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Timber Queensland

Koala Management Operating Guidelines State Forest - Queensland



2023

Contents

Overview	5
Part 1- Koala Overview	6
Description	6
Conservation Status	6
Etymology	6
Habitat and Distribution	6
Diet.....	7
Behaviour	8
Signs of a Distressed Koala.....	9
Threats	9
Signs of Koalas.....	9
Visual.....	9
Sound	10
Scats	10
Markings/scratches.....	11
Scent Marking	11
High Use Tree.....	11
Distribution	12
Regulatory Requirements	13
Commonwealth.....	13
State.....	13
<i>Forestry Act 1959</i> Contractual Requirements.....	14
Hardwood and Cypress Sales Permit	14
Cutter Select Trial.....	15
Forestry Operations	15
Types of Forestry Operations.....	15
Selective Harvesting.....	15
Mechanical Harvesting.....	16
Manual Harvesting.....	16
Integrated Harvesting	16
Extraction	16
Road Construction and Maintenance	16
Haulage	17
Greater Glider Habitat	18



Habitat and Recruitment Trees.....	19
Habitat and Recruitment Habitat Restrictions.....	20
Part 2- Koala Management Operating Guidelines.....	21
Objective.....	21
Contractual Requirements.....	22
Species Management Profile.....	22
Training Requirements.....	22
Koala Spotter Requirements.....	22
Required Training.....	22
Future Training.....	23
Formal Training.....	23
Survey Information.....	23
Koala Survey.....	24
Planning.....	24
Survey Timing.....	25
Pre-harvest survey (prior to harvesting commencing).....	26
Daily pre-harvest survey (on the day of harvesting).....	26
Survey Method.....	27
Walkover Method.....	27
Spiral Method.....	27
When evidence of high use is found:.....	28
When a koala is observed during inspection:.....	29
Returning to Sales Area.....	30
If An Injured Koala Is Found.....	30
Reporting and Monitoring.....	30
Safety.....	30
Future Recommendations.....	31
Koala Care.....	32
Koala Care Response Plan.....	32
Koala Rescue and Care Groups.....	32
References.....	33
Appendices.....	34
Species Management Profile.....	34
Koala Survey Record.....	35
Future Koala Survey Record.....	36

OHP Provisions	37
Koala Tree Species Suitability	38
Future Survey Methods	39
Operating Guidelines- Pre-Harvest Survey	41
Operating Guidelines- Daily Pre-Harvest Survey	47

List of Figures

Figure 1- Koala and Joey	5
Figure 2- Conservation Status	6
Figure 3- Tallowwood	8
Figure 4- Spotted Gum	8
Figure 5- Non-Juvenile Koala Habitat Tree	10
Figure 6- Koala scats	10
Figure 7- Koala scats	10
Figure 8- Koala 'highway'	11
Figure 9- Koala scratches	11
Figure 10- High Use Tree Indicators	12
Figure 11- Distribution	12
Figure 12- Greater Glider Habitat (QPWS Code, 2020).....	18
Figure 13- Koala	21
Figure 14- Survey Methods	27
Figure 15- Walkover Method	27
Figure 16- Spiral method (left- every tree, right- greater area)	28
Figure 17- Example of applying 100m exclusion zone from koala.....	30

List of Tables

Table 1- Habitat and Recruitment Trees (QPWS, 2020).	20
Table 2- Koala SMP (DAF, 2022).....	34
Table 3- Koala Tree Species (Source: Runge, 2021).....	38
Table 4- Future Survey Methods	39

Overview

The objective of the Koala Management Operating Guidelines is to provide information on Koala legislation and compliance requirements for the Queensland timber industry. Koala observation and awareness training in the field is a critical component. The guidelines will assist native forestry operators to plan and undertake their activities in a manner that limits the risks to koala populations, plus provide guidance on appropriate actions to ensure compliance with relevant legislation.

There are two sections to the document; an overview of koalas to outline the context, followed by detailed operating guidelines for both pre-harvest surveys and daily pre-harvest surveys. In addition, there is a printable step-by-step guide at the end of the document.

A quick reference referred to as the 'Koala Field Guide for Queensland Forestry Operations,' supports the Koala Management Operating Guidelines and step-by-step print out versions.

All documents are tailored to mechanical harvesting, however are expected to be applied for all operations.



Figure 1- Koala and Joey

Acknowledgments

This document is a product of Timber Queensland's Native Forest Operations Capacity Building Project, funded by the Queensland Department of Agriculture and Fisheries (Forestry).

Disclaimer

Information provided in this document is for general guidance only, it does not replace koala prescriptions outlined in Commonwealth and State Government legislation. This document applies to Queensland State Forest only, it does not apply to private native forestry, or timber plantations.

This document has been compiled to support the Species Management Profile, implemented by DAF in 2022. Any changes to the SMP will require changes to this document. At the time of release, this document was consistent with the requirements of the SMP.

Part 1- Koala Overview

Description

The koala (*Phascolarctos cinereus*) has a short compact body and large head, large ears, and no functional tail. Comparatively for their body mass, they have relatively long limbs with primate like hands; with two thumbs per hand and with strong feet enable strong gripping and climbing during their arboreal life. Non-Juvenile Koala Habitat Tree (NJKHT) bark texture can be smooth or highly textured, specialised grip evolution assists in climbing different bark and tree types.

It has dense fur, which is white below and brown to grey above with white patches, a prominent black nose, and large claws. Males and females can look different in relation to size and colour, with males having a broader face and scent gland which can be highly defined during the breeding season. Females have a relatively 'clean' white chest and a backward facing pouch. Koalas have poor vision and rely heavily on their senses. They have excellent hearing and an acute sense of smell that allows them to seek out other koalas and their preferred feed trees.

Conservation Status

Koalas are listed as 'endangered' in Queensland under Queensland's *Nature Conservation Act (1992)* and under the Australian Governments *Environment Protection and Biodiversity Conservation Act (1999)* (EPBC Act). Both levels of government have conservation strategies in place to help address the decline in koala populations in key habitat areas.




Figure 2- Conservation Status

Etymology

The word koala-meaning 'no water', is said to come from the Dharug people (whose traditional lands span the area from Parramatta to the Blue Mountains of New South Wales). In Southeast Queensland, koalas are called dumbirribi in the Jagera language, marrambi in the Yugarabul language, borobi in the Ugambah language, and dumbribbi in the Turrbul language (DES, 2022).

Habitat and Distribution

Koalas live in a range of temperate, tropical, and woodland communities dominated by Eucalypts.



The distribution of koalas covers large areas of Queensland, extending from the south-east corner to the wet tropics in the north and semi-arid vegetation communities to the west.

Their preferred habitat is defined by the presence of a select group of feed trees, as they do have preferred species and don't consume all species of eucalyptus. Koalas are found in greater numbers where trees grow on fertile soil or near watercourses. While woodland and forests dominated by Eucalyptus species are koalas preferred habitat, cypress forests may present suitable habitat and shelter due to their proximity to poplar box and ironbark woodlands.

Critical core koala habitat areas, corridors and practicing sustainable harvesting methods are critical for the survivorship of koalas. Koalas do remain in areas recently harvested if habitat and feed trees remain. The koala habitat also refers to partially cleared or cleared areas used by koalas to access their preferred habitat, known as corridors. This is important in areas where lesser nutrient availability occurs or when there is a dominant alpha male with a large territory to protect.

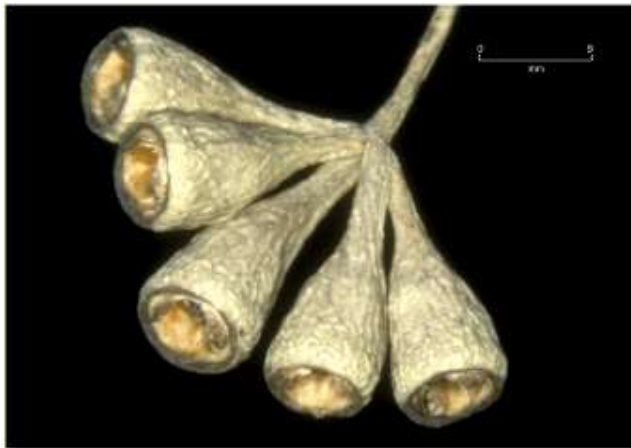
Diet

Koalas commonly eat a variety of eucalyptus and related species such as *lophostemon*, *corymbia*, and *melaleuca*. They eat around 500 grams of leaves per day and obtain most of their required water from these leaves. This reduces the likelihood or need for koalas to climb down from trees in search of a drink, except in hot and dry periods.

The leaves are incredibly low in energy and contain toxic compounds that most animals cannot eat. This unique diet is shared only with possums and gliders, so koalas have little competition for their food source.

The following species are classified as 'high' suitability for koalas (Runge, 2021)

- *Eucalyptus longirostrata* (Grey Gum)
- *Eucalyptus major* (Mountain Grey Gum)
- *Eucalyptus microcorys* (Tallowwood)
- *Eucalyptus propinqua* (Grey Gum)
- *Eucalyptus robusta* (Swamp Mahogany)
- *Eucalyptus tereticornis* (Forest Red Gum)
- *Eucalyptus tereticornis subsp. basaltica*
- *Eucalyptus tereticornis subsp. tereticornis*
- *Eucalyptus biturbinata* (Grey Gum)
- *Eucalyptus camaldulensis* (River Red Gum)



Eucalyptus microcorys (Tallowwood)

Figure 3- Tallowwood

The following species are classified as 'medium' suitability for koalas (Runge, 2021)

- *Corymbia citriodora* (Spotted Gum)
- *Eucalyptus drepanophylla* (Grey Ironbark)
- *Eucalyptus crebra* (Narrow-leaved Red IB)
- *Eucalyptus pilularis* (Blackbutt)
- *Eucalyptus resinifera* (Red Mahogany)
- *Eucalyptus Poplenea* (Poplar Box) and
- *Eucalyptus thozetiana* (Mountain Yapunyah).




Corymbia citriodora (Spotted Gum)

Figure 4- Spotted Gum

For a full list of species, see Table 3 (Runge, 2021).

Behaviour

Koalas can sleep for up to 22 hours a day due to their low energy diet and requiring up to 22 hours to digest and process their food. Although mostly nocturnal, they do move during the day if disturbed or relocating to a new tree. Koalas are typically solitary, existing within a network of overlapping



home ranges. This allows for contact between individuals during mating season. Males begin calling in spring, advertising their presence to other koalas. They can displace younger males into alternative areas, and demonstrate their dominance.

Koalas breed from August to February, during this time males are increasing mobile. Females reach reproductive maturity at 3-4 years before producing one joey every 1-3 years. Koalas can live for up to 12 years, producing 5-6 offspring on average.

Signs of a Distressed Koala

Indicators of a distressed koala can include excessive movement up and down the trunk, throughout the canopy, to on ground movements. Otherwise, koalas can shut down and not moving due to excessive anaerobic respiration response; this can potentially lead to maternal females displacing a joey. Refer to the Koala Care Response Plan if there are signs and avoid the area.

A distressed koala can be aggressive as it may be fearful for its life. Koala biters or scratches can be severe, and if an injury does occur via a bite or scratch, medical attention should be considered to prevent post injury complications.

Threats

Koalas were almost driven to extinction when the Queensland Government declared open season on koala hunting in the 1920's. Presently, the most significant threat to koalas is the permanent loss of tree cover (mainly habitat and corridors), increased urbanisation, increased road traffic, dog predation, prolonged drought followed by bushfires, and diseases. Habitat loss and the associated stressors can lead to increased disease risk.

Signs of Koalas

Visual

Whilst koalas are difficult to spot by eye in tree canopy, they can be found sitting in the trunk or between tree forks (DES, 2022).

Koalas are commonly found in non-juvenile koala habitat trees (NJKHT, Figure 5). NJKHT are trees commonly a tree that has a height of more than four metres, or a trunk with a diameter greater than 10cm at 1.3 metres above the ground.



Figure 5- Non-Juvenile Koala Habitat Tree

Sound

Koalas have distinctive calls- they both scream and wale. Females may make a low-pitched bellow, and whilst during the breeding season, the male koala ‘snores’ or ‘grunts’ (DES, 2022). A male koala bellow can be heard up to one kilometre away depending on the topography of the area.

Scats

Scats are typically strong *eucalyptus* smelling and sticky. Scats can be visible around the base of an inhabited tree and can extend to the dripline. It is noted that scats are a main indicator of recent koala presence.

- A high use tree has twenty or more faecal pellets below the tree.



Figure 6- Koala scats



Figure 7- Koala scats

If measured accurately, twenty or more faecal pellets can be a sign of the tree being a ‘home’ tree,

and therefore likely to remain here (also referred to as NJKHT). In comparison to other trees, where the koala may have exhausted the new growth, and will navigate to nearby trees.

Markings/scratches

Koalas are arboreal species, using their sharp claws for climbing. When climbing, koalas leave behind characteristic scratches (from their double thumb) in the bark, which can remain visible when undertaking koala surveys (DES, 2022).

- A high use tree has multiple scratches present.



Figure 8- Koala 'highway'



Figure 9- Koala scratches

Scent Marking

Scent from males rubbing their scent gland found on their chest against the trunk.

- A high use tree may have rub marks.

High Use Tree

High use indicators are found on and around trees that are frequently used by koalas. As defined in the Species Management Profile (see below), a **high use tree means—**

- Multiple scratches or
- Twenty or more faecal pellets found.
- Significantly greater usage indicators (multiple scratches, faecal pellets, and rubs from scent marking).

If a tree is determined as high use, then the tree must be paint marked or protected as a habitat tree, and habitat and recruitment management actions apply, conforming with the QPWS Code of Practice.

Note: High use indicators can be more difficult on rough bark species (example – *E.microcorys*-Tallowood). Further, scats can be difficult to see under trees that shed bark. This needs to be considered when inspecting for high use indicators.

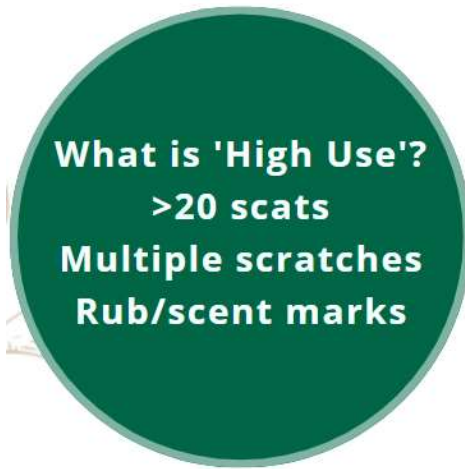


Figure 10- High Use Tree Indicators

Distribution

Fragmented sub-populations of the koala occur throughout Queensland and the distribution extends inland including the following bioregions: East Coast, Wet Tropics, Einasleigh Uplands, Central Mackay Coast, Brigalow Belt, Desert Uplands, Mitchell Grass Downs, Southeast Queensland, Brigalow Belt, Mulga Lands, and the Channel Country (SMP)

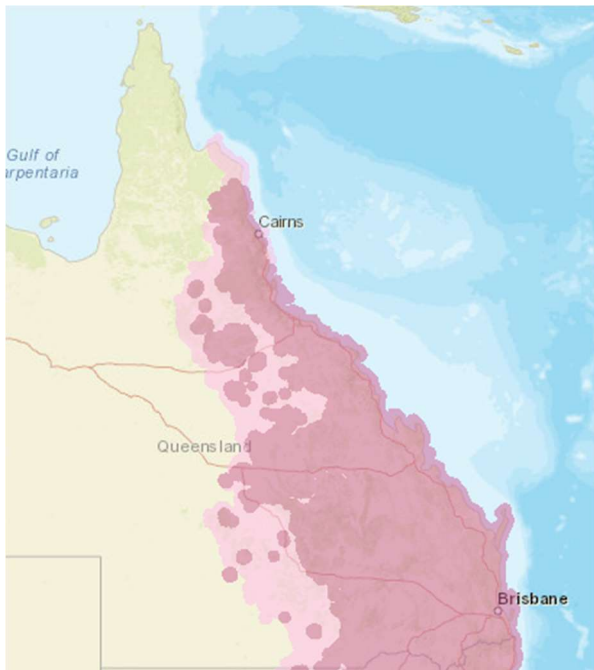


Figure 11- Distribution

Regulatory Requirements

In Queensland, **koalas** and **their habitat** are protected by several instruments of Commonwealth, and State legislation.

At a state level, koalas are protected by the *Nature Conservation Act 1992* and their habitat is protected by clearing controls prescribed in the *Planning Regulation 2017*. There are also independent clearing requirements prescribed in Part 3 of the [Nature Conservation \(Koala\) Conservation Plan 2017](#) (Koala Conservation Plan), which apply when clearing koala habitat in particular areas.

Unlike the clearing controls prescribed in the [Planning Regulation 2017](#) (that are to protect koala habitat), the clearing requirements prescribed in the *Koala Conservation Plan* are in place to prevent the injury or death of koalas when koala habitat is being cleared.

Commonwealth

- [Environmental Protection and Biodiversity Conservation Act \(1999\)](#)

The EPBC Act provides a legal framework to protect and manage nationally and internationally important flora, fauna, ecological communities, and heritage places. The EPBC provides legislative classification for nationally important listings. In 2022, the koala listing was elevated to endangered, and the referral guidance for the endangered koala was published.

State

- [Nature Conservation Act \(1992\)](#)

The *Nature Conservation Act 1992* provides the legislative basis for the conservation of nature through the commitment of declaration and management of protected areas and the protection of native wildlife and its habitat. The Act aims to promote the continuation of viable and sustainable koala populations in the wild.

- [Nature Conservation \(Koala\) Conservation Plan \(2017\)](#)

The Koala Conservation Plan is designed to promote the continued existence of viable koala populations and to prevent the decline of koala habitat. The Plan divides the State into three koala districts based on the management strategies, further applying objectives and controls on management, and clearing. The three koala districts forms koala priority areas, which can be determined as a koala habitat area. The Plan refers to exempt clearing, outlining the conditions which must be met to conduct 'harvest' operations. **The SMP summarises the requirements of the EPBC and Nature Conservation Act. These are measures that are designed to protect koala's and comply with legislative requirements.**

- [Planning Act 2016](#)

The purpose of this Act is to establish an efficient, effective, transparent, integrated, coordinated, and accountable system of land use planning (planning), development assessment and related matters that facilitates the achievement of ecological sustainability. The Planning Act sets the framework for koala management outlining identification and protection measures of koala habitat areas.

- [Planning Regulation 2017](#)

The Planning Regulation defines the conditions required to undertake works in koala districts. This involves operational work that is the clearing of native vegetation in a koala habitat area on prescribed land if the activity is clearing, or for another activity or matter.

Clearing vegetation is exempt under the Planning Regulation, as harvest operations are an authorised activity under the [Forestry Act 1959](#) (referred to Planning Regulation- Schedule 21 (1&2)). As mentioned in Contractual Requirements the Species Management Profile will guide koala management requirements.

Forestry Act 1959 Contractual Requirements

Under the *Forestry Act 1959* several contractual documents are required to be signed and followed, including:

Hardwood and Cypress Sales Permit

On State Forest and OSL, a Sales Permit (SP) is required under the *Forestry Act (1959)* to conduct harvest activities. A SP is a legal agreement between the State of Queensland and a Permittee, and sets out the commercial terms, rights, and performance requirements agreed between the parties, with varying time limits. Operational harvest provisions (appendix) are included as an attachment to the SP to provide additional instruction for koala management.

Operational Harvesting Plan

To achieve and facilitate the administration of legislation, regulations and sales permits, Operational Harvesting Plans (OHPs) are key instruments for the planning and management of harvesting. DAF prepare OHPs that identify all harvesting requirements pursuant to legislation and aim to protect values including environmental, cultural, waterways, soil properties, and endangered species. This includes prescriptions for Species Management Profiles.

Species Management Profile

The Species Management Profile (SMP) accompanies the OHP. The SMP aims to apply protection measures to protect EVNT Species, habitat and breeding sites, conserve native species, maintain ecosystem function, and monitor the biodiversity values and impacts. **The SMP summarises the requirements of the EPBC and Nature Conservation Act. These are measures that are designed to protect koala's and comply with legislative requirements.**

Code of Practice for Native Forest Timber Production on Queensland State Forest Estate (2020)

The [Code of Practice for Native Forest Timber Production on Queensland's State Forest Estate \(2020\)](#) includes schedules specific to koala management that are included in the SMP:

- Schedule 3- watercourse protection
 - Watercourse protection provides protection zones that restrict or exclude harvesting and clearing activities along watercourse corridors, aiding connectivity across the harvest area.

- Schedule 6- nature conservation, including habitat trees (6.3), feed, shelter, and nest trees (6.4).
 - Habitat trees outlines provisions to retain and protect habitat and recruitment trees across the harvested area, providing connectivity, feed, and shelter trees and ensures protection of fauna on-site during harvest.
- Schedule 8- forest road and track management
 - Minimise road length, complexity of road network, interference with natural drainage and alternation of natural features.

Cutter Select Trial

Department of Agriculture and Fisheries (Forestry) are undertaking a review of the current operational model (2022). A four stage Cutter Select Model trial was introduced and is *implemented* by the cypress division and is being *trialed* by select hardwood Permittees and contractors. The trial aims to give the permittee and the sub-contractor (cutter), more responsibilities in undertaking operation field work, including product marking, waterway marking, and determining road and landing location.

If a permittee or sub-contractor has undergone training in sections of the Cutter Select Trial then they may be required to undertake koala survey requirements- both pre-harvest survey (including identifying high use trees, habitat, and recruitment trees) and daily pre-harvest surveys. Some stages of this trial do not require marking habitat and recruitment trees (H&R trees), and therefore do not require marking high-use trees. Whilst marking H&R trees is the recommended approach (under schedule six of the QPWS Code), it is not consistent with DAF's current trial and therefore the H&R trees and high-use trees just need to be protected, identified and communicated. If you are unsure, always ask.

Forestry Operations

Forestry operations are the activities associated with felling, snigging, roading, hauling and loading of products from a forest area. These activities will all need to be considered when implementing koala management. Any felling requires koala management.


It is imperative that whilst undertaking koala management, the forestry operation continually minimises damage and disturbance to flora and fauna, vegetation, habitat trees, water courses and soil integrity.

Types of Forestry Operations

The following forestry operation methods are derived from the [Forest Harvesting Code of Practice 2007](#). The type of forestry operations required will be determined by DAF and detailed in the Operational Harvesting Plan, note that multiple types of forestry operations can occur.

Selective Harvesting

Selective harvesting- a silvicultural system used to harvest and regenerate forest types. Trees are harvested either individually or in small groups at intervals, indefinitely and periodically. Regeneration is established continually in the gaps produced and an uneven-aged stand is maintained.



The prescription of selective harvesting is commonly established through calculating basal area. Generally, a certain % of basal area will be removed during the operation, and this prescribes the diameter of the tree that can be removed. If removal of more than 50% of basal area is instructed in the OHP for salvage operations, additional H&R are required.

Selective harvesting can be undertaken in two ways- mechanical and manually.

Mechanical Harvesting

Mechanical harvesting refers to the use of machinery to fell trees. Mechanical harvesting can be undertaken by plant including a Harvester, Feller Buncher or Excavator (in combination with a manual feller). Mechanical harvesting is commonly used in high productivity operations and is a safe method to directionally fell trees.

Manual Harvesting

Manual harvesting means the harvesting of trees by handheld tools, most commonly chainsaws. Trees are assessed typically by walking around the base of the tree, then manual scarfing is practiced to control felling direction, and placement of the tree. Manual felling is commonly used in lower production operations.

Manual harvesting provides a thorough visual assessment of the tree prior to felling, and therefore inspection for koalas and high use indicators occurs prior to felling.

Integrated Harvesting

Integrated harvesting means multiple permittees enter the same sales area to get different timber products (poles, girders, saw log, landscape etc.,). This typically occurs in hardwood operations and can occur in multiple ways- as a *standalone* operation where permittees go into the sales area at separate times or *integrated*- where a cutter gets timber multiple permittees. A stand-alone operation compared to an integrated operation will determine the responsible permittee required to undertake on ground tasks including product marking and H&R tree marking. The permittee will be required to know how an integrated sales area will be approached, to understand their role in koala management. In majority of cases, the permittee responsible for saw log would be responsible for managing the site, however this is on a case-by-case situation and will always require clarification from DAF.


Extraction

Extraction includes snigging, skidding, cable logging and forwarding. Planning of extraction and installing extraction tracks is often used to safely extract logs to a pre-determined log landing and aims to minimise damage to retained vegetation. On steep slopes, extraction tracks will allow traversing across contour to deliver the tree to a processing/log landing.

Road Construction and Maintenance

Road construction is the establishment and extension of a new road or new section of road; this does not include road maintenance or significant road improvement operations on already existing temporary or permanent roads. Road construction can include tree removal to make way for new roads.

Road maintenance means works designed to restore the serviceability of the surface, drainage, and



verges of an existing temporary or permanent road to the condition of its original road class and within the original road footprint. This may include surfacing grading, clearing table drains, resurfacing etc.

Clearing under QPWS Code refers to the removal of vegetation for road construction, extraction track, processing areas and landing construction.

Haulage

Haulage refers to transporting of timber on road infrastructure.

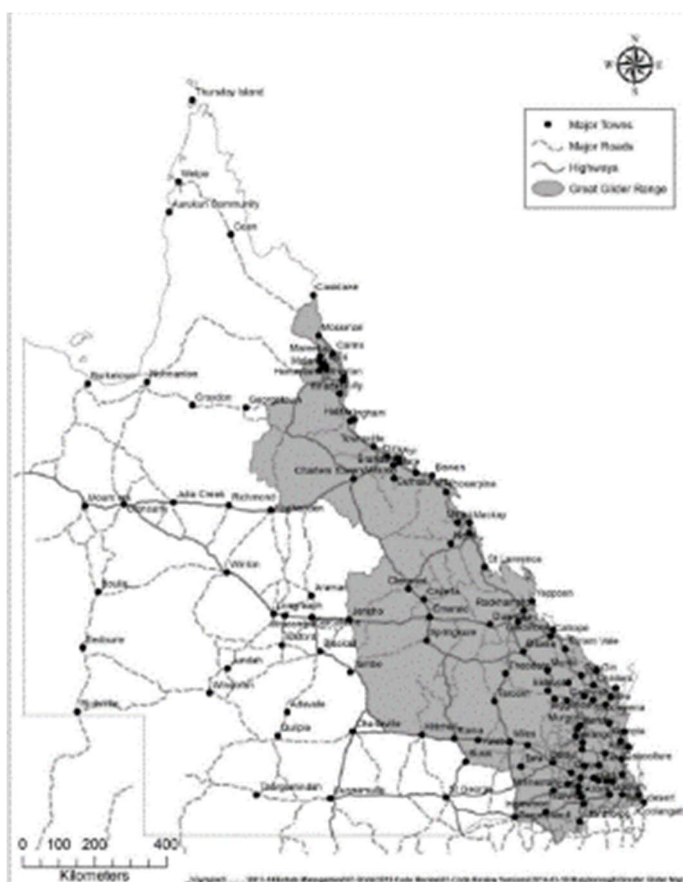
Cypress and Hardwood

Queensland is home to 41% of Australia's forests. The state has the most forested land area in the country with 52.5 million hectares of native forests, including cypress and hardwood. Operations occurring in cypress and hardwood may influence the koala sighting likelihood and number of habitat and recruitment trees for retention.

Greater Glider Habitat

There are requirements for selection of H&R, specifically for protecting greater gliders, which coincide with koala management.

Figure 12- Greater Glider Habitat (QPWS Code, 2020)



Habitat and Recruitment Trees

Habitat trees and recruitment habitat trees are those that are required to be retained for wildlife conservation purposes. As introduced in Part One (pg. 11) when a tree is determined as 'high use' during either

Operating Guidelines- Pre-Harvest Survey or **Operating Guidelines- Daily Pre-Harvest Survey** then the tree must be marked as a habitat and/ or recruitment tree.

The aim of **habitat tree** selection is to retain the larger living trees that contain the most hollows and are likely to persist over several harvest rotations. Selected habitat trees must be dominant or co-dominant trees, with at least one 'hollow' 10cm or greater in diameter.

The aim of **recruitment habitat tree** selection is to retain the trees with the greatest potential to become habitat trees in the shortest time. These recruitment habitat trees shall be from a species known to develop hollows earlier, that live a relatively long time (this may include, but is not exclusive to, *Eucalyptus*, *Corymbia* and *Angophora* species) and be as evenly spaced as possible.

The habitat trees marked as high usage trees contribute to the requirements of H&R trees under the QPWS Code of Practice (Table 1). These requirements must be implemented, whilst adhering to prescriptions of operations occurring in the greater glider regions.

- Hardwood operations
 - Inside the greater glider range- a minimum of six live habitat trees and two recruitment habitat trees per hectare will be designated and retained throughout the harvesting area.
 - Outside the greater glider range- a minimum of four live habitat trees and one recruitment habitat tree per hectare will be designated and retained throughout the harvesting area.
- Cypress operations
 - Where available, a minimum of two live habitat trees and one recruitment tree per hectare will be designated and retained throughout the harvesting area.

Table 1- Habitat and Recruitment Trees (QPWS, 2020).

Hardwood forests within the greater glider range		Hardwood forests outside the greater glider range		Cypress forests	
Number of habitat trees available/ha	Number of recruitment habitat trees/ha	Number of habitat trees available/ha	Number of recruitment habitat trees/ha	Number of habitat trees available/ha	Number of recruitment habitat trees/ha
6	2	4	1	2	1
5	4	3	3	1	3
4	5	2	4	0	4
3	7	1	6		
2	8	0	7		
1	10				
0	11				

For further information on hierarchy of selection, key characteristics, removing more than 50% basal area and applying watercourse buffers, see the QPWS Code- Schedule 3 &6.

Habitat and Recruitment Habitat Restrictions

Habitat trees and recruitment habitat trees must be identified, marked or otherwise protected where they may be at risk of harvesting damage or deliberate felling (pg. 47, [The QPWS Code](#)).

H&R trees and high use trees at the risk of harvest damage, should be reinspected.

If the operators are undertaking a **Cutter Select Trial** then this may not require the marking of H&R, and therefore marking high use trees. In this situation, receive clarification from DAF and put controls in place to ensure the H&R trees, including high use trees are protected from forestry operations.

Part 2- Koala Management Operating Guidelines



Figure 13- Koala

Objective

The Koala Management Operating Guidelines aim to ensure conservation of koalas and their habitat and minimise the potential of harm and disruption during forestry operations. The Guidelines aim to comply with legal obligations and the document outlines the specific items and actions for commencing forestry operations including:

- Contractual requirements as per the Species Management Profile.
- Training requirements as per legislation.
- Guidelines overview including survey timing and methods.
- Monitoring and reporting documents.
- Future recommendations.
- Koala Rescue and Care Groups and the two Operating Guidelines (step by step) in printable versions for:
 - **Operating Guidelines- Pre-Harvest Survey** and
 - Operating Guidelines- Daily Pre-Harvest Survey

Contractual Requirements

The requirement of each contractual document is detailed in the Regulatory Requirements in part one. Each contractual document has specific koala management actions in place when undertaking forestry operations (Table 2- Koala SMP (DAF, 2022))

Species Management Profile

The koala SMP was updated in 2022 and incorporates all legislative and operational requirements—all actions are outlined in Table 2- Koala SMP (DAF, 2022). The Koala Management Operating Guidelines will support the prescribed actions under the SMP.

Training Requirements

Koala Spotter Requirements

The Nature Conservation (Koala) Conservation Plan (2017), and subsequently the SMP requires a person undertaking *clearing* to be trained as a *koala spotter*.

A *koala spotter* means a person who has qualifications and experience, or demonstrated skills and knowledge, in—

- Locating koalas in koala habitats; or
- Conducting arboreal fauna surveys.

To address these legislative requirements, a demonstrated skills and knowledge approach will be undertaken. Operators will attend training to understand, and practice locating koalas in koala habitats and conduct arboreal fauna surveys.

Therefore, all persons undertaking selective harvesting (mechanical and hand felling), road and landing construction or maintenance, or *any* tree removal will be required to participate in training.

Haulage, snigging (unless pushing trees), and other machinery operators will not be required to undertake the training if they are not undertaking felling, however, will be expected to understand the Koala Management Field Guide.

Required Training

As stated in part one (Pg 15) those undertaking forestry operations required to undertake training in koala observing as per the above koala spotting requirements.

Training must include:

- Koala observing,
- Conducting arboreal fauna surveys (techniques) and
- Identification of high use trees.

And initially *will* include components of:

- Legislation overview.

- Koala identification.
- Indirect survey method (high use indicators, walkover, and spiral method).
- Reporting and monitoring.

This will be a combination of desktop training and field implementation. **The awareness training will allow the individual to participate to demonstrate skills and knowledge. A certificate of attendance will be awarded.**

Future Training

Future koala management training could include:

- Species and key features identification.
- Working with machinery.
- Applying exclusion zones.
- Habitat recruitment and retention identification and marking.
- Waterway classifications and
- Understanding The Code of Practice for Native Forest Timber Production on Queensland's State Forest Estate 2020.

Further to this, there may be additional requirements of koala training in the future. This may include supplementary training, concentrating on advancing the use of technology:

- Use of technology (Avenza, ArcGIS Survey 123, field maps and other programs).
- Direct survey techniques.
- Collecting GPS points and
- Recording data in applications including Survey123 and GoCanvas.

Formal Training

It is recommended that several representatives have a qualification (or permit) in a Fauna Spotting/Catcher Course. Whilst this is not mandatory, it would give operators further understanding of management regimes.

Survey Information

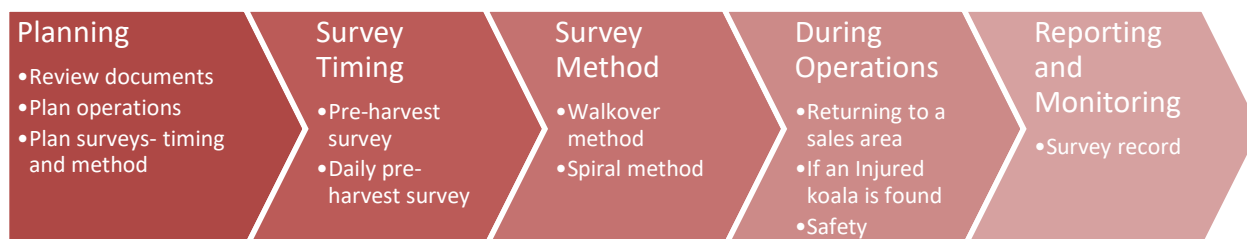
The operating guidelines;

Operating Guidelines- Pre-Harvest Survey and **Operating Guidelines- Daily Pre-Harvest Survey** will be compiled for ***mechanical harvesting operations***, but are expected to be applied for all forestry operations where felling of trees occurs (manual felling, landing construction, road construction and maintenance, installation of extraction tracks).

IMPORTANT NOTE: Survey methods will be completed by the responsible person for Habitat and

Recruitment (H&R) tree marking, or product marking. If the Cutter Select Trial is in progress (cypress and various hardwood crews) and then H&R trees do not always require marking (as per direction from DAF, and stage of trial), therefore some of the tree marking requirements are not applicable. However, high use trees still need to be protected, identified and communicated to all operators. If unsure, contact DAF to determine who is responsible for indicating H&R trees and refer to 4.OHP Provisions.

Koala Survey



Planning


Once the OHP is received, the permittee can undertake a desktop review of the sales area, incorporating koala management, OHP requirements and pre-planning of the forestry operations, including:

- Review Sales Area tree species (i.e., products).
- Review harvesting regime details.
 - Understand if the Sales Area is an integrated operation (Integrated Harvesting).
 - Determine if the cutter is undertaking the Cutter Select Trial (therefore undertaking their own product identification).
 - Basal area retention limit and DBH limit.
 - Requirements of H&R trees retention and marking requirements.
- Review operational maps.
 - Greater glider range.
 - Waterway classification.
 - Assess native vegetation location.
 - Exclusion zones.
- Review Koala Species Management Profile.
- Desktop planning for:
 - Roads and landings (if not involved in OHP planning stage).
 - Extraction tracks.

- Location of available product location.
- Plan surveys
 - Survey timing.
 - Survey method.
- Required equipment and materials
- OHP and map.
 - Paper or,
 - Georeferenced map to download to Avenza maps for tracking (preferred)
- Biodegradable tree marking tape or spray paint.
- Record/forms (attached is recommended form- 2.Koala Survey Record).
- Koala Field Guide for Queensland Forestry Operations.
- UHF Radio or form of communication.
- Binoculars (optional)

Survey Timing

The permittee can plan the appropriate method to achieve the koala survey. Undertaking and [Operating Guidelines- Daily Pre-Harvest Survey](#) has a dual purpose. Trees found to have high use (i.e. 20 or more scats, or multiple scratches or rub scent marks) will be marked and/or protected as habitat trees and therefore will aim to identify presence of koalas and will contribute to the requirements of Schedule 6 of the Code (see



Habitat and Recruitment Trees). Whilst all trees are to be inspected, there will be a greater importance on non-juvenile koala habitat trees (greater than 10cm and taller than 4m).

Pre-harvest survey (prior to harvesting commencing)

- Conducted during planning phase.
- Survey options
 - the entire sales area or
 - Systematically conduct surveys of the area that is likely to be worked in a pre-defined time (etc. weekly/fortnightly/monthly).
- Use the **Walkover Method**.
- Beneficial for those undertaking all tree marking (product, H&R, waterway marking etc.) Note: If DAF are undertaking the tree marking, then marking high usage indicators will be their responsibility during the pre-harvest phase.

Daily pre-harvest survey (on the day of harvesting)

- Conducted daily, prior to harvesting commencing.
- Inspect every tree (for koala presence and high usage) prior to harvesting.
- Using the **Spiral Method**.

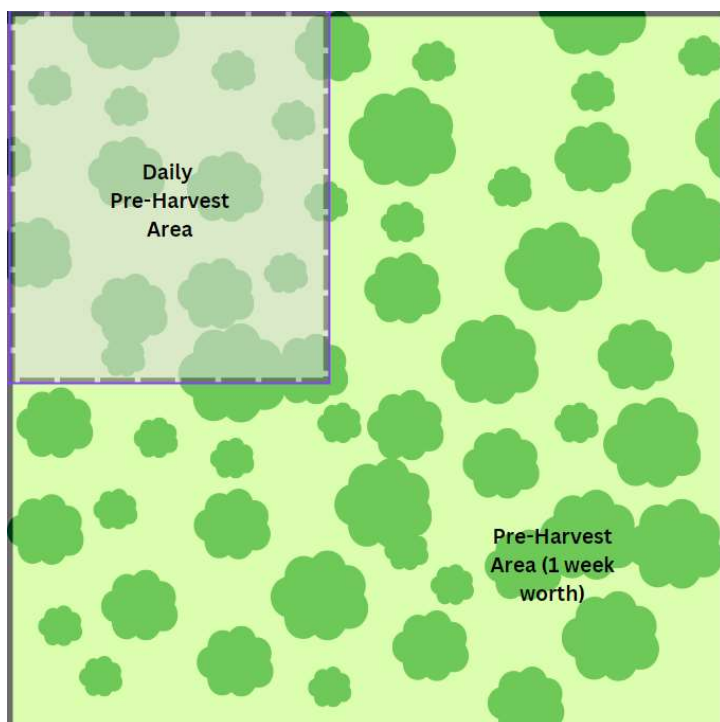


Figure 14- Survey Methods

Survey Method

The following methods are recommended to identify high use indicator trees and the presence of koala's during pre-harvest surveys and daily pre-harvest surveys:

Walkover Method

The walkover method will be used during the pre-harvest survey. This technique involves approximately two people to systematically walk through the pre-harvest survey area, covering the entire area determined during the planning phase. For example, enough area for one weeks' worth of cutting, or entire sales area.

The aim of the walkover method is to identify high use trees and mark as H&R trees if required. This method will incidentally allow for koala observations—if sighted, the information must be reported as per the remainder of the guidelines.

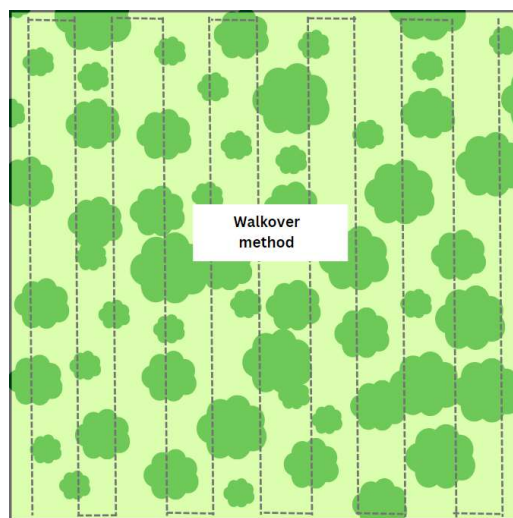


Figure 15- Walkover Method

Spiral Method

The spiral method involves conducting 360-degree surveys on trees primarily used when koala climbing indicators, or a high use koala scat is observed. This method starts from the base of the tree and extends outwards looking up safely to maximise the observation potentials in the lower to upper canopy extents, inclusive of forks, junctions of the tree. The aim of this method is to walk in a spiral motion, with your back facing the centre tree (any centralised point). This can be undertaken per tree or for a greater area as per Figure 16- Spiral method (left- every tree, right- greater area), providing all trees are surveyed for the presence of koalas. The method aims to view the trees from multiple

directions, concentrating from the base to the drip line of the tree- binoculars are recommended. Whilst completing this survey, it is required to continue to search for high use indicators, and mark as required.

This method has multiple ways it can be completed:

- 1-2 people conducting the method daily prior to harvesting.
- Operator getting out of the cab to conduct survey method prior to felling.
- Hand feller undertaking method at the time of felling or
- Using a non-feller to conduct survey method, providing safety distances are adhered to.

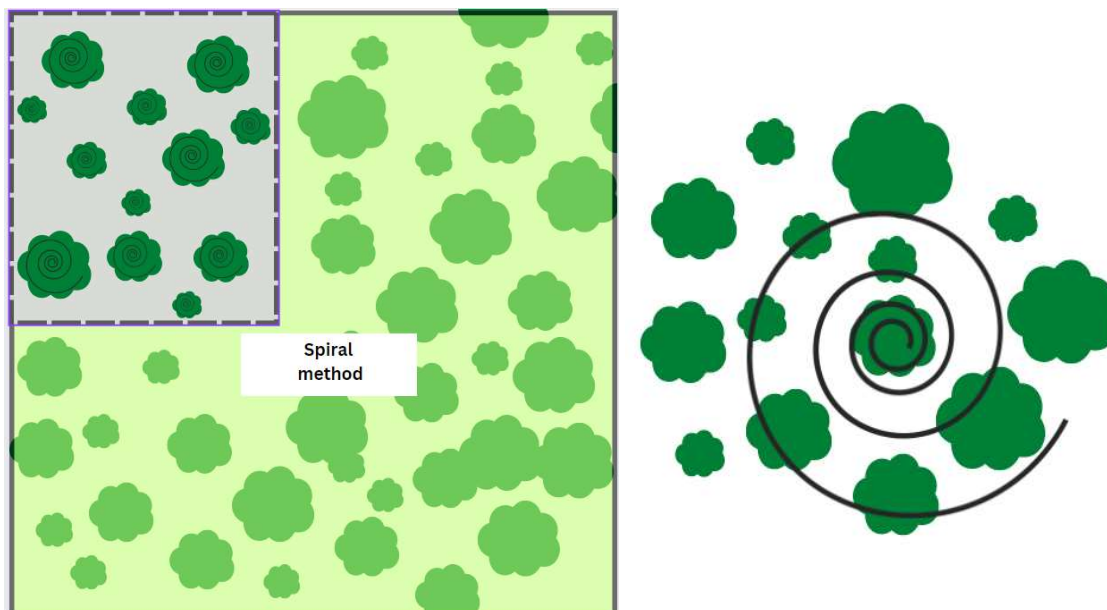


Figure 16- Spiral method (left- every tree, right- greater area)

When evidence of high use is found:

Pre Harvest Survey

- The high use tree is to be marked as a habitat tree (Part One-

- Habitat and Recruitment Trees) unless undertaking the Cutter Select Trial (Part One- Pg15)
- The tree is not to be felled.
- Thoroughly inspect tree, to determine whether there is a koala in the tree.

Daily Pre-Harvest Survey

- The high use tree is to be marked (or protected) as a habitat tree (Part One- Pg19), unless undertaking the Cutter Select Trial (Part One- Pg15)
- The tree is not to be felled.
- Thoroughly inspect tree, to determine whether there is a koala in the tree.

When a koala is observed during inspection:

Pre-Harvest Survey

- Collect GPS point and fill out koala survey record.
- Assess the koala for general condition, or physical harm. Determine if veterinary care is required (refer to Koala Care Response Plan).
- Depending on when harvest or forestry operations are likely to commence, exclusion zones may be required, and contractor may need to be notified.
- The area may need to be re-assessed prior to commencing harvest. This is dependent on the time between survey and commencing harvesting.

Daily Pre-Harvest Survey

- Cease all harvesting activity and move to different area outside the 100m exclusion zone.
- Collect GPS point, apply a **100m exclusion zone** and instruct operators to keep 100m away.
- Assess the koala for general condition, or physical harm. Determine if veterinary care is required (refer to Koala Care Response Plan).
- If not possible to instruct others to stay 100m away, physically marking of a 100m exclusion radius may also be necessary. The area must be taped off using pink tape (or another agreed colour), paint markings or another agreed method.
- Ensure no operations commence in this exclusion area.
- Operator to shift to commence operations outside of the 100m exclusion, whilst remaining vigilant.
- Felling of trees outside of the exclusion zone should be conducted in a way that ensures that appropriate habitat links are maintained within the harvesting site, and between the site and adjacent areas, to allow koalas that are present to move out of the site of their own accord.
- Operations within the excluded area may only recommence after 6am of the day following the koala sighting and only if the koala is no longer located in the excluded area.

Returning to Sales Area

If returning to the sales area after a period of downtime, it is important that the daily pre-harvest survey recommences prior to felling commencing.

If An Injured Koala Is Found

If an injured koala is found at any stage, you must:

- Paint/mark the tree, apply an exclusion area of 100m in all directions from the injured koala.
- Cease all operations within the exclusion area.
- Not interfere with or transport the injured animal.
- Record details on the 2.Koala Survey Record.
- Advise 1300 ANIMAL (1300 264 625) and the Forestry sale supervisor as soon as possible.

Reporting and Monitoring

To demonstrate compliance with koala legislative documents, reporting and monitoring will be recommended. This demonstrates a process is in place and the documentation provides evidence of undertaking koala management.

It is recommended to use the Koala survey record (2.Koala Survey Record)

It is recommended that the permittee is to complete/ receive completed survey records and provide these to DAF as required. DAF will notify DES for the inclusion in the relevant database.

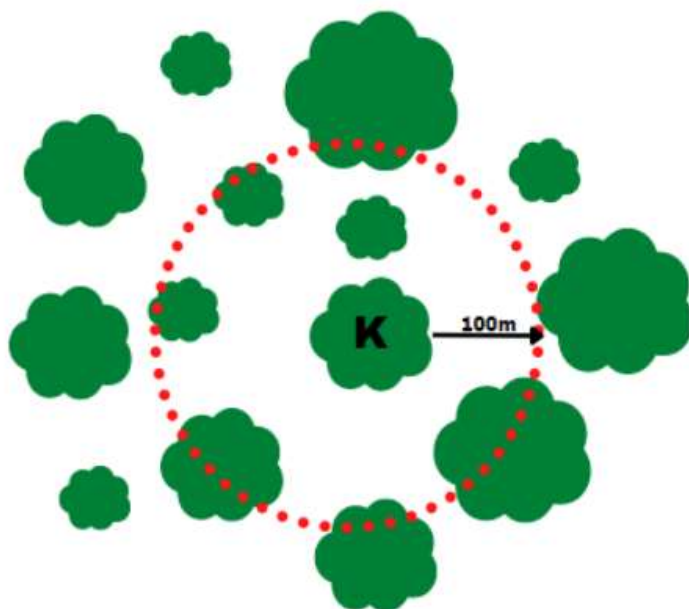


Figure 17- Example of applying 100m exclusion zone from koala.

Safety

If an independent person is commencing the koala surveying (not the feller), then maintain constant communications during the operation to ensure operators know where you are always. A person/s who is working collaboratively with the feller must ensure they are a minimum of 100m from any



machinery or felling activities.

Take careful consideration of potential hazards- slips, trips and falls, adverse weather, bites and stings, other machines and so on.

Future Recommendations

- Future survey methods (Table 4) including Spot Assessment Techniques (SAT), use of thermal imagery drones, and detection dogs.
- Ability for pre-harvest broadacre surveys.
- A risk assessment to determine the level of intensity and frequency of koala management.
- Different controls for different Koala Districts.
- Using koala habitat preference species and habitat to determine likelihood of presence.
- Controls for integrated harvesting operations.

Koala Care

Koala Care Response Plan

STOP: If you see a koala at any time stop operations and establish an exclusion zone around the koala for checking, assessment, and protection.

CHECK: Without causing stress to the koala, make a visual assessment of the koala to determine if veterinary assistance is required. Look to see if the koala:

- Has any visible injuries.
- Is not placing weight on limbs.
- Has weeping eyes.
- Has poor body condition.
- Is smaller than normal, i.e., a joey.
- Signs of distress (as per part one-page 9)

CALL: If the answer to any of the above is yes then koala care is required.

ACTIONS: If an injured koala is found you must:

- Apply an exclusion area of 100m in all directions from the injured koala.
- Cease all operations within the exclusion area.
- Not interfere with or transport the injured animal.
- Advise 1300 ANIMAL (1300 264 625) and the Forestry sale supervisor as soon as possible.

SEARCH: Inspect the exclusion zone, immediate and broader area for any further evidence of koalas. The spiral method can be used and remember to look down for scats and well as looking up.

Koala Rescue and Care Groups

- 1300 ANIMAL (1300 264 625)
- Koala Rescue Queensland
 - 0466 439 947
- Australia Zoo Wildlife Hospital
 - (07) 5436 2000
- RSPCA
 - (07) 3429 9910- Brisbane or (07) 5442 8057- Eumundi
- Currumbin Wildlife Hospital
 - (07) 5534 0813
- Moggill Koala Rehabilitation Centre
 - 1300 130 372
- Daisy Hill Koala Centre
 - (07) 3078 3101

Or contact your nearest wildlife veterinary clinic.



References

Australia Department of the Environment (2014). EPBC Act referral guidelines for the vulnerable koala (combined populations of Queensland, New South Wales, and the Australian Capital Territory).

Department of Environment and Science (2022). Koala Facts.

Department of Agriculture and Fisheries (Forestry) (2022). Koala Species Management Profile.

Krockenberger, A, Gordon, G, Dennis, AJ (2012). Koala (south-east bioregion) in L. Kurtis et al. (eds.), Queensland's threatened animals, CSIRO Publishing, Collingwood, Victoria

Runge, C.A., Rhodes, J.R., Lopez-Cubillos, D.S. (2021). Mapping koala habitat for greater Queensland report. NESP Threatened Species Recovery Hub Project 4.4.12 report, Brisbane.

Appendices

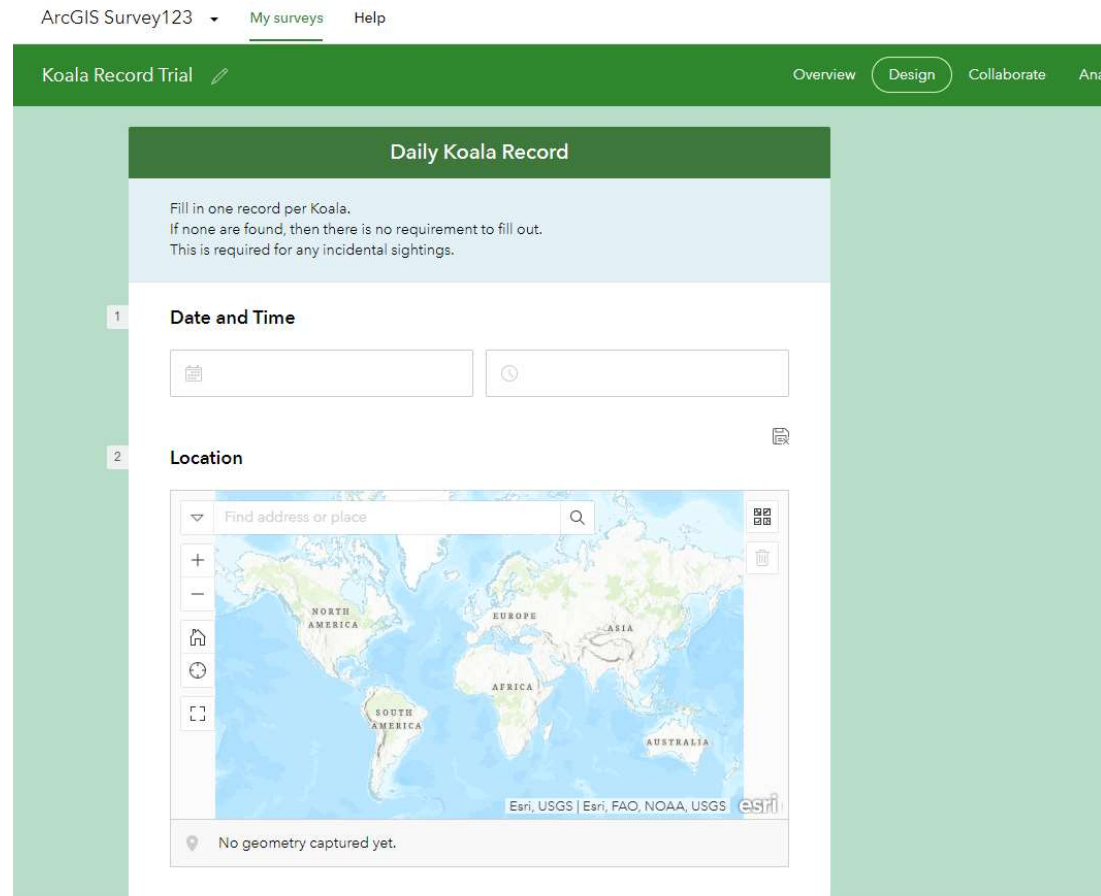
1.Species Management Profile

Table 2- Koala SMP (DAF, 2022)

Koala Species Management Profile (DAF, 2022)
Schedule 3 Watercourse protection provides protection zones that restrict or exclude harvesting and clearing activities along watercourse corridors, aiding connectivity across the harvest area
Schedule 6 Habitat trees outlines provisions to retain and protect habitat and recruitment habitat trees across the harvested area, providing connectivity, feed, and shelter trees and ensures protection of fauna on-site during harvest.
Schedule 8 Forest Road and Track Management-minimise Road length, complexity of road network, interference with natural drainage and alternation of natural features
ACTION 1: Any tree which shows the following indicators for high usage by koalas must be retained and protected as a habitat tree or retained tree.
A1- protect and retain habitat or retained tree when multiple scratches or 20 or more faecal pellets found OR significantly greater usage indicators (multiple scratches, faecal pellets, and rubs from scent marking) relative to other trees in the broader area (e.g., State Forest or region)
A1- damage minimisation and residue management measures for habitat trees from Schedule 6 of the CoP are to be applied
ACTION 2: Consistent with the Nature Conservation (Koala) Conservation Plan 2017 (the Plan), harvesting is to address koala spotting and sequential clearing requirements:
A2- Harvesting of trees is conducted in a way that ensures that appropriate habitat links are maintained within the harvesting site, and between the site and adjacent areas, to allow koalas that are present to move out of the site of their own accord
A2- the operator responsible for harvesting trees has requisite training or experience as a 'koala spotter'
A2- all trees are inspected for koalas by a 'koala spotter' prior to harvesting
ACTION 3: Where a koala is observed in a tree:
A3- when koala is observed- apply 100m exclusion area with directions marked on tree
A3- when koala is observed- cease operations within exclusion area
A3- when koala is observed- operations must only recommence after 6am the following day, or when the koala is no longer located in excluded area
ACTION 4: If an injured koala is found you must:
A4- if an injured koala is found- apply 100m exclusion in all directions
A4- if an injured koala is found-ceasing all operation within the exclusion area
A4- if an injured koala is found- not interfere or transport the injured animal
A4- if an injured koala is found- advise 1300 Animal and Forest Products supervisor ASAP
ACTION 5: For all koala sightings, you must notify the Forest Products' sale supervisor as soon as possible including:
A5-for all koala sightings you must advise DAF- whether Koala is alive or dead
A5- for all koala sightings you must advise DAF- Location (GPS coordinate)
A5- for all koala sightings you must advise DAF-date and time

3.Future Koala Survey Record

Using ArcGIS Survey123 may be an alternative to paper forms in the future.



/images-8411...jpg ^

4.OHP Provisions

General procedures to identify and protect wildlife (including koalas) on native forest harvesting areas.

Treemarkers

- Treemarkers are to visually inspect the trunks of trees for evidence of wildlife, including koalas (e.g. scratch marks and scats at base of tree), that would indicate that the tree is used intensively by wildlife or koalas as a preferred feed tree. If there is sufficient evidence that the tree is a feed tree, the tree is to be protected in accordance with the relevant SMP. The tree is to be identified by paint marking as a habitat or a habitat recruitment tree and any required protective buffer or exclusion zone delineated with paint.
- Where indications of the presence of koalas are observed or koalas are sighted, the location(s) must be recorded on a GPS and in GIS for reporting. The harvesting contractor(s) and their employees are to be alerted to the presence of koalas and their location within the harvesting area.
- The recorded sighting of koalas must also be advised to QPWS.
- The Koala Sightings Register must also be updated with all recorded sightings.

Fellers including Mechanical Harvesting Operators

- Fellers must visually inspect the crown of each tree to be felled and any adjacent tree with an overlapping crown for the presence of koalas. If a koala or other wildlife is sighted in the tree to be felled or in a tree with an overlapping crown, felling should not proceed in the immediate area until the koala or wildlife moves out of danger of its own accord.
- Felling can resume in the area after a period of 12 hours (minimum) and only if subsequent inspection by the cutter cannot identify the presence of koalas/wildlife.
- An adequate buffer or exclusion zone, as defined in the SMP and delineated by paint markings, is to be maintained around feed trees or trees with resident koalas/wildlife to ensure damage to that tree is minimised.
- Fellers must not physically interfere with, or move koalas or wildlife either from a tree or from the site
- Adequate communication must be maintained between the feller and the operator of snigging machinery. The feller is to advise the machine operator of the location of any identified koalas or wildlife and the protective measures being adopted.
- Fellers should report any sightings of koalas, and any injured or dead koalas, to the sale manager.

Snigging and other Machinery Operators

- Adequate communication must be maintained between the feller and the operator of snigging machinery. The operator of snigging machinery is to advise the feller of the location of any identified koalas or wildlife.
- The operator of any snigging machinery must not push, damage or interfere with trees containing koalas or trees likely to fall into trees containing koalas or other wildlife.
- The operator of snigging machinery should avoid the vicinity of trees containing koalas to allow the koala to move from the area of its own accord.
- An operator of any snigging machinery must not physically move a koala, either from a tree or from the site.

5.Koala Tree Species Suitability

Table 3- Koala Tree Species (Source: Runge, 2021).

	Tree Suitability				Tree Suitability		
	Lower	Medium	Higher		Lower	Medium	Higher
<i>Acacia harpophylla</i>		Yes		<i>Eucalyptus largiflorens</i>		Yes	
<i>Acacia tephрина</i>		Yes		<i>Eucalyptus latisinensis</i>		Yes	
<i>Acmena smithii</i>		Yes		<i>Eucalyptus longifolia</i>		Yes	
<i>Allocasuarina littoralis</i>		Yes		<i>Eucalyptus longirostrata (Grey Gum)</i>			Yes
<i>Allocasuarina torulosa</i>		Yes		<i>Eucalyptus major (Mountain Grey Gum)</i>			Yes
<i>Alphitonia excelsa</i>		Yes		<i>Eucalyptus melanophloia</i>		Yes	
<i>Angophora costata</i>		Yes		<i>Eucalyptus melliodora</i>		Yes	
<i>Angophora floribunda</i>		Yes		<i>Eucalyptus microcarpa</i>		Yes	
<i>Angophora leiocarpa</i>		Yes		<i>Eucalyptus microcorys (Tallowwood)</i>			Yes
<i>Angophora woodsiana</i>		Yes		<i>Eucalyptus moluccana</i>		Yes	
<i>Brachychiton populneus</i>		Yes		<i>Eucalyptus montivaga</i>		Yes	
<i>Callitris columellaris</i>		Yes		<i>Eucalyptus nobilis</i>		Yes	
<i>Callitris glaucophylla</i>		Yes		<i>Eucalyptus obliqua</i>		Yes	
<i>Casuarina cristata</i>		Yes		<i>Eucalyptus orgadophila</i>		Yes	
<i>Casuarina cunninghamiana</i>		Yes		<i>Eucalyptus pilularis</i>		Yes	
<i>Casuarina equisetifolia subsp. incana</i>		Yes		<i>Eucalyptus planchoniana</i>		Yes	
<i>Casuarina glauca</i>		Yes		<i>Eucalyptus platyphylla</i>		Yes	
<i>Corymbia citriodora</i>		Yes		<i>Eucalyptus populnea</i>		Yes	
<i>Corymbia citriodora subsp. variegata</i>		Yes		<i>Eucalyptus portuensis</i>		Yes	
<i>Corymbia clarksoniana</i>		Yes		<i>Eucalyptus prava</i>		Yes	
<i>Corymbia dallachiana</i>		Yes		<i>Eucalyptus propinqua (Grey Gum)</i>			Yes
<i>Corymbia erythrophloia</i>		Yes		<i>Eucalyptus psammitica</i>		Yes	
<i>Corymbia gummifera</i>		Yes		<i>Eucalyptus racemosa</i>		Yes	
<i>Corymbia intermedia</i>		Yes		<i>Eucalyptus racemosa subsp. racemosa</i>		Yes	
<i>Corymbia terminalis</i>		Yes		<i>Eucalyptus resinifera</i>		Yes	
<i>Corymbia tessellaris</i>		Yes		<i>Eucalyptus robusta (Swamp Mahogany)</i>			Yes
<i>Corymbia trachyphloia</i>		Yes		<i>Eucalyptus saligna</i>		Yes	
<i>Diospyros geminata</i>	Yes			<i>Eucalyptus saligna subsp. saligna</i>		Yes	
<i>Endiandra sieberi</i>	Yes			<i>Eucalyptus seeana</i>		Yes	
<i>Eremophila mitchellii</i>		Yes		<i>Eucalyptus siderophloia</i>		Yes	
<i>Eucalyptus ochrophloia</i>		Yes		<i>Eucalyptus sideroxylon</i>		Yes	
<i>Eucalyptus acmenoides</i>		Yes		<i>Eucalyptus tereticornis (Forest Red Gum)</i>			Yes
<i>Eucalyptus albens</i>		Yes		<i>Eucalyptus tereticornis subsp. basaltica</i>			Yes
<i>Eucalyptus baileyana</i>		Yes		<i>Eucalyptus tereticornis subsp. tereticornis</i>			Yes
<i>Eucalyptus banksii</i>		Yes		<i>Eucalyptus thozetiana</i>		Yes	
<i>Eucalyptus biturbinata (Grey Gum)</i>			Yes	<i>Eucalyptus tindaliae</i>		Yes	
<i>Eucalyptus blakelyi</i>		Yes		<i>Eucalyptus whitei</i>		Yes	
<i>Eucalyptus bridgesiana</i>		Yes		<i>Eucalyptus youmanii</i>		Yes	
<i>Eucalyptus brownii</i>		Yes		<i>Geijera parviflora</i>		Yes	
<i>Eucalyptus caleyi</i>		Yes		<i>Grevillea robusta</i>		Yes	
<i>Eucalyptus caliginosa</i>		Yes		<i>Lophostemon confertus</i>		Yes	
<i>Eucalyptus camaldulensis (River Red Gum)</i>			Yes	<i>Lophostemon suaveolens</i>		Yes	
<i>Eucalyptus cambageana</i>		Yes		<i>Melaleuca bracteata</i>		Yes	
<i>Eucalyptus campanulata</i>		Yes		<i>Melaleuca nervosa</i>		Yes	
<i>Eucalyptus carnea</i>		Yes		<i>Melaleuca nodosa</i>		Yes	
<i>Eucalyptus chlorocladus</i>		Yes		<i>Melaleuca quinquenervia</i>		Yes	
<i>Eucalyptus cloeziana</i>	Yes			<i>Melaleuca sieberi</i>		Yes	
<i>Eucalyptus conica</i>		Yes		<i>Syncarpia glomulifera</i>		Yes	
<i>Eucalyptus coolabah</i>		Yes					
<i>Eucalyptus crebra</i>		Yes					
<i>Eucalyptus dalrympleana</i>		Yes					
<i>Eucalyptus dealbata</i>		Yes					
<i>Eucalyptus deanei</i>		Yes					
<i>Eucalyptus decorticans</i>		Yes					
<i>Eucalyptus drepanophylla</i>		Yes					
<i>Eucalyptus dura</i>		Yes					
<i>Eucalyptus exserta</i>		Yes					
<i>Eucalyptus fibrosa</i>		Yes					
<i>Eucalyptus fibrosa subsp. fibrosa</i>		Yes					
<i>Eucalyptus grandis</i>		Yes					
<i>Eucalyptus helidonica</i>		Yes					
<i>Eucalyptus intertexta</i>		Yes					
<i>Eucalyptus laevopinea</i>		Yes					

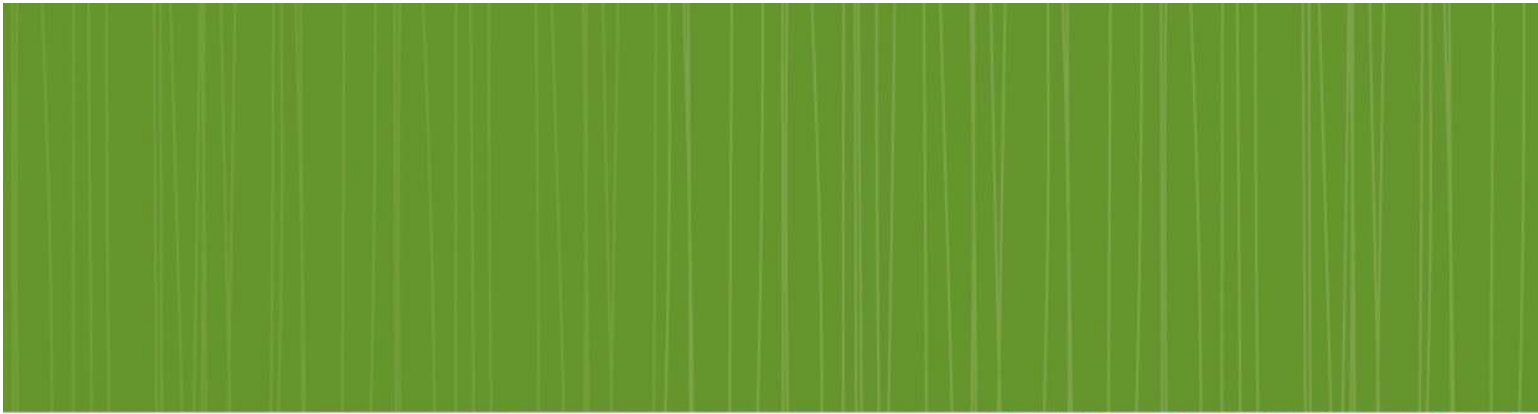
Timber Eucalyptus species in State Forest-

Runge, C.A., Rhodes, J.R., Lopez-Cubillos, D.S. 2021. Mapping koala habitat for greater Queensland report. NESP Threatened Species Recovery Hub Project 4.4.12 report, Brisbane.

6.Future Survey Methods

Table 4- Future Survey Methods

	Description	Benefits
Direct Survey	Direct observation methods rely on the physical sighting of a koala, and can be undertaken during the day (e.g., transect searches) or at night (e.g., spotlighting), with or without additional aids (e.g., thermal drones or koala detection dogs).	
Strip Transect	During transect and strip transect surveys, multiple observers concurrently walk parallel lines at closely spaced intervals so that each tree is searched from multiple angles to observe every individual within the defined study area.	<ul style="list-style-type: none"> ○ Thoroughly assess area. ○ Visual. ○ Can be beneficial when undertaking tree marking, waterway assessments and marking habitat trees. ○ Can count density.
Drone Survey	Drones with thermal imagery, flown to detect koala's thermal signature.	<ul style="list-style-type: none"> ○ Cover large areas. ○ Suitable when difficult to access. ○ Detect koalas in dense canopy. ○ More accuracy than by eye. ○ Can be conducted during the night.
Spotlighting	Spotlighting is a direct survey method suitable for detecting koalas. As a nocturnal, arboreal species with bright eye-reflectance, large body size and slow movement patterns, koalas can be detected by spotlighting	<ul style="list-style-type: none"> ○ Suitable when difficult to access. ○ Accuracy with eye shine. ○ Conducted during the night. ○ Limited training required.
Koala Detection Dogs	A detection dog, trained to identify koala scat, is an indirect method for detecting koala presence.	<ul style="list-style-type: none"> ○ Cover large areas. ○ Good accuracy.
Remote Sensor Cameras	Sense the movement of species, and some take photos and deliver notifications via message or email.	<ul style="list-style-type: none"> ○ Easy to set up. ○ Low cost. ○ Limited training required.
Indirect Survey	Indirect survey methods depend on locating evidence of the presence of koalas, such as faecal pellets or vocalisations. These methods are generally lower cost alternatives to direct observation techniques.	
Call Playback or Passive Acoustic Survey	Standard call playback surveys involve broadcasting a recording of a male koala bellowing, while observers listen for responses from other males that may be in the vicinity. Whereas passive acoustic surveys record vocalisations to confirm koala presence on the subject land.	<ul style="list-style-type: none"> ○ Beneficial in breeding season. ○ Can be conducted during the night. ○ Suitable when difficult to access.
Scats/ Scratching Spot Assessment Technique	The SAT is an indirect survey method, assessing the presence of koala scat within a prescribed search area. Select survey locations using a grid with 150 m spacing, for suitable habitat ≤50 ha or 250 m spacing for suitable habitat >50 ha	<ul style="list-style-type: none"> ○ Occur during daylight. ○ Good coverage of area. ○ Can be beneficial when undertaking tree marking, waterway assessments and marking habitat trees.



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Operating Guidelines Pre-Harvest Survey Step-by-Step



Operating Guidelines- Pre-Harvest Survey

Instructional step-by step Guide

Aim:

The aim of the daily pre-harvest survey is to conduct a survey using the walkover method to determine any tree which shows the following indicators for high use by koalas and therefore ensures protection of the koala and their habitat:

- >20 faecal pellets.
- Multiple scratches and
- Rubs from scent marking.

If the high use indicators are located, then the tree will be marked as a H&R tree (Part One-

Habitat and Recruitment Trees). The pre-harvest survey typically occurs during the **planning phase or tree marking phase** (product marking, waterways, and H&R trees) and must be **undertaken prior to commencing operations**. This step is optional.

IMPORTANT NOTE:


- This section will be completed by the responsible person for H&R tree marking or product marking.
- If DAF currently complete the H&R tree marking, then this step is their responsibility.
- If H&R marking is NOT required under the Cutter Select Model, then this step is **optional**.

Materials:

- OHP and map.
 - Paper or,
 - Georeferenced map to download to Avenza maps for tracking (preferred)
- Biodegradable tree marking tape or spray paint.
- Record/forms (attached is recommended form, 2.Koala Survey Record).
- Koala Field Guide for Queensland Forestry Operations.
- UHF Radio or form of communication.

How:

- Surveying generally requires a ground crew of at least 2 people working together to undertake the walkover method. Specific focus within densely clumped leaf (normally within the extent of the canopy) as koalas can be very hard to detect.
- Conducted as soon as there is adequate daylight for it to be safe and effective.
- All trees (mainly non-juvenile koala habitat trees) to be potentially felled in the sales area must be inspected high usage of koalas, and incidental sightings of koalas. Every tree of any species should be inspected from several angles wherever possible, taking time and care to have a thorough look at the base of the tree to the dripline for scats, scratches and in the crown of the tree to look for a koala.
- When working amongst thick undergrowth that restricts visibility, take additional time, and look for clearer patches from where a more thorough inspection can be made.
- Other Code requirements during pre-harvest survey.
 - During a pre-harvest survey, if a tree features one visible hollow (>10cm and above 2m) then this is to be marked as a H&R tree. Other tree features/defects including deeply fissured bark, fire scars, small hollows, burls with cavities and other irregularities or damage that can provide habitat, or other dominant or co-dominant trees with habitual characteristics that can be recruitment trees may require marking (

- 
- Habitat and Recruitment Trees)
 - Refer to Part 1- Habitat and Recruitment Habitat Restrictions for protection.
 - Assess waterways and mark waterway exclusions.
 - Plan log storage, road, and extraction track network, to ensure minimal road length, complexity, and interference with natural features.

When evidence of high use is found:

- The high use tree is to be marked as a H&R tree (Part One-

- Habitat and Recruitment Trees)
- The tree is not to be felled.
- Thoroughly inspect tree, to determine whether there is a koala in the tree.

When a koala is observed during pre-harvest inspection:

- Collect GPS point and fill out koala survey record.
- Assess the koala for general condition, or physical harm. Determine if veterinary care is required (refer to Koala Care Response Plan).
- Depending on when harvest or forestry operations are likely to commence, exclusion zones may be required, and contractor may need to be notified.
- The area may need to be re-assessed prior to commencing harvest. This is dependent on the time between survey and commencing harvesting.

Who to notify if a koala is found:


- Permittee (if sub-contractor commencing the surveying).
- Forestry Sale Supervisor or other via phone call.
- If injured advise 1300 ANIMAL (1300 264 625), follow the Koala Care Response Plan.

Documentation:

- Record all sightings and details (recommend using attached 2.Koala Survey record).
- Record sightings on the OHP map.
- Map pre-harvest survey inspection area.
- Submit documents to DAF as required.

Considerations:

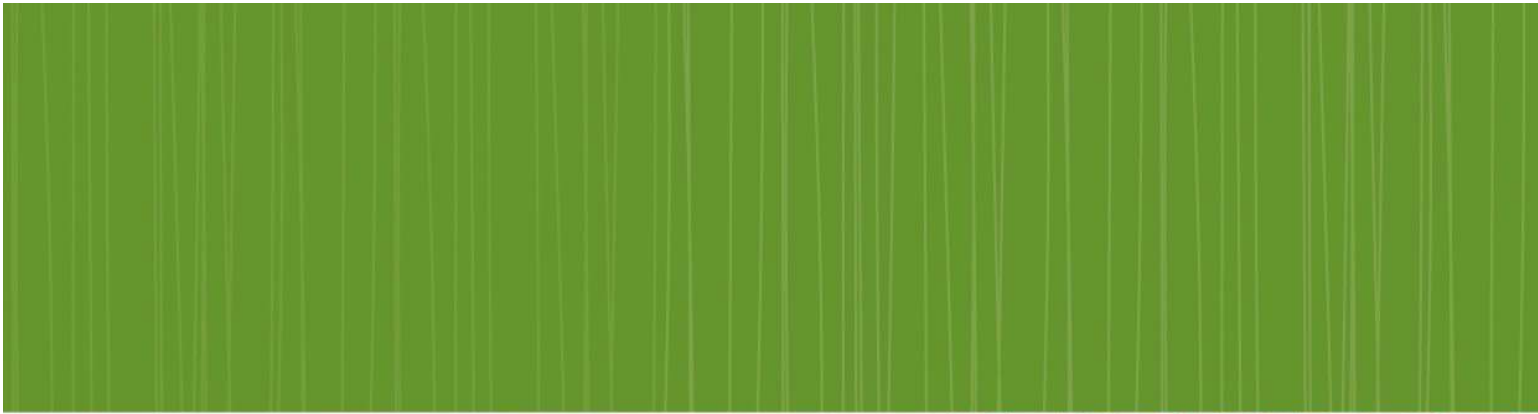
- Weather (rain, wind, heat).
- Koala breeding season (August-February) (may be likely to frequently shift).
- Safety (adverse weather, hazards, communications, number of people surveying).
- Site characteristics- slope
- Species- scratches and rub marks can be more difficult on rough bark species (example- *E.microcorys*- Tallowood). Further, scats can be difficult to see under trees that shed bark.
- Timing
 - If completing large areas of survey, this can be timely, and there is a high likelihood that koalas may shift.
- Size of inspection
 - Aim to survey an achievable area to ensure the inspection is thorough, and areas are not missed.
- Integrated harvesting operations – determine who is responsible for completing the survey.

- 
- Cutter selects trials.
 - DAF completing the H&R Tree marking.

Future methods

In future, there may be other indirect surveys (Table 4- Future Survey Methods) that can assist to conduct large scale surveys. This is an opportunity and requires deviation from the SMP.

Note: The pre-harvest survey does not replace requirements of inspecting trees during the daily-pre-harvest survey, prior to felling.



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Operating Guidelines Daily Pre-Harvest Survey Step-by-step



Operating Guidelines- Daily Pre-Harvest Survey

Instructional step-by step Guide

Aim:

The aim of the daily pre-harvest survey is to conduct a spiral method to determine if there is a **koala present** in the tree, and indirectly to determine any tree which shows the following indicators for high use by koalas:

- >20 faecal pellets.
- Multiple scratches and
- Rubs from scent marking.

If the high use indicators are located, then the tree will be marked (unless otherwise advised) as a habitat tree (

Habitat and Recruitment Trees). If a koala is present, then protection measures will apply. This spiral method occurs **daily, prior** to felling commencing on that day and during the entire term of the operation.

IMPORTANT NOTE: Every feller (or another nominated person) is responsible for daily pre-harvest surveys. Includes all felling (including pushing, road making etc).

Materials:

- OHP and map.
 - Paper or,
 - Georeferenced map to download to Avenza maps for tracking (preferred)
- Biodegradable tree marking tape or spray paint.
- Record/forms (attached is recommended form- 2.Koala Survey Record).
- Koala Field Guide for Queensland Forestry Operations.
- UHF Radio or form of communication.
- Binoculars (optional)

How:

- All trees within the operational area that are likely to be felled **that day** must be inspected for koalas and high use evidence, using the spiral method. Identify the search area in consultation with the felling operator and commence ongoing inspection of individual trees **prior to felling**.
 - This can occur systematically (doing small sections throughout the day) or
 - Survey the entire daily area for koala presence and high use trees.
- Trees being felled should be inspected using the spiral method. Including taking time and care to have a thorough look at the base to the drip line of the tree for scats, scratches and in the crown of the tree to look for a koala.
 - Hand felling.
 - The spiral method can be undertaken at the time of felling if being undertaken by a hand faller.
 - Mechanically felling.
 - The spiral method generally requires a ground crew of at least two people working together (can undertake with 1) and is to be conducted as soon as there is adequate daylight for it to be safe and effective. This happens prior to felling commencing. OR
 - The spiral method will involve the operator getting out of the cab before felling individual/groups of trees OR
 - Or using an independent person to conduct survey.
- When working amongst thick undergrowth that restricts visibility, take additional time, and look for clearer patches from where a more thorough inspection can be made.

- Other Code requirements during daily harvest inspection*.
 - During harvest, if a tree features one visible hollow (>10cm and above 2m) then this is to be marked as a H&R tree. Other tree features/defects including deeply fissured bark, fire scars, small hollows, burls with cavities and other irregularities or damage that can provide habitat, or other dominant or co-dominant trees with habitual characteristics that can be recruitment trees may require marking (Pg 19)
 - Ensure protection of H&R trees including, felling must not accumulate harvesting debris within 2 metres of H&R trees and felling or snigging must not physically damage the bole of the tree.
- Assess waterways and mark exclusions.
- Plan log storage, road, and extraction track network, to ensure minimal road length, complexity, and interference with natural features.

***Safety note:** If an independent person is commencing the koala surveying (not the feller), then maintain constant communications during the operation to ensure operators know where you are always. A person/s who is working collaboratively with the feller must ensure they are a minimum of 100m from any machinery or felling activities.

When evidence of high use is found during daily pre-harvest inspection:

- The high use tree is to be marked as a habitat tree (Part One- Pg19), unless undertaking the Cutter Select Trial (Part One- Pg15)
- The tree is not to be felled.
- Thoroughly inspect tree, to determine whether there is a koala in the tree.

When a koala is observed during daily pre-harvest inspection:

- Cease all harvesting activity and move to different area outside the 100m exclusion zone.
- Collect GPS point, apply a 100m exclusion zone and instruct operators to keep 100m away.
- Assess the koala for general condition, or physical harm. Determine if veterinary care is required (refer to Koala Care Response Plan).
- If not possible to instruct others to stay 100m away, physically marking of a 100m exclusion radius may also be necessary. The area must be taped off using pink tape (or another agreed colour), paint markings or another agreed method.
- Ensure no operations commence in this exclusion area.
- Operator to shift to commence operations outside of the 100m exclusion, whilst remaining vigilant.
- Felling of trees outside of the exclusion zone should be conducted in a way that ensures that appropriate habitat links are maintained within the harvesting site, and between the site and adjacent areas, to allow koalas that are present to move out of the site of their own accord.
- Operations within the excluded area may only recommence after 6am of the day following the koala sighting and only after 6am when the koala is no longer located in the excluded area. If

the koala remains within the exclusion area, harvest may not start again until reassessing after 6am the following day.

- Complete record (recommended using the 2.Koala Survey record)

Who to notify:

- Those working in the operational area.
- Anyone conducting felling, snagging or other operations.
- Permittee (is sub-contractor commencing the surveying).
- DAF or other via phone call.
- If injured advise 1300 ANIMAL (1300 264 625), follow Koala Care Response Plan.

Documentation:

- Record all sightings and details (date, time, location) (recommend attached record- 2.Koala Survey Record).
- Record any sighting on the OHP Map and any incidental sightings.
- Map survey inspection area.
- Submit documents to DAF as required.

Considerations:

- Weather (rain, wind, heat).
- Koala breeding season (August-February) (may be likely to frequently shift throughout the day, therefore need to remain vigilant).
- Safety (Adverse weather, hazards, communications, number of people surveying, active operations, snagging, and felling).
- Site characteristics- slope
- Species- scratches and rub marks can be more difficult on rough bark species (example- *E.microcorys*- Tallowood). Further, scats can be difficult to see under trees that shred bark.
- Same day felling.
- Surveys, marking trees and felling requires sufficient time to avoid business disruption.
- Integrated harvesting operations.
- Cutter Select Trials

Assumptions:

- All personnel and machinery will adhere to exclusion zones.
- This step is typically undertaken by the permittee/cutter.