arising from the subdivision of land shall be prohibited by an effective restriction as to user on the title of the land or other suitable planning measure, unless the dog is an assistance animal as defined by the Companion Animals Act 1998.
- (ii) for subdivision of non-urban zones allotments, the keeping of domestic dogs on any new lots arising from the subdivision of land shall be prohibited by an effective restriction as to user on the title of the land or other suitable planning measure unless any of the following apply:
 - a) the dog is a working dog as defined by the Companion Animals Act 1998;
 - b) the dog is an assistance animal as defined by the Companion Animals Act 1998.
- (iii) Council may consider exemptions to (i) and (ii) above only if:
 - a) it can be demonstrated any dog/s permanently resided on the land for a minimum of 12 months prior to subdivision, and
 - b) the movement of the domestic dog is restricted by a suitable fence or enclosure that effectively contains dogs and excludes koalas, and
 - c) the fence must be located a suitable distance from trees to ensure koalas cannot climb over the fence to access the enclosed area.
- (iv) All public managed open space must be declared a dog free area and suitable signage installed to communicate the restrictions that apply.
- (v) “No dogs” signage shall be installed at all entry points and in any areas of open space. Signage must state the reason for exclusion of dogs is for koala conservation and must be pre-approved by Council.

Education and community awareness

- (i) The importance of the site for koalas must be communicated to prospective purchasers of residential lots. As a minimum this must include providing educational brochures or similar publications which state the importance of the areas for koalas, the responsibilities of landholders under this Plan and how they can assist the conservation of Koalas. Publications must be approved by Council and may include material developed as a result of Section 7 of this Plan.
- (ii) Interpretive signage communicating the importance of the site for koalas must be installed at appropriate locations on public land within the development.

12.4 Non-conforming subdivisions

In the event that extenuating circumstances occur which are beyond the capacity of the Plan to resolve, some basis may exist for Council to consider modifying a development proposal for the subdivision of land in such a way as to not compromise long-term koala management objectives. This would incorporate enclaving of the proposed development in such a way as to permanently

exclude koalas by way of fencing, grids and gateways of a type that do not allow koalas to enter the area.

- (i) Despite Section 12.3 Council may grant consent for enclaving the subdivision of land into 2 or more lots in such a way as to permanently exclude koalas by way of fencing, grids and gateways of a type that do not allow koalas to enter the area.
- (ii) Areas of land where the presence of koalas has been established by a Koala Habitat Assessment Report cannot be included in any land that is proposed for enclaving.
- (iii) In considering any application for the purposes of this section and only after consultation with the Koala Management Committee, Council must be satisfied that all options relating to conformity with Section 12.3 of the Plan have been explored and exhausted.
- (iv) For the purposes of (iii) above the Koala Management Committee must provide a written response which must be considered by Council as part of the assessment process.
- (v) Following consideration of the response from the Koala Management Committee at (iv) above, Council may grant consent to the application subject to the following:
 - a) All roads and pedestrian access ways entering the enclaved area including suitable approved devices such as specially constructed cattle grids and gates to prevent koalas from entering the area.
 - b) The design and specifications of the fencing, grids and/or gates being determined in consultation with a suitably qualified and/or accredited individual. Where the use of fencing is not considered necessary, sufficient justification in writing must be provided within the documentation supporting the development application.
 - c) Lands upon which the fencing is to be installed being dedicated to Council, or access otherwise enabled by way of formal easement.
 - d) The first development application for development of land to be enclaved providing the following plans to the satisfaction of Council:
 - the precise location of the fencing, and
 - details of conformity with (a) – (c) above.
 - e) The costs of providing and installing fencing, and maintenance thereof being met by the proponent until such a time that 50% of lots resulting from subdivision of the lands have been sold and thus rateable by Council. Thereafter and in perpetuity, funding for ongoing maintenance and repair of the fencing will be derived by Council by apportioning a percentage of the rate yield from the proposed development, or by the levying of a special rate explicitly for this purpose.
 - f) No development works pursuant to a construction certificate being undertaken on the land to be enclaved, other than fencing approved as a consequence of (i) above until the fencing is installed and operational.
- (vi) *preferred koala food trees* cannot be planted for landscaping purposes within any area that is proposed for enclaving.
- (vii) Compensation in accordance with Section 13 of the Plan is required for all *preferred koala food trees* that are within any area to be enclaved.
- (viii) The balance of lands relating to the development application and which are not to be enclaved will be subject to the development standards in Section 12.3 of this Plan.

12.5 Music festivals

Monitoring of koalas exposed to the impacts of amplified sound associated with music festivals indicates that such exposure may cause aversive behaviour in the form of movement within and out of individual home range areas.

Some koalas respond by temporarily moving outside of their normal home ranges during some events. Data suggests that koalas residing within 500m are more likely to be affected, although responses may vary between sites and events. As such koala use of habitat within a 500m radius of a festival may be reduced and enhancement or compensation is sought.

- (i) This section applies to a development application to undertake a permanent music festival on any land; or multiple music festivals on any land
- (ii) For the purposes of this section a music festival is a public event characterised by stage based amplified music being played for large crowds over a number of consecutive days and nights.
- (iii) If a music festival is proposed to occur annually and/or on more than one occasion throughout the course of a calendar year and in addition to the requirements of 11.3 above, a site specific Music Festival Koala Management Plan must be submitted with the development application for approval.
- (iv) The Music Festival Koala Management Plan shall:
 - a) identify areas of *core koala habitat* within and surrounding the site that occur within a radius of 500m from the centre of the staging areas with the objective of calculating compensatory planting or enhancement requirements.
 - b) provide for compensation for any *core koala habitat* identified within the impact area identified in a), which:
 - shall be in accordance with the requirements of Section 13 of this Plan;
 - shall be outside of the area of impact and located on the same property as that which the development application relates. Where compensation or enhancement cannot be created on the same property as that to which the development relates, the replacement area will be selected from that identified in Section 6.1 (ii) of the Plan; and
 - despite (i) above the total area of compensatory planting required by this Plan is based on replacement ratio of 1:1 and may be discount by up to 50% of the total area, if no vegetation is to be removed.
 - c) identify other hazards and/or threats to koalas at the festival site and surrounding lands and include measures for the long term protection of the resident koala population to mitigate those hazards and threats, including but not limited to:
 - site layout to ensure the stage and event layout minimise impacts on koala habitat,
 - appropriate fencing, signage and the like which protect koala habitat,
 - implement koala awareness education for patrons, and workers during an event,
 - measures for the treatment of sick or injured koalas,
 - a monitoring program to measure the effectiveness of the management plan, and
 - any other identified matters.
- (v) Where the land owner or festival operators have already replanted koala food trees and habitat, a credit will be given for any compensatory planting for prior works if in the opinion of Council that planting:
 - a) is outside the area of potential impact or within a Council mapped wildlife corridor; and
 - b) makes a positive contribution to koala recovery by way of consistency with the visions, aims and objectives of this plan.

13 Compensation for loss of koala habitat

The loss of native vegetation is identified as a key threatening process (TSC Act, EPBC Act) and a contributing factor to koala population decline. A number of issues arise with regard to compensating for habitat losses arising from development that need to be addressed, notably:

1. compensatory plantings take time before they provide the food resource that the removed trees provided,
2. compensatory plantings on land nominated by a developer is not necessarily the most appropriate location in terms of longer-term koala management objectives,
3. compensatory plantings need to be guaranteed in perpetuity, particularly if undertaken on lands that do not have a secure conservation tenure,
4. there may be limited supervision of planting to ensure that the planting succeeds over time, and
5. there needs to be standards by which compensation can be determined for the loss of habitat.

The overall objective of this section is to create a standardised approach to compensate for loss of koala habitat with a transparent process that enables loss and compensation requirements to be quantified; and to provide a process that will ensure works achieve their objectives.

13.1 Compensation considerations

This section applies to any development application where approval results in the removal of native vegetation. Where a proponent chooses to seek the removal of native vegetation in accordance with a development application, provision must be made to compensate for the loss in accordance with this Part.

- (i) Approval for removal of vegetation and hence requirements of this Part will not be considered unless Council is satisfied that:
 - a) all alternative options to avoid, minimise and mitigate development impacts (in this order of preference) on *potential koala habitat* have been considered and employed, and no other alternatives are available;
 - b) the proposed compensation works will lead to an improvement in the extent or condition of *potential koala habitat*;
 - c) any temporary loss in habitat between clearing and maturation of the compensation works does not result in a significant risk to koala populations;
 - d) the gains in the compensation site are of significant magnitude to compensate for the losses from clearing.
 - e) the development application has been prepared in accordance with the provisions of this Part.

13.2 Compensation works

All compensation works must aim to result in the increase in vegetation quality or extent. Protection of existing vegetation alone is not recognised an option to compensate for habitat loss. Formal protection of compensation areas is required in combination with revegetation or restoration works as described below.

When compensation works are required the works must include one or a combination of the following methods:

13.2.1 Revegetation

Revegetation involves the planting of local native species with the aim restoring the structure and function of the forest type which has been disturbed or cleared. Revegetation is the preferred option in the central parts of the *koala planning area* where the habitat is highly fragmented. Revegetation works must be directed by an approved Koala Habitat Restoration Plan approved by Council.

13.2.2 Assisted Regeneration

Assisted regeneration is the process of managing degraded land to reduce threats such as weeds, grazing or inappropriate fire regime with the aim of promoting the regeneration of native vegetation. Assisted regeneration is the preferred option in areas in the north (Billinudgel) and South (Broken Head) of the *koala planning area* where the vegetation is less fragmented and occurs in larger patch sizes. When assisted regeneration works are proposed the compensation work must focus on areas of degraded habitat with good restoration potential; and result in an overall increase of *potential koala habitat* by expanding edges and infilling gaps.

13.2.3 BioBanking

The Biodiversity Banking and Offsets Scheme, 'BioBanking', is designed to address the loss of biodiversity values from habitat degradation. The NSW Government has introduced BioBanking to help address the loss of biodiversity values, including threatened species, due to habitat degradation and loss. Koalas are a "species credit" species under BioBanking. Landowners with Koala habitat which is subject to a BioBanking agreement need to ensure the following management actions:

- Apply ecological fire management practices
- Exclude domestic stock grazing
- Replanting (for use in "Low condition" vegetation)
- Supplementary planting (for use in "Moderate to good condition" vegetation)
- Weed control

Further information is available at <http://www.environment.nsw.gov.au/biobanking/>

13.3 Compensation Multiplier

- (i) The minimum required for compensation works for each class of *potential koala habitat* is to be calculated using the compensation multiplier formula in Appendix 3.
- (ii) A development application processed under the following assessment policies, is also required to meet the objectives of this Plan:
 - a) land to which the development application applies has been conferred Biodiversity Certification (TSC Act), or;
 - b) land entered into a BioBanking Agreement (TSC Act) or similar legal biodiversity offsetting agreement adopted by either the NSW or Australian Government.

13.4 Habitat Compensation Requirements

For habitat compensation works to be applied under this Plan, council must ensure that the following measures have been undertaken as part of the development application. Options are available for variation of the requirements for compensation works associated with *minor development* as outlined in 13.4.4 below.

13.4.1 Koala Habitat Restoration Plan

- (i) A Koala Habitat Restoration Plan must be prepared and approved by Council prior to compensation works commencing.
- (ii) Koala Habitat Restoration Plans include the following information:
 - a) a map identifying the location and total area proposed for restoration/ revegetation
 - b) description of current vegetation cover and condition;
 - c) the number of trees to be planted, species planting list, and plantings densities;
 - d) details of the sourcing of all seedlings (demonstrating local seed stock will be used);
 - e) detailed description of the management techniques to be use when restoration through assisted regeneration is being employed
 - f) a schedule of management, monitoring and maintenance activities to ensure establishment and ongoing protection and management of planting(s);
 - g) the length of proposed monitoring and management periods, the timing of key milestones, and reporting requirements linked to key stages in the development process. As a minimum a 5 year implementation and maintenance program, or longer when required in order to meet specific performance measures.
 - h) provisions for planting mortality replacements;
 - i) responsible parties for the undertaking of all works and activities included in the plan; and
 - j) If the revegetation is to take place on other than public land, how the revegetation will be maintained in perpetuity for the benefit of koala recovery must be specified.
- (iii) The Koala Habitat Restoration Plan must be prepared and implemented by a suitably qualified person with qualifications and experience in best practise for native vegetation management and restoration.

13.4.2 Receiving land

- (i) Compensation works should occur on the property where the habitat loss has occurred. Where compensation works cannot be created on the same property as that to which the development relates, the replacement area should:
 - a) be located within the same KMP (if applicable), or
 - b) be selected in consultation with Council from that identified in the Koala Habitat Restoration Program as per Section 6.1 (ii).
- (ii) Receiving land must have owner consent prior to the lodgement of the development application;
- (iii) There must be sound ecological consideration given to suitable location of compensation works. Works should focus on:
 - c) infilling gaps in areas of koala habitat through revegetation or assisted regeneration;
 - d) restoration works to improve the condition of degraded areas of koala habitat;
 - e) improving connectivity between areas of koala habitat through revegetation.
- (iv) the area where compensation works occur must be protected by a suitable legal mechanism. Suitable mechanism for protection include:
 - a) positive covenant under the *Conveyancing Act 1919*;

- b) a Voluntary Conservation Agreement (VCA), or equivalent, under the *National Parks and Wildlife Act 1974* or *Nature Conservation Trust Act 2001*;
- c) Incentive property vegetation plan under the *Native Vegetation Act 2003*;
- d) transfer of land to Council for dedication as a reserve and rezoned for environmental protection under the Byron LEP.

13.4.3 Guarantee

- (i) Council may require the habitat compensation works to be guaranteed either through a consent condition or legally binding management agreement between council, the proponent of the development, the lawful owner(s) of the development area or other receiving land to which the habitat compensation measures apply.

13.4.4 Performance Criteria

- (i) Compensation rates for tree replacement determined by the Compensation Multiplier are to be used as a performance measure after 2 years of management of the site.

Example: If a development requires 100 trees to be planted as compensation for removing habitat, then monitoring must demonstrate survival of 100 trees 2 years after planting. Replacement planting will be required if survival rate is not achieved. Applicants may choose to plant additional trees initially to allow for mortalities and ensure performance measure is achieved.

13.4.5 Consent

- (i) Development Consent shall be conditional upon the compensation works commencing prior to removal of habitat and any protection mechanisms referred to above being registered and in place prior to issuing of a construction certificate.
- (ii) Council may grant deferred commencement for removal of *core koala habitat* or *preferred koala food trees* subject to compensatory revegetation being undertaken and established to a stage that is beneficial for use by koalas.

13.4.6 Financial contributions

- (i) Council may consider receiving a financial contribution in lieu of the applicant undertaking the compensation works. Financial contribution amount will be determined through consultation with Council with funds being used by Council to implement the Koala Habitat Restoration Program referred to in Section 6.
- (ii) Applicants choosing to make a financial contribution in lieu of implementing works must enter into a legally binding agreement with Council to make the financial contribution towards the Koala Habitat Restoration Program referred to in Section 6.

13.4.7 Variations for minor compensation works

- (i) Council may consider reducing the requirements listed above subject to the following requirements:
 - a) the compensation works are minor in nature and involve compensation planting of less than 250 trees.
 - b) the compensation works are carried out on the same property where the habitat loss has occurred.
 - c) a Koala Habitat Revegetation Plan has been submitted and approved by Council which includes:

- a map identifying the location and total area proposed for revegetation
 - a table showing the number of trees to be planted, species planting list, and plantings densities;
 - details of the sourcing of all seedlings (demonstrating local seed stock will be used);
 - a schedule of management, monitoring and maintenance activities to ensure establishment and ongoing protection and management of planting(s);
 - provisions for planting mortality replacements;
 - responsible parties for the undertaking of all works and activities included in the plan.
- d) the area where compensation works occurred is protected by a positive covenant (eg Section 88 *Conveyancing Act*), or equivalent,

13.4.8 Reduction for prior koala habitat restoration works

- (i) Where it is demonstrated that previous works have been undertaken to rehabilitate koala habitat on the subject land, a reduction may be given against any required compensation works according to the circumstances of each case. Previous rehabilitation works must be comparable and commensurate with the development impacts and compensation requirements, and must not be as a result of previous conditions of consent, direction from the courts or publically funded environmental grant project.
- (ii) Any reduction in compensation required should not exceed 50% of the total compensation requirements.

14 References

Biolink Ecological Consultants. 2012. *Byron Coast Koala Habitat Study*. A report to Byron Shire Council.

Department of Environment and Climate Change (DECC). 2008. *Approved Recovery Plan for the Koala (Phascolarctoscinereus)*. Department of Environment and Climate Change, Sydney, NSW.

Office of Environment and Heritage 2012. *Vegetation Classification for the Northern Rivers Catchment Management Area of New South Wales*.

Office of Environment and Heritage, 2014. *Proposed changes to the Plant Community Type list for the Northern Rivers Catchment Authority Area*. A submission to the Plant Community Type Control Panel September 2014.

Phillips, S. and Callaghan, J. 2011. *The Spot Assessment Technique: a tool for determining localised levels of habitat use by Koalas Phascolarctos cinereus*.

Appendix 1 – Statutory Context

Statutory Context

Community and political interest in the management of koalas is reflected by a range of Commonwealth and State-based statutory measures that are generally intended - in the broader context of sustainability principles - to minimise impacts upon koalas and their habitat. A brief summary of the relevant tiers of legislation is provided below.

Commonwealth legislation

Environment Protection and Biodiversity Conservation (EPBC) Act 1999

The koala is listed as a Vulnerable species throughout NSW for purposes of this legislation. For the purpose of assisting the conservation of “important” populations the EPBC Act has the ability to over-ride the majority of State legislation detailed herein and the *koala planning area* does contain “important” koala populations as defined by this legislation. Some large-scale development applications/re-zonings that have the potential to impact upon koalas and/or their habitat within the *koala planning area* may require referral to the Commonwealth Government as a consequence of this listing; Significant Impact Guidelines (DEWHA 2009) are available to assist this process.

State legislation

Threatened Species Conservation (TSC) Act 1995

The koala is listed as a Vulnerable species throughout NSW for purposes of this legislation.

As a consequence of TSC Act amendments to other legislation such as the EPA Act (see below), the potential for negative impact upon koalas must be assessed by way of what is generally known as 7-part test of significance. A Species Impact Statement will be required for any development application and/or rezoning that is assessed as having the potential for significant effect.

As at the time of preparing this Plan the Tweed – Brunswick Coast Population of the Koala had been nominated to the NSW Scientific Committee for listing as an Endangered Population. Some of the area covered by this nomination includes that part of the *koala planning area* north of the Brunswick River and east of the Pacific Motorway.

Environmental Planning & Assessment (EPA) Act 1979

Amongst other things this legislation makes provision for a range of environmental planning instruments which additionally provide for protection of koala habitat, including State Environmental Planning Policies (SEPPs), Local Environmental Plans (LEPs) and Tree Preservation Orders (TPOs). Within the *koala planning area* those of particular relevance to koalas include:

State Environmental Planning Policy No. 44 - Koala Habitat Protection

SEPP No. 44 “aims to encourage the proper conservation and management of areas of natural vegetation that provide habitat for koalas to ensure a permanent free-living population over their present range and reverse the current trend of koala population decline:

- a) by requiring the preparation of plans of management before development consent can be granted in relation to areas of *core koala habitat*, and
- b) by encouraging the identification of areas of *core koala habitat*, and
- c) by encouraging the inclusion of areas of *core koala habitat* in environment protection zones”.

In order to give effect to the aims of the SEPP, Clause 15 proposes that Councils being the representatives of Local Government Areas listed in Schedule 1 of the SEPP should undertake the following:

- a) identify areas of potential koala habitat and *core koala habitat*, and

- b) make or amend a local environmental plan:
 - i. to include land identified as a *core koala habitat* within an environmental protection zone, or
 - ii. to identify land that is a *core koala habitat* and apply special provisions to control the development of that land, and
- c) give consideration to preparing an appropriate development control plan for land that is or adjoins an area of *core koala habitat*.

SEPP 44 requires councils to address koala conservation through either Individual Koala Plans of Management (ICKPoM) for a specific site/development, or Comprehensive Koala Plans of Management (CKPoM) that will apply to part or the whole of a Local Government Area. A site-specific IKPoM must accompany any development application (DA) where *core koala habitat* is found to occur. However, if a CKPoM has been approved for the area, then individual DAs do not need to include an IKPoM – as long as the DA is consistent with the requirements of the CKPoM. An applicant may still prepare an IKPoM if they so choose.

A plan of management must be prepared in accordance with the Department of Urban Affairs and Planning Circular No 35 (DUAP, 1995). Further to this guideline, in 1999, the National Parks and Wildlife Service in consultation with DUAP prepared further guidance entitled, Items that should be addressed in a Comprehensive Koala Plan of Management for Compliance under the Provisions of SEPP 44 (NPWS, 1999). Appendix 1 sets out how the Plan has conformed to these guidelines and SEPP 44.

Native Vegetation Act 2003

The Native Vegetation Act 2003 regulates the clearing of native vegetation. Division 3 of the Act permits the removal of native vegetation for the purposes of Routine Agricultural Management Activities (RAMAs). The Act does not override any requirement to obtain consent from Council where an LEP otherwise requires approval for the clearing of native vegetation. Private Native Forestry can only be undertaken with an approved Property Vegetation Plan (PVP) and only in accordance with the PNF Code of Practice. The Code of Practice includes a specific prescription for managing impacts of forestry operations on koalas and their habitat. This includes the prohibiting of forestry activities in areas identified as 'Core Koala Habitat' within the meaning of SEPP 44.

Rural Fires Act 1998

The objects of this legislation provide for the protection of the environment by requiring its key management focus (i.e. fire prevention, mitigation and suppression) to be carried out having regard to the principles of ecologically sustainable development as defined by Section 6 (2) of the Protection of the Environment Administration Act 1991.

Environmental Planning Instruments such as those referred to above cannot prohibit, require development consent for or otherwise restrict activities associated with bushfire planning and management. Similarly, Part 5 of the EPA Act does not apply to managed bush fire hazard reduction work carried out on land other than excluded land if:

- “(a) the work is carried out in accordance with a bush fire risk management plan that applies to the land, and
- (b) there is a bush fire hazard reduction certificate in force in respect of the work and the work is carried out in accordance with any conditions specified in the certificate, and
- (c) the work is carried out in accordance with the provisions of a bush fire code applying to the land specified in the certificate.”

Similar legal over-ridings are in place in respect of the NV Act, the TSC Act and the National Parks and Wildlife Act 1974. Whilst these arrangements *prima facie* should provide appropriate safeguards for koala habitat, in effect there are significant practical concerns:

- The Far North Coast Bush Fire Risk Management Plan (FNCBFRMP) does not recognise koalas or their habitat in the Asset Register.
- Whilst the Bush Fire Environmental Assessment Code (BFEAC) includes a range of environmental safeguards (e.g. slope, vegetation and riparian buffers), none make specific reference to koalas.

Companion Animals Act 1998

The Companion Animals Act 1998 requires dogs to be under the control of a competent person when in public places, and that they must not roam and/or attack other animals including native wildlife. In practice, enforcement of these key aspects of the Act can be problematic.

The Act provides for the preparation of the Byron Shire Council Companion Animals Management Plan 2000, which enables Council to fulfil its responsibilities under the Act by determining relevant objectives and priorities along with a clear program of implementation. However currently the Byron Shire Council Companion Animals Management Plan does not address the management of dogs in relation to koalas.

Local Government Act 1993

The Local Government Act 1993 requires Council to have in place an Integrated Planning and Reporting Framework to ensure that Council operations and strategic planning are meeting the needs of the community. Amongst other things, budgetary items such as those arising from nominated actions in the Plan must be sanctioned within this framework before they can be actioned.

Roads Act 1993

Amongst other things, the Roads Act 1993 regulates the carrying out of activities on public roads, including those managed by Local Government authorities. Section 88 in Division 3 of this act enables Council to lop or remove any tree (including a koala food tree) that is growing in or overhanging a road reserve, and in so doing exempts them from the need to consider any Act or law to the contrary.

Local legislation

Byron Local Environmental Plan 2014

Byron Local Environmental Plan (BLEP) 2014 provides a statutory planning framework for overseeing development within most of the BLGA while also protecting important aspects of the natural and built environment. Whilst the BLEP 2014 provides land use controls through the zoning of land and related planning controls, at the time of writing it contains no specific zones that relate to environmental protection and koala habitat, pending a review by the State government. Proposed environmental protection zones have been deferred from the BLEP 2014, and in these areas BLEP 1988 applies. Existing environmental protection zones in BLEP 1988 and vegetation protection through Byron Shire Development Control Plan (DCP) 2014 provisions (Chapter B2 – Preservation of trees and other vegetation) and the Byron Tree Preservation Order provide for planning controls during the development process.

Appendix 2 – Undertaking a Koala Habitat Assessment using Regularised, Grid-based SAT (RG-bSAT) sampling.

STEP 1

Determine appropriate sampling intensities for the site to be assessed using the following table:

Area of land being subject of DA or rezoning application	<u>Initial</u> SAT sampling intensity	<u>High</u> SAT sampling intensity
<15ha	150m intervals	75m intervals
15-50ha	250m intervals	125m intervals
>50ha	350m intervals	175m intervals

STEP 2

Overlay the site with a square grid the dimensions of which correspond to the “high sampling intensity” specifications in the table above, then use the resulting grid-cell intersections to identify those points that fall upon areas of land wherein 30 trees of any species that have a dbh \geq 100mm could theoretically be sampled within a radius approximately equal to that of 50% of the sampling intensity being utilised (e.g. 75m = 38m radius, 125m = 73m etc).

When overlaying the grid, ensure that adjoining areas of land are included to the extent that an overlap consistent with the relevant Initial SAT sampling intensity interval has been achieved (i.e. provision is made to sample adjoining areas of habitat and so place the site into a broader koala management context).

STEP 3

- Preliminary sampling of the site should be undertaken at intervals commensurate with the initial sampling intensity specified in Step 1.
- Sampling is to be undertaken at each sampling point using the Spot Assessment Technique (SAT) of Phillips and Callaghan (2011).
- In the event that koala activity is recorded at any of the initial sampling sites, then the surrounding high sampling intensity sites within the boundary of the land under assessment (or immediately adjoining areas) must also to be sampled.

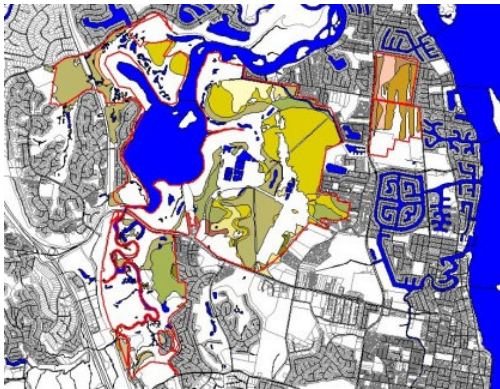
STEP 4

In the absence of a suitable spatial modelling technique such as splining, all SAT sites wherein significant koala activity has been recorded must become the central point of a grid cell, the size of which must be commensurate with sampling intensity as follows.

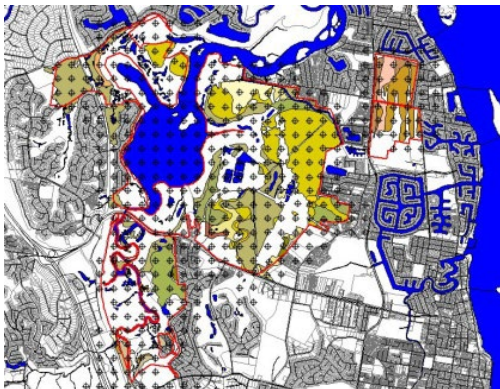
- For 75m sampling intersections, the grid cell size will be 75m x 75m (0.56ha)
- For 125m sampling intersections, the grid cell size will be 125m x 125m (1.56ha)
- For 175m sampling intersections, the grid cell size will be 175 x 175m (3.06ha)

All areas within a grid cell identified in Step 4 and that have an activity level of 9% or greater must be regarded as supporting a resident koala population for the purposes of this plan.

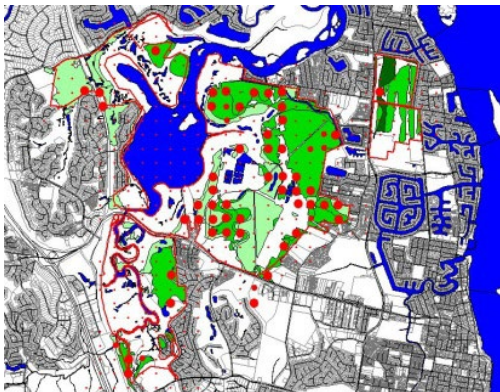
The overall process is illustrated below



Step 1. Nominal study area – in this example ~ 1500ha - comprising cleared areas and a heterogeneous mix of vegetation communities.



Step 2. Study area overlain with a point-based, regularized grid for sampling purposes, each grid cell intersection point that falls within an area of forest sampled for koala activity using the Spot Assessment Technique of Phillips & Callaghan (2011).



Step 3. The results of SAT sampling, here illustrated by graduated symbols indicating sites of low, medium and high koala activity respectively.

Appendix 3 – Compensation Multiplier

The aim of the compensation multiplier is to determine the compensation requirements associated with removal of native vegetation. Compensation is required to ensure over the long term there is no net loss, and preferably a net gain, in koala habitat as a result of approved vegetation removal.

How do I calculate the habitat compensation required?

Step 1 – Calculate Area of habitat

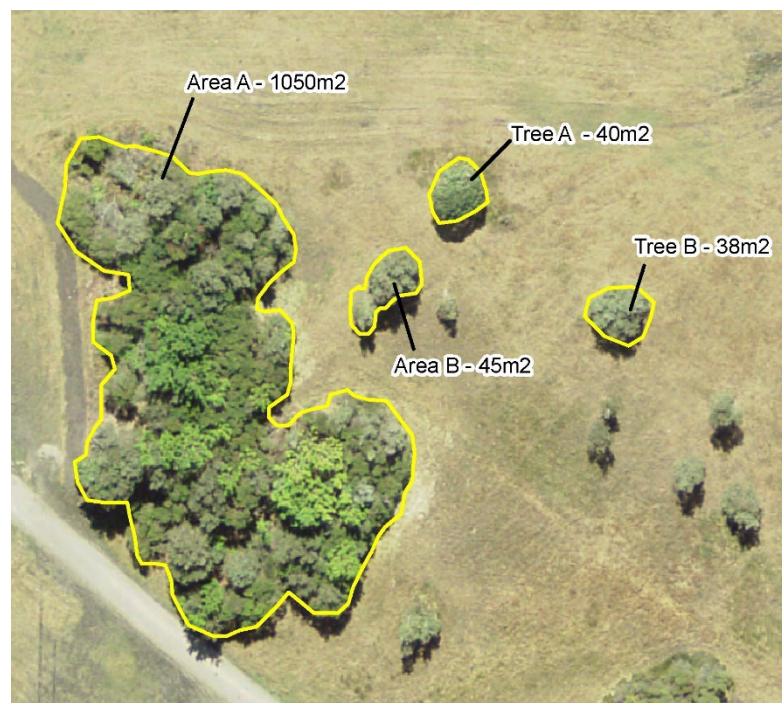
In determining the area of vegetation to be removed, the following methods for calculation shall be used.

- (i) Single tree/s with no part of canopy overlapping another tree – area within the drip line of the trees Crown (see example for Trees A & B in figure below)
- (ii) Multiple trees with overlapping canopy – outer edge of total canopy (see example for Area A & B in figure below).

Step 2 – Determine Multiplier to apply

After calculating the area of vegetation to be removed, the “Single Tree” or “Area” compensation multipliers shall be used as follows;

- (i) If the proposed tree removal is for an Area less than 0.1ha apply the Single Tree multiplier
- (ii) If the area of the proposed tree removal is greater than 0.1ha, apply the Area multiplier



Single Tree Multiplier

Where removal of individual trees, or an area <0.1ha, is proposed, the following compensation measures apply:

Any trees removed must be replaced according to the ratio detailed in Table 1, or, at council's discretion the applicant may conduct enhancement works which improve the integrity and viability of koala food trees and/or *potential koala habitat* or a koala corridor within the development area.

Table 1 Replacement ratio for single tree removal

Food tree size class (dbh)	Replacement ratio (loss:gain)	
	<i>preferred koala food trees</i>	other native vegetation
<200 mm	1:15	1:10
200-500 mm	1:20	1:15
>500 mm	1:30	1:20

Ratio and size class multiplier

Replacement ratios are higher than 1:1 because of the time lag before the ecological benefits of compensatory plantings are realised and risk of compensatory plantings failing.

The size class multiplier is used to reflect the increased ecological value of larger trees. Removal of larger trees has a higher environmental cost, therefore a larger compensation is required.

Area Multiplier

Where removal of an area of vegetation >0.1ha is proposed, the following compensation measures apply:

Any area of vegetation removed must be compensated for according to the compensation multiplier for each class of koala habitat detailed in Table 2. This may involve either Restoration or Revegetation in accordance with provision in Section 13 of this Plan.

Table 2 Compensation multiplier for removal of areas of vegetation

		Multiplier
Class of koala habitat to be impacted	Primary	12
	Secondary	10
	Any other native vegetation within a localised koala corridor or mapped wildlife corridor	6

Worked examples:

Single Tree

As part of a development application to construct a dwelling the applicant has designed the development to avoid, minimise and mitigate impacts on koala habitat as much as possible. However despite these measures the development will require the removal of 4 isolated single trees. The trees include

- 2 preferred koala food trees, both Swamp Mahogany's (DBH 15cm and 19cm),
- 1 Melaleuca, (DBH 18cm) ,and
- 1 Swamp Box (DBH 55cm)

The required compensation is calculated as follows:

Tree	Size (cm DBH)	Replacement ratio	Replacement trees required
Swamp Mahogany	15	1:15	15
Swamp Mahogany	19	1:15	15
Melaleuca	18	1:10	10
Swamp Box	55	1:20	20
Total			60

The applicant will be required to plant a total of 60 trees as compensation.

Area

A 50 hectare undeveloped land parcel within a KMP contains 10 hectares of primary koala habitat. Clearing of 1.5 hectares of primary koala habitat is initially proposed to upgrade an existing road servicing the proposed development and enlarge a house site. After all efforts to avoid, minimise and mitigate the adverse impacts on koala habitat have been exhausted clearing of 0.3 hectares is still required.

The area of habitat compensation works required is calculated as follows:

$$\begin{aligned}
 \text{Area of Habitat Compensation Works} &= \text{Area removed} \times \text{Compensation Multiplier} \\
 &= 0.3 \text{ ha} \times 12 \\
 &= 3.6 \text{ hectares}
 \end{aligned}$$

The applicant chooses the assisted regeneration option from Section 13 and will be required to regenerate 3.6 ha of habitat.

Appendix 4 - Koala habitat mapping

The following tables provide details of vegetation communities identified as *potential koala habitat* for the purposes of this Plan.

Table 3 shows plant community types identified as *potential koala habitat* based on the plant dominance as described in *Vegetation Classification for the Northern Rivers Catchment Management Area of New South Wales* (OEH 2012). Additional field work has informed variations to habitat categories in some areas based on observations of the density of preferred koala food trees.

Table 4 shows other areas of vegetation that have been identified as *potential koala habitat* based on field observation during the vegetation mapping review 2014-15 but have not yet been categorised into plant community types, or areas which contain *preferred koala feed trees* in areas not usually considered *potential koala habitat*, which is often a result of historic disturbance affecting vegetation community composition. These areas have been categorised into Vegetation Classes and further work is required to identify or refine vegetation classifications, or in some cases develop suitable plant community type descriptions. Areas of Plantations with *preferred koala food trees* occurring as the subdominant component have also been listed in Table 4.

Table 3 Plant community types identified as potential koala habitat

PCT code	Plant Community Type	Area (hectares)			
		Primary	Secondary (A)	Secondary (B)	Total
2185	Forest Red Gum- tall to very tall moist open forest/rainforest transition on the coastal plain	33.1	14.6		47.7
1944	Forest Red Gum-Willow Bottlebrush-Broad-leaved Paperbark tall open forest on alluvial floodplains	39.6	7.5		47.1
1942	Swamp Mahogany-Tantoon-Tassell Rush forested wetland of waterlogged sandy soils	0.3			0.3
1937	Swamp Mahogany-tea-tree-Tassell Rush forested wetland of waterlogged wallum soils	61.2	27.8		89
9002	Forest Red Gum-Tallowwood-Flooded Gum-Swamp Mahogany-Pink Bloodwood+/- Brush Box on floodplain	49.7	75.4	0	125.1
1938	Swamp Box-Forest Red Gum-Pink Bloodwood seasonal swamp forest	12.9	26.1		39
1934	Broad-leaved Paperbark-Swamp Mahogany-Swamp Box swamp sclerophyll forest on coastal sandsheets	29	402		431

PCT code	Plant Community Type	Area (hectares)			
		Primary	Secondary (A)	Secondary (B)	Total
102	Swamp Mahogany-Scribbly Gum-Plume Rush Swamp Sclerophyll Mallee	6	12.8	5.3	24.1
233	Tallowwood-Small-fruited Grey Gum - Forest Oak			6	6
2226	Tallowwood-Blackbutt moist shrubby tall open forest			2	2
9016	Blackbutt on metasediments			77.8	77.8
9017	Tallowwood-Brush Box-Flooded Gum on sheltered lower slopes and gullies			5	5
2246	Blackbutt - Turpentine tall moist open forest on sandstone ranges			176.8	176.8
2114	Blackbutt-Scribbly Gum-Satinwood-Tassell Rush open forest of sandy waterlogged soils		2	95.1	97.1
2117	Scribbly Gum-bloodwood heathy open forest on poorly drained sandy soils			1.6	1.6
9019	Wallum Banksia-Scribbly Gum +/- Coast Cypress Pine			52.4	52.4
9014	Forest Red Gum-Flooded Gum-Pink Bloodwood-Tallowwood+/-Blackbutt, Grey Ironbark, Brush Box		36.8	7.4	44.2
2195	Brush Box-Tallowwood-Pink Bloodwood+/-Flooded Gum shrubby wet open forest		17.7	178	195.7
2117	Scribbly Gum-bloodwood heathy open forest on poorly drained sandy soils			1.6	1.6

PCT code	Plant Community Type	Area (hectares)			
		Primary	Secondary (A)	Secondary (B)	Total
	Total	231.8	622.7	609	1463.5

Table 4 Additional areas of *potential koala habitat* identified during field observation as part of the 2014-15 vegetation mapping review.

Vegetation Class	Area			
	Primary	Secondary (A)	Secondary (B)	Total
North Coast Wet Sclerophyll Forest		36.8	33	69.8
Northern Hinterland Wet Sclerophyll Forest		6.8	11.9	18.7
Coastal Swamp Forest	2.6	97		99.6
Coastal Dune Dry Sclerophyll Forests		4.5		4.5
Coastal Floodplain Wetland	0.6	2.4		3
Wallum Sands Heath			7.5	7.5
Mangrove Swamps		1.1		1.1
Closed Forest		2.3		2.3
Plantation		78.4	0.2	78.6
TOTAL	3.2	229.3	52.6	285.1