

DRAFT **MIDCOAST KOALA** **CONSERVATION STRATEGY**



Document verification

Project Title:	Koala Conservation Strategy
Project Number:	230411
Project File Name:	MidCoast Koala Conservation Strategy.DR2

Revision	Date	Prepared by	Reviewed by	Approved by
DR.0	16/02/2024	Emily Hatfield Jacqui Coughlan	Jonathan Lamb	Emily Hatfield
WDR.2	27/02/2024	MidCoast Council	Emily Hatfield	
DR.2	1/03/2024	Emily Hatfield	Jonathan Lamb	

Acknowledgement

NGH gratefully acknowledges the New South Wales Department of Climate Change, Energy, the Environment and Water for the provision of mapping used in the development of this Koala Conservation Strategy.

NGH gratefully acknowledges the input of staff from MidCoast Council, who were involved in the provision of koala surveys and mapping, the administration of the MidCoast Koala Reference Group and the provision of information and ideas for the development of this Koala Conservation Strategy. Special acknowledgment is made to the following staff members: Caitlin Orr, Nicholas Colman, Andrew Ballard, Mat Bell, Tanya Cross and Gerard Tuckerman.

NGH gratefully acknowledges the work of the MidCoast Koala Reference Group in providing ideas, input, and feedback to this Koala Conservation Strategy.

Acknowledgment of Country

We acknowledge the traditional custodians of the land on which we work and live, the Gathang-speaking people and pay our respects to all Aboriginal and Torres Strait Islander people who now reside in the MidCoast Council area. We extend our respect to elders past and present, and to all future cultural-knowledge holders.

Koalas carry deep cultural significance for Traditional Owners. Traditional Owners hold profound knowledge of koalas, their habits, and their biology. Traditional Owners lived alongside koalas for tens of thousands of years. Totems, dreaming stories and song lines feature the koala. Traditional Owner views and knowledge is important to the recovery and conservation of koalas in NSW and on the MidCoast.

Decline or extinction of local koala populations directly impacts Traditional Owners and their culture (NSW DPE, 2022). The National Recovery Plan (DAWE, 2022) for the koala recognises the experience and wisdom of Traditional Owners in koala conservation and recovery.

Table of Contents

Acknowledgment of Country	i
Acronyms and Abbreviations	iv
Executive summary	v
1. Introduction.....	1
1.1. Koala conservation and recovery in this Strategy	2
1.2. Background.....	4
1.3. Studies and surveys	4
1.4. Legislative and planning context.....	5
1.5. Strategy development consultation	6
1.6. Habitat mapping	8
2. Koala ecology on the MidCoast.....	16
2.1. Distribution and important populations	16
2.2. Habitat and home range.....	19
2.3. Diet.....	19
2.4. Lifecycle	20
2.5. Behaviour	21
2.6. Threats.....	21
2.6.1. Habitat destruction, fragmentation, and degradation.....	22
2.6.2. Vehicle strike	24
2.6.3. Disease	24
2.6.4. High intensity bushfire and altered fire regimes	25
2.6.5. Climate change including heatwave and drought	26
2.6.6. Domestic dog attack.....	27
2.6.7. Cattle and horse attack	27
2.6.8. Stress.....	28
2.6.9. Emerging or other threats.....	28
2.7. Summary of threats within ARKS.....	29
3. Strategy targets	30
3.1. Strategy targets relative to the NSW koala strategy	30
3.2. Council strategy targets	31
4. Strategy actions.....	35
4.1. Habitat protection, restoration, and connectivity.....	37
4.2. Threat mitigation	40

4.3.	Education, engagement and integrating Traditional Owner knowledge.....	44
4.4.	Research, monitoring, health and welfare	46
4.5.	Advocacy, funding and partnerships.....	49
4.6.	Priority focus areas for conservation.....	51
5.	Implementation	52
5.1.	Adaptive framework.....	52
5.2.	Reporting and review.....	52
6.	References	53
Appendix A Legislative context		A-I
Appendix B Koala survey methods and results		B-I
Appendix C LGA wide habitat mapping		C-I
Appendix D MidCoast koala habitat trees		D-V
Appendix E Strategy action timings		E-I

Figures

Figure 1-1	North Coast Koala Management Area and MidCoast LGA	3
Figure 1-2	Meeting of the Koala Reference Group.....	6
Figure 1-3	Community engagement on the draft Strategy mapping and actions (at Tinonee).....	7
Figure 1-4	Preliminary study area (Kundle, Khappinghat and Tea Gardens) locations within MidCoast	9
Figure 1-5	Khappinghat Study Area	10
Figure 1-6	Kundle Study Area.....	11
Figure 1-7	Tea Gardens Study Area	12
Figure 1-8	Occupied koala habitat grids with koala sightings in MidCoast LGA.....	14
Figure 1-9	Likely koala habitat across the MidCoast LGA.....	15
Figure 2-1	ARKs within MidCoast Council.....	18
Figure 2-2	2019-2020 bushfire affected areas in the MidCoast LGA. Source: TierraMar 2021	26

Table

Table 1-1	Examples of the ‘in scope’ and ‘out of scope’ elements within this Strategy.....	2
Table 1-2	Applicable legislation and policy guidelines for koalas on the MidCoast	5
Table 2-1	ARKs of the MidCoast Council Area	16
Table 2-2	ARKs profile	17
Table 2-3	Threat likelihood in each MidCoast ARKS	29
Table 3-1	MidCoast Strategy targets aligned with the State Government’s Koala Strategy targets.....	30

Table 3-2 Combined local and State action targets with performance measures31

Table 4-1 Council management categories aligned to NSW Koala Strategy pillars35

Table 4-2 Timeframes.....36

Table 4-3 Habitat protection actions37

Table 4-4 Threat management actions40

Table 4-5 Education management actions44

Table 4-6 Research management actions46

Table 4-7 Advocacy management actions50

DRAFT

Acronyms and Abbreviations

ARKS	Areas of Regional Koala Significance
BC Act	<i>Biodiversity Conservation Act 2016 (NSW)</i>
BCT	Biodiversity Conservation Trust
CIFOA	Coastal Integrated Forestry Operations Approval
Council	MidCoast Council
Cwth	Commonwealth
DCCEEW	Department of Climate Change, Energy, the Environment and Water (formerly the Department of Planning and Environment (NSW))
EPA	Environment Protection Authority
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999 (Cwth)</i>
EP&A Act	<i>Environmental Planning and Assessment Act 1979 (NSW)</i>
FCNSW	Forestry Corporation of NSW
ha	hectares
IBRA	Interim Biogeographic Regionalisation for Australia
IKPOM	Individual Koala Plans of Management
KVS	koala vehicle strike
LEP	local environment plan
LGA	local government area
NPW Act	<i>National Parks and Wildlife Act 1974 (NSW)</i>
NPWS	National Parks and Wildlife Service
NSW	New South Wales
LLS Act	<i>Local Land Services Act 2013 (NSW)</i>
PCT	plant community type
PNF	private native forestry
the Strategy	Koala Conservation Strategy
SAT	spot assessment technique
SEPP 2021	State Environmental Planning Policy (Biodiversity and Conservation) 2021 (NSW)
SF	State Forest

Vision

The MidCoast contains enough safe spaces and safe connections for koalas. Our koala populations and habitat are secure, healthy, and safe in the long-term.

Executive summary

MidCoast Council has developed this Koala Conservation Strategy to guide the conservation and management of koalas and their habitat across the region for the next five years.

The Koala Conservation Strategy is funded by the New South Wales Government Regional Koala Conservation Partnership and aims to align with actions, pillars, and targets in the State Government's 2022 Koala Strategy.

The region contains some of the highest recorded densities of koalas in New South Wales.

Koala habitat mapping developed to support this Koala Conservation Strategy represents the most up to date and accurate spatial analysis for the MidCoast and is intended to be dynamic, so that it can be updated as new survey data becomes available.

Management actions within this Strategy have been developed with consideration of previous and ongoing plans and actions, as well as through consultation with key stakeholders and the local community. Council's partners, through the Koala Reference Group, were central to the development of this Koala Conservation Strategy and their ongoing collaboration is fundamental to its realisation.

Council recognises the crucial role private landholders play in providing valuable koala habitat and movement corridors and Council endeavours to undertake projects that produce benefits for both koalas and landholders.

Council also recognises that the New South Wales and Commonwealth agencies have key roles and responsibilities for koala conservation and recovery. This Strategy is essentially a Council plan that reflects the values our community places on maintaining the local koala population and, that high quality and connected habitat is essential for koala survival. It sets out the roadmap for Council's contribution to koala conservation in the MidCoast, but it also seeks to align these Council efforts with those of other agencies, organisations, and the community.

The actions outlined in this Strategy have been classified under five categories:

1. Habitat protection, restoration and connectivity
2. Threat mitigation (vehicle strike, wild and domestic dogs, livestock trampling, bushfire management)
3. Education, engagement and the integration of Traditional Owner knowledge
4. Research, monitoring, health and welfare
5. Advocacy, funding and partnering.

The successful delivery of this Koala Conservation Strategy requires that management actions are pragmatic and prioritised according to resource availability.

Progress reporting against the Strategy's targets and actions will be presented annually.

1. Introduction

Koalas in New South Wales (NSW) are facing an uncertain future. This is one of the key messages from the NSW Koala Strategy, which reported that, without action, koalas in NSW could be extinct by 2050 (DPE, 2022). The MidCoast region is recognised for its biodiversity (MidCoast Council, 2020) and still contains substantial populations of koalas in coastal, near-coastal ranges, river valleys and the slopes of the eastern Great Dividing Range. The MidCoast region can play a valuable role in the conservation and recovery of koalas in a statewide context. For this reason, the MidCoast Council (Council) is a regional partner to the NSW Koala Strategy.

The MidCoast local government area (LGA) lies within the North Coast Koala Management Area (that extends between Tweed Heads and Newcastle and west to the Great Dividing Range). The region contains some of the highest recorded densities and the largest population of koalas remaining in New South Wales.

Across NSW, threatening factors, including climate change, land clearing, vehicle strike, and disease, has resulted in the koala's distribution contracting by at least 30%. Declines have been documented from all regions (Predavec *et al.*, 2017) (Phillips in Legislative Council Portfolio Committee No. 7 - Planning and Environment, 2020). The 2019/2020 bushfires resulted in additional, sudden, and significant loss of remaining populations and short to medium-term impacts on habitat. Consistent with the state-wide trends, there is evidence of decline in koala populations across parts of the MidCoast, and the "black summer" bushfires had substantial local impacts.

On 20 May 2022, the conservation status of the koala (*Phascolarctos cinereus*) was uplisted to endangered under the NSW *Biodiversity Conservation Act 2016* (BC Act) following a determination from the NSW Threatened Species Scientific Committee. The koala was also listed as endangered on 12 February 2022 under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

The koala is one of the priority threatened species listed in Council's Biodiversity Framework 2020-2030, with a focus on populations in the Kiwarrak, Hawks Nest, Crowdy Bay, Hallidays Point and The Bucketts (Gloucester) localities (MidCoast Council, 2020). There is an Area of Intergenerational Significance (AIS) for the koala in the MidCoast region, in Crowdy Bay NP (AIS_E0_182).

Successful conservation of the koala and koala habitat in the MidCoast region relies on a collaborative approach across all levels of government and with partnering organisations, and the community. This Koala Conservation Strategy (the Strategy) supports the aims of Chapter 3 Koala habitat protection 2020 and Chapter 4 Koala habitat protection 2021 of the State Environmental Planning Policy (Biodiversity and Conservation) 2021 (SEPP 2021), 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 trend of koala population decline* in the MidCoast LGA.

Council has developed this Strategy to guide the conservation and management of koalas and their habitat across the MidCoast LGA for the next five years.

This Strategy is a roadmap for Council's contribution to koala conservation in the MidCoast. It also seeks to coordinate and position the Council action within a wider framework of effort by other agencies, organisations, and the community.

Importantly, the koala is an umbrella species. The conservation of koalas in the landscape has cascading effects for the protection of other species and biodiversity generally, the condition of the natural environment and the function of natural processes.

1.1. Koala conservation and recovery in this Strategy

The elements that underpin a species recovery and conservation effort generally comprise:

- Enhancing and conserving existing habitat, including occupied habitat, unoccupied but otherwise suitable habitat, connecting habitat (corridors) and buffering habitats, and
- Creating new habitat and new corridors in areas that aid the expansion / recovery of populations, and
- Avoiding, minimising, or mitigating the factors that are threatening adult survival and / or juvenile recruitment, and
- Compiling applied knowledge and adaptively incorporating it in enhanced management systems.

These are reflected in the NSW Koala Strategy (DPE, 2022).

The koala is a landscape species. The management of threats and the conservation of the species requires actions and management to be applied in a strategic, coordinated way across landscape-wide scales.

This is a Strategy for Council that aligns and integrates the Council actions with the efforts of all other stakeholders, including government agencies, organisations, and the broader community. Council, as the closest tier of government to the community, is well placed to lead the delivery of some koala conservation and recovery actions, and to support others. Councils can also lead, advocate, research and play a coordinating, collaborating, or informing role.

Effective koala conservation will not be delivered by continuing the approaches of the past. Business as usual / the status quo is not going to achieve the outcomes that are needed. Generally, conserving and recovering the koala on the MidCoast will require five (5) informed action platforms that need to be delivered in a system with adequate resources, delivery frameworks and processes. These action platforms are:

1. Safeguarding koala habitat (whether occupied or unoccupied) through tools and mechanisms that avoid the progressive loss and decline of important habitat (“*avoiding loss*”), and
2. Strategically delivering effective conservation action, habitat restoration, new habitat creation and increased reservation of important habitat, and
3. Systematically controlling the threats affecting koala survival and successful reproduction, as well as dispersal / movement needed to support the resilience and integrity of long-term populations,
4. Effective, efficient, and targeted auditing, performance monitoring and feedback loops, and
5. Community education, communication and engagement.

There are elements of this Strategy that can be described as “*in scope*” and as “*out of scope*”. Whether an element is in or out of scope depends on factors such as whether it is within the control of Council, or whether the element can be feasibly resourced. Examples are provided below:

Table 1-1 Examples of the ‘in scope’ and ‘out of scope’ elements within this Strategy

In Scope (examples)	Out of Scope (examples)
Council actions and activities	A Comprehensive Koala Plan of Management (CKPOM) as defined in the SEPP [^]
Council advocacy and partnerships	Activities of Government agencies that are not regulated by Council (e.g. public forestry) and not agreed to by that agency
Council targets and priorities	
Actions agreed by external project partners	Existing State and Commonwealth legislation, such as land management and development assessment processes

[^] The Koala Reference Group of MidCoast Council considers that a CKPOM is not appropriate until the NSW Government review of the SEPP has been completed.

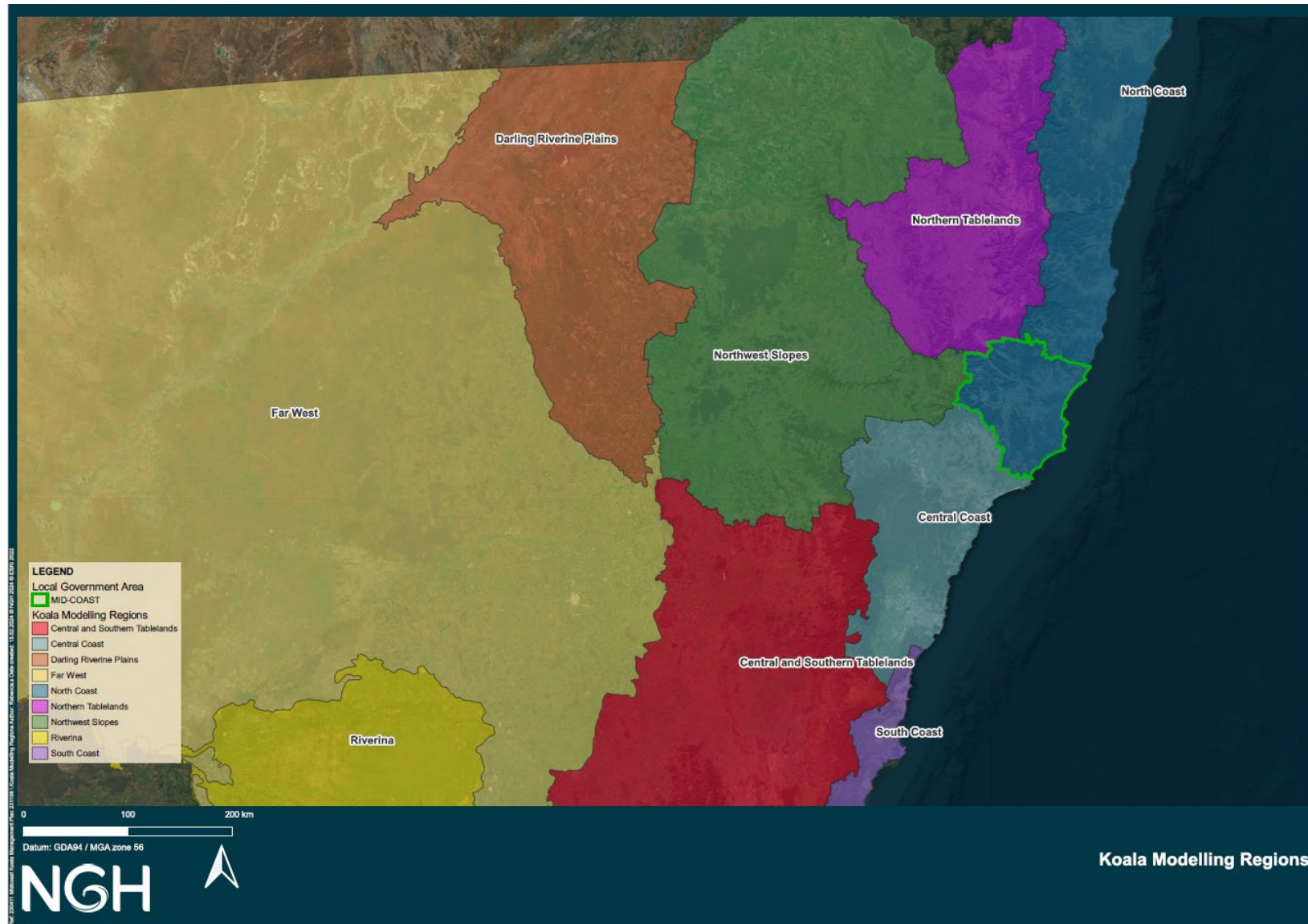


Figure 1-1 North Coast Koala Management Area and MidCoast LGA

1.2. Background

The NSW Government funds the Regional Koala Conservation Partnership with MidCoast Council as part of the NSW Koala Strategy. The NSW government has invested \$193.3 million on the NSW Koala Strategy which identifies 24 actions to protect koala populations under four pillars:

- koala habitat conservation
- conservation through community action
- safety and health of koala populations
- building our knowledge (NSW DPE, 2022).

This MidCoast Koala Conservation Strategy is also funded under the Regional Koala Conservation Partnership and the management categories within it reflect the NSW Strategies' four pillars.

The NSW Koala Strategy recognises 50 koala populations, based on the Areas of Regional Koala Significance (ARKS) (Rennison and Fisher, 2018). These ARKS were developed to guide regional scale planning in NSW. ARKS boundaries were based on a density analysis of koala records between 1990 and 2016 and reflect areas of moderate to high density of koala occupancy. They are regarded as regional koala populations (DPIE, 2020). The 50 populations (mapped ARKS) have been prioritised, with the highest two intervention categories being: *"populations for immediate investment"* and *"populations to fill key knowledge gaps and deliver local actions"*.

Nineteen populations have been identified as priorities for immediate investment under the NSW Koala Strategy (NSW DPE, 2022), with three (3) of these being wholly or partly located in the MidCoast Council area (Crowdy Bay, Comboyne and Forster). There are thirty-one populations identified to fill key knowledge gaps and deliver local actions, with seven (7) of these being wholly or partly contained in the MidCoast.

1.3. Studies and surveys

Management actions within this Strategy have been developed in consideration of previous and ongoing actions and works from other plans including from several government and non-government agencies that have undertaken or are undertaking conservation work (i.e. research on disease, threat mitigation, habitat modelling and surveys) on the MidCoast. These plans include, but are not limited to:

- A strategic Threatened Species Action Plan for koalas in the MidCoast LGA was developed as a multi-agency plan to provide local decision makers with the ability to undertake landscape-scale conservation actions to achieve maximised outcomes (TierraMar, 2021).
- A 2019 study of the Kiwarra ARKS which was commissioned by the Saving our Species Iconic Koala initiative of the OEH (Biolink, 2022).
- The Good Koala Country Plan (the Plan) was created by Gumbaynggirr people for Gumbaynggirr people in upholding cultural law and responsibilities to care for Country and koala (NSW Government, 2023).
- Cool Country Koala Project (South) was prepared by Northern Tablelands Local Land Services and investigated koalas and their management in areas including Nowendoc (Stringybark Ecological, 2017).
- In 2002, the former Greater Taree City Council prepared a Draft Comprehensive Koala Plan of Management in accordance with SEPP 44. In 2016, Gloucester Shire, Greater Taree City and Great Lakes Council became MidCoast Council. The Plan was not formally adopted.

MidCoast Council is conducting a project that maps and defines the distribution, population and trends of koala across the LGA (i.e. Koala Sightings Reporting, combined with targeted koala surveys). Public sightings, particularly on private land are critical sources of information that are incorporated into the Council and State databases and help drive prioritisation, actions, funding, and resource allocations.

The Koala Safe Spaces Program is a partnership program between Council and the NSW Government aimed to provide more habitat for koalas and support local community action. A koala safe space is a feature of habitat or land that contributes positively to the health, wellbeing, and long-term conservation of koalas across the MidCoast. They can be found in rural and urban areas and can span from a single paddock or yard tree to a large bush block. Safe spaces include corridors for the safe movement of koalas (MidCoast Council, 2023a).

1.4. Legislative and planning context

A range of legislation, policies and plans are applicable for koalas and their habitat on the MidCoast (Table 1-2). Appendix A provides further information.

In NSW, koala habitat protection is now consolidated in two chapters of the State Environmental Planning Policy (Biodiversity and Conservation) 2021 (SEPP 2021).

- Chapter 3 State Environmental Planning Policy (Koala Habitat Protection) 2020 and
- Chapter 4 State Environmental Planning Policy (Koala Habitat Protection) 2021

This is an interim measure and new codes are being developed that are purported to include protections for high value koala habitat under the *Local Land Services Act 2013*.

Table 1-2 Applicable legislation and policy guidelines for koalas on the MidCoast

LEVEL	LEGISLATION	POLICY	PLAN
National	EPBC Act – Endangered 2022	Significant Impact Guidelines 1.1	National Recovery Plan for the Koala (DAWE, 2022)
State	BC Act – Endangered 2022 <i>Environmental Planning and Assessment Act 1979</i> <i>Local Land Services Act 2013</i>	SEPP (Biodiversity and Conservation) 2021	Koala Strategy (NSW DPE, 2022)
Local	Greater Taree Local Environment Plan (LEP) Great Lakes LEP Gloucester LEP Development Control Plans (DCP) – for Greater Taree, Great Lakes and Gloucester	Vegetation Management Policy 2021 and Greening Strategy Biodiversity Framework	-

Individual Koala Plans of Management (IKPOM) are legally enforceable action plans prepared under the former SEPP44 – Koala Habitat Protection. They apply to certain specified lands. They are actioned as part of the consent conditions for developments. Failure to comply with the requirements of an IKPOM can be regulated with compliance action. Across the MidCoast region, there are approximately twenty (20) IKPOMs in the former Greater Taree area, and one (1) IKPOM in the former Great Lakes area.

1.5. Strategy development consultation

The MidCoast community and key stakeholders have played an important role in the development of this Strategy. Many individuals, community groups, Traditional Owners, koala care providers and research institutions along with the State government and Council were invited to contribute. Stakeholders provided input and feedback into the preliminary mapping and management actions.

The consultation process for the development of this Strategy included:

- Koala Reference Group meetings
- Online survey (December 2023 – February 2024)
- Koala Reference Group workshop (4 December 2023)
- Community engagement drop-in sessions (5-7 December 2023) at Tinonee, Bulahdelah, and Gloucester.

The Koala Reference Group (KRG) consists of members from:

- Department of Climate Change, Energy, the Environment and Water
- NSW National Parks and Wildlife Service
- Hunter Local Land Services
- Crown Lands
- Taree Indigenous Development & Enterprise (TIDE)
- MidCoast 2 Tops Landcare
- NSW Farmers
- Port Macquarie Koala Hospital
- Koalas in Care
- Community & Industry Groups
- MidCoast Council (Mayor and Councillors).



Figure 1-2 Meeting of the Koala Reference Group

Council's online survey containing 18 questions regarding koala threats and potential management actions was posted on Council's website between December 2023 and February 2024. Forty-nine survey responses were received.

Community members were invited to participate in several drop-in sessions carried out at Tinonee, Bulahdelah, and Gloucester (Figure 1-3). Approximately 50 people attended a drop-in session.

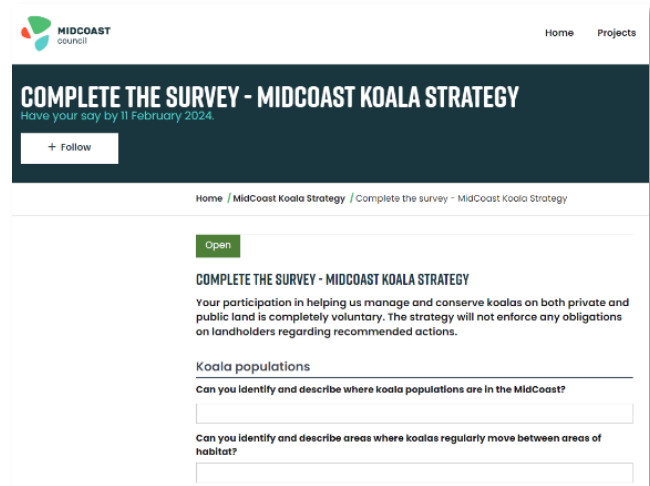


Figure 1-3 Community engagement on the draft Strategy mapping and actions (at Tinonee)

Amongst the many findings from the engagement and Strategy development consultation process, community and stakeholders' preferences indicated that:

- they hold concerns for private native forestry practices and logging in State Forests and the implications on koala habitat and populations already under threat.
- Council advocacy to the NSW and Australian Governments should be centred on actions related to habitat and corridor expansion and protection, including from the impacts of residential developments, logging and tree clearing.
- there should be greater focus on protecting existing high-quality habitat from clearing, degradation and development.
- private landholders should be engaged and educated on their obligations and restrictions concerning koala habitats.
- Council could help facilitate planting projects that have co-benefits for private landholders.
- most survey respondents identified habitat conservation and restoration as the key desired outcome of recommended partnerships.
- responsible dog ownership behaviours should be better promoted and enforced.
- more or better signage (including speed reduction) could help reduce koala-vehicle strikes when koalas are moving through the landscape (the Bucketts Way was one of several roads and locations highlighted).
- there is a demand for more education on koalas (including by Traditional Owners, the importance of preserving trees, which tree species to plant, weeding, bushfires) in a variety of formats (wild koala

day, workshops, schools, letterbox drops, information packs, radio, social media) at various locations throughout the LGA including a request for results of the koala surveys to be published.

- more information for private landowners regarding bushfire management, ecological and hazard reduction burning, and more traditional ways for low and slow burns.
- Council should consider partnerships with the local indigenous population, schools, clubs, nurseries, Rural Fire Service, environmental groups, and residents on koala projects.
- The NSW Forestry Corporation submission *applauds the MidCoast Council for developing a local koala strategy* and expressed interest to partner with and share koala survey, monitoring, and research data with Council.

1.6. Habitat mapping

Habitat mapping developed for this Strategy represents the most up to date and accurate spatial analysis for koalas occurring on the MidCoast. Habitat mapping for this Strategy is intended to be dynamic, so that it can be updated as new survey data becomes available, and altered where the modelling displays fine scale inaccuracies or amendments are required. As part of the Strategy's actions, Council will be responsible for collating and updating ongoing changes to the spatial layers on an annual basis.

Habitat mapping was undertaken as a two-stage process:

1. Development of a habitat model in preliminary case study areas (Figure 1-4)
2. Application of the habitat mapping model across the whole LGA.

The habitat model is based on a range of datasets (i.e. BioNet koala sighting records), spatial layers (i.e. plant community types) and regional koala food trees. A report describing the mapping methods is provided in Appendix B.

Mapped koala habitat was classified into two categories, described as:

- Occupied – habitat derived from plant community types containing 15% koala food trees AND known to contain koala records from the last 3 koala generations (18 years i.e. generational persistence).
- Likely – habitat derived from plant community types containing 15% koala food trees. (N.B. some of this mapping category contains recent survey records, however 'occupancy over time or generational persistence' is yet to be established).

As part of the mapping process, Council carried out targeted ground-truthing surveys with botanists and koala detection dogs. This data helped populate both the 'Occupied' and 'Likely' koala habitat mapping.

Land managed by National Parks and Wildlife Services and Forestry Corps is not mapped within this Strategy.

Lands without classification contain unknown koala habitat value possibly due to incompatible land uses, or they are highly developed / urban areas, or they are areas with insufficient data available to inform the classification process. Land that is not mapped as occupied habitat or likely habitat may contain koalas and koala habitat. The mapping is constrained by the availability of quality data.

Stage 1: Case Studies

Within the MidCoast LGA, three (3) initial study areas were selected for illustrating koala habitat for the consultation process. The three study areas including Khappinghat (Figure 1-5), Kundle (Figure 1-6) and Tea Gardens (Figure 1-7) were chosen because they are considered to be representative, they contain recorded koala populations, and they are subject to moderate to high levels of development pressure.

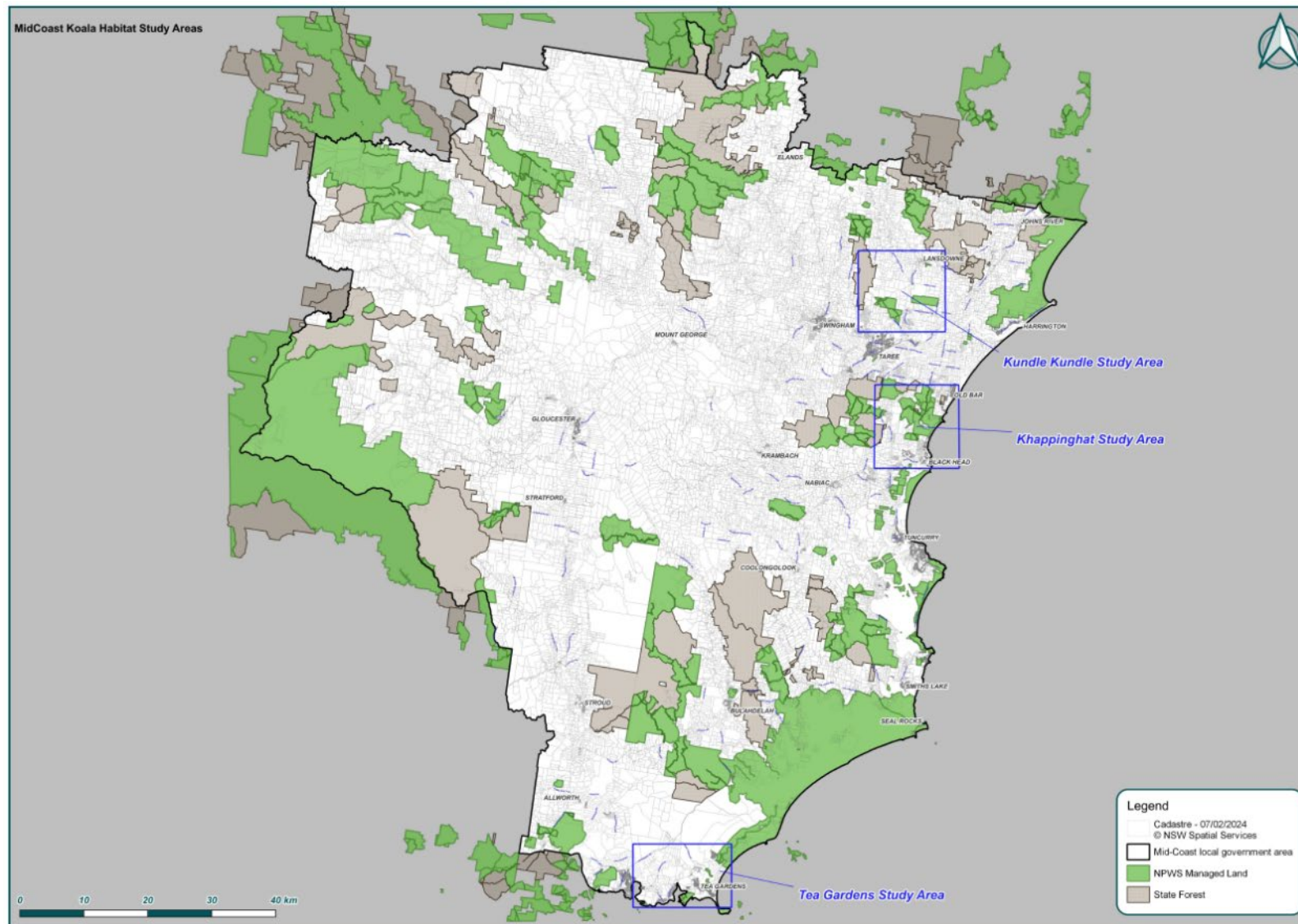


Figure 1-4 Preliminary study area (Kundle, Khappinghat and Tea Gardens) locations within MidCoast

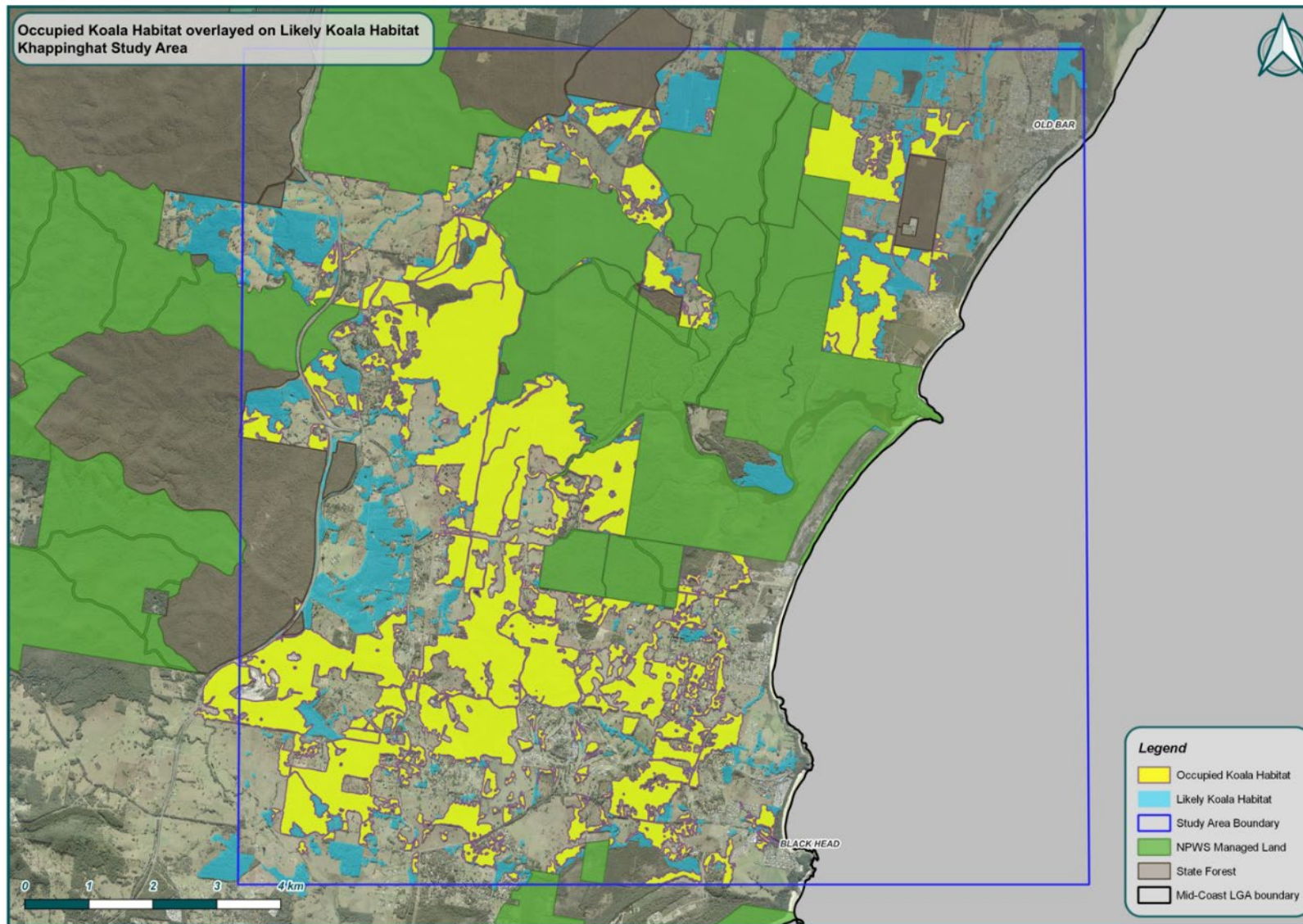


Figure 1-5 Khappinghat Study Area

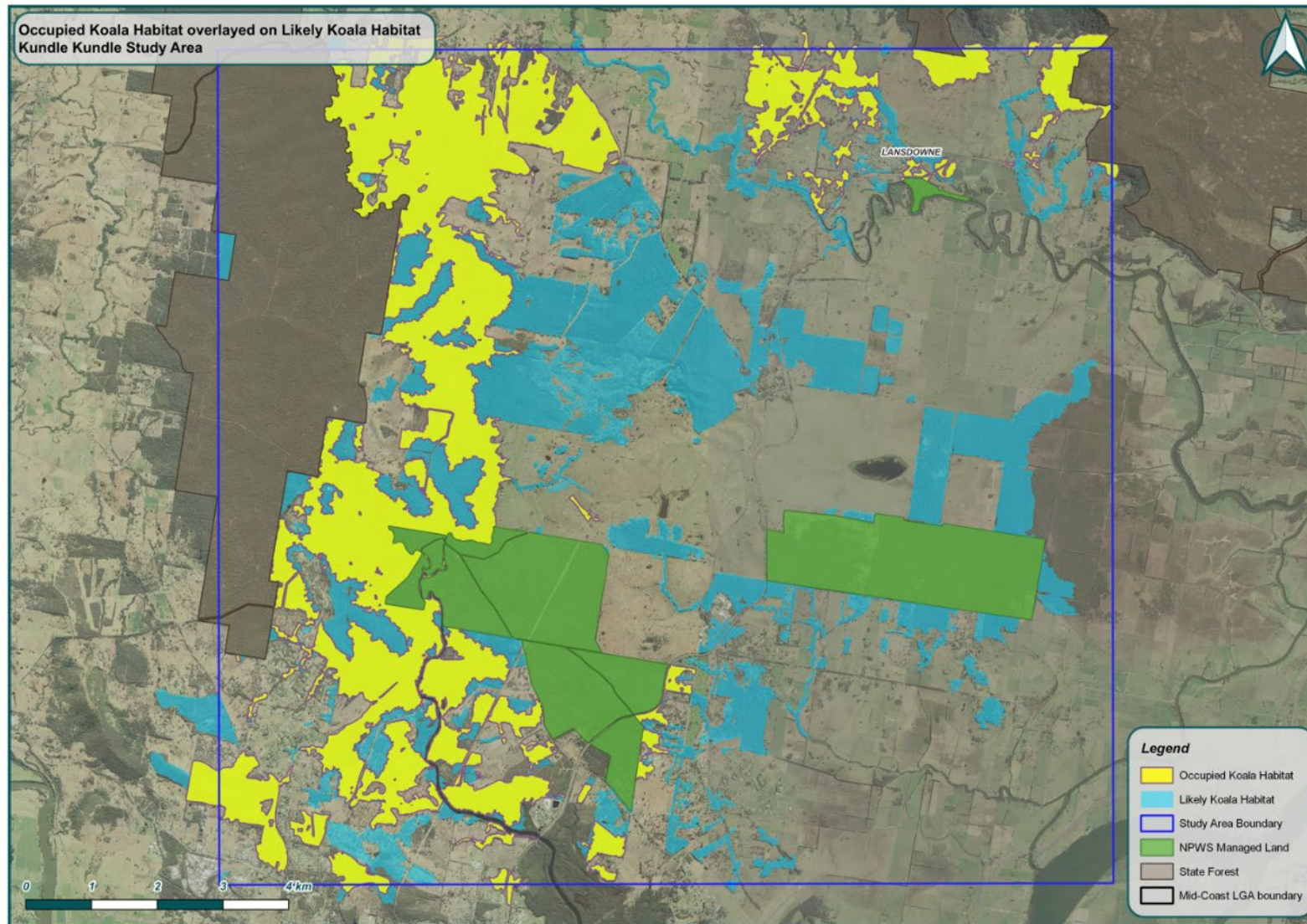


Figure 1-6 Kundle Study Area

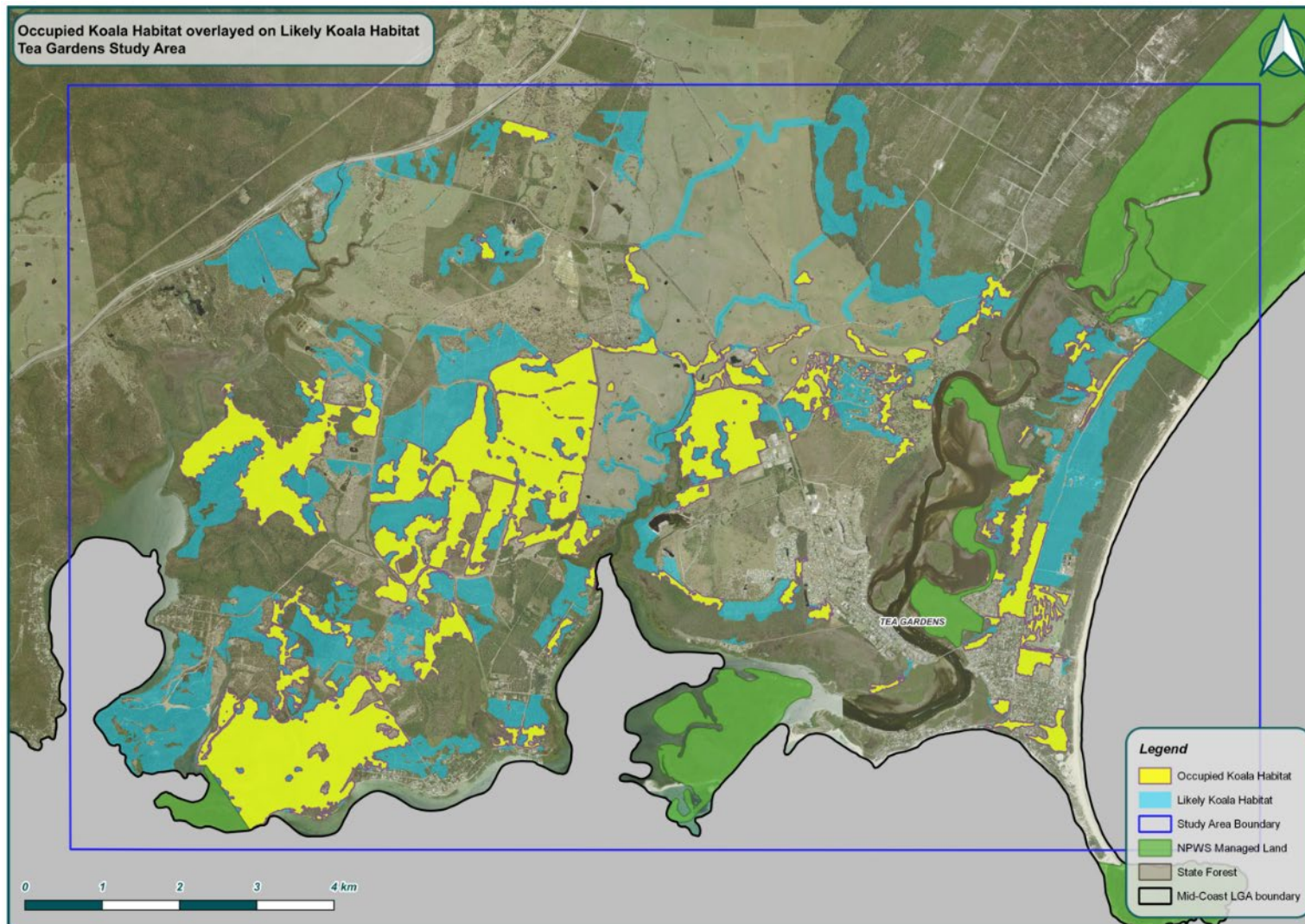


Figure 1-7 Tea Gardens Study Area

Stage 2: LGA-wide habitat mapping

After the stakeholder consultation on the three study areas was completed, the koala habitat model for 'Occupied' (Figure 1-8) and 'Likely' (Figure 1-9) was then applied across the whole MidCoast region. Noting, that at the LGA-wide scale, 'Occupied' koala habitat is displayed at the modelled 2.5km grid cells (refer methods in Appendix B) not at a study area scale. This will be refined in a future iteration.

A range of datasets containing koala records (i.e. BioNet koala sighting records and wildlife carer records) along with Council's most recent survey data is also shown within both 'Occupied' and 'Likely' koala habitat mapping.

Available koala sightings records are displayed for between the years:

- 2005-2010
- 2011-2016
- 2017-2022
- 2023 onwards.

Appendix C provides further detailed mapping, breaking the region into four quadrants.

As part of the Strategy actions, koala corridor mapping will also be developed to identify key koala movement pathways for maintaining genetics and supporting climate change resilience.

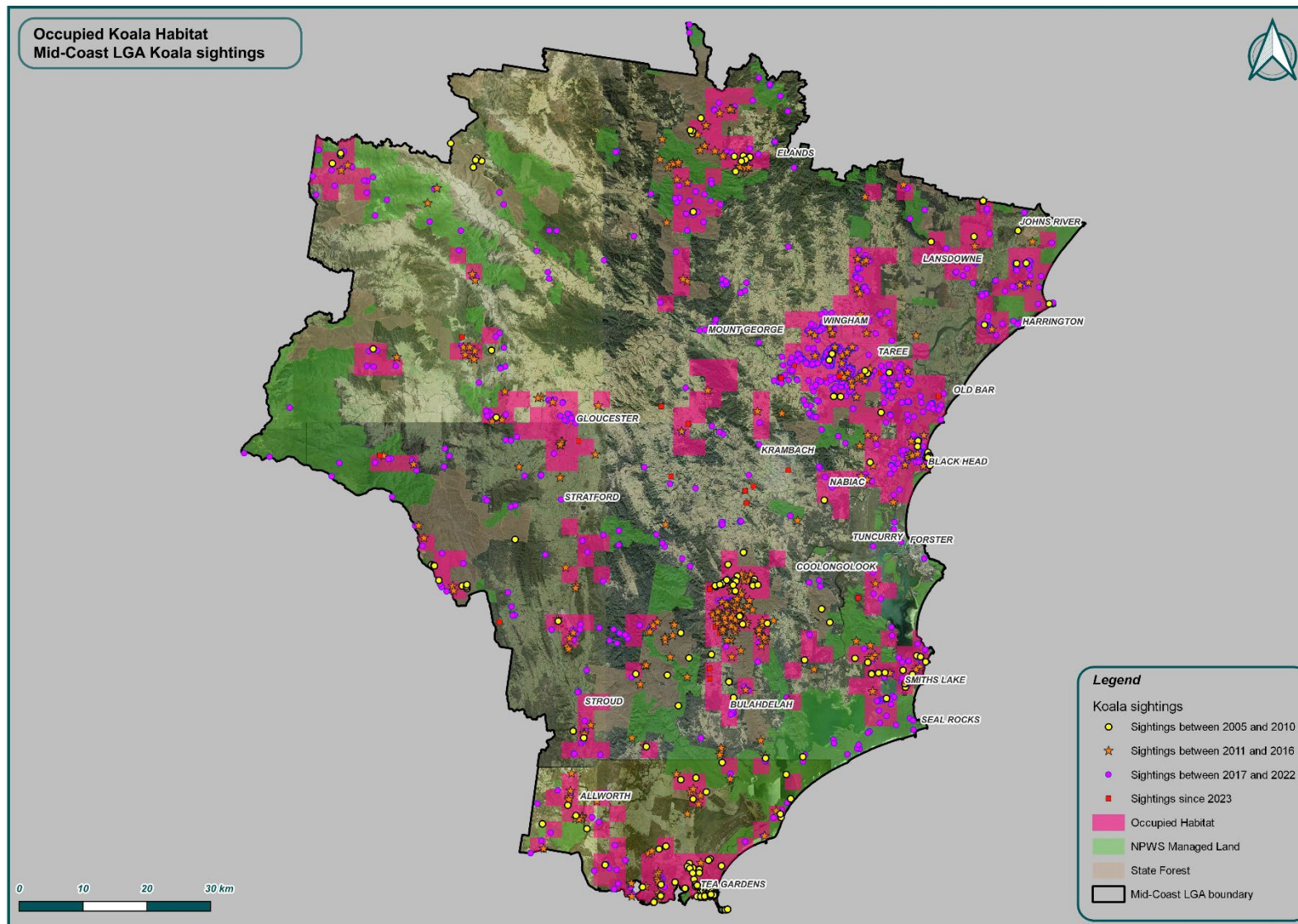


Figure 1-8 Occupied koala habitat grids with koala sightings in MidCoast LGA

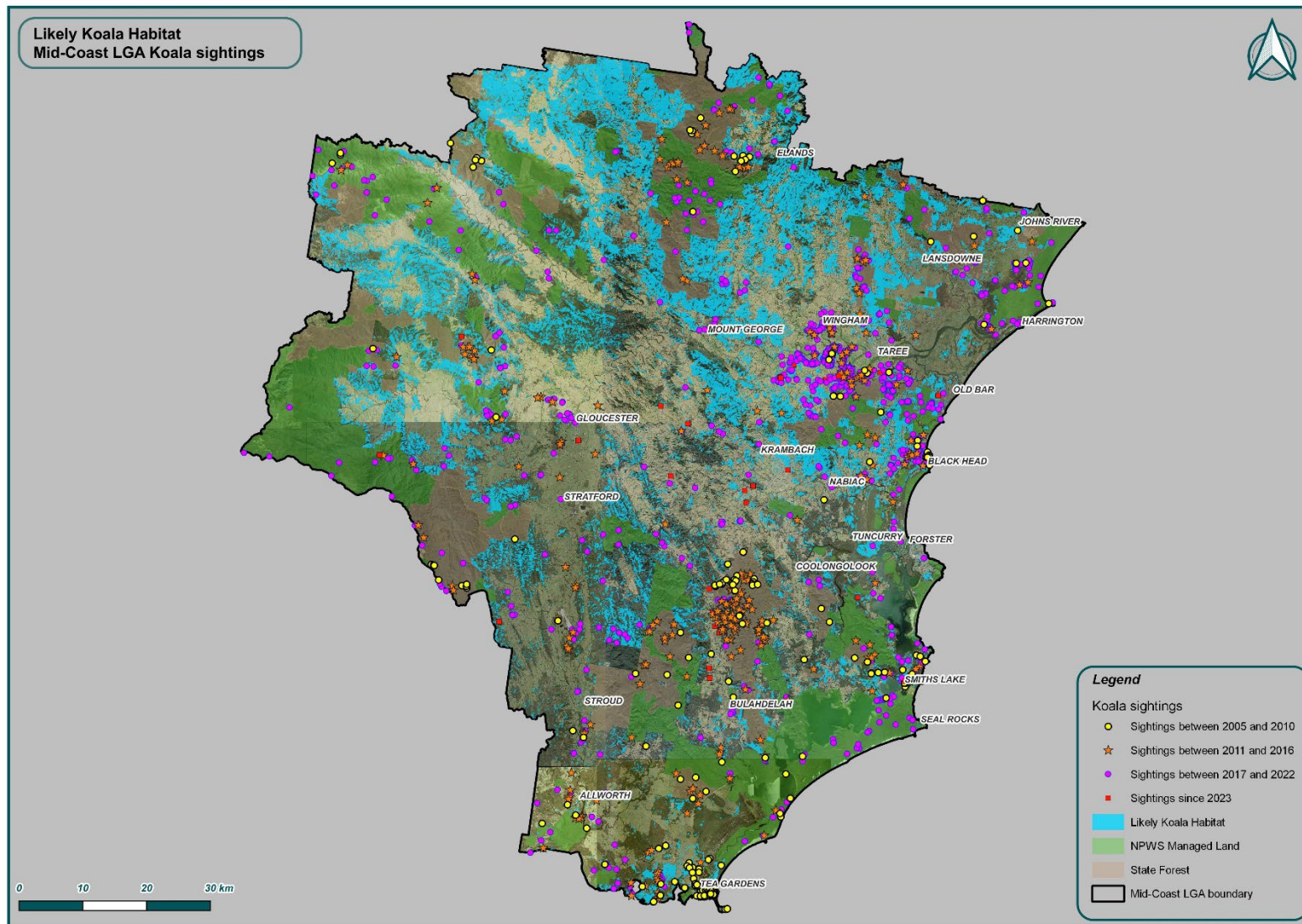


Figure 1-9 Likely koala habitat across the MidCoast LGA

2. Koala ecology on the MidCoast

2.1. Distribution and important populations

Koalas are distributed along the east coast of Australia, in Queensland, NSW, Victoria, and eastern South Australia. Most koalas in NSW are now found in the forests and subhumid woodlands on the central and north coasts. MidCoast Council lies within the NSW North Coast Bioregion where significant populations are found. Koalas occur across all parts of the LGA, but population densities are variable (TierraMar, 2021).

Of the 50 ARKS in NSW, there are 10 within the MidCoast LGA (Figure 2-1). All the ARKS / populations of the MidCoast are either populations for immediate investment or populations prioritised for filling key knowledge gaps and delivering local actions in the NSW Koala Strategy. These are listed in Table 2-1.

Table 2-1 ARKS of the MidCoast Council Area

ARK Name	Reference in NSW Koala Strategy	Total Size (ha)	Area in MidCoast LGA (ha)
Barrington	Barrington ²	94,827	76,048
Comboyne	Comboyne ¹	168,506	142,511
Crowdy Bay	Crowdy Bay ¹	16,664	15,117
Hawks Nest	Hawks Nest ²	2,568	2,568
Karuah – Myall Lakes	Myall Lakes ²	18,850	18,850
Khappinghat	East Taree ²	18,807	18,807
Kiwarra	South Taree ²	34,947	34,947
Nowendoc	Nowendoc ²	11,979	2,366
Wallingat NP	Forster ¹	37,852	37,852
Wang Wauk SF	Bulahdelah ²	162,554	153,165

1 – Population for immediate investment

2 – Population prioritised for filling key knowledge gaps and delivering local actions

While the NSW Koala Strategy (DPE, 2022) lists these as the second tier priority, MidCoast Council considers that the Kiwarra and Khappinghat ARKS are two areas likely to contain important remnant koala populations within the MC LGA (Biolink, 2019) and they are a focal point for Council's koala recovery and conservation efforts (MidCoast Council, 2020).

Previous studies have suggested that the Kiwarraak and Khappinghat ARKS function as a single unit, because they share a boundary and are most likely operating as a single, interconnected koala metapopulation (Biolink, 2022).

Over the past 18-months, Council, with financial support from the NSW Koala Strategy, and assistance from partnering agencies, has undertaken numerous surveys, gathering the latest local data for koala and habitat presence. Enhanced data now exists for Kiwarraak, Khappinghat, Wang Wauk SF, Karuah - Myall Lakes, Wallingat NP, Hawks Nest and Barrington ARKS (C. Orr, pers. comm. 7 December 2023).

Based on the best available knowledge, and acknowledging substantial limitations in some data, an evaluation of each of the ARKS of the MidCoast LGA has been provided in Table 2-2.

Table 2-2 ARKS profile

ARK Name	Estimated Population Density	Estimated trend over last 3 koala generations	Population estimate
Barrington	Low - Moderate	Stable	Not available
Comboyne	Low	Large decline in some areas	Not available
Crowdy Bay	Moderate - High	Stable; impacted by 2019 bushfires	Not available
Hawks Nest	Low	Large decline across all areas	Not available
Karuah – Myall Lakes	Low - Moderate	Stable	Not available
Khappinghat	Low - Moderate	Stable; impacted by 2019 bushfires and high incidence of disease	Not available
Kiwarraak	High	Previously stable; but substantially impacted by 2019 bushfires	1,358 ¹
Nowendoc	Low - Moderate	Stable	Not available
Wallingat NP	Low	Stable	Not available
Wang Wauk SF	Moderate – High	Stable	Not available

1 – Gonsalves & Law, 2023

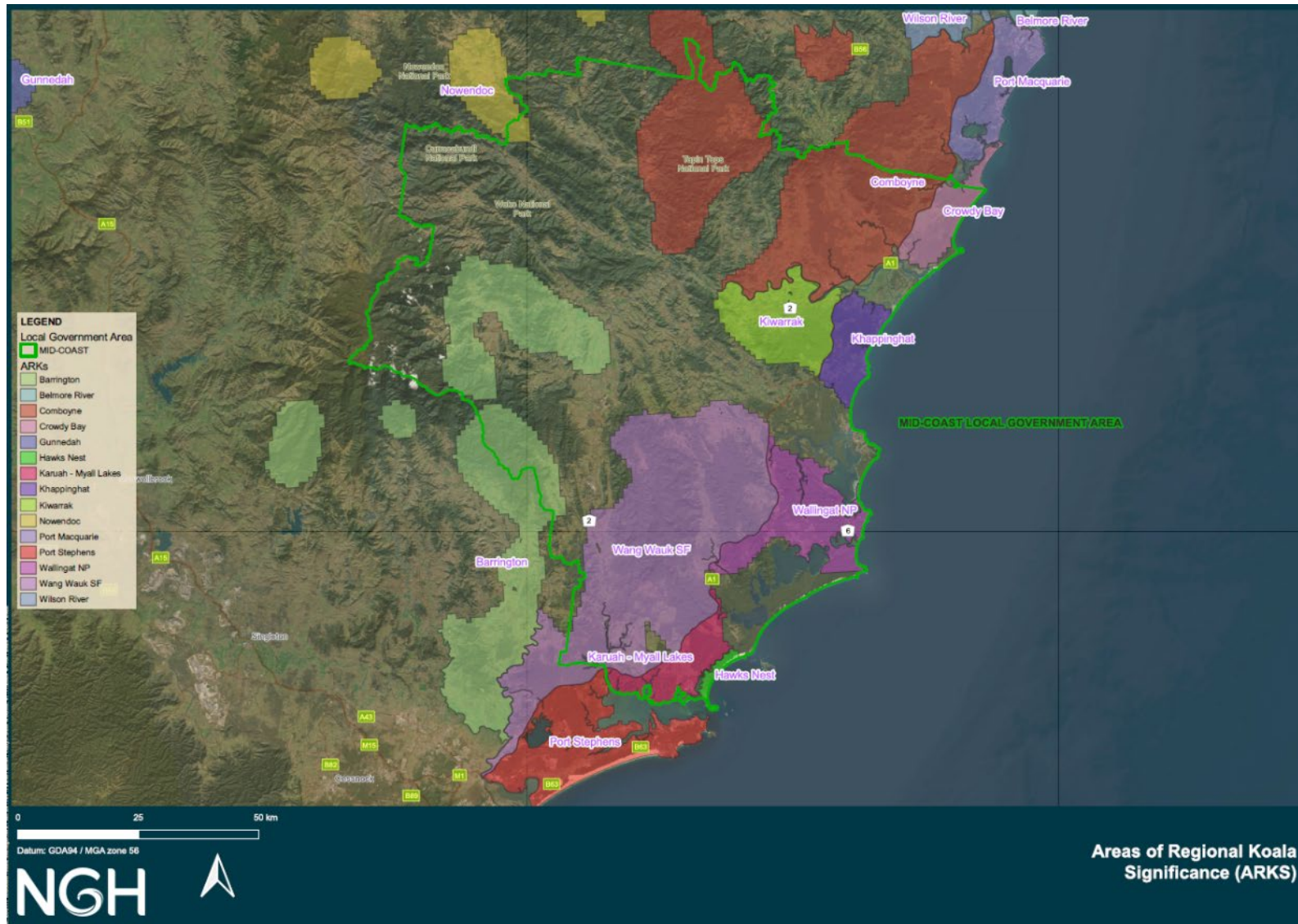


Figure 2-1 ARKs within MidCoast Council

2.2. Habitat and home range

Koala habitat includes a wide range of forest and woodland environments from dry, semi-arid woodlands to tall, wet coastal forests. They occur in riverine woodlands, forested wetlands and sometimes rainforest, if there are emergent preferred koala food tree species present (refer Section 2.3 Diet). Koala habitat is influenced by land elevation, annual temperature and rainfall patterns, soil types, soil moisture and fertility. For a viable population, comprising numbers of breeding females, dominant males, and juvenile animals, large mostly contiguous or connected areas of suitable habitat are required.

In certain circumstances, koalas can inhabit residential areas (such as at Port Macquarie), but urban environments have a high incidence of stressors and threats, which can suppress and even extirpate the population. Koalas can occur in fragmented, mostly agricultural landscapes, provided there are sufficient trees along riparian zones, bushland remnants, shelterbelts, and other sites. Again, such populations are at substantial risk as they lack the security of contiguous, intact habitat patches.

Koala occurrence is largely driven by food tree preferences which is determined by the nutritional quality of the leaves on the trees. Water and the availability of thermal refuges (cooler areas for sheltering during hot weather) appear to be important components of preferred habitat. Koalas do spend time in trees that they do not eat including non-eucalypts, for the shade or thermal properties determined by the type of bark, tree size and/or density of canopy foliage, offering cooler or warmer surface temperatures to help the koala thermoregulate (Ellis *et al.*, 2010) (Youngentob, Marsh and Skewes, 2021). Where food tree availability is scarce or absent, the carrying capacity of the habitat is reduced or eliminated. Proximity to water or cooler areas with higher moisture content will become more important as the climate warms and may influence the persistence of populations. Heat stress and disease appear to have been synergistically involved in serious declines in koala populations in parts of western NSW.

Koalas have highly variable home ranges; a typical home range of a koala in northern coastal NSW is about 20 ha (DPIE, 2020). Males have larger home ranges encompassing several female home ranges. For the MidCoast area, home ranges can vary significantly depending on the quality of habitat, ranging from a few hectares (high density) to over 30 to 40 ha or larger (low density and widespread) (J Turbill, pers. comm. 27 November 2023). In Kiwarra ARKS, prior to the 2019 bushfires, male koalas were detected at a density of 1 per 0.07 ha, which equates to a range of about 14 ha. Assuming a 50:50 male to female ratio; koala average density may be 1 koala per 7 ha. At Wang Wauk, a thermal drone study regularly detected about 10 individual koalas per 100 ha search area (S. Tamplin, pers. comm. 24 February 2024), which equates to one koala per 10 ha.

As mentioned, the size of koala home ranges is influenced by the nutritional quality and availability of preferred food trees and the quality of the habitat. Different parts of a home range can be used in different seasons, with wetter and cooler positions preferred during warmer months. Dominant male koalas will occupy the best quality habitat; aggressively defending this area from rivals and overlapping his range with several breeding females. Lower ranking males live on the periphery of the range of the dominant male koala. Animals tend to stay in their home range and have preferred trees for feeding and sheltering.

Koala habitats can include both partially cleared areas of scattered trees as well as forests. This means that habitat areas of a koala's home range may often overlay a number of private properties and the actual presence of a koala on an individual property may not be a daily occurrence but linked to seasonal dispersal and usage within an individual koala's larger home range (J Turbill, pers. comm. 27 November 2023).

2.3. Diet

Koalas are folivores preferentially browsing mostly but not entirely on *Eucalyptus*, *Corymbia* and *Angophora* species (Youngentob, Marsh and Skewes, 2021). Koalas consume around 500 – 800 grams of leaves each day, obtaining most their water requirements from the leaf. Koalas seek out trees with higher leaf water

during drought. It is a very low energy diet comprising only 5% sugars and starches (DES, 2022). Koalas cope with this low nutrient, low energy, high toxicity diet because of their specialised digestive system and their low metabolic rate. In dry periods, koalas need to access surface water and do drink. They lick the trunks of trees of dew and rain, and drink from water-filled cavities in trees or other standing water in creeks and dams. Koalas readily drink from artificial water sources, such as dishes and buckets. Koalas live in a fine nutritional balance; they have no fat reserves. In heatwaves, hot animals eat less.

Browsing preferences show regional differences which are influenced by the chemical profiles and water content of different target food leaves (Stalenberg *et al.*, 2014). Foliar chemistry varies both within and between eucalypt species and between different leaf phases or age (Marsh *et al.*, 2018). Eucalypt leaves contain a variety of chemical constituents, including nitrogen (a proxy for protein) and plant secondary metabolites (PSMs) such as tannins, formylated phloroglucinol compounds (FPCs), and unsubstituted B-ring flavanones (UBFs). Koalas can break down the toxic oils using a specialised digestive system, comprising an elongated caecum and specialised bacteria. Koalas are not born with this bacteria in their system and need to acquire it from their mother (DES, 2022).

Locally important koala habitat trees present within the LGA are listed in Appendix D. In any area, the bulk of a koala's diet is sourced from a small number of preferred food tree species, with supplementary browsing adding to nutritional needs. Very minor quantities of other plant material may be consumed, such as buds, flowers, or bark. Even within a species of tree, the nutritional quality of leaves can vary.

There are nearly 50 different primary and secondary koala habitat tree species in the MidCoast. Due to the variety of environments from coastlines to the mountains, these species are often only found within specific areas, limiting the number of food tree species in each area. Some of the species are often missing in the landscape due to the landscapes' clearing, agricultural and / or logging history.

2.4. Lifecycle

Koalas are relatively long-lived with maximum reported ages of 15 years and 12 years for females and males respectively in the wild (Martin and Handasyde, 1999) and longer in captivity. Natural lifespans in the wild can be substantially reduced in stressful or high-risk environments. Female koalas reach reproductive maturity between two and three years of age, after which females can produce up to one offspring per year (McLean and Handasyde, 2007). As marsupials, they give birth after 34-36 days gestation, where the young joey then grows in the pouch for another six months. At this age, juvenile koalas begin transitioning from their exclusive milk diet by ingesting a special maternal faeces known as pap (Blyton *et al.*, 2022) that contains the bacteria it needs to eat the leaves in adult life. After a 12-month lactation period, young koalas are weaned during periods of high food availability and favourable climatic conditions to maximise survivorship when approaching independence (Ballantyne *et al.*, 2015).

Local factors, including population density, food quality and availability, soil type and climate, influence the timing of breeding but on the MidCoast this generally occurs between October and March (McLean and Handasyde, 2007; Ballantyne *et al.*, 2015). Koalas may not breed every year if conditions are unfavourable, and breeding can be unsuccessful due to poor body condition or disease (e.g. *Chlamydia*) (McLean and Handasyde, 2007). Seasonality is a major factor in koala reproduction, and the breeding season differs between northern and southern populations. Generally, the greatest percentage of births occur in summer and early autumn (December to March), as a result of opportunistic breeding in response to optimum resource conditions coinciding with rainfall (Ellis *et al.*, 2010).

Koalas have slow reproductive rates, which limits the capacity of populations to recover from disturbance events and declines, including moderate to high severity fires.

Breeding female koalas exhibit high levels of maternal care to their dependent young. While young can become independent from about 12 months of age, particularly young females may remain in their birth range for up to 3-years. Juvenile dispersal can be from 0.3 to more than 20 km from their birth range.

2.5. Behaviour

Koalas are mostly nocturnal, sleeping or resting up to 20 hours a day. They are typically solitary, but live in a network of overlapping home ranges, allowing contact between individuals for mating. Territorial behaviour is shown in both males and females who use urine and faeces to scent mark objects in their environment. Males also use the sternal gland on their chest to leave chemical signals, mostly at the base of trees. Koalas also use a range of vocalisations to communicate with one another over large distances. The males use a deep grunting bellow to signify its social and physical position. Bellowing is used to attract females and conserve fighting energy by bellowing their dominance. Females tend to make squeaks, screams, or yaps. Mostly arboreal, they can move over large distances on the ground, but they are then vulnerable to vehicle strike and attack from predators.

It was previously believed koalas rarely drank water and observations of drinking in captivity were considered 'unusual'. Koalas seen drinking from pools or water bottles were attributed to heat stress. However, a recent study revealed koalas were observed (44 records) to drink by licking the wet surface of branches and tree trunks during or immediately after rain even when free standing water was available. It is likely this behaviour has probably gone unnoticed because observations are rarely undertaken during heavy rainfall (Mella *et al.*, 2020).

During hot days, koalas seek cool microclimates and take up heat-dispersing postures, such as hugging the cooler trunks of large trees, splaying limbs (Briscoe *et al.*, 2014) or even climbing into large tree cavities, to reduce or eliminate their need for respiratory evaporative cooling. During heat events or fire, koalas seek refuge in riparian areas, gorges and rock outcrops (Collins *et al.*, 2019). Koalas cannot move rapidly out of the way of fast-moving fire fronts, and tend to climb as high up a tree as possible, in a bushfire situation.

2.6. Threats

The status of koalas has been influenced by legacy impacts associated with two significant drivers in this region, namely broadscale clearing of fertile habitats during the period from European settlement through to the mid-20th century, as well as the hunting of koalas for their pelts up until about 1930. Clearing for European settlement would have irreparably transformed some of the highest and best quality habitats of the koala in the region – the alluvial forests along the floodplains of the major rivers and creeks. The continuous use of these landscapes for cropping and stock, and the suppression of natural regeneration, would have meant that areas likely to have naturally supported the highest density koala populations would have been heavily altered. Further, koalas in the region were killed in their thousands for their pelts for the export fur trade market. There are references in local newspapers from the period of around the late 1800's and early 1900's, such as:

- *"Messrs Hayward and Cowan shot 62 bears, at Marlee, on Friday evening last,*
- *A dray loaded with bear skins arrived from Marlee containing many thousands of skins,*
- *A large bale of bear skins, ... was shipped to Sydney aboard the steamer Coraki,*
- *A great many persons are shooting native bears on the Upper Manning for the sake of obtaining their skins which bring about 10/- or 12/- per dozen. Some say they make fair wages at it, bears being very abundant in these parts".*

In 1897, it was reported that "a trio of sportsmen from Taree" journeyed to Gangat, where they shot 5 koalas amongst a total bag of 311 animals from 10 different species (<https://trove.nla.gov.au/newspaper/article/122735288>).

The enduring influence of these drivers is not known. The clearing of the highest quality habitats and the killing of many thousands of koalas in the region for "sport" or their pelts would have significantly reduced the population of koalas by the mid-20th century and reduced the diversity of the koala genetic pool. Diverse genetics is advantageous for wildlife populations. With their slow reproductive rate, plus the effect of

persistent, ongoing threats, these legacy impacts would be influencing the current state of koalas in the MidCoast; but the scale of this influence is not known.

There are many key threats to koalas across the MidCoast region, including:

- Habitat destruction, fragmentation, and degradation,
- Urbanisation, resource development, infrastructure and agriculture,
- Disease,
- Vehicle strike,
- High intensity bushfire and altered fire regimes,
- Climate change including heatwaves, droughts and intensified flooding
- Domestic dog attack,
- Cattle and horse attack, and
- Stress.

Many of these threats operate synergistically; working together to exert compounding negative effects on local koalas.

Previous experience has shown that the extinction of local populations (e.g. Barrenjoey Peninsula) can be the result of a tyranny of small factors, such as habitat loss, urban development, koala vehicle strike and domestic dog attacks (S. Phillips, pers. comm. 29 October 2023). These factors can initiate a decline, which once commenced, can be protracted and difficult to reverse. Typically, habitat loss is the key factor in declining populations.

2.6.1. Habitat destruction, fragmentation, and degradation

The clearing, fragmentation and degradation of koala habitat is considered the primary threatening process affecting the koala.

Koalas are often found in areas where soil fertility is high, and hence are subject to conflicts associated with intensive land-uses such as agriculture, urban development, and infrastructure.

Most clearing events affecting koala habitat occurs on freehold or leasehold land (Ward *et al.*, 2019). The remaining fragmented koala habitat is reduced in its availability and accessibility and subjected to degradation from urbanisation. Loss of connectivity in habitat reduces movement and the ability of individuals to disperse safely, therefore reducing gene flow. Ongoing habitat loss and degradation intensifies climate change impacts on koala populations by reducing the availability of climate-suitable habitat or refuges.

Koalas are territorial and show substantial fidelity to their established home range. As such, clearing and modification of habitat reduces the space available for a viable, stable population. Koala populations, confined by territoriality and by limited preferred habitat cannot simply adjust to most patterns of clearing and modification of their habitat.

Modification of habitat can result from activities such as under-scrubbing, selective thinning, weed invasion or altered fire and water regimes. These changes disadvantage the koala population and exposes it to increased stress or threats (such as from predation).

Most clearing of habitat results from approved developments / activities including State significant development / major projects, clearing conducted in agricultural lands purportedly under NSW legislated land management codes and exemptions, for infrastructure or as potentially unexplained or unauthorised clearing.

The issue of public and private native forestry is contentious. Industry, logging interests and some government agencies cite published research and monitoring that logging and koala populations are not incompatible and that koala populations pre- and post-harvesting can be demonstrated to be equivalent. Public forestry in the region has a requirement to comply with the Coastal Integrated Forestry Operations

Approval (CIFOA), which has koala specific prescriptions. Private Native Forestry requires compliance with the PNF Code, which also has koala prescriptions. PNF is administered by Hunter Local Land Services and regulated by the Environment Protection Authority.

However, other researchers, governmental reports and some community members believe that private and public native forestry is a significant threat to NSW koala populations. This view is that private native forestry (PNF) and logging in public native forests in NSW has had cumulative impacts on koalas over many years because it has reduced the maturity, size and availability of preferred feed and shelter trees and it fragments and degrades koala habitat (DPIE, 2020). Mature or older forests have cooler microclimates than younger / regenerating forests and the logging can open the forest canopy promoting weed invasion and changed mid and lower storey vegetation. Logging is also cited as an activity with a risk of injury or death to individual koalas, increases the stresses affecting koalas, and causes a transformation of the habitat of forests that makes them at greater risk from more frequent and / or high-intensity bushfire. Logging in the near-aftermath of moderately and severely impacted forests after the 2019 bushfires is particularly contentious, as koala and other wildlife populations are depleted, susceptible to further impacts and stresses and are in mid-recovery.

Between 2007 and 2015, there were 3,052 PNF approvals ranging in size from less than one hectare to over 24,000 hectares across NSW. In the MidCoast, there are presently 327 PNF Agreements in the LGA covering properties totalling some 110,394 ha. This equates to approximately 11% of the LGA. If PNF is a threat to koalas, then the scale of PNF approvals across the MidCoast would mean that it would be having substantial negative impacts. A recent Senate Estimates Inquiry heard that there is a very low rate of governmental auditing of compliance with the PNF Code at present in NSW.

MidCoast Council routinely reports observations of potentially unlawful clearing to the NSW Government agency responsible for regulation and compliance action. Over the past six years, there has been several instances where potentially unauthorised clearing of native vegetation has impacted properties on which there are known koala sightings or where koalas have been recorded on adjoining or proximal lands.

It has been argued in the inquiry into Koala populations and habitat in NSW (Legislative Council Portfolio Committee No. 7 - Planning and Environment, 2020) that the *Biodiversity Conservation Act 2016* is weaker, in the protection of koalas, than both the former *Threatened Species Conservation Act 1995* and *Native Vegetation Conservation Act 2003* allowing for greater land clearance through land-owner self-assessment and greater difficulty in detecting and challenging illegal clearing of koala habitat following the reforms. NSW Government's Woody Vegetation Change 2017-18 report, *found a substantial increase in the rate of deforestation following repeal of the Native Vegetation Act and its replacement with the Local Land Services Act and Biodiversity Conservation Act under the 2016 land management reforms.*

Land use threats impacting koalas and their habitat include urbanisation, grazing and agriculture, mining and resource extraction, roads, and other linear infrastructure. Ever-increasing populations drive the need for more housing and infrastructure. The continual change of natural and rural landscapes to build urban, commercial and industrial estates is a significant threatening process for koala populations, particularly along the coast where human populations are high and demand is increasing (DPIE, 2020). It can significantly impact and interrupt wildlife corridors. Coal mines, hard rock quarries and coal seam gas extraction over the past two decades and more recently the clearing of habitat for renewable energy projects has additional impacts to koalas (McAlpine *et al.*, 2015)(DAWE, 2022).

Council has substantial land use planning roles and regulates some development but has limited to no formal responsibility for State-significant development (such as large gravel quarries and coal mines), public native forestry, biodiversity matters within PNF, infrastructure projects or rural land clearing.

Addressing the threat associated with the clearing and modification of koala habitat requires effective development assessment, regulatory and land management frameworks, and an enhanced reserve system. It also relies on adequate contemporary knowledge of the presence of important koala habitat (occupied and unoccupied), corridors and priority habitat re-creation areas.

2.6.2. Vehicle strike

The NSW government reported that 3,500 koalas were killed by vehicles between 1980 and 2018. (NSW OEH, 2019). Vehicle strike is more likely to occur on roads that dissect or are in close proximity to occupied koala habitat (Gonzalez-Astudillo, 2018). This likelihood is exacerbated where habitat and roads correspond with large residential coastal cities and towns.

A large proportion of individuals killed by vehicles are otherwise healthy. This mortality removes otherwise healthy individuals from the population (Gonzalez-Astudillo, 2018). Mortality poses a significant threat during the breeding season, when males move around searching for mates or territories and during post-weaning dispersal, which occurs at a young age in both male and female koalas, potentially disrupting gene flow. Young males typically disperse more frequently and over larger distances than their female counterparts. Mature males are at a higher risk as they have larger home ranges and increased movements during the breeding season (October to March).

MidCoast Council is being supported by the NSW Government to develop a koala vehicle strike (KVS) mitigation strategy and install mitigation measures such as fencing, signage and retrofitting road underpasses across the LGA. A KVS audit report has been prepared to guide actions.

By analysing available data sources and interpreting patterns in koala vehicle strike observations, five (5) priority road sections have been identified in the MidCoast:

- The Pacific Highway – north (from Nabyac to the south arm of the Manning River),
- The Bucketts Way – north (from Taree South to Krambach),
- Tinonee – Wingham Road,
- The Bucketts Way – south (from Stroud to the intersection with the Pacific Highway), and
- Pacific Highway – south (from Nerong to the Karuah River).

Other notable roads where there have been recent koala vehicle strike deaths, injuries and / or near-misses include Old Bar Road, Failford Road, Bootawa Road / Bootawa Dam Road, Belbora Creek Road, The Bucketts Way near Belbora, the Pacific Highway at Wang Wauk Gap, Thunderbolts Way, and Harrington Road.

2.6.3. Disease

Disease is a significant driver of decline for koalas in some areas and there are correlations between disease and stress and disease and heatwaves / droughts.

Of all potential pathogens and parasites, infections by the bacterium *Chlamydia pecorum* that lead to chlamydial disease and the Koala retrovirus are of special concern (Bachmann *et al.*, 2014; Fabijan *et al.*, 2017; Grogan *et al.*, 2017; McCallum *et al.*, 2018; Quigley and Timms, 2020) (Wildlife Health Australia, 2023).

The most prevalent symptoms of Chlamydia are conjunctivitis which leads to blindness, urinary tract disorders (wet bottom / dirty tail), pneumonia and infertility in females (Polkinghorne, Hanger and Timms, 2013; Fabijan *et al.*, 2017). Chlamydial infection is ubiquitous across the Australian population and, given the fertility implications of resultant infections, remains one of the major causes of decline in most contemporary populations (Rhodes *et al.*, 2011). Various studies have targeted temporal and regional comparisons of Chlamydia infection rates in an attempt to understand how the severity of the disease varies with time and population range (Quigley and Timms, 2020), and the influences of different environmental stressors (Narayan and Williams, 2016; Narayan, 2019). The symptoms of chlamydial infection are known to be exacerbated by factors that increase chronic stress to individual koalas such as poor nutrition, reduced habitat quality (habitat loss, fragmentation, degradation, and drought), exposure to unnatural situations (predation, dogs, and traffic), heat-stress or bushfires. These factors lead to the production of glucocorticoids (stress hormones), which can inhibit reproductive hormones and immune responses, reducing individual health (McAlpine *et al.*, 2015; Narayan and Williams, 2016).

The NSW Koala Strategy includes actions associated with disease monitoring and facilitating Chlamydia vaccine trials.

Koalas are also susceptible to a range of medical issues, such as cancerous growths, organ failures and respiratory diseases. Respiratory diseases can increase in populations affected by large bushfire events, which suggests a link between smoke inhalation and respiratory diseases.

2.6.4. High intensity bushfire and altered fire regimes

Fire is a key threatening process for koalas, affecting habitat use, their feeding behaviour, growth rates, reproductive capacity, and risk of predation. In moderate to high intensity fire, where the tree canopy is scorched, bushfires can cause direct koala mortality.

Although ecologically-appropriate fire is essential for the maintenance of koala habitat, altered fire regimes that exclude fire increase fuel loads, potentially causing high intensity canopy fires resulting in habitat decline and displacement, at least in the immediate and short term. Studies have shown koalas can recolonise burnt habitat, even after severe fire (Law *et al.*, 2022) and that burnt habitat can support breeding behaviour (Beale, Marsh and Youngentob, 2022). However, the 2019 bushfires had severe negative impacts. 21% of all mapped Areas of Regional Koala Significance (ARKS) across the MidCoast were burnt; many at moderate or high fire severities. The Crowdy Bay, Comboyne, Khappinghat and Kiwarra ARKS were all severely impacted.

Law, *et al.* (2022b) sought to identify the impact of the 2019 bushfires on koala populations. It estimated male koala density before and after fires using large acoustic arrays and spatial count models. Acoustic arrays sampled three timber production forests with a gradient in fire severity and three unburnt controls in national parks. It found that koalas were temporarily extirpated where high fire severity dominated the landscape, but some localized recovery was evident after 1 year. Where moderate severity fire dominated, density was reduced by about 50% within 1 year, but koalas were widespread throughout the burnt area. In the third area dominated by low severity fire, no impact was detected as pre- and post-fire uncertainty intervals overlapped. Control sites surveyed at similar times showed little change in density between years. Law *et al.* (2022b) confirmed the substantial impact of the 2019 bushfires. It also identified that more frequent fires in a changing climate in the future will compound koala losses. In a fire-impacted forest of the Kiwarra ARKS, Gonsalves & Law (2023) reported a change of male koala density from 0.07 males per hectare prior to 2019 to 0.025 males per hectare after the bushfires in the Kiwarra State Forest. Full population recovery from moderate to high intensity fires will take many years.

Prescribed burns can deliver the cool, slow fires that are ecologically appropriate for koalas. However, this requires significant planning and execution to keep fire intensities low, protect koala use trees through trittering or fuel reduction and prevent breakouts. Those undertaking prescribed burns benefit from up-to-date information on the relationship between fire extent, frequency, and severity as well as impacts on koala habitat (Beale, Marsh and Youngentob, 2022). Taree Indigenous Development and Enterprise (TIDE) has funding from the NSW Koala Strategy to employ a Koala Officer. The purpose of this position is to conduct cultural burning, raise awareness of Traditional Ecological Knowledge and Traditional Caring for Country practices through working with local Traditional Owner community, and the broader community.

Most eucalyptus recover from fire via epicormic regrowth (regeneration above ground on branches and stems). How quickly this recovery occurs is dependent upon forest composition, seasonal conditions before and after the fire, and the patchiness and intensity of the fire (Martin and Handasyde, 1999). This can have implications for the timing of release of rehabilitated koalas back into fire-affected areas (Beale, Marsh and Youngentob, 2022).

At least 5,000 koalas (about 17% of the population) died during the 2019–20 bushfires (NSW Parliament 2020). More than 1.9 million hectares, or 22% of the modelled high or very high suitability koala habitat in

eastern New South Wales, was impacted; 20.5% of the MidCoast LGA was burnt (Figure 2-2). 49% and 63% of the Kiwarra and Khappinghat ARKS respectively were subjected to canopy scorch (Biolink, 2022).

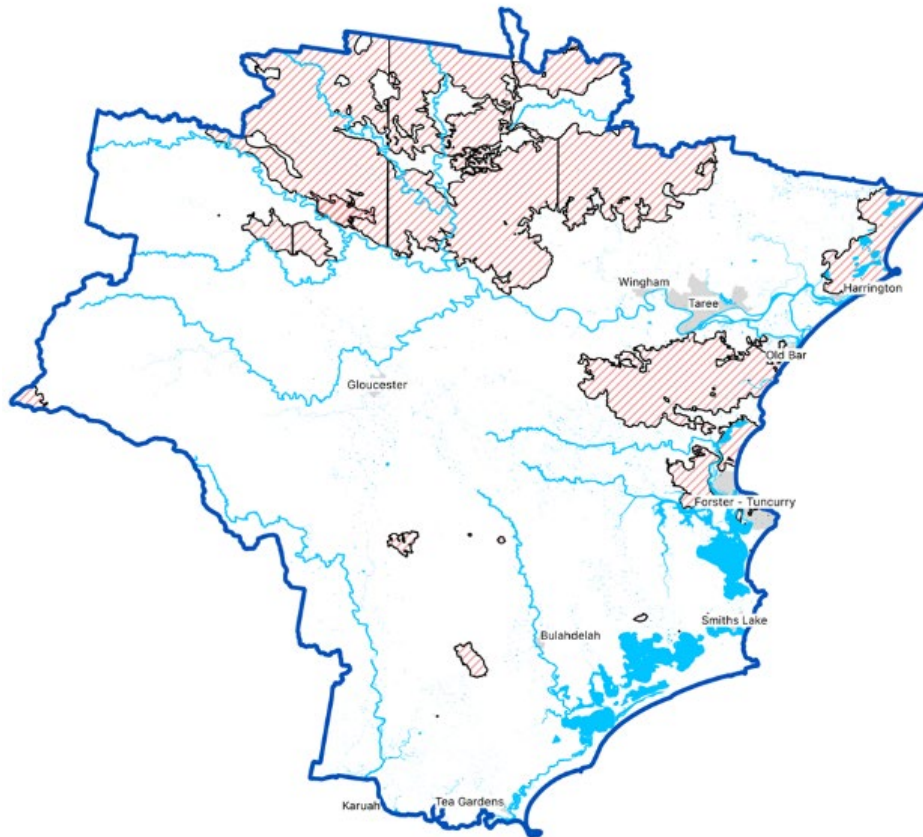


Figure 2-2 2019-2020 bushfire affected areas in the MidCoast LGA. Source: TierraMar 2021

2.6.5. Climate change including heatwave and drought

Drought and heatwaves are the predominant means by which climate change will impact koalas. Climate change is having a severe impact on koala populations by affecting the quality of their food and habitat. Koalas have limited capacities to cope with very hot days.

Climate change is expected to increase the frequency of high temperatures, change rainfall patterns, increase the frequency and intensity of droughts, potentially causing the koala's range to contract eastward (Adams-Hosking *et al.*, 2011) (Steffen *et al.*, 2009). Up to 20 additional days per year above 35°C have been predicted for northwest NSW. Koalas can be killed directly by heat stress as high temperatures impact kidney function and reduce the ability of koalas to digest the toxins found in eucalypt foliage. High temperatures force koalas out of trees to search for refuges and water, putting them at risk of predators and traffic. (Legislative Council Portfolio Committee No. 7 - Planning and Environment, 2020). Access to permanent water in times of drought and heat stress is considered an important landscape feature for koala populations during these high stress events (DPIE, 2020). Ensuring the protection of sheltered cool refuges, intact riparian zones, and retaining or enhancing the presence of tree species of value for koala thermoregulation are also important measures for the future.

Extensive tracts of eucalypt forest and woodlands along the eastern seaboard of NSW, including preferred koala food trees such as grey gums and box gums have experienced browning off and the associated dieback of many individuals, presumably due to lack of water in heatwave / drought events. In the future, preferred koala food trees may become unpalatable or lost from where they currently occur as conditions become climatically unsuitable for these trees.

2.6.6. Domestic dog attack

Domestic dogs attack, injure and kill koalas. 75% of all domestic dog attack koala victims that are brought into care at the Port Macquarie Koala Hospital die because of their injuries or resultant infection. Koalas are most often attacked in the residential yards where domestic dogs are present, although sometimes uncontrolled domestic dogs do attack koalas.

Domestic dog attacks are a significant cause of death and injury especially in areas within and adjacent to peri-urban and residential areas (DPIE, 2020) and domestic dog attack is one of the leading causes of koala death and injury within the MidCoast LGA (MidCoast Council, 2023b).

Dog attack was considered a high likelihood in all of the MidCoast ARKS (DPIE, 2020), although further analysis in this Strategy has refined this assessment (see Section 2.7)

As noted, there is some uncertainty about the relative contribution of dingoes, feral dogs and domestic dogs to koala predation (Gentle et al., 2019).

Dingoes in the MidCoast area exhibit high genetic purity and have special ecological and cultural significance. The extent to which dingoes attack koalas is not well understood in the MidCoast Council area. Council has collected and analysed 43 dingo / wild dog scats for their prey items, and none of these scats contained evidence of koala predation. Some of the scats analysed were collected in high density koala population areas near Gangat and Bootawa. Dingoes and koalas have co-existed in Australia for over 6,000-years, suggesting that koalas would not have prey naivety with regards to dingoes.

Fragmented landscapes require koalas to move large distances along the ground, making them vulnerable to predation. In a Port Stephens study, predation by dogs was the most common reason koalas died following release into burnt habitat after rehabilitation from burns (Lunney *et al.*, 2004). The burnt habitat may have given dogs in the study a predatory advantage, and the koalas may also have moved more frequently as they would not have occupied established and stable home ranges.

Across NSW, there are laws to protect koalas from dog attacks on both public and private land. The owner or person in charge of a dog that rushes at, attacks, bites, harasses, or chases a koala (whether or not any injury is caused) is guilty of an offence under the *Companion Animals Act 1998* for which the maximum penalty is \$11,000 (or \$44,000 for a dangerous, menacing or restricted dog) and the dog can be seized. However, there has been no action against an owner of a dog killing a koala on the MidCoast, even where the same dog / owner has been involved in more than one known incident. A dog killing, injuring or harming a koala may also be an offence under the *Biodiversity Conservation Act 2016* (MidCoast Council, 2023b). It would not be the intent to prosecute people should an unfortunate, unforeseen, one-off event occurs. It is important to not stigmatise dog attacks on koalas, rather it is critical that koalas involved in dog attacks are urgently admitted to care and that measures are taken to prevent any risk of re-occurrence of the incident. This might be via fencing rectifications, koala climbing poles to allow for escapes from yards, effective dog containment, etc. Responsible dog ownership is the best prevention measure to mitigate this threat.

2.6.7. Cattle and horse attack

Injury and mortality from trampling by cattle or horses (and even sheep) has been reported by veterinarians, farmers and wildlife carers (Hill, Keogh and Anderson, 2019; Jiang *et al.*, 2021, 2022). Data from wildlife hospitals show that although incidents are low relative to all koala admissions, they are increasing, and is also believed to be under-reported (Jiang *et al.*, 2022). Another veterinarian suggests that cattle may confuse koalas with a threat like a small dog (Mitchell-Whittington 2017). Cattle trampling has been described by a wildlife rescuer as being as frequent as dog attacks (Mitchell-Whittington, 2017). For koalas, the presence of grazing cattle within their home range has been shown to reduce their travel distance and home range size (Jiang *et al.*, 2022).

The risk of death or injury from cattle or horse attack is likely to be reduced where scattered paddock trees offer koalas an opportunity to escape and seek refuge from the stock, although no research has been done. Paddock trees, or other treed areas such as shelter belts, could be valuable refuge spaces for koalas, but have also proven to be economically beneficial to agricultural production systems because of reduced heat stress to cattle and other agroecological benefits.

2.6.8. Stress

There is scientific evidence that stress is a significant issue. Stress levels in koalas can be measured by the cortisol levels in their blood or their scats. There is a new body of research in this area. The highest stressors for wild koalas as measured by high cortisol rates are associated with:

- loss of habitat / land clearing,
- the proximity of roads,
- bushfires, and
- encounters with dogs

Long-term stress caused by environmental trauma is known to lead to significant problems in koalas. It causes:

- increased sign of koala stress syndrome,
- increased risk of infection and disease,
- suppressed reproduction, growth and development
- high mortality rates.

The negative impacts of stress on koalas can be avoided or reduced by providing reduced stress environments. This is a primary goal of the MidCoast Koala Safe Spaces program.

2.6.9. Emerging or other threats

Several feral deer species have established populations in the MidCoast region. Rusa deer (*Rusa timorensis*) occur in coastal areas between Smiths Lake and Old Bar, and west to the Pacific Highway (in the Wallingat NP ARKS) and near Crowdy Bay in the north-east. They can be present in high densities in some areas. Fallow Deer (*Dama dama*) are a herding deer, which are only present on the northern foreshores of Port Stephens and in western areas around Curricabark. Sambar (*Rusa unicolor*) are Australia's largest deer species and confined to an area in the north-east near Crowdy Bay / Coopernook. Red Deer (*Cervus elaphus*) are typically in low densities but are widespread in the more mountainous areas of the slopes of the eastern Great Dividing Range. All feral deer species are increasing in distribution and abundance. It has been inferred that feral deer impact the habitat of native wildlife by over-grazing and competition, impact soil structure and kill plants by ringbarking, however there is a lack of knowledge of the nature, extent and severity of deer impacts in Australia (Davis *et al.*, 2016). Feral deer may cause significant damage to koala habitat in sensitive areas. Feral deer are also known to browse, damage and destroy new tree plantings for koalas. Further, feral deer may aggressively attack koalas that are on the ground in the same way that cattle and horses sometimes do. Feral deer control techniques are limited and population scale control is difficult. It relies on a nil-tenure, coordinated and sustained approach.

The prevention of the regeneration of important koala food trees in the environment through the deliberate suppression is a threat in some areas and land use contexts.

There are records of koalas drowning in backyard swimming pools. There have been no recent reports of this in the MidCoast Council area. The human safety measures associated with swimming pools has probably been effective in isolating koalas from accessing residential pools, in most instances. Pools designed with shallow, sloping edges or with a piece of stout rope allow koalas to climb out if they have fallen in.

2.7. Summary of threats within ARKS

Existing threats to koalas in the MidCoast were assessed in the Framework for the Spatial Prioritisation of Koala Conservation Action in NSW (DPIE, 2020) and were assigned a ‘threat likelihood’. Threat likelihood is the potential for koala values to be impacted upon across an ARKS and therefore, the likelihood of diminishing habitat integrity and koala viability. Dog attack was considered a ‘high’ threat likelihood in all ten ARKS. Five ARKS (i.e. Comboyne, Karuah-Myall Lakes, Khappinghat, Kiwarraak and Wang Wauk SF) recorded a ‘high’ threat likelihood for habitat fragmentation. Vehicle strike was considered a ‘high’ threat likelihood in four ARKS (Karuah-Myall Lakes, Khappinghat, Kiwarraak and Wallingat). Three ARKS contained a ‘high’ threat likelihood for wildfire (Barrington, Nowendoc and Wang Wauk SF) and Kiwarraak was considered a ‘very high’ threat likelihood for disease.

Council’s koala project team re-evaluated the previous threat likelihoods published in DPIE (2020) based on their expert knowledge of koala populations and the threats that each ARK is facing. The revised threat likelihood in each MidCoast ARKS is provided in Table 2-3.

Table 2-3 Threat likelihood in each MidCoast ARKS

ARK name	Fragmentation	Wildfire	Vehicle strike	Heat stress	Disease	Dog attack	Climate change
Barrington	High	High	Moderate	High	High	Moderate	High
Comboyne	Moderate	High	Low	High	High	Moderate	High
Crowdy Bay	Moderate	High	Moderate	Moderate	Low	Moderate	Moderate
Hawks Nest	High	High	Moderate	Moderate	Moderate	High	Moderate
Karuah – Myall Lakes	Moderate	High	Moderate	Moderate	Low	Low	Moderate
Khappinghat	High	High	Moderate	Moderate	Very High	Moderate	Moderate
Kiwarraak	Moderate	High	High	Moderate	High	High	High
Nowendoc	Moderate	High	Moderate	High	Moderate	Moderate	High
Wallingat NP	Low	Moderate	Low	Moderate	Low	Low	Moderate
Wang Wauk SF	Moderate	Moderate	Moderate	Moderate	Low	Low	Moderate

3. Strategy targets

3.1. Strategy targets relative to the NSW koala strategy

The Strategy seeks to align with and feed into seven of the NSW Koala Strategy conservation targets (DPE, 2022) (Table 3-1). Council will report its annual progress against local scale versions of these targets which feed into the State Government's Koala Strategy targets.

Table 3-1 MidCoast Strategy targets aligned with the State Government's Koala Strategy targets.

NSW Koala Strategy Targets	NSW Government (by 2026)	MidCoast Council (by 2029)^
Protected koala habitat	22,000 ha	800 ha of koala habitat permanently protected (Strategy Action 1.2)
Restored koala habitat	25,000 ha	1,000 ha of koala habitat on private or public land restored or replanted through Council programs (Action 1.4)
Land use planning	-	Koala habitat values included in all land use planning decisions (Action 1.9)
Areas of Intergenerational Significance for koalas	20 assets secured	1 new asset identified and advocated for (Action 1.11) 1 existing asset supported (Crowdy Bay Area of Intergenerational Significance)
Regional partnerships	Up to 8 regional koala conservation partnerships	1 regional koala conservation partnership delivered (Action 2.1) Local communities engaged in local koala actions (Action 2.2)
Develop koala habitat maps	10+ councils supported to develop koala habitat maps	Extend koala habitat mapping across the LGA (Action 2.3)
Baseline surveys	Up to 50 populations surveyed	>4 surveys of priority for immediate investment and / or knowledge gap populations supported (Action 4.2)

^ These are the targeted contributions by Council to the state-wide targets. They do not include contributions to these targets by other agencies and organisations across the MidCoast region, such as the NPWS Reserve Acquisition team, etc. This Strategy separately identifies our local targets for koala habitat conservation, improving the safety and health of koalas, supporting local communities to conserve koalas and building our knowledge of koalas. These are identified in s3.

3.2. Council strategy targets

MidCoast Council has adopted a range of local targets for actions within this Strategy. The contributions to the NSW Koala Strategy targets as well as the local MidCoast targets are identified in the table below.

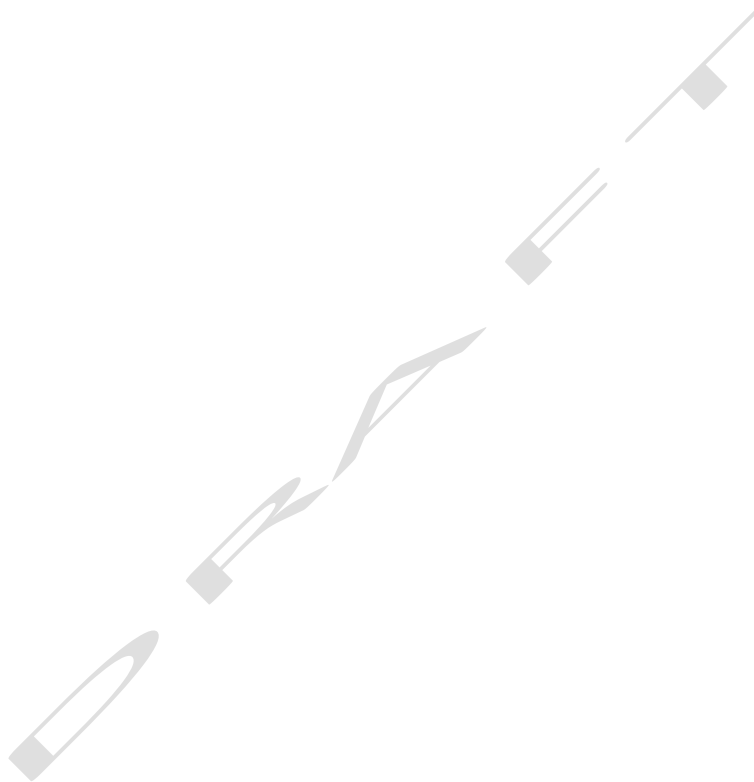
Table 3-2 Combined local and State action targets with performance measures

Action	Performance measurement
>800 ha of koala habitat has been acquired or permanently protected by 2029	Number of hectares acquired or permanently protected Number of Council referrals to Biodiversity Conservation Trust (BCT) Number and area in hectares of BCT Agreements in koala habitats Number of BCT revolving fund investments in koala habitats Number of Council referrals to National Parks & Wildlife Service (NPWS) for possible land acquisition Number and area in hectares of NPWS Reserve Acquisitions of koala habitats
>1,000 ha of koala habitat has been restored or planted by 2029 including through devolved grant landholder projects	Number of hectares of koala habitat restored or planted Number of koala habitat trees planted
Koala habitat values and koala populations have always been considered in land use planning and development assessment decisions	Legally defensible and high-quality DA, land use planning and strategic decisions have been made
1 new area of intergenerational significance for the koala has been identified to the NSW Government by 2029	Number of areas of intergenerational significance identified to the NSW Government
The MidCoast Regional Partnership with the NSW Government has been successfully delivered	Number of Regional Partnerships delivered
Koala habitat mapping has been extended across the MidCoast LGA by 2029	Number of hectares with fine-scale koala habitat mapping Number of koala habitat map upgrades
>4 priority koala populations have been surveyed and described by 2029	Number of populations subject to monitoring and surveys Number of surveys (Songmeter, detection dog, etc) undertaken Number of populations with population estimates Number of koalas present in the Bootawa songmeter project area
>500 ha of Council owned land has been designated, restored and actively managed as koala safe spaces by 2029	Number of hectares managed as Council Koala Safe Spaces

Action	Performance measurement
A map of important koala corridors across the MidCoast LGA has been published by 2025	Number of koala corridors maps
A register of Koala Safe Spaced landholder has been maintained	Number of landholders
Council's efforts have always been strategically aligned and communicated to the wider koala network	Number of stakeholder meetings Number of joint koala conservation projects delivered
5,000 koala habitat trees have been given to the community by 2029	Number of trees provided in tree giveaway programs Number of trees provided by Council's nursery for koala projects
>10 koala vehicle strike projects / actions have been delivered by 2029	Number of sites with different KVS actions
Underpasses have been identified, maintained and enhanced	Number of underpasses mapped Number of underpass enhancement or maintenance projects completed Area in hectares of land within 200-metres of underpasses protected and managed
>100 ha of ecological / cultural burns has been completed on Council owned land by 2029	Number of hectares
Koala habitat has been identified on fire plans	Number of bushfire management plans, operational plans and hazard reduction plans where koala habitat has been identified
>30 artificial watering stations have been installed by 2029 in priority areas	Number of watering stations
Koala habitat has been protected as an asset in fire control operations and emergencies	Number of fire control operations and emergencies where koala habitat has been protected as an asset
>200-ha of climate change adaptation corridors and refuge nodes for koalas are conserved and managed by 2029	Number of hectares
Koala populations have been protected from domestic dog impacts in new developments	Number of restrictions or covenants Off-leash areas locations (outside koala habitat)
Community koala sightings have been recorded and provided to BioNet	Number of community koala sightings Number of awareness campaigns to promote reporting of koala sightings

Action	Performance measurement
Koala education and engagement has been delivered	Number of participants Number of events Number of views Number of awareness campaigns to promote reporting of injured koalas
Traditional Owner projects have been supported	Number of Traditional Owner projects supported
>3 MidCoast Koala Festivals have been delivered by 2029	Number of Koala Festivals Number of attendees
>6 conferences, workshops or symposia have been attended by 2029	Number of events attended
MidCoast Koala Research Strategy prepared and delivered	Number of research strategies prepared Number of research projects delivered Number of replanting sites monitored for koala use
Advocacy for koalas has been delivered across different topic areas, including forestry, environmental legislation, etc	Number of advocacy actions undertaken
Carbon Farming projects have been supported	Number of Carbon Farming projects supported
Koala offsets have been delivered as required	Number of offset trees planted Number of offset hectares conserved
Koala Emergency Response Plan prepared by 2029	Number of Emergency Response Plans
Final koala habitat tree list prepared by 2029	Number of koala habitat tree lists
Partnerships in koala conservation and recovery have been delivered	Number of partnerships Number of partnerships with farming organisations
Regional koala connectivity has been protected at The Gate by 2029	Area of corridor protected Area of corridor restored
All IKPOMS are in-compliance by 2029	Number of compliant IKPOMs
Tinonee has been managed as an urban safe space for koalas by 2029	Number of trees planted Number of signs installed Areas of habitat protected in hectares
Hazard reduction burns and prescribed burns have had a pre-burn koala inspection	Number of burns Number of koala inspections
Domestic dog incidents have been prevented	Number of domestic dog attacks on koalas Number of domestic dog education campaigns

Action	Performance measurement
Annual Report Cards have been prepared for priority koala populations	Number of report cards
>4 MidCoast specific koala research projects have been delivered by 2029	Number of research projects
Private sector investment in koala conservation has been delivered	Value of investment



4. Strategy actions

The actions within this Strategy aim to align with the NSW Koala Strategy pillars and have been grouped under five categories:

1. Habitat protection, restoration, and connectivity
2. Threat mitigation (vehicle strike, wild and domestic dogs, livestock trampling, bushfire)
3. Education, engagement, and the integration of Traditional Owner knowledge
4. Research, monitoring, health, and welfare
5. Advocacy, funding and partnering.

Council is one of numerous land managers within the LGA. Our duty to protect and conserve koala populations and their habitat is shared with all levels of government agencies such as the NSW NPWS, as well as businesses, industry, and research institutions.

Council recognises the knowledge of Traditional Owners, koala care providers, community groups, environmental volunteer organisations and private landholders, and the crucial roles they play. Potential partner entities are noted as 'additional stakeholders' within management action tables.

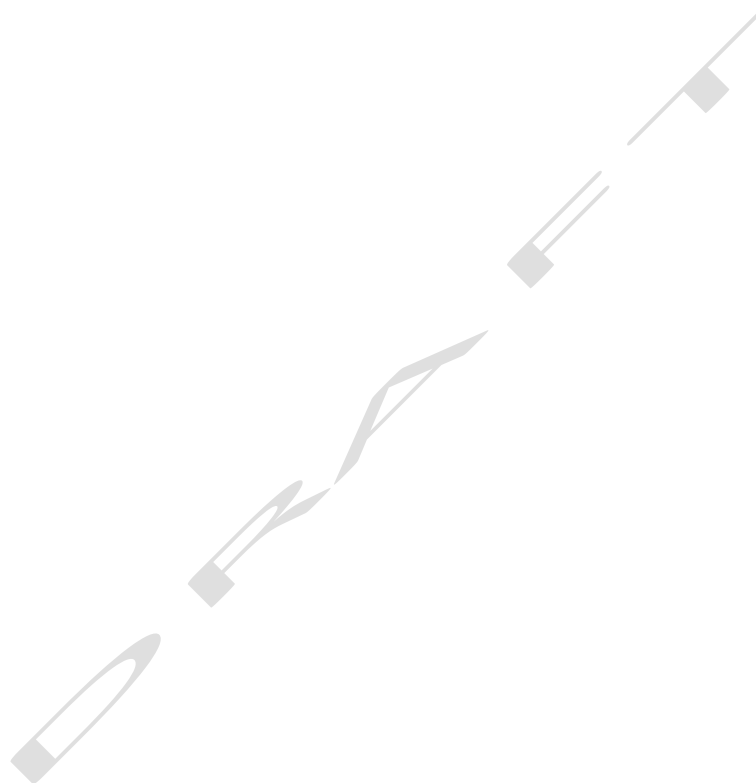
Table 4-1 Council management categories aligned to NSW Koala Strategy pillars

Management category	1. Koala habitat conservation	2. Supporting local communities to conserve koalas	3. Improving the safety and health of koalas	4. Building our knowledge
1. Habitat protection, restoration, and connectivity	✓	✓	✓	
2. Threat management	✓	✓	✓	
3. Education, engagement and integrating Traditional Owner knowledge	✓	✓	✓	✓
4. Research, monitoring, health, and welfare	✓	✓	✓	✓
5. Advocacy, funding and partnering	✓	✓	✓	✓

Management actions are allocated a timeframe for when they are to be undertaken (Table 4-2).

Table 4-2 Timeframes

Timeframe	Definition
Ongoing	Action to be delivered in an ongoing basis
Short	Action to be completed by the end of year one
Medium	Action to be completed by the end of year three
Long	Action to be completed by the end of year five



4.1. Habitat protection, restoration, and connectivity

Funding provided by the NSW Government through the NSW Koala Strategy is already helping to create new koala habitat through plantings, and restoring existing koala habitat that is impacted by weeds or stock in priority ARKS (and their buffers). Our partners and the community play an important role in hosting plantings of koala feed and shelter trees to enable safe movement and safe habitat for koalas. Council's nurseries have assisted in this effort through provision of local koala food tree seedlings to landholders.

Koala conservation and recovery requires the creation of coordinated safe spaces and safe connections and reducing the operation of threats and stresses in the landscape. Local Government is well placed to work collectively with other agencies and the community to assist deliver the Safe Spaces program outcomes. In the Safe Spaces model, well-managed public forests and Council reserves are linked with protected freehold land and key threats to koalas are managed throughout the wider landscape.

Table 4-3 Habitat protection actions

Action ID.	Action	Additional Stakeholders	Timeframe
1.1	Designate and manage Council land and reserves that contain valuable koala habitat as koala safe spaces and enhance their condition and connectivity through active restoration. Key Council owned land that are to be koala safe spaces shall include (but not be limited to): • <i>Bootawa Dam perimeter lands,</i> • <i>Bucketts Way Waste Management Centre perimeter lands,</i> • <i>Tinonee playing fields perimeter lands,</i> • <i>Peg Leg Creek future dam perimeter lands,</i> • <i>Cattai Wetlands,</i> • <i>Darawakh Creek / Frogalla Swamp Wetlands,</i> • <i>Red Head / Seascapes Koala corridor, and</i> • <i>Kore Kore Creek Reserve.</i>	-	Ongoing
1.2	Prepare and implement an implementation plan and program that assists deliver active protection and restoration of mapped priority koala corridors across the MidCoast LGA. This will follow the preparation of the corridor mapping in Action 4.2.	NPWS DCCEEW BCT	Long

Action ID.	Action	Additional Stakeholders	Timeframe
1.3	Maintain the ability to deliver devolved funding programs to private landholders and public lands to restore existing koala habitat and create new koala habitat. Funded works are to include bush regeneration, control of weeds that impact koalas and the quality of their habitat, fencing for stock exclusion, planting, facilitated natural regeneration, seeding). Habitat restoration programs shall affect strategic, long-term improvement. Programs will be delivered in identified priority areas.	Landholders	Ongoing
1.4	Maintain a register of landholders across the MidCoast that are willing to use their land for koala habitat creation, restoration, and monitoring programs, as part of a MidCoast Koala Safe Spaces program	Community	Ongoing
1.5	Strategically align and communicate Council's koala recovery and conservation efforts to the wider koala network. Assist the capacity of partnering organisations to deliver koala habitat restoration and conservation programs.	All stakeholders	Ongoing
1.6	Partner with the BCT and the NSW Credits Supply Taskforce to increase the amount of koala habitat that is protected under private land covenants, instruments, and agreements. Encourage the BCT to utilise the revolving fund mechanism to protect koala habitat. Identify suitable properties to BCT for the application of the revolving fund scheme. Encourage and promote the uptake of private land conservation and the revolving fund scheme for koala conservation in priority areas.	BCT Credits Supply Taskforce Landholders	Ongoing
1.7	Identify strategically important areas of koala habitat on private land that should be considered for addition to the National Parks estate. Understand the NPWS Reserve Acquisition priorities and considerations for koala habitat reservations. Connect potential vendors with the NPWS Reserve Acquisitions team.	NPWS – Reserve Acquisitions Landholders	Ongoing

Action ID.	Action	Additional Stakeholders	Timeframe
1.8	Develop an action plan or equivalent for securing connectivity outcomes at <i>The Gate</i> – the regional wildlife corridor area between Myall Lakes NP, Wallingat NP and Booti Booti NP. Implement the actions within the Plan.	NPWS LALC Community BCT	Medium
1.9	Deliver annual koala food tree species giveaways to the community. Maintain the capacity of the Council nurseries to collect seed and grow-out koala food trees for giveaways and planting programs.	-	Ongoing
1.10	Audit all the Individual Koala Plans of Management (IKPOMs) across the MidCoast LGA and redress issues of non-compliance.	IKPOM stakeholders	Medium

4.2. Threat mitigation

Koalas face many current and emerging threats in our region including habitat destruction, wildfire, climate change, vehicle strike, disease, and domestic dog attack (Section 2.6). Reducing or mitigating those threats is an integral part of any strategy for protecting koalas and ensuring their long-term resilience. Because different areas of the MidCoast are subject to varying levels of these threats, Council will prioritise funding toward targeted locations and mitigation activities. It will also seek out partnerships to leverage additional resources and up-scale threat reduction activities. For mitigation actions to be effective, all land managers and landholders need to work together, in a coordinated and tenure-blind approach.

Table 4-4 Threat management actions

Action ID.	Action	Additional Stakeholders	Timeframe
2.1	Ensure that all planning proposals, development application assessments and design and approvals for Council activities take koala habitat and population protections into account.	DCCEEW DPHI	Ongoing
2.2	Review and improve the MidCoast Council offsets procedure for Council activities in relation to loss of koala habitat / loss of koala food tree species, so as to improve program effectiveness and delivery.	-	Short
2.3	Manage Tinonee as an urban koala safe space. Develop an Urban Koala Safe Space Strategy for Tinonee, including a tree audit, street and public tree planting programs, KVS measures, as well as education and interpretation features.	Community	Medium
2.4	Request that the NSW Government amend the 10:50 code to require that landholders formally register their use in a central database. Advocate to the NSW Government to rescind the rural boundary clearing code.	RFS	Medium
2.5	Assist the delivery of koala vehicle strike avoidance and mitigation measures at priority locations (i.e. reduced speeds, variable message signs, roadside letterbox / garbage bin stickers, pavement treatments, directive fencing, crossing structures, road verge maintenance, lighting, request for speed patrols).	DCCEEW	Ongoing

Action ID.	Action	Additional Stakeholders	Timeframe
2.6	Develop a register of wildlife underpasses throughout the LGA. Audit and monitor the structures and deliver or advocate to the responsible authority for maintenance. Target the area on each side of wildlife underpasses for conservation instruments and management to ensure that koala habitat on each side of underpasses is secure and well-managed.	TfNSW	Ongoing
2.7	Assist the work being undertaken with relevant practitioners to expand the use of traditional ecological knowledge and cultural burning practices to assist protect koala habitat from risks associated with high intensity bushfire and other threats.	DCCEEW TIDE LALCs NPWS Hunter LLS	Ongoing
2.8	Identify and map (or advocate for) priority koala habitat areas (high density koala populations and population refuge areas) to be identified in Bushfire Management Plans, operational fire plans and hazard reduction plans to better protect koala populations when managing bushfire control and hazard reduction burns.	RFS NPWS FCNSW	Ongoing
2.9	Deliver a dedicated koala drinking water program to landholders to increase water availability in known koala habitats that are susceptible to heat-stress events and have limited availability of natural surface water.	FAWNA	Ongoing
2.10	Advocate for the protection of priority koala habitat areas as an <u>asset</u> to be actively protected in bushfire control situations and emergencies. Share occupied koala habitat and important fire refuge areas for koalas with local fire responders and emergency management teams.	RFS NPWS FCNSW	Ongoing

Action ID.	Action	Additional Stakeholders	Timeframe
2.11	Develop a MidCoast Koala Emergency Response Plan to guide collective action following a natural disaster event. <i>In implementing this Action, consider the NSW Government response to Recommendation 53 of the NSW Bushfire Inquiry (“that the government develop and implement a policy for injured wildlife response, rescue and rehabilitation in bushfires, including developing a framework for interaction with emergency operations and consideration of wildlife response in operational plans”)</i>	Care organisations NPWS	Short
2.12	Liaise with authorities (RFS) or land managers to advance that all prescribed burns in or near koala habitat are conducted in a way that minimises impact to koala habitat and individual koalas. Advocate for the requirement for koala inspections immediately prior to the burn within the burn area using contractors or knowledgeable volunteers.	RFS NPWS FCNSW	Medium
2.13	For climate change adaptation, deliver projects that increase the area of koala habitat that is protected in public and private conservation areas, and manage such lands in a way that improves the ecological condition and function of the vegetation (thus increasing resilience). Identify and protect climate adaptation corridors and climate refuge / nodes, particularly altitudinal corridors and north – south corridors and re-connect populations to improve genetic diversity. The mapping of wildlife corridors and nodes (Action 4.2) shall include an element that identifies the important climate corridors and refuge nodes.	All stakeholders	Ongoing
2.14	Identify areas where domestic dog attacks are a key threat to koalas and develop a plan to engage and communicate with and change the behaviour of dog owners. Promote the importance of keeping on dogs on leads and in properly fenced enclosures in koala habitat areas. Record the accurate locations of domestic dog attacks in a central database.	Care organisations	Medium

Action ID.	Action	Additional Stakeholders	Timeframe
2.15	Use restrictions and covenants on new developments to avoid or manage domestic dog impacts on koalas near populations and habitat. Plan off-leash dog areas only within areas distant from koala populations and habitat or securely fence the off-leash area with koala proof fencing.	-	Ongoing
2.16	Advocate for amendments to the <i>Companion Animals Act 1998</i> or its <i>Regulation</i> to increase the prosecution capabilities of authorities for property owners whose dogs wantonly attack and kill a koala (by amending the “trespass” consideration).	DCCEEW	Medium
2.17	Work with landholders to design a paddock tree or climbing refuge pole arrangement in cattle, horse or sheep stock paddocks near high density koala habitats and corridors to help protect koalas from stock. Systematically audit each stock attack incident on koalas to develop a greater understanding of the influencing factors and conditions, and effective responses.	Care organisations	Long
2.18	Communicate the locations of important koala habitat and populations to agencies and organisations involved in regional feral deer control efforts.	HLLS	Medium

4.3. Education, engagement and integrating Traditional Owner knowledge

The principles in the 2036 MidCoast Cultural Plan include ‘Caring for Country’ and ‘Connected to Nature’,. They encourage us all to be involved in protecting and conserving the environment, including koalas and their habitat.

The NSW Koala Strategy (DPE, 2022) recognises that “*many Aboriginal cultures have a strong connection to koalas and their habitat. Aboriginal knowledge of the land and its management is based on deep spiritual connections with Country... This strategy values the koala as an important cultural feature of the NSW landscape and recognises the importance of embedding Aboriginal cultural knowledge in all aspects of koala conservation and management... This strategy recognises Aboriginal communities have a strong role to play in ensuring the long-term health of koalas and their habitat*”. This Strategy shares this perspective. The MidCoast is on the traditional lands of the Gathang-speaking People.

Council hosts and supports various forms of education and engagement on koalas for the community such as the MidCoast Koala Festival, the Koala Safe Spaces Program, workshops, koala walks, citizen science opportunities and tree planting days. The MidCoast Council Partnership supports the appointment of a dedicated Koala Officer, who coordinates and administers local projects with our community. The role is funded by the NSW Koala Strategy to December 2026.

The NSW Koala Strategy is administering the Koala Smart program in primary and high schools, using NPWS Discovery Rangers and other supporting partners. The Myall Koala and Environment Group advocates for the value of primary school education programs for koalas, as the students often enthusiastically engage with their carers and families after these experiences.

To date, within the MidCoast Koala Safe Spaces project, there have been six (6) main objectives for engagement:

- Raise awareness of the NSW Koala Strategy and MidCoast Regional Koala Partnership,
- Increase landholder involvement in koala habitat restoration and conservation across the region,
- Raise general community awareness of koalas, their needs, and threats,
- Gain landholder participation in field surveys to determine populations levels and identify key threats,
- Encourage community input and support for the development of a Koala Conservation Strategy for the MidCoast, and
- Increase engagement of the public in citizen science including submitting koala sightings reports.

Table 4-5 Education management actions

Action ID.	Action	Additional Stakeholders	Timeframe
3.1	Maintain and promote the community Koala Sightings Register and provide regular updated sightings data to State Government.	Community BioNet	Ongoing

Action ID.	Action	Additional Stakeholders	Timeframe
3.2	Continue raising awareness in the community about local koala populations and their conservation needs through the Koala Safe Spaces Program and Citizen Science projects. Outline all Council koala education and engagement actions within a documented Koala Education and Engagement Strategy.	Community	Ongoing
3.3	Co-design koala conservation education and engagement campaigns with key stakeholders (potential target audiences to include rural landholders, schools (using Koala Smart and other projects). The potential activities include workshops, art experiences, symposia, field days, koala walks, community tree planting, spotlighting, etc.	Council Community Conservation groups Businesses	Short
3.4	Build partnership and co-design initiatives with Traditional Owner communities, Elders and knowledge holders, where appropriate. Only share knowledge and stories on koalas, if appropriate. Learn about Traditional Owner knowledge and perspective to aid future conservation and recovery actions.	Council Traditional Owners	Medium
3.5	Support local Traditional Owner people to implement, monitor and evaluate koala projects.	Council Traditional Owners	Ongoing
3.6	Deliver a biannual (two-yearly) MidCoast Koala Festival. Deliver special koala engagement events, including art / science or educational programs for koalas.	All stakeholders	Ongoing
3.7	Develop an Annual Report Card for each priority ARKS across the MidCoast. Report on the achievements and deliverables and synthesise the findings of any monitoring and research. Pilot the Annual Report Card template using the Kiwarra ARKS.	-	Medium

4.4. Research, monitoring, health and welfare

Filling gaps in our knowledge and understanding threats to koalas requires ongoing monitoring and research so that we can best respond to issues and identify emerging matters. The impacts of climate change on koalas are likely to increase in frequency and severity in the coming decades. Ongoing monitoring and research will help improve the health and safety of koalas in the short, medium and long-terms.

Table 4-6 Research management actions

Action ID.	Action	Additional Stakeholders	Timeframe
4.1	Invest in additional koala habitat mapping to fill knowledge gaps and extend the area covered by fine-scale koala habitat mapping (likely and occupied koala habitat). Revise as-held mapping as new data becomes available.	DCCEEW NPWS FCNSW Community	Ongoing
4.2	Publish a map of the spatial locations of important movement corridors (and nodes) for koalas across the entire MidCoast LGA using a recognised connectivity mapping / modelling tool.	DCCEEW Connectivity scientists	Short
4.3	With the permission of the relevant agency, extend the habitat mapping process used in this Strategy to the areas of the National Parks estate and the Forestry Corporation estate to assist compile a complete koala habitat mapping dataset for the LGA.	FCNSW NPWS	Short
4.4	Undertake on-ground koala and habitat surveys and monitoring throughout the LGA and update associated partner databases with the latest data. Compile population estimates for priority koala habitat areas within the MidCoast. Continue the Bootawa song-meter program every two years to track population changes at the local level.	DCCEEW Hunter LLS NPWS FCNSW Community	Ongoing
4.5	Provide support (if needed) to koala care and rescue groups to maintain or increase the accuracy of sightings data that is provided to BioNet.	Wildlife rescue / care organisations	Ongoing
4.6	Attend conferences / symposia offering the latest findings and research on koala knowledge, data gaps or koala programs and incorporate learnings into this Koala Conservation Strategy implementation.	DCCEEW Universities / researchers	Ongoing

Action ID.	Action	Additional Stakeholders	Timeframe
4.7	Prepare a research strategy to identify focus areas for applied knowledge gathering for key threats to koalas in the LGA. Advocate for the efficient and effective direction of funds and resources to where they're most needed to address priority threats.	Universities / researchers NPWS Community	Short
4.8	Support, promote and / or facilitate scientific investigation of actions identified in the MidCoast Koala Research Strategy.	Universities / researchers DCCEEW Consultants	Ongoing
4.9	Support a scientific evaluation as to the impact of lantana on koala occupancy and movement and scientifically investigate and publish a report on koala habitat use following lantana control.	Universities / researchers	Medium
4.10	Support or oversee a Council wide collection and analysis (hair / DNA) of dingo / wild dog scats to increase knowledge of the rate of dingo / wild dog predation of koalas in different landscapes.	Universities / researchers Consultants Community	Medium
4.11	Actively monitor the replanting sites associated with the MidCoast Koala Safe Spaces Program to track patterns of koala use. Use the results of this monitoring to improve habitat creation processes and activities in the future.	Universities / researchers Consultants	Ongoing
4.12	Collaborate with researchers in regard to climate change data and modelling that predict the impacts of climate change on koalas and their habitat. Use this information to prioritise the identification, adaptation actions and investment in key habitat refugia and climate change adaptation corridor protection and restoration.	Universities / researchers DCCEEW NPWS	Medium

Action ID.	Action	Additional Stakeholders	Timeframe
4.13	Stay informed of evaluations and knowledge-gathering regarding the impacts and management of koalas in relation to public and private native forestry.	FCNSW NRC EPA	Ongoing
4.14	Support volunteer wildlife rehabilitators, vets, and other partner organisations to enhance coordination of emergency response for koalas and other wildlife due to bushfire or extreme weather events.	Wildlife rescue organisations DCCEEW	Medium
4.15	Promote the community to urgently report sick, injured, or at-risk koalas to the appropriate koala care and rescue organisations across the MidCoast. Seek to break-down barriers to community reporting of koalas involved in vehicle strike or dog attack incidents.	Care organisations Community	Ongoing
4.16	Undertake a detailed review, consult and engage, and publish a final list of koala habitat tree species for the MidCoast region, with notes on the geographic landscapes associated with each species (eg. coastal sites, high elevation sites, etc).	DCCEEW	Short

4.5. Advocacy, funding and partnerships

Council is one of several authorities on the MidCoast responsible for land and biodiversity management, including koala conservation and protection.

Council is a planning authority, making decisions on local developments, planning for strategies, and determining land use zones. There are statutory frameworks and processes associated with development assessment and land use planning that considers the koala.

Further, there are approximately 6,000 ha of Council natural area reserves across the MidCoast, some of which provide important koala habitat. This is only a fraction of the total land area on the MidCoast. It is essential that actions within this Strategy can be delivered in a coordinated manner with our partners, and the community.

It is important to note that some of the issues associated with koala management, such as the issue of logging in public State Forests, is not regulated by Council. Public forestry is managed by the NSW Government through the Forestry Corporation of NSW. It is regulated by the NSW Environment Protection Authority and reviewed by the Natural Resources Commission.

MidCoast Council has a history of science-backed advocacy. For example, on the 8 February 2023, MidCoast Councillors *“unanimously supported a notice of motion to advocate to NSW Forestry and National Parks for a cease to logging in compartments 41 and 43 of the Bulga Forest and transition these compartments to National Parks, and advocate to the NSW Government to develop a plan for the transition of Forestry’s native forest sector to ecologically sustainable plantations”*. In September, Mayor Pontin of MidCoast Council wrote to the NSW Forestry Corporation asking that the proposed logging in compartments 7, and 10 – 13 in Kiwarra SF be “substantially postponed or abandoned” because:

“The koala population within this forest was reduced by 50 to 80% because of the 2019 bushfires. The planned introduction of logging activities at this time has the potential to physically endanger and add to the stressors affecting the remaining, depleted koala population, thus markedly inhibiting its recovery,

Council’s partner in koala recovery and conservation activities, the Hunter LLS has invested in ecological burning trials for koala recovery and conservation in this state forest. This is an important area of applied research. The planned logging will disrupt this research,

The operation (particularly in Compartments 10 – 13) will likely be associated with significant controversy and community opposition. This has the potential to damage the MidCoast Regional Koala Partnership brand and the substantial positive momentum that has been generated to date. Timber harvesting at this time will potentially conflict with the positive narrative associated with providing “koala safe spaces” in the Kiwarra ARKS that are intended to safeguard the koala population and allow it to recover from the combination of legacy and contemporary impacts (including the 2019 bushfires).”

This Strategy prompts the continuation of advocacy to the NSW and Commonwealth Governments and other parties on local koala conservation matters.

In relation to funding, Council will utilise locally relevant data to continue to apply for and attract government funding to this Koala Conservation Strategy and the implementation of its actions. Council may also investigate or leverage opportunities in co-investment for restoration and planting programs from the private sector seeking to meet environment and social governance objectives such as the nature repair market, natural capital, or net-zero commitments.

Table 4-7 Advocacy management actions

Action ID.	Action	Additional Stakeholders	Timeframe
5.1	Advocate to the NSW Government to extend the NSW Koala Strategy program and funding to the MidCoast Regional Partnership, including extending the role of the MidCoast Koala Project Officer beyond December 2026.	DCCEEW	Short
5.2	Participate in and contribute to reviews of environmental legislation and strategies in NSW and Australia; advocating for positive improvements to the protection and conservation of koalas.	DCCEEW DPHI	Ongoing
5.3	Continue to engage and advocate to the NSW Government and NRC regarding forestry practices and koala conservation (particularly in Wang Wauk SF, Kiwarra SF, Nerong SF, Bulga SF and Wallaroo SF) and in relation to private native forestry. Engage and advocate for koala conservation in state-significant developments and major projects, including resources developments and public infrastructure.	NSW Government Community	Ongoing
5.4	Advocate to State Government (Transport for NSW) to include koala barrier fencing and crossings at new road construction projects and vehicle strike hotspots on State managed roads.	NSW Government TfNSW	Ongoing
5.5	Foster partnerships with neighbouring councils, Traditional Owners, universities, schools, MidCoast 2 Tops Landcare, community groups, NGOs and local experts to expand delivery of the Koala Smart and the Koala Safe Spaces programs. Work in collaborative way to assist all relevant stakeholders to align and coordinate their koala conservation and recovery efforts.	All stakeholders	Short
5.6	Partner with farming organisations to explore new ways to encourage landholders to protect koala habitat on their land while maintaining agricultural production.	Community	Short
5.7	Explore opportunities to guide or inform private sector organisations to leverage action and investment in koala conservation across the MidCoast.	Industry Private sector	Medium

Action ID.	Action	Additional Stakeholders	Timeframe
5.8	Work to support the NSW Government (and other relevant organisations) to deliver local Carbon Farming projects.	Net Zero Land Clean Energy Regulator Private sector	Ongoing

4.6. Priority focus areas for conservation

The mapping compiled for this Strategy will be analysed to identify priority focus areas for conservation, recovery, and research investment and action. This analysis will be commenced within the first year of the implementation of the Strategy and be revised and updated adaptively.

The MidCoast Biodiversity Framework (MCC, 2020) has established some initial koala area priorities. This includes populations in the Kiwarra, Hawks Nest, Crowdy Bay, Hallidays Point and The Bucketts (Gloucester) localities (MidCoast Council, 2020).

Further, the NSW Koala Strategy has its identified priorities – being the populations for immediate investment or populations prioritised for filling key knowledge gaps and delivering local actions.

Within these broad populations, there is a need for the extensive, high-quality occupied and likely koala habitat mapping generated for this Strategy to be used to identify local intervention priorities and targets. This can help identify:

- Valuable additions to the public conservation estate (National Park acquisitions),
- Land of importance for private land conservation (conservation agreements, stewardship agreements, revolving fund investment),
- Private land partnerships and devolved grant investment, and
- Development offset sites.

Local priority sites for conservation and recovery actions should be identified spatially. Local priority sites should consider (but not be limited to):

- Important koala connecting habitats and corridors, including climate change adaptation corridors,
- Climate change refuge nodes,
- Existing protected areas (to increase the area reserved or improve the shape or management of the reserve),
- High density koala populations that are unprotected or subject to imminent risks and threats,
- Unoccupied or lightly occupied but otherwise highly suitable koala habitat,

This Strategy will be effective only if it uses the mapping provided to adaptively guide strategic conservation and recovery effort into priority locations. Implementation planning will need to define where, how and when interventions are delivered.

5. Implementation

5.1. Adaptive framework

This Strategy utilises an adaptive management framework that can be updated as necessary where new data and information becomes available. This Strategy will be reviewed and updated at least every five years. The Strategy itself may require updates where changes to policy, legislation, resourcing, or technology occur.

5.2. Reporting and review

This Strategy outlines 59 actions to be delivered over five years:

- Ongoing (32 actions)
- Short (completed by the end of year 1) (10 actions)
- Medium term (completed by the end of year 3) (15 actions)
- Long term (completed by the end of year 5) (2 actions).

The timeframes of the different actions are identified in Appendix E.

Progress on each of the actions within this Strategy will be reported to Council and the community annually and will detail the status of each action as either:

- Planned (and the expected commencement date)
- Commenced (and the expected duration of implementation)
- Ongoing (and the expected completion date, where relevant)
- Completed (date of completion).

An annual reporting template shall be prepared within the first 12-months of the implementation of this Plan.

Reporting against Strategy targets will be a focus of the annual reporting. It will include reference to performance that aligns with the State Government (Table 3-1) as well as local targets set out in Section 3.2:

6. References

- Adams-Hosking, C. *et al.* (2011) 'Modelling climate-change-induced shifts in the distribution of the koala', *Wildlife Research*, 38(2), pp. 122–130. Available at: <https://doi.org/doi.org/10.1071/WR10156>.
- Bachmann, N.L. *et al.* (2014) 'Comparative genomics of koala, cattle and sheep strains of *Chlamydia pecorum*', *BMC genomics*, 15, pp. 1–14.
- Ballantyne, K. *et al.* (2015) 'Seasonal oestrous cycle activity of captive female koalas in south-east Queensland', *Australian Mammalogy*, 37(2), pp. 245–252.
- Beale, P., Marsh, K. and Youngentob, K. (2022) 'Revegetating koala habitat'. Available at: <https://www.dcceew.gov.au/environment/epbc/publications/revegetating-koala-habitat>.
- Biolink (2017) *Mapping and Analysis of Koala Records - Myall Koala and Environment Group Community Koala Sightings*. Report for MldCoast Council.
- Biolink (2019) *The Kiwarra and Khappinghat ARKS: Aspects of the distribution and abundance of koalas*. Final report to MidCoast Council. Uki.
- Biolink (2022) *Koala Habitat Connectivity in the Kirrawak ARKS: Modelling and evaluating revegetation scenarios*. Prepared for MidCoast Council. Pottsville.
- Blyton, M.D. *et al.* (2022) 'Characterization of the juvenile koala gut microbiome across wild populations', *Environmental Microbiology*, 24(9), pp. 4209–4219.
- Briscoe, N.J. *et al.* (2014) 'Tree-hugging koalas demonstrate a novel thermoregulatory mechanism for arboreal mammals', *Biology letters*, 10(6), p. 20140235.
- Collins, L. *et al.* (2019) 'Wildfire refugia in forests: Severe fire weather and drought mute the influence of topography and fuel age', *Global Change Biology*, 25(11), pp. 3829–3843.
- DAWE (2022) 'National Recovery Plan for the Koala: *Phascolarctos cinereus* (combined populations for Queensland, New South Wales and the Australian Capital Territory)'. Australian Government.
- DES (2022) *Koala facts, Department of the Environment and Science*. Available at: https://environment.des.qld.gov.au/wildlife/animals/living-with/koalas/facts#reproduction_and_lifecycle (Accessed: 7 July 2023).
- DoE (2013) 'Matters of National Environmental Significance, Significant impact guidelines 1.1 Environment Protection and Biodiversity Conversation Act 1999'. Department of the Environment. Commonwealth of Australia. Available at: https://www.awe.gov.au/sites/default/files/documents/nes-guidelines_1.pdf.
- DPE (2022) 'NSW Koala Strategy'. Available at: <https://www.environment.nsw.gov.au/-/media/OEH/Corporate-Site/Documents/Animals-and-plants/Threatened-species/koala-strategy-2022-220075.pdf>.
- DPIE (2020) 'Framework for the spatial prioritisation of koala conservation actions in NSW; Saving our Species Iconic Koala Project'. NSW Government.
- Ellis, W. *et al.* (2010) 'Climate change and the koala *Phascolarctos cinereus*: water and energy', *Australian Zoologist*, 35(2), pp. 369–377.
- Fabijan, J. *et al.* (2017) 'Lymphoma, koala retrovirus infection and reproductive chlamydiosis in a koala (*Phascolarctos cinereus*)', *Journal of comparative pathology*, 157(2–3), pp. 188–192.

Gentle, M. *et al.* (2019) 'Genetic sampling identifies canid predators of koalas (*Phascolarctos cinereus*) in peri-urban areas', *Landscape and Urban Planning*, 190, p. 103591.

Gonzalez-Astudillo, V. (2018) *Analysis of Morbidity and Mortality of Wild Koalas in South-East Queensland using Passive Surveillance Data*. University of Queensland. Available at: <https://core.ac.uk/download/pdf/189933096.pdf>.

Grogan, L.F. *et al.* (2017) 'Current trends and future directions in koala chlamydial disease research', *Biological Conservation*, 215, pp. 179–188.

Hill, A., Keogh, S. and Anderson, B. (2019) 'Case study: Cattle-associated traumatic injuries in koalas', *Wildlife Rehabilitation*, 39(1), pp. 11–15.

Jiang, A. *et al.* (2021) 'Do Livestock Injure and Kill Koalas? Insights from Wildlife Hospital and Rescue Group Admissions and an online survey of livestock-koala conflicts', *Animals*, 11.

Jiang, A. *et al.* (2022) 'Insights from Koala-Cattle Interaction Experiments: Koalas and Cattle May See Each Other as a Disturbance', *Animals*, 12(872).

Law, B.S. *et al.* (2022) 'Fire severity and its local extent are key to assessing impacts of Australian mega-fires on koala (*Phascolarctos cinereus*) density', *Global Ecology and Biogeography*, 31(4), pp. 714–726.

Legislative Council Portfolio Committee No. 7 - planning and Environment (2020) *Koala populations and habitat in New South Wales*. 3. NSW Parliament.

Lunney, D. *et al.* (2004) 'Post-fire survival and reproduction of rehabilitated and unburnt koalas', *Biological Conservation*, 120(4), pp. 567–575.

Marsh, K.J. *et al.* (2018) 'Intraspecific variation in nutritional composition affects the leaf age preferences of a mammalian herbivore', *Journal of chemical ecology*, 44, pp. 62–71.

Martin, R. and Handasyde, K.A. (1999) *The koala: natural history, conservation and management*. UNSW press.

McAlpine, C. *et al.* (2015) 'Conserving koalas: A review of the contrasting regional trends, outlooks and policy challenges', *Biological Conservation*, 192, pp. 226–236.

McCallum, H. *et al.* (2018) 'Assessing the significance of endemic disease in conservation—koalas, chlamydia, and koala retrovirus as a case study', *Conservation Letters*, 11(4), p. e12425.

McLean, N. and Handasyde, K.A. (2007) 'Sexual maturity, factors affecting the breeding season and breeding in consecutive seasons in populations of overabundant Victorian koalas (*Phascolarctos cinereus*)', *Australian Journal of Zoology*, 54(6), pp. 385–392.

Mella, V. *et al.* (2020) 'An insight into natural koala drinking behaviour', *Ethology*, (126), pp. 858–863.

MidCoast Council (2020) 'Biodiversity Framework 2020-2030; A roadmap for conserving natural heritage of the MidCoast'.

MidCoast Council (2023a) *Koala Safe Spaces Program*. Available at: <https://haveyoursay.midcoast.nsw.gov.au/koala-safe-spaces-program>.

MidCoast Council (2023b) 'MidCoast Council - Protecting Koalas'. Available at: <https://www.midcoast.nsw.gov.au/files/assets/public/document-resources/environment-docs/animals-threatened-species/mcc-koala-dog-brochure-280318.pdf#:~:text=The%20owner%20or%20person%20in%20charge%20of%20a,restricted%20dog%29%20and%20the%20dog%20can%20be%20seized.>

- Mitchell-Whittington, A. (2017) 'Koalas are being attacked by cattle, horses as trees are felled: wildlife carer', *Brisbane Times*, 19 June. Available at: <https://www.brisbanetimes.com.au/national/queensland/koalas-are-being-attacked-by-cattle-horses-as-trees-are-felled-wildlife-carer-20170619-gwtucn.html>.
- Narayan, E. (2019) 'Physiological stress levels in wild koala sub-populations facing anthropogenic induced environmental trauma and disease.', *Scientific Reports*, 9, p. 6031.
- Narayan, E.J. and Williams, M. (2016) 'Understanding the dynamics of physiological impacts of environmental stressors on Australian marsupials, focus on the koala (*Phascolarctos cinereus*)', *BMC zoology*, 1(1), pp. 1–13.
- NSW DPE (2022) 'NSW Koala Strategy'. NSW Government. Available at: <https://www.environment.nsw.gov.au/-/media/OEH/Corporate-Site/Documents/Animals-and-plants/Threatened-species/koala-strategy-2022-220075.pdf>.
- NSW Government (2023) *Gumbaynggirr Good Koala Country Plan*. Available at: <https://www.koala.nsw.gov.au/news/gumbaynggirr-good-koala-country-plan>.
- NSW OEH (2019) 'Bionet data records: koala roadkill'. Bionet.
- Polkinghorne, A., Hanger, J. and Timms, P. (2013) 'Recent advances in understanding the biology, epidemiology and control of chlamydial infections in koalas', *Veterinary microbiology*, 165(3–4), pp. 214–223.
- Predavec, M. *et al.* (2017) 'Using repeat citizen science surveys of koalas to assess their population trend in the north-west of New South Wales: scale matters', *Australian Mammalogy*, 40(1), pp. 47–57.
- Quigley, B.L. and Timms, P. (2020) 'Helping koalas battle disease—Recent advances in Chlamydia and koala retrovirus (KoRV) disease understanding and treatment in koalas', *FEMS Microbiology Reviews*, 44(5), pp. 583–605.
- Rennison, B. and Fisher, M. (2018) 'Framework for the Spatial Prioritisation of Koala Conservation Actions in NSW—A report for the Save our Species Iconic Koala Project', *Report to the NSW Office of Environment and Heritage* [Preprint].
- Rhodes, J.R. *et al.* (2011) 'Using integrated population modelling to quantify the implications of multiple threatening processes for a rapidly declining population', *Biological conservation*, 144(3), pp. 1081–1088.
- Stalenberg, E. *et al.* (2014) 'Nutritional correlates of koala persistence in a low-density population', *PLoS One*, 9(12), p. e113930.
- TierraMar (2021) *Koala Action Plan for the NSW MidCoast Local Government Area*. Prepared for Hunter Local Land Services as part of the Regional Land Partnerships Program. Sutherland.
- Ward, M.S. *et al.* (2019) 'Lots of loss with little scrutiny: The attrition of habitat critical for threatened species in Australia', *Conservation Science and Practice*, 1(11), p. e117.
- Wildlife Health Australia (2023) 'Koala retrovirus (KoRV) Fact Sheet'. Available at: https://wildlifehealthaustralia.com.au/Portals/0/ResourceCentre/FactSheets/Mammals/Koala_Retrovirus.pdf.
- Youngentob, K.N., Marsh, K.F. and Skewes, J. (2021) *A review of koala habitat assessment criteria and methods*. The Australian National University. Available at: <https://www.dcceew.gov.au/sites/default/files/documents/review-koala-habitat-assessment-criteria-and-methods-2021.pdf>.

Appendix A Legislative context

Commonwealth legislation

Environmental Protection and Biodiversity Conservation Act 1999 (EPBC Act)

On 12 February 2021, the koala was listed as endangered under the EPBC Act and hence is defined as a Matter of National Environmental Significance (MNES).

The EPBC Act requires that proponents of activities assess whether their proposed actions will have a significant impact on koala populations and koala habitat based on an Assessment of Significance. The Significant Impact Guidelines 1.1 (DoE, 2013) for critically endangered and endangered species are used to assist this process.

Under the EPBC Act, any action (which includes a development, project, or activity) that may have a significant impact on MNES must be referred to the Commonwealth Minister for a determination as to whether that action is controlled.

Controlled actions require Commonwealth approval.

State legislation

Biodiversity Conservation Act 2016 (BC Act)

This Act outlines the list of threatened species, populations, and ecological communities in NSW. The koala is listed as endangered under the BC Act.

This legislation requires that a proponent of a development assess whether the proposed actions will have a significant impact on koala populations and koala habitat based on a Biodiversity Assessment Methodology (BAM). The BC Act links to other legislation including the *Environmental Planning and Assessment Act 1979* (EP&A Act) (see below). The Act includes a Biodiversity Offsets Scheme (BOS), which may be triggered by the proposed development. Council and other planning authorities, such as the Independent Planning Commission, regulates development in accordance with the provisions of this Act.

If a Biodiversity Development Assessment Report is required, an accredited assessor must prepare it.

The BOS may also apply if a proposed activity under Part 5 of the EP&A Act is likely to significantly affect koalas and koala habitat, and the proponent opts into the BOS, otherwise a Species Impact Statement (SIS) must be prepared.

The BOS is intended to measure the biodiversity loss of development proposals and the gains in biodiversity value achieved at offset sites.

The BAM establishes an avoid - mitigate – offset hierarchy for development, which means that avoiding impacts on biodiversity values is paramount and must be clearly demonstrated in development applications. Offset measures are to be applied to residual impacts only after biodiversity impacts have been firstly avoided and then mitigated.

The BOS applies to local development (assessed under Part 4 of the EP&A Act) where the project exceeds any one of the BOS thresholds according to s7.1 of the NSW Biodiversity Conservation Regulation 2019 (BC Regulation). Likewise, it applies to all State Significant projects unless the Secretary of the Department of Planning and Environment and the Chief Executive of DPE determine that the project is not likely to have a significant impact.

The Biodiversity Conservation Act 2016 also provides a framework for private land conservation in NSW, principally through conservation agreements and biodiversity stewardship sites administered by the NSW Biodiversity Conservation Trust.

Environmental Planning and Assessment Act 1979

The EP&A Act is the legislation for planning in NSW. Part 4 (Development Assessment) and Part 5 (Environmental Assessment) are the most relevant for koalas.

Environmental planning instruments are also created through the EP&A Act. These include State Environmental Planning Policies (SEPPs), Local Environment Plans (LEPs) and Development Control Plans (DCPs).

The State Environmental Planning Policy for koala habitat protection is in two chapters (Chapter 3 and 4) of the State Environmental Planning Policy (Biodiversity and Conservation) 2021 (SEPP 2021).

Currently, the two Koala SEPPs that apply in NSW:

- The State Environmental Planning Policy (Koala Habitat Protection) 2020, which commenced on 30 November 2020 and largely reinstates the policy framework of SEPP 44, and
- The State Environmental Planning Policy (Koala Habitat Protection) 2021, which commenced on 17 March 2021 and largely reinstates the policy framework of the 2019 Koala SEPP.

Local Land Services Act 2013

The LLS Act controls and regulates clearing of native vegetation on rural land.

Companion Animals Act 1993

The *Companion Animals Act 1998* and the *Companion Animals Regulation 2008* provide for the identification and registration of cats and dogs, how they are managed and the duties and responsibilities of their owners in NSW. Pet owners must ensure that their dog (or cat) does not threaten or harm a person or animal (such as a koala) and is prevented from straying or causing other nuisance. *The Companion Animals Act 1998* also provides for Council to prohibit dogs and cats on public land for the purpose of protecting wildlife.

Local Government Act 1993

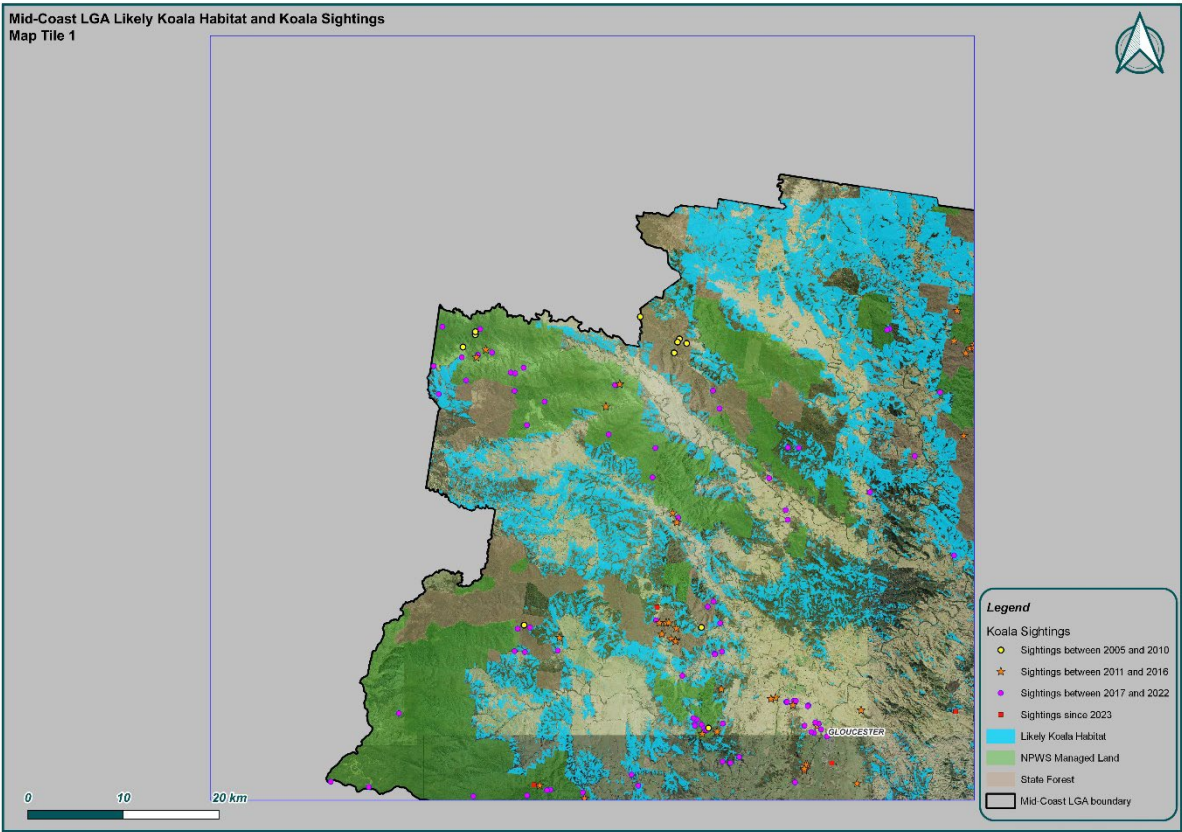
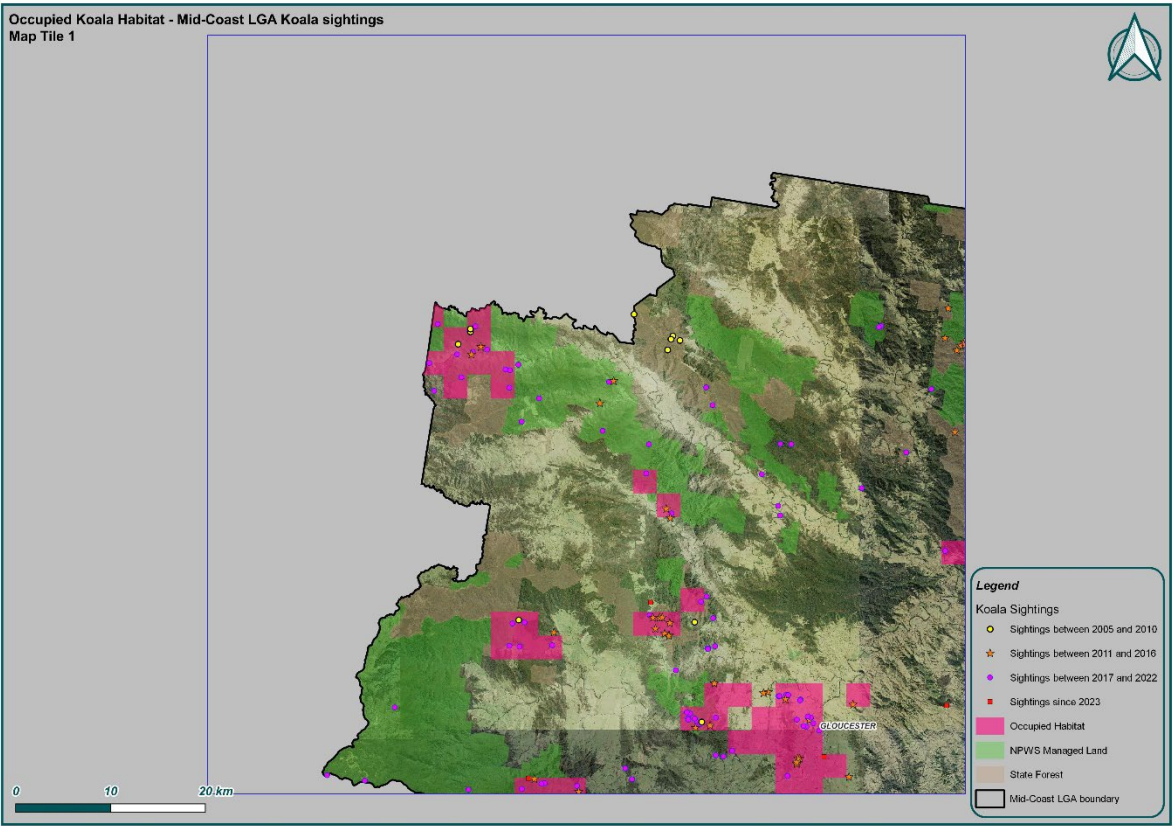
This Act provides for a framework of classifying and managing natural area / bushland reserves and provides Councils with land acquisition and ownership powers. It establishes the requirement for Ecologically Sustainable Development to be factored into Council decision making. It also provides regulatory powers in relation to reserves and notices.

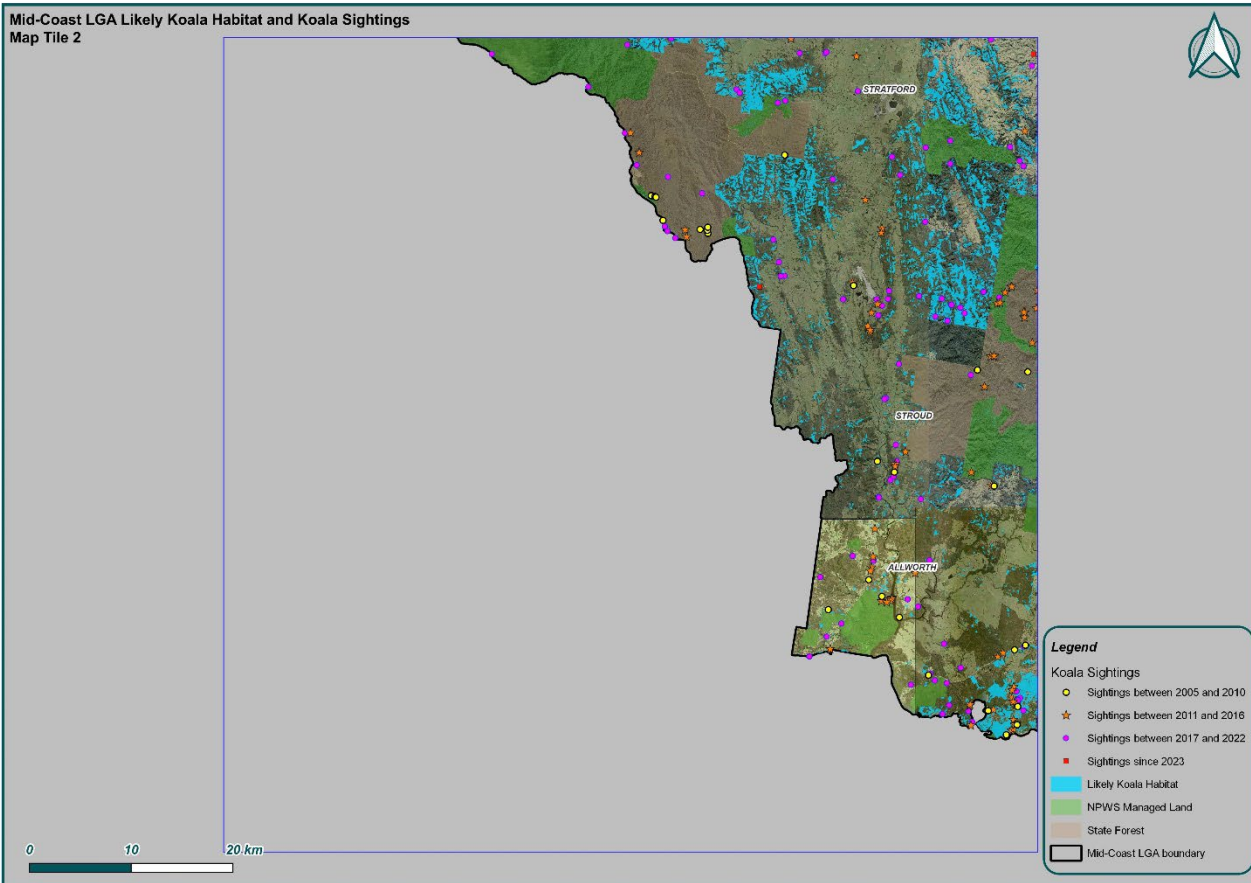
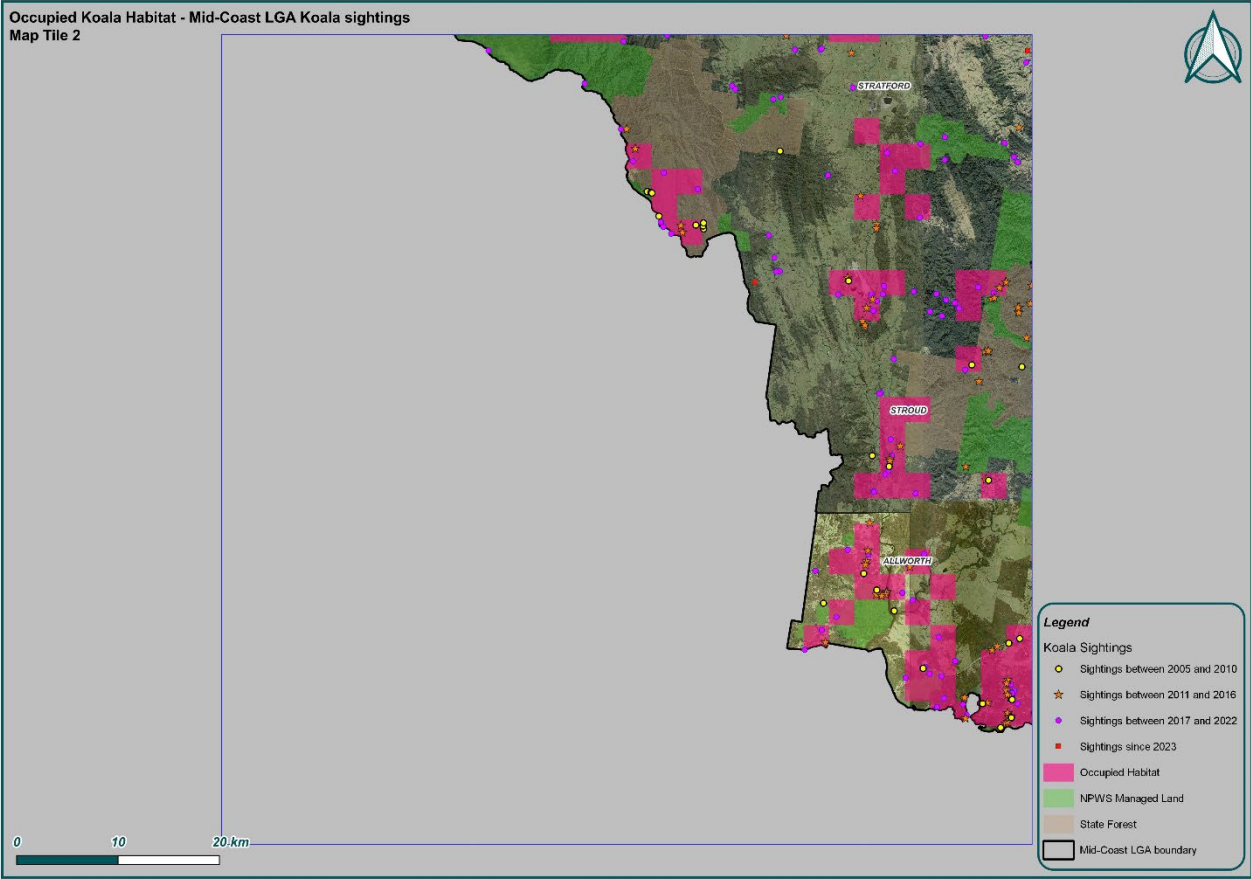
Appendix B Koala survey methods and results

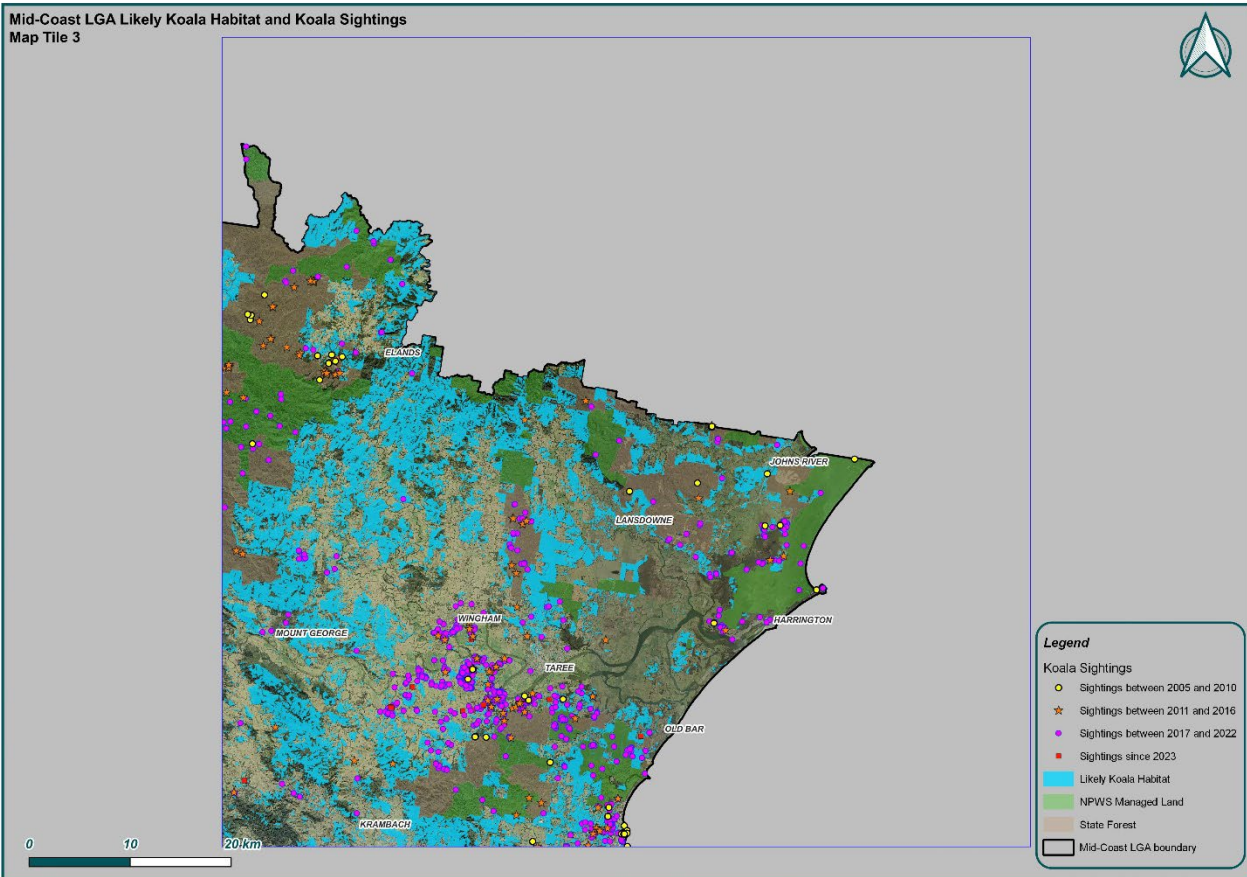
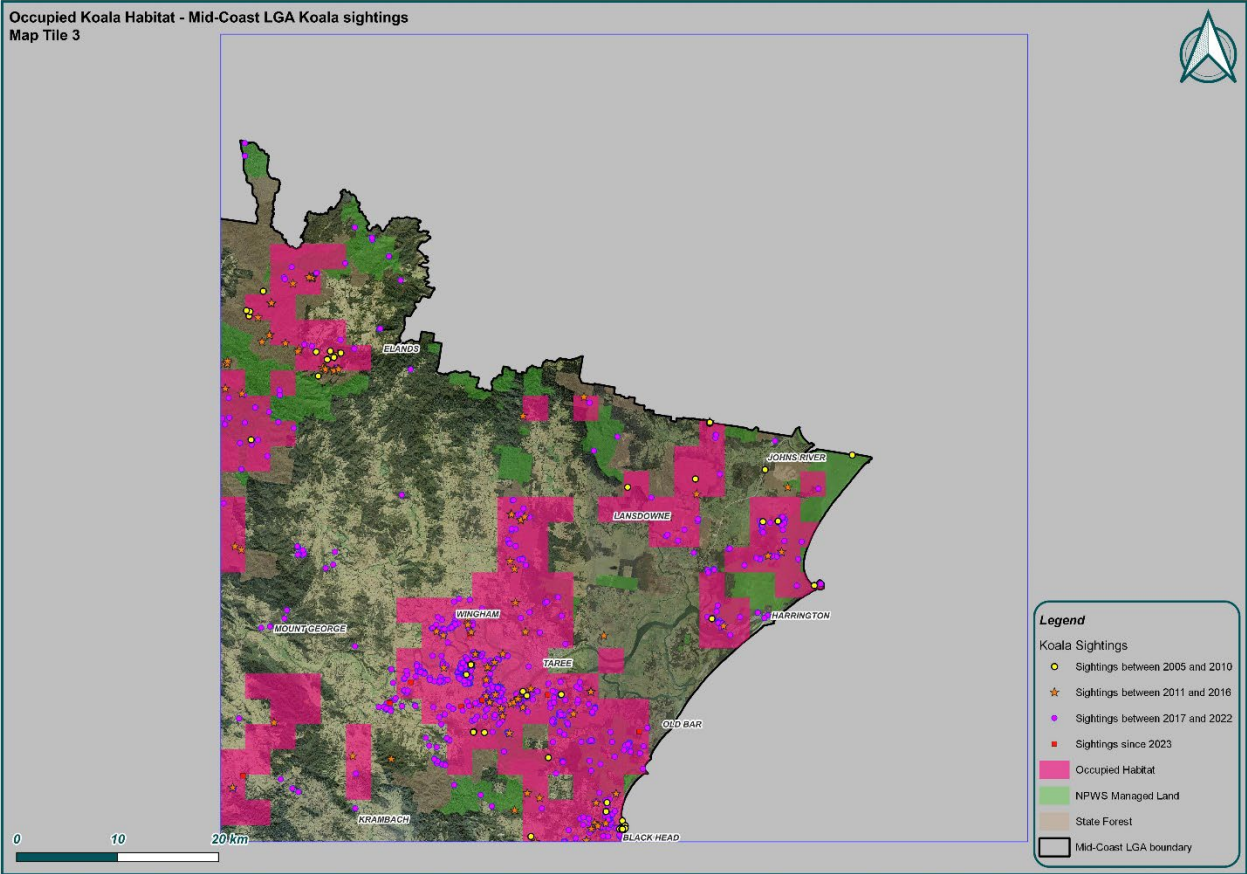
[Mid Coast Council Koala Survey Report 2023.pdf](#)

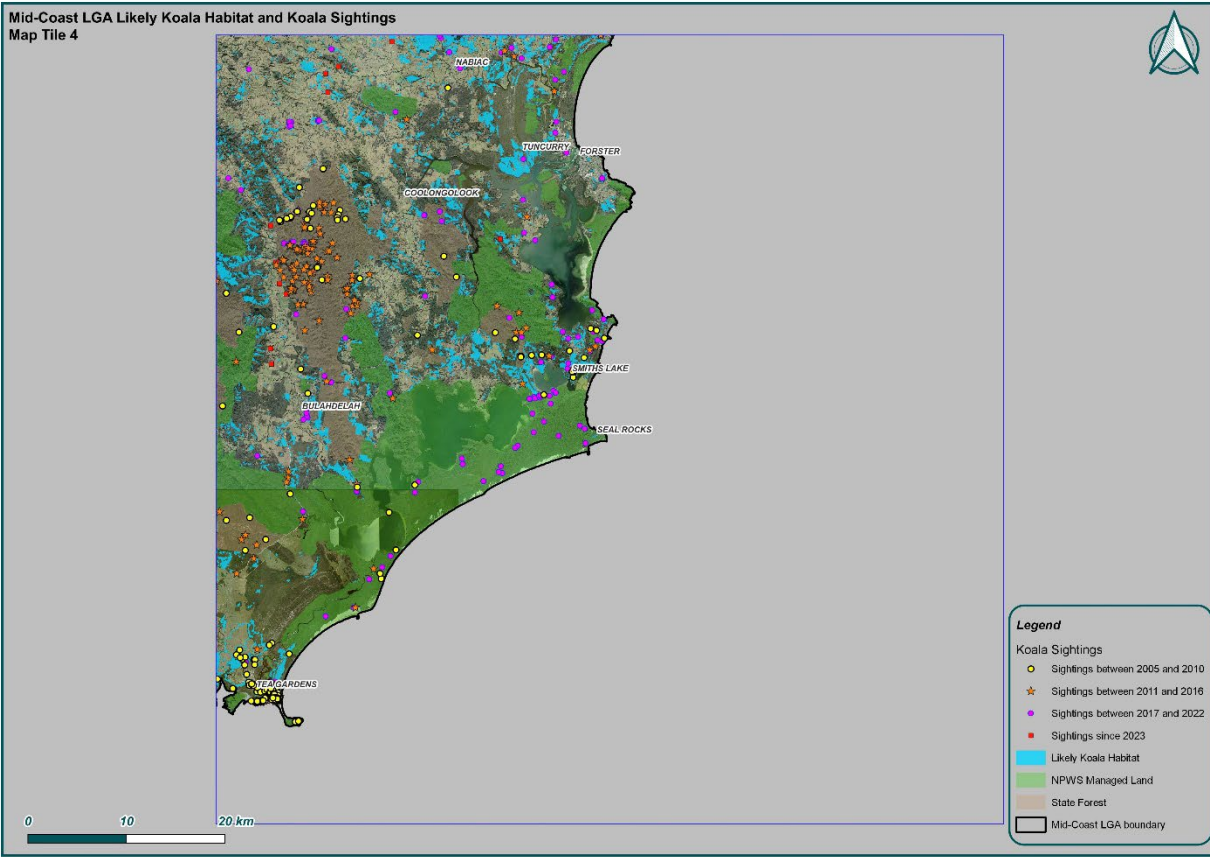
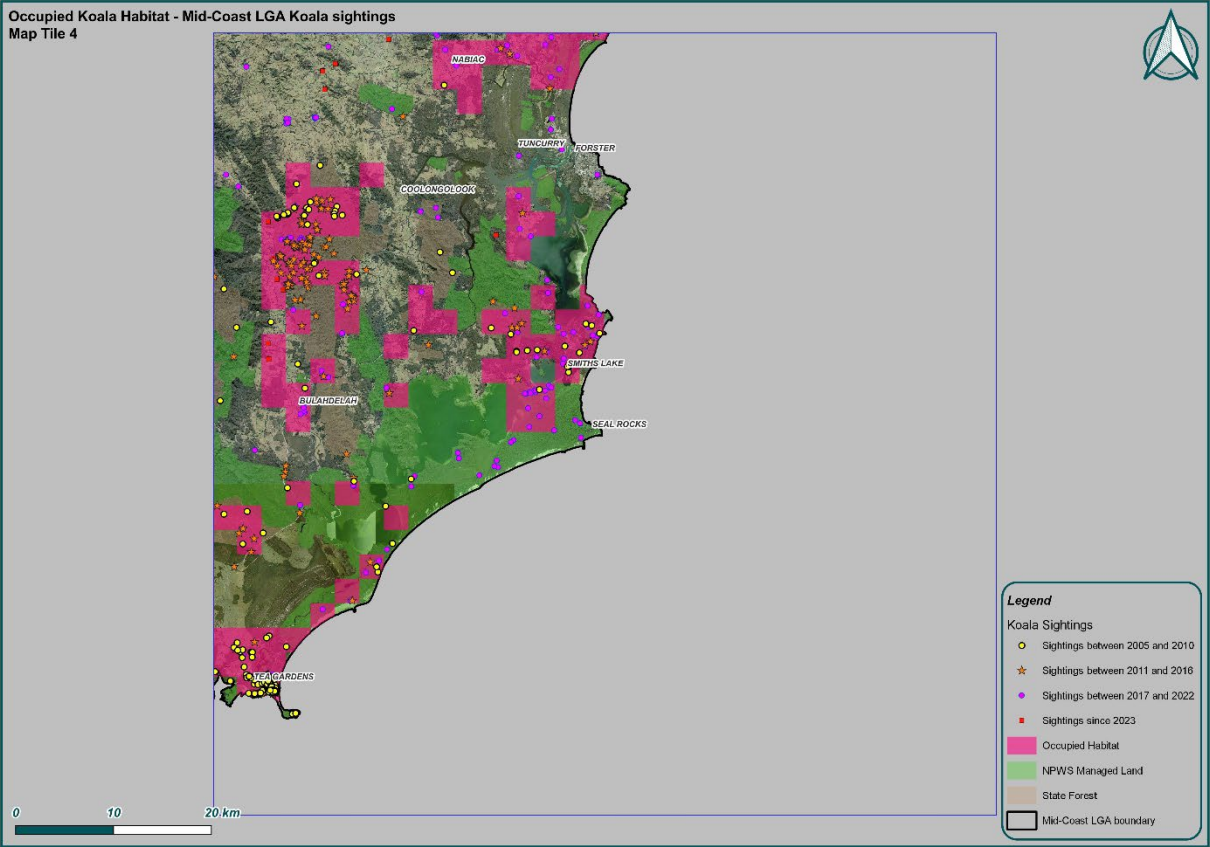
DRAFT

Appendix C LGA wide habitat mapping









Appendix D MidCoast koala habitat trees

Source: MidCoast Council, 2024

Primary (feed trees)

Grey gum (*Eucalyptus biturbinata*)
Bangalay (*Eucalyptus botryoides*)
Large-fruited grey gum (*Eucalyptus canaliculata*)
Thick-leaved white mahogany (*Eucalyptus carnea*)
Slaty red gum (*Eucalyptus glaucina*)
Flooded gum (*Eucalyptus grandis*)
Tallowwood (*Eucalyptus microcorys*)
Grey box (*Eucalyptus moluccana*)
Drooping red gum (*Eucalyptus parramattensis* subsp. *decadens*)
Small-fruited Grey Gum (*Eucalyptus propinqua*)
Grey gum (*Eucalyptus punctata*)
Red mahogany (*Eucalyptus resinifera*)
Swamp mahogany (*Eucalyptus robusta*)
Narrow leaved red gum (*Eucalyptus seeana*)
Grey ironbark (*Eucalyptus siderophloia*)
Forest red gum (*Eucalyptus tereticornis*)

Secondary / Supplementary (Including browse and shelter trees)

Black she-oak (*Allocasuarina littoralis*)
Forest oak (*Allocasuarina torulosa*)
Smooth-barked apple (*Angophora costata*)
Rough-barked apple (*Angophora floribunda*)
Rough-barked apple (*Angophora subvelutina*)
River Oak (*Casuarina cunninghamiana*)
Red Bloodwood (*Corymbia gummifera*)
Pink Bloodwood (*Corymbia intermedia*)
Spotted Gum (*Corymbia maculata*)
White mahogany (*Eucalyptus acmenoides*)
Cabbage Gum (*Eucalyptus amplifolia*)
Thin-leaved stringybark (*Eucalyptus eugenioides*)
Broad-leaved red ironbark (*Eucalyptus fibrosa*)
Blue-leaved Stringybark (*Eucalyptus agglomerata*)
White stringybark (*Eucalyptus globoidea*)

Ribbon Gum (high altitude) (*Eucalyptus viminalis*)
Silver-top stringybark (*Eucalyptus laevopinea*)
Craven grey box (*Eucalyptus largeana*)
Forest ribbon gum (*Eucalyptus nobilis*)
Messmate Stringybark (high altitude) (*Eucalyptus obliqua*)
Blue Mountains ash (*Eucalyptus oreades*)
Grey ironbark (*Eucalyptus paniculata*)
Blackbutt (*Eucalyptus pilularis*)
Sydney Peppermint (*Eucalyptus piperita*)
Grey ironbark (*Eucalyptus placita*)
Rudder's Box (*Eucalyptus rudderi*)
Sydney blue gum (*Eucalyptus saligna*)
Scribbly gum (*Eucalyptus signata*)
Broad-leaved White Mahogany (*Eucalyptus umbra*)
Broad-leaved paperbark (*Melaleuca quinquenervia*)
Turpentine (*Syncarpia glomulifera*)

Appendix E Strategy action timings

Action ID.	Action	Timeframe	Progress
1.1	Designate and manage Council land and reserves that contain valuable koala habitat as koala safe spaces and enhance their condition and connectivity through active restoration. Key Council owned land that are to be koala safe spaces shall include (but not be limited to): • <i>Bootawa Dam perimeter lands,</i> • <i>Bucketts Way Waste Management Centre perimeter lands,</i> • <i>Tinonee playing fields perimeter lands,</i> • <i>Peg Leg Creek future dam perimeter lands,</i> • <i>Cattai Wetlands,</i> • <i>Darawakh Creek / Frogalla Swamp Wetlands,</i> • <i>Kore Kore Creek Reserve.</i>	Ongoing	
1.3	Maintain the ability to deliver devolved funding programs to private landholders and public lands to restore existing koala habitat and create new koala habitat. Funded works are to include bush regeneration, control of weeds that impact koalas and the quality of their habitat, fencing for stock exclusion, planting, facilitated natural regeneration, seeding). Habitat restoration programs shall affect strategic, long-term improvement. Programs will be delivered in identified priority areas.	Ongoing	
1.4	Maintain a register of landholders across the MidCoast that are willing to use their land for koala habitat creation, restoration, and monitoring programs, as part of a MidCoast Koala Safe Spaces program	Ongoing	

Action ID.	Action	Timeframe	Progress
1.5	Strategically align and communicate Council's koala recovery and conservation efforts to the wider koala network. Assist the capacity of partnering organisations to deliver koala habitat restoration and conservation programs.	Ongoing	
1.6	Partner with the BCT and the NSW Credits Supply Taskforce to increase the amount of koala habitat that is protected under private land covenants, instruments, and agreements. Encourage the BCT to utilise the revolving fund mechanism to protect koala habitat. Identify suitable properties to BCT for the application of the revolving fund scheme. Encourage and promote the uptake of private land conservation and the revolving fund scheme for koala conservation in priority areas.	Ongoing	
1.7	Identify strategically important areas of koala habitat on private land that should be considered for addition to the National Parks estate. Understand the NPWS Reserve Acquisition priorities and considerations for koala habitat reservations. Connect potential vendors with the NPWS Reserve Acquisitions team.	Ongoing	
1.9	Deliver annual koala food tree species giveaways to the community. Maintain the capacity of the Council nurseries to collect seed and grow-out koala food trees for giveaways and planting programs.	Ongoing	
2.1	Ensure that all planning proposals, development application assessments and design and approvals for Council activities take koala habitat and population protections into account.	Ongoing	

Action ID.	Action	Timeframe	Progress
2.5	Assist the delivery of koala vehicle strike avoidance and mitigation measures at priority locations (i.e. reduced speeds, variable message signs, roadside letterbox / garbage bin stickers, pavement treatments, directive fencing, crossing structures, road verge maintenance, lighting, request for speed patrols).	Ongoing	
2.6	Develop a register of wildlife underpasses throughout the LGA. Audit and monitor the structures and deliver or advocate to the responsible authority for maintenance. Target the area on each side of wildlife underpasses for conservation instruments and management to ensure that koala habitat on each side of underpasses is secure and well-managed.	Ongoing	
2.7	Assist the work being undertaken with relevant practitioners to expand the use of traditional ecological knowledge and cultural burning practices to assist protect koala habitat from risks associated with high intensity bushfire and other threats.	Ongoing	
2.8	Identify and map (or advocate for) priority koala habitat areas (high density koala populations and population refuge areas) to be identified in Bushfire Management Plans, operational fire plans and hazard reduction plans to better protect koala populations when managing bushfire control and hazard reduction burns.	Ongoing	
2.9	Deliver a dedicated koala drinking water program to landholders to increase water availability in known koala habitats that are susceptible to heat-stress events and have limited availability of natural surface water.	Ongoing	

Action ID.	Action	Timeframe	Progress
2.10	Advocate for the protection of priority koala habitat areas as an <u>asset</u> to be actively protected in bushfire control situations and emergencies. Share occupied koala habitat and important fire refuge areas for koalas with local fire responders and emergency management teams.	Ongoing	
2.13	For climate change adaptation, deliver projects that increase the area of koala habitat that is protected in public and private conservation areas, and manage such lands in a way that improves the ecological condition and function of the vegetation (thus increasing resilience). Identify and protect climate adaptation corridors and climate refuge / nodes, particularly altitudinal corridors and north – south corridors and re-connect populations to improve genetic diversity. The mapping of wildlife corridors and nodes (Action 4.2) shall include an element that identifies the important climate corridors and refuge nodes.	Ongoing	
2.15	Use restrictions and covenants on new developments to avoid or manage domestic dog impacts on koalas near populations and habitat. Plan off-leash dog areas only within areas distant from koala populations and habitat or securely fence the off-leash area with koala proof fencing.	Ongoing	
3.1	Maintain and promote the community Koala Sightings Register and provide regular updated sightings data to State Government.	Ongoing	
3.2	Continue raising awareness in the community about local koala populations and their conservation needs through the Koala Safe Spaces Program and Citizen Science projects. Outline all Council koala education and engagement actions within a documented Koala Education and Engagement Strategy.	Ongoing	

Action ID.	Action	Timeframe	Progress
3.5	Support local Traditional Owner people to implement, monitor and evaluate koala projects.	Ongoing	
3.6	Deliver a biannual (two-yearly) MidCoast Koala Festival. Deliver special koala engagement events, including art / science or educational programs for koalas.	Ongoing	
4.1	Invest in additional koala habitat mapping to fill knowledge gaps and extend the area covered by fine-scale koala habitat mapping (likely and occupied koala habitat). Revise as-held mapping as new data becomes available.	Ongoing	
4.4	Undertake on-ground koala and habitat surveys and monitoring throughout the LGA and update associated partner databases with the latest data. Compile population estimates for priority koala habitat areas within the MidCoast. Continue the Bootawa song-meter program every two years to track population changes at the local level.	Ongoing	
4.5	Provide support (if needed) to koala care and rescue groups to maintain or increase the accuracy of sightings data that is provided to BioNet.	Ongoing	
4.6	Attend conferences / symposia offering the latest findings and research on koala knowledge, data gaps or koala programs and incorporate learnings into this Koala Conservation Strategy implementation.	Ongoing	
4.8	Support, promote and / or facilitate scientific investigation of actions identified in the MidCoast Koala Research Strategy.	Ongoing	

Action ID.	Action	Timeframe	Progress
4.11	Actively monitor the replanting sites associated with the MidCoast Koala Safe Spaces Program to track patterns of koala use. Use the results of this monitoring to improve habitat creation processes and activities in the future.	Ongoing	
4.13	Stay informed of evaluations and knowledge-gathering regarding the impacts and management of koalas in relation to public and private native forestry.	Ongoing	
4.15	Promote the community to urgently report sick, injured, or at-risk koalas to the appropriate koala care and rescue organisations across the MidCoast. Seek to break-down barriers to community reporting of koalas involved in vehicle strike or dog attack incidents.	Ongoing	
5.2	Participate in and contribute to reviews of environmental legislation and strategies in NSW and Australia; advocating for positive improvements to the protection and conservation of koalas.	Ongoing	
5.3	Continue to engage and advocate to the NSW Government and NRC regarding forestry practices and koala conservation (particularly in Wang Wauk SF, Kiwarra SF, Nerong SF, Bulga SF and Wallaroo SF) and in relation to private native forestry. Engage and advocate for koala conservation in state-significant developments and major projects, including resources developments and public infrastructure.	Ongoing	
5.4	Advocate to State Government (Transport for NSW) to include koala barrier fencing and crossings at new road construction projects and vehicle strike hotspots on State managed roads.	Ongoing	

Action ID.	Action	Timeframe	Progress
5.8	Work to support the NSW Government (and other relevant organisations) to deliver local Carbon Farming projects.	Ongoing	
2.2	Review and improve the MidCoast Council offsets procedure for Council activities in relation to loss of koala habitat / loss of koala food tree species, so as to improve program effectiveness and delivery.	Short	
2.11	Develop a MidCoast Koala Emergency Response Plan to guide collective action following a natural disaster event. <i>In implementing this Action, consider the NSW Government response to Recommendation 53 of the NSW Bushfire Inquiry ("that the government develop and implement a policy for injured wildlife response, rescue and rehabilitation in bushfires, including developing a framework for interaction with emergency operations and consideration of wildlife response in operational plans")</i>	Short	
3.3	Co-design koala conservation education and engagement campaigns with key stakeholders (potential target audiences to include rural landholders, schools (using Koala Smart and other projects). The potential activities include workshops, art experiences, symposia, field days, koala walks, community tree planting, spotlighting, etc.	Short	
4.2	Publish a map of the spatial locations of important movement corridors (and nodes) for koalas across the entire MidCoast LGA using a recognised connectivity mapping / modelling tool.	Short	
4.3	With the permission of the relevant agency, extend the habitat mapping process used in this Strategy to the areas of the National Parks estate and the Forestry Corporation estate to assist compile a complete koala habitat mapping dataset for the LGA.	Short	

Action ID.	Action	Timeframe	Progress
4.7	Prepare a research strategy to identify focus areas for applied knowledge gathering for key threats to koalas in the LGA. Advocate for the efficient and effective direction of funds and resources to where they're most needed to address priority threats.	Short	
4.16	Undertake a detailed review, consult and engage, and publish a final list of koala habitat tree species for the MidCoast region, with notes on the geographic landscapes associated with each species (eg. coastal sites, high elevation sites, etc).	Short	
5.1	Advocate to the NSW Government to extend the NSW Koala Strategy program and funding to the MidCoast Regional Partnership, including extending the role of the MidCoast Koala Project Officer beyond December 2026.	Short	
5.5	Foster partnerships with neighbouring councils, Traditional Owners, universities, schools, MidCoast 2 Tops Landcare, community groups, NGOs and local experts to expand delivery of the Koala Smart and the Koala Safe Spaces programs. Work in collaborative way to assist all relevant stakeholders to align and coordinate their koala conservation and recovery efforts.	Short	
5.6	Partner with farming organisations to explore new ways to encourage landholders to protect koala habitat on their land while maintaining agricultural production.	Short	
1.8	Develop an action plan or equivalent for securing connectivity outcomes at <i>The Gate</i> – the regional wildlife corridor area between Myall Lakes NP, Wallingat NP and Booti Booti NP. Implement the actions within the Plan.	Medium	

Action ID.	Action	Timeframe	Progress
1.10	Audit all the Individual Koala Plans of Management (IKPOMs) across the MidCoast LGA and redress issues of non-compliance.	Medium	
2.3	Manage Tinonee as an urban koala safe space. Develop an Urban Koala Safe Space Strategy for Tinonee, including a tree audit, street and public tree planting programs, KVS measures, as well as education and interpretation features.	Medium	
2.4	Request that the NSW Government amend the 10:50 code to require that landholders formally register their use in a central database. Advocate to the NSW Government to rescind the rural boundary clearing code.	Medium	
2.12	Liaise with authorities (RFS) or land managers to advance that all prescribed burns in or near koala habitat are conducted in a way that minimises impact to koala habitat and individual koalas. Advocate for the requirement for koala inspections immediately prior to the burn within the burn area using contractors or knowledgeable volunteers.	Medium	
2.14	Identify areas where domestic dog attacks are a key threat to koalas and develop a plan to engage and communicate with and change the behaviour of dog owners. Promote the importance of keeping on dogs on leads and in properly fenced enclosures in koala habitat areas. Record the accurate locations of domestic dog attacks in a central database.	Medium	

Action ID.	Action	Timeframe	Progress
2.16	Advocate for amendments to the <i>Companion Animals Act 1998</i> or its <i>Regulation</i> to increase the prosecution capabilities of authorities for property owners whose dogs wantonly attack and kill a koala (by amending the “trespass” consideration).	Medium	
2.18	Communicate the locations of important koala habitat and populations to agencies and organisations involved in regional feral deer control efforts.	Medium	
3.4	Build partnership and co-design initiatives with Traditional Owner communities, Elders and knowledge holders, where appropriate. Only share knowledge and stories on koalas, if appropriate. Learn about Traditional Owner knowledge and perspective to aid future conservation and recovery actions.	Medium	
3.7	Develop an Annual Report Card for each priority ARKS across the MidCoast. Report on the achievements and deliverables and synthesise the findings of any monitoring and research. Pilot the Annual Report Card template using the Kiwarra ARKS.	Medium	
4.9	Support a scientific evaluation as to the impact of lantana on koala occupancy and movement and scientifically investigate and publish a report on koala habitat use following lantana control.	Medium	
4.10	Support or oversee a Council wide collection and analysis (hair / DNA) of dingo / wild dog scats to increase knowledge of the rate of dingo / wild dog predation of koalas in different landscapes.	Medium	

Action ID.	Action	Timeframe	Progress
4.12	Collaborate with researchers in regard to climate change data and modelling that predict the impacts of climate change on koalas and their habitat. Use this information to prioritise the identification, adaptation actions and investment in key habitat refugia and climate change adaptation corridor protection and restoration.	Medium	
4.14	Support volunteer wildlife rehabilitators, vets, and other partner organisations to enhance coordination of emergency response for koalas and other wildlife due to bushfire or extreme weather events.	Medium	
5.7	Explore opportunities to guide or inform private sector organisations to leverage action and investment in koala conservation across the MidCoast.	Medium	
1.2	Prepare and implement an implementation plan and program that assists deliver active protection and restoration of mapped priority koala corridors across the MidCoast LGA. This will follow the preparation of the corridor mapping in Action 4.2.	Long	
2.17	Work with landholders to design a paddock tree or climbing refuge pole arrangement in cattle, horse or sheep stock paddocks near high density koala habitats and corridors to help protect koalas from stock. Systematically audit each stock attack incident on koalas to develop a greater understanding of the influencing factors and conditions, and effective responses.	Long	

NGH Pty Ltd

NSW • ACT • QLD • VIC

ABN 31 124 444 622 ACN 124 444 622

E: ng@nghconsulting.com.au

GOLD COAST

2B 34 Tallebudgera Creek Road
Burleigh Heads QLD 4220
(PO Box 424 West Burleigh QLD 4219)

T. (07) 3129 7633

SYDNEY REGION

Unit 17, 21 Mary Street
Surry Hills NSW 2010

T. (02) 8202 8333

BEGA

Suite 11, 89-91 Auckland Street
(PO Box 470)
Bega NSW 2550

T. (02) 6492 8333

MELBOURNE

Level 14, 10-16 Queen Street
Melbourne VIC 3000

T: (03) 7031 9123

TOWNSVILLE

Level 4, 67-75 Denham Street
Townsville QLD 4810

T. (07) 4410 9000

BRISBANE

T3, Level 7, 348 Edward Street
Brisbane QLD 4000

T. (07) 3129 7633

NEWCASTLE - HUNTER & NORTH COAST

Level 1, 31-33 Beaumont Street
Hamilton NSW 2303

T. (02) 4929 2301

WAGGA WAGGA - RIVERINA & WESTERN NSW

35 Kincaid Street (PO Box 5464)
Wagga Wagga NSW 2650

T. (02) 6971 9696

CANBERRA

Unit 8, 27 Yallourn Street
(PO Box 62)
Fyshwick ACT 2609

T. (02) 6280 5053

SUNSHINE COAST

Suite 101, Level 2/30 Main Drive
Birtinya QLD 4575

(07) 4410 9000

WODONGA

Unit 2, 83 Hume Street
(PO Box 506)
Wodonga VIC 3690

T. (02) 6067 2533