Considering koalas in planned burns

Guidelines to reduce the impact of planned burns on koala populations

Department of Planning and Environment

NSW GOVERNMENT

Prepared by the Environment and Heritage Group within the NSW Department of Planning and Environment in collaboration with the NSW Rural Fire Service.

Cover photo: Koalas (*Phascolarctos cinereus*) in river red gum. Dan Lunney/DPE

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Contents

List of figures

Introduction

Koalas are in a state of decline in NSW. They are listed as endangered under both the NSW *Biodiversity Conservation Act 2016* and the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*.

Threats to koala populations are well documented and include habitat loss and fragmentation, climate change, vehicle strike, dog attack, high intensity fire, disease, drought and heatwave. The 2019–20 bushfires had a sudden and significant effect on remaining populations and habitat. Without intervention to protect habitat and address these threats, the koala may become extinct in NSW before 2050.

These guidelines are intended to help landholders, fire management authorities, councils and government agencies to manage and reduce the impact of planned burns on koalas. When appropriately considered, planned, approved and executed, prescribed burning can provide positive benefits for koala populations, including reducing the risk of high intensity fire and reducing density of ground level vegetation and weeds that can inhibit movement.

While there are environmental regulations that must be satisfied when undertaking a prescribed burn in koala habitat, these guidelines are a policy initiative, rather than a regulatory obligation. User groups can apply the guidelines to suit their local context and needs.

Although users are not legally required to follow these guidelines, considering koalas in a planned burn in koala habitat is encouraged in the interests of minimising the impact on endangered koala populations.

Fire and koalas

Fire is an integral part of the Australian landscape, and wildfires are common in many areas of koala habitat.

Wildfire and ill-considered planned burns can have significant impacts on wildlife including koalas, by reducing koala habitat quality, reducing it to remnant patches, as well as directly impacting population numbers through mortality (Bradshaw et al. 2018; Phillips et al. 2021; van Eeden et al. 2020). For example, the 2019–20 Black Summer bushfires impacted more than 1.9 million hectares, or 22%, of the modelled high or very-high suitability koala habitat in eastern NSW (DPIE 2021).

Appropriate planned burning, such as hazard reduction, ecological and cultural burning, endeavours to create patches in the landscape that are less likely to support a high intensity wildfire. Population viability is strongly determined by the severity and frequency of large catastrophic fires, particularly in coastal forest, which can become fragmented and isolated (Lunney et al. 2007). Reducing the extent, intensity and frequency of wildfires through planned burns may therefore help minimise the impacts of wildfire to koalas, including direct koala mortality.

Within koala habitat, well-planned burning provides a means to:

- reduce the intensity of a wildfire, if one occurs
- reduce the extent, intensity and frequency of uncontrolled, high severity wildfires
- create patches in the landscape that are less likely to support a high intensity wildfire.

Planned burns may help maintain koala habitat by:

- encouraging growth of koala feed trees
- maintaining appropriate soil environments for koala feed trees
- reducing mid-storey competition for nutrients and water.

Like all forms of fire, planned burns may impact wildlife, including koalas, if carried out in a manner that produces fire that is too intense. These guidelines provide advice and guidance on how to manage and mitigate potential impacts.

Aboriginal fire management and cultural burning

Many Aboriginal cultures have a strong connection to koalas and their habitat, and many Aboriginal people are skilled in using fire to manage land. Cultural burns are an important component of Aboriginal land management today, and are being used to help manage and shape the landscape in ways that are favourable for koalas. To learn more about Aboriginal-led cultural burning to care for Country and koalas, please visit ‘Aboriginal fire management and cultural burning’ on the *NSW Koala Country* website.

Why you should consider koalas when preparing for your planned burns

The NSW Government identifies ‘intense prescribed burns or wildfires that scorch or burn the tree canopy’ as one of the threats to koalas (see ‘Koala species profile’). It is therefore important to consider how a planned burn can be conducted to mitigate potential impacts on koalas.

During fire, the canopy is an important refuge for koalas. High intensity fires that result in significant canopy scorch can harm or kill koalas seeking refuge in the canopy.

High intensity fires can also impact koalas’ ability to traverse burning trees or flee from fire grounds, or increase threat of dog attack. Smouldering fire matter can burn the pads of koalas, and if tree trunks are significantly burnt, it can make the bark very friable and reduce the ability of koalas to climb, seek food, and shelter.

High intensity fires can also reduce the availability of food until resprouting of vegetation occurs, leaving koalas vulnerable to dehydration and starvation, and increasing their vulnerability to heat stress due to a lack of canopy cover.

NSW fire management agencies such as the NSW Rural Fire Service (NSW RFS) and National Parks and Wildlife Service (NPWS) do not perform high intensity planned burns due to their potential impacts on koalas, as well as for personnel and community safety.

How to use these guidelines

These guidelines provide general information and guidance to help reduce impacts of planned burns to koalas. The guidelines are intended to be a 'conversation starter', rather than a legislative or regulatory obligation. User groups are expected to adapt the use of these guidelines to suit their local context and needs.

The guidelines do not provide advice about wildfire management strategies and tactics, such as backburning in response to an active bushfire. Please contact your local NSW RFS for information on these activities.

The guidelines are not a one size fits all approach and it is important to apply situational approaches, catering for local differences in land and fire management, and to suit local conditions.

The guidelines will be reviewed regularly to improve on-ground management decisions as further information is gained about koala behaviour during fire.

Who are these guidelines for?

- Landholders
- Government agencies
- Fire management authorities
- Councils
- Individuals or groups undertaking ecological burns
- Individuals or groups undertaking cultural burns
- Individuals or groups undertaking agricultural burns
- Contractors
- Other individuals or groups as applicable

When and where these guidelines apply

These guidelines provide guidance for any type of planned burn in koala habitat, including (but not limited to):

- bushfire hazard reduction planned burns
- ecological planned burns
- cultural burns
- planned burns for other land management purposes, such as agriculture.

How to check if the burn area is in koala habitat

To check if your burn area is in koala habitat, you should start with a search for koala sightings in NSW BioNet, to see if there are recent sightings in your local area.

Secondly, you can check the NSW Koala Habitat Information Base dataset, which contains spatial information to help you determine if your burn area is likely to contain koala habitat, koala feed tree species, or a koala. For more information about this dataset, including the spatial layers and guidance material, refer to the Koala Habitat Information Base webpage.

Your local council may also have knowledge of local groups that can provide information on koalas in your area. Some councils also have a Koala Plan of Management, which will have additional information on the local population and its habitat. The NSW Koala Country website includes a list of community groups that have local knowledge of koalas and koala habitat.

A summary of koala survey methods is provided in Appendix A if you would like to survey your burn area for koalas.

Actions to consider when undertaking a planned burn in koala habitat

Planned burns undertaken in koala habitat are much the same as those undertaken elsewhere; however, a few specific considerations can minimise the impacts of a planned burn on the local koala population.

Manage the intensity

- Where possible, avoid high intensity burns (consult local NSW RFS or Fire and Rescue NSW if you require more information on burn intensity).
- Burn only within the prescriptions (e.g. prescriptions regarding fire danger rating, wind and temperature). Contact your local NSW RFS or Fire and Rescue NSW for more information or guidance on suitable conditions for undertaking a burn.
- Consider how your planned burn's intensity can be managed through manipulation, ensuring optimal weather conditions, and consideration of local conditions and variables, including:
  - fuel load
  - fuel moisture
  - temperature
  - humidity
  - wind conditions
  - topography and slope – fire burns hotter and faster up slope.
- Consider how your planned burn's light up technique can influence the fire intensity; consider use of:
  - spot lighting patterns rather than strip lighting
  - lighting at the top of slopes (encouraging the fire to 'trickle' downslope)
  - burning away from high-risk/high fuel load areas
  - time of day, lighting and year, for people to consider cooler burns in colder months
  - strategic placement of containment lines (protecting assets and encouraging 'mosaics').
- Refer to the NSW RFS *Standards for Low Intensity Bush Fire Hazard Reduction Burning (for Private Landholders)*. This document is specifically designed to guide private landholders on how to plan and conduct a low intensity burn.
- Contact your local NSW RFS or Fire and Rescue NSW for more information or guidance on how to undertake a low intensity burn and any approvals required.

Minimise significant canopy scorch

Some scorching of the lower canopy is common when implementing low intensity planned burns (unless the lower branches are extremely high and there is no mid-storey). Habitat with a dense shrub layer and/or mid-storey will lead to a higher degree of canopy scorch even under low intensity conditions. Equally, topography (such as steep slopes and gullies) can lead to localised canopy 'flare-ups' even under low intensity conditions.

- Consider how unavoidable canopy scorch can be minimised and 'localised' (i.e. contained). A localised approach to unavoidable canopy scorch can reduce possible impacts on the local koala population.

Time the burn to be outside koala breeding season

- When practical to do so, and when conditions allow, consider scheduling your burn outside koala breeding season (September – January).

Plan a mosaic approach

- When burning large areas[1] (e.g. over 5 hectares), consider how your planned burn area can be planned to provide a mosaic of burned and unburned compartments. In achieving a mosaic, 50% burned and 50% unburned is recommended in high quality koala habitat.
- If practical to do so, manage priority sites by wetting the ground fuel in those areas prior to ignition. Assessment of local conditions is required to ensure that any steps taken to benefit koala habitat are not to the detriment of other species, habitats and threatened ecological communities; for example, wetting ground fuel can result in the introduction of pathogens (Chytrid, Phytophthora).

For further advice on how to implement a mosaic approach, or how to wet ground fuel before a burn, please consult your local NSW RFS or Fire and Rescue NSW.

Retain mesic refuge areas

Recent research undertaken by the NSW Government indicates koalas move to refuge areas very quickly after fire and largely remain there for a short period (3–4 months) post-burn.

- Consider how to minimise the intrusion or the intensity of the planned burn into mesic (moister) refuge areas. These areas are commonly found in deeper, wetter gullies and riparian areas, but the moister areas on south-facing slopes may also offer refuge[2]. Not burning such areas provides a refuge for koalas in the immediate post-burn environment.

Facilitate koala search and rehabilitation post-fire

- If there is a high likelihood of canopy scorch within your burn site due to the vegetation fuels, terrain, and lighting pattern, consider pre-emptively organising an animal rescue response.
- If your planned burn in koala habitat results in canopy scorch, consider immediately contacting your local animal rescue authority to request a post-fire koala search and rescue.
- If you find an injured or distressed koala, call a licensed wildlife rescue and rehabilitation provider for advice. Further information is available on how to help koalas in emergencies on the 'Helping koalas in emergencies' webpage.

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[1] There may be limitations to undertaking a mosaic approach due to tenure, resources, containment lines, size of the burn and objectives of the burn.

[2] These wetter areas typically contain rainforest or wet sclerophyll species (but may also contain paperbarks). The understories typically support rushes, ferns, or small rainforest plants. They will often, but not always, have permanent or ephemeral water, such as temporary 'chains of ponds' that may be present along drainage lines.

Your local wildlife rescue group may also contact you to request access to undertake rescue and rehabilitation activities.

For more information, see the *Wildlife first response training for NSW firefighters* handbook.

Protect koala food trees

- If you have sufficient resources and knowledge, you may consider raking around the base of known koala food trees to remove leaf litter and other fuel. This reduces the likelihood of bark ignition or otherwise decreases the likelihood of the tree igniting. You need to assess the local conditions to ensure this action does not harm other species, habitat and threatened ecological communities. For example, raking areas around food trees can remove habitat for other fauna such as burrowing reptiles and small birds. See Chapter 4 of the *State Environmental Planning Policy (Biodiversity and Conservation) 2021* for a list of koala use tree species.
- Trimming elevated fuels (shrubs) around the base of such trees may also assist.

This work may take time, which may affect the timing of your planned burn. If firefighting authorities are undertaking the burn, such work will need to be completed prior to the day of the planned burn. This is to ensure personnel (particularly volunteers) and allocation of other associated resources can proceed without delay on the scheduled day of the burn.

Notify authorities

- Contact your local NSW RFS or Fire and Rescue NSW to notify them of your planned burn. You can use the NSW RFS 'Notify us of your planned burn' webpage.

Legal obligations – *Before you light that fire*

It is the responsibility of the relevant landowner, occupier or agency to ensure their actions comply with the laws that are relevant to their specific circumstance. For advice on the approval and notification processes, please see the NSW RFS document *Before you light that fire*.

The document will guide you on the environmental approvals that may be required, your responsibilities to notify the NSW RFS or Fire and Rescue NSW of your planned burn, along with notifying neighbours. The document also guides you on the circumstances in which a permit (fire safety) is required and other matters such as total fire ban days.

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More information

- Aboriginal fire management and cultural burning
- Before you light that fire [PDF 2.9MB]
- Helping koalas in emergencies
- Koala Habitat Information Base dataset
- Koala Habitat Information Base webpage
- Koala species profile
- Managing fire in parks and reserves, NSW National Parks and Wildlife Service
- Notify us of your planned burn, NSW Rural Fire Service
- NSW BioNet
- NSW Koala Country
- Standards for Low Intensity Bush Fire Hazard Reduction Burning (for Private Landholders) [3.6MB]
- State Environmental Planning Policy (Biodiversity and Conservation) 2021
- Wildlife first response training for NSW firefighters
- Wildlife rehabilitation licences

For more information and additional contacts for koala conservation in NSW, please visit www.koala.nsw.gov.au/contacts/.

For information and additional contacts regarding your prescribed burn, please visit www.rfs.nsw.gov.au/about-us/contact-us.

Appendix A – Additional information to help identify koala habitat

Koalas are cryptic animals and can be difficult to find. There are a number of ways that landholders, individuals and groups can survey for koalas before undertaking a planned burn.

Localised survey methods that may be suitable for landholders include (but are not limited to) looking for scats, spotlighting and listening. There are also other survey methods that require a conservation practitioner.

Scats

- Koala droppings, also known as 'scats', are a reliable indicator of koala presence.
- It is often easier to find koala scats on the ground than it is to find a koala.
- Scats can be found by raking in a 1 m circumference around the base of koala feed trees.
- Koala scats can be easily confused with scats from other animals, such as brushtail possums. Tips to identify koala scats include:
  - koala scat contains no visible hairs or insect particles
  - eucalypt leaf particles may be present (but not necessarily); extremely fresh koala scat can smell like eucalypt but will have little odour when dry
  - scats are hard on the outside, slightly ridged and have an oval shape (Figure 1).
- Limitations of this method include:
  - less effective in areas with dense ground cover (Cristescu et al. 2012; Jiang et al. 2020)
  - scat surveys should not be undertaken within 3 days of rainfall due to scat decomposition rates (Melzer et al. 1994; Cristescu et al. 2012).

Figure 1 **Koala scat (Photo: DPE)**

Spotlighting

- Whilst koalas are notoriously difficult to spot, spotlighting (with a torch at night) can be an effective method for detecting koalas (Figure 2).
- By walking around and 'spotlighting' the tree canopy with a spotlight or torch, koala presence can be detected via their reflective eyeshine (DSEWPaC 2011; Wilmott et al. 2019). Koala eyeshine (the reflection from their eyes of the torch/spotlight) is generally a green/yellow colour.
- This method relies on identifying koalas via eyeshine, so is not suitable in dense vegetation, where tree height is upwards of 30 m, where there are steep slopes, or in deep gullies (DSEWPaC 2011).

Figure 2 **Koalas detected via spotlighting (Photo: Lachlan Hall)**

Listening

- Another sign that koalas are present is the distinctive call by males, also known as 'bellowing', during the breeding season over summer months (August to February).
- The call is produced as the male inhales and gives a loud, deep 'bellow' as he breathes out.
- Bellows can be heard up to 1 km away.

Other survey methods (used by conservation practitioners)

- Remotely piloted aircraft systems or drones have emerged as an effective tool for conservation practitioners (Beranek et al. 2020).
- Acoustic recording of koala bellows detects koala presence during breeding season (Ellis et al. 2011; Smith 1980; Charlton et al. 2011).
- Conservation detection dogs are suitable for low-density koala populations or sites with complex litter (Cristescu et al. 2015; Arnett 2006; Cristescu et al. 2012).

Seeking appropriate advice

- When planning your prescribed burn, consider speaking with your local council or local wildlife volunteer group to obtain advice on identifying and marking koala feed tree species.
- Trained members of koala rescue organisations may be able to provide sufficient experience for both koala surveys and tree identification.
- In areas where there is a lack of surveys (e.g. western NSW) and given the broad nature of koala habitat maps, local councils and interest groups (e.g. local animal rescue organisations) may be able to provide specific information on the local koala populations.

Engaging local animal rescue organisations

- Landowners may consider contacting local animal rescue organisations to see whether they are interested in pre-emptively scheduling a pre-burn search and/or post-burn search and rehabilitation for their property. To find a licensed wildlife rehabilitation provider in your area, please visit the 'Wildlife rehabilitation licences' webpage.