



Final report

Advice on finalising Draft Private Native Forestry Codes of Practice

March 2022



Natural Resources Commission

Enquiries

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List of acronyms

AGS	Australian Group Selection (harvesting method)
CEO	Chief Executive Officer
DPI	NSW Department of Primary Industries
DPE	NSW Department of Planning and Environment
DRNSW	Department of Regional NSW
DPE EES	NSW DPE - Energy, Environment and Science (Group)
EPA	NSW Environment Protection Authority
EPA Act	<i>Environmental Planning and Assessment Act 1979 (NSW)</i>
ESFM	Ecological Sustainable Forest Management
FMIP	Forest Monitoring and Improvement Program
IFOA	Integrated Forestry Operation Approval
IPCC	Intergovernmental Panel on Climate Change
LLS	Local Land Services
LLS Act	<i>Local Land Services Act 2013 (NSW)</i>
NRC	Natural Resources Commission
NSW	New South Wales
MER	Monitoring, Evaluation and Reporting
OCSE	Office of the NSW Chief Scientist and Engineer
PNF	Private Native Forestry
RFA	Regional Forest Agreement
SEPP	State Environmental Planning Policy
STS	Single Tree Selection (harvesting method)

Acknowledgement of Country

The Natural Resources Commission acknowledges and pays respect to traditional owners and Aboriginal peoples. The Commission recognises and acknowledges that traditional owners have a deep cultural, social, environmental, spiritual and economic connection to their lands and waters. We value and respect their knowledge in natural resource management and the contributions of many generations, including Elders, to this understanding and connection.

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Attachment 1 – Terms of Reference

Attachment 2 – Final draft PNF codes

Attachment 3 – Objects of the Local Land Services Act 2013

Attachment 4 – Principles of Ecologically Sustainable Forest Management

Attachment 5 – Criteria for assessing fulfilment of requirements

Attachment 6 – Assessment of LLS response to OCSE recommendations

Attachment 7 – Assessment against Principles of ESFM

1 Executive summary

Private Native Forestry (PNF) is the sustainable management of native forests on private property for timber production in line with the objects of the *Local Land Services Act 2013* (LLS Act). The rules for forestry on private land are established in the four PNF codes of practice (the PNF codes), which cover Northern NSW, Southern NSW, River Red Gum Forests, and Cypress and Western Hardwood Forests.

In line with the *Independent Biodiversity Legislation Review*¹ and *NSW Forestry Industry Roadmap*², the NSW Government committed to a reform of the PNF regulation that:

- does not regulate native timber harvesting on private land as a form of land use change
- regulates sustainable PNF operations based on scale and intensity, including options for low-intensity operations without approvals and a focus on outcomes rather than process
- improves the environmental performance of haulage and harvest contractors.

Revised PNF codes were developed by Local Land Services (LLS) and released for public consultation in March 2020. The draft PNF codes were then subject to a series of reviews, including the Office of the NSW Chief Scientist & Engineer's (OCSE's) 2021 review as to whether the draft PNF codes deliver Government's dual objectives of '*robust koala protections in high value koala habitat and certainty and consistency for primary producers*'.³ In response to this, LLS developed revised draft PNF codes.

1.1 The Commission's review

To assist in finalising the PNF codes, the Deputy Premier and the Minister for Planning and Public Spaces has sought the following advice from the Natural Resources Commission (the Commission) under a Terms of Reference (**Attachment 1**):

- **Task 1** – advise on whether the final draft PNF Codes fulfil the Objects of Part 5B of the LLS Act (including the principles of Ecologically Sustainable Forest Management (ESFM)), other government policy objectives, and recommendations in the OCSE's 2021 report. The Commission can make recommendations to amend the final draft PNF Codes to assist in fulfilling these requirements.
- **Task 2** – work with the NSW Forest Monitoring Steering Committee to develop shared understanding on fundamental information and develop a PNF Monitoring Evaluation and Reporting framework, including aligning methods in measuring, modelling, mapping, reporting and data management.

As per the Terms of Reference, the Commission reviewed the revised draft PNF codes against the requirements outlined in **Task 1** above and delivered initial advice to LLS. The Commission appointed and worked with an expert panel comprising of Professor Patrick Baker (University of Melbourne), Dr Alistair Meltzer (Central Queensland University) and Dr Chris Armstrong (Deputy NSW Chief Scientist and Engineer).

¹ Byron, N., Craik, W., Keniry, J., and Possingham, H. (2014). *A review of biodiversity legislation in NSW: final report*, report by the Independent Biodiversity Legislation Review Panel for the State of NSW and the Office of Environment and Heritage, Sydney, NSW.

² NSW Government (2016). *NSW Forestry Industry Roadmap*. NSW Government, Sydney, NSW.

³ Office of the NSW Chief Scientist & Engineer (2021). *Advice on Koala protection in the proposed new Private Native Forestry Codes of Practice*. Office of the NSW Chief Scientist & Engineer, Sydney, NSW.

The Commission also consulted with Department of Planning and Environment (DPE) - Energy, Environment and Science (EES) and Place, Design and Public Spaces Group, Department of Primary Industries (DPI) and the Environment Protection Authority (EPA) during the review.

The Commission's initial advice to LLS indicated that the revised draft PNF codes offer an improvement on past arrangements, particularly in terms of delivering regulation based on scale and intensity. These codes would also provide landholders with certainty and consistency, recognising the differences between private and public native forestry.

However, the Commission determined the revised draft PNF codes did not fully meet the ESFM principles and recommendations from the 2021 OCSE review. The Commission therefore identified a range of further opportunities for improvement, including strengthening koala protections in high value koala habitat and shifting to an outcomes-based approach. **Box 1** in **Section 2.4.1** summarises the Commission's suggested improvements in its initial advice to LLS.

In response to the Commission's initial advice, LLS provided feedback and a set of updated draft PNF codes. The draft PNF codes were revised further in response to ongoing discussions with the Commission, culminating in the final draft PNF codes that are included as **Attachment 2** (see **Section 2.4.1** for further detail).

The Commission has reviewed the final draft PNF codes against the **Task 1** requirements to inform the findings and recommendations in this report. The Commission also sought feedback from LLS, DPE EES, EPA, and the expert panel. The Commission also considered earlier public submissions to LLS on the draft codes.

During the review process, LLS, DPE EES and EPA have constructively engaged with the Commission to further improve the PNF codes to deliver better outcomes for landholders, native forests and fauna. In particular, the Commission welcomed LLS's openness and outcomes-focused approach given the various reviews that had occurred previously, and their willingness to work with the Commission to refine the PNF codes.

Throughout this review, the Commission have also been working with the DPE EES and DPI Forest Science Unit to refine the koala habitat mapping for use in the PNF codes, in line with **Task 2** of the Terms of Reference. The approach and outcomes of this process are also outlined in this report, as well as the proposed next steps for developing a PNF Monitoring Evaluation and Reporting (PNF MER) framework.

1.2 Summary of Task 1 review findings

Having reviewed the final draft PNF codes against the **Task 1** requirements, the Commission considers that these codes are a substantive improvement on the existing PNF codes.

The Commission advises that the final draft PNF codes meet the Objects of Part 5B of the LLS Act, the ESFM principles, Government's dual objectives of "...robust protections for koalas in high value koala habitat and certainty and consistency for primary producers" and the 2021 OCSE review recommendations. They also provide greater clarity and are easier for landholders to apply, which addresses key areas of stakeholder feedback in relation to the existing PNF codes.⁴

These final draft PNF codes incorporate the Commission's suggested improvements as identified over the course of this review, including revised Forest Stewardship Plan provisions, stronger koala protections, revised harvesting intensity limits, enhanced stream protections and provisions addressing the precautionary principle. Specifically, the final draft PNF codes:

⁴ Elton Consulting (2019). *Private Native Forestry Review Terms of Reference - Submissions Review Final Report*. Report produced for NSW Local Land Services.

- include long-term outcomes statements to support a shift towards outcomes-based regulation
- provide a range of different planning options with provisions and approval processes commensurate to the scale and intensity of the proposed activities, including:
 - **PNF Plans** – that allow for limited small scale harvesting operations on private land without the need for additional planning documents
 - **Forest Management Plans** – that provide a straightforward pathway for landholders to carry out PNF under specified conditions, including Net Harvestable Area limits
 - **Forest Stewardship Plans** – that allow for increased extent or intensity of harvesting (within region-specific limits) or to respond to significant disturbance events, subject to LLS approval informed by an independent expert panel assessment against set criteria
- increase the minimum basal area for single tree selection and thinning in the Northern region to a flat retention rate of 14 metres squared per hectare (up from 10 metres squared per hectare in the initial final draft PNF codes), with scope to lower basal area limits to 10 metres squared per hectare in the Northern, Southern and River Red Gum regions under Forest Stewardship Plans subject to safeguards to protect environmental values
- revise Australian Group Selection provisions such that canopy opening rules are based around maximum area limits (0.5 hectares in a Forest Management Plan and 0.75 hectares in a Forest Stewardship Plan) instead of existing stand height provisions to improve ease of implementation and compliance for landholders, and adding post-harvest protections around canopy openings
- improve koala protections in high value koala habitat, including increasing the koala tree retention rate to 15 primary and 5 secondary koala feed trees per hectare (compared with 10 primary and 5 secondary koala feed trees per hectare in the existing PNF codes) across some 2.8 million hectares
- include enhanced stream protections due to expanded riparian exclusion zones that will apply to both mapped and unmapped streams
- allow for interventions to ensure harvest operations are distributed over time and space, or in instances where an unforeseen disturbance event – such as large-scale wildfires, drought or mass tree dieback – may cause serious or irreversible damage to the environment
- commit to the development of a PNF MER framework to assist in further improving PNF, and periodic reporting on PNF planning, activities and outcomes to improve accountability and transparency.

Section 4 of this report provides further details about the updates and expected benefits.

The Commission recommends that the NSW Government approves the attached codes in their substantive form, noting minor adjustment may be warranted during final legal drafting. The Commission considers that these PNF codes are in line with the Objects of Part 5B of the LLS Act and other identified requirements. However, Government could seek further legal advice on the drafting and enforceability of the proposed code provisions for assurance.

In addition, the Commission has provided further recommendations to support the effective implementation of the PNF codes. These recommendations, as set out in **Section 1.5**, primarily focus on Government support for LLS and PNF, establishing the PNF MER framework, improving the guidance material associated with the PNF codes, and strengthening the collaborative relationship between LLS and EPA.

Earlier draft PNF codes were released for public consultation in March 2020. The Commission notes the Minister may undertake further public consultation on the codes, if the Minister deems it appropriate given the extent of changes.

1.3 Summary of Task 2 progress

The OSCE's 2021 report emphasised the need for shared understanding and agreement on critical issues such as the relationship between koalas and private native forestry. To achieve this will take time, investment and goodwill. Although some progress has been made as part of the Commission's review, this is an ongoing process that must continue.

Under the Terms of Reference for **Task 2**, the Commission has worked productively with scientists at the DPE EES Group and DPI Forest Science Unit to develop a fit-for-purpose interim *PNF Koala Prescription Map* for each PNF code region. These maps identify areas that are likely to have a high probability of containing vegetation types that contain koala feed trees, which is a good indicator of high-quality koala habitat. The primary purpose of the map is to trigger additional koala protections, in particular koala feed tree retention at a PNF site if the trees are available. It is important to note that the map is not a map of koala occupancy.

Importantly, the final draft PNF codes allow landholders to request a habitat verification survey through LLS on their properties to assess any disputed areas indicated on the PNF Koala Prescription Map as requiring additional koala protections. If the mapping is found to be incorrect, the map will be updated and any relevant PNF planning instruments will be amended accordingly.

The Commission recommends the PNF Koala Prescription Map and associated spatial layer in the final PNF code is adopted as an interim map (Version 1) for 12 months (**Figure 4-Figure 7** and **Attachment 2**). Following approval of the PNF codes, the PNF Koala Prescription Map should be field checked, and a verification and improvement process initiated to identify any trends of false negatives and positives. This process should be overseen by the NSW Forest Monitoring Steering Committee, independently chaired by the Commission. Both Ministers responsible for making the PNF codes should jointly approve changes to the map, which can be based on advice from the Commission in its role described above.

Going forward, the NSW Forest Monitoring Steering Committee will oversee a broader process to collaboratively design a PNF MER framework to be jointly approved by the Department of Regional NSW (DRNSW) and DPE EES. This process will also improve associated modelling and monitoring methods for PNF, adaptively review and improve prescriptions for threatened species in the Code and ensure data management protocols are in place.

This work will be ongoing and can occur after the PNF Codes are finalised and approved.

1.4 Better outcomes rely upon more than improved Codes

Achieving legislative objectives, including ESFM on private land relies on five elements:

- **clear and workable guidelines and operating standards** – the final draft PNF codes, supported by further protocols, will deliver this
- **extension and incentives** – LLS working with landholders to understand the PNF codes and how good forest stewardship can benefit their property and business
- **strong enforcement capability** – provided by the EPA with support from LLS, for example through timely sharing of information
- **understanding best practice and effective evidence base** – generating knowledge and evidence about what aspects of PNF are working and what needs improvement, guided by the NSW Forest Monitoring Steering Committee independently overseen by the Commission through a PNF MER framework
- **communication and collaboration** – building better relationships between Government agencies, particularly LLS and EPA, to foster collaborative co-regulation and improve PNF outcomes.

If the final draft PNF Codes are to deliver ESFM and meet their identified outcomes, they will require effective implementation and enforcement, as well as ongoing support for extension and MER activities.

ESFM on private land is dependent upon private landholders and contractors understanding the benefits of good forest management and stewardship and being willing to participate in forest management activities. As such, LLS's role in providing extension services is paramount to driving better forest stewardship across different forest types and regions and needs to be adequately funded. It is particularly important to ensure landholders have the capacity to carry out proposed PNF activities such that good outcomes will be achieved. There is also an urgent need to invest in monitoring and research through the PNF MER framework and NSW FMIP, as there are key knowledge gaps around the benefits and impacts of PNF activities.

In addition, LLS and EPA should seek a more collaborative approach to regulation. The benefits of shared understanding and avoidance of potential costly litigation can readily outweigh the initial upfront costs of collaborative co-regulation. Memorandums of Understanding between the agencies should be used to strengthen relationships and co-operation, including for information sharing. LLS should also consult with EPA when developing the necessary protocols and guidance that will accompany the PNF codes, particularly where enforceability is a consideration.

1.5 Recommendations

The Commission recommends that:

- 1 The NSW Government approves the attached PNF codes, including the interim PNF Koala Prescription Map, noting some adjustment may be warranted during final legal drafting.
- 2 The NSW Government support PNF by:
 - 2.1 increasing support to LLS to ensure it can carry out the following roles effectively:
 - 2.1.1 building landholder capacity through training and education, particularly for landholders proposing to apply Australian Group Selection, and to offer advisory services, training, and education where necessary
 - 2.1.2 identifying other opportunities to encourage voluntary compliance and best practice PNF.
 - 2.2 adequately funding the Commission, in its role as independent Chair of the NSW Forest Monitoring and Improvement Program, to oversee the design and implementation of:
 - 2.2.1 a PNF MER framework (as requested under this Terms of Reference)
 - 2.2.2 a process for verifying and improving the PNF Koala Prescription Map and underlying koala habitat models to ensure koala prescriptions are applied in high value koala habitat areas. Custodianship of the PNF Koala Prescription Map spatial data be transferred to Data NSW within the NSW Department of Customer Service.
 - 2.2.3 a LLS survey protocol for the landholder-instigated koala habitat verification surveys
 - 2.2.4 a risk-based review of threatened species protections for key species in Appendix A that will be carried out by a cross-agency technical review team.
 - 2.3 improving transparency and accountability around the PNF code revision process by making public submissions and reviews that have informed the PNF code updates publicly available in a timely manner, including the Commission's review.
- 3 LLS to develop and approve protocols and guidance material with input from EPA and DPE that are needed to support the implementation of the PNF codes within six months of the PNF codes' approval, including:

- 3.1 a protocol for the development of Forest Stewardship Plans, including a standardised Forest Stewardship Plan template – EPA Legal Officers should be consulted on the design of the template to ensure enforceability and compliance
 - 3.2 a protocol for Forest Stewardship Plan assessment and approval to guide the independent expert panel assessment process
 - 3.3 a transparent framework or protocol to guide the Minister and LLS when enacting clauses relating to the management of environmental impacts at the plan or bioregional scale following a significant disturbance event
 - 3.4 regeneration guidelines, including guidance on appropriate regeneration management following the use of Australian Group Selection and risks arising from premature grazing in canopy openings
 - 3.5 guidelines for the use of Australian Group Selection, including canopy opening configuration and placement to deliver the intended outcomes and reduce the risk of regeneration failure, and a list of shade-intolerant species to provide clarity for landholders as to where the use of Australian Group Selection may be appropriate.
- 4 LLS and EPA establish a Memorandum of Understanding for the timely sharing of information needed to regulate PNF, including transfer of information regarding PNF plan approvals and plan variation approvals from LLS to the EPA.

2 Background

Key insights

- 1 Sustainable management of native forests on private property provides resources for the NSW forestry industry, land management options for landholders, and supports environmental outcomes.
- 2 The NSW Government is seeking to finalise the draft Private Native Forestry (PNF) codes of practice to meet commitments under the *Independent Biodiversity Legislation Review* and *NSW Forestry Industry Roadmap*. Amongst other things, this PNF review seeks to develop a risk-based regulatory approach to sustainable forestry operations based on their scale and intensity and shift the focus towards outcomes rather than process.
- 3 The context for PNF has changed since the draft codes were first developed in 2019 due to the 2019/20 wildfires and their impact on landholders, industry and the environment, Government commitments to climate adaptation and mitigation, updated koala research and policies, and evidence emerging from forest science, reviews and inquiries.
- 4 The Natural Resources Commission has been given a Terms of Reference to:
 - **Task 1** – advise on whether the final draft PNF Codes are consistent with the Objects of Part 5B of the LLS Act (including the principles of Ecologically Sustainable Forest Management (ESFM)), reflect government policy, and help implement the recommendations in the OCSE’s 2021 report
 - **Task 2** – build upon the Commission’s existing responsibility to implement a NSW Forest Monitoring Improvement Program to help inform evidence-based decision making and promote active and adaptive forest management in NSW.
- 5 The Commission’s review has been informed by expert panel advice, consultation with relevant agencies, government legislative requirements, relevant policy objectives and previous work by independent experts, including the OCSE’s previous reviews.
- 6 This report summarises the Commission’s final advice, based on final draft PNF codes developed by LLS. The codes were updated by LLS in response to initial advice provided by the Commission on 25 November 2021 under this Terms of Reference.

2.1 Private native forestry codes of practice

Private Native Forestry (PNF) is the sustainable management of native forests on private property for timber production in line with the objects of the LLS Act. Private native forests account for 37 percent of the ~20 million hectares of native forests in NSW.⁵ As such, PNF is a key resource for the NSW forestry industry, as well as an important land management option for landholders.

The rules for forestry on private land are established in the PNF codes of practice (the PNF codes). There are four PNF codes covering different areas of NSW:

- **Northern NSW** – all forests in northern NSW (north of Sydney) except river red gum forests, cypress or western hardwood forests
- **Southern NSW** – all forests in southern NSW (south of Sydney) except river red gum forests, cypress or western hardwood forests

⁵ Montreal Process Implementation Group for Australia and National Forest Inventory Steering Committee, 2018, *Australia’s State of the Forests Report 2018*, ABARES, Canberra.

- **River red gum forests** – river red gum forests⁶ dominated by *Eucalyptus camaldulensis*
- **Cypress and western hardwood forests** – cypress forests where 80 percent of the stand basal area is made up of white cypress pine (*Callitris glaucophylla*), and western hardwood forests, generally eucalypt woodlands and forests⁷ of NSW western plains and slopes.

The existing PNF codes have been in place since 2008.⁸

2.2 Review of the private native forestry codes of practice

In line with Recommendation 7 of the 2014 *Independent Biodiversity Legislation Review*⁹ and the 2016 *NSW Forestry Industry Roadmap*¹⁰, the NSW Government committed to reviewing the regulatory arrangements for timber harvesting on private land, including options for:

- not regulating native timber harvesting on private land as a form of land use change
- regulating sustainable forestry operations based on their scale and intensity rather than tenure, including options for permitting low-intensity operations on private land without the need for approval and a focus on outcomes rather than process
- improving the environmental performance of haulage and harvest contractors on private and public land, including licensing and minimum standards.

In 2018, LLS received a Terms of Reference to lead the PNF Review in collaboration with the Environment Protection Authority (EPA) and the Department of Primary Industries (DPI). LLS sought public submissions on the Term of Reference, then developed draft PNF codes that were released for public consultation by the NSW Government in March 2020.

Key issues raised during public consultation on the Terms of Reference include:

- improving the clarity and ease of use of the PNF codes
- ensuring land management achieves good environmental outcomes, particularly for threatened species and ecological communities
- mixed views as to the effectiveness of current compliance and enforcement measures
- support for an outcomes-based approach.¹¹

⁶ Consistent with Forest Type 199 (River Red Gum) in Baur, GN. (1965). *Research Note 17, Forest Types in New South Wales*. Reprinted 1979. Forestry Commission of N.S.W., Sydney, NSW.

⁷ Consistent with Forest Types 99, 103, 104, 124, 171–178, 180–185, 203–210 and 213 in Baur, GN. (1965). *Research Note 17, Forest Types in New South Wales*. Reprinted 1979. Forestry Commission of N.S.W., Sydney, NSW.

⁸ There was a minor amendment to the Northern NSW Code in 2013 to include provisions for seasonal limitations within one (then) Catchment Management Authority Area.

⁹ Byron, N., Craik, W., Keniry, J., and Possingham, H. (2014). *A review of biodiversity legislation in NSW: final report*, report by the Independent Biodiversity Legislation Review Panel for the State of NSW and the Office of Environment and Heritage, Sydney, NSW.

¹⁰ NSW Government (2016). *NSW Forestry Industry Roadmap*. NSW Government, Sydney, NSW.

¹¹ Elton Consulting (2019). *Private Native Forestry Review Terms of Reference - Submissions Review Final Report*. Report produced for NSW Local Land Services.

The draft PNF codes have undergone a series of reviews and amendments, including:

- multiple reviews, namely:
 - A/Prof. Brack (Fenner School of Environment and Society, Australian National University) report on *Native Forest Harvesting and Thinning on Private Managed Land in New South Wales for Multiple Purposes*¹² that supported the proposed ‘flat-rate’ minimum basal area values of 10m²/ha for Northern NSW and 12m² /ha for Southern NSW, particularly in the context of regeneration and renewal operations to guard against the risk of high-grading
 - the Office of the NSW Chief Scientist & Engineer’s (OCSE’s) facilitated a peer review of the Brack report, through advice from Prof. Vanclay (Sustainable Forestry, Southern Cross University) that supports the proposed basal area limits while also encouraging a shift towards outcomes- and incentives-based approaches¹³
 - Prof. Vanclay (Sustainable Forestry, Southern Cross University) advice to LLS *PNF Review: Recommendations Report* reviewing the draft PNF codes against the Objects of Part 5B of the LLS Act and advising that the draft PNF codes improve on the former codes and should be adopted subject to minor amendment and a greater focus upon extension, incentives, monitoring and peer-reviewed research. Prof. Vanclay also strongly supported the inclusion of Forest Stewardship Plans to enable site specific variations and conservation of rare species.¹⁴
- further amendments in early 2021 to harmonise with the LLS Act and the *Environmental Planning and Assessment Act 1979* (EPA Act) to ensure robust protections for koalas in areas of high value koala habitat and certainty and consistency for primary producers
- a 2021 review by the OCSE as to whether the proposed amendments to the draft PNF codes deliver the desired robust koala protections in areas of high value habitat and certainty and consistency for primary producers.¹⁵

In September 2021, the Secretary of the Department of Regional NSW (DRNSW) informed the Secretary of the then Department of Planning, Industry and Environment (now DPE) that DRNSW have agreed-in-full or agreed-in-principle to all of the OCSE’s recommendations in their 2021 advice. Accordingly, LLS presented a set of initial final draft PNF codes that seek to address the OCSE’s recommendations.

The NSW Government is committed to finalising these final draft PNF codes. To this end, the Deputy Premier and the Minister for Planning and Public Spaces has sought additional advice from the Natural Resources Commission (the Commission) under a Terms of Reference (**Attachment 1**).

¹² Brack, CL. (2020). *Native Forest harvesting and thinning on Privately Managed Lands in New South Wales for multiple purposes*. Prepared for Local Land Services by CL. Brack, Fenner School of Environment and Society, Australian National University, Canberra, ACT.

¹³ OCSE (2020). *Peer review of the report ‘Native Forest Harvesting and Thinning on Private Managed Lands in New South Wales for Multiple Purposes’ by Dr Cris Brack*. Advice to The Hon. Adam Marshall MP, Minister for Agriculture and Western NSW from OCSE, Sydney, NSW.

¹⁴ Vanclay, J. (2021). *PNF Review: Recommendations Report*. Prepared for Local Land Services by J. Vanclay, Southern Cross University, Lismore, NSW.

¹⁵ Office of the NSW Chief Scientist & Engineer (2021). *Advice on Koala protection in the proposed new Private Native Forestry Codes of Practice*. Office of the NSW Chief Scientist & Engineer, Sydney, NSW.

2.3 Additional context

Since the draft PNF codes were developed in 2019 there have been events, policy and legal developments, research, reviews and inquiries that are relevant to the PNF codes and the Commission's review.

2.3.1 Recent and future wildfires

Unprecedented wildfires in 2019/20 across eastern NSW impacted over 5 million hectares of forest, the majority of which was on public land.¹⁶ The fires followed drought conditions from 2017 onwards and had significant impacts on forest ecosystems and local communities.^{17,18} Wood supply from public lands was impacted, resulting in supplemental supply from private land.

Studies suggest that increasing fire activity in Australian forests is linked to climate change.¹⁹ Research also indicate that the extent and severity of the 2019/20 fires was largely related to adverse fire weather driven by drought and wind conditions over the entire fire season, rather past forest management of fire disturbance.²⁰ The risks and impacts from fire are expected to worsen in future in coastal NSW due to recent shifts in fire regimes exacerbated by changing climatic conditions.²¹

2.3.2 Koala conservation and forestry

In July 2020, the (then) NSW Energy and Environment Minister set a goal of doubling the number of koalas in NSW by 2050, supported by a \$193 million commitment in the 2021/22 State Budget for a new koala conservation program. In addition, an updated koala strategy is soon to be released, which will build on the existing *NSW Koala Strategy 2018–21*.²²

The Australian Government has also recently upgraded the threatened species status for Koalas from vulnerable to endangered under the *Environment Protection and Biodiversity Conservation Act 1999* for the combined koala populations of Queensland, New South Wales and the Australian Capital Territory based on expert advice²³, and committed \$50 million to enhance the protection of koala nationally.²⁴

¹⁶ State of New South Wales and Department of Planning, Industry and Environment (2020) NSW Fire and the Environment 2019-20 Summary

¹⁷ *Ibid.*

¹⁸ Australian Disaster Resilience Knowledge Hub. Accessed at <https://knowledge.aidr.org.au/resources/black-summer-bushfires-nsw-2019-20/>

¹⁹ Canadell, J.G., Meyer, C.P., Cook, G.D. et al. (2021). Multi-decadal increase of forest burned area in Australia is linked to climate change. *Nature Communications* 12, 6921. <https://doi.org/10.1038/s41467-021-27225-4>

²⁰ Bowman, D.M.J.S., Williamson, G.J., Gibson, R.K. et al. The severity and extent of the Australia 2019–20 Eucalyptus forest fires are not the legacy of forest management. *Nat Ecol Evol* 5, 1003–1010 (2021). <https://doi.org/10.1038/s41559-021-01464-6>

²¹ Bradstock, R., Bedward, M., & Price, O. (2021), *Risks to the NSW Coastal Integrated Forestry Operations Approvals Posed by the 2019/2020 Fire Season and Beyond*, Centre for Environmental Risk Management of Bushfires, University of Wollongong and the NSW Bushfire Risk Management Research Hub, commissioned by the NSW Forest Monitoring Steering Committee, Sydney, NSW

²² Office of Environment and Heritage (2018). *NSW Koala Strategy*. Office of Environment and Heritage on behalf of the NSW Government, Sydney, NSW.

²³ Department of Agriculture, Water and the Environment (2022). *Conservation advice for Phascolarctos cinereus (Koala)*. Australian Government, Canberra.

²⁴ Prime Minister of Australia – Media Release – 29 Jan 2022– Record \$50 million for Koalas accessed at <https://www.pm.gov.au/media/record-50-million-koalas>

Recent research published in September 2021 found that koala density depends on the nutritional quality of available habitat, and that the nutritional quality of trees for koalas depends more on the species type than the size of the tree.²⁵ Noting that the protections for koalas on state forests are significantly different to those on private land, the research also found that selective harvesting did not have an adverse impact upon koala numbers on the surveyed north coast state forests. Overall, koala density was higher than anticipated in the surveyed state forests, with similar densities between state forests and national parks.²⁶ This is consistent with recent monitoring that demonstrates koala occupancy has remained stable in north coast forests since monitoring started in 2015.

The NSW Koala Strategy also funded a three-year study across 130 sites within privately-owned forests in north-east NSW, targeting areas of moderate to high quality habitat as predicted by a koala habitat suitability model.²⁷ The study used passive mini-acoustic sensors to survey for koalas based on recording male koala bellows. The published study found that private native forests are commonly occupied by koalas, that there is no evidence that koala occupancy is impacted by past timber harvesting where natural regeneration was allowed to occur.²⁸

2.3.3 Legal directions, challenges, and inquiries

In August 2021, NSW Land and Environment Court ordered the NSW Environment Protection Authority (EPA) to develop environmental quality objectives, guidelines and policies to ensure the protection of the environment in NSW from climate change.²⁹ According to the judgement, the EPA have a duty to adapt their objectives, guidelines and policies to address emerging threats to the environment.

In August 2021 it was also announced that the North-East Regional Forest Agreement (RFA) is being challenged in the Federal Court. The North-East RFA was first agreed in 1999 and renewed for a period of 20 years in 2018. The Environmental Defenders Office, on behalf of the North-East Forest Alliance (NEFA), is arguing that the Commonwealth, in renewing the RFA, did not have sufficient regard to endangered species (including koalas), the state of old growth forests or the impacts of climate change as required under the relevant legislation.³⁰

In March 2021, the NSW Parliament established an inquiry into the long-term sustainability and future of the timber and forest products industry.³¹ Some issues raised by stakeholders include:

- ensuring the legal framework regulating forestry operations on private land aligns with ESFM principles, including increased transparency and reporting review outcomes³²

²⁵ Natural Resources Commission (2021). *Research program - Koala response to harvesting in NSW north coast state forests - Final report*. Delivered under the NSW Koala Strategy 2018-21 overseen by the NSW Department for Planning, Industry and Environment, Sydney, NSW.

²⁶ See also Law, B., Gonsalves, L., Burgar, J. *et al.* Regulated timber harvesting does not reduce koala density in north-east forests of New South Wales. *Sci Rep* **12**, 3968 (2022). <https://doi.org/10.1038/s41598-022-08013-6>

²⁷ Law, B., Kerr, I., Gonsalves, L., Brassil, T., Eichinski, P., Truskinger, A., & Roe, P. (2021). Mini-acoustic sensors reveal occupancy and threats to Koalas *Phascolarctos cinereus* in private native forests. *Journal of Applied Ecology*, 00, 1– 12. <https://doi.org/10.1111/1365-2664.14099>

²⁸ *Ibid.*

²⁹ *Bushfire Survivors for Climate Action Incorporated v Environment Protection Authority* [2021] NSWLEC 92

³⁰ Environmental Defenders Office (2021). Statement available at: <https://www.edo.org.au/2021/08/04/nsw-forest-logging-agreement-faces-legal-challenge-over-climate-biodiversity/>

³¹ Legislative Council Portfolio Committee No. 4 - Regional New South Wales, Water and Agriculture (2021). *Inquiry into the long-term sustainability and future of the timber and forest products industry*. See:

<https://www.parliament.nsw.gov.au/committees/inquiries/Pages/inquiry-details.aspx?pk=2762>

³² Submission No. 189 – Environmental Defenders Office – Inquiry into long-term sustainability and future of the timber and forest products industry – 3 June 2021:

<https://www.parliament.nsw.gov.au/lcdocs/submissions/71970/0189%20Environmental%20Defenders%20Office.pdf>

- designing new codes in a way to encourage landholders to seek recognised forestry certification standards³³
- ensuring the new codes honour Government commitments to increase koala protections³⁴
- improving education and training for landholders to increase both the quantity and quality of forest products originating from private land.³⁵

This inquiry follows an earlier inquiry into koala populations and habitat in New South Wales, which delivered a final report in June 2020.³⁶ In the Government response to this report, it was stated that as part of the PNF review, the Government will consider how to balance Koala habitat protection and the sustainable development of private native forestry in NSW.³⁷

In November 2021, Australia also endorsed the Glasgow Leaders' Declaration on Forests and Land Use at the UN Climate Change Conference UK 2021, which commits to (amongst other things) strengthening of forest conservation and restoration efforts.³⁸ This builds on the Intergovernmental Panel on Climate Change (IPCC) Special Report on Climate Change and Land, which also identified agroforestry and sustainable forest management as climate adaptation and mitigation strategies.³⁹

2.4 The Commission's review

2.4.1 Scope

The Terms of Reference asks the Commission to provide independent advice and assist in finalising the new PNF Codes (Attachment 1).

The Terms of Reference directs the Commission to:

- **Task 1** – provide advice on the final draft PNF codes to ensure they fulfil:
 - the Objects of Part 5B of the LLS Act (**Attachment 3**), including the principles of Ecologically Sustainable Forest Management (ESFM, as defined in the LLS Act – see **Attachment 4**)
 - Government's dual policy objectives of '*providing robust protections for koalas in areas of high value koala habitat and certainty and consistency for primary producers*'

³³ Submission No. 222 – Timber NSW – Inquiry into long-term sustainability and future of the timber and forest products industry – 11 June 2021:

<https://www.parliament.nsw.gov.au/lcdocs/submissions/72215/0222%20Timber%20NSW.pdf>

³⁴ Submission No. 189 – Nature Conservation Council of NSW - Inquiry into long-term sustainability and future of the timber and forest products industry – 7 June 2021

<https://www.parliament.nsw.gov.au/lcdocs/submissions/72025/0198%20Nature%20Conservation%20Council%20of%20NSW.pdf>

³⁵ Submission No. 4 – Responsible Wood – Inquiry into long-term sustainability and future of the timber and forest products industry – 29 April 2021

<https://www.parliament.nsw.gov.au/lcdocs/submissions/71485/0004%20Responsible%20Wood.pdf><https://www.parliament.nsw.gov.au/lcdocs/submissions/72215/0222%20Timber%20NSW.pdf>

³⁶ Legislative Council Portfolio Committee No. 7 – Planning and Environment (2020). *Koala populations and habitat in New South Wales (Report no. 3)*. NSW Parliament, Sydney, NSW.

³⁷ Department of Planning, Industry and Environment (2020). *NSW Government Response: Inquiry into Koala populations and habitat in New South Wales*. Department of Planning, Industry and Environment, Sydney, NSW.

<https://ukcop26.org/glasgow-leaders-declaration-on-forests-and-land-use/>

³⁸ IPCC, (2019). *Summary for Policymakers*. In: Climate Change and Land: an IPCC special report on climate change, desertification, land degradation, sustainable land management, food security, and greenhouse gas fluxes in terrestrial ecosystems [P.R. Shukla, J. Skea, E. Calvo Buendia, V. Masson-Delmotte, H.- O. Pörtner, D. C. Roberts, P. Zhai, R. Slade, S. Connors, R. van Diemen, M. Ferrat, E. Haughey, S. Luz, S. Neogi, M. Pathak, J. Petzold, J. Portugal Pereira, P. Vyas, E. Huntley, K. Kissick, M. Belkacemi, J. Malley, (eds.)]. In press.

- relevant Government decisions⁴⁰
- OCSE's 2021 recommendations report.

The Terms of Reference provided for the Commission to make recommendations to amend the final draft PNF Codes to assist in fulfilling the above.

- **Task 2** – build upon the Commission's existing responsibility to oversee the design and implementation of the NSW Forest Monitoring and Improvement Program (FMIP) to help inform evidence-based decision making and promote active and adaptive forest management in NSW.

2.4.2 Expert panel, consultation and evidence

The Commission convened the following expert group, chaired by the Assistant Commissioner, Peter Cochrane, to inform this advice:

- **Prof. Patrick Baker** – University of Melbourne – Professor of Silviculture and Forest Ecology, School of Ecosystem and Forest Sciences
- **Dr. Alistair Melzer** – Central Queensland University – Adjunct Research Fellow, Koala Research CQ, School of Medical and Applied Sciences and research program leader for koala research at Central Queensland University
- **Dr. Chris Armstrong** – OCSE – NSW Deputy Chief Scientist, Chair of the NSW Koala Strategy expert panel.

The Commission also sought further specific subject matter advice from Dr. Peter Hairsine and Professor Phillip Gibbons, both from the Australian National University.

In line with the Terms of Reference, the Commission consulted with LLS, OCSE, DPE EES, EPA and DPI, noting that the review scope did not allow for consultation with external stakeholders.

The Commission also considered government legislative requirements, relevant policy objectives and previous work by independent experts (including the OCSE's previous reviews), available literature and community submissions on the draft PNF codes.

2.4.3 Approach

To assist the Government in finalising the PNF codes, the Commission adopted an iterative and highly consultative approach with LLS, EPA, DPE EES and the expert panel during the course of its review.

In line with **Task 1**, the Commission first assessed whether the revised draft PNF codes developed by LLS fulfilled the principles of ESFM, the OCSE's 2021 recommendations and relevant Cabinet decisions using set criteria (**Attachment 5**). As per the Terms of Reference, the Commission provided LLS with initial advice, including recommendations about how the revised draft PNF codes could better fulfil the necessary legislative requirements and policy objectives (see **Box 1**).

⁴⁰ The Commission reviewed the extent to which the draft PNF codes fulfils NSW Government commitments and decisions relating to PNF. For instance, the Government endorsed the draft PNF codes for public consultation, commissioned OCSE to review evidence relied upon by LLS to draft the PNF code, directed decoupling the SEPP (Koala Habitat Protection) from the LLS Act, removal of dual consent requirements in respect of Local Government, and lengthening of PNF Plan approval periods to 30 years.

Box 1: Summary of the Commission's initial suggested PNF code improvements

The Commission advised that the revised draft PNF codes would be improved by:

- including outcomes statements to guide implementation, evidence gathering and reviews
- clarifying the intent and design of the various planning instruments within the codes, particularly by refining the design of Forest Stewardship Plans to include suitable limits for selective harvesting activities combined with appropriate oversight and protections
- increasing the minimum basal area for single tree selection and thinning in the Northern region to a flat rate of 14 metres squared per hectare (up from 10 metres squared per hectare in the initial final draft PNF codes), with scope to lower basal area limits to 10 metres squared per hectare under Forest Stewardship Plans subject to safeguards to protect environmental values
- revising Australian Group Selection provisions such that canopy opening rules are based around maximum area limits (0.5 hectares in a Forest Management Plan and 0.75 hectares in a Forest Stewardship Plan) instead of stand height to improve implementation and compliance, and adding post-harvest protections around canopy openings
- improving koala protections in high value koala habitat, including increasing the koala tree retention rate to 15 primary and 5 secondary koala feed trees per hectare (compared with 5 primary and 5 secondary koala feed trees per hectare in the revised draft PNF codes, and 10 primary and 5 secondary koala feed trees per hectare in the existing PNF codes) and using DPE's koala feed tree list (replacing a koala use tree list in the revised draft PNF codes)
- strengthening requirements for forest regeneration monitoring and management based on species composition and condition
- allowing for the suspension of PNF activities in instances where an unforeseen large-scale disturbance event – such as large-scale wildfires, drought or mass tree dieback – has created a risk that is causing serious or irreversible damage to the environment.
- establishing the need for a PNF Monitoring, Evaluation and Reporting Framework (PNF MER framework) in the codes.

LLS considered the Commission's initial advice and recommendations and responded with feedback and a set of updated draft PNF codes. Further iterations of the draft PNF codes were then developed in response to ongoing discussions with the Commission, which were informed by feedback from the expert panel, DPE EES and EPA (see **Table 1** for a summary). LLS have now provided a set of final draft PNF codes (V5) (provided in **Attachment 2**) that form the basis of the Commission's final findings and recommendations, as set out in this report.

Table 1: Overview of versions of the draft PNF code developed by LLS

Version	Details
V0	Consultation draft codes developed by LLS – released for public consultation in March 2020
V1	Revised draft PNF codes developed by LLS including their response to the OCSE recommendations. The Commission consulted the expert panel, EPA and DPE EES. This version formed the basis of the Commission’s initial advice to LLS.
V2	Developed by LLS in response to the Commission’s initial advice.
V3	Developed by LLS in response to Commission feedback on V2. The Commission consulted the expert panel, EPA and DPE EES. This version of the PNF codes was reviewed by the Commission in the Commission’s draft final PNF report.
V4	Developed by LLS in response to the Commission’s draft final PNF report.
V5	Developed by LLS in response to ongoing discussions with the Commission, informed by DPE EES and EPA feedback on the Commission’s draft final PNF report. The Commission consulted the expert panel, EPA and DPE EES. These final draft PNF codes have informed the findings and recommendations in this report.

The Commission has reviewed the final draft PNF codes, consulted further with agencies and sought additional advice from the expert panel in order to deliver this final report.

Under **Task 2**, the Commission also worked with the DPE EES and DPI Forest Science Unit to refine the koala habitat mapping for use in the PNF codes.

Further, the Commission, as independent chair of the NSW Forest Monitoring and Improvement Program (FMIP), is, in collaboration with the NSW Forest Monitoring Steering Committee, developing:

- a shared understanding and agreement on fundamental information, facts and metrics over time (including aligned methods in measuring, modelling, mapping, reporting and data collection and handling)
- a Monitoring Evaluation and Reporting framework for NSW’s private forest estate.

2.4.4 Reporting

This is the Commission’s final report to the Deputy Premier, Minister for Agriculture and Western NSW, Minister for Environment and Heritage and the Minister for Planning and Homes, as per the Terms of Reference.

3 Task 1 - Overarching findings

Key insights

- 1 The planning instruments within the final draft PNF codes deliver regulation based on the scale and intensity of proposed forestry activities.
- 2 The final draft PNF codes:
 - include outcome statements to assist in the Government's desired shift from process- to outcomes-based regulatory approaches
 - offer robust protections for koalas and their habitat
 - enable sustainable PNF operations, including appropriate harvesting limits
 - provide certainty and consistency for landholders and better ease of implementation
 - better protect soil and water quality and riparian biodiversity corridors
 - include measures to apply the precautionary principle and respond to significant disturbances at both the plan and bioregional scale
 - establish independent expert oversight for Forest Stewardship Plans
 - strengthen monitoring, evaluation and reporting arrangements.
- 3 The final draft PNF codes are a substantive improvement from the existing Codes. These codes meet Objects of Part 5B of the LLS Act including ESFM principles, the Government's objectives to ensure robust protections for koalas in areas of high value koala habitat and provide certainty and consistency for landholders, and address the OCSE's 2021 recommendations.
- 4 The Commission recommends that the NSW Government adopts the attached codes in their substantive form, noting minor adjustment may be warranted during final legal drafting. The Commission has also identified further opportunities to support the effective implementation of the PNF codes.

Once finalised, the PNF codes are to deliver on Government commitments under the *Independent Biodiversity Legislation Review* and *NSW Forest Industry Roadmap*. This section of the report discusses how the final draft PNF codes meet key Government commitments around:

- regulating PNF based on scale and intensity rather than tenure (**Section 3.1.1**)
- focusing on outcomes rather than process (**Section 3.1.2**).

In addition, this section outlines how the final draft PNF codes meet the Government's dual policy objectives for the PNF codes of providing:

- robust protections for koalas in areas of high value koala habitat (**Section 3.1.3**)
- certainty and consistency for primary producers (**Section 3.1.4**).

The Terms of Reference also directs the Commission to assess whether the final draft PNF codes fulfil the Objects of Part 5B of the LLS Act (**Section 3.2**), including whether the codes:

- enable landholders to carry out sustainable private forestry operations and recognise the differences between private and public native forestry (**Section 3.1.4**)
- fulfil the Principles of Ecologically Sustainable Forest Management, including whether there are adequate protections for biodiversity and water quality (**Section 3.1.2**).

This section also highlights the need for adequate funding to support LLS to deliver capacity building, extension services and training services, as well as the necessary resources for a PNF MER program.

3.1 Consistency with Government direction and policy

3.1.1 The codes deliver regulation based on scale and intensity

The updated PNF codes adopt and improve on the planning instruments in the draft final PNF codes (and existing PNF codes), specifically:

- **PNF Plans** – overarching plan for PNF that allows for limited small scale harvesting operations on private land without the need for additional planning documents
- **Forest Management Plans** – accompany the PNF Plan to provide a simple pathway for landholders to apply standard provisions to forestry operations outside of small-scale harvesting limits, and are expected to make up the majority of plans
- **Forest Stewardship Plans** – accompany the PNF Plan to provide landholders with a means of applying a site-specific ruleset that allows for increased extent or intensity of harvesting (within limits) or to respond to significant disturbance events, subject to LLS approval informed by an independent expert panel assessment.

Overall, the Commission considers that these plans offer a significant improvement on past arrangements in terms of delivering regulation based on scale and intensity. The Commission estimates PNF Plans and Forest Management Plans will account for up to 90 percent of all plans approved by LLS, with only around 10 percent requiring a Forest Stewardship Plan. The approach addresses stakeholder feedback in support of reducing the regulatory burden whilst also providing greater rigour where environmental values are at greatest risk.⁴¹

The Commission is satisfied that the PNF Plans meet Government objectives relating to low-intensity harvesting on private land subject to limited regulatory and approval burden. Forest Management Plans, which replace the existing Forest Operation Plans, also continue to provide a straightforward pathway for landholders to carry out PNF under specified conditions.

The Commission notes that the final draft PNF codes now limit Forest Management Plan operations to a specified Net Harvestable Area for a given region, specifically:

- 250 hectares for the Northern and Southern regions
- 500 hectares for the River Red Gum region
- 1000 hectares for the Cypress and Western Hardwoods region.

These Net Harvestable Area limits are applied on the basis that the standard PNF code provisions for Forest Management Plans have been developed to manage the expected risks associated with forestry operations up to a certain size. The Commission supports the use of spatially explicit Net Harvestable Area limits for Forest Management Plans.

Forest Stewardship Plans, which are a new instrument within the revised PNF codes, allow landholders to apply approved provisions and management approaches tailored to a specific site to deliver better outcomes and effectively manage risks.

⁴¹ Elton Consulting (2019). *Private Native Forestry Review Terms of Reference - Submissions Review Final Report*. Report produced for NSW Local Land Services.

As Professor Vanclay noted in his review:

“The ability to develop a Forest Stewardship Plan is an important addition to the PNF Codes, because it is central to the ESFM goal to maintain biological diversity (biodiversity). There are two key aspects of biodiversity: the number of plant and animal species at a site (alpha diversity), and the way that the number of species varies between sites (beta diversity), and it is the latter that is especially important in conserving rare species. There is potential to degrade beta diversity if all PNF follows the same guidelines and creates the same regeneration and regrowth patterns. Better outcomes with higher beta diversity will be enabled if landholders are encouraged to manage forests deliberately to create habitat for rare species or for species in which they have a particular interest.”⁴²

Forest Stewardship Plans are intended to be used for extensive operations, where an increase in harvest intensity (within region-specific limits) is sought, or to respond to significant disturbance events. Forest Stewardship Plans are subject to additional protections and oversight as necessary, reflecting the greater potential for risk under a Forest Stewardship Plan. As part of the Forest Stewardship Plan approval process, LLS must consider independent expert advice and the results of an assessment of the proposed plan against set criteria.

Figure 1 provides an overview of the PNF code planning instruments, with more detail in **Sections 4.2.1** and **4.2.2**.

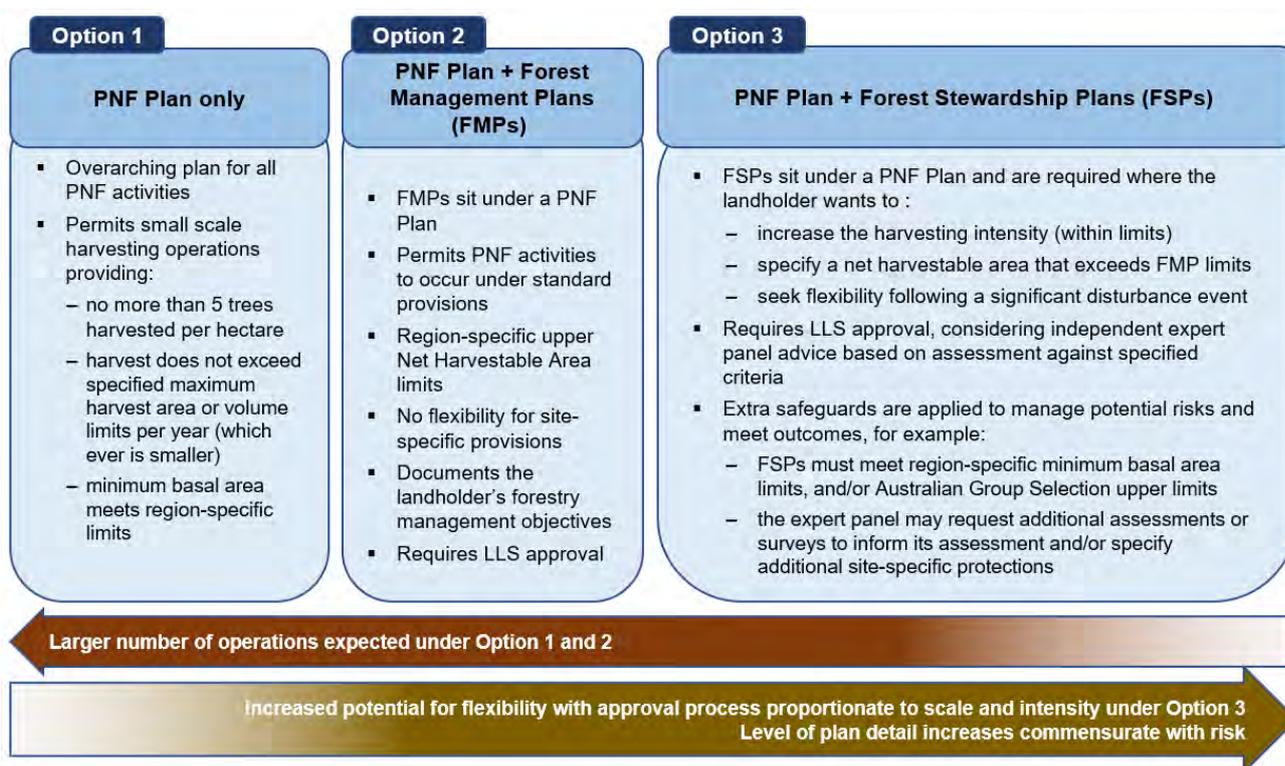


Figure 1: Commission's preferred design for PNF code planning instruments

⁴² Vanclay, J. (2021). *PNF Review: Recommendations Report*. Prepared for Local Land Services by J. Vanclay, Southern Cross University, Lismore, NSW.

3.1.2 The codes adopt an outcomes-based approach

The *Independent Biodiversity Legislation Review*⁴³ recommended that regulation shift towards outcomes rather than process, while the *NSW Forestry Industry Roadmap* includes a guiding principle that ‘*regulation of the forestry industry should be efficient, effective, transparent and outcomes-focused*’.⁴⁴ In addition, stakeholders supported an outcomes-based approach during public consultation on the PNF review Terms of Reference⁴⁵, for example:

“*Should be an outcomes-based approach to allow flexibility in landscape and threatened species management*”, Allied Natural Wood Exports⁴⁶

“*Focus on outcomes rather than process*” NSW Bird Atlasers Inc⁴⁷

“*To improve the PNF Code and promote forestry it needs to be simple, practical, user friendly, outcome-focused and not overly prescriptive if it is to engage operators*” Koppers Wood Products Pty Ltd⁴⁸

The desire for outcomes-based forestry regulation sits within a broader state-wide context of regulatory improvement across the NSW public sector, where regulators are being encouraged to take an outcomes and risk-based approach to deliver more with fewer resources.⁴⁹ This is also reflected in the NSW EPA’s recently updated Regulatory Policy which states that:

“*The EPA takes a risk-based, outcomes focussed approach to regulation rather than a prescriptive approach. This allows flexibility to choose the most innovative, cost effective and efficient way of achieving a given outcome.*”⁵⁰

Outcomes and risk-based regulation offers a consistent and transparent way for regulators to proactively respond to emerging issues and risks, while also improving the effectiveness of regulatory actions and achievement of outcomes over time. While there is an important role for clear, transparent and enforceable prescriptions, it is critical that prescriptions are driven by strategic outcomes.

The final draft PNF codes now include long-term outcomes statements (refer to **Table 2**), along with requirements for adaptive management and reporting on outcomes under a PNF MER framework.

The broad intent is to maintain these long-term outcomes over space and time at a landscape scale, recognising forestry operations will have short term impacts at the site scale. Practically speaking, these outcomes statements provide critical guidance for all parties, for example by helping in the interpretation and understanding of the PNF rule set and informing the criteria used to objectively assess Forest Stewardship Plans (**Section 4.2.2**).

In addition, the long-term outcomes statements provide the necessary foundation for the proposed PNF MER framework (**Section 5**) to test the effectiveness of PNF prescriptions, help build an evidence base for PNF and facilitate adaptive management. These MER activities will in turn support further progress towards more outcomes-based regulatory approaches in subsequent revisions of the PNF codes.

⁴³ Byron, N., Craik, W., Keniry, J., and Possingham, H. (2014). *A review of biodiversity legislation in NSW: final report*, report by the Independent Biodiversity Legislation Review Panel for the State of NSW and the Office of Environment and Heritage, Sydney, NSW.

⁴⁴ NSW Government (2016). *NSW Forestry Industry Roadmap*. NSW Government, Sydney, NSW.

⁴⁵ Elton Consulting (2019). *Private Native Forestry Review Terms of Reference - Submissions Review Final Report*. Report produced for NSW Local Land Services.

⁴⁶ *Ibid.*

⁴⁷ *Ibid.*

⁴⁸ *Ibid.*

⁴⁹ Department of Finance, Services and Innovation (2016). *Guidance for regulators to implement outcomes and risk-based regulation*. Department of Finance, Services and Innovation, Sydney, NSW.

⁵⁰ <https://www.epa.nsw.gov.au/-/media/epa/corporate-site/resources/about/2021p3444-regulatory-policy.pdf>

Table 2: Long-term outcomes statements within the final draft PNF codes

Long-term PNF outcomes	Rationale (not for inclusion in the codes)
<p>1 Maintain forest health and regeneration at site and bioregional scales</p>	<ul style="list-style-type: none"> ▪ Meets ESFM principle to maintain forest health and vitality and the precautionary principle ▪ Ensure the continued provision of ecosystem services from forests under a changing climate, managing risks within acceptable limits and applying best practice forest management
<p>2 Maintain the productive capacity of the private native forest estate at site and bioregional scales</p>	<ul style="list-style-type: none"> ▪ Meets ESFM principle to maintain the productive capacity for forest ecosystems and social and economic benefits of native forests ▪ Ensure sustainable timber supplies of appropriate species and quality through adequate regeneration of growing stock
<p>3 Maintain the persistence of native species at site and bioregional scales</p>	<ul style="list-style-type: none"> ▪ Meets ESFM principle to maintain forest biological diversity ▪ Support the persistence or recolonisation of forest dwelling flora and fauna (including koalas and other threatened species) at the local scales and support the maintenance of those populations throughout their range
<p>4 Maintain water quality and soil health at site and bioregional scales</p>	<ul style="list-style-type: none"> ▪ Meets ESFM principle to maintain soil and water quality ▪ Water within and leaving properties is of sufficient quality to maintain environmental function ▪ Soil stability and quality maintains production and environmental function
<p>5 Build landholder capacity to deliver best practice forest management</p>	<ul style="list-style-type: none"> ▪ Meets ESFM principle for voluntary compliance, capacity building and adoption of best practice standards ▪ Empower and enable landholders to manage and maintain their prosperity, environment and well-being
<p>6 Support the economic resilience of landholders and regional communities</p>	<ul style="list-style-type: none"> ▪ Meets ESFM principle for the long-term social and economic benefits of native forests ▪ Recognises the important role of forest management in supporting resilient and diverse farm enterprises and regional communities

3.1.3 The codes deliver robust koala protections in high value habitat

The Commission considers that the final draft PNF codes meet Government’s dual objectives of robust protections for koalas in areas of high value koala habitat and certainty and consistency for primary producers and address the OCSE’s 2021 report recommendations.

The consultation draft PNF codes changed many of the existing provisions for koala protection. In their 2021 review, the OCSE found that it was not clear that the consultation draft PNF codes offered robust koala protections. The Commission determined that LLS’s response to the OCSE recommendations was mixed, with the initial final draft PNF codes either mostly or partly fulfilling the requirements. Under this Terms of Reference, the Commission provided LLS with advice on further improvements that are necessary to deliver adequate koala protections, and LLS responded by developing a set of final draft PNF codes.

The Commission considers that the final draft PNF codes better meet Government's direction for robust koala protections in high quality koala habitat and certainty and consistency for landholders and the OCSE's recommendations.

For example, updated draft final PNF codes now have:

- revised the minimum basal area for Forest Management Plans in the Northern region from 10 to 14 metres squared per hectare for both single tree selection and thinning and small scale harvesting (**Section 4.3.1**)
- ensured that Forest Stewardship Plans, including those seeking greater extent or intensity of forestry operations, are subject to region-specific intensity limits and require LLS approval informed by the outcomes of an independent expert panel review against set criteria (**Sections 4.2.1 and 4.2.2**)
- applied PNF-specific mapping across approximately 2.84 million hectares based on high and very high suitability koala habitat to trigger tree retention prescriptions (**Section 4.4.1**)
- increased the koala tree retention requirements to 15 primary and 5 secondary feed trees per hectare (compared with 10 primary and 5 secondary feed trees under existing arrangements) (**Section 4.4.3**)
- replaced the current koala *use* tree list with DPIE's koala tree *feed* tree list to address potential risks around lack of food resources if shelter trees are preferentially retained (**Section 4.4.4**)
- focused on koala habitat rather than measures of koala presence/absence as a means of verifying koala habitat suitability mapping (**Section 4.4.2**)
- included provisions that ensure each tree is visually assessed for koalas immediately prior to felling, along with any tree where koala presence is identified during pre-harvest surveys (**Section 4.4.5**)
- specified that regeneration composition must be monitored and managed to ensure preharvest forest conditions and habitat values are maintained or improved in the long-term (**Section 4.3.4**).

The Commission also notes that in addition to the new habitat-based koala protections, existing harvesting exclusions that apply to approximately 6,000 hectares of mapped core koala habitat under the Koala SEPP will continue to apply, in line with recent Government decisions.

Section 4.4 provides more information in relation to koala protections. The Commission's full analysis of LLS's responses to the OCSE recommendations can be found in **Attachment 6**.

3.1.4 The codes provide certainty and consistency for landholders

The final draft PNF codes are intended to enable landholders to carry out forestry operations in a sustainable manner, recognising the differences between native forestry on private and public land and the need for certainty and consistency for landholders.

The Commission considers that the final draft PNF codes meet these requirements by:

- authorising landholders to carry out PNF in a sustainable manner and with a reasonable regulatory burden, particularly in lower-risk contexts under PNF Plans and Forest Management Plans
- providing adaptable pathways via Forest Stewardship Plans for landholders to carry out PNF under site-specific conditions and protections where landholders wish to increase the intensity or extent of PNF operations within region-specific limits, or in response to significant disturbance events
- reducing the complexity of basal area requirements and risk of high-grading by removing basal area limits based on forest type and stand height

- simplifying rules applying to Australian Group Selection
- replacing a combination of exclusion zones and buffers in riparian corridors with a single expanded exclusion zone.

To further meet this intent, it is understood that the Government will decouple PNF from the *State Environmental Planning Policy (Koala Habitat Protection) 2021* (Koala SEPP 2021) and remove the need for Development Consent requirements for PNF Plans.

Research undertaken by the Department of Primary Industries concluded the existing PNF Plan approval process involves 44 different types of planning and regulatory exclusions.⁵¹ The research highlighted that around 25 percent of private native forestry land is subject to a dual consent process, with council approval processes identified as being inconsistent and unpredictable, and in some circumstances difficult and expensive. Removing the requirement for landholders to obtain both a PNF Plan and separate and duplicative approval from councils will help provide landholders with the certainty and consistency required for long-term forest management.

The Commission notes that the PNF codes have less onerous provisions and protections compared to public native forestry regulations. This is appropriate as PNF typically has smaller impacts over time and space compared to forestry operations on public land. In many cases, PNF activities are undertaken as an additional, opportunistic income source for landholders alongside their primary activities such as grazing.⁵²

Accordingly, Forest Management Plans provide a simple pathway for the majority of landholders to undertake less intensive or extensive forestry operations than occur on public land. In contrast, Forest Stewardship Plans are designed such that increased safeguards will govern larger and/or more intense forestry operations.

Other risks that apply to a larger extent on private land compared to public forests, such as regeneration impacted by stock and fragmented forests, are also effectively managed under the stronger forest regeneration monitoring and management requirements in the final draft PNF codes. This focus on regeneration and restocking is consistent with stakeholder feedback on PNF, where over half of submissions indicated that it required more attention under the new PNF codes.

The Commission recognises that the final draft PNF codes now include provisions to address risks from unforeseen events that may cause significant or irreversible harm to environmental values through short-term suspension of PNF activities in affected areas (see **Section 4.6**). This is necessary to ensure the long-term sustainability of PNF as a resource and management option for landholders. The Commission understands LLS is developing a risk-based assessment process to inform decision making under this provision.

To help landholders to comply and implement various provisions, simple guidance material would be beneficial for key settings including basal area, forest regeneration and roading requirements. The Commission understands that LLS has commissioned the Forest Research Centre at Southern Cross University to develop this material, which is expected to be released in 2022.

⁵¹ https://www.dpi.nsw.gov.au/_data/assets/pdf_file/0011/817751/nsw-planning-and-regulatory-instruments-that-interact-with-pnf.pdf

⁵² Dare, L., Schirmer, J., & Mylek, M. (2017). *Private native forest owner attitudinal survey – Northern NSW: Understanding forest owners value and use of their forest resource*. Report prepared for the NSW Department of Primary Industries (project DI-DPI-16-567). University of Canberra. Canberra, ACT.

3.2 Consistency with Objectives of Part 5B of the LLS Act

Figure 2 presents an overarching summary of the Commission’s findings in relation to the Objects of Part 5B of the LLS Act. The Commission’s judgement is that the final draft PNF codes meet the Objects of Part 5B of the LLS Act and as such are suitable for adoption. The Commission notes that in addition to the advice in this report, Government may wish to seek further legal advice on the drafting and enforceability of the proposed code provisions to provide additional assurance prior to approval of the codes. For example, this may involve a review by LLS and EPA legal officers.

LLS Act objectives	Section	Summary of assessment
(a) to authorise the carrying out of private native forestry in accordance with principles of ecologically sustainable forest management	<p>Section 3.2.1</p> <p>Consistency with Ecologically Sustainable Forest Management</p>	<p>Objective (a) met – the updated final draft PNF codes sufficiently meet the ESFM requirements for (a) maintaining forest values for future and present generations, (b) public participation, accountability and transparency, (c) incentives, capacity building and best practice, (d) evidence-based adaptive management processes, and (e) application of the precautionary principle in preventing environmental harm.</p>
(b) to protect biodiversity and water quality (including threatened species, populations and ecological communities under Part 7A of the <i>Fisheries Management Act 1994</i>) in connection with private native forestry operations	<p>Section 3.1.3</p> <p>Robust koala protections</p>	<p>Objective (b) met – the updated final draft PNF codes include sufficient protections for biodiversity and water quality and deliver robust koala protections in line with Government objectives.</p>
(c) to enable landholders to carry out forestry operations in a sustainable manner in areas of the State to which this Part applies.	<p>Section 3.1.4</p> <p>Providing certainty and consistency for landholders</p>	<p>Objective (c) met – the updated final draft PNF codes allow landholders to carry out PNF in a sustainable manner, offering a range of planning pathways depending on landholder objectives and site-specific requirements. The PNF MER framework will assess whether PNF is sustainable and delivering desired outcomes.</p>
(d) to ensure that differences between private native forestry and native forestry operations in State forests or other Crown-timber land are recognised, including in the application of protocols, codes, standards and other instruments.		<p>Objective (d) met – the final draft PNF codes allow landholders to carry out PNF under a range of planning pathways based on the risk, scale and intensity of proposed operations. The protections and requirements reflect that PNF occurs on private land, and therefore has different objectives and regulatory burden compared with native forestry on public land, while still maintaining environmental protections.</p>

Figure 2: Summary of findings in relation to the Objects of Part 5B of the LLS Act

3.2.1 Updated codes meet ESFM principles

The final draft PNF codes were assessed against the Principles of ESFM as set out in the LLS Act. The Principles of ESFM underpin all native forest management in NSW, as ESFM is also a key objective identified in the Regional Forest Agreements. The Principles of ESFM are increasingly being used by stakeholders to test Government performance, including through legal challenges.⁵³

The Commission’s assessment found the updated draft final codes meet the ESFM principles, while also identifying some opportunities for further improvement over time (**Table 3**). **Attachment 7** further details the results of the assessment.

Table 3: Assessment against the Principles of ESFM

Principle and key findings	
(a) Maintaining forest values for future and present generations	Met
<p>The final draft PNF codes:</p> <ul style="list-style-type: none"> ▪ allow for sustainable access to timber resources using relatively low-intensity harvesting methods ▪ protect landscape features of environmental and cultural significance, including by excluding operations from areas of outstanding biodiversity value, old growth forests, wetlands and riparian exclusion zones ▪ apply enhanced riparian exclusion zones to protect soil and water quality and biodiversity, including on both mapped and unmapped streams ▪ require identification and protection of known records or site evidence of any threatened populations or threatened ecological communities ▪ requires the identification of the presence of pests and weeds and details of proposed pest and weed management actions ▪ have provisions for hollow-bearing trees, recruitment trees, food resource trees, roost trees, and nest trees defined as habitat trees ▪ have higher koala tree retention rates than the existing codes, and include a habitat-based trigger for koala tree retention ▪ require the identification of steep slopes, dispersible and highly erodible soils and areas of mass movement, forest access (including roads and drainage feature crossings), log landings and portable mill sites ▪ apply operational exclusion conditions to areas of soil risk, and machine operation limits in the Northern region during high compaction risk periods ▪ detailed controls on the planning, design, construction and maintenance of PNF infrastructure including roads, culverts and landing sites. <p>There are also provisions to manage cumulative impacts from forestry activities on adjacent properties and risks from significant disturbance events (such as wildfire or dieback) with the potential to cause serious or irreversible impact upon forest ecosystem and health (see Principle (e)).</p> <p>Ongoing research and monitoring through the PNF MER framework and NSW FMIP should assess the ongoing sustainability of PNF activities and maintenance of forest values. It may also explore the socio-economic benefits of PNF, and barriers to participation, to inform policy development, and information on PNF’s carbon implications.</p> <p>Ongoing areas to improve:</p> <ul style="list-style-type: none"> ▪ Initiate further field verification and improvement processes for the PNF Koala Prescription Map through the PNF MER framework ▪ Initiating a risk-based review of threatened species protections for key species in Appendix A after the codes are approved, carried out by a cross-agency technical review team. This is particularly important after the 2019/20 wildfires and will be informed by latest available knowledge. 	

⁵³ See for example, *NSW Forest Logging Agreement Faces Legal Challenge over Climate, Biodiversity*. Environmental Defenders Office, accessed at <https://www.edo.org.au/2021/08/04/nsw-forest-logging-agreement-faces-legal-challenge-over-climate-biodiversity/>

Principle and key findings

(b) Public participation, accountability, and transparency

Met

LLS undertook two rounds of public consultation on the PNF review Terms of Reference and the draft PNF codes in accordance with legislative requirements. Note that additional public consultation in response to substantial changes to a proposed code following public consultation is at the discretion of the Minister. A summary of the public submissions has been published for the consultation on the Terms of Reference.

There are now provisions within the final draft PNF codes that require public reporting on PNF activities in the region and state under the PNF MER framework. Such reporting, including at a high level on Forest Stewardship Plans and outcomes of independent expert panel assessments will help improve transparency and build trust, if designed with respect to the privacy of landholders.

LLS have also committed to the timely transfer of information about PNF plan approvals and approved variations from the LLS to the EPA will be addressed through a Memorandum of Understanding. A public information register of application approvals, variations and refusals under Part 5B of the LLS Act would also improve transparency, openness and accountability in decision making processes and improve performance.

In the final draft PNF codes, LLS have addressed potential conflict of interests by separating their PNF advice and approval functions. LLS are no longer involved in plan preparation, although they can advise on what evidence may be required to inform the assessment and approval process, as well as whether a disturbance event is significant enough to warrant a Forest Stewardship Plan.

Ongoing areas to improve

- LLS and EPA establish a Memorandum of Understanding to ensure timely sharing of information needed to co-regulate PNF, including transfer of information regarding PNF plan approvals and plan variation approvals from LLS to the EPA.
- NSW Government should make public submissions and reviews that have informed the PNF code updates, including the Commission's review, publicly available in a timely manner.

(c) Incentives, capacity building and best practice

Met

The final draft PNF codes provide greater clarity and are easier for landholders to apply, which encourages voluntary compliance and addresses stakeholder feedback in relation to the existing codes.

LLS is planning to conduct two pilots that focus on extension, training and incentives for private native forest managers. One Pilot will test the use of financial incentives paired with expert advice to facilitate improved practices in private native forestry, with the second Pilot developing a targeted engagement approach for Aboriginal forest managers. These are important and welcome initiatives in line with Prof. Vanclay's recommendations⁵⁴. There may be further scope for LLS to consider how incentives could be used to help improve participation and compliance in future.

LLS has also developed a supporting package under the Programme for the Endorsement of Forest Certification (PEFC) standard. This package and the draft PNF Codes have been independently audited and found to be compliant with the relevant Australian and international standard. A pilot program is due to commence with landholders in 2022 and would be the first of its kind in Australia.

Face-to-face extension services (including field days and farm visits) are part of the PNF oversight and enabling program, along with training. PNF Plans should identify landholder objectives so LLS can provide relevant advice and capacity building.

LLS will need adequate additional funding to deliver these important services, to help develop and deliver an effective MER framework and oversee a more rigorous (and labour intensive) approvals process. Government could also increase support for LLS in its role to build landholder capacity through training and education, and opportunities to encourage voluntary compliance and best practice. The EPA will also need additional funds for compliance and enforcement.

⁵⁴ Vanclay, J. (2021). *PNF Review: Recommendations Report*. Prepared for Local Land Services by J. Vanclay, Southern Cross University, Lismore, NSW.

Principle and key findings

LLS are currently developing guidelines that cover a range of forest management topics, such as regeneration. As part of this process, guidance materials should include priority issues such as road construction for forestry operations.

Ongoing areas to improve

- Increasing Government support to LLS to fulfil its advisory and extension role in building landholder capacity through training and education and identifying opportunities to encourage voluntary compliance and best practice, particularly where landholders intend to apply Australian Group Selection.

(d) Evidence-based adaptive management processes

Met

The final draft PNF codes establish the requirement for a PNF MER framework, as well as monitoring requirements for forest regeneration. The LLS is working with the Australian National University and Southern Cross University on research to address key information gaps. This research should link to the PNF MER framework and NSW FMIP once developed.

The final draft PNF codes have also identified appropriate review points and public reporting of results and progress, including annual reports from the PNF MER program and a 5-yearly review of the PNF evidence base to determine whether there is sufficient evidence to warrant a formal PNF code review.

Ongoing areas to improve:

- Adequately funding of the Commission, in its role as independent Chair of the NSW Forest Monitoring and Improvement Program (as directed in the Terms of Reference), to design and implement:
 - a PNF MER framework that is aligned with the NSW FMIP
 - processes to develop a shared understanding and agreement on fundamental information, facts and metrics over time, including verification and improvement of the PNF Koala Prescription Map.

(e) Application of the precautionary principle in preventing environmental harm

Met

The final draft PNF codes have been updated such that LLS can require forestry operations be rescheduled to avoid cumulative impacts. The final draft PNF codes also allow the Minister to respond to significant disturbance events if there is risk of significant or irreversible harm to environmental values (for example, due to widespread droughts and severe fire driven by climate change, or mass dieback events). If LLS determines risks cannot be mitigated or managed under the code or a Forest Stewardship Plan, LLS can suspend or reschedule forestry operations. The PNF codes also allow DPE EES Deputy Secretary or the EPA CEO to recommend that either of these clauses be triggered. LLS is developing a process to guide the assessment of cumulative PNF impacts.

A range of provisions may also be varied within Forest Stewardship Plans where appropriate in response to a significant disturbance event, subject to LLS approval informed by an independent expert panel assessment.

Ongoing areas to improve:

- LLS should consider maintaining a regional scale forest inventory to facilitate the cumulative impact assessment.

3.2.2 Need for adequate funding and support for capacity building and training

Previous advice^{55,56}, and inquiry submissions⁵⁷ note that capacity building, extension services and training will be critical to deliver PNF and ESFM outcomes. It is important that landholders have the capacity to carry out their proposed PNF activities in a way that supports long term forest management outcomes, particularly in relation to specific silvicultural activities like Australian Group Selection. LLS need to build relationships with landholders to identify where capacity building is required, and provide access to advisory services, training, and education as required.

LLS will need adequate funding to deliver these important services.⁵⁸ As OCSE noted:

“To maximise the chances of consistently high-quality silviculture practice that delivers ESFM as well as other outcomes, appropriate training, decision making guidelines, regulatory and compliance measures, and incentives for good practice can be used.”⁵⁹

Industry-based bodies have also called for support to improve education and training – for example:

“There is significant opportunity to increase both the quantity and quality of forest products originating from private native forests through improved education and training. Recent research indicates that the opportunities in this area have potential to increase resource availability several fold. A small investment in education has potential to deliver sizeable economic benefits.”⁶⁰

The NSW Government should provide adequate funding to support LLS to deliver these services, as well as the necessary resources for a PNF MER program. This investment is essential to provide data and guidance to industry and landholders, assure the community, achieve desired outcomes for landholders and ecosystems, and ensure the ongoing sustainability of PNF.

⁵⁵ Office of the NSW Chief Scientist & Engineer (2021). *Advice on Koala protection in the proposed new Private Native Forestry Codes of Practice*. Office of the NSW Chief Scientist & Engineer, Sydney, NSW.

⁵⁶ Vanclay, J. (2021). *PNF Review: Recommendations Report*. Prepared for Local Land Services by J. Vanclay, Southern Cross University, Lismore, NSW.

⁵⁷ For example, Submission No. 186 – Australian Sustainable Timbers – *Inquiry into long-term sustainability and future of the timber and forest products industry* – 31 May 2021. Available at: <https://www.parliament.nsw.gov.au/lcdocs/submissions/71967/0186%20Australian%20Sustainable%20Timbers.pdf> and Submission No. 222 – Timber NSW – *Inquiry into long-term sustainability and future of the timber and forest products industry* – 11 June 2021. Available at: <https://www.parliament.nsw.gov.au/lcdocs/submissions/72215/0222%20Timber%20NSW.pdf>

⁵⁸ Vanclay, J. (2021). *PNF Review: Recommendations Report*. Prepared for Local Land Services by J. Vanclay, Southern Cross University, Lismore, NSW.

⁵⁹ Office of the NSW Chief Scientist & Engineer (2021). *Advice on Koala protection in the proposed new Private Native Forestry Codes of Practice*. Office of the NSW Chief Scientist & Engineer, Sydney, NSW.

⁶⁰ Responsible Wood (2021) Submission to the Inquiry into long-term sustainability and future of the timber and forest products industry. Available at <https://www.parliament.nsw.gov.au/lcdocs/submissions/71485/0004%20Responsible%20Wood.pdf>

4 Task 1 – Summary of PNF code improvements

Key insights

- 1 PNF Plans, Forest Management Plans and Forest Stewardship Plans match the risks associated with permissible forestry operations under each instrument, with PNF Plans and Forest Management Plans offering a standard pathway for lower-risk forestry operations.
- 2 Forest Stewardship Plans offer a pathway for landholders to increase the extent or intensity of harvesting (within region-specific limits) or to respond to significant disturbance events, subject to a rigorous assessment and approvals process, and with additional protections where necessary.
- 3 Forest Management Plans will apply a higher flat-rate minimum average basal areas as proposed in the updated draft final northern and western hardwoods regions, while Forest Stewardship Plans in specific regions may have lower thresholds where appropriate.
- 4 Provisions for Australian Group Selection have been updated to provide for:
 - area-based canopy opening limits to simplify implementation and compliance
 - post-harvest protections for recently harvested areas
 - irregular shaped gaps to support retention of landscape features
 - the creation of ash beds to support regeneration.Landholders should be proactively offered advice and capacity building by LLS where necessary to ensure appropriate use of Australian Group Selection.
- 5 The final draft PNF codes include mandatory monitoring of regeneration composition and condition to ensure that post-harvest regeneration maintains (or improves on) pre-harvest conditions.
- 6 Stream protections have been enhanced and made easier to implement using a set of expanded region-specific riparian exclusion zones that apply to both mapped and unmapped streams, informed by the most up to date stream mapping.
- 7 The final draft PNF codes use koala habitat mapping to trigger tree retention and prescriptions. Landholder-instigated validation processes for koala mapping will focus on confirming habitat suitability via survey, not koala presence or absence.
- 8 Trees in mapped koala habitat areas must be visually assessed immediately prior to being felled, along with any trees with koala presence identified in pre-harvest surveys, and a harvest exclusion zone applied to any tree containing a koala.
- 9 Koala tree retention requirements have increased to *15 primary + 5 secondary koala feed trees per hectare (where available)* based on the DPE koala *feed* tree list.
- 10 Threatened species protections will be improved over time through ongoing review and improvement through processes established via the NSW FMIP, including risk-based reviews conducted by threatened species experts.
- 11 There are now provisions allowing for a response where there has been, or there is risk of, cumulative impacts or significant or irreversible harm to environmental values, for instance from a significant disturbance event (such as wildfire or mass dieback).
- 12 The Codes commit to a PNF MER framework to be developed to assist in further improving PNF (see also **Section 5.1** for further details).
- 13 Public transparency and accountability around PNF can be improved, along with more effective collaboration and communication between relevant Government agencies.

This section summarises key settings and expected benefits of the final draft PNF codes. It also provides more detail on how various elements of the updated codes have been amended to better meet the Terms of Reference (**Task 1**) requirements. It captures LLS’s responses to the Commission’s previous draft advice under this Terms of Reference, and the Commission’s recommendations for how the codes can be further improved prior to approval.

4.1 Summary of key settings and expected benefits

The Commission considers that the final draft PNF codes are a substantive improvement on the existing PNF codes. **Table 4** provides a summary of the final draft PNF codes’ key settings and expected benefits, noting where the Commission has recommended additional improvements.

Table 4: Key settings and expected benefits from the final draft PNF codes

Key settings	Comparison with existing code	Expected benefits
Species and habitat protection		
<p>Koala tree retention rates</p> <p>Retain 20 koala feed trees (>20 cm DBHOB) in specified PNF Koala Prescription Map areas (where available)</p> <ul style="list-style-type: none"> ▪ 15 primary feed trees ▪ 5 secondary feed trees. <p>Primary feed trees may be substituted for secondary feed trees if necessary (and vice versa) to retain as many feed trees as possible up to the specified rate. Tree retention provision uses updated DPE koala feed tree list.</p>	<p>Revised setting</p> <p>Increases retention rate from existing codes (previously 10 primary and 5 secondary feed trees, >30 cm DBHOB)</p> <p>Updated tree list focused on feed trees</p>	<p>Increased koala tree retention rate, as per the Commission’s recommendations, meets NSW Government koala policy commitments for robust protections for koalas in areas of high value koala habitat. Provides access to feed trees post-harvest and ensures continued regeneration.</p> <p>A 20-centimetre minimum diameter for retained trees is acceptable based on recent research on species composition and use of smaller trees and gives landholders more flexibility in tree selection.</p> <p>Focusing on the DPE koala feed tree list ensures koalas have ongoing access to food resources and addresses the risk that landholders may retain only shelter trees rather than important koala feed trees.</p>

Key settings	Comparison with existing code	Expected benefits
<p>Habitat-based koala protections</p> <p>Koala feed tree retention and visual assessment required in areas specified on the PNF Koala Prescription Map.</p> <p>A habitat verification survey can be carried out in a specified area if landholders consider the PNF Koala Prescription Map is inaccurate.</p> <p>This is in addition to existing harvesting exclusions in areas identified as 'core koala habitat' under <i>State Environmental Planning Policy No. 44 – Koala Habitat Protection</i> (Koala SEPP).</p>	<p>New setting</p> <p>Applies tree retention and visual assessment requirements to larger area based on habitat suitability while allowing sustainable harvesting</p>	<p>Use of a habitat-based trigger for tree retention and visual assessment requirements meets NSW Government koala policy commitments for robust koala protections in high value koala habitat areas.</p> <p>This setting provides tree retention and visual assessment protections across approximately 2.84 million hectares of koala habitat identified on the PNF Koala Prescription Map as requiring additional protections, providing post-harvest access to feed trees for koalas and ensures continued regeneration. The Commission notes this is in addition to the approximate 6,000 hectares of Koala SEPP habitat that is excluded from harvesting under the existing codes – an arrangement that is expected to continue under the new PNF codes.</p> <p>Mapping provides certainty for landholders, and the codes include options for situations where landholders disagree with mapped koala habitat areas on their property, including where tree retention requirements cannot be met.</p>
<p>Other protection triggers</p> <p>Each tree in areas specified on the PNF Koala Prescription Map must be visually assessed immediately prior to felling, plus any trees where pre-harvest surveys detected koala presence.</p> <p>Tree retention and a harvest exclusion zone applies to any tree containing a koala, beneath which koala scats are found, and/or where koala presence is identifiable by recent scratches.</p>	<p>New and revised settings</p> <p>Adds visual assessment requirement prior to harvesting</p> <p>Lowers the scat trigger, and adds scratches as a trigger</p>	<p>Improved koala protections and animal welfare outcomes compared with existing codes. Visual assessment requirements prior to harvesting helps ensures koalas are not harmed during harvesting.</p> <p>A lower scat trigger is applied in most areas (10 scats, compared with 20 scats in the existing codes), while retaining the one scat trigger in the Southern region. Inclusion of scratches as a trigger increases the range of identification measures that can trigger koala protections.</p>

Key settings	Comparison with existing code	Expected benefits
<p>Regeneration requirements</p> <p>Landholders must monitor forest regeneration, composition, and condition at 2, 6 and 10 years after a regeneration event.</p> <p>Where forest regeneration is not maintaining (or improving on) preharvest conditions, landholders must implement regeneration management actions.</p> <p>Minimum percentages for stocked plots have also been simplified.</p>	<p>Revised setting</p> <p>Considers regeneration composition and condition, as well as stocking rate</p> <p>Removes percentages based on forest type</p> <p>Extends monitoring period</p>	<p>The requirement to monitor and manage regeneration to maintain (or improve on) preharvest forest conditions is an improvement on existing arrangements and will help maintain long-term habitat values.</p> <p>The simplified minimum percentages of stocked plot rules reduce complexity and compliance risks and improves implementation for landholders.</p> <p>Provides a minimum of three regeneration monitoring data points over 10 years.</p>
<p>Stream protections</p> <p>Harvesting exclusions apply to both mapped and unmapped streams in all regions.</p> <p>Stream protections have been simplified in the Northern and Southern regions by removing riparian buffer zones and applying a single expanded riparian exclusion zone of variable width depending on the stream order type and class.</p> <p>Stream protections for Cypress and Western Hardwoods have been made consistent with those in the Northern and Southern regions.</p> <p>LLS will provide the landholder with Hydroline spatial data for mapped watercourses and waterbodies in NSW.</p>	<p>New and revised settings</p> <p>Extends stream protections to unmapped streams.</p> <p>Increases existing riparian exclusion zone protections in most cases.</p> <p>Uses up to date mapping.</p>	<p>Extending protections to unmapped streams and increasing the exclusion zones significantly enhances protections to preserve the integrity of riparian corridors and the functions they regulate, including:</p> <ul style="list-style-type: none"> ▪ streambank erosion, ▪ buffering ingress of sediment and nutrients, ▪ habitat and corridor provision and ▪ moderating water temperature. <p>The proposed riparian exclusion zone widths are a significant increase in comparison to existing PNF code harvesting exclusions in the Northern, Southern and River Red Gum regions. The removal of riparian buffer zone requirements in the Northern and Southern regions (i.e. buffers on buffers) mean stream protections are easier to comply with. The specified widths offer adequate protection in a PNF context given the allowable type and intensity of silvicultural activities.</p> <p>The stream protections will also be based on Hydroline spatial data, which is the most up to date mapping information available.</p>

Key settings	Comparison with existing code	Expected benefits
<p>Environmental protections</p> <p>Protections for threatened populations or ecological communities, areas of outstanding biodiversity value, old growth forests, wetlands, and hollow-bearing, recruitment, food, roost and nest trees.</p> <p>Protections for areas of soil risk, and machine operation limits in the Northern region during high compaction risk periods. Controls on PNF infrastructure (roads, culverts, landing sites).</p>	<p>Existing settings</p> <p>Retains existing environmental protections, with some minor amendments</p>	<p>A range of existing settings are carried over from the existing codes that provide key environmental protections for threatened species and ecological communities, habitat and food resources, soil and water.</p> <p>Some species-specific protections have been amended to reduce duplication of general environmental protections or to reflect latest knowledge.</p>
<p>Silvicultural operations</p>		
<p>Small scale harvesting</p> <p>Small scale forestry operations (5 trees per hectare, max 5 hectares or 50m³ per annum (or 100m³ per annum in Cypress and Western Hardwoods) are permitted under an approved PNF Plan.</p> <p>Basal area limits for small scale harvesting are the same as for single tree selection and thinning in Forest Management Plans (see below).</p>	<p>New setting</p> <p>Simplifies planning requirements for small scale operations</p>	<p>Allows for low-intensity small scale harvesting operations within specified limits and with limited regulatory burden, in line with Government objectives.</p>
<p>Single tree selection and thinning</p> <p>Basal area limits for Forest Management Plans simplified to a flat rate minimum in the following regions:</p> <ul style="list-style-type: none"> ▪ Northern codes = 14 m²/ha ▪ Southern codes = 12 m²/ha ▪ Western Hardwoods codes = 8 m²/ha <p>Red Gums and Cypress limits remain unchanged compared with existing settings.</p> <p>In Forest Stewardship Plans, landholders can seek approval to lower basal area limits to 10 m²/ha in Northern, Southern and River Red Gum regions.</p>	<p>Revised setting</p> <p>Replaces existing variable basal area limits coupled to forest type or stand height</p>	<p>The simplified threshold structure for basal area reduces complexity and compliance risks and improves implementation for landholders. It will also deliver improved production outcomes for landholders.</p> <p>Flat-rate lower basal area limits (compared to the existing codes) may improve regeneration outcomes in some forest types. The higher basal area limit for the Northern region of 14 metres squared per hectare (for both single tree selection and thinning and small scale harvesting) reflects the need for increased koala habitat protection in this region.</p>

Key settings	Comparison with existing code	Expected benefits
<p>Australian Group Selection</p> <p>Limits use to shade intolerant species or where regeneration has failed.</p> <p>Sum of canopy openings must at no time exceed 20 percent of the Net Harvestable Area.</p> <p>New rules that the maximum area of an individual canopy opening must not exceed 0.5 hectares in a Forest Management Plan and 0.75 hectares in a Forest Stewardship Plan. Canopy openings can be an irregular shape and allow for retention of significant habitat features.</p> <p>Operations restricted within 100m of a canopy opening edge for a specified time.</p> <p>Post-harvest debris may be burnt to create an ash bed.</p>	<p>Revised setting</p> <p>Limits use to appropriate situations</p> <p>Maintains limits on sum of canopy openings</p> <p>Replaces existing rules for canopy openings based on stand height</p> <p>Includes new settings providing improved canopy opening configurations, and post-harvesting protections</p>	<p>Revised provision ensures this silvicultural method is used in appropriate situations for regeneration outcomes.</p> <p>The simplified canopy opening rules promote regeneration, reduce complexity and compliance risks and improves implementation for landholders.</p> <p>Configuration of irregular shaped openings must seek to maximise regeneration outcomes and the conservation of significant habitat features such as hollow bearing and koala feed trees.</p> <p>Time and space limits on operations near canopy openings help maintain a mosaic harvesting approach that maximises undisturbed habitat.</p> <p>Allowing burning of post-harvest debris to form an ash bed can help shade-intolerant species regeneration.</p>
<p>Cypress thinning</p> <p>Maintains non-commercial thinning and oldest age class harvest (release operation) provisions for Cypress Pine.</p> <p>Removes commercial thinning provisions.</p>	<p>Revised setting</p> <p>Removes commercial thinning provisions</p>	<p>Focuses thinning operations on activities that will free regeneration that is in a state of 'lock-up', therefore increasing forest structure and associated ecological outcomes.</p>
<p>Planning Instruments</p>		
<p>Private Native Forestry Plans</p> <p>PNF Plans are the base plan for all PNF operations. Permits small scale harvesting without additional planning.</p>	<p>Revised setting</p> <p>Planning instrument allowing for low impact harvesting</p>	<p>PNF Plans meet Government objectives relating to low-intensity harvesting on private land subject to limited regulatory and approval burden.</p>

Key settings	Comparison with existing code	Expected benefits
<p>Forest Management Plans</p> <p>Forest Management Plans allow for forestry operations in line with a standard set of provisions, and only apply to plans below a set Net Harvestable Area limit.</p> <p>LLS can request revision of a Forest Management Plan prior to approval, and both LLS and EPA can ask to be provided with a copy of the plan.</p>	<p>Revised setting</p> <p>Planning instrument allowing for PNF in line with standard code provisions</p>	<p>Forest Management Plans (previously Forestry Operation Plans) provide a straightforward planning pathway for landholders to carry out PNF activities with balanced safeguards under the PNF codes.</p> <p>Limiting Net Harvestable Area under a Forest Management Plan ensures the provisions are commensurate with the likely risks associated with forestry operations of that size.</p> <p>Forest Management Plans have been refined through the inclusion of additional mapping of landscape features to inform planning.</p>
<p>Forest Stewardship Plans (FSPs)</p> <p>Forest Stewardship Plans allow for variation from Forest Management Plan provisions (within limits) for harvesting intensity, extent and where forestry operations can improve long-term ESFM outcomes.</p> <p>Proposed activities will be subject to independent expert panel assessment against set criteria to ensure that the plan is appropriate and will have no significant adverse environmental impacts.</p>	<p>New setting</p> <p>Provides scope for site-specific forest management compared with existing codes, while establishing appropriate safeguards</p>	<p>Where appropriate, Forest Stewardship Plans allow a landholder to increase the size and/or intensity of PNF operations. They also allow landholders to respond to significant disturbance events, with tailored interventions to achieve outcomes with a greater degree of control and certainty than naturally occurring processes.</p> <p>The plans allow for agreed site-specific conditions within a safety net of mandatory limits and provisions. The plans are to be developed by experts and will be subject to a rigorous approvals process, including independent expert panel assessment, to ensure the protections are commensurate with the likely risk.</p> <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> <p>NOTE: The Commission recommends LLS develop a standardised Forest Stewardship Plan template with input from EPA legal officers (Section 4.2.1).</p> </div>
Settings to support effective implementation		
<p>Outcomes statements</p> <p>Outcomes statements are included within the PNF codes.</p>	<p>New setting</p> <p>Provides new PNF outcomes statements</p>	<p>Outcome statements guide implementation, evidence gathering and review activities, and support further progress towards outcomes-based regulatory approaches in future PNF code revisions.</p>
<p>Cumulative impacts</p> <p>LLS can require forestry operations are rescheduled to ensure harvest operations are distributed over time and space.</p>	<p>New setting</p> <p>Existing codes do not address cumulative impacts</p>	<p>LLS can require forestry operations be rescheduled to ensure harvest operations are distributed over time and space, and to support a mosaic of forest age-classes and forest structures across the landscape, which is an improvement on existing arrangements.</p>

Key settings	Comparison with existing code	Expected benefits
<p>Serious or irreversible environmental damage</p> <p>The Minister can request forestry operations are reviewed where there is risk of serious or irreversible environmental damage on private land at a bioregional scale.</p> <p>If risks cannot be mitigated or managed under the code or through additional protections under a Forest Stewardship Plan, LLS can suspend or reschedule forestry operations or augment protections.</p> <p>The EPA CEO can also recommend a review.</p>	<p>New setting</p> <p>Existing codes do not address unforeseen events with risk of serious or irreversible environmental damage</p>	<p>Allows for a response to a significant forest disturbance event(s) if there is a risk of significant or irreversible harm to environmental values. For example, where events such as wildfires (such as the 2019/20 wildfire event), drought or disease induced tree dieback are likely to impact forest health, productivity and habitat for species.</p> <p>A range of provisions may also be varied within Forest Stewardship Plans in response to significant forest disturbance events, subject to LLS approval informed by an independent expert panel assessment.</p>
<p>Reporting</p> <p>Landholders must notify LLS of forestry operations 30 days prior to commencement, and 30 days after completion.</p> <p>Replaces existing provision where Landholders must report to the EPA by 31 March if forest operations have been carried out in the previous year or planned in the current year.</p>	<p>Revised setting</p> <p>Updated notification requirements regarding forestry operations</p>	<p>Revised provision gives LLS up to date information about operations, but potentially less advance notice of planned operations compared with existing arrangements (noting, however, there was relatively low compliance with the existing annual return provision). Notifications will assist LLS in assessing cumulative landscape impacts. Timely transfer of information between LLS and EPA should be supported by a Memorandum of Understanding.</p>
<p>Monitoring, evaluation and reporting (MER)</p> <p>The Codes require that a PNF MER framework is developed, including an approval process and governance arrangements for the development and oversight of the framework.</p> <p>The code also specifies adaptive management requirements, including annual and five-yearly reviews of the evidence base for PNF.</p>	<p>New setting</p> <p>Existing codes do not require a MER framework</p>	<p>A PNF MER framework will establish an evidence base for PNF that can be used to inform decision making, longer-term reviews and adaptive management. The PNF MER framework should report on the effectiveness of the PNF code in meeting identified objectives and outcomes, and identify where improved rules, practices or approaches are required. The PNF MER framework will link to the NSW FMIP.</p> <p>Annual adaptive management processes ensure that the evidence base is up to date (including relevant maps), identify emerging evidence from monitoring and research, and opportunities for improvement. Also includes five-yearly reviews that will consider whether there is sufficient evidence to warrant a review of the PNF codes.</p>

4.2 Improving intent, certainty and consistency

4.2.1 Planning options are an improvement on existing arrangements

In its initial draft advice, the Commission advised that the design of PNF Plans, Forest Management Plans and Forest Stewardship Plans in the final draft PNF codes should be refined to provide greater clarity around their intent and make the range of available options more easily understood by landholders. The design of these planning instruments should also match the risks associated with the forestry operations permitted under each instrument.

In the final draft PNF codes, LLS have amended the various planning instruments, as summarised in **Table 6**. Key updates include:

- Forest Management Plans and Forest Stewardship Plans require landholders to identify their forest management objectives to inform LLS advice and capacity building activities
- Forest Management Plans set region-specific Net Harvestable Area limits⁶¹ above which a Forest Stewardship Plan is needed reflecting increased risk from larger operations
- Forest Stewardship Plans provide a path for landholder(s) to obtain approval for:
 - higher intensity harvesting within region-specific limits
 - more extensive harvesting operations than allowed under Forest Management Plans
 - limited code variations to provisions in Sections 5, 6 and 7 and Appendix A in order to manage impacts or improve outcomes after significant forest disturbance events.
- Forest Stewardship Plans can only be approved by LLS after considering advice from an independent expert panel, including an assessment against set criteria (see **Section 4.2.2**)
- In conducting a Forest Stewardship Plan assessment, the independent expert panel can seek additional information (including site-surveys) and recommend additional site-specific protections for any identified issue (consistent with legislative obligations and conditions)
- Forest Management Plans and Forest Stewardship Plans can be amended, although significant changes require LLS approval.

The Commission supports the planning instruments in the final draft PNF codes.

To assist landholders and help ensure enforceability, LLS should develop a protocol for the development of Forest Stewardship Plans, including a standardised Forest Stewardship Plan template. It should align with the supporting protocol for Forest Stewardship Plan assessment and approval, as recommended in **Section 4.2.2**.

In developing this protocol and template, LLS should consult with DPE and EPA legal officers to ensure Forest Stewardship Plans are enforceable. The protocol and template should be finalised and approved by the LLS CEO within six months of the Code's approval, with all parties providing feedback in a timely manner. No Forest Stewardship Plans should be prepared or approved until the template is developed and approved.

⁶¹ Maximum Net Harvestable Area of: 250 hectares for Northern and Southern regions; 500 hectares for River Red Gum region; 1000 hectares for Cypress and Western Hardwoods region.

Table 5: The Commission’s recommendations for PNF code planning instruments

Recommendation	Comment
<p>LLS, in consultation with EPA, should develop and approve protocols and guidance material needed to support the application, administration and regulation of the PNF codes within six months of the Code’s approval.</p> <p>This should include a protocol for the development of Forest Stewardship Plans, including a standardised Forest Stewardship Plan template – EPA Legal Officers should be consulted on the design of the template to ensure enforceability and compliance.</p>	<p>Although LLS is responsible for developing and approving protocols or guidance for PNF, consultation with EPA is encouraged as it helps ensure the PNF codes are consistently implemented and enforced.</p> <p>A protocol for the development of Forest Stewardship Plans, including a standardised template, should help ensure enforceability of the PNF codes. It should be developed in conjunction with the supporting protocol for Forest Stewardship Plan assessment and approval, as recommended in Section 4.2.2.</p>

Table 6: Overview of the final draft PNF code planning instruments

	Option 1 – PNF Plan	Option 2 – PNF Plan + Forest Management Plans (FMPs)	Option 3 - PNF Plan + Forest Stewardship Plans (FSPs)
Description	<ul style="list-style-type: none"> ▪ Base plan for all PNF operations ▪ Permits small scale harvesting without additional planning: <ul style="list-style-type: none"> - harvest up to 5 trees/ha - harvest area less than 5 hectares or volume less than 50m³ (or 100m³ for Cypress and Western Hardwood region) per year (whichever is smaller) - basal area limits as per Forest Management Plan Single Tree Selection and thinning 	<ul style="list-style-type: none"> ▪ Supplements the PNF Plan ▪ Identifies the landholder’s forest management objectives ▪ Forest Management Plans apply a standard set of provisions with no allowance for site-specific amendments ▪ Maximum Net Harvestable Area of: <ul style="list-style-type: none"> - 250 hectares in Northern and Southern regions - 500 hectares in River Red Gum region - 1000 hectares in Cypress and Western Hardwoods region - Expect most plans to fall into this category 	<ul style="list-style-type: none"> ▪ Supplements the PNF Plan ▪ Identifies landholder forest management objectives ▪ Allow for, within limits and subject to independent expert assessment: <ul style="list-style-type: none"> - increased extent or intensity of harvesting - limited variation of other code requirements in response to a significant disturbance event where forestry operations can be used to improve long-term ESFM outcomes - Expect fewer plans to fall into this category; will tend to be larger scale operations
Basal area limits – Single Tree Selection and thinning	<ul style="list-style-type: none"> ▪ Requires Forest Management Plan or Forest Stewardship Plan 	<ul style="list-style-type: none"> ▪ Northern: 14 m²/ha ▪ Southern and River Red Gum: 12 m²/ha ▪ Cypress: 6 m²/ha ▪ Western Hardwoods: 8 m²/ha 	<ul style="list-style-type: none"> ▪ Potential to vary the basal area for single tree selection and thinning down to a minimum average of 10 m²/ha in Northern, Southern and River Red Gums where appropriate ▪ No variation of Cypress or Western Hardwoods limits (already below 10 m²/ha).

Option 1 – PNF Plan	Option 2 – PNF Plan + Forest Management Plans (FMPs)	Option 3 - PNF Plan + Forest Stewardship Plans (FSPs)
<p>Area limits – Australian Group Selection (AGS)</p>	<ul style="list-style-type: none"> ▪ Sum of canopy openings must not exceed 20 percent of Net Harvestable Area ▪ Maximum area of individual canopy openings must not exceed 0.5 hectares ▪ No further AGS or STS within 100 metres of the edge of the canopy opening within ten years of completion; or until the forest stand within the opening has reached 10 metres or more ▪ Canopy openings can be irregular shape whilst maximising regeneration outcomes and retaining key habitat features ▪ Does not apply to Cypress and Western Hardwoods 	<ul style="list-style-type: none"> ▪ Same settings as for Forest Management Plans, except the maximum area of individual canopy openings must not exceed 0.75 hectares
<p>Key Protections</p> <ul style="list-style-type: none"> ▪ Provisions for environmental protections set out in Section 6 and Appendix A of the final draft PNF codes 	<ul style="list-style-type: none"> ▪ Provisions for environmental protections as per Section 6 and Appendix A of the PNF codes ▪ Koala feed tree retention = 15 primary and 5 secondary feed trees per hectare in specified koala habitat areas ▪ Must conduct regeneration monitoring and management to ensure forest composition and structure is maintained 	<ul style="list-style-type: none"> ▪ Provisions for environmental protections as per Section 6 and Appendix A of the PNF codes, unless variations approved in response to significant disturbance events ▪ During the approval process, the independent expert panel can: <ul style="list-style-type: none"> - request further information to inform its assessment where required, including additional flora and fauna assessments or surveys if necessary - recommend additional site-specific protections for any identified issue (consistent with legislative obligations and conditions). ▪ Must conduct regeneration monitoring and management to ensure forest composition and structure is maintained

	Option 1 – PNF Plan	Option 2 – PNF Plan + Forest Management Plans (FMPs)	Option 3 - PNF Plan + Forest Stewardship Plans (FSPs)
Governance and MER	<ul style="list-style-type: none"> ▪ Landholders prepare the PNF Plan ▪ LLS approves the PNF Plan ▪ LLS can vary the PNF Plan on application by the landholder ▪ Landholder reports on number and area of trees harvested ▪ No public reporting requirements 	<ul style="list-style-type: none"> ▪ Landholders prepare the Forest Management Plan ▪ LLS assesses against code, approves and reports ▪ Forest Management Plans can be amended, although significant changes require LLS approval ▪ Data collected under these plans contributes to PNF MER program ▪ Plans publicly registered 	<ul style="list-style-type: none"> ▪ Suitably qualified experts prepare the Forest Stewardship Plan in line with a template jointly developed by EPA and LLS ▪ LLS approves the plan, considering advice from an independent expert panel based on assessment against set criteria (see Section 4.2.2, Table 7) ▪ Forest Stewardship Plans can be amended, although significant changes require LLS approval ▪ Plans publicly registered

4.2.2 Appropriate approval processes are in place

LLS are the approval body for PNF Plans, Forest Management Plans and Forest Stewardship Plans. The approval process for PNF Plans and Forest Management Plans is straightforward, as LLS will simply assess the given plan against the relevant PNF code provisions.

In contrast, LLS’s approval process for Forest Stewardship Plans will be more involved given the scope for variation of provisions and potential for greater impacts and risks. As a result, the Commission recommends that LLS’s approval be informed by the outcomes of an independent expert panel review of the proposed Forest Stewardship Plan:

- against a set of assessment criteria as set out in the final draft PNF code, and
- considering compliance with relevant legislative requirements and the code.

The Forest Stewardship Plan approval process applies to all Forest Stewardship Plans, without exception, and is outlined in **Figure 3**.

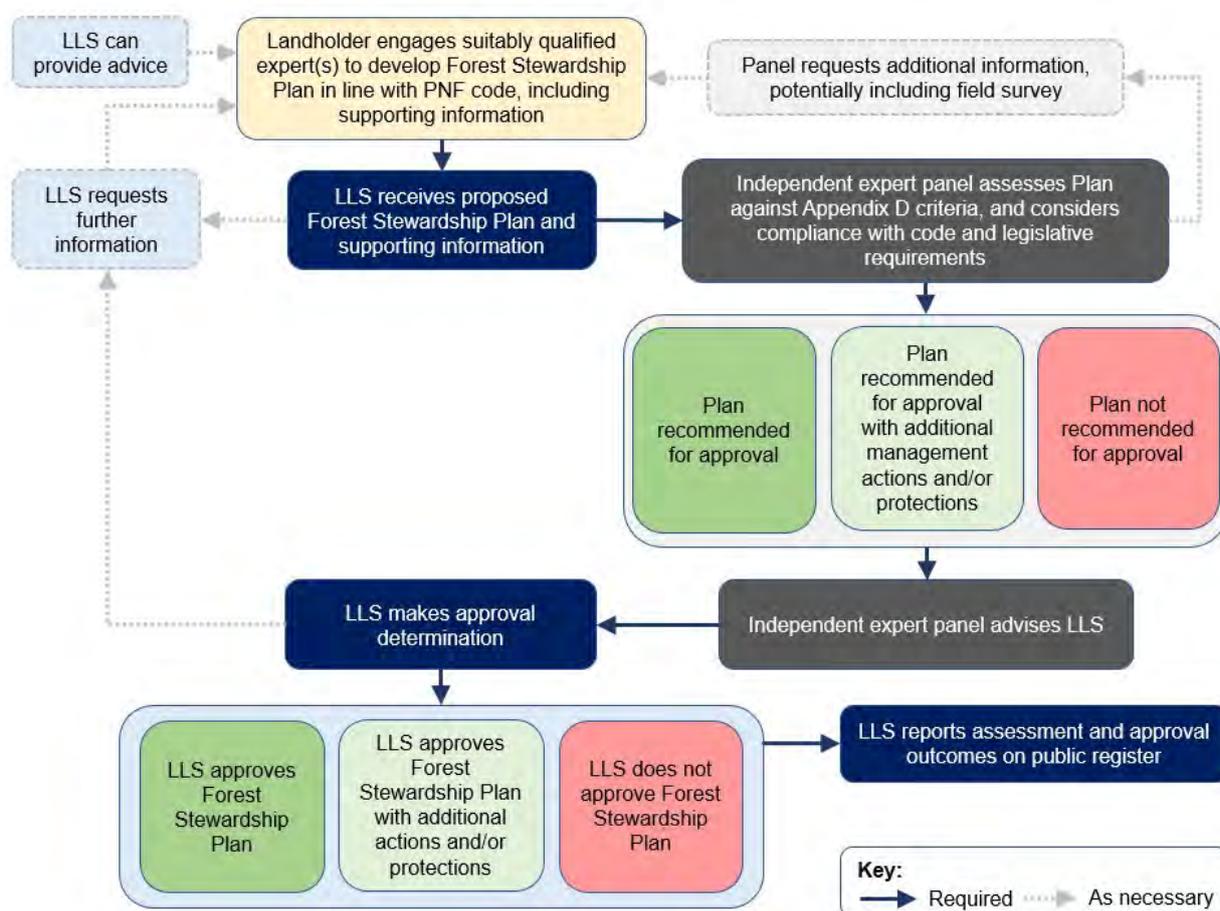


Figure 3: Forest Stewardship Plan approval process

The composition of the independent expert panel is set out in the final PNF codes. The codes require that:

- panel members must have applied knowledge and experience in the principles of ESFM, as well as expertise in at least one of a specified list of areas of expertise
- every panel must include, at a minimum, members with expertise in forest management (including silviculture), and forest ecology.

As such, the broad composition of the panel is jointly approved by the two relevant Ministers. The selection and approval of the independent expert panel representatives for a given Forest Stewardship Plan assessment will be determined by the LLS CEO, ideally in a collaborative manner with the regulator.

The Commission endorses the Forest Stewardship Plan assessment criteria as set out in **Table 7** and included in Appendix D of the final draft PNF code. These criteria were developed based on the overarching outcomes statements in **Section 3.1.2**.

Table 7: Assessment criteria for Forest Stewardship Plans

Assessment criteria	Assessment consideration	Related Outcomes Statement
1. Potential impacts on biodiversity conservation at the local and bioregional scales	<ul style="list-style-type: none"> ▪ Important trees, habitat and environmental features are identified and protected: <ul style="list-style-type: none"> - for shelter and food resources for native species, and to support their persistence - to provide refuge, connectivity and to support forest regeneration. ▪ Site-specific measures are implemented to manage long term forest health and habitat for threatened flora and fauna. 	(1) Maintain forest health and regeneration at site and bioregional scales (3) Maintain the persistence of native species at site and bioregional scales
2. Potential impacts on the environment at the local scale and bioregional scales	<ul style="list-style-type: none"> ▪ Forest regeneration and management actions are monitored and where necessary interventions made to ensure long-term active and adaptive management. ▪ Vegetation adjacent to drainage features and wetlands is managed effectively in the long-term, and groundcover is retained, to maintain water quality, stream stability, riparian habitat and contribute to habitat connectivity. ▪ Water quality and aquatic habitat are maintained through the implementation of best management practices for roads, tracks and crossings. ▪ Areas of soil erosion hazard are identified and managed effectively ▪ The site and any infrastructure no longer required after operations area rehabilitated according to best management practices. 	(2) Maintain the productive capacity of the private native forest estate at a site and bioregional scales (4) Maintains water quality and soil health at site and bioregional scales
3. The likely suitability of the site, and landholder knowledge and capacity to manage potential risk	<ul style="list-style-type: none"> ▪ Site location, access, slopes, etc, support forestry operations without generating unmanageable or cumulative risks at site and landscape scale. ▪ Harvesting operations can be effectively distributed across the landscape and over time and space, to support a mosaic of forest age-classes and maintenance of forest structure across the landscape. ▪ Operator and/or landholder have sufficient capacity to identify and manage risks and implement best practice forest management. 	(1) Maintain forest health and regeneration at site and bioregional scales (5) Build landholder capacity to deliver best practice forest management

Assessment criteria	Assessment consideration	Related Outcomes Statement
4. Aboriginal values, places and practices	<ul style="list-style-type: none"> Site-specific measures ensure the appropriate management, protection and persistence of Aboriginal places and practices Site specific measures help foster connection and collaboration within Aboriginal communities and/or between Aboriginal communities and landholders Site specific measures help improve our knowledge of Aboriginal forest management 	<p>(2) Maintain productive capacity of the private native forest estate at a site and bioregional scales</p> <p>(5) Build landholder capacity to deliver best practice forest management</p>
5. Research, innovation and industry development	<ul style="list-style-type: none"> Site specific measures encourage active and adaptive management Site specific measures help improve our knowledge of silviculture and forest ecology Site specific measures help facilitate innovation and industry development 	<p>(5) Build landholder capacity to deliver best practice forest management.</p> <p>(6) Support the economic resilience of landholders and regional communities.</p>
6. Relevant legislation	<ul style="list-style-type: none"> Consideration of relevant legislative requirements 	

The Commission advises that in the independent expert panel assessment, the satisfaction of assessment criteria one, two and three is essential, as is the consideration of criterion six. In contrast, while desirable, satisfaction of criteria four and five may not always be relevant depending on the nature of the proposed Forest Stewardship Plan activities. It is not intended that the criteria be weighted, or that the satisfactory fulfilment of any given criteria can offset inadequate fulfilment of assessment criteria one, two and/or three.

To inform the Forest Stewardship Plan assessment and approval process, LLS and the independent expert panel will need to refer to supporting information. When conducting their assessment, the final draft PNF codes allow the independent expert panel to:

- request further information where required, including additional flora and fauna assessments or surveys if necessary
- recommend additional site-specific protections for any identified issue, consistent with legislative obligations and conditions.

The Commission supports the current approvals processes in place within the final draft PNF codes, particularly the requirement for independent expert panel review for Forest Stewardship Plans prior to approval.

The Commission recommends that a supporting protocol for Forest Stewardship Plan approval and the independent expert panel assessment be prepared to guide the process and clarify expectations. In particular, the protocol should assist in the interpretation of and assessment against the criteria in **Table 7**, for example by clarifying what is meant by key terms such as landholder knowledge and capacity. Additional guidance relating to the determination and assessment of significant disturbance events could also be provided (see **Section 4.3.3**). The assessment and approval protocol should align with the Forest Stewardship Plan development protocol and standardised template (see **Section 4.2.1**).

The protocol should be developed by LLS and approved by the LLS CEO. As part of efforts to improve collaborative co-regulation and ensure the Forest Stewardship Plans are enforceable, the Commission encourages LLS to seek feedback from DPE and the EPA on the protocol, with additional support or input available from the Commission where necessary.

All parties should provide feedback in a timely manner to ensure this protocol is in place within six months of the PNF codes being approved, and prior to any Forest Stewardship Plans being developed or approved.

Table 8: The Commission’s recommendations for PNF code approval processes

Recommendation	Justification and Intent
<p>LLS, in consultation with EPA, should develop and approve protocols and guidance material needed to support the application, administration and regulation of the PNF codes within 6 months of the Code’s approval.</p> <p>This should include a supporting protocol for Forest Stewardship Plan assessment and approval to guide the independent expert panel assessment process.</p>	<p>Although LLS is responsible for developing and approving protocols or guidance for PNF, consultation with EPA is encouraged as it helps ensure the PNF codes are consistently implemented and enforced.</p> <p>A supporting protocol for Forest Stewardship Plan assessment and approval would provide useful guidance for the independent expert panel. It would increase transparency and consistency in the assessment process and support effective and efficient decision making.</p> <p>The Forest Stewardship Plan assessment and approval protocol should be developed alongside the protocol for the development of Forest Stewardship Plans, including a standardised template, as recommended in Section 4.2.1.</p>

4.3 Maintaining productive and healthy forests

4.3.1 Basal area limits for selective harvesting

In the context of ESFM, the stand basal area limits for selective harvesting have implications for the ability to maintain the productive capacity and sustainability of the forest ecosystems (**ESFM Principle (a)(ii)**).

The basal area requirements established in the silvicultural provisions of the draft PNF codes changed significantly during the drafting process when compared with the existing arrangements, as shown in **Table 9**. As noted by OCSE, the Northern region has the greatest population of Koalas in NSW. Trend monitoring undertaken by DPI Forest Science indicates that the koala population in hinterland forests of north east NSW is stable since at least 2015.⁶² It is also where most PNF occurs, and where a lower minimum basal area of 10 metres squared per hectare was proposed in the consultation draft PNF codes.⁶³

Existing arrangements

The existing Northern, Southern and Western Hardwoods PNF codes include different basal area limits for each region of between 12 - 18 metres squared per hectare, depending on forest type and stand height. For context, the average stand basal area for private landholdings in the Northern region is 20-21 metres squared per hectare.⁶⁴

There are two existing codes where a flat rate basal area limit is applied irrespective of forest height or type: River Red Gums (12 metres squared per hectare); and Cypress (6 metres squared per hectare).

⁶² <https://www.dpi.nsw.gov.au/forestry/science/forest-ecology/Koala-research-in-nsw-forests>

⁶³ Office of the NSW Chief Scientist & Engineer (2021). *Advice on Koala protection in the proposed new Private Native Forestry Codes of Practice*. Office of the NSW Chief Scientist & Engineer, Sydney, NSW.

⁶⁴ NSW Department of Primary Industries (2021). *Site Index Mapping for North Coast NSW using LiDAR Data - Technical Report for Local Land Services*. NSW DPI - Forest Science Unit, Parramatta, NSW.

Proposed basal area limits in the consultation draft PNF codes

In the consultation draft PNF codes, basal area limits were reduced to a flat rate of 10 metres squared per hectare for the Northern region and 12 metres squared per hectare for the Southern region, while Western Hardwoods was set at a flat rate of 8 metres squared per hectare (River Red Gums and Cypress limits have remained unchanged). This removes any variation in basal area limit based on forest type or stand height.

The simplified threshold structure for basal area was intended to reduce complexity and compliance risks and improve implementation for landholders⁶⁵, while also addressing risks around high-grading.⁶⁶

The proposed flat rate minimum basal areas in the final draft PNF codes were supported by expert reviews. For example, Brack (2020) concluded that the simplified, flat-rate threshold structure is reasonable, and will support regeneration.⁶⁷ In a report produced for OCSE, Vanclay also agreed that the proposed limits were workable if basal area was the preferred approach, while noting a preference for alternative incentives or outcomes-based approaches.⁶⁸

Basal area limits linked to stand height were removed on the basis that this prescription has limited ecological justification while also being difficult to implement.⁶⁹ For example, Bracks (2020) advised that measurement of stand height from the ground *'can be relatively time consuming, expensive and prone to sampling error'*. Further, it is noted that the dominant height of most private native forest areas in coastal NSW are less than 25 metres tall.⁷⁰ For example, 66 percent of forests on private property on the north coast and 85 percent of forests on private property on the south coast are below 25 metres tall.

In addition to supporting the proposed reduced, flat-rate basal area limits, expert reviews also identified that a basal area limit even lower than 10 square metres per hectare may be preferable in some circumstances where regeneration outcomes would be improved by greater removal of the over-story and mid-story, for example:

*'Whilst the specific limits of 10 m²/ha and 12 m²/ha are reasonable for most situations, I am aware of a few cases where lower limits would likely lead to better outcomes (hence my suggestion above that I would welcome greater flexibility for certified consultants and landholders with a reliable track record).'*⁷¹

Experts have also cautioned that basal area limits alone are a blunt instrument and may not deliver the required outcomes alone, for example:

⁶⁵ OCSE (2020). *Peer review of the report 'Native Forest Harvesting and Thinning on Private Managed Lands in New South Wales for Multiple Purposes'* by Dr Cris Brack. Advice to The Hon. Adam Marshall MP, Minister for Agriculture and Western NSW from OCSE, Sydney, NSW.

⁶⁶ The removal of a limited number of commercially valuable trees without considering the subsequent impacts on the remaining stand, including poorer species composition and regeneration.

⁶⁷ Brack, CL. (2020). *Native Forest harvesting and thinning on Privately Managed Lands in New South Wales for multiple purposes*. Prepared for Local Land Services by CL. Brack, Fenner School of Environment and Society, Australian National University, Canberra, ACT.

⁶⁸ OCSE (2020). *Peer review of the report 'Native Forest Harvesting and Thinning on Private Managed Lands in New South Wales for Multiple Purposes'* by Dr Cris Brack. Advice to The Hon. Adam Marshall MP, Minister for Agriculture and Western NSW from OCSE, Sydney, NSW.

⁶⁹ Brack, CL. (2020). *Native Forest harvesting and thinning on Privately Managed Lands in New South Wales for multiple purposes*. Prepared for Local Land Services by CL. Brack, Fenner School of Environment and Society, Australian National University, Canberra, ACT.

⁷⁰ NSW Department of Primary Industries (2021). *Site Index Mapping for North Coast NSW using LiDAR Data - Technical Report for Local Land Services*. NSW DPI - Forest Science Unit, Parramatta, NSW.

⁷¹ OCSE (2020). *Peer review of the report 'Native Forest Harvesting and Thinning on Private Managed Lands in New South Wales for Multiple Purposes'* by Dr Cris Brack. Advice to The Hon. Adam Marshall MP, Minister for Agriculture and Western NSW from OCSE, Sydney, NSW.

‘Justifying relatively low values for residual basal area by claiming the need for regeneration / forest renewal, may require the inclusion of some additional (simple) metrics to demonstrate that regeneration is “likely” to result.’⁷²

OCSE recommendations

The expert advice that informed the development of the proposed basal area limits in the consultation draft focused on forest regeneration outcomes.⁷³ In contrast, the OCSE’s review, which addressed the adequacy of koala protections, found that:

‘The proposed increased allowable take (lowered minimum average basal area limit) proposed in the proposed PNF Codes is not coupled with proportionate enhancement of risk management or ecosystem protection efforts: retained or set aside habitat; regulatory oversight in the planning phase; or information gathering and forestry outcomes monitoring’⁷⁴

OCSE recommended that the stand basal area average minimum values should be increased until proportionate protections and procedures for koalas are included, and their beneficial effect can be demonstrated, particularly in the Areas of Regional Koala Significance (ARKS).

Final draft PNF codes

The basal area limits in the final draft PNF codes are presented in **Table 9**. The basal area limits in the final draft PNF codes align with those suggested in the Commission’s initial advice to LLS. The increased basal area limits for both Single Tree Selection and Thinning and Small Scale Harvesting for the Northern region also address OCSE’s recommendation to increase average minimum stand basal area values until proportionate koala protections are included and their beneficial effect can be demonstrated (**OCSE Recommendation 9**).

For Forest Management Plans, the existing highest minimum basal area for forests less than 25 metres tall from each region has been applied as a flat rate minimum basal area limit. In Forest Stewardship Plans a lower average minimum basal area may be agreed in Northern, Southern and River Red Gum regions, provided it remains above the specified lower limit and subject to LLS approval and independent expert panel assessment.

Box 2 describes potential outcomes for the north coast based on modelled simulations, providing context for the proposed minimum basal area values in the Northern Region.

The Commission notes that the basal area limits for Single Tree Selection and Thinning under Forest Management Plans also apply to Small Scale Harvesting under PNF Plans.

The Commission suggests that the PNF MER framework should identify and address key knowledge gaps relating to the impact of basal area limits to inform future decision making. DPI Forest Science is now designing further research to investigate koala response to harvesting under the PNF codes when approved. This work should be integrated into the PNF MER framework when adopted. The Commission notes that evidence from PNF MER programs will be collated annually, along with a five-yearly review of evidence to determine whether there is sufficient data and insights to warrant a formal review of the PNF Codes (see **Section 5.1.1**).

⁷² Brack, CL. (2020). *Native Forest harvesting and thinning on Privately Managed Lands in New South Wales for multiple purposes*. Prepared for Local Land Services by CL. Brack, Fenner School of Environment and Society, Australian National University, Canberra, ACT. Pg 19.

⁷³ *Ibid.*

⁷⁴ Office of the NSW Chief Scientist & Engineer (2021). *Advice on Koala protection in the proposed new Private Native Forestry Codes of Practice*. Office of the NSW Chief Scientist & Engineer, Sydney, NSW. Pg iii.

OCSE Recommendation 3 also identified that the median and mean values for basal area are both important, and LLS proposed a new provision requiring that no more than 50 percent of the area should be below the average minimum basal area. The Commission notes that the relevant provision has been refined to improve clarity. LLS should consider developing simple guidance material to ensure landholders can comply and implement this new requirement, in line with capacity building and adoption of best practice standards as per **ESFM Principle (c)**.

Box 2: North Coast harvest simulation

At the request of the Commission, researchers from the University of Melbourne modelled the potential forest structure from a private native forestry harvest operation.

The simulation used inventory plot data provided by Forestry Corporation of NSW from a state forest on the NSW mid-north coast (noting stem numbers are typically higher on state forests compared to private land). The starting basal area of the plot was 21.8 m²/hectare. This rate is comparable to a DPI PNF study that found average basal area of 20.1 m² per hectare on private land.⁷⁵

The simulation looked at the stem numbers and size distribution following a harvest when restricted to an average minimum basal area retention of 16 m²/hectare, 14 m²/hectare, 12 m²/hectare and 10 m²/hectare.

The simulation modelled a 'from above' harvesting operation – a typical operation mostly expected under Forest Management Plans. The operation would target merchantable trees only, starting with largest trees first until they reach the basal area limit. In addition, it is also assumed that any unmerchantable trees would not be harvested and remain in the stand.

Where a basal area retention is:

- 16 m²/hectare: well-over half of the canopy trees are retained, with the landholder accessing only up to 12-13 trees per hectare under this scenario. This operation is likely to be economically unviable and may have adverse regeneration outcomes in less shade tolerant forest types.
- 14 m²/hectare: this scenario leaves a good retention of mature canopy trees, providing habitat for native species and also enables the landholder to harvest up to 21 trees per hectare. This is likely to provide the best balance for environmental and economic outcomes in the more shade tolerant species found in north coast forests.
- 10 and 12 m²/hectare: removes almost all of the canopy trees, and in the absence of incentives and experienced forest management, will leave a large proportion of small unmerchantable trees that may have adverse regeneration outcomes.

There is the opportunity to provide incentive for the landholder to conduct an operation that will improve future forest regeneration outcomes. Should all unmerchantable timber under 20 cm diameter at breast height be removed this would account for approximately 5m²/hectare of basal area in that stand. The landholder then may be allowed to harvest to a lower basal area minimum but would still achieve a much better regeneration outcome for that forest than if only the largest trees were harvested within higher basal area retentions. A scenario such as this could be a forest outcome that is achieved under a Forest Stewardship Plan.

⁷⁵ Lewis, T, et al (2020) *Improving productivity of the private native forest resource in southern Queensland and northern New South Wales*. Forest & Wood Products Australia Limited. Melbourne.

Table 9: Basal area limit adjustments for selective harvesting

Region	Forest Type	Existing Codes (STS + thinning)		Consultation draft (STS + thinning)	Final draft PNF codes (STS + thinning)	
		Stand height			FMPs*	FSPs
		<25m	>25m			
Northern	<i>Tablelands hardwood</i>	12 m2/ha	16 m2/ha	10 m2/ha	14 m2/ha	10 m2/ha (where assessed and approved)
	<i>Tablelands ash</i>					
	<i>Spotted gum</i>					
	<i>North coast dry/moist mixed hardwood</i>					
	<i>North Coast flooded gum</i>		18 m2/ha			
	<i>North Coast Blackbutt</i>	14 m2/ha	18 m2/ha			
Southern	<i>Tablelands hardwood</i>	12 m2/ha	16 m2/ha	12 m2/ha	12 m2/ha	
	<i>Tablelands ash</i>					
	<i>Spotted gum</i>					
	<i>South Coast ash/stringybark</i>		18 m2/ha			
River Red Gums	-	12 m2/ha		12 m2/ha	12 m2/ha	
Cypress & Western Hardwoods	<i>Cypress</i>	6 m2/ha		6 m2/ha		6 m2/ha
	<i>Western hardwoods</i>	8 m2/ha	12 m2/ha	8 m2/ha		8 m2/ha

* **Note:** the region-specific basal area limits for Single Tree Selection and Thinning under Forest Management Plans also apply to Small Scale Harvesting under PNF Plans

4.3.2 Australian Group Selection provisions

Australian Group Selection involves harvesting groups (small patches or stands) of trees to create a canopy opening. This method is suitable for promoting regeneration of shade-intolerant species and leads to a forest comprising patches of differently aged trees. Under the PNF codes, Australian Group Selection is available for use in the Northern, Southern and River Red Gum regions but is not permitted in the Cypress and Western Hardwood region.

Like the basal area provisions for Small Scale Harvesting and Single Tree Selection and Thinning, **Table 10** shows that provisions for Australian Group Selection have changed compared with existing arrangements.

Table 10: Australian Group Selection key provisions

	Existing	Consultation draft	Final draft PNF codes
Use restrictions	-	-	Australian Group Selection can only be used to encourage the regeneration of forest stands with shade intolerant species and/or where forest regeneration has failed.
Sum of canopy openings	Maximum limit of the sum of canopy openings is 20% of the Net Harvestable Area		
Canopy opening limits	-	-	Maximum area of an individual canopy opening: - FMP = 0.5 hectares - FSP = 0.75 hectares.
Post-harvest restrictions	-	-	Australian Group Selection and Single Tree Selection cannot occur within 100 metres of a canopy opening edge: (i) within ten years of the completion of harvest operations, or (ii) until the forest stand within a canopy opening has reached 10 metres or more.
Canopy opening definition	An area greater than 0.1 hectares in size, measured between canopy perimeters, where any vegetation remaining within the opening is less than one-half of the stand height.		An area greater than 0.1 hectares in size, measured between canopy perimeters, where any vegetation remaining within the opening is less than one-half of the stand height unless this is a significant habitat feature.
Irregular canopy openings	-	A canopy opening can be an irregular shape to maximise light penetration (including the boundary to area ratio), forest regeneration and account for existing landscape features provided it does not exceed the width or area prescriptions.	A canopy opening can be an irregular shape to maximise light penetration and optimise the area to boundary ratio, to encourage forest regeneration and account for existing landscape features and significant habitat features (such as hollow bearing trees, dead standing trees, feed trees) provided it does not exceed the maximum area and is non-linear in shape.
Post-harvest debris	-	-	After harvesting, the debris in the gap may be burnt to create an ash bed for regeneration.

The Commission supports the proposed Australian Group Selection provisions in the final draft PNF codes. While the limit for the sum of canopy openings has remained constant at 20 percent of the Net Harvestable Area, the following provisions have been added or improved in comparison to the existing PNF codes:

- **use restrictions** – limiting the use of Australian Group Selection to encourage the regeneration of forest stands with shade intolerant species or where regeneration has failed to ensure this silvicultural method is used in appropriate situations
- **canopy opening limits** – simplifying the limits to specified maximum areas for Forest Management Plans and Forest Stewardship Plans, removing variation based on stand height to improve ease of implementation and compliance for landholders and regulators
- **post-harvest restrictions** – excluding harvesting operations in the 100 metres adjacent to recently harvested canopy openings (for ten years after harvesting operations, or until the canopy opening forest stand has reached 10 metres or more) to reduce cumulative impacts on forested areas and maintain habitat refugia and connectivity
- **canopy opening definition** – updating the definition to allow for significant habitat features to be retained within a canopy opening, including large hollow bearing trees
- **canopy opening shape** – allowing for irregularly-shaped canopy openings to maximise light penetration and optimise the area to boundary ratio, to encourage forest regeneration and account for existing landscape features and significant habitat features (such as hollow bearing trees, dead standing trees, feed trees) provided it does not exceed the maximum area and is non-linear in shape
- **post-harvest debris** – allowing harvesting debris to be burnt to create an ash bed in which a future crop of shade-intolerant species can regenerate.

The Commission supports maximum canopy openings of 0.5 hectares for Forest Management Plans and 0.75 hectares for Forest Stewardship Plans. The Commission considers that a canopy opening limit of at least 0.5 hectare is necessary to provide sufficient gapping to promote regeneration and meet ESFM principles around maintaining the productive capacity of forests. For example, Australian Group Selection with a canopy opening of 0.25 hectares was not sufficient for effective regeneration on State Forests.⁷⁶ A study found that in mixed blackbutt forests, the use of a larger canopy openings improves growth of regeneration without compromising species composition.⁷⁷ One hectare gaps were optimal for regeneration, while also noting that issues with seed dispersal in larger gaps means enrichment plantings or artificial sowing are needed for gaps with diameters exceeding 0.5 hectares in area.⁷⁸

Further, under the existing PNF codes, the canopy opening diameter must not exceed two times the stand height. A 0.5 hectare canopy opening is equivalent to a stand height of around 40 metres. The Commission also suggests that the suitability and effectiveness of Australian Group Selection provisions, particularly canopy opening sizes, should be reviewed as a priority under the PNF MER framework.

⁷⁶ NRC (2016) Advice on Coastal Integrated Forestry Operations Approval remake. Natural Resources Commission, Sydney.

⁷⁷ Kinny, M., McElhinny, C. & Smith, G. (2012), The effect of gap size on growth and species composition of 15-year-old regrowth in mixed blackbutt forests, *Australian Forestry*, 75:1, 3-15, DOI: 10.1080/00049158.2012.10676380

⁷⁸ *Ibid.*

The Commission recognises there may be higher risks when applying Australian Group Selection compared with selective harvesting in a PNF context, including the potential for this type of harvesting to impact landscape features, including habitat trees. The Commission notes that habitat tree retention rules, and koala feed tree retention rules where applicable, still apply in the remaining 80 percent of an Australian Group Selection tract where gapping cannot occur. For instance, the requirement to meet 15 primary and 5 secondary koala feed trees per hectare still applies and if it can't be met in the surrounding 0.5 hectare outside of the gap, then feed trees must be retained within the gap to meet the requirement. Provisions relating to canopy opening definition and configuration have also been revised to ensure landholders are able to retain significant habitat features.

Importantly, the Commission recognises that the effective use of Australian Group Selection requires significant landholder capacity to ensure it is used appropriately to achieve beneficial outcomes and improve forest health. As such, consideration of landholder knowledge and capacity to manage potential risk is part of the assessment criteria in the Forest Stewardship Plan assessment process (**Table 7, Section 4.2.2**).

LLS should also engage proactively with landholders proposing to apply Australian Group Selection under a Forest Management Plan or Forest Stewardship Plan and offer advisory services, training, and education where necessary to ensure the best possible gap configurations and effective post-harvest regeneration management. The Commission has also identified a range of additional guidance materials that should be developed to assist landholders who wish to use Australian Group Selection (see **Table 11**).

Table 11: The Commission's recommendations for Australian Group Selection

Recommendation	Justification and Intent
<p>LLS should be supported to ensure it can effectively carry out its role in building landholder capacity through training and education, particularly for landholders proposing to apply Australian Group Selection, and to offer advisory services, training, and education where necessary</p>	<p>These actions will help address concerns around landholder capacity and ensure Australian Group Selection is applied appropriately to deliver the intended outcomes.</p>
<p>LLS, in consultation with EPA, should develop and approve protocols and guidance material needed to support the application, administration and regulation of the PNF codes within six months of the Code's approval. This should include:</p> <ul style="list-style-type: none"> ▪ a list of shade-intolerant species to provide clarity for landholders as to where the use of Australian Group Selection may be appropriate ▪ guidelines for the shape, size, and placement of Australian Group Selection canopy openings to deliver the intended outcomes and reduce the risk of regeneration failure, seeking input from relevant agencies ▪ regeneration guidelines that reinforce the importance of appropriate regeneration management following the use of Australian Group Selection, including risks arising from premature grazing in canopy openings. 	<p>As above.</p> <p>Although LLS is responsible for developing and approving protocols or guidance for PNF, consultation with EPA is encouraged as it helps ensure the PNF codes are consistently implemented and enforced.</p>

4.3.3 Variation of code provisions under Forest Stewardship Plans

The Commission supports the code provisions that define the scenarios in which a Forest Stewardship Plan is appropriate, specifically where a landholder seeks to:

- 1 specify a Net Harvestable area in excess of the specified Forest Management Plan limits
- 2 intensify harvesting in an area within specified Forest Stewardship Plan limits
- 3 vary specific code provisions to manage impacts or improve outcomes following significant forest disturbance events.

Under the third scenario, Forest Stewardship Plans specifically provide landholder(s) with a mechanism to:

'Include alternative requirements to those in sections 5, 6, 7 and Appendix A of this Code following a significant forest disturbance event(s) and where forestry operations can be used to minimise or manage impacts and/or improve ESFM outcomes. In these circumstances, Local Land Services will conduct a site assessment within the area(s) identified by the landholder(s) to advise on the suitability of a Forest Stewardship Plan.'

The Commission supports this provision as it gives landholders additional options for addressing the most significant threats facing forest ecosystems. Specifically, climatic modelling indicates that NSW forests on both private and public land will likely face more intense and frequent extreme events, including severe droughts, extreme fire weather, and potentially landscape-scale tree dieback.^{79,80} These disturbances will alter the condition and function of many forest ecosystems, from paddock to bioregional scale across the short to long term.⁸¹ In addition, in some instances, the legacy of historical disturbance events may be impacting the current condition and function of a forest to support a range of values.⁸²

Where appropriate, landholders should be able to use PNF activities as a means of responding to significant disturbance events to either mitigate impacts and/or improve post-disturbance outcomes. Landholders should also be able to apply targeted and active interventions to areas that have previously been disturbed. These interventions should direct forest regeneration towards desired outcomes in shorter time frames and with a greater degree of certainty than naturally occurring or more passive processes, and/or help mitigate the risk of future disturbances.⁸³

All proposals under this provision will be subject to the same assessment and approval processes (as detailed in **Section 4.2.2**) as apply to Forest Stewardship Plans that exceed Forest Management Plan Net Harvestable Area limits or wish to apply alternative harvesting limits under Forest Stewardship Plan provisions.

⁷⁹ Fensham, R.J., Fraser, J., Macdermott, H.J. and Firn, J. (2015) 'Dominant tree species are at risk from exaggerated drought under climate change'. *Global Change Biology*. 21: 3777–3785.

⁸⁰ Bradstock, R., Bedward, M. and Price, O. (2021) *Risks to the NSW Coastal Integrated Forestry Operations Approvals posed by the 2019/20 fire season and beyond*. Working draft dated May 2021. A draft report to the NSW Natural Resources Commission, prepared by the Centre for Environmental Risk Management of Bushfires, University of Wollongong

⁸¹ Losso A, Challis A, Gauthey A, Nolan RH, Hislop S, Roff A, Boer MM, Jiang M, Medlyn BE, Choat B (in review) Consequences of extreme drought: canopy dieback and recovery in Australian native forests. *Frontiers in Plant Science*

⁸² Sharples, J.J., Cary, G.J., Fox-Hughes, P., Mooney, S., Evans, J.P., Fletcher, M.S, Fromm, M., Grierson, P.F., McRae, R. and Baker, P. (2016) 'Natural hazards in Australia: extreme bushfire'. *Climate Change* 139: 85–99.

⁸³ See for example Hobbs, R., Hallett, L., Ehrlich, P. and Mooney, H. (2011) "Intervention ecology: Applying ecological science in the twenty-first century," *BioScience*, 61, pp. 442–450; Westoby, M., Walker, B. and Noy-Meir, I. (1989) "Opportunistic management for rangelands not at equilibrium," *Journal of Range Management*, 42(4), pp. 266–274.

The Commission considers it is appropriate that prior to the preparation of a Forest Stewardship Plan in response to a significant disturbance event, LLS will conduct a site assessment within the area(s) identified by the landholder(s) to advise on the suitability of the proposed approach.

As previously identified in **Section 4.2.2**, the Commission advises that a supporting protocol for the independent expert panel assessment should be prepared to guide the Forest Stewardship Plan assessment process and clarify expectations. As part of this protocol, additional guidance relating to the determination and assessment of significant disturbance events could be provided. However, the Commission does not support the development of prescriptive thresholds or triggers in relation to significant disturbance events, as in this instance the PNF codes should allow for consideration of a range of individual circumstances where flexibility may be appropriate.

4.3.4 Forest regeneration requirements

OCSE Recommendation 8 states that forest management activity should not reduce the habitat suitability and value for koalas in the landscape. The OCSE suggests the relative abundance of tree species in harvested areas pre-harvest should be equivalent or improved following post-harvest regeneration, for example *'by 7 years (one koala generation) after the harvesting, the habitat should have the same (or higher) koala suitability score as before the forestry operation'*.

The final draft PNF codes specify that regeneration and composition must be monitored at 2, 6 and 10 years after a regeneration event. If forest regeneration is deemed inadequate, landholders must implement regeneration management actions as described in the final draft PNF codes' Glossary (including minimising or removing grazing pressures) to ensure that the post-harvest regeneration maintains (or improves on) pre-harvest conditions.

The Commission considers that the proposed requirement for monitoring and management of regeneration composition and condition fulfils **OCSE Recommendation 8**. This provision strengthens the monitoring and management requirements for regeneration, improving long-term, post-harvest habitat outcomes. The Commission also notes that this provision will maintain habitat for a range of threatened species and ecological communities in addition to koalas. This contributes to fulfilment of ESFM Principle (a), and LLS Act requirements around adequate biodiversity protections.

This provision will generate at least three regeneration monitoring data points over the course of ten years following harvesting activities. The regeneration monitoring information should be collected in a way that allows it to inform the assessment of PNF outcomes under the PNF MER framework.

The Commission notes that LLS are in the process of developing guidance material to ensure landholders can comply with forest regeneration monitoring and management provisions. This guidance should highlight key risks to regeneration outcomes, including premature grazing in harvested areas. LLS should consult with EPA to ensure enforceability, as they should with other guidance material.

4.3.5 Maintaining soil and water quality

Stream protection settings are a key mechanism for maintaining soil health, water quality and biodiversity. The existing and proposed PNF code stream protection settings are provided in **Table 12**.

Extending protections to unmapped streams and increasing the riparian exclusion zones within the final draft PNF codes significantly enhances protections to preserve the integrity of riparian corridors and the functions they regulate, including:

- limiting streambank erosion
- buffering ingress of sediment and nutrients
- providing habitat and habitat corridors for connectivity
- moderating water temperature.

Table 12: Overview of stream protections

Stream type	Existing PNF code			Final draft PNF code
	Exclusion Zone (No harvesting)	Buffer zone (Harvesting with limits)	Total	Exclusion Zone (No harvesting)
Northern and Southern regions				
Unmapped	-	-	-	10
Class 1	5	10	15	
Class 2	5	20	25	20
Class 3 or higher	5	30	35	30
Prescribed	20	15	35	
River Red Gum region				
Unmapped	5	-	5	5
Class 1				
Class 2				
Class 3 or higher				
Prescribed	20	25	45	30
Cypress and Western Hardwoods region				
Unmapped	-	-	-	10
Class 1	10	-	10	
Class 2	20	-	20	20
Class 3	30	-	30	
Class 4	40	-	40	
Class 5 or higher	50	-	50	30
Prescribed	-	-	-	

Importantly, protection for unmapped streams is now provided within the riparian exclusion zones provisions across all PNF code regions. This inclusion addresses identified issues in relation to lack of protections for smaller streams in the existing PNF codes, which do not apply harvesting exclusions to unmapped streams.⁸⁴ The definition of an unmapped stream should ensure that private landholders and compliance officers are easily able to identify said streams and implement or confirm compliance with the required exclusion zones. The Commission supports the definition of a stream within the final draft PNF codes:

‘A stream is defined as an incised watercourse with a defined channel, bed and banks and a minimum depth of 30 centimetres. Stream orders are determined according to the Strahler System’

In the existing and consultation draft PNF codes for the Northern and Southern regions, soil and water protections include the application of riparian buffer zones around riparian exclusion zones. Riparian exclusion zones prohibit all harvesting activities within the identified area and are measured from the bank or channel edge of a stream. Riparian buffer zones apply around the riparian exclusion zones and allow for forestry operations subject to specified limitations.

The Commission supports the updated arrangements within the final draft PNF codes whereby a single riparian exclusion zone is applied and riparian buffer zones are no longer required i.e. avoiding ‘buffer-on-buffers’. The riparian exclusion zones vary in width depending on the region, stream order type and class, as set out in **Table 12**. The Commission considers that the proposed provisions maintain or enhance stream protections while also being simpler and easier to comply with. They also align with alternative stream protections rulesets⁸⁵ that the Commission reviewed. In contrast, the existing nested riparian exclusion and buffer zones are difficult for landholders to implement while also providing insufficient harvest exclusion areas.

In particular, the proposed riparian exclusion zone widths for the Northern, Southern and River Reg Gum regions offer increased riparian protections in comparison to existing PNF code harvesting exclusions. These settings offset the removal of riparian buffer zones in the Northern and Southern regions, where forestry operations including limited selective harvesting were allowed to occur under existing settings.

The Commission notes that riparian exclusion zones in the Cypress and Western Hardwoods region for Class 1 to 3 streams are the same as those in the existing and consultation draft PNF codes. However, riparian exclusion zones for Class 4 or higher streams have decreased. The Commission considers that the proposed maximum exclusion zone width of 30 metres for streams Class 3 and above offers adequate protection in a PNF context given the allowable type and intensity of silvicultural activities.

To identify mapped streams and determine their stream class, LLS should provide the landholder with Hydroline spatial data⁸⁶ for mapped watercourses and waterbodies in NSW.

The Commission notes that final draft codes have been updated to include a clause relating to management of risks associated with soil erosion, sediment movement or water turbidity:

“Where existing measures are not adequately managing the risk of soil erosion, sediment movement or water turbidity the landholder may implement further riparian protection measures. These additional measures must be recorded in the Forest Management Plan or Forest Stewardship Plan.”

⁸⁴ ‘The PNF Codes do not provide adequate protection for un-mapped drainage lines.’ Submission #38, Environmental Defenders Office. Elton Consulting (2019). *Private Native Forestry Review Terms of Reference - Submissions Review Final Report*. Report produced for NSW Local Land Services.

⁸⁵ For example, the Coastal IFOA arrangements and Natural Resources Access Regulator (2018). *Guidelines for controlled activities on waterfront land—Riparian corridors*. NSW Department of Industry.

⁸⁶ <https://www.industry.nsw.gov.au/water/licensing-trade/hydroline-spatial-data>

The final draft PNF codes also apply operational exclusion conditions to identified areas of soil risk, and the slope of the land is a key criterion guiding the design and construction of roading infrastructure. Where feasible, slope angle should be included in Forest Management Plan and Forest Stewardship Plan mapping, to assist in assessing proposed activities against the code.

The Commission also notes that the road construction provisions are very detailed and may be difficult for landholders to interpret. LLS should consider developing guidance material to ensure landholders can comply with the road construction provisions.

4.4 Protecting koalas and their habitat

4.4.1 Koala habitat mapping for the PNF koala Prescriptions

In the revised PNF codes, koala habitat mapping applies koala tree retention and visual assessment prescriptions to a significant area of private native forest. In the final draft PNF codes, LLS applied two different mapping approaches – the DPI koala habitat suitability map for the Northern region, and the DPE EES koala habitat suitability map for all other regions. **Box 3** describes the DPI and DPE EES models.

Box 3: Koala habitat suitability models

DPI Koala habitat predictive map

Forestry Science within DPI have developed a regional scale koala suitability map for north east NSW⁸⁷. This map was developed using koala occurrence records (from 1990-2015 from NSW BioNet) and environmental variables (vegetation, browse trees, topography, elevation, fire, climate and primary productivity) at a 250-metre spatial distribution. The browse trees information is derived from Comprehensive Regional Assessment Aerial Photographic Interpretation (CRAFTI) from NSW National Parks and Wildlife Services.

The model was validated using independently collected field data – koala occupancy, using acoustic sampling, and browse tree availability. The field validation demonstrated a linear increase in koala occupancy with higher modelled habitat suitability at field validated sites. A site habitat quality index at field validated sites was correlated positively with modelled habitat suitability.

DPE EES Koala Habitat Suitability Model

The DPE EES koala Habitat Suitability Model⁸⁸ predicts the spatial distribution of potential koala habitat across NSW. The model uses a value between 0 and 1, where higher values represent higher probability that a specific location will contain habitat suitable for koalas.

This dataset is delivered as a set of seven regional habitat suitability models that show how koala habitat suitability varies at a regional scale. For example, the far western regional suitability model predicts the most westerly extent that koalas have the potential to occupy. Each suitability model provides an indication of where koalas have the potential to occupy but does not necessarily indicate occupation at that point in time.

The habitat suitability models predict the distribution and suitability of potential habitat in terms of a relationship between a full set of sites occupied by koalas, compared to what is available. It does this by relating the location of koala records to environmental factors such as plant community types, soil and topography. Other variables in the model include:

- a depth to bedrock soil layer

⁸⁷ Law et al. (2017). *Development and field validation of a regional, management-scale habitat model: A Koala *Phascolarctos cinereus* case study*. Sydney, NSW

⁸⁸ NSW Department of Planning, Industry and Environment (2019). *Koala Habitat Information Base Technical Guide*. Sydney, NSW

Box 3: Koala habitat suitability models

- a land soil capability index (used to distinguish high, moderate and low fertility soils from very low soil fertility)
- cold air drainage (which attempts to capture the location of cold air pools in low-lying areas and is loosely correlated with depth to bedrock and topographic roughness)
- a remote sensed index of projected foliage cover based on SPOT5 satellite imagery.

OCSE recommendations

The OCSE recommendations identified issues with the proposed approach, including the:

- need for DPI Forestry Science, LLS, EPA and DPE EES to collaborate on koala habitat maps to ensure consistency in mapping products (**OCSE Recommendation 2**)
- inclusion of both high and moderate suitability koala habitat (very high suitability by DPE EES metric is already mapped) (**OCSE Recommendation 5**).

Developing a fit-for-purpose interim PNF Koala Prescription Map

As per the Terms of Reference (**Task 2**), the Commission facilitated a process with relevant parties to begin building a shared understanding on fundamental information, including the koala habitat mapping that triggers specific PNF koala prescriptions. Specifically, the Commission worked with scientists from DPE EES and DPI Forest Science Unit to develop a fit-for-purpose interim *PNF Koala Prescription Map* to support Government efforts to finalise the revised PNF codes.

A key consideration when developing the PNF Koala Prescription Map is the need to define and identify high value koala habitat, in line with the Government objective of ‘robust protections for koalas in areas of high value koala habitat’. Critically, there is no existing definition of ‘high value koala habitat’, and the available koala habitat models described in **Box 3** focus on koala habitat suitability. As discussed in **Box 4**, habitat suitability – while significant – may not correlate exactly to habitat value.

Box 4: High suitability habitat vs. high value habitat

The importance of a given site to koala – the habitat value – is determined by many components. Elements to consider when assessing the value of the koala habitat in a given area include presence of feed trees, soil nutritional value, climate, landscape position and function, as well as contemporary and historical koala occupancy.

Many of these factors are considered when assessing koala habitat suitability using the koala habitat suitability models described in **Box 3**. However, in the absence of a clear definition of ‘high value koala habitat’, it is not possible to determine:

- to what extent the koala habitat suitability models correlate to high value koala habitat
- whether additional data sets need to be considered, for example koala occupancy, elevation or other landscape scale features
- whether different classification thresholds may be appropriate when mapping high value koala habitat.

While not ideal, time constraints and currently available information and modelling require that koala habitat suitability is used as a proxy for koala habitat value in the recommended interim PNF Koala Prescription Map. To ensure the specified koala tree retention and visual assessment prescriptions are applied in high value koala habitat, the Commission has taken a conservative approach based on areas of high and very high suitability koala habitat.

However, the Commission recognises that, under this approach, there may be areas that are classified as high or very high suitability koala habitat that may not meet future thresholds for high value koala habitat once other factors and information are considered.

The Commission notes that each of the two available koala habitat suitability models described in **Box 3** have differing advantages and limitations, for instance, the DPI model performs better in contiguous forest, while the DPE model performs better in fragmented areas. In addition, the DPI koala model has undergone some ground validation whereas the DPE EES model has not.

Critically, the DPI model only covers a small proportion of the whole PNF estate (in part of the Northern region), while the DPE model covers the full koala range. As a result, the proposed interim PNF Koala Prescription Map is based on a hybrid model for the Northern region, and the use of a common threshold for the other regions.

DPE EES developed the interim PNF Koala Prescription Map through a staged process presented in **Box 5**.

Box 5: Process to develop PNF Koala Prescription Map

- **Stage 1** – The northern and southern PNF regions were merged, and one process was used to create a map covering both regions. Maps for the Western Cypress and River Red Gum PNF regions were developed separately using a slightly different process. For the northern and southern regions, habitat suitability values in each model (DPI and DPE) were broken into six classes (scaled with Class 1 being the lowest and Class 6 the highest suitability).

The method creates a set of classes that are roughly comparable between any two (or more) habitat models with values scaled between 0-1, by finding the class means and then clustering pixels using minimum distance techniques. Maps were then created of each the two suitability models, each with six classes. For the Cypress and Western Hardwoods and River Red Gum regions, suitability values form a whole-of-range maxent model designed to capture the western range limit of koalas was merged with KMR-specific regional maxent models that covered the northwest slopes and south west slopes bioregions separately.

- **Stage 2** – For the Northern and Southern PNF regions, a maximum cell statistics method was applied to identify the highest class from either model, grid cell by grid cell across the study area. This involves transferring areas of high and very high suitability from either model to the combined layer.

A median pixel value was extracted for every individual Plant Community Type (PCT) Vegetation polygon in the draft (v1.1) 1750 State Vegetation Type Map (SVTM) that covers the NSW coast and tablelands. This (1-6) median value was used as the final habitat score across the individual PCT polygons, aligning the final suitability class map as closely to the SVTM map as possible. For the Western Cypress and River Red Gum PNF regions, the limited SVTM coverage precluded this method being applied. Instead the six-class per-pixel suitability values are not aligned with to the SVTM map to any degree.

- **Stage 3** – region-specific binary layers for the area under koala prescriptions was created by:
 - merging koala habitat Classes 1-4 (representing lower koala habitat suitability) and Classes 5-6 (representing higher koala habitat suitability) for the Northern and Southern PNF code regions. The merged habitat classes 1-4 were then removed from the map, so that Classes 5 and 6 (the two highest classes) suitability koala habitat remained.
 - merging koala habitat Classes 1-5 and retaining Class 6 as a stand-alone class for the River Red Gum and Cypress and Western Hardwood PNF code regions. The merged habitat classes 1-5 were then removed from the map, so that only Class 6 (the highest class) suitability koala habitat remained. Class 6 captures the higher value habitat across the northwest and southwest slopes bioregions, but does not extend out to cover the full western-most range of koalas.

Box 5: Process to develop PNF Koala Prescription Map

- **Stage 4** – The 3 binary layers created above (Northern/Southern, Cypress and Western Hardwoods and River Red Gum) were merged into a single state-wide mosaic. Three additional masks were then applied to the statewide layer to ensure that the final map covers areas specific to PNF proposals only. The first mask involved the removal of non-native vegetation at a 5x5m pixel scale.

The second mask used the latest Native Vegetation Regulatory map to locate land where the PMF Code is required on Rural Regulated Land and remove all Category 1 Exempt land or Category 2 - Sensitive regulated land. Lastly, a patch-size filter was applied to remove all non-connected patches of koala habitat that are less than 2 hectares in size (which exclude scattered trees and small patches of forest that are not directly connected to one another at a 5x5m patch scale). The final PNF map was delivered as a 5x5m binary raster covering all NSW.

Within the interim map development process, there were two key decision points:

- 1 deciding to use the maximum pixel value instead of the average pixel value in Stage 2
- 2 deciding to use Classes 5 and/or 6 to represent high value koala habitat.

In relation to point 1, high koala habitat suitability is being used as a proxy for the protection of high value koala habitat. By taking the average value, there is a risk that where the two models do not align, high suitability koala habitat may be missed. For example, if the DPI model were to show Class 6 while the DPE model showed Class 1 or 2, using an average value would mean the area would not meet the Class 5 and/or 6 threshold required to be afforded koala protections. As a result, to increase the likelihood that all high suitability – and therefore, high value – koala habitat is captured, an approach based on the maximum pixel value was adopted.

In relation to point 2, Classes 5 and 6 thresholds were applied for the Northern and Southern PNF Codes regions. Nearly 75 percent of koala records are captured within the north coast PNF region. This provides assurance that high value habitat is likely being protected in areas known to contain koalas. It is accepted that the maps are reasonably conservative, that is they will capture areas that have some moderate value koala habitat.

Modellers have less confidence in the modelled products for the Cypress and Western Hardwood and River Red Gum PNF code regions. Further, including Class 5 and 6 in western regions resulted in large areas being mapped as high suitability, despite those areas or adjacent areas not having records of koala occupancy. The Commission recommends adopting Class 6 only – indicating the highest koala habitat suitability – within the interim maps for these regions. This will ensure a trigger remains embedded in the code to retain koala feed trees at the PNF sites where available, while providing confidence to landholders that the interim mapping is not unnecessarily overreaching at this point of time. However, the Commission recommends these areas are prioritised for immediate improvement through the mapping verification and improvement process (see **Section 5.3.2**).

Table 13 shows the total area indicated under the PNF Koala Prescription Map as requiring additional koala protections for each PNF code region.

Table 13: Area under PNF Koala prescription

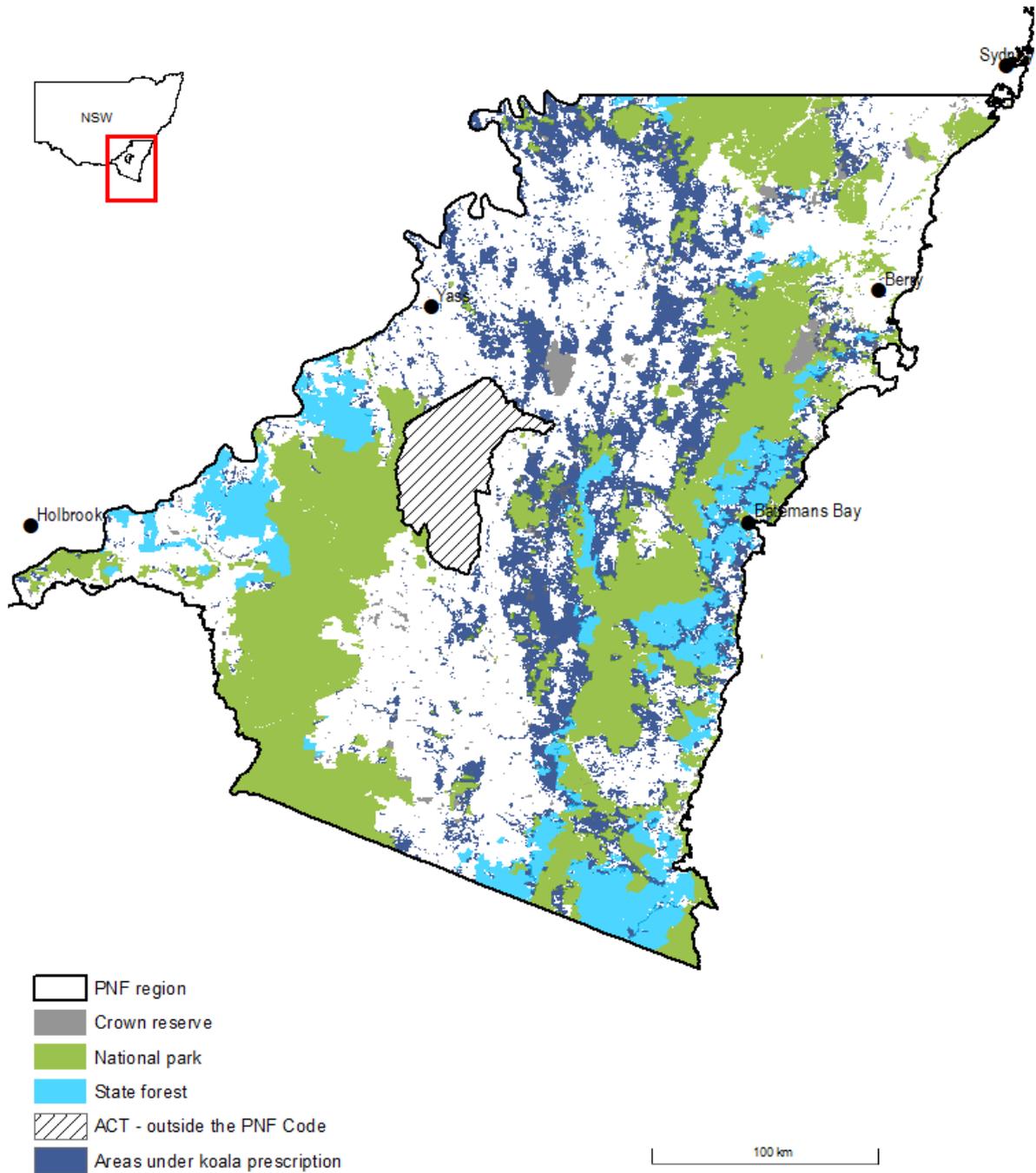
Region	Area under PNF koala prescription (Hectares)
Northern	1,224,628
Southern	562,231
Cypress Western Hardwoods	1,009,856
River Red Gum	38,720
TOTAL	2,835,435

The Commission recommends that this fit-for-purpose interim PNF Koala Prescription Map should be adopted in the final PNF codes (as per **Table 14**). For clarity and enforceability, the PNF codes should make specific reference to the relevant spatial layer, in addition to any map figures that may also be included. The Commission notes that areas mapped under the PNF Koala Prescription Map has also been added to the list of specified landscape features that must be mapped as part of a Forest Management Plan or Forest Stewardship Plan, in line with **OCSE Recommendation 4(ii)**.

Proposed interim PNF Koala Prescription Maps are provided for the Northern (**Figure 4**), Southern (**Figure 5**), Cypress & Western Hardwoods (**Figure 6**) and River Red Gum (**Figure 7**) regions. **Figure 8** provides a larger scale map of private land near Royal Camp State Forest on the NSW north coast, a known area recognised for koala occupancy.

The Commission advises that the PNF Koala Prescription Map was designed to meet specific PNF requirements, and as such this spatial layer should only be used within the PNF codes and not for any other purpose. The Commission’s advice regarding the ongoing custodianship of the PNF Koala Prescription Map and data is provided in **Section 5.3.4**.

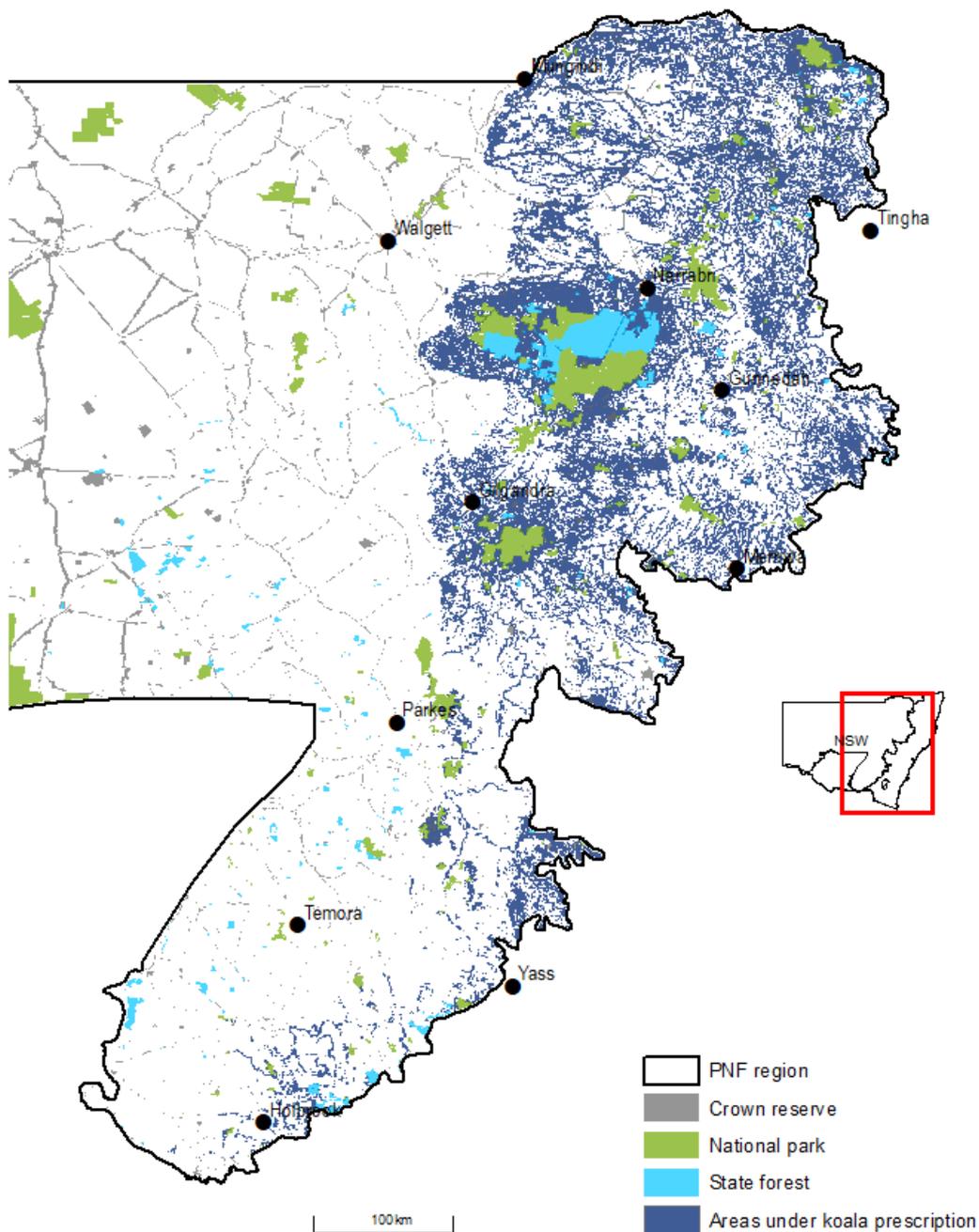
Final - Cabinet-in-Confidence Interim PNF Koala Prescription Map - Southern



Document Path: G:\ARCGIS Data\MXD\FORESTS\Private native forestry\Final Map 002 - Interim PNF koala - 2 Southern.mxd

Figure 5: Interim PNF Koala Prescription Map – Southern

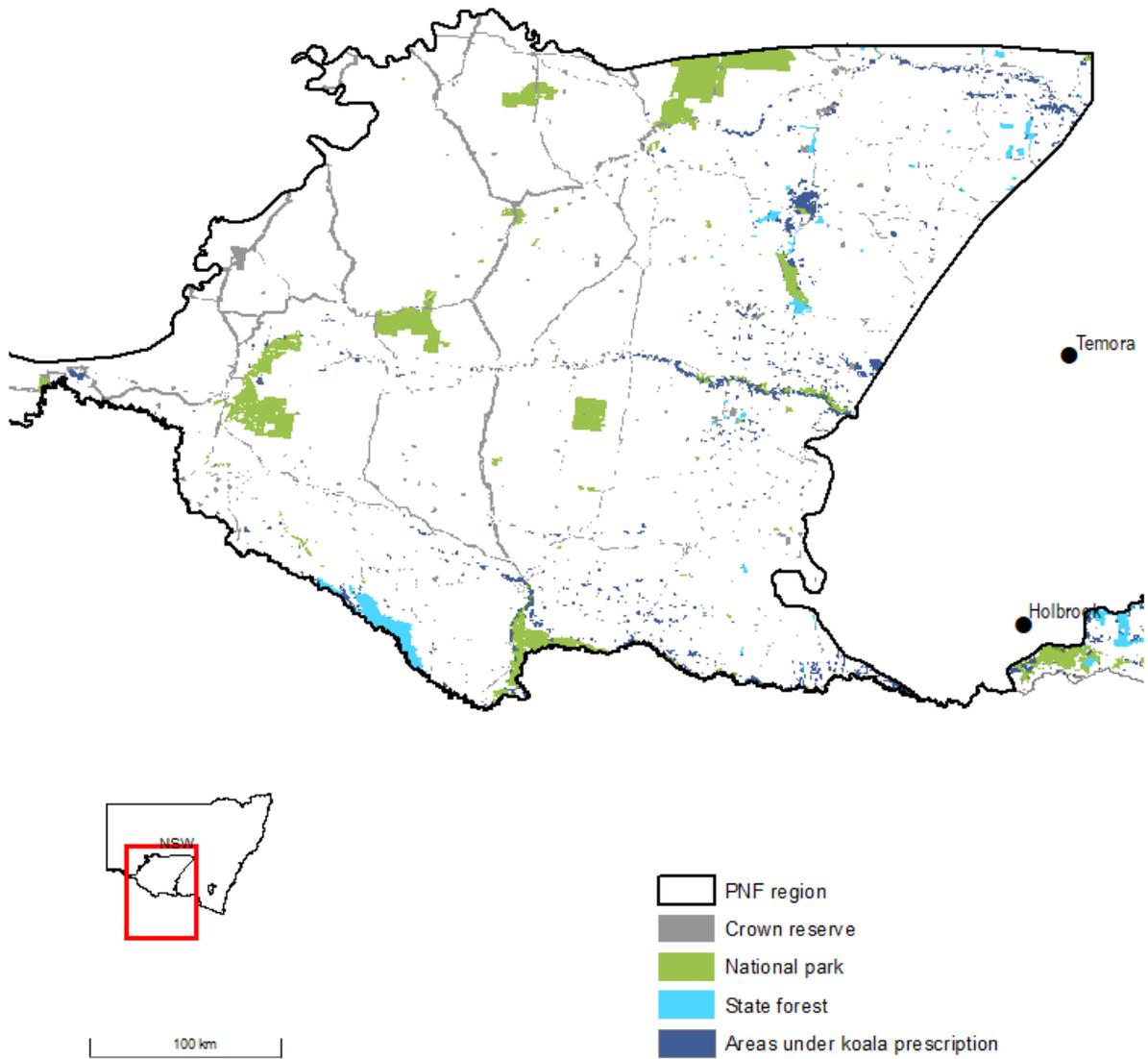
Final - Cabinet-in-Confidence Interim PNF Koala Prescription Map - Cypress and Western Hardwoods



Document Path: G:\ARCGIS Data\MXDS\FORESTS\Private native forestry\Final Map 001 - Interim PNF koala - 3 Cypress west hardwoods.mxd

Figure 6: Interim PNF Koala Prescription Map – Cypress and Western hardwoods

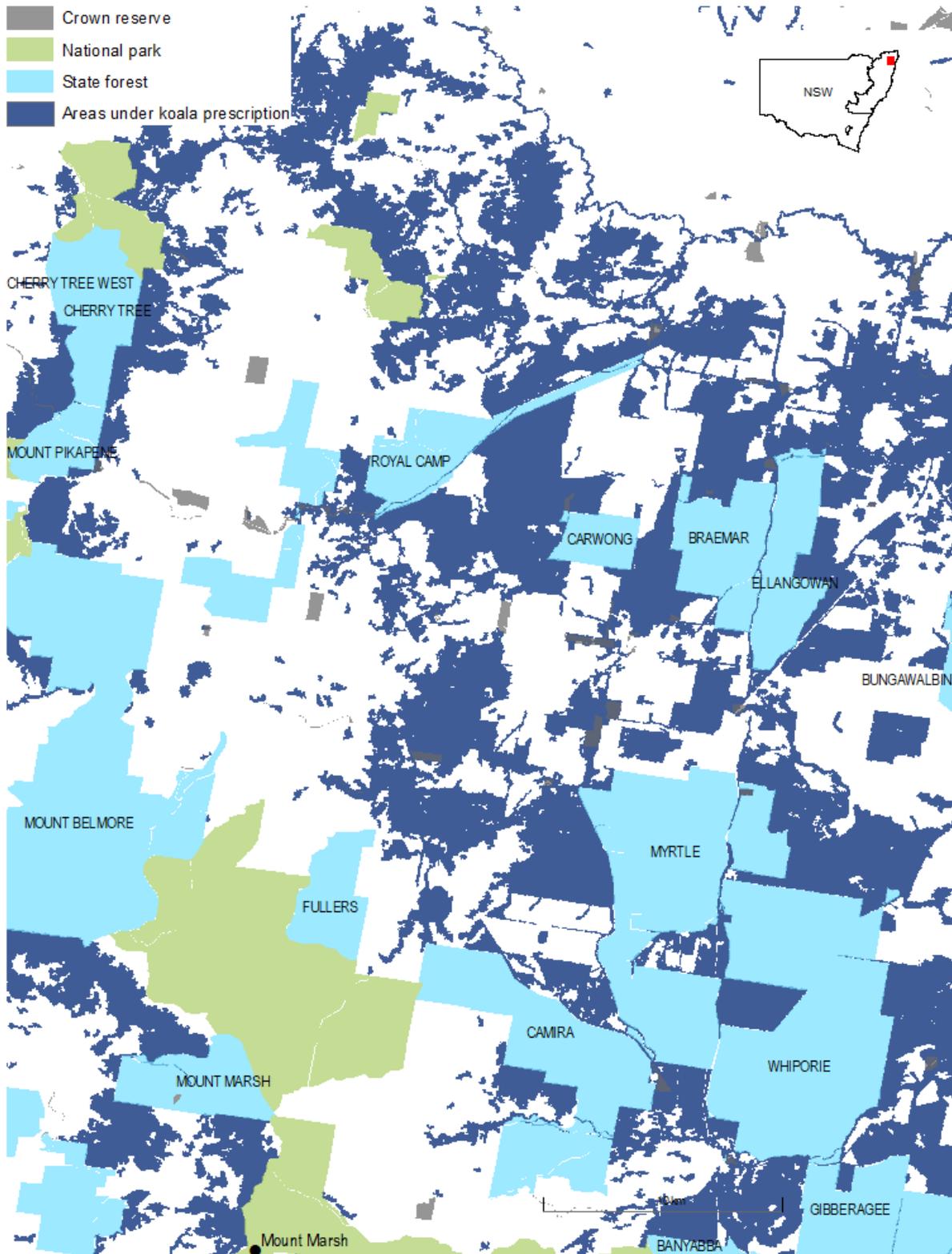
Final - Cabinet-in-Confidence Interim PNF Koala Prescription Map - River Red Gum



Document Path: G:\ARCGIS Data\MXD\SF\FORESTS\Private native forestry\Final Map 001 - Interim PNF Koala - 4 River red gum.mxd

Figure 7: Interim PNF Koala Prescription Map – River Red Gum

Final - Cabinet-in-Confidence PNF Koala Prescription Map near Royal Camp state forest



Document Path: G:\ARCGIS Data\MXD\SF\FORESTS\Private native forestry\Final Map 001 - Interim PNF koala - 5 Royal Camp.mxd

Figure 8: Interim PNF Koala Prescription Map – area near Royal Camp State Forest

Improving the PNF Koala Prescription Map over time

To ensure that the application of koala prescriptions is better targeted to high value koala habitat, the Commission advises that the PNF Koala Prescription Map will require further updates and improvements over time.

As a priority, the Commission advises that the PNF Koala Prescription Map should be field checked through a verification and improvement process overseen by the NSW Forest Monitoring Steering Committee, independently chaired by the Commission. This process will focus on:

- defining what constitutes high value koala habitat and identifying what features are of high value to koalas
- conducting targeted field surveys that assess all habitat elements to improve the accuracy of the koala habitat classes and their effectiveness in protecting high value koala habitat, prioritising the Cypress and Western Hardwood and River Red Gum PNF code regions.

The Commission therefore recommends that the PNF Koala Prescription Map should remain interim for a period of at least 12 months to allow for field validation and further updates to the model to occur. Any changes to the map must be jointly approved by both Ministers responsible for making the PNF codes. More detail regarding the proposed validation and improvement of the PNF Koala Prescription Map is provided in **Section 5.3.2**.

In the longer term, ongoing independent review of the effectiveness of the PNF Koala Prescription Map should take place through the PNF monitoring program to help improve a shared understanding and build a social licence with landholders who have been wary of using predictive mapping as a regulatory tool (see **Section 5.3.3**).

Table 14: The Commission’s recommended improvements for PNF code koala habitat mapping

Recommendation	Comment
<p>The Commission recommends the PNF Koala Prescription Map and associated spatial layer in the final PNF code is adopted as an interim map (Version 1) for 12 months (Figures 4-7). The PNF codes should make specific reference to the relevant spatial layer for the PNF Koala Prescription Map, in addition to any map figures that may also be included.</p> <p>Following approval of the PNF codes, the PNF Koala Prescription Map should be field checked through a verification and improvement process overseen by the NSW Forest Monitoring Steering Committee, independently chaired by the Commission.</p>	<p>The Commission has worked with scientists in the DPE EES Group and DPI Forest Science Unit to develop a fit-for-purpose interim map for use in the application of PNF koala prescriptions. Reference to the spatial layer would improve clarity and enforceability.</p> <p>The Forest Monitoring and Improvement Program has the existing governance structure to deliver ongoing improvement through NSW government technical working groups.</p> <p>Ministerial joint approval will ensure any additional mapping updates are well considered and justified, particularly given the need for certainty and consistency for landholders.</p>

4.4.2 Landholder-initiated koala habitat verification

The initial final draft PNF codes included an option for surveying for koala presence where the landholder believes areas have been incorrectly mapped as high suitability koala habitat. **OCSE Recommendation 7** addresses this provision, recommending that at least two survey methods be employed for any form of monitoring and/or surveying at a site. In response LLS expanded the range of surveys allowed as per the NSW Koala Monitoring Framework, but only specified the “most appropriate” method be used, consistent with the NSW Koala Monitoring Framework.

In developing its draft advice to LLS, the Commission noted that the surveys are being conducted to resolve instances where mapped koala habitat is disputed by the landholder. As such, the Commission’s position is that this process should remain focused on verification of the available koala habitat, not the presence or absence of koalas. A simpler and more effective test is to check that the actual vegetation and habitat correlates with the modelled vegetation and habitat. By focusing on koala habitat, it also provides for potential re-colonisation of the forest by koalas in the future, if they are not currently present.

The Commission notes that in the final draft PNF codes:

- where the landholder considers the koala habitat mapping is inaccurate, including where the required number of retained koala feed trees cannot be found, the landholder may commission a review be undertaken by a suitably qualified expert(s)
- koala habitat in the area must be reassessed based on an on-ground koala habitat verification survey conducted by a suitably qualified expert(s)
- the koala habitat verification survey must be conducted by suitably qualified individuals in accordance with a survey protocol available on the LLS website.

The Commission supports the koala habitat verification process and recommends that a survey protocol for the landholder-instigated koala habitat verification survey should be collaboratively developed. The development of the protocol should be overseen by the NSW Forest Monitoring Steering Committee, independently chaired by the Commission, with input from relevant agencies. LLS will approve the protocol. The Commission can advise LLS on recommended improvements to the protocol. The protocol and surveys should align with and inform the wider koala habitat mapping verification and model improvement process under the PNF MER framework, as discussed in **Section 5.3.2**.

Where it is determined via a koala habitat verification survey that an area identified on the PNF Koala Prescription Map does not warrant additional koala protections, the Map will be updated accordingly. LLS will then approve amendments to the relevant Private Native Forestry Plan, Forest Management Plan and/or Forest Stewardship Plan to apply the revised PNF Koala Prescription Map. The verification process may therefore remove the need for additional koala protections including tree retention requirements (**Section 4.4.3**) and visual assessment of trees prior to harvesting unless other triggers are also present.

Table 15: The Commission’s recommended improvements for koala habitat mapping verification

Recommendation	Justification and Intent
A survey protocol for the landholder-instigated koala habitat verification surveys should be developed under oversight by the NSW Forest Monitoring Steering Committee by with input from relevant agencies	An appropriate koala habitat verification survey must be put in place, given the outcomes of this survey have significant implications for whether additional koala protections are required in a given area. The protocol should be designed in a way that allows the information gathered to contribute to the overarching PNF Koala Prescription Map verification and improvement process.

4.4.3 Koala tree retention requirements

A key element of the revised PNF codes is that in addition to koala record and scat triggers, koala tree retention prescriptions are also to be applied across all areas of mapped suitable koala habitat (**Section 4.4.1**).

In the revised draft PNF codes, LLS proposed a decrease to the tree retention requirements in response to updated mapping thresholds that significantly extended the area of mapped koala habitat. LLS also proposed a reduction in minimum diameter at breast height over bark for retained trees (where possible) for retained trees from 30 centimetres to 20 centimetres.

The Commission's initial advice to LLS agreed that a 20 centimetre minimum diameter for retained trees is acceptable based on recent research on species composition and use of smaller trees.⁸⁹ However, the Commission did not support LLS's proposed reduction in the number of retained primary koala use trees as it does not align with OCSE recommendations or Government's objective of 'providing robust protections for koalas in high value koala habitat'.

Koala tree retention rates

The final draft PNF codes now include an increased tree retention requirement of **15 primary + 5 secondary koala feed trees** in mapped koala habitat areas within the PNF code, where available. This rate considers the contribution from existing areas excluded from harvesting on private land in northern and southern code regions being 26 percent and 21 percent respectively.⁹⁰ In comparison, while the state forest estate is subject to lower koala feed tree retention rates under the relevant forestry rule set, on average around 50 percent of the state forest estate is permanently excluded from harvesting and many other activities.

The Commission also notes that in areas mapped under the PNF koala prescription map but where the required rate of tree retention cannot be met, the final draft PNF codes require landholders to retain as many koala feed trees as are available, including substituting primary feed trees for secondary (or vice versa) up to a maximum of 20 koala feed trees per hectare. Primary feed trees are to be prioritised for retention over secondary feed trees.

The Commission considers that the koala tree retention rates and associated provisions in the final draft PNF codes better meet NSW Government koala policy commitments, including direction for robust PNF koala protections in high value habitat.

As noted in **Section 4.4.2**, where it can be verified by a survey that an area has been incorrectly mapped as requiring additional koala protections, then the PNF Koala Prescription Map will be updated accordingly and the associated tree retention prescriptions will no longer apply.

Koala tree retention minimum diameter

The Commission maintains that minimum diameter of 20 centimetres for retained koala feed trees is acceptable. Recent research indicates that there were no differences in the nutritional quality of mature leaves from different sized trees of the same species.⁹¹ This research indicates tree species composition, not tree size, is the key determinant of habitat nutritional quality for koalas.

⁸⁹ Natural Resources Commission (2021). *Research program - Koala response to harvesting in NSW north coast state forests - Final report*. Delivered under the NSW Koala Strategy 2018-21 overseen by the NSW Department for Planning, Industry and Environment, Sydney, NSW.

⁹⁰ NSW Department of Primary Industries (2018). *North Coast Private Native Forest Project: NSW planning and regulatory instruments that interact with private native forestry*. NSW DPI Forest Science Unit; Parramatta.

⁹¹ Natural Resources Commission (2021). *Research program - Koala response to harvesting in NSW north coast state forests - Final report*. Delivered under the NSW Koala Strategy 2018-21 overseen by the NSW Department for Planning, Industry and Environment, Sydney, NSW.

This study suggests that from a koala nutrition perspective, the selection of trees for retention within koala habitat should therefore be guided by species, rather than tree size and age.

Preliminary findings from koala tracking in the north coast state forests indicate koalas used the full range of tree sizes above eight centimetres DBH available at these sites. This included young regenerating trees in the previously harvested areas, as well as mature trees in the unharvested areas. This is consistent with previous studies that also found that koalas use a wide range of tree sizes, including small trees. For example, in north-east NSW koalas were observed to be using trees that were 12 to 197 centimetres DBH.⁹² In the Pilliga forests, koalas were found to be using trees from seven to 150 centimetres DBH.⁹³

The Commission considers that, providing the tree species composition within a stand is nutritionally suitable, koalas should be able to find food of adequate nutritional quality with trees of 20 centimetres diameter or greater.

Koala tree retention triggers

As shown in **Table 16**, the final draft PNF code also amended the koala scat trigger for tree retention to be based on koala feed trees (not use trees), and to include scats under both primary and secondary feed trees, in line with protections in the existing code. In addition, a one scat trigger has been applied to both koala tree retention and exclusion zones on the south coast, in line with **OCSE Recommendation 6(ii)**.

The Commission also notes that koala presence triggers (such as a koala sighting or recent koala scratches) have been made consistent across Koala Prescription (a) and (b). The Commission notes, however, that the use of koala scratches as a trigger for koala protections is likely to be difficult to implement and enforce. For example, it may be difficult for a landholder or contractor to tell the difference between a koala scratch and a goanna scratch.

⁹² Faulks (1990) cited in Melzer, A. and Houston, W. (2001). An overview of the understanding of koala ecology: how much more do we need to know? In Lyons, K., Melzer, A., Carrick, F. and Lamb, D. (eds.). *The research and management of non-urban koala populations*. Rockhampton, Qld: Koala Research Centre of Central Queensland Central Queensland University pp. 6-45

⁹³ Kavanagh, R. P., Stanton, M. A., and Brassil, T. E. (2007). Koalas continue to occupy their previous home-ranges after selective logging in Callitris–Eucalyptus forest. *Wildlife Research* 34: 94–107

Table 16: Koala tree retention requirements

Requirement		Existing PNF code	Consultation draft PNF code	Final draft PNF code
Triggers	Koala record	<ul style="list-style-type: none"> Within an area of forest operations Within 500 metres of an area of forest operations 	<ul style="list-style-type: none"> Within an area of forest operations 	<ul style="list-style-type: none"> Within an area of forest operations Within 500 metres of an area of forest operations
	Scats	<ul style="list-style-type: none"> A koala faecal pellet (scat) is found beneath the canopy of any primary or secondary koala food tree 	-	<ul style="list-style-type: none"> Where 10 or more koala scats (or one or more koala scats in the Central and Southern Tablelands and South Coast Koala Management Areas) are found beneath the canopy of a primary or secondary koala feed tree during pre-harvest surveys or forestry operations
	Habitat	No habitat mapping applied	Within mapped koala habitat: <ul style="list-style-type: none"> high and very high suitability koala habitat DPE and DPI hybrid map for the Northern region, and DPE map for all other regions 	Within mapped koala habitat: <ul style="list-style-type: none"> high and very high suitability koala habitat DPE and DPI hybrid map for the Northern region, and DPE map for all other regions
Minimum koala food trees per hectare (where available)	<ul style="list-style-type: none"> 10 primary 5 secondary 	<ul style="list-style-type: none"> 10 primary 5 secondary 	<ul style="list-style-type: none"> 15 primary 5 secondary 	
Minimum diameter at breast height over bark	30 centimetres	30 centimetres	20 centimetres	
Applicable feed tree list	Koala food tree list	Koala SEPP use tree list	DPE koala feed tree list	
Visual assessment	Not required		Each tree in mapped koala habitat areas must be visually assessed immediately prior to being felled, along with any trees with koala presence identified in pre-harvest surveys, and a harvest exclusion zone applied to any tree containing a koala	

4.4.4 Koala feed tree species lists

In developing the koala feed tree species list for the revised PNF codes, the NSW Government directed the LLS to use the Koala Use Tree Species listings provided for by the SEPP (Koala Habitat Protection). As a result, the initial final draft PNF codes listed the 123 koala use tree species identified in Schedule 2 of the Koala SEPP 2019.

The final draft PNF codes adopt DPE EES's revised list of koala feed trees, in line with the Commission's initial advice to LLS.

The Commission considered that the large number of trees approved for retention created a risk that koala habitat suitability could be eroded through PNF operations, as higher priority trees for retention could be supplanted by less desirable species. As such, the Commission advised LLS that the koala tree retention provision should focus on koala feed tree species, specifically by applying the DPE EES's revised list of 60 koala feed species that was developed as part of the PNF code review. This list provides sufficient diversity to ensure that there are a range of species that can be selected, whilst reducing the risk that koala habitat suitability will not be maintained through the application of the codes.

The Commission notes that by focusing on feed trees, the list will no longer include use trees. This includes shelter trees, which have a role to play especially given expected increases in heat stress due to climate change. However, the Commission considers that the inclusion of use tree species in the koala tree retention lists creates a risk that landholders may choose to retain shelter species such as turpentine and harvest all of the preferred high nutritional quality koala feed trees. This would leave koalas with shade but without food, resulting in reduced koala habitat quality.

The Commission recognises that the list may need to be revised as new information emerges about koala feeding and diet selection. This should be considered as part of the PNF MER annual checks and five-yearly review cycle overseen by the NSW Forest Monitoring Committee (**Section 5.1.1**)

4.4.5 Koala visual assessment requirements

The Commission notes that the final draft PNF codes require that in certain situations, trees must be visually assessed for koalas immediately prior to being felled, specifically:

- where there is a record of a koala within the area of forestry operations or within 500 metres of an area of forestry operations
- where 10 or more koala scats (or one or more koala scats in the Central and Southern Tablelands and South Coast Koala Management Areas) are found beneath the canopy of a primary or secondary koala feed tree during pre-harvest surveys or harvest operations
- within areas identified on the PNF Koala Prescription Map
- where signs of koala presence (including a koala, scats or recent scratches) are identified, including during pre-harvest surveys.

The Commission supports these provisions as they represent improved animal welfare protections compared with existing code settings.

4.5 Reviewing threatened species protections

LLS have updated the Appendix A (Listed species ecological prescriptions) of the final draft PNF codes based on expert advice and agency feedback since late 2019 including:

- the removal of some species such as frogs where general provisions, including enhanced riparian zones, now provide similar protections as previous species-specific prescriptions
- the addition of new species, including bird and frog species, with new protections
- other adjustments such as exclusions around large stick nests and retention of coarse woody debris for species such as reptiles.

To ensure protections remain current based on best available data, the Commission recommends the NSW Forest Monitoring Steering Committee initiates a risk-based review of threatened species protections for key species. This will be carried out by a cross-agency technical review team. There is a similar process for reviewing Species Management Plans under the Coastal IFOA, also overseen by the NSW Forest Monitoring Steering Committee. The Commission will advise the Ministers on recommended improvement for threatened species protection under the PNF code.

Table 17: The Commission’s recommendations for reviewing threatened species protections

Recommendation	Justification and Intent
A risk-based review of threatened species protections for key species in Appendix A should be carried out under the oversight of the NSW Forest Monitoring and Improvement Program.	A risk-based review of threatened species protections for key species in Appendix A is needed to reflect the new PNF code settings, best available knowledge and recent impacts from disturbance events, including the 2019/20 wildfires. Given the potential duration of said review, it should not prevent the finalisation of the PNF codes. Instead, the review should be prioritised to allow key updates to be approved by the Minister alongside updates to the PNF Koala Prescription Map.

4.6 Managing cumulative impacts and risks

OCSE Recommendation 4 focuses on managing the cumulative impact of PNF, including that there are no cumulative or scale limits to the area under PNF plans in a region. OCSE notes that the landholder can harvest at any time during the 15 years approval, may harvest only some of the total area approved, or may not harvest at all throughout the duration of an approval.

The final draft PNF codes allow LLS to require that forestry operations are rescheduled to help ensure harvest operations are distributed over time and space, to support a mosaic of forest age-classes and forest structures across the landscape. LLS’s determination will consider landholders’ circumstances and the nature, extent and intensity of forestry operations.

The final draft PNF codes also allow for a response to unforeseen significant forest disturbance events if there has been, or there is a risk of, serious or irreversible environmental impact on private land at a bioregional scale. Specifically, the Minister administering the LLS Act can request harvest operations are reviewed. In these circumstances LLS will conduct a site assessment within the impacted area(s) identified by the Minister.

The LLS site assessment will occur prior to harvest operations commencing to determine whether site scale environmental risks:

- a) can be managed within the existing requirements of the code, or
- b) can be mitigated and managed with additional management actions and protections through a Forest Stewardship Plan, or
- c) cannot be mitigated or managed to avoid serious or irreversible environmental damage. In this event, LLS can suspend or reschedule harvest operations but will agree with the landholder on a timeframe for reassessing the site.

The final draft PNF codes allows the EPA CEO to recommend to the LLS CEO that a review of harvest operations is required due to the potential risk of serious or irreversible environmental damage on private land at a bioregional scale due to an unforeseen event. The Commission notes that the LLS Act already allows EPA to make a recommendation to LLS regarding the termination or variation of an individual PNF plan based on information gained via monitoring and compliance activities.

The Commission considers that these new provisions considerably improve the PNF codes' fulfilment of Principle (e) of ESFM in relation to the application of the precautionary principle.

A transparent framework or protocol, potentially within a Memorandum of Understanding, would be beneficial to guide the Minister and LLS when enacting these new clauses. This could be extended to cover other existing powers relating to plan suspension or termination, including as a result of compliance actions.

To support the implementation of these important new provisions, LLS should also develop a data-driven approach, with objective decision thresholds to carefully evaluate the risk-weighted impact and consequences of various options. LLS should consider maintaining a regional scale forest inventory to facilitate the assessment of cumulative impacts (noting that any inventory should be based on non-private aggregated data). The register should be informed by data collected under the PNF MER Framework. In addition, LLS can work (as per their suggestion) with independent experts to model the relative impacts of PNF operations on NSW's private forest estate.

Table 18: The Commission's recommended improvements for managing cumulative impacts and risks

Recommendation	Justification and Intent
Develop a transparent framework or protocol to guide the Minister and LLS when enacting clauses relating to the management of environmental impacts at the plan or bioregional scale.	Clear, transparent guidance will assist the Minister and LLS when enacting these new clauses, improve consistency in the clauses' implementation, and provide assurance to landholders as to the decision-making process. This could be extended to cover other existing powers relating to plan suspension or termination, including as a result of compliance actions

4.7 Increasing transparency and accountability

LLS have met the legislative requirements for public consultation on the PNF codes under the LLS Act, specifically that the proposed code is to be made publicly available for a period of at least 4 weeks prior to being approved and implemented. During the course of the PNF code revision process, LLS undertook two rounds of public consultation, firstly on the PNF review Terms of Reference in November 2018, and secondly on the consultation draft PNF codes in March 2020.

The Commission recognises that the proposed PNF code has undergone changes since it was first released for public consultation. As such, an additional round of public consultation may have been desirable. However, while the LLS Act allows the Minister to undertake further public consultation on the revised proposed code, it is not a legislative requirement. At this stage in the lengthy process, there are trade-offs to be considered between the benefits of additional public consultation and the impacts of further delays in finalising the codes.

Regarding publicly available information, LLS has released a useful summary document of public submissions made on the PNF review Terms of Reference, which is available on the LLS website.⁹⁴ However, there has been limited public transparency in the subsequent review stages, including in relation to public submissions made on the consultation draft PNF codes.

In relation to PNF activities more broadly, LLS have been providing information about the number of PVP plan approvals and area covered on their website.⁹⁵ However, there has been limited reporting on the overall outcomes of PNF to date.

The community is legitimately interested in PNF planning, operations, and their impacts. Stakeholder analysis found that transparency of PNF regulation and practice was supported by the Environmental Defenders Office.⁹⁶ Environment groups held the view that improved monitoring and more publicly available information would enhance community understanding and awareness of PNF activities.

To improve openness and accountability, the codes now require that LLS will maintain a public register of PNF Plans and Forest Stewardship Plans, including periodic reporting of outcomes associated with independent assessments for Forest Stewardship Plans. This will include data on the scale of PNF activity that has been lacking to date.

It is also expected that the PNF MER framework will report publicly on PNF outcomes and the effectiveness of the PNF codes (see **Section 5**).

To improve transparency, the NSW Government should also make public submissions and reviews that have informed the PNF code updates, including the Commission's review, publicly available in a timely manner.

⁹⁴ Elton Consulting (2019). *Private Native Forestry Review Terms of Reference - Submissions Review Final Report*. Report produced for NSW Local Land Services. Available at: <https://www.lls.nsw.gov.au/help-and-advice/private-native-forestry/private-native-forestry-review/submissions-on-the-pnf-review-terms-of-reference>

⁹⁵ <https://www.lls.nsw.gov.au/help-and-advice/private-native-forestry/reporting>

⁹⁶ Elton Consulting (2019). *Private Native Forestry Review Terms of Reference - Submissions Review Final Report*. Report produced for NSW Local Land Services.

Table 19: The Commission’s recommended improvements for transparency and accountability

Recommendation	Justification and Intent
NSW Government should make public submissions and reviews that have informed the PNF code updates, including the Commission’s review, publicly available in a timely manner.	This would improve transparency and accountability around the PNF code revision process and better meet ESFM principle (b) Public participation, accountability, and transparency.

4.8 Fostering collaboration

The PNF codes provide an opportunity to work towards greater collaboration across government agencies. LLS and EPA should establish a Memorandum of Understanding that ensures the timely sharing of information needed to regulate PNF, including transfer of information regarding PNF plan approvals and plan variation approvals from LLS to the EPA.

LLS should also consult with EPA when developing and applying the protocols and guidance material needed to support the application, administration and regulation of the PNF codes, particularly where enforceability is a consideration. Effective consultation will ensure the protocols and guidelines reflect best practice and improve consistency across code implementation and compliance activities.

As identified elsewhere in this report, this should include (but is not limited to) protocols or guidance for:

- Forest Stewardship Plan development, including a standardised Forest Stewardship Plan template
- Forest Stewardship Plan assessment and approval to guide the independent expert panel assessment process
- enacting clauses relating to the management of environmental impacts at the plan or bioregional scale
- Australian Group Selection activities, including canopy opening configuration and identification of shade-intolerant species
- regeneration guidelines, including appropriate regeneration management following the use of Australian Group Selection.

The Commission’s recommended improvements for fostering collaboration are summarised in **Table 20**.

Table 20: The Commission’s recommended improvements for fostering collaboration

Recommendation	Justification and Intent
LLS and EPA should establish a Memorandum of Understanding for the timely sharing of information needed to regulate PNF, including transfer of information regarding PNF plan approvals and plan variation approvals from LLS to the EPA.	Strengthening information sharing between LLS and EPA will improve code implementation and enforcement, and ensure governance arrangements for PNF are operating effectively.
LLS, in consultation with EPA, to develop and approve protocols and guidance material needed to support the application, administration and regulation of the PNF codes within 6 months of the Code’s approval.	Although LLS is responsible for developing and approving protocols or guidance for PNF, consultation with EPA is encouraged as it helps ensure the PNF codes are consistently implemented and enforced.

5 Task 2 - Building an evidence base for private native forestry

Key insights

- 1 The final draft PNF codes establishes that a PNF MER framework is required to improve the evidence base for forestry on private land to inform decision making, longer-term reviews and adaptive management.
- 2 The final draft PNF codes also establish review points and public reporting of results and progress, including annual reports from the PNF MER program complemented by a five-yearly review of the evidence.
- 3 The PNF MER framework should:
 - be designed according to best practice principles for MER
 - meet legislative requirements under the LLS Act
 - link to the NSW Forest Monitoring and Improvement Program
 - consider and respond to emerging climate change issues.
- 4 The PNF MER framework will be overseen by the NSW Forest Monitoring Steering Committee (independently chaired by the Commission). It will be developed through a cross-agency technical working group including representatives from the Commission, LLS, EPA, DPI, EES and experts from the NSW Forest Monitoring Steering Committee.
- 5 The Committee and cross-agency technical working group will consider the unique challenges and different economic objectives that exist on the private estate compared to the public estate. For example, achieving landholder consent and engagement, and managing landholder privacy and confidentiality.
- 6 The Committee will also oversee the field validation and any improvements to the PNF Koala Prescription Map. This should include targeted surveys to improve the accuracy of the koala habitat classes and their effectiveness in protecting high value koala habitat.

This section summarises the Commission's advice and recommendations in relation to building an evidence base for private native forestry through monitoring, evaluation and reporting.

5.1 Establishing an MER requirement in the PNF codes

Task 2 of the Terms of Reference directs the Commission to collaborate with the NSW Forest Monitoring Steering Committee under its existing responsibilities to develop a Monitoring, Evaluation and Reporting (MER) framework for NSW's private forest estate (PNF MER framework).

A PNF MER framework is necessary to establish an evidence base for forestry on private land that can be used to inform decision making, longer-term reviews and adaptive management. The PNF MER framework should report on the effectiveness of the PNF code in meeting identified objectives and outcomes, and identify where improved rules, practices or approaches are required. Activities under the PNF MER framework should align with the overarching NSW FMIP.

The Commission notes that the need for this framework has now been established in the final draft PNF codes, including a provision for approval by the Chief Executive Officer of LLS and Secretary of DPE. The final draft PNF code also specifies governance arrangements for the development and oversight of the PNF MER framework.

5.1.1 Adaptive management, review and reporting

The LLS Act provides for the amendment of the PNF codes without further public consultation if the matter is urgent, and without public consultation or the concurrence of, or consultation with, another Minister if the change is minor. The legislative review process also provides opportunities for amendment and continual improvement.

It is critical that regulatory arrangements for PNF are based on best available knowledge, and that subsequent decision-making and reviews are driven by evidence. The Commission notes that the final draft PNF codes now specify an annual check as part of the PNF MER framework to ensure that the evidence base is up to date (including relevant maps), identify emerging evidence from monitoring and research, and opportunities for improvement.

The final draft PNF codes also require that the NSW Forest Monitoring Steering Committee will assess best available data and evidence from the program (and any other lines of evidence) every five years and advise the Minister administering the *Forestry Act 2012*, the Minister administering the LLS Act and the Minister administering the *Biodiversity Conservation Act 2016* whether there is sufficient evidence to warrant a review of the PNF codes.

5.2 Process to develop a PNF MER framework

As per the Terms of Reference, the PNF MER framework will be overseen by the NSW Forest Monitoring Steering Committee, independently chaired by the Commission. It will be developed through a cross-agency technical working group, including representatives from the Commission, LLS, EPA, DPI, DPE EES and experts from the NSW Forest Monitoring Steering Committee.

The Committee will oversee a process to develop the PNF MER framework by understanding priority risks and assumptions, tailoring monitoring and evaluation questions to address these risks, identifying relevant indicators, and designing an appropriate monitoring plan.

The PNF MER framework will draw on concepts, design and learnings from the Coastal IFOA Monitoring Program work to date. This includes good practice principles for MER, as set out in **Box 6**.

However, while the Coastal IFOA Monitoring Program provides a template, design of a MER framework for private native forestry must consider the unique challenges and different economic objectives that exist on the private estate. For example, processes for achieving landholder consent must be considered, as well as how to manage data whilst maintaining landholder privacy and confidentiality in line with state and commonwealth privacy policies.

In developing the PNF Framework, the Forest Monitoring Steering Committee could consider the following actions to strengthen the evidence base for future decision making including:

- integrating planned research by:
 - the NSW DPI Forest Science Unit on koala response to different harvesting types and koala densities on private land and
 - other universities and research institutions
- considering how data collected under the PNF MER framework (and other MER programs, including those under the NSW FMIP) can inform future cumulative assessments to ensure a data-driven and transparent approach
- initiating targeted research regarding the economics of PNF to inform policy reviews and development.

Box 6: Good practice principles

The NSW Forest Monitoring Steering Committee has previously agreed to good practice principles to underpin effective MER design and delivery⁹⁷. These include:

- **targeted and specific** – use evaluation questions to inform program design and focus monitoring to ensure that critical information for management and decision-making is collected
- **risk-based and value-driven** – determine priorities through an analysis of risks, opportunities and value for money; risks can be prioritised by ranking according to the potential reduction in risk, or by the cost-effectiveness of monitoring that mitigate multiple risks concurrently
- **credible and appropriate** – use robust metrics and thresholds that are based on best available evidence, and generate information using best practice monitoring approaches at relevant spatial scales and time periods
- **strategic and cost-effective** – seek to maximise the information generated given the available budget, and ensure the proposed activities are not overly onerous or costly for landholders
- **collaborative and transparent** – facilitate landholder engagement and report publicly on MER activities in findings to improve landholder confidence and encourage participation
- **adaptable** – ensure the framework can evolve in response to new priority questions and risks; review frequently enough to drive better outcomes and improvement while also allowing landholders to keep pace with change.

5.2.1 Role of the NSW Forest Monitoring Steering Committee

The Commission will oversee the design, implementation, and review of the PNF MER framework in collaboration with the NSW Forest Monitoring Steering Committee (**Box 7**). Specifically, the Steering Committee must:

- ensure scientifically valid methods are used that will result in addressing critical information needs and outcomes
- ensure monitoring data collected, collated or derived under the PNF MER framework be made publicly available in a way that is also consistent with NSW and Commonwealth privacy legislation
- review the effectiveness of the PNF MER framework and inform necessary amendments to ensure it is progressing and providing scientifically robust results.

Box 7: NSW Forest Monitoring Steering Committee

In 2019, the NSW Government established the NSW Forest Monitoring and Improvement Program (FMIP) to support ecologically sustainable management of all NSW forests. The Premier asked the Commission to independently oversee the program, collaboratively undertaken by NSW agencies working with universities, private sector scientists, the community and industry.

The Commission independently chairs the NSW Forest Monitoring Steering Committee. The Committee consists of NSW agencies including representatives from LLS, EPA, DPE EES; Aboriginal Affairs, National Parks and Wildlife Service; and the NSW Forestry Corporation and Crown Lands. The Commission has appointed five independent experts with expertise in biodiversity, forestry, soil and water, Aboriginal natural resource management and social sciences to advise the Committee.

The NSW FMIP delivers information to support the strategic management of forests in NSW, on both public and private land. Under the program's terms of reference, all forests in NSW are within scope,

⁹⁷ NSW Forest Monitoring and Improvement Program – Program Framework 2019-2024

Box 7: NSW Forest Monitoring Steering Committee

including forests in national parks, state forests, plantation forests, private native forestry, forests on private and Crown land.

The Committee also oversees monitoring for forestry on state forests under the coastal Integrated Forestry Operations Approval, and coordinates monitoring for the bilateral NSW Regional Forest Agreements with the Commonwealth.

Funding for the program ceases in the financial year 2022. The Commission, on behalf of the Steering Committee is seeking to secure additional funding over four years to continue the program.

5.3 Process for developing a shared understanding

5.3.1 Process for agreeing on a koala habitat mapping approach

Under **Task 2** of the Terms of Reference, the Commission is to oversee with the NSW Forest Monitoring Steering Committee under its existing responsibilities to ‘develop a shared understanding and agreement on fundamental information, facts and metrics over time’ (including aligned methods in measuring, modelling, mapping, reporting and data collection and handling).

As a first step, and as part of this Terms of Reference, the Commission oversaw the development of the interim PNF Koala Prescription Map which involved the merging of koala models from DPI-Forest Science and DPE (see **Section 4.4.1**).

Following approval of the new Codes, through the Commission’s oversight of the PNF MER framework, there will be a 12-month interim period to provide opportunity for further improvement and update to the PNF Koala Prescription Map. As a priority, the interim PNF Koala Prescription Map will undergo a field verification campaign to establish the reliability of the model and collect additional data to improve the PNF Koala Prescription Map, which is described in **Section 5.3.2**.

As described in **Section 5.3.3** there will be continual improvements to the map over time which will include agreement on what constitutes high values koala habitat and what additional datasets will be required to improve the protection of habitat that is high value to koalas.

5.3.2 Verifying and improving the PNF Koala Prescription Map

The PNF Koala Prescription Map should be field checked through a verification and improvement process overseen by the NSW Forest Monitoring Steering Committee, independently chaired by the Commission. This will include development of a field verification survey protocol with input from and agreed to by both agencies.

Implementation of predictive habitat suitability models for management purposes requires a high level of confidence in the model reliability. Field validation or ground-truthing to collect an independent data set is an important part of that process. While the DPI koala habitat suitability model has been field validated, the DPE EES model has not.

DPI Forest Science have developed a field assessment protocol⁹⁸ for field validation of the DPI MaxEnt predictive habitat model for koalas. The combined MaxEnt model was ground-truthed at 65 sites and included sampling of browse tree size and availability.

⁹⁸ Law et al (2017) *A predictive habitat model for Koalas Phascolarctos cinereus in north-east New South Wales: Assessment and field validation*. NSW Department of Industry—Lands and Forestry.

The Commission proposes to field validate the PNF Koala Prescription Map and associated modelling using an agreed field validation protocol that uses the DPI Forest Science approach as its basis. The field validation will be a site-based assessment of habitat potential for koalas to determine if areas mapped as high suitability habitat contain the adequate composition of koala feed trees to support koala occupancy as well as other landscape features such as climate, fire history, soil type, habitat connectivity, elevation, slope and aspect.

The site surveys will be done by either agencies or suitably qualified individuals in accordance with a PNF mapping verification protocol developed with input from and agreed to by both agencies. The Commission recommends that the mapping verification protocol is developed by adapting a version of the DPI Forest Science field assessment protocol. Under the protocol, sites should be selected at random but should avoid any sites with a recent history of timber harvesting or fire (within the previous five years).

As mentioned in **Section 4.4.1**, the Cypress and Western Hardwood and River Red Gum PNF code regions should be prioritised within this process to address identified issues relating to confidence in the modelled products for these regions.

Alongside the map verification and improvement process, additional ground verification information may also be generated through the landholder-initiated koala habitat verification surveys, as described in **Section 4.4.2**. Protocols for the landholder-initiated koala habitat verification surveys and field verification surveys will be developed through a similar process to ensure that, where possible, information gathered through landholder-initiated surveys will be used as an input in the overarching map verification and improvement process.

5.3.3 Improving the PNF Koala Prescription Map over time

As identified in **Section 4.4.1**, the PNF Koala Prescription Map and underlying koala habitat models will continue to be reviewed and improved over time as a priority through the PNF MER framework, with oversight by the NSW Forest Monitoring Steering Committee.

Model improvements will continue to focus on better defining and identifying high value koala habitat, to ensure koala prescriptions are applied in the target areas. Monitoring activities will also seek to determine the levels of koala occupancy present across the range of habitat classes, the appropriateness of the habitat class thresholds in each region and their effectiveness in protecting high value koala habitat.

Ongoing independent review of the effectiveness of the PNF Koala Prescription Map will help improve a shared understanding and build a social licence with landholders who have been wary of using predictive mapping as a regulatory tool.

5.3.4 Custodianship of the PNF Koala Prescription Map

As outlined in **Section 5.3.3**, the PNF Koala Prescription Map will require further updates and improvements to address identified issues and incorporate best available information. However, the Commission recognises that updates to the PNF Koala Prescription Map may generate uncertainty for landholders and regulators if not managed appropriately.

Both DPE EES and DPI are the custodians of some of the data from which the PNF Koala Prescription Map is derived. Policy requires that the custodian approves any updates and that data users should be informed. In the interests of collaborative co-regulation, and to encourage certainty and consistency in the mapping within the PNF code, the Commission recommends that custodianship of the PNF Koala Prescription Map data be transferred to NSW Spatial Services within the NSW Department of Customer Services (DCS), The DCS must make the data accessible to all users and the public through SEED and the spatial collaboration portal.

Further, the Commission recommends that updates to the data and PNF Koala Prescription Map are only be approved with the concurrence of the Departments of Planning and Environment and Regional NSW.

Table 21: The Commission’s recommendations for PNF Koala Prescription Map custodianship

Recommendation	Justification and Intent
Custodianship of the PNF Koala Prescription Map spatial data should be transferred to Data NSW within the NSW Department of Customer Service.	These arrangements are intended to foster collaborative co-regulation, and to encourage certainty and consistency in the mapping within the PNF code.

Attachment 1 – Terms of Reference

TERMS OF REFERENCE NATURAL RESOURCES COMMISSION FINAL PRIVATE NATIVE FORESTRY CODES OF PRACTICE

The Deputy Premier and the Minister for Planning and Public Spaces request that the Natural Resource Commission (the Commission) convene a group of experts to provide independent advice and assist in finalising the new Private Native Forestry Codes of Practice (PNF Codes). In providing this advice, the Commission will build upon government legislative requirements, relevant policy objectives and previous work by independent experts, including reviews undertaken by the Office of the Chief Scientist and Engineer (OCSE). This request is consistent with the Commission's legislative functions as outlined in Part 3 of the *Natural Resource Commission Act 2003* (NRC Act), in particular Part 3 (section 13 (1) (d1)) which stipulates that the NRC undertake audits and reviews relating to forestry as required by the Minister.

BACKGROUND

Private Native Forestry (PNF) is the sustainable management of native forests on private property in line with the objects of the *Local Land Services Act 2013* (LLS Act). Private native forests represent the largest single component of NSW's native forest estate, accounting for 37.2 percent of the ~ 20 million hectares of native forests in NSW⁹⁹. PNF is a key resource for the NSW Forestry Industry and an important land management option for landholders.

In December 2014, the NSW Government commissioned an independent review of biodiversity legislation in NSW. The NSW Government committed to implementing all the review's recommendations, including Recommendation 7, which called for a review of regulatory arrangements for timber harvesting on private land as part of a separate process that:

- a. does not regulate the harvesting of native timber on private land as a form of land use change
- b. considers options for regulating sustainable forestry operations based on their scale and intensity rather than tenure, including options for permitting low intensity operations on private land without the need for approval and a focus on outcomes rather than process
- c. considers a range of options for improving the environmental performance of haulage and harvest contractors operating on private and public land¹⁰⁰ (Attachment A).

In August 2016, the NSW Government released the NSW Forestry Industry Roadmap (the Roadmap)¹⁰¹ (Attachment B). The Roadmap adopts a triple bottom line approach to achieving social, ecological, and economic sustainability for the NSW Forestry Industry through four priority pillars:

1. Regulatory modernisation and environmental sustainability
2. Balancing supply and demand
3. Community understanding and confidence
4. Industry innovation and new markets.

⁹⁹ P55. Commonwealth of Australia. 2017. Australia's forests at a glance 2017: with data to 2015-16. Department of Agriculture and Water Resources ABARES.

¹⁰⁰ P30. Byron, N., Craik, W., Keniry, J., and Possingham, H. 2014. A review of biodiversity legislation in NSW. State of NSW and the Office of Environment and Heritage, Sydney NSW.

¹⁰¹ NSW Government 2016. NSW Forestry Industry Roadmap. NSW Government, Sydney NSW.

The Roadmap committed to reviewing the regulatory arrangements for PNF by developing a modern and simple regulatory framework consistent with the Independent Biodiversity Review Panel Recommendations.

CABINET AGREEMENT ON PNF CODES

In December 2019, the NSW Government endorsed the release of draft PNF Codes for an 8-week consultation period with finalisation of PNF Codes from June 2020. The forest management settings for the draft PNF Codes were independently reviewed by the Fenner School of Environment and Society at the Australian National University (ANU) (Attachment C). Consistent with the NSW Government's recommendation, during the consultation period the OCSE also reviewed the evidence relied upon by LLS in amending the PNF Codes. This report was delivered to the Minister for Agriculture and Western NSW on 28 May 2020 (Attachment D).

In October 2020, the NSW Government endorsed an approach in the final PNF Codes that balances the protection of Koalas and the ecologically sustainable development of private forests by:

- a. adopting an approach informed by contemporary science on the relative impact of timber harvesting on Koala occupancy and based on the approach taken in the Coastal Integrated Forestry Operations Agreement (CIFOA), and
- b. improving the administration of PNF regulatory framework by removing dual consent requirements in respect of Local Government for PNF Plans, in line with recommendation seven of the Independent Biodiversity Legislation Panel Review
- c. that the Koala Tree Species will be used by LLS as part of the tree retention process with regards to PNF according to the listings provided for by the *State Environmental Planning Policy (Koala Habitat Protection)*.

In March 2021, the (former) Deputy Premier and Minister for Planning and Public Spaces advised the Premier of an agreement regarding how the LLS Act and the Environmental Planning and Assessment Act 1979 can work together to protect Koalas including delivering PNF Codes which ensure robust protections for Koalas in areas of high value Koala habitat and certainty and consistency for primary producers.

As part of this process, the Secretary of the Department of Regional NSW (DRNSW) sought advice from OCSE as to whether changes to the proposed PNF Codes can provide robust protections for Koalas in areas of high value Koala habitat and certainty and consistency for primary producers.

In September 2021, the Secretary of DRNSW wrote to the Secretary of the [then] Department of Planning, Industry and Environment (DPIE) to inform that DRNSW have agreed-in-full or agreed-in-principle to all of OCSE's recommendations (Attachment E).

PURPOSE

The draft PNF Codes have previously been through extensive review, stakeholder consultation and deliberation. The NSW Government is committed to finalising the Codes by building upon this prior work to help implement the recommendations of the Independent Biodiversity Panel Review and deliver Government commitments made in the Roadmap.

The Commission will:

- a. provide advice on the draft final PNF Codes to ensure they are consistent with Objects of Part 5B of the LLS Act, including the principles of Ecological Sustainable Forest Management (ESFM), reflect government policy objectives and help implement the recommendations of OCSE's 2021 report.
- b. build upon the Commission's existing responsibility to implement a Forest Monitoring and Improvement Program (FMIP) to help inform evidence-based decision making and promote active and adaptive forest management in NSW.

SCOPE

1. The Commission will assess whether the final draft PNF Codes fulfils:
 - a. the Objects of Part 5B of the LLS Act, including the principles of ESFM
 - b. the Government's dual objectives of '...providing robust protections for Koalas in areas of high value Koala habitat and certainty and consistency for primary producers'
 - c. relevant Cabinet decisions on the PNF Codes, and
 - d. recommendations 2-10 of OCSE's 2021 advice

The Commission can make recommendations to amend the final draft PNF Codes to assist in fulfilling the above.

The Commission will convene an expert group to inform this advice. This expert group will include a representative of the OCSE, a forest scientist and a forest ecologist with expertise in Koala management on private land.

In providing advice, the Commission will consult with LLS, OCSE, DPE-EES and other relevant agencies as required.

2. As independent chair of the NSW FMIP the Commission will, in collaboration with the NSW Forest Monitoring Steering Committee develop:
 - a. a shared understanding and agreement on fundamental information on facts and metrics over time (including aligned methods in measuring, modelling, mapping, reporting and data collection and handling), and
 - b. a Monitoring Evaluation and Reporting framework for NSW's private forest estate.

The existing NSW Forest Monitoring Steering Committee includes NSW agencies responsible for natural resource and environmental policy, regulation, science and forest land management and independent experts in forest science, forest ecology, soil science, catchment hydrology, social science, natural resource economics and Aboriginal land governance and management.

In carrying out this task, the Commission may have regard to the following:

- a. the Independent Biodiversity Legislation Review Panel's Final Report: A Review of Biodiversity Legislation in NSW,
- b. the NSW Forestry Industry Roadmap,
- c. the Private Native Forestry Review Terms of Reference: Submissions Review Final Report,
- d. Australian National University Native Forest Harvesting and Thinning on Private Managed Land in New South Wales for Multiple Purposes,
- e. OCSE 2020 Review Private Native Forestry,
- f. OCSE 2021 Review of Private Native Forestry Codes, and
- g. any additional information provided by LLS or requested from LLS by the Commission.

FINAL ADVICE

The Commission will provide the CEO of LLS with an initial report by **19 January 2022** and commence the process outlined in section 2 of the scope of works. The final report to be submitted to the Deputy Premier, Minister for Planning and Public Spaces, Minister for Agriculture and Western NSW and the Minister for Environment by **4 February 2022**.

The initial report will outline the review's recommendations on initial drafts of the final PNF Codes. The final report will outline the review's recommendations on the final PNF Codes.

CONFIDENTIALITY

All information presented by the Commission, as well as its recommendations, should be treated as Cabinet in Confidence. The Minister for Planning and Public Spaces may direct the Commission to produce a public report of its final advice with the concurrence of the Deputy Premier.

ATTACHMENTS

A – Final Report: A Review of Biodiversity Legislation in NSW

B – NSW Forestry Industry Roadmap

C - Native Forest Harvesting and Thinning on Private Managed Land in NSW for Multiple Purposes

D – Office of Chief Scientist and Engineer – 2020 Review of Private Native Forestry

E – Office of Chief Scientist and Engineer – 2021 Review of draft Private Native Forestry Codes

F – Objects of Part 5B of the *Local Land Services Act 2013*

Attachment 2 – Final draft PNF Codes

Private Native Forestry

Code of Practice for Northern NSW

I, the Minister for Agriculture and Western New South Wales, make the following *Private Native Forestry Code of Practice for Northern NSW* under section 60ZT of the *Local Land Services Act 2013*.

Dated this ____ day of [insert month] 2022 at _____ am/pm.

Dugald Saunders, MP
Minister for Agriculture and Western New South Wales

I, the Minister for Environment and Heritage, give concurrence to the following *Private Native Forestry Code of Practice for Northern NSW* under section 60ZT of the *Local Land Services Act 2013*.

Dated this ____ day of [insert month] 2022 at _____ am/pm.

James Griffen, MP
Minister for Environment and Heritage

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Introduction

The Private Native Forestry Code of Practice (the 'Code') supports the long-term sustainable management of native forests on private land and Crown land (other than State forests or other Crown-timber land) for timber production and ecologically sustainable forest management (ESFM).

The Code applies to forestry operations in areas of the State as defined by Part 5B of the *Local Land Services Act 2013*. This Code is made under Part 5B, section 60ZT of the *Local Land Services Act 2013*. The objects of Part 5B of the Act are:

- (a) to authorise the carrying out of private native forestry in accordance with principles of ecologically sustainable forest management, and
- (b) to protect biodiversity and water quality (including threatened species, populations and ecological communities under Part 7A of the *Fisheries Management Act 1994*) in connection with private native forestry operations, and
- (c) to enable landholders to carry out forestry operations in a sustainable manner in areas of the State to which this Part applies, and
- (d) to ensure the differences between private native forestry and native forestry operations in State forests or other Crown-timber land are recognised, including in the application of protocols, codes, standards and other instruments.

'Northern NSW' means that part of the state north of the latitude of Sydney: 33° 52' 02.71 S. These Code prescriptions apply to all forests in Northern NSW except those that meet the definitions of either River Red Gum Forests or Cypress Forests or Western Hardwood Forests.

Outcomes Statement

- (1) The Code supports the implementation of the following long-term outcomes:
 - (a) Maintain forest health and regeneration at site and bioregional scales.
 - (b) Maintain the productive capacity of the private native forest estate at site and bioregional scales.
 - (c) Maintain the persistence of native species at site and bioregional scales.
 - (d) Maintain water quality and soil health at site and bioregional scales.
 - (e) Build landholder capacity to deliver best practice forest management.
 - (f) Support the economic resilience of landholders and regional communities.
- (2) The outcomes statement is included to improve interpretation and understanding of the long-term objectives of private native forestry but do not form part of the Private Native Forestry Plan (PNF Plan) approval or enforceable requirements of the Private Native Forestry Code.

The Code

1. Private Native Forestry Plans

- (1) Before any forestry operations commence in areas of the State to which Part 5B of the *Local Land Services Act 2013* applies as described in section 60ZS, a Private Native Forestry Plan (PNF Plan) must be prepared by the landholder(s) or by a person nominated by the landholder(s) and approved by Local Land Services in accordance with section 60ZY of the *Local Land Services Act 2013*.
- (2) Forestry operations under an approved PNF Plan must be conducted in accordance with all relevant provisions of this Code.
- (3) Local Land Services will provide all relevant digital information on landscape features (as identified in Table B) and slope angles (where feasible), drainage features (as identified in Table E) and Listed Ecological Prescriptions including areas mapped under the PNF koala prescription map (as identified in Appendix A) when issuing the PNF Plan and prior to the commencement of any forestry operations to ensure plants, animals and ecological communities listed in the schedules of the *Biodiversity Conservation Act 2016* are identified for protection in accordance with the Code.
- (4) Private Native Forestry Plans must identify the landholder(s) and the land to which the plan applies (including the lot and deposited plan number).
- (5) Forestry operations under an approved PNF Plan must be accompanied by either a Forest Management Plan or a Forest Stewardship Plan, except for operations consistent with Clause 3.1.
- (6) A copy of the PNF Plan must be available on-site during any forestry operations.
- (7) Local Land Services will maintain a public register of PNF Plans, Forest Management Plans and Forest Stewardship Plans, including periodic reporting of outcomes associated with independent assessments for Forest Stewardship Plans (Section 2.2).

Note 1: Section 60S of the *Local Land Services Act 2013* and clause 124 of the Local Land Services Regulation 2014 provide that the clearing of native vegetation is not authorised by a land management (native vegetation) code if the clearing is:

- the carrying out of a forestry operation within the meaning of Part 5B (Private native forestry)
- on land that is subject to a PNF Plan that was approved under Part 5C of the *Forestry Act 2012* before the repeal of that Part
- on land that is subject to a PNF Plan under Part 5B of the Act.

Note 2: Section 60ZZ (4) of the *Local Land Services Act 2013* provides that a private native forestry plan may be varied by Local Land Services on application by the landholder.

2. Forest planning and management

2.1 Forest Management Plans

Introduction

Forest Management Plans outline how individual forestry operations will be undertaken within a Private Native Forestry Plan area. The Forest Management Plan includes a map and written section describing the forest condition, forestry operations and forest management activities. A Forest Management Plan is to be used when undertaking forestry operations consistent with the standard requirements of the Code.

- (1) A Forest Management Plan must be prepared by the landholder(s) or a person nominated by the landholder(s) and submitted to Local Land Services before forestry operations commence (other than operations that are conducted consistent with Clause 3.1).
- (2) The net harvestable area under a Forest Management Plan must not exceed 250 hectares. A Forest Stewardship Plan must be prepared if the net harvestable area exceeds this limit.
- (3) A Forest Management Plan must be in an approved form and consistent with the provisions of this Code and the requirements of the Listed Species Ecological Prescriptions set out in Appendix A.
- (4) Local Land Services may require a Forest Management Plan to be revised and re-submitted if the Plan it is not in an approved form or is not consistent with the provisions of this Code, including the requirements of the Listed Species Ecological Prescriptions set out in Appendix A.
- (5) The landholder(s) and anyone else carrying out forestry operations must read, sign and date the Forest Management Plan.
- (6) A copy of the Forest Management Plan must be available on-site during forestry operations.
- (7) A Forest Management Plan must contain the following:
 - (a) a map (or maps) showing:
 - (i) the boundaries of the landholding, area(s) subject to the plan, including areas in which harvest operations and/or forestry operations will occur
 - (ii) Within the area subject to the plan:
 - a. forested areas
 - b. recorded locations of any threatened populations or threatened ecological communities listed under the schedules of the *Biodiversity Conservation Act 2016* and species in the Listed Species Ecological Prescriptions set out in Appendix A
 - c. areas mapped under the PNF koala prescription map (as in Appendix A Koala (*Phascolarctos cinereus*) prescription)
 - d. the location of landscape features as listed in Table B and protection buffers required
 - e. drainage features (including riparian exclusion zones as listed in Clause 6.4 (2) and Table E)
 - f. slope angles (where feasible)
 - g. the location of silvicultural treatments outlined in (7)(b)(viii)
 - h. the indicative location of existing and proposed roads and drainage feature crossings

- i. the indicative location of log landings and portable mill sites.
 - (iii) Within areas adjacent to the area subject to the plan:
 - a. forested areas
 - b. recorded locations of any threatened populations or threatened ecological communities listed under the schedules of the *Biodiversity Conservation Act 2016* and species in the Listed Species Ecological Prescriptions set out in Appendix A
 - c. areas mapped under the PNF koala prescription map (as in Appendix A Koala (*Phascolarctos cinereus*) prescription)
 - d. wetlands and drainage features
 - e. areas of outstanding biodiversity value
 - (b) a written component that provides:
 - (i) details of ownership of the land
 - (ii) the landholder's forest management objectives
 - (iii) a contemporary description of the pre-harvest forest condition (including overstorey species type and composition, known disturbance and harvest history, pre-harvest basal area, stand height [where required] and any presence of pests and/or weeds)
 - (iv) the post-harvest basal area objective
 - (v) details of forest access, including any necessary construction, upgrading or maintenance of forest roads and drainage feature crossings
 - (vi) details of harvesting and/or other proposed forestry operations
 - (vii) details of activities to promote regeneration and post-harvest management
 - (viii) details of relevant silvicultural treatments that may be carried out as part of the Forest Management Plan
 - (ix) details of flora and fauna management actions (where applicable)
 - (x) details of tree marking activities (where applicable)
 - (xi) details of pest and weed management (where applicable)
 - (xii) details of fire management (where applicable)
 - (xiii) details of research or monitoring plots within the PNF Plan area (where applicable).
- (8) The Landholder may amend the parts of the Forest Management Plan, except for matters referred to in Clause 2.1 (7) (a) (i), Clause 2.1 (7) (a) (ii) (a-f), Clause 2.1 (7) (a) (iii) and Clause 2.1 (7) (b) (i). Amendments to Clause 2.1 (7) (a) (i), Clause 2.1 (7) (a) (ii) (a-f), Clause 2.1 (7) (a) (iii) and Clause 2.1 (7) (b) (i) may only occur with the approval of Local Land Services.
- (9) Any amendments to either the map or the written component must be noted on the Forest Management Plan and must be consistent with the relevant provision of the Code.
- (10) The landholder must retain a copy of the Forest Management Plan, including any amendments, for the life of the PNF Plan or for three years after completion of the forestry operations for which it was prepared, whichever is the later date.
- (11) The landholder must provide the Forest Management Plan, including a record of any amendments, to an officer from Local Land Services and/or an authorised officer from the Environment Protection Authority if requested to do so.

2.2 Forest Stewardship Plans

Introduction

Forest Stewardship Plans are an alternative to Forest Management Plans and allow alternative requirements to be applied based on individual site-specific circumstances and only after independent expert review. A Forest Stewardship Plan will have conditions that form part of the approval, including specific forestry operation and forest management conditions.

- (1) A Forest Stewardship Plan must, before forestry operations commence, be:
 - (a) prepared by a suitably qualified expert(s),
 - (b) assessed by an independent expert panel against the criteria in Appendix D
 - (c) approved by Local Land Services, after considering the independent expert panel's advice and is satisfied that the Forest Stewardship Plan complies with relevant legislative requirements and the Code.
- (2) Independent expert panel members must have applied knowledge and experience in the principles of ESFM and expertise in at least one of the following areas:
 - (a) forest management, including silviculture (required for all panel assessments)
 - (b) forest ecology (required for all panel assessments)
 - (c) natural resource economics
 - (d) fire management and climate change
 - (e) Aboriginal land management
 - (f) water and soil management
- (3) A Forest Stewardship Plan can:
 - (a) apply the basal area limits in accordance with Clause 3.2 (2) (ii)
 - (b) apply canopy area limits for Australian Group Selection in accordance with Clause 3.3 (2) (c) (ii)
 - (c) include alternative requirements to those in sections 5, 6, 7 and Appendix A of this Code following a significant forest disturbance event(s) and where forestry operations can be used to minimise or manage impacts and/or improve ESFM outcomes. In these circumstances, Local Land Services will conduct a site assessment within the area(s) identified by the landholder(s) to advise on the suitability of a Forest Stewardship Plan.
- (4) A Forest Stewardship Plan must be in an approved form and will include:
 - (a) a map (or maps) consistent with Clause 2.1 (7)(a)
 - (b) a written component that is consistent with Clause 2.1 (7)(b)
 - (c) relevant information to inform Local Land Services assessment of the plan, including:
 - (i) details of proposed forestry operations
 - (ii) details of any alternative requirements as per Clause 2.2 (3)
 - (iii) the results of any pre-harvest flora and fauna assessments and surveys, including any required in accordance with Clause 2.2 (5) (a)
 - (iv) any additional management actions and/or protections that may be proposed, including any required in accordance with Clause 2.2 (5) (b).
 - (v) details of site-specific monitoring and reporting requirements.
- (5) As per Clause 2.2 (1), Local Land Services can only approve a Forest Stewardship Plan after an independent expert panel has assessed the plan against the criteria in Appendix D and provided the assessment to Local Land Services. In conducting an assessment of a Forest Stewardship Plan, the independent expert panel can:

- (a) request further information, additional advice or external expertise to inform its assessment, including additional flora and fauna assessments or surveys, if necessary
 - (b) recommend additional site-specific management actions and/or protections
 - (c) recommend that the Forest Stewardship Plan is approved by Local Land Services
 - (d) recommend that the Forest Stewardship Plan is not approved by Local Land Services.
- (6) The Landholder may amend the parts of the Forest Stewardship Plan referred to in Clause 2.1 (7) (b) (ii) and Clause 2.1 7 (b) (x-xii). Any other amendments to the Forest Stewardship Plan may only occur with the approval of Local Land Services.
- (7) Any amendments to either the map or the written component must be noted on the Forest Stewardship Plan and must be consistent with the relevant provision of the Code.
- (8) The landholder and anyone else carrying out forestry operations must read, sign and date the Forest Stewardship Plan.
- (9) A copy of the Forest Stewardship Plan must be available on-site during forestry operations.
- (10) The landholder(s) must retain a copy of the Forest Stewardship Plan, including a record of any amendments, for the life of the PNF Plan or for three years after completion of the forestry operations for which it was prepared, whichever is the later date.
- (11) The landholder(s) must provide the Forest Stewardship Plan to an officer from Local Land Services and/or an authorised officer from the Environment Protection Authority if requested to do so.

2.3 Reporting

- (1) The landholder must notify Local Land Services of the commencement and completion of forestry operations under clauses 3.1 to 3.3 of the Code.
- (2) In respect of forestry operations under clauses 3.1 to 3.3 of the Code, notification must be provided to Local Land Services within 30 days prior to commencement of the relevant forestry operations.
- (3) In respect of forestry operations under clauses 3.1 to 3.3 of the Code, notification must be provided to Local Land Services within 30 days of the completion of the relevant operations.
- (4) The following information must be included in any commencement notification to Local Land Services:
 - (a) the PNF Plan approval number
 - (b) the Forest Management Plan or Forest Stewardship Plan approval number where applicable
 - (c) the proposed commencement date and estimated time it will take to complete the forestry operations
 - (d) a map showing the location of the proposed forestry operations
 - (e) name and contact details of the landholder.

Note 3: Local Land Services will provide updated information to the landholder on the locations of plants, animals and ecological communities listed in the schedules of the *Biodiversity Conservation Act 2016* at this time to ensure that the relevant Code requirements are applied to the forestry operation.

- (5) The following information must be included in any completion notification to Local Land Services:
 - (a) the PNF Plan approval number
 - (b) a Forest Management Plan or Forest Stewardship Plan approval number where applicable
 - (c) a map showing the location of the forestry operations
 - (d) the approximate volume of forest products harvested
 - (e) the approximate number of hectares on which the forestry operations have occurred
 - (f) the date that the forestry operations were completed
 - (g) name and contact details of the landholder.

2.4 Monitoring, assessment and adaptive management

- (1) A monitoring, evaluation and reporting framework must be jointly approved by the Chief Executive Officer of Local Land Services and the Secretary of DPE.
- (2) The PNF MER framework will be proposed by the NSW Forest Monitoring Steering Committee (or equivalent) independently chaired by the NSW Natural Resources Commission.
- (3) The NSW Forest Monitoring Steering Committee (or equivalent) independently chaired by the NSW Natural Resources Commission will:
 - (a) conduct annual checks that the evidence base is up to date (including relevant maps), identify emerging evidence from monitoring and research, and opportunities for improvement
 - (b) formally assess the data and evidence from the program (and any other lines of evidence) every five years and advise the Minister administering the *Forestry Act 2012*, the Minister administering the *Local Land Services Act 2013* and the Minister administering the *Biodiversity Conservation Act 2016* whether there is sufficient evidence to warrant a review of the PNF Codes.
- (4) Local Land Services can require that forestry operations are rescheduled to help ensure harvest operations are distributed over time and space, to support a mosaic of forest age-classes and forest structures across the landscape. This determination will consider landholder's circumstances and the nature, extent and intensity of forestry operations.
- (5) The Minister administering the *Local Land Services Act 2013* can request harvest operations are reviewed where an unforeseen event (such as wildfire, mass dieback or a forest biosecurity event) has caused, or has the potential risk of causing serious or irreversible environmental damage on private land at a bioregional scale. In these circumstances Local Land Services will conduct a site assessment within the impacted bioregion(s) identified by the Minister. The site assessment will occur prior to harvest operations commencing to determine whether site scale environmental risks:
 - (a) can be managed within the existing provisions of the Code, or
 - (b) can be mitigated and managed with additional management actions and protections through a Forest Stewardship Plan, or
 - (c) cannot be mitigated or managed to avoid serious or irreversible environmental damage. In this event, Local Land Services can suspend or reschedule harvest operations but will agree with the landholder(s) on a timeframe for reassessing the site.
- (6) Where an unforeseen event (such as wildfire, mass dieback or a forest biosecurity event) has caused, or has the potential risk of causing serious or irreversible environmental damage on private land at a bioregional scale, the Chief Executive Officer of the Environment Protection Authority can inform the Chief Executive Officer of Local Land Services that a review under Clause 2.4 (5) may be required.

Note 4: Any research or forest monitoring activities undertaken in PNF Plan areas beyond minimum requirements set out in this Code can only occur with the written consent of the landholder. The written consent must outline the purpose of the research or monitoring, and how the data will be collected, stored and used, including how landholder confidentiality will be managed.

3. Silvicultural operations

3.1 Small scale harvesting

Introduction

A silvicultural system in which single trees of various ages are harvested at a low intensity. This method is suitable for the provision of fence posts, poles and firewood and promoting regeneration of shade-tolerant species, or growth of preferred species or individual trees.

- (1) Forestry operations are permitted after a PNF Plan has been approved.
- (2) Small scale harvesting is permitted provided no more than 5 trees per hectare are harvested and the harvest area is no more than 5 hectares or the volume is no more than 50m³ per year, whichever is smaller.
- (3) Small scale harvesting must not reduce the stand basal area below 14m²/hectare.
- (4) For the purposes of clause 3.1 the minimum stand basal area will be calculated in accordance with Appendix B. The average can only be calculated within contiguous forest areas and must not include isolated patches of forest.
- (5) The landholder must keep a record of the number of trees harvested and the approximate area harvested.

3.2 Single tree selection and thinning

Introduction

A silvicultural system in which single trees or small groups of trees of various ages are harvested. This method is suitable for promoting regeneration of shade-tolerant species, or growth of preferred species or individual trees

- (1) Forestry operations are permitted after the approval of a Forest Management Plan or a Forest Stewardship Plan.
- (2) Single tree selection and thinning operations must not reduce the stand basal area below:
 - (i) 14m²/hectare across the net harvestable area of a Forest Management Plan.
 - (ii) 10m²/hectare across the net harvestable area of a Forest Stewardship Plan.
- (3) For the purposes of clause 3.2 the minimum stand basal area will be calculated in accordance with Appendix B. The average can only be calculated within contiguous forest areas and must not include isolated patches of forest.

3.3 Australian Group Selection

Introduction

A silvicultural system in which groups (small patches or stands) of trees are harvested, allowing for subsequent regeneration and leading to a forest comprising patches of differently aged trees. The method is suitable for promoting regeneration of shade intolerant species.

- (1) Forestry operations are permitted after the approval of a Forest Management Plan or a Forest Stewardship Plan.
- (2) Harvest operations that result in canopy openings must conform with the following requirements:
 - (a) be used to encourage the regeneration of forest stands with shade intolerant species and/or where forest regeneration has failed
 - (b) the sum of canopy openings must at no time exceed 20% of the net harvestable area
 - (c) the maximum area of an individual canopy opening must not exceed:
 - (i) 0.5 hectares in area under a Forest Management Plan, or
 - (ii) 0.75 hectares in area under a Forest Stewardship Plan.
 - (d) Australian Group Selection and Single Tree Selection cannot occur within 100 metres of the edge of the canopy opening:
 - (i) within ten years of the completion of harvest operations, or
 - (ii) until the forest stand within canopy openings has reached 10 metres or more
- (3) A **canopy opening** is an area greater than 0.1 hectares in size, measured between canopy perimeters, where any vegetation remaining within the opening is less than one-half of the stand height unless this is a significant habitat feature.
- (4) A **canopy opening** can be an irregular shape to maximise light penetration and optimise the area to boundary ratio, to encourage forest regeneration and account for existing landscape features and significant habitat features (such as hollow bearing trees, dead standing trees, feed trees) provided it does not exceed the maximum area in Clause 3.3 (2)(c) and is non-linear in shape.
- (5) After harvesting, the debris in the gap may be burnt to create an ash bed in which a future crop of shade-intolerant species can regenerate.

3.4 Forest regeneration

- (1) The minimum stand stocking (as determined by the percentage of stocked plots specified in Table A) must be achieved within 2 years of a regeneration event.
- (2) In this clause, **regeneration event** is a harvesting or thinning operation under Clauses 3.1 to 3.3 of the Code.
- (3) A harvesting operation must not occur in a previously harvested area until stocking levels meet the minimum stocked plot requirements in Table A.

Table A: Minimum percentage of stocked plots

Within canopy openings	Elsewhere in the forest
≥ 55%	≥ 65%

- (4) For the purposes of Clause 3.4 and Table A, forest regeneration will be calculated in accordance with Appendix C.
- (5) The landholder must comply with any reasonable requirements of the Environment Protection Authority for the purpose of regenerating or re-establishing the forest, if the minimum percentage of stocked plots has not been reached within a period of 24 months following a regeneration event.
- (6) Landholders must monitor forest regeneration, composition, and condition at 2, 6 and 10 years after a regeneration event. Where the relevant forest is not regenerating along a trajectory that maintains (or improves on) preharvest forest conditions, landholders must implement regeneration management actions.

4. Pest and weed management

Note 5: The landholder may manage pest plants and animals on land to which a PNF Plan applies. Any such management is to be carried out in accordance with all applicable legal requirements. Local Land Services and the relevant local council can provide advice on management of pest plants and animals.

5. Fire management

Note 6: The landholder may carry out burning activities, fire management, bush fire hazard reduction and bush fire recovery and response activities on land to which a PNF Plan applies. However, any such activities may only be carried out in accordance with all applicable legal requirements and any necessary approvals must be obtained. Advice should be sought from the Rural Fire Service and the relevant local council before carrying out any of these activities.

- (1) Fire management should be consistent with the following:
 - (a) flame heights should average one metres, but may be higher in patches of heavy or elevated fuels
 - (b) scorch heights should average less than five metres, but may be higher in patches of heavy or elevated fuels
 - (c) the fire should spread at a slow walking pace.
- (2) Fire management under this part is not permitted on land that:
 - (a) contains peat soils, or
 - (b) is mapped or described as a fire exclusion zone in a bush fire risk management plan, or
 - (c) contains isolated forest, woodland or wetland vegetation formations under Clause 4.1 of the *Bush Fire Environmental Assessment Code for New South Wales*.

Fire management under this part must be conducted in accordance with the *NSW Rural Fire Services Standards for Low Intensity Bush Fire Hazard Reduction Burning* and the *Bush Fire Environmental Assessment Code for New South Wales*.

6. Protection of the environment

6.1 Protection of landscape features of environmental and cultural significance

- (1) Forestry operations in and adjacent to specified landscape features must comply with the requirements in Table B.
- (2) Old growth forests will be identified according to the protocol approved by the relevant Ministers and available at https://www.ils.nsw.gov.au/_data/assets/pdf_file/0003/807420/Protocol-for-re-evaluating-old-growth-forest-on-private-property.pdf.
- (3) Rainforest will be identified according to the protocol approved by the relevant Ministers and available at https://www.ils.nsw.gov.au/_data/assets/pdf_file/0004/807421/Protocol-for-re-evaluating-rainforest-on-private-property.pdf.

Table B: Requirements for protecting landscape features

Landscape feature	Operational conditions
Threatened ecological communities listed in the <i>Biodiversity Conservation Act 2016</i>	Forestry operations may not occur in threatened ecological communities unless authorised by a Forest Stewardship Plan. However, existing roads may be maintained.
Threatened populations listed in the <i>Biodiversity Conservation Act 2016</i>	Forestry operations must not result in any harm to an animal that is a threatened species or a protected animal or result in the picking of any plant that is part of a threatened population, except that existing roads may be maintained.
Areas of outstanding biodiversity value	Forestry operations must not occur in declared areas of outstanding biodiversity value agreed with the written consent of the landholder, except that existing roads may be maintained.
Rainforest	Forestry operations must not occur within rainforest, except that existing roads may be maintained.
Old growth forest	Forestry operations must not occur within old growth forest, except that existing roads may be maintained.
Wetlands	Forestry operations must not occur in any wetland or within 20 metres of any wetland, except that existing roads may be maintained.
Heathland	Forestry operations must not occur in any heathland or within 20 metres of heathland, except that existing roads may be maintained.
Rocky outcrops	Forestry operations must not occur on any rocky outcrop or within 20 metres of a rocky outcrop, except that: <ul style="list-style-type: none"> • existing roads may be maintained • existing snig tracks may be used.
Cliffs, caves, tunnels and disused mineshafts (excluding open pits less than 3 metres deep)	Forestry operations must not occur within 10 metres of cliffs, caves, tunnels or disused mineshafts, except that existing roads may be maintained.

Steep slopes	Forestry operations must not occur on slopes greater than 30 degrees, except that: <ul style="list-style-type: none"> existing roads and tracks may be maintained new roads and tracks may be constructed subject to conditions in clause 7.1(18) of the Code.
Aboriginal object or place as defined in the <i>National Parks and Wildlife Act 1974</i>	Forestry operations must not occur within: <ul style="list-style-type: none"> 50 metres of a known burial site 20 metres of an Aboriginal scarred or carved tree 10 metres of a known Aboriginal object or place (this requirement does not apply to Aboriginal objects or places that may lawfully be destroyed).
Areas containing items identified as heritage items in an environmental planning instrument	Forestry operations must not occur within 10 metres of a listed heritage item.
Areas of existing mass movement	Harvesting operations which create canopy openings must not occur within the area, and harvesting machinery must not enter the area, except that existing roads may be maintained. New roads must not be constructed.
Dispersible and highly erodible soils	Existing roads may be maintained. <ul style="list-style-type: none"> Drainage feature crossings must be armoured with erosion-resistant material. Road batters and table drains must be stabilised using erosion-resistant material, ameliorants, vegetation or slash. Log landings must be stabilised using erosion-resistant material, vegetation or slash at the completion of forestry operations. Measures must be taken to immediately stabilise any erosion of roads or snig tracks.

6.2 Protection of habitat and biodiversity

- (1) Habitat trees must be retained in accordance with Table C.
- (2) Hollow bearing trees, recruitment trees, food resource trees, roost trees and nest trees are defined as habitat trees retained for the purposes of this Code.
- (3) An individual tree may satisfy more than one condition in the tree retention standards (see Table C) if it has the appropriate characteristics.
- (4) Where available:
 - (a) retained habitat trees must represent the range of species in mature and late mature growth stages
 - (b) preference must be given to selecting habitat trees that best meet the characteristics of habitat trees as set out in clause 6.2(5)
 - (c) preference must be given to habitat trees that will provide habitat connectivity, build on existing landscape features (Table B), provide additional protections for threatened species, and build on existing habitat islands, refugia and conservation areas adjacent to and within the PNF Plan area.
 - (d) preference must be given to trees with well-developed crowns.

- (5) For the purpose of this clause:
- (a) a **hollow bearing tree** is a tree 30 cm diameter at breast height over bark (DBHOB) or greater, where the trunk or limbs:
 - (i) contain visible hollows, holes or cavities (including basal hollows), or
 - (ii) have inferred hollows as it is an older growth stage tree and has one or more obvious deformities such as a burl, large protuberance or a broken limb
 - (b) if there are more than the minimum required number of habitat trees, preference must be given to trees with the largest hollows, holes or cavities (including basal hollows) and/or greatest number of visible hollows, holes or cavities (including basal hollows). Trees that pose a health or safety risk may be removed and substituted with other hollow bearing trees if available, and if not available, by recruitment trees.
 - (c) a **dead standing** tree is a standing dead tree that has hollows, and:
 - (i) the bark is fully separated from the sapwood
 - (ii) is greater than 30cm in diameter, and
 - (iii) is over three metres tall
 - (d) a **feed tree** is a tree that provides a source of nectar or other food for wildlife, and is listed in Table D
 - (e) a **recruitment tree** is a large, vigorous tree (30cm or greater in DBHOB) capable of developing hollows to provide habitat for wildlife. Where practical, preference must be given to trees from the next cohort to that of retained hollow bearing trees.
 - (f) **roost, nest and food resource trees** are defined as:
 - (i) trees with roosts of any species of raptor
 - (ii) trees that support active maternity bat roosts with clear evidence of roosting such as bat guano (faeces)
 - (iii) trees with recent 'V' notch incisions or other incisions made by a glider species. Recent incisions are incisions that have not closed.

Table C: Minimum standards for tree retention

Trees that must be retained
<ul style="list-style-type: none"> ● 10 hollow bearing trees per 2 hectares, where available. ● A maximum of 2 dead standing trees may contribute to the total of 10 hollow-bearing trees per 2 hectares (see above) where available. ● One recruitment tree, representing the range of species in the forest before forestry operations commenced, must be retained for every hollow bearing tree. ● Where the total number of hollow bearing trees is less than 10 trees per 2 hectares, additional recruitment trees must be retained to bring the total number of retained hollow bearing and recruitment trees up to 20 trees per 2 hectares. ● Up to half of all required recruitment trees can be located in a riparian exclusion zone where the subject 2-hectare area is within 200 metres of, and partly includes, that riparian exclusion zone. ● A minimum of 6 feed trees per 2 hectares should be retained where available. ● All feed trees that have marks or 'V' notches from sap-feeding mammals must be retained. ● All roost, nest or food resource trees to be retained. ● All trees with large stick nests (50cm or larger) to be retained with a 50 metre exclusion zone

Table D: Feed trees

White mahogany – <i>Eucalyptus acmenoides</i> , <i>E. umbra</i> , <i>E. carnea</i>	Spotted gum species – <i>Corymbia</i> spp.
Ironbark species – <i>E. ancophila</i> , <i>E. tetrapleura</i> , <i>E. ophitica</i> ,	Mountain gum – <i>E. dalrympleana</i>
Swamp mahogany – <i>E. robusta</i>	Manna gum – <i>E. viminalis</i>
Forest red gum – <i>E. tereticornis</i>	Needlebark stringybark – <i>E.</i> <i>planchoniana</i>
Bloodwood species – <i>Corymbia</i> spp.	Tindale’s stringybark – <i>E. tindaliae</i>
Craven grey box – <i>E. largeana</i>	Red stringybark – <i>E. macrorhyncha</i>
Yellow box – <i>E. melliodora</i>	Fuzzy box – <i>E. conica</i>
White box – <i>E. albens</i>	Red ironbark – <i>E. fibrosa</i>
Grey ironbark – <i>E. paniculata</i> , <i>E. siderophloia</i> , <i>E. placita</i> , <i>E. fusiformis</i>	Mugga ironbark – <i>E. sideroxylon</i>
Grey box – <i>E. moluccana</i>	Caley’s ironbark – <i>E. caleyi</i>
Narrow-leaved ironbark – <i>E. crebra</i>	Rudder’s box – <i>E. rudderi</i>
Ferguson’s ironbark – <i>E. fergusonii</i>	Steel box – <i>E. rummeryi</i>
Snow Gum - <i>E. pauciflora</i>	stringybark species - <i>E.</i> <i>agglomerata</i> , <i>E. globoidea</i>
Mountain Grey Gum - <i>E. cypellocarpa</i>	Swamp Gum - <i>E. ovata</i>
Black Sallee – <i>E. stellulata</i>	Eurabbie – <i>E. bicostata</i>
River Peppermint - <i>E. elata</i>	Maiden’s Gum - <i>E. maidenii</i>

6.3 Minimising damage to retained trees and native vegetation

- (1) As far as practicable, forestry operations must not damage or heap debris around protected trees.
- (2) In this clause **protected trees** are defined as:
 - (a) trees required to be retained under clause 6.2
 - (b) plants of the genus *Xanthorrhoea* (grass trees), genus *Allocasuarina* (forest oak) and genus *Banksia*.
 - (c) other trees that are required to be retained by this Code.

6.4 Drainage feature protection

- (1) For the purposes of this Code, a stream is defined as an incised watercourse with a defined channel, bed and banks and a minimum depth of 30 centimetres. Stream orders are determined according to the Strahler System (see Figure 1).

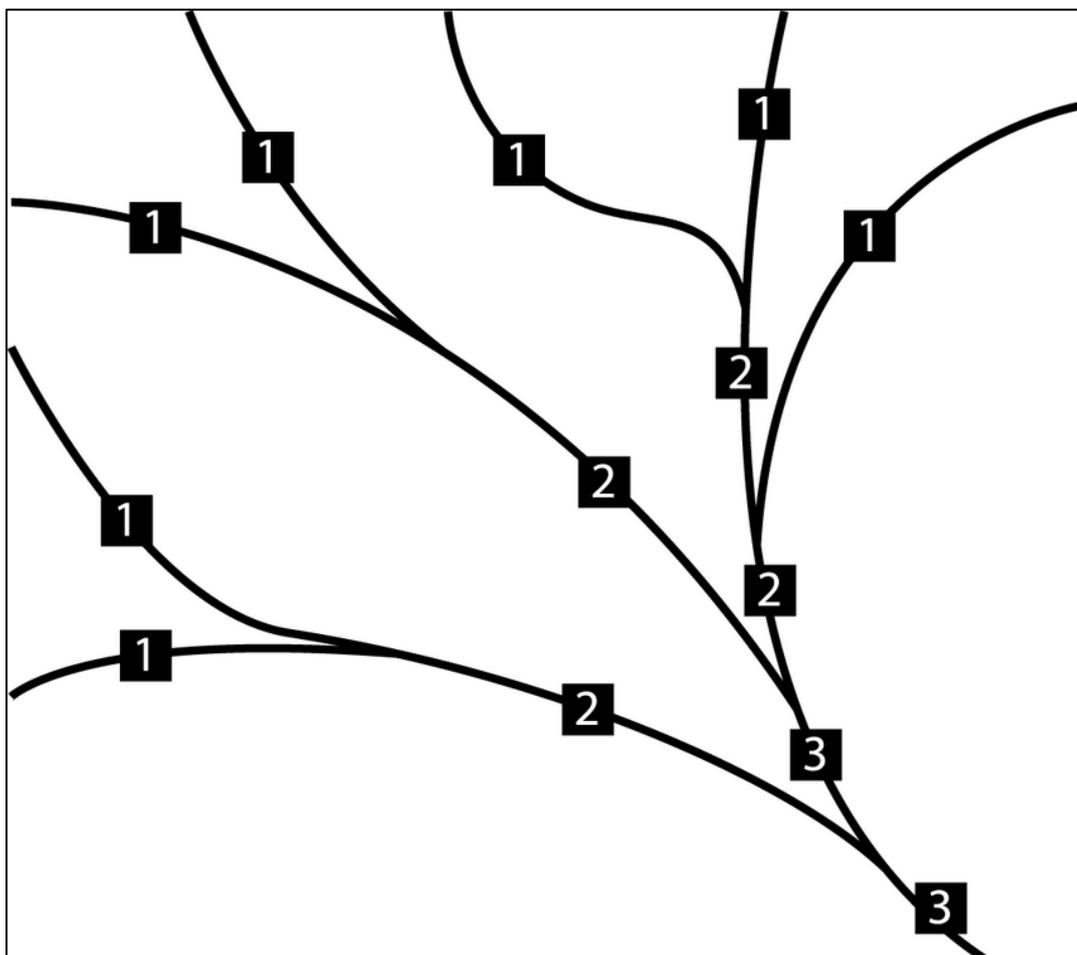


Figure 1: Diagram of stream order (Source: *Water Management (General) Regulation 2018*).

- (2) The riparian exclusion zone must be measured from the top of the defined bank of the stream or where there is no defined bank, from the edge of the channel of the stream for the distance specified in Table E.

Table E: Riparian exclusion zones

Stream order	Riparian exclusion zone
Unmapped and mapped first-order	10 metres
Mapped second-order	20 metres
Mapped third-order or higher	30 metres
Prescribed Streams	

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- (3) Harvesting machinery must not enter riparian exclusion zones, except at designated crossings or where otherwise allowed by this Code.
- (4) Where harvesting is occurring in or adjacent to riparian exclusion zones, all tree felling must employ directional felling to minimise disturbance to streams
- (5) Where a tree is accidentally felled into a riparian exclusion zone, the tree may be removed provided:
 - (a) disturbance to soil, groundcover and native vegetation is limited to the minimum extent necessary, and
 - (b) harvesting machinery does not enter the riparian exclusion zone to retrieve the tree, or part of the tree, unless using walkover techniques, and
 - (c) following the tree's removal, any soil disturbance or furrows are treated to prevent concentration of water flow or soil movement, and
 - (d) the incident must be recorded in the Forest Management Plan or Forest Stewardship Plan, as soon as possible.
- (6) New roads and crossings may be constructed and old roads and crossings re-opened within riparian exclusion zones provided that:
 - (a) the road or crossing is identified in the Forest Management Plan or Forest Stewardship Plan
 - (b) the road prism or crossing intersects with the riparian exclusion zone at right angles or as close to right angles as is practicable
 - (c) clearing and disturbance within the riparian exclusion zone are minimised
 - (d) any other necessary permits have been obtained.
- (7) Trees may be felled within drainage depressions, and machinery may enter, however, disturbance must be minimised by:
 - (a) machinery not operating when the soil is saturated
 - (b) using walkover techniques wherever possible
 - (c) preventing skewing of machinery tracks as much as possible
 - (d) not snagging along drainage depressions.
- (8) Where existing measures are not adequately managing the risk of soil erosion, sediment movement or water turbidity the landholder may implement further riparian protection measures. These additional measures must be recorded in the Forest Management Plan or Forest Stewardship Plan.

7. Construction and maintenance of forest infrastructure

7.1 Construction and maintenance of roads

- (1) Clearing of native vegetation for the purpose of roads, drainage structures, log landings, mill sites, snig tracks or extraction tracks must not occur except in accordance with this Code, and the clearing must be limited to the minimum extent necessary.
- (2) Construction of new roads and drainage feature crossings should be minimised as far as practicable, consistent with the requirements for management, harvesting and fire control in the PNF Plan area.
- (3) As far as practicable, roads must be located on ridgetops or just off the crest of the ridge to facilitate outfall drainage.
- (4) Clearing for road construction is no more than 3 metres from the outside edges of batters or table drains. If it is necessary to clear a wider area, a minimum of 70% groundcover must be established on all the cleared area beyond the road formation within one month of the date of completed construction.
- (5) Trees and other debris must not be stacked in landscape features referred to in Table B or riparian exclusion zones referred to in clause 6.4(2) and Table E.
- (6) Any cut or fill batter must be stabilised.
- (7) Tree stumps or other woody debris must not be used to provide fill for road construction.
- (8) New roads must be constructed, upgraded and maintained with a maximum grade of 10 degrees. The maximum grade may be increased to 15 degrees where it would result in an improved environmental outcome or to avoid difficult ground conditions. The Forest Management Plan or Forest Stewardship Plan must be noted.
- (9) Roads must be maintained according to Table F.
- (10) Roads must be maintained to ensure that road surfaces remain stable and drainage systems and sediment controls remain functional.
- (11) Soil exposure on road verges must be kept to a minimum.
- (12) Roads that are not required for ongoing property management must be stabilised, drained and allowed to revegetate.
- (13) Haulage must not be undertaken over any section of road where the surface has rutting more than 150 millimetres deep for any distance exceeding 20 metres.
- (14) Haulage on natural surface roads must cease when there is runoff from the road surface, except for trucks that have already been loaded or partially loaded. These trucks can travel to their intended destination.
- (15) Where existing roads are overgrown and require re-opening, the clearing width must be minimised to the extent required to make the road suitable for traffic.
- (16) As far as practicable, grass cover must be maintained and disturbance to existing drainage structures must be minimised.
- (17) Blading-off of roads must be used to the minimum extent necessary to rehabilitate the road surface.

- (18) Sections of new road may be constructed on ground slopes exceeding 25 degrees only if:
- (a) there is no practical alternate route available,
 - (b) the sections are designed by a suitably qualified person using currently acceptable engineering standards to ensure stability, and
 - (c) the section is noted within the Forest Management Plan or Forest Stewardship Plan.

Table F: Maximum distance that water may travel along road surfaces and table drains

Road grade (degrees)	Maximum distance (metres)
0 to ≤ 3	150
> 3 to ≤ 5	100
> 5 to ≤ 10	60
> 10 to ≤ 15	40
> 15 to ≤ 20	30

7.1.1 Road drainage

- (1) All reasonable steps must be taken to minimise soil erosion from roads. Accordingly, one or more of the following measures must be adopted, where appropriate:
 - (a) maintain vegetative cover (that is, plant material, living or dead) that protects the road surface from erosion
 - (b) establish a grass cover on the road surface using a sterile seed or native grass seed
 - (c) crossfall-drain the road with outfall or infall drainage (preferably with the outward or inward slope being between 4% and 6%) or by shaping the road to a crown so water drains to both of its sides
 - (d) construct drainage structures on the road surface to convey water away from the road formation (for example, cross drains, mitre drains or relief culverts).
- (2) Any drainage structure must be designed to convey the peak flow from a 1-in-5-year storm event.
- (3) Drainage structures must be established on a road if concentrated water flow on the road surface or table drains is likely to occur for distances exceeding the relevant spacing, as shown in Table F.
- (4) Earth windrows resulting from road construction and upgrading operations must be removed from the shoulders of all roads unless they are specifically constructed to prevent erosion of fill batters or where infall drainage is used.
- (5) Earth windrows from road maintenance must be cut through at regular intervals to ensure that water flow on road surfaces does not exceed the distances specified in Table F.
- (6) Rollover banks must have a minimum effective bank height of 15 centimetres (consolidated). Spoon drains must have a minimum effective depth of 15 centimetres.
- (7) Drainage structures must divert water onto a stable surface and must be kept free of debris that may impede flow of water.

- (8) Drainage structures must not be designed to directly divert sediment laden water into drainage features.
- (9) A drop-down structure and dissipater must be installed where drainage structures divert water over an exposed fill batter more than 1 metre high.

7.1.2 Roads crossing drainage features

- (1) Drainage feature crossings must be stable causeways, culverts or bridges. Existing gully stuffers may be used if they are stable, but new gully stuffers must not be constructed.
- (2) Crossings must be designed, constructed and maintained to minimise disturbance to the passage of fish and other aquatic fauna. They must be located and constructed to cause minimum disturbance to stream banks, stream beds and natural flows. The base of the crossing must be made of erosion-resistant material such as rock, concrete or heavy timber and must conform to the natural level of the stream bed.
- (3) Crossings must be constructed as close as practicable to right angles to the water flow unless an angled approach reduces soil and ground disturbance.
- (4) Disturbance to the bed and banks of the drainage feature during crossing construction or maintenance must be minimised. Disturbed areas must be reshaped and stabilised as soon as possible following crossing construction or maintenance.
- (5) The approaches to a crossing over a stream must be drained, using a drainage structure, between 5 metres and 30 metres of the crossing. Where this is impracticable, a drainage structure must be constructed as near as practicable to the crossing.
- (6) Permanent drainage crossing structures must be designed to convey a 1-in-5-year storm event and withstand a 1-in-10-year storm event. Bridges must be designed and constructed so the natural stream flow is not restricted and erosion is minimised.
- (7) The surface of any crossing and the approaches on both sides of it must be made of stable material that is unlikely to be displaced during normal use of the crossing or approach, or by any flood up to and including peak flow of a 1-in-10-year storm event.
- (8) Causeways must be constructed of stable, non-soil material such as crushed gravel, rock, bitumen, concrete, logs or other stable material that is unlikely to produce water turbidity.
- (9) Construction equipment must minimise disturbance or damage to the stream bed and banks.
- (10) Fill and construction material must not be placed into streams, and surplus fill must be located outside the riparian exclusion zone.
- (11) Stream banks and bridge embankments must be protected to minimise erosion.
- (12) Soil stabilisation must be undertaken in all areas disturbed by crossing construction, upgrading or maintenance.

7.2 Log landings, portable mill sites and snig tracks

- (1) Wherever practicable, log landings and portable mill sites must be located on ridge-tops or spurs.
- (2) Log landings and portable mill sites must be no larger than the minimum size necessary for efficient operations.
- (3) If topsoil is removed, it must be stockpiled and respread at completion of harvesting operations.
- (4) Log landings and portable mill sites must be located and constructed as far as practicable to allow effective crossfall drainage during harvesting operations.
- (5) The construction of new log landings and portable mill sites must not be located nearer than 10 metres to an exclusion zone, or riparian exclusion zone.
- (6) Existing log landings located within riparian exclusion zones may only be used with the prior written approval of Local Land Services, and provided:
 - (a) clearing for a new log landing would cause greater environmental harm; and
 - (b) disturbance to soils and groundcover is minimised; and
 - (c) erosion and sediment control measures must be in place for the duration of the log landing's use, and upon its completion, and
 - (d) at least 70% ground cover must be reinstated within one month of the completion of the relevant log landings used for the forestry operations.
- (7) Runoff from log landings and portable mill sites must not be directly discharged into a drainage feature.
- (8) Log landings must not be used when the log landing soil is saturated.
- (9) Vegetation and debris from log landings and portable mill sites must not be deposited in an exclusion zone, or riparian exclusion zone.
- (10) Woody waste and debris on log landings and portable mill sites must not be stacked against retained trees.
- (11) Bark accumulated on log landings, and sawdust on mill sites, must be progressively dispersed away from the site during harvesting operations. Alternatively, bark can be placed in a discrete area on a log landing provided:
 - (a) Bark heaps are not located adjacent to or under crowns of retained trees, and
 - (b) Bark heaps are surrounded by a 5-metre earth or mineral break, and
 - (c) Timber off-cuts are staked at least 5 metres away from any bark heap, and
 - (d) Upon completion of forestry operations bark heaps are positioned at the centre of the log landing. Bark heaps must be burnt in accordance with all applicable legal requirements and necessary approvals.
- (12) On completion of operations, log landings and portable mill sites must be drained and reshaped to disperse runoff onto surrounding vegetation, and topsoil must be respread evenly over the landing.

7.2.1 Snig tracks and extraction tracks

- (1) Snig track or extraction track construction must be minimised and, as far as practicable walkover extraction must be used and slash retained on snig and extraction tracks.
- (2) Soil disturbance and exposure on snig and extraction tracks must be minimised.
- (3) As far as practicable, snig tracks from previous operations must be used.
- (4) Existing snig tracks or extraction tracks must not be used if they are incised and cannot be drained.
- (5) In re-opening existing snig tracks and extraction tracks, the use of blades must be restricted to the removal of obstructions such as understorey vegetation, logs/tree heads and surface rock, and ensuring that the track is adequately drained.
- (6) Wherever practicable, snigging and timber extraction must be uphill.
- (7) Snig tracks and extraction tracks must be located where they can be drained effectively, and should be located where there is sufficient natural crossfall to remove runoff from the track surface.
- (8) Snig tracks and extraction tracks must not encroach on exclusion zones or riparian exclusion zones except at designated crossings and where permitted by clause 6.4 (5-6).
- (9) Blading-off of snig tracks and extraction tracks must not occur.
- (10) The grade of snig tracks must not exceed 25 degrees, except in the following circumstances:
 - (a) it will result in a better environmental outcome than construction and/or use of a side cut snig track to access the same area using a snig track of less than 25 degrees, and
 - (b) the Forest Management Plan or Forest Stewardship Plan is noted, and
 - (c) the snig track can be effectively drained, and
 - (d) the maximum grade is 28 degrees, and
 - (e) the maximum combined length of the snig track exceeding 25 degrees, commencing from the serviced log landing, is not greater than 75 metres.
- (11) Where downhill snigging is necessary, snig tracks and extraction tracks must enter the log landing from beside or below. Where this is not possible, a drainage structure must be installed at the entrance to the log landing at the end of each day's operations.
- (12) Drainage must be incorporated as soon as possible at the completion of operations on each extraction track or snig track, and in any event within two days, unless the soil is saturated.
- (13) Temporary drainage must be installed on any snig or extraction track that will not be used for a period of five days or more.
- (14) Track drainage structures must be located, constructed and maintained to divert water onto a stable surface which can handle concentrated water flow, and which provides for efficient sediment trapping. Drainage structures must not be designed to directly divert sediment laden water directly into streams.

- (15) Snig tracks and extraction tracks must be located and constructed to ensure that water flow on the track surface does not exceed the distances specified in Table G. This could be achieved by one of the following techniques or a combination:
- (a) retain the existing groundcover using walkover techniques
 - (b) retain or cover the track surface with slash and harvesting debris
 - (c) construct outfall drainage or maintain the track's outfall drainage
 - (d) construct track drainage structures.

Table G: Maximum distance that water may run along snig and extraction tracks

Track grade (degrees)	Maximum distance (metres)
0 to ≤ 5	100
> 5 to ≤ 10	60
> 10 to ≤ 15	40
> 15 to ≤ 20	25
> 20 to ≤ 25	20
> 25 to ≤ 28	15

- (16) On completion of operations, the following measures must be implemented:
- (a) where practicable, snig tracks and extraction tracks must be reshaped, all earth windrows, wheel ruts and log furrows removed, and recoverable topsoil spread back over the track, and
 - (b) crossfall drainage must be reinstated on snig tracks or, where this is not sufficient to divert runoff from the track, crossbanks must be installed consistent with the spacings in Table G.
- (17) Crossbanks must be constructed to have a minimum effective height of 35 centimetres unconsolidated, or 25 centimetres consolidated, and as a guide should not be greater than 50 centimetres in height.
- (18) Crossbanks must not be constructed of bark or woody debris.

7.2.2 Snig track and extraction track crossings on drainage features

- (1) The location of log landings and snig/extraction tracks must be planned to minimise the number of crossings required.
- (2) Temporary crossings may be constructed if this construction will enable access to a forested area that cannot be practically accessed by other means, and negates the need to construct new roads, snig tracks or extraction tracks which are likely to cause greater environmental harm.
- (3) Snig track and extraction track crossings must be stable causeways (including natural surface causeways), culverts or bridges. Existing gully stufferers may only be used if they are stable. New gully stufferers must not be constructed.
- (4) Machinery must not cross a drainage feature which is running water or when the soil is saturated, unless by means of a stable crossing.
- (5) Approaches to crossings must be as close as possible to right angles to the flow of water.

- (6) A crossbank must be installed on each approach, between 5 and 20 metres from the drainage feature crossing. The distance must be measured from the top of the bank of the incised channel or, where there is no defined bank, from the edge of the channel or centre of the depression. The drainage structure must divert water onto a stable surface. If such a surface is not available, sediment control measures must be used to prevent sediment entering the drainage feature. Drainage structures must not be designed to directly divert sediment laden water directly into streams.
- (7) Disturbance to the bed and banks of the drainage feature must be minimised, and any spoil must be removed from the drainage feature.
- (8) All areas disturbed during crossing construction and use, including approaches, must be rehabilitated following completion of use. Rehabilitation includes the reshaping of the crossing to conform as closely as possible to the original ground surface. If groundcover is not likely to recover naturally, sowing with a suitable sterile seed or endemic native seed/fertiliser mix must be undertaken to establish effective groundcover.

7.2.3 Wet weather limitations for snigging, log landing and portable mill operations

- (1) Harvesting operations must not occur when:
 - (a) there is runoff from the snig track surface, or
 - (b) soils are saturated, or
 - (c) soil is rutted to a depth of more than 200 millimetres below the track surface over a 20 metre section or longer, until the soil has dried and/or rehabilitation has restored the stability of the track surface.
- (2) Forwarders, excavators and truck-mounted loaders may be used as stationary loaders when there is runoff from the log landing.
- (3) All other machinery on the log landing must remain stationary when there is runoff from the log landing surface, unless the log landing is constructed of gravel or other stable material.

7.2.4 Seasonality limitations within the former Northern Rivers Catchment Management Authority Area

- (1) Within the former Northern Rivers Catchment Management Authority area, where each of the following circumstances exist, clause 7.2.4(2) applies:
 - (a) it is December, January, February or March, and
 - (b) the rainfall erosivity is equal to or greater than 6000, and
 - (c) the ground slopes are equal to or greater than 20 degrees.
- (2) Forestry operations involving ground disturbance caused by machinery must not occur unless:
 - (a) only one snig track, or extraction track, extending from felling operations to a log landing, is open and in use at any one time, and
 - (b) the drainage structures referred to in Clause 7.2.1(14) are installed:
 - (i) immediately for each snig track, extraction track, section of a snig track and section of extraction track, that is no longer required and

- (ii) at the end of each day of operations for each snig track and extraction track that has been used during that day, and
- (c) measures are taken:
 - (i) immediately for each snig track, extraction track, section of a snig track and section of extraction track, that is no longer required, and
 - (ii) at the end of each day of operations for each snig track and extraction track that has been used during that day,

to ensure that the track, or section of the track, continues to meet the requirements for construction of the track in Clause 7.2.1(15).

- (3) For the purposes of this clause, areas of rainfall erosivity equal to or greater than 6000 means those indicative areas shaded in Figures 2 and 3.

Note 7: For the purposes of preparing a PNF Plan, Local Land Services will provide landholders affected by this clause with a property-scale map detailing the exact areas on their property where rainfall erosivity is equal to or greater than 6000.

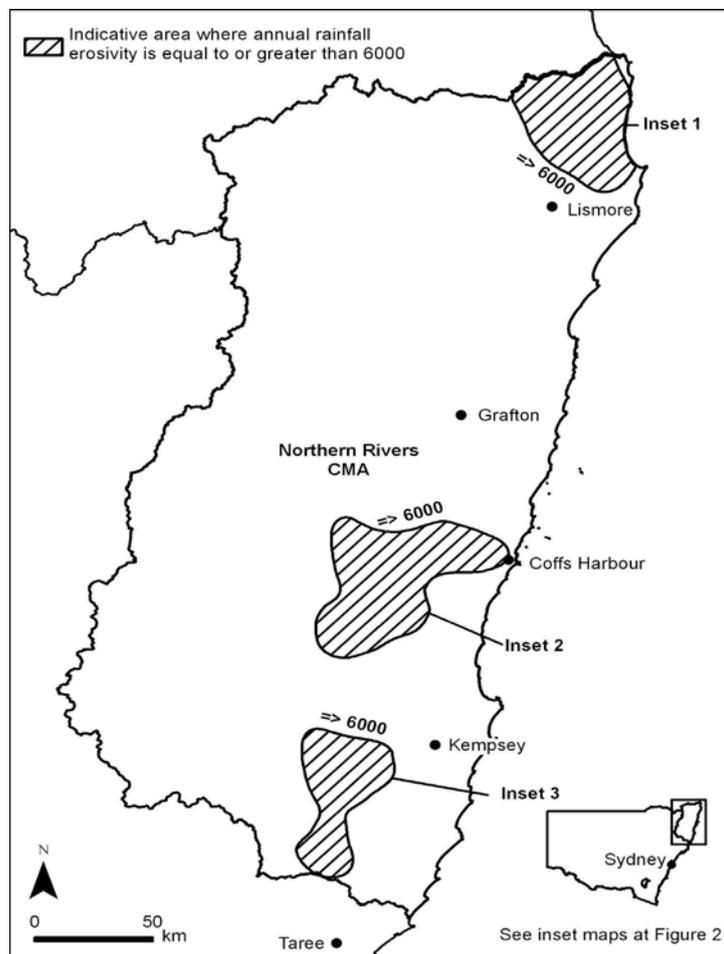


Figure 2: Seasonality limitations within the former Northern Rivers Catchment Management Authority area

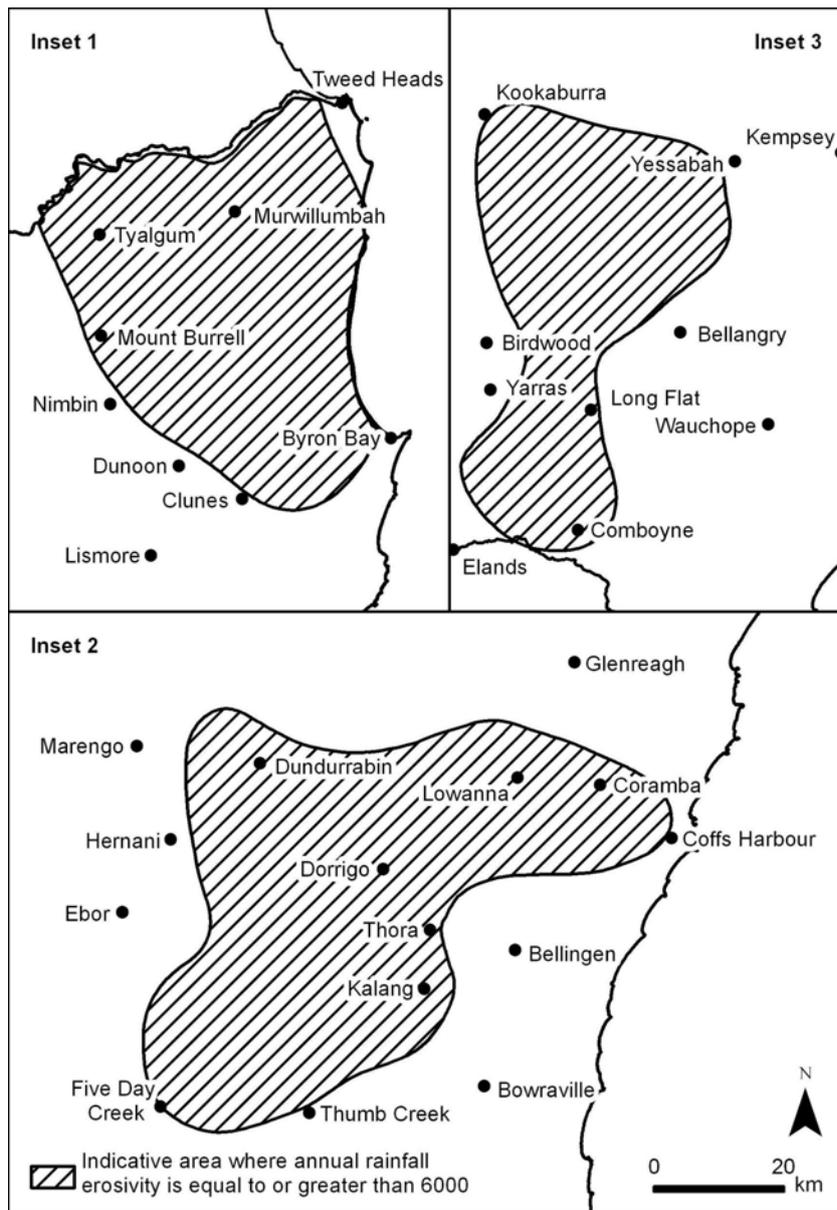


Figure 3: Inset maps for seasonality limitations within the former Northern Rivers Catchment Management Authority area

Appendix A: Listed species ecological prescriptions

Introduction

These prescriptions must be applied within the forestry operations area where there is a **known record, site evidence**, or in relation to koalas potential habitat (see Figures 6-7), of a threatened species.

- (a) A known record is a sighting or record of the species in the NSW BioNet (<http://www.bionet.nsw.gov.au/>) that is less than 20 years old with a reliability level and/or Source Code of 1 to 4 and a coordinate accuracy of 100 metres or less,
- (b) Site evidence is a sign a species has visited or regularly uses a site, and includes observations of, for example, faecal pellets or scats, chewed seed cones or a nest, or evidence that the site has been used as a latrine.
- (c) recorded by a suitably qualified expert(s) as part of a fauna survey and/or flora survey during the planning and assessment of harvest operations

A list of threatened species under the *Biodiversity Conservation Act 2016* and species profiles for each species can be viewed on the Department of Planning, Industry and Environment (DPIE) website at <https://www.environment.nsw.gov.au/topics/animals-and-plants/threatened-species>

The prescriptions set out below assist in the protection of threatened species, and include:

- (1) additional widths to stream exclusion zones
- (2) exclusion zones and/or buffer zones around locations of threatened species records
- (3) additional tree retention requirements around locations of threatened species records.

Exclusion zones and buffer zones requiring additional tree retention requirements must be applied within the PNF Plan area subject to the area of the forestry operation described in the Forest Management Plan or Forest Stewardship Plan.

Some species prescriptions vary according to the Bioregion in which they occur. Unless otherwise stated, the regions referred to in the prescriptions are based on the Interim Biogeographic Regionalisation of Australia (IBRA) shown in Figure 4.

General conditions

For all threatened species prescriptions, the following applies:

- where a retained eucalypt tree (as required by these prescriptions) also meets the requirements of a habitat tree, the eucalypt tree may be counted as a habitat tree
- where other exclusion zones form part of the habitat area required for threatened species prescriptions, the exclusion zones may count towards the area of habitat required to be retained
- where public conservation/reserved land (for example National Parks) falls within buffer or exclusion zone areas requiring additional tree retention requirements as part of threatened species prescriptions, then the area of public conservation/reserved land may contribute towards the area of habitat required to be retained.

- buffer and exclusion zones are to be marked in the field where they adjoin the area, subject to forestry operations. This marking has to be visible while forestry operations are occurring.

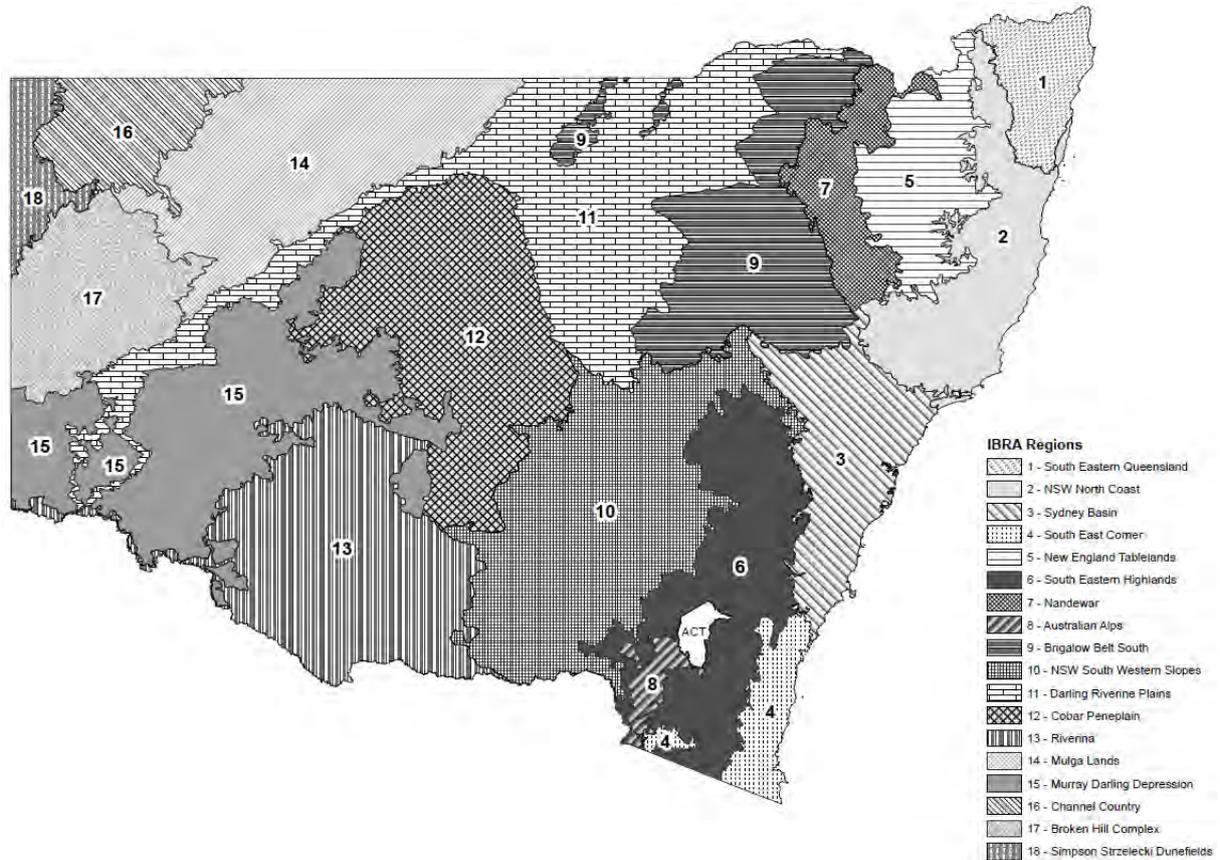


Figure 4: Interim Biogeographic Regionalisation of Australia (IBRA) regions, where prescriptions for some threatened species may vary.

Further information about individual threatened species may be sourced from the Environment, Energy and Science Group (EES) of DPE. The DPE EES website provides species profiles and additional information. Visit <https://www.environment.nsw.gov.au/topics/animals-and-plants/threatened-species>.

Amphibians

Pouched frog (*Assa darlingtoni*)

Zones for application of prescription

This prescription applies only to the area shown in Figure 5.

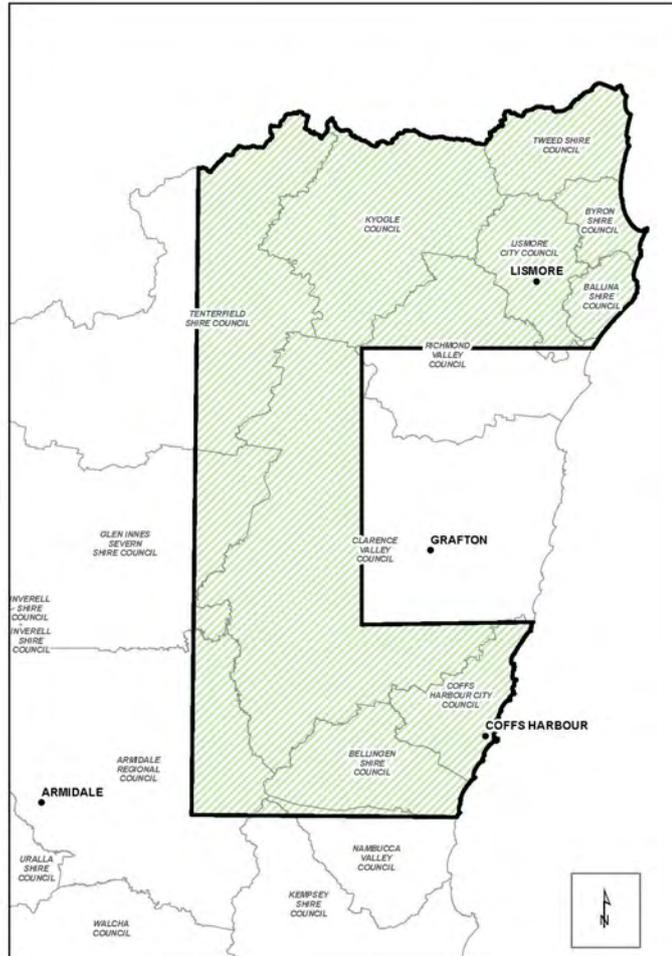


Figure 5: Area of application of pouched frog prescription

Prescription

Where there is a record of a pouched frog within the area of forest operations, an exclusion zone with at least a 50-metre radius must be implemented around the location of the record. No post-harvest burning may occur within this exclusion zone.

Additional information

The pouched frog lives in cool, moist rainforest with trees such as Antarctic beech, or in moist eucalypt forest in mountainous areas. It lives mostly above 800 metres above sea level and spends most of its time in damp leaf litter or under rocks and rotten logs.

Phyloria species: Loveridge's frog (*Phyloria loveridgei*), *P. pughi* and mountain frog (*P. kundagungan*), *P. richmondensis*

Zones for application of prescription

NSW North Coast, South East Queensland, New England Tablelands and Nandewar

Prescription

Where there is a record of any of the species of *Phyloria* within an area of forest operations, an exclusion zone with at least a 50-metre radius must be implemented around the location of the record.

Mammals

Brush-tailed phascogale (*Phascogale tapoatafa*)

Zones for application of prescription

NSW North Coast, South East Queensland, New England Tablelands, Nandewar, Brigalow Belt South, South Eastern Highlands, Darling Riverine Plains, South Western Slopes and Sydney Basin

Prescription

Where there is a brush-tailed phascogale record within the area of forest operations, the following must apply:

- (a) A 50 metre exclusion zone must be implemented around den trees, and
- (b) coarse woody debris within 200 metres of the record must be retained where practicable.

Additional information

Potential brush-tailed phascogale habitat is dry sclerophyll open forest or woodland with a generally open understorey, preferably containing large trees with rough bark and hollows to provide optimal foraging and denning habitat.

Eastern pygmy-possum (*Cercartetus nanus*)

Zones for application of prescription

NSW North Coast, South East Queensland, New England Tablelands, Nandewar, Brigalow Belt South, South Eastern Highlands, Darling Riverine Plains, South Western Slopes and Sydney Basin

Prescription

Where there is an eastern pygmy-possum record within the area of forest operations, the following must apply:

- (a) An exclusion zone with a 50-metre radius (about 0.8 hectares) must be identified, centred on the location of the record, with no forestry operations or removal of understorey plants permitted.
- (b) Within a 100-metre radius (about 3.5 hectares) of the exclusion zone, a buffer zone must be identified within which the following additional prescriptions must be implemented:
 - (i) Only single-tree selection and thinning operations can occur (i.e. no canopy openings).
 - (ii) Single-tree selection and thinning operations must not reduce the stand basal area below 12m²/hectare.
 - (iii) A minimum of 26 trees with visible hollows must be retained where available.
 - (iv) Disturbance to understorey trees and shrubs (particularly banksias, bottlebrush and acacias), ground logs, rocks and litter must be minimised.
 - (v) coarse woody debris must be retained where practicable

Additional information

Potential eastern pygmy-possum habitat is found in a broad range of habitats including rainforest, sclerophyll (including box-ironbark) forest, woodland and heath. In most areas, woodlands and heath appear to be preferred, except in north-eastern NSW where they are most frequently encountered in rainforest.

Hastings River mouse (*Pseudomys oralis*)

Zones for application of prescription

NSW North Coast, South East Queensland, New England Tablelands

Prescription

Where there is a Hastings River mouse record within the area of forestry operations or within 200 metres of the area of forest operations, the following must apply:

- (a) An exclusion zone with a 200-metre radius (about 12.5 hectares) must be identified, centred on the location of the record, within which the following additional prescriptions must be implemented:
 - (i) No forestry operations or removal of understorey plants or groundcover are permitted.
 - (ii) No post-harvest burning is permitted.
 - (iii) Disturbance to any seepage areas within or adjacent to the exclusion zone, as well as to ground logs, rocks and litter, must be minimised.

Additional information

Potential Hastings River mouse habitat includes a variety of dry open forest types with dense, low ground cover and a diverse mixture of ferns, grass, sedges and herbs. Access to seepage zones, creeks and gullies is important, as is permanent shelter such as rocky outcrops. Habitat is usually found at elevations between 500 and 1100 metres.

Spotted-tailed quoll (*Dasyurus maculatus*)

Zones for application of prescription

NSW North Coast, South East Queensland, New England Tablelands, Nandewar, Brigalow Belt South, South Eastern Highlands, Darling Riverine Plains, South Western Slopes and Sydney Basin

Prescription

Where there is a record of a spotted-tailed quoll den site, maternal den or latrine site within the area of forest operations, the following must apply:

- (a) An exclusion zone with a 200-metre radius (about 12.5 hectares), centred on the location of the record, must be implemented around a spotted-tailed quoll maternal den site or latrine site. This exclusion area must be linked to riparian exclusion zones where practicable.
- (b) An exclusion zone with a 100-metre radius (about 3.5 hectares), centred on the location of the record, must be implemented around spotted-tailed quoll den sites. This exclusion zone must be linked to riparian exclusion zones where practicable.
- (c) Areas of riparian exclusion and protection zone must not be counted towards exclusion zones for the spotted-tailed quoll.

Squirrel glider (*Petaurus norfolcensis*)

Zones for application of prescription

NSW North Coast, South East Queensland, New England Tablelands, Nandewar, Brigalow Belt South, South Eastern Highlands, Darling Riverine Plains, South Western Slopes and Sydney Basin

Prescription

Where there is a squirrel glider record in an area of forest operations, the following must apply:

- (a) A buffer zone with a 250-metre radius (about 20 hectares) must be identified, centred on the location of the record or records.
- (b) Within this buffer zone, the following additional prescriptions must be implemented:
 - (i) A minimum of 15 trees per 2 hectares with visible hollows must be retained where available.
 - (ii) A recruitment tree must be retained for each hollow bearing tree retained. Where the total number of hollow bearing trees and recruitment trees is less than 30 trees per 2 hectares, additional recruitment trees must be retained to bring the number up to 30 trees per 2 hectares.
 - (iii) Disturbance to understorey trees and shrubs (particularly banksias and acacias), ground logs, rocks and litter must be minimised.
- (c) Where there are records of dens or roosts, these must be contained within buffer zones encompassing suitable habitat.
- (d) Where there are more than two squirrel glider records closer than 250 metres apart within the forest operation area, advice on the location of the buffer area must be sought from EES before commencing forest operations.

Additional information

Squirrel glider habitat is generally dry eucalypt forest and woodland. In coastal areas, potential habitat is blackbutt, bloodwood and ironbark forest with a heathy understorey. In the absence of these forest types, areas of mature or old growth forest must be retained.

Yellow-bellied glider (*Petaurus australis*)

Zones for application of prescription

NSW North Coast, South East Queensland, New England Tablelands, Nandewar, Brigalow Belt South, South Eastern Highlands, Darling Riverine Plains, South Western Slopes and Sydney Basin

Prescription

- (a) An exclusion zone with a 50-metre radius must be implemented around yellow-bellied gliders dens.
- (b) All sap feed trees must be retained and marked for retention. A sap feed tree is a tree with recent V-notch incisions or other incisions made by a glider. Recent incisions are incisions that have not closed.
- (c) The feed trees retained as above must be of the same species as the identified sap feed tree or identified den tree, or should be trees that shed their bark in long strips, e.g. species from blue, flooded, grey, red and white gum groups.
- (d) The retained feed trees must be marked for retention.

Additional information

Yellow-bellied gliders occur in tall mature eucalypt forest, generally in areas with high rainfall and nutrient-rich soils. Forest type preferences vary with latitude and elevation: mixed coastal forests to dry escarpment forests in the north, and moist coastal gullies and creek flats to tall montane forests in the south. The gliders feed primarily on plant and insect exudates, including nectar, sap, honeydew and manna with pollen and insects providing protein. They extract sap by incising or biting into the trunks and branches of favoured food trees, often leaving a distinctive 'V'-shaped scar.

Greater glider (*Petauroides volans*)

Zones for application of prescription

NSW North Coast, South East Queensland, New England Tablelands, Nandewar, Brigalow Belt South, South Eastern Highlands, Darling Riverine Plains, South Western Slopes and Sydney Basin

Prescription

No forestry operations are permitted within 50 metres of each greater glider den site.

Additional information

Greater gliders occur in woodlands and eucalypt forests along the ranges and coastal plains of NSW, favouring tall, montane, and moist forests with a diversity of eucalypt species, relatively old trees and abundant hollows. They tend to occupy a relatively small home range, between 1 to 4 hectares, though this range becomes larger in lower productivity forests and more open woodlands. Greater gliders shelter during the day in hollows of large trees, which may be lined with leaf matter, and typically use between 2 to 18 hollows in their home range. They are usually solitary, though mated pairs and offspring will share a den during the breeding season and until the young are independent.

Long-nosed potoroo (*Potorous tridactylus*)

Zones for application of prescription

NSW North Coast, South East Queensland

Prescription

Where there is a record of a long-nosed potoroo in an area of forest operations, the following must apply:

- (a) Forestry operations must be excluded from a 5-metre radius buffer around 12 retained trees per 2 hectares. These 12 trees can include trees retained under other prescriptions.
- (b) No post-harvest burning is permitted within or adjacent to the 5-metre radius buffers identified in point (a) above.

Additional information

The long-nosed potoroo inhabits coastal heaths, and dry and wet sclerophyll forests. Dense understorey with occasional open areas is an essential part of habitat and may consist of grass-trees, sedges, ferns or heath, or of low shrubs of tea-trees or melaleucas. A sandy loam soil is also common. The fruit-bodies of hypogeous (underground-fruited) fungi are a large component of the diet of the long-nosed potoroo.

Koala (*Phascolarctos cinereus*)

Prescription

- (a) Where there is a record of a koala within the area of forestry operations, or within 500 metres of an area of forestry operations, or where 10 or more koala scats (or one or more koala scats in the Central and Southern Tablelands and South Coast Koala Management Areas (KMA)) are found beneath the canopy of a primary or secondary koala feed tree during pre-harvest surveys or harvest operations, or within areas mapped under the PNF koala prescription map as shown in Figures 6-7, the following must apply:
- (i) A minimum of 15 primary koala feed trees and 5 secondary koala feed trees must be retained per hectare in the forestry operations area (not including other exclusion or buffer zones), where available.
 - (ii) Where possible, preference should be given to trees that provide habitat connectivity and/or build on existing landscape features (Table B), existing habitat islands, refugia and conservation areas adjacent to and within the PNF Plan area, have leafy, broad crowns and be in a range of size classes with a minimum of 20 centimetres diameter at breast height over bark.
 - (iii) Damage to retained trees must be minimised by directional felling techniques.
 - (iv) Post-harvest burns must minimise damage to the trunks and foliage of retained trees.
 - (v) Each tree must be visually assessed for koalas immediately prior to it being felled.
 - (vi) Where 20 koala feed trees per hectare are present in areas mapped under the PNF koala prescription map but either 15 primary or 5 secondary feed trees for the relevant KMA cannot be met, then the landholder must retain as many koala feed trees as are available, including substituting primary feed trees for secondary (or vice versa) up to a maximum of 20 koala feed trees per hectare. Primary feed trees are to be prioritised for retention over secondary feed trees.
 - (vii) Where there are not 20 koala feed trees per hectare present in areas mapped under the PNF koala prescription map then conditions (a) (i)-(iv) and (a) (vi) do not apply but the landholder(s) must retain as many koala feed trees as are available. However, if in the course of harvest operations 10 or more koala scats are found beneath the canopy of a koala feed tree (or one or more koala scats in Central and Southern Tablelands and South Coast KMAs) or where the presence of a koala is clearly identifiable by recent scratches, the landholder must also reinstate conditions (a) (ii) – (v). These areas will remain part of the PNF koala prescription map unless surveyed consistent with (viii).
 - (viii) Where the landholder considers the PNF koala prescription map is inaccurate on their property, including where the required number of koala feed trees cannot be found (as per koala prescription clause vi-vii), the landholder may request that the area(s) is verified by a suitably qualified expert(s) as described in Note 9.

- b) Any tree containing a koala, or any tree beneath which 10 or more koala scats are found (or one or more koala scats in Central and Southern Tablelands and South Coast Koala Management Areas), or where the presence of a koala is clearly identifiable by recent scratches must be retained, and an exclusion zone of 20 metres (50 metres in Central and Southern Tablelands Koala Management Area) must be implemented around each retained tree.
- (i) Where signs of koala presence outlined in (b) are identified during pre-harvest surveys, those trees must be visually assessed for koala presence during harvest operations.

Note 8: Landholders will be provided with the PNF koala prescription mapping held by the NSW Government as part of their PNF Plan approval. Updates to this map will be overseen by the NSW Forest Monitoring Steering Committee (or equivalent) independently chaired by the NSW Natural Resources Commission. Notwithstanding this the PNF koala prescription map may be updated at a property scale consistent with Note 9.

Note 9: Verifying areas mapped as highly suitable koala habitat on private land

Where the landholder(s) consider the mapping of koala habitat is inaccurate, and/or where the required number of koala feed trees cannot be found (as per Koala Prescription Clause (a)(vi)), the landholder may commission a review be undertaken by a suitably qualified expert(s).

The koala habitat suitability of the area must be reassessed based on an on-ground koala habitat verification survey conducted by a suitably qualified expert(s). The landholder(s) will need to identify the disputed area and provide their written permission for a habitat verification survey to be conducted.

The survey must be conducted in accordance with the protocol available at www.lfs.nsw.gov.au/pnforestry.

Depending on the results of the assessment, Local Land Services will provide the landholder(s) with:

- (a) an amended map to show any revised areas of highly suitable koala habitat, or
(b) the original map, showing the highly suitable koala habitat areas mapped before the review.

Where the survey has determined that the disputed area is not highly suitable koala habitat, Local Land Services will approve an amendment to the Private Native Forestry Plan and an amended Forest Management Plan or Forest Stewardship Plan to apply the revised highly suitable koala habitat mapping.

Trees with koalas present that are identified during surveys must be marked and this information provided to the landholder(s) by Local Land Services prior to forestry operations commencing.

Additional information

Generally, koala habitat comprises eucalypt forest and woodland containing primary and secondary food trees (see Table H). Koala droppings (scats) have a strong eucalyptus odour, are pale green in colour with faint or clear ridges and/or vertical stripes, have a moist mucus coating and bullet shaped appearance. For further information on the identification of koala scats, contact DPE or refer to the DPE website – <https://www.environment.nsw.gov.au/>

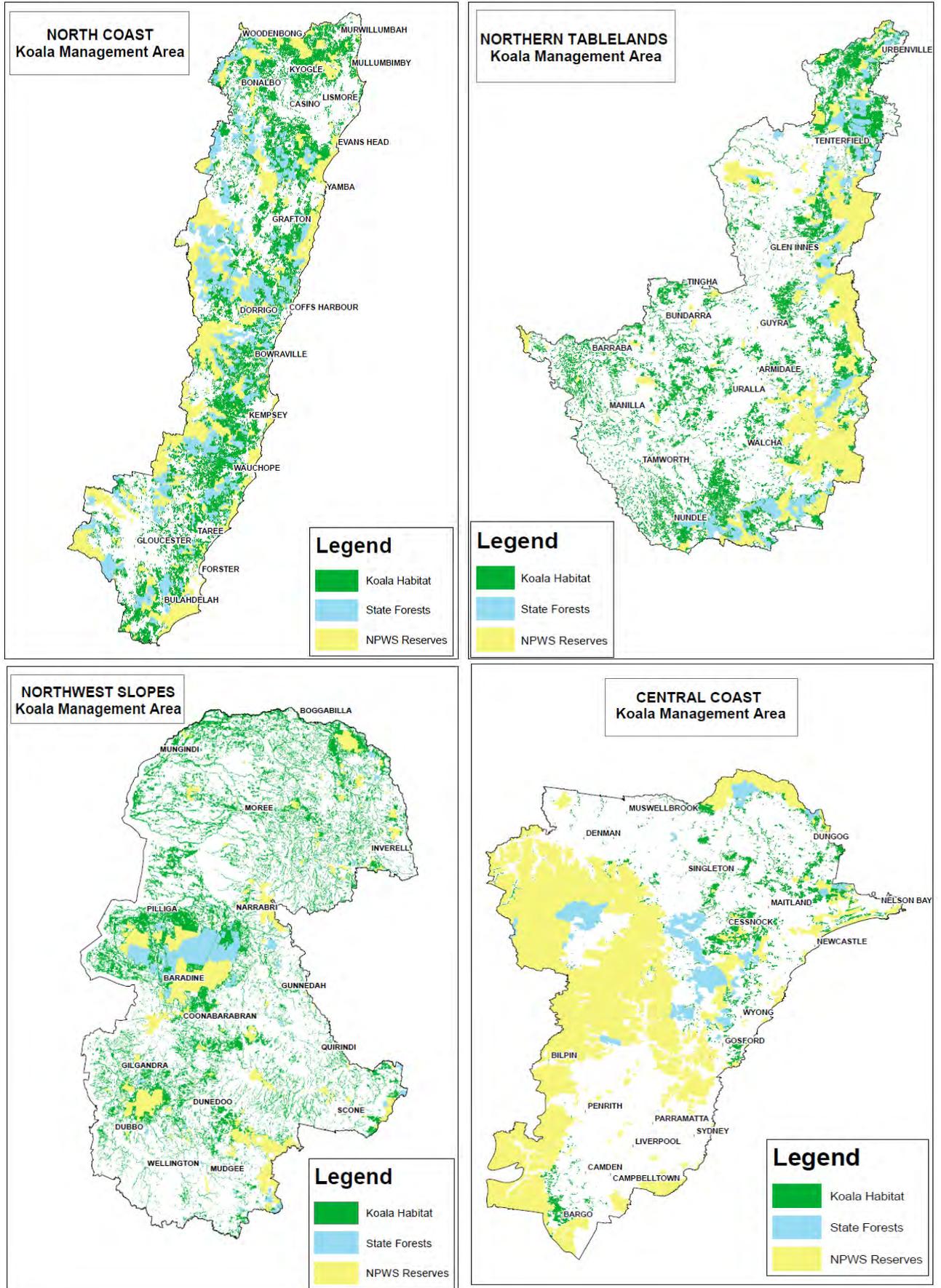


Figure 6: PNF koala prescription map (green) in North Coast (top left), Northern Tablelands (top right), Northwest Slopes (bottom left) and Central Coast (bottom right) Koala Management Areas.

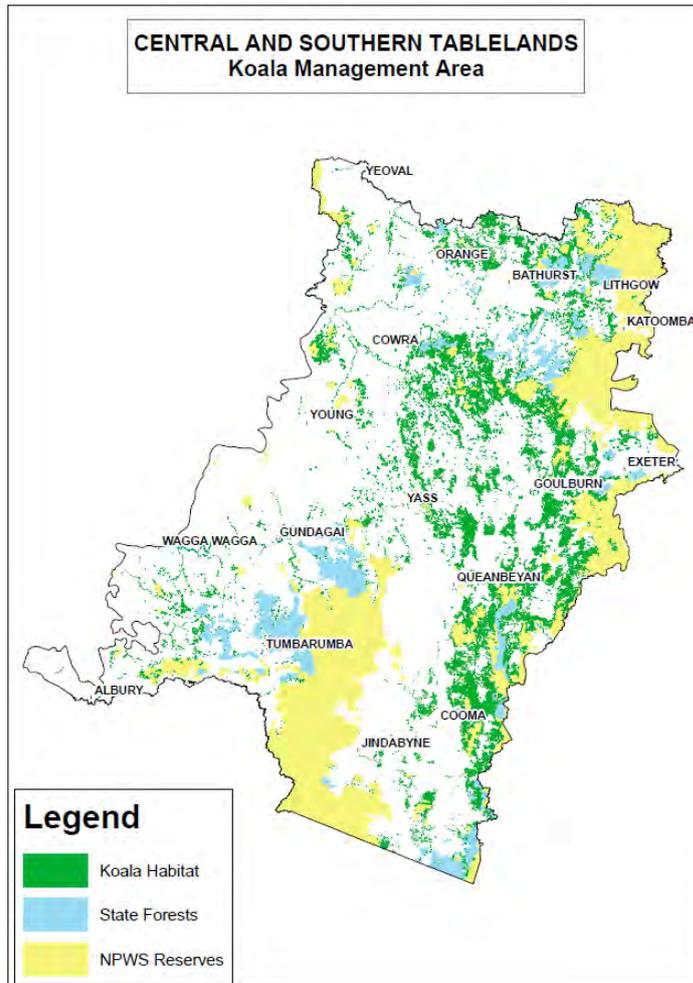


Figure 7: PNF koala prescription map (green) in Central and Southern Tablelands Koala Management Area.

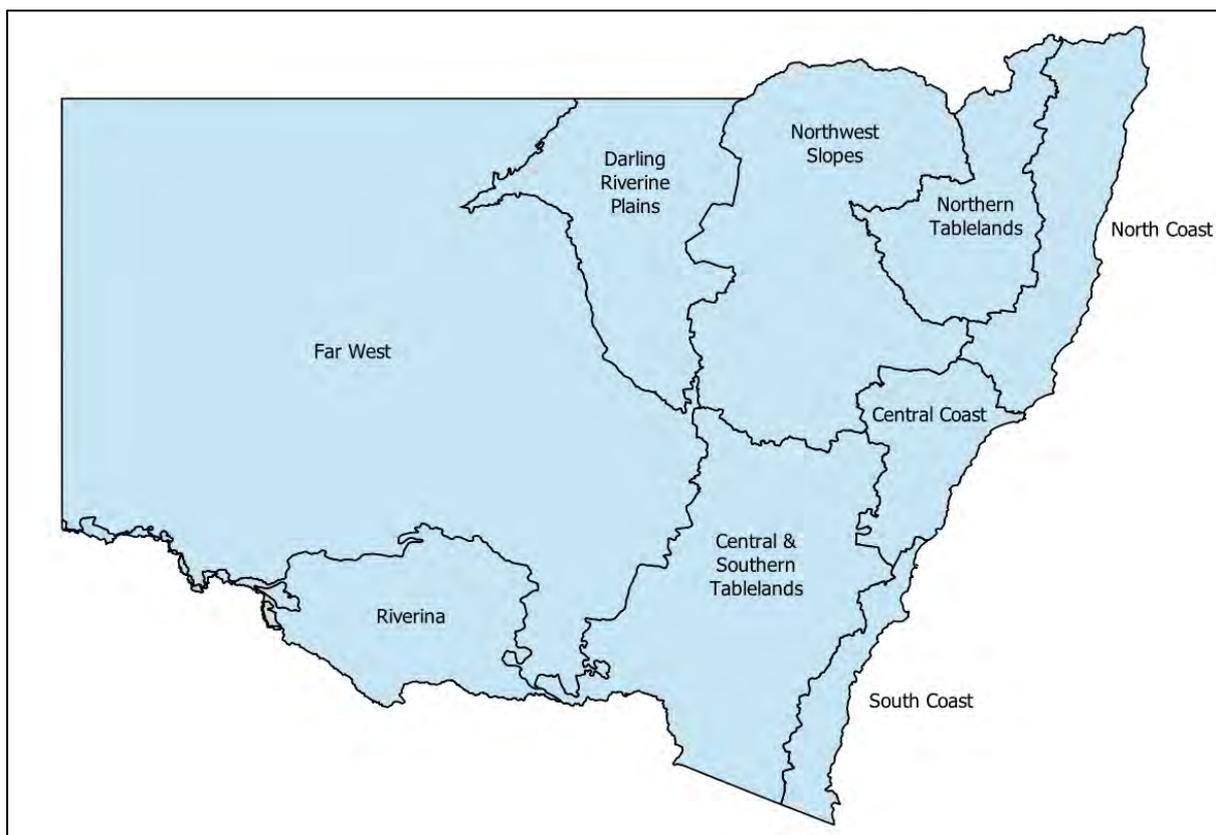


Figure 8: Koala Management Areas in NSW

Table H: Primary and secondary koala feed trees for Koala Management Areas in the Northern PNF Code areas

Koala feed tree species		Koala Management Area				
Common name	Scientific name	North Coast	Central Coast	Northern Tablelands	Central and Southern Tablelands	North West Slopes
Primary tree species						
Blakley's red gum	<i>Eucalyptus blakelyi</i>			X	X	X
River red gum	<i>Eucalyptus camaldulensis</i>			X	X	X
Coolibah	<i>Eucalyptus coolabah</i>					X
White stringybark	<i>Eucalyptus globoidea</i>		X			
Craven grey box	<i>Eucalyptus largeana</i>	X	X			
Brittle gum	<i>Eucalyptus mannifera</i>				X	
Tallowwood	<i>Eucalyptus microcorys</i>	X	X	X		
Parramatta red gum	<i>Eucalyptus parramattensis</i>		X			
Grey gum	<i>Eucalyptus punctata</i>		X		X	
Swamp mahogany	<i>Eucalyptus robusta</i>	X	X			
Inland scribbly gum	<i>Eucalyptus rossii</i>				X	
Forest red gum	<i>Eucalyptus tereticornis</i>	X	X	X	X	
Ribbon gum	<i>Eucalyptus viminalis</i>			X	X	

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Koala feed tree species		Koala Management Area				
Common name	Scientific name	North Coast	Central Coast	Northern Tablelands	Central and Southern Tablelands	North West Slopes
Secondary tree species						
Wattle leaved peppermint	<i>Eucalyptus acaciiformis</i>			X		
White box	<i>Eucalyptus albens</i>		X	X	X	X
Cabbage gum	<i>Eucalyptus amplifolia</i>	X	X			
Orange gum	<i>Eucalyptus bancroftii</i>	X				
Beyer's ironbark	<i>Eucalyptus beyeriana</i>		X			
Grey gum	<i>Eucalyptus biturbinata</i>	X				
Blakley's red gum	<i>Eucalyptus blakelyi</i>		X			
Coastal grey box	<i>Eucalyptus bosistoana</i>		X			
Apple box	<i>Eucalyptus bridgesiana</i>			X		
Mountain blue gum	<i>Eucalyptus brunnea</i>			X		
Broad-leaved stringybark	<i>Eucalyptus caliginosa</i>			X		
Large-fruited grey gum	<i>Eucalyptus canaliculata</i>	X				
Dirty gum	<i>Eucalyptus chloroclada</i>					X
Mountain grey gum	<i>Eucalyptus cypellocarpa</i>		X		X	
Mountain gum	<i>Eucalyptus dalrympleana</i>			X		
Tumbledown red gum	<i>Eucalyptus dealbata</i>			X		X
Broad-leaved peppermint	<i>Eucalyptus dives</i>				X	
Slaty red gum	<i>Eucalyptus glaucina</i>	X				
White stringybark	<i>Eucalyptus globoidea</i>	X			X	
Flooded gum	<i>Eucalyptus grandis</i>	X				
Silver-top stringybark	<i>Eucalyptus laevopinea</i>	X		X		
Black box	<i>Eucalyptus largiflorens</i>					X
Woolybutt	<i>Eucalyptus longifolia</i>		X			
Red stringybark	<i>Eucalyptus macrorhyncha</i>			X	X	
Brittle gum	<i>Eucalyptus mannifera</i>		X			
Silver-leafed ironbark	<i>Eucalyptus melanophloia</i>					X
Yellow box	<i>Eucalyptus melliodora</i>		X	X		X
Western grey box	<i>Eucalyptus microcarpa</i>				X	X
Grey box	<i>Eucalyptus moluccana</i>	X	X	X		X
Narrow-leaved black peppermint	<i>Eucalyptus nicholii</i>			X		
Giant white gum	<i>Eucalyptus nobilis</i>			X		
Grey ironbark	<i>Eucalyptus paniculata</i>		X			
Snow gum	<i>Eucalyptus pauciflora</i>			X	X	X

Koala feed tree species		Koala Management Area				
Common name	Scientific name	North Coast	Central Coast	Northern Tablelands	Central and Southern Tablelands	North West Slopes
Narrow-leaved grey box	<i>Eucalyptus pilligaensis</i>					X
Sydney peppermint	<i>Eucalyptus piperita</i>				X	
Bimble box	<i>Eucalyptus populnea</i>					X
Orange gum	<i>Eucalyptus prava</i>			X		X
Small-fruited grey gum	<i>Eucalyptus propinqua</i>	X	X			
Grey gum	<i>Eucalyptus punctata</i>					X
White-topped box	<i>Eucalyptus quadrangulata</i>		X			
Narrow-leaved peppermint	<i>Eucalyptus radiata</i>			X		
Red mahogany	<i>Eucalyptus resinifera</i>	X				
Sydney blue gum	<i>Eucalyptus saligna</i>	X				
Hard-leaved scribbly gum	<i>Eucalyptus sclerophylla</i>				X	
Narrow-leaved red gum	<i>Eucalyptus seeana</i>	X				
Black sally	<i>Eucalyptus stellulata</i>			X		
Tindale's stringybark	<i>Eucalyptus tindaliae</i>	X				
Ribbon gum	<i>Eucalyptus viminalis</i>		X			
Youman's stringybark	<i>Eucalyptus youmanii</i>			X		

Grey-headed flying-fox (*Pteropus poliocephalus*) camps

Zones for application of prescription

NSW North Coast, South East Queensland, New England Tablelands, Nandewar, Brigalow Belt South, South Eastern Highlands, Darling Riverine Plains, South Western Slopes and Sydney Basin

Prescription

- (a) Forestry operations and any associated activities must be excluded within a flying-fox camp, and within a 50-metre exclusion zone around any camp which contains grey-headed flying-foxes.

Additional information

Flying-foxes congregate (roost) in large numbers known as 'camps'. These areas are typically within 20 kilometres of known food sources, and 'camp' localities vary over different seasons, depending on regional food availability. Camps are often located in riparian vegetation such as rainforest remnants, swamp forest (paperbarks) or casuarina forests. They are often used annually. Camps are extremely important for day-time roosting and socialising and are used as maternity sites for rearing young.

Common blossom-bat (*Syconycteris australis*)

Zones for application of prescription

NSW North Coast, South East Queensland

Prescription

In areas of common blossom-bat potential habitat (i.e. wet sclerophyll and swamp sclerophyll forest within 30 kilometres of the coast), at least 75% of mature individuals of each species of coast banksia (*Banksia integrifolia* or *Banksia serrata*), broad-leaved paperbark (*Melaleuca quinquenervia*), silky oak (*Grevillea robusta*), white bottlebrush (*Callistemon viminalis*) and swamp mahogany (*Eucalyptus robusta*) in the net harvestable area must be protected from damage from forestry operations activities. During forestry operations activities, the potential for damage to these trees must be minimised by using directional felling techniques.

Additional information

The common blossom-bat feeds on winter-flowering species such as those species listed in the above paragraph.

Reptiles

Broad-headed snake (*Hoplocephalus bungaroides*)

Zones for application of prescription

NSW North Coast, South Eastern Highlands, NSW South Western Slopes Sydney Basin

Prescription

Where there is a broad-headed snake record in the area of forestry operations, the following must apply:

- (a) A buffer zone with a 100-metre radius (about 3 hectares) must be identified, centred on the location of the record.
- (b) Within this buffer zone, the following additional prescriptions must be implemented:
 - (i) A minimum of 26 trees with visible hollows with openings greater than 10 centimetres must be retained where available.
 - (ii) Disturbance to understorey trees and shrubs, ground logs and, in particular, rock outcrops and ledges must be minimised.

Additional information

Potential habitat for the broad-headed snake is largely confined to Triassic sandstones, including the Hawkesbury, Narellan and Shoalhaven formations on the coast and in the ranges, in an area within approximately 250 kilometres of Sydney. The snake shelters in rock crevices and under flat sandstone rocks on exposed cliff edges during autumn, winter and spring, and shelters in hollows in large trees within 200 metres of escarpments in summer.

Rosenberg's goanna (*Varanus rosenbergi*)

Zones for application of prescription

NSW North Coast, South Eastern Highlands, NSW South Western Slopes Sydney Basin

Prescription

Where there is a Rosenberg's goanna record in the area of forestry operations, the following must apply:

- (a) A buffer zone with a 200-metre radius (about 12.5 hectares) must be identified, centred on the location of the record.
- (b) Within this buffer zone, the following additional prescriptions must be implemented:
 - (i) All termite mounds must be protected from any disturbance.
 - (ii) Disturbance to understorey trees and shrubs and, in particular, ground logs and rock outcrops and ledges must be minimised.
 - (iii) No post-harvest burning is permitted.

Additional information

Rosenberg's goanna occurs on Sydney sandstone in Wollemi National Park north-west of Sydney, in the Goulburn and ACT regions and near Cooma in the south. There are records from the south-west slopes near Khancoban and the Tooma River. It is found in heath, open forest and woodland. This species nests in termite mounds, which are a critical component of its habitat.

White-crowned snake (*Cacophis harriettae*)

Zones for application of prescription

NSW North Coast and South Eastern Queensland

Prescription

Where there is a record of a white-crowned snake in an area of forestry operations, coarse woody debris within 200 metres of the record must be retained where practicable.

Additional information

Distribution: The snake has a patchy distribution in NSW from Forster to the Queensland border, west to Urbenville.

Macrohabitat: The snake has been recorded in a range of habitats: wet sclerophyll, heathlands, open forest, woodland, dry eucalypt forest, coastal stringybark forest, rainforest and wet sclerophyll forest. Low elevation sclerophyll forests are favoured in northern NSW.

Microhabitat: The snake shelters during the day under logs, leaf litter and rocks.

Pale-headed snake (*Hoplocephalus bitorquatus*)

Zones for application of prescription

NSW North Coast, South East Queensland, New England Tablelands, Nandewar, Brigalow Belt South, South Eastern Highlands, Darling Riverine Plains, South Western Slopes and Sydney Basin

Prescription

Where there is a record of the pale-headed snake in an area of forestry operations, the following must apply:

- (a) An exclusion zone with at least a 100-metre radius must be implemented around the location of the record.
- (b) If forestry operations are being conducted during the months of May, June, July, August or September, an additional 200 metre-wide buffer zone must be implemented around the exclusion zone. Within this buffer zone, the following must apply:
 - (i) A minimum of 26 trees with visible hollows with openings greater than 10 centimetres must be retained where available.
 - (ii) All dead standing trees must be retained where it is safe to do so.
 - (iii) During forest operations, the potential for damage to these trees must be minimised by the use of directional felling techniques.
 - (iv) Coarse woody debris must be retained where practicable

Additional information

Distribution: The snake has a patchy distribution from north-eastern NSW to north Queensland. It is found in NSW on both sides of the Great Dividing Range as far south as Tuggerah.

Macrohabitat: The snake is mainly found in dry eucalypt forests and woodlands and occasionally in rainforest or moist eucalypt forest.

Microhabitat: The snake shelters during the day between loose bark and tree trunks, or in hollow trunks and limbs of dead trees, especially near watercourses.

Birds

Rufous scrub-bird (*Atrichornis rufescens*)

Zones for application of prescription

NSW North Coast, South Eastern Highlands, NSW South Western Slopes Sydney Basin

Prescription

If there is a record of a rufous scrub-bird in an area of forestry operations, the following must apply:

- (a) An exclusion zone must be implemented which encompasses all rufous scrub-bird microhabitat (as defined below) within 300 metres of the location of the record.
- (b) An additional exclusion zone at least 20 metres wide must be implemented around all microhabitat referred to below.

Additional information

Distribution: Rufous scrub-birds occur in rainforest and wet sclerophyll forest at higher elevations. There are considered to be five major habitat refuges: Barrington Tops, Werrikimbe–Mt Boss, New England–Killiekrankie Mountain, Gibraltar Range and Border Ranges.

Microhabitat: Potential rufous scrub-bird habitat is defined as areas of rainforest and/or wet sclerophyll forest that are one hectare or greater in size, and contain extremely dense cover between 2 and 50 centimetres above the ground and moderate cover between 50 and 100 centimetres above the ground. The cover may consist of living or non-living plant material or both. These areas generally have a moist ground level microclimate and abundant leaf litter. Rainforest and some wet sclerophyll areas meeting this description often have dense vines in the lower stratum. In some wet sclerophyll forest dense fern cover creates this arrangement. Areas of rufous scrub-bird micro-habitat are not readily traversed on foot.

Albert's lyrebird (*Menura alberti*)

Zones for application of prescription

NSW North Coast and South Eastern Queensland

Prescription

Where there is an Albert's lyrebird record within an area of forestry operations, the following must apply:

- (a) An exclusion zone of 25 metres applies to all Albert's lyrebirds nests
- (b) An exclusion zone at least 20 metres wide must be implemented on both sides of all first-order streams (see Figure 1) within 300 metres of the location of the record.
- (c) An exclusion zone at least 30 metres wide must be implemented on both sides of all second-order streams (see Figure 1) within 300 metres of the location of the record.
- (d) The width of these exclusion zones must be measured from the top of the bank of the incised channel or, where there is no defined bank, from the edge of the channel.
- (e) Logging and snigging are prohibited in these exclusion zones (road construction and road re-opening are permitted only where there is no other practical means of access).

Additional information

Habitat: The bird lives in mixed rainforest and wet open forest, which is frequently dominated by brush box. In winter, birds commonly forage in moist forest on ridges between wetter forests.

Distribution of Albert's lyrebird is limited to areas of rainforest and wet sclerophyll forest, frequently dominated by brush box, with rainforest understorey in the Richmond-Tweed and Woodenbong sub-catchments of the Northern Rivers. In winter, the birds commonly forage in moist forest on ridges between wetter forests.

Nesting: Albert's lyrebird builds a dome-shaped nest of sticks lined with ferns, feathers, moss, and rootlets beneath the canopy, usually in the darkest areas of the forest. Nests are often located in rocky areas, usually on ledges, in clefts or between rocks, in caves, on rock or cliff-faces, in deep rocky ravines, and sometimes near waterfalls. Nests may also be placed in other sites, including on the ground on steep slopes, on creek banks, between the buttress roots of fig trees, amongst tree stumps, at the base of palm trees, amongst ferns, in dense shrubs, or occasionally in tree forks.

Marbled frogmouth (*Podargus ocellatus*)

Zones for application of prescription

NSW North Coast and South Eastern Queensland

Prescription

Where there is a record of a marbled frogmouth within an area of forestry operations, the following must apply:

- (a) An exclusion zone at least 20 metres wide must be implemented on both sides of all first-order streams (see Figure 1) in the area to be logged.
- (b) An exclusion zone at least 30 metres wide must be implemented on both sides of all second-order streams (see Figure 1) in the area to be logged.
- (c) The width of these exclusion zones must be measured from the top of the bank of the incised channel or, where there is no defined bank, from the edge of the channel.
- (d) Logging and snagging are prohibited in these exclusion zones (road construction and road re-opening are permitted only where there is no other practical means of access).

Additional information

Habitat: The bird lives in mixed rainforest and wet open forest.

Powerful owl (*Ninox strenua*), masked owl (*Tyto novaehollandiae*), sooty owl (*Tyto tenebricosa*) and barking owl (*Ninox connivens*)

Zones for application of prescription

Border Rivers–Gwydir, Central West, Hawkesbury–Nepean, Hunter–Central Rivers, Namoi, Northern Rivers and Sydney Metro

Prescription

Where there is a record within the area of forestry operations for the powerful owl, masked owl, sooty owl or barking owl, the following prescriptions apply:

- (a) Nest trees (trees with hollows containing a nest of a powerful, masked, sooty or barking owl) must be retained and protected by a 50-metre exclusion zone.
- (b) Roost trees (trees where a powerful, masked, sooty or barking owl have been observed roosting or signs of roosting are observed) must be retained and protected by a 25-metre exclusion zone.
- (c) Within 1000 metres of the record, the following additional prescriptions must be implemented:
 - i. a minimum of 15 hollow bearing trees per two hectares must be retained, where available.
 - ii. a recruitment tree must be retained for each hollow bearing tree, where available.
 - iii. where there are not 15 hollow bearing trees available recruitment trees must be substituted for hollow bearing trees up to a maximum of 30 trees per two hectares, where available.

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- iv. Disturbance to the understorey, coarse woody debris and ground cover should be limited to the minimum extent necessary.

Additional information

Potential owl habitat comprises rainforest, wet and dry sclerophyll forest, and woodland.

Regent honeyeater (*Xanthomyza phrygia*)

Zones for application of prescription

NSW North Coast, South East Queensland, New England Tablelands, Nandewar, Brigalow Belt South, South Eastern Highlands, Darling Riverine Plains, South Western Slopes and Sydney Basin

Prescription

Where there is a record of a regent honeyeater in an area of forestry operations, the following must apply:

- (a) At least ten eucalypt feed trees (refer to Table D) must be retained within every two hectares of the net harvest area. These must be marked for retention. Where retained eucalypt feed trees also meet the requirements of habitat or recruitment trees, the retained eucalypt feed trees can be counted as habitat or recruitment trees.
- (b) Where a regent honeyeater is observed feeding, the tree in which it is feeding must be retained.
- (c) Trees containing regent honeyeater nests must be retained, with a 20-metre radius exclusion zone around them.

Additional information

This species inhabits dry open forest and woodland, particularly box–ironbark woodland and riparian forests of river she-oak. Regent honeyeaters inhabit woodlands that support a significantly high abundance and richness of bird species. These woodlands have many mature trees and mistletoes and high canopy cover. The bird also forages in winter-flowering coastal swamp mahogany and spotted gum forests on the central coast and the upper north coast. These birds are also occasionally seen on the south coast.

Swift parrot (*Lathamus discolor*)

Zones for application of prescription

NSW North Coast, South East Queensland, New England Tablelands, Nandewar, Brigalow Belt South, South Eastern Highlands, Darling Riverine Plains, South Western Slopes and Sydney Basin

Prescription

Where there is a record of a swift parrot in an area of forestry operations, the following must apply:

- (a) An exclusion zone of 25 metres applies to all swift parrot roost trees
- (b) At least ten eucalypt feed trees (refer to Table D) must be retained within every two hectares of the net harvest area. These must be marked for retention. Where retained eucalypt feed trees also meet the requirements of habitat or recruitment trees, the retained eucalypt feed trees can be counted as habitat or recruitment trees.
- (c) Where a swift parrot is observed feeding, the tree in which it is feeding must be retained.

Additional information

Swift parrots migrate to the Australian south-east mainland between March and October. On the mainland, they occur where eucalypts are flowering profusely or where there are abundant lerps (from sap-sucking bugs). Favoured feed trees include winter-flowering species such as swamp mahogany (*Eucalyptus robusta*), spotted gum (*Corymbia maculata*), red bloodwood (*C. gummifera*), mugga ironbark (*E. sideroxylon*) and white box (*E. albens*). Commonly used lerp-infested trees include grey box (*E. microcarpa*), grey box (*E. moluccana*) and blackbutt (*E. pilularis*).

Eastern bristlebird (*Dasyornis brachypterus*)

Zones for application of prescription

These birds are very rare, with fewer than 40 individuals known in northern NSW. The area for the application of the prescription is shown in Figure 9 below.

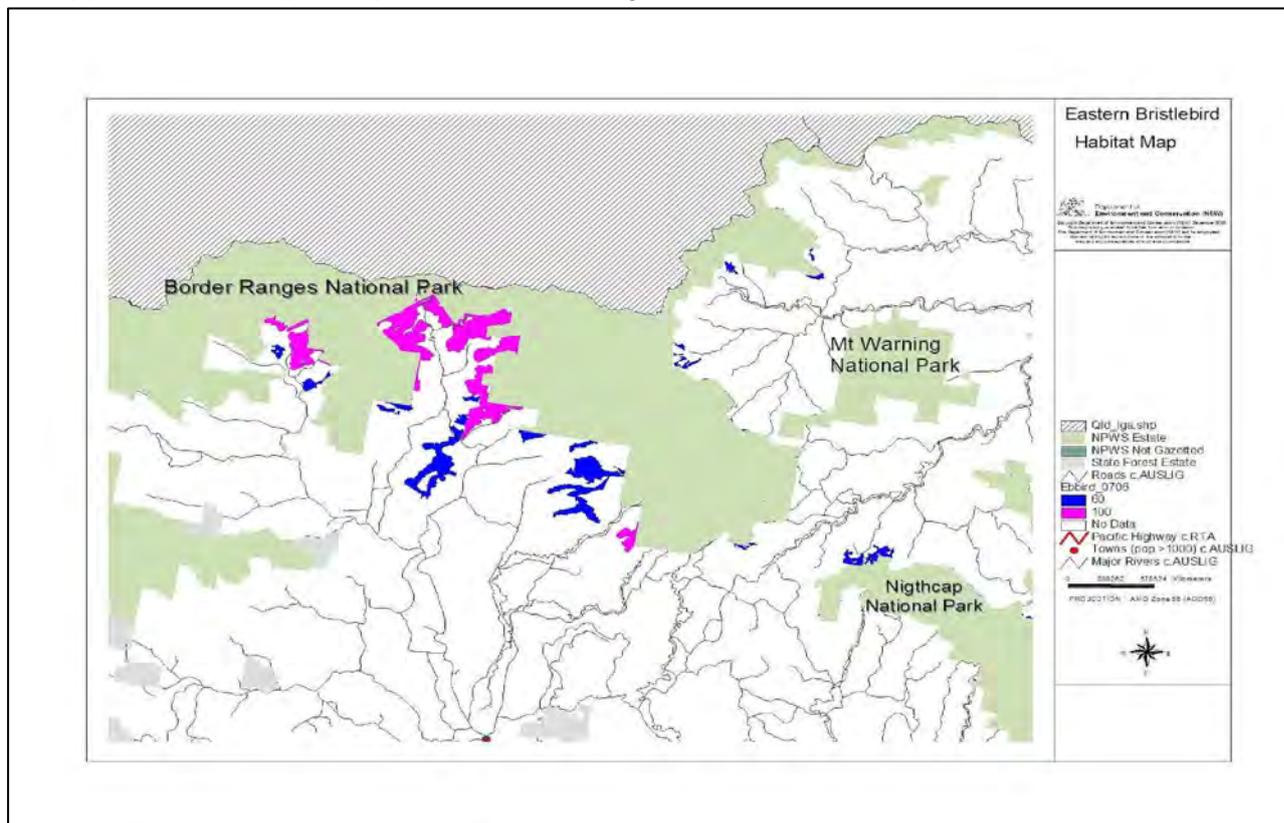


Figure 9: Area of eastern bristlebird prescription application

Prescription

Where there is an eastern bristlebird record within the area of forestry operations, the following must apply:

- (a) A 200-metre radius (about 12.5 hectares) exclusion zone must be identified, centred on the record.
- (b) Additionally, a 150-metre buffer must be identified around the exclusion zone, and within this buffer zone the following prescriptions must be implemented:
 - (i) No forestry operation can be undertaken within the breeding season between 1 August and 1 February in any year.
 - (ii) Disturbance to understorey trees and shrubs and, in particular, ground cover and litter must be minimised.

Additional information

Eastern bristlebird habitat is characterised by dense, low vegetation including open woodland and open forest (montane open forest) with tussocky grass understorey; all these vegetation types are fire-prone. The age of the habitat since fires (fire-age) is of paramount importance to this species.

Bush stone-curlew (*Burhinus grallarius*)

Zones for application of prescription

All

Prescription

- (a) No forestry operations are permitted within a 50-metre radius of all bush stone-curlew ground nests.
- (b) coarse woody debris within 200 metres of the nest must be retained where practicable

Additional information

Bush stone-curlew nests are found in areas of dry, grassy open forest or woodland and are a small scrape on bare ground, often near a bush or tree or beside a fallen limb. Nest sites can be re-used in consecutive years. Eggs are stone-coloured, blotched dark brown and grey. Nesting season is August through to January.

Glossy black-cockatoo (*Calyptorhynchus lathami*)

Zones for application of prescription

All except for South Western Slopes

Prescription

- (a) There must be a 50-metre-radius exclusion zone around all glossy black-cockatoo nests, within which no forestry operations may occur.
- (b) Within a 200-metre radius of any location of a glossy black-cockatoo record, damage to stands of she-oaks (*Allocasuarina* and *Casuarina* spp.) containing trees more than 3 metres in height and seed cones must be minimised.
- (c) Any she-oaks with evidence of foraging by glossy black-cockatoos (i.e. chewed seed cones under the tree) must be protected.

Additional information

Glossy black-cockatoos nest in tree hollows usually in larger, mature trees. Nest locations are indicative of where a glossy black-cockatoo is seen entering a hollow. Nesting season is from March to August.

The presence of she-oaks (*Allocasuarina* and *Casuarina* spp.) is a key indicator of likely feeding habitat. Mature trees with hollows are required for nesting.

Red-tailed black-cockatoo (*Calyptorhynchus banksii*)

Zones for application of prescription

NSW North Coast, South East Queensland, New England Tablelands, Nandewar, Brigalow Belt South, South Eastern Highlands, Darling Riverine Plains, South Western Slopes and Sydney Basin

Prescription

No forestry operations are permitted within a 50-metre radius of all red-tailed black-cockatoo nests.

Additional information

Red-tailed black-cockatoos nest in tree hollows, usually in larger, mature trees. Nest locations are indicative of where a bird is seen entering a hollow. Nesting season is from March to August.

Red-tailed black-cockatoos are found in a wide variety of habitats. In coastal north-east NSW they have been recorded in dry open forest and areas of mixed rainforest/eucalypt forest.

Gang-gang cockatoo (*Callocephalon fimbriatum*)

Zones for application of prescription

NSW North Coast, South East Queensland, New England Tablelands, Nandewar, Brigalow Belt South, South Eastern Highlands, Darling Riverine Plains, South Western Slopes and Sydney Basin

Prescription

No forestry operations are permitted within a 25-metre radius of all gang-gang cockatoo nests.

Additional information

The gang-gang cockatoo is generally found in tall mountain forests and woodlands (particularly heavily timbered and mature wet sclerophyll forests) in spring and summer, and moves to lower altitudes in drier, more open eucalypt forests and woodlands (particularly box-gum, box-ironbark and dry coastal areas) in autumn and winter. The species favours old growth forest and woodland for nesting and roosting. Nests are located in hollows that are 10 cm in diameter or larger and at least 9 m above the ground in eucalypts.

Brown treecreeper (*Climacteris picumnus*)

Zones for application of prescription

All

Prescription

No forestry operations are permitted within a 25-metre radius of all brown treecreeper nests between 1 June and 31 January.

Additional information

The brown treecreeper occurs in eucalypt woodlands and dry open forest, mainly inhabiting woodlands dominated by stringybarks or other rough-barked eucalypts. Fallen timber is an important habitat component for foraging. This species depends on hollows in standing dead or live trees for nesting, and are generally present at a site year-round.

Speckled warbler (*Chthonicola sagittate*)

Zones for application of prescription

All

Prescription

No forestry operations are permitted within a 25-metre radius of all speckled warbler nests between 1 August and 31 January.

Additional information

The speckled warbler occurs in a range of *Eucalyptus* dominated communities that have a grassy understorey. Pairs occupy a breeding territory of about 10 hectares, with a slightly larger home range outside of the breeding season. They nest in a rounded, domed, roughly built nest of dry grass and strips of bark at the base on a low dense plant, often among fallen branches and other litter.

Diamond firetail (*Stagonopleura guttata*)

Zones for application of prescription

All

Prescription

No forestry operations are permitted within a 25-metre radius of all diamond firetail nests between 1 August and 31 January.

Additional information

The diamond firetail occurs in grassy eucalypt woodlands, but also occurs in open forest, mallee, and grasslands. It is often found in riparian areas, and sometimes in lightly wooded farmland. Nests are globular structures built either in the shrubby understorey or higher up, especially under hawk or raven nests.

Grey-crowned babbler (*Pomatostomus temporalis*)

Zones for application of prescription

All

Prescription

No forestry operations are permitted within a 25-metre radius of all grey-crowned babbler nests.

Additional information

The grey-crowned babbler occurs in open box-gum woodlands on the slopes, box-cypress pine and open box woodlands on alluvial plains, and woodlands on fertile soils in coastal regions. The species builds and maintains several conspicuous, dome-shaped stick nests about the size of a football, which is used as a dormitory for roosting each night. Nests are maintained year-round.

Flame robin (*Petroica phoenicea*)

Zones for application of prescription

All

Prescription

No forestry operations are permitted within a 25-metre radius of all flame robin nests between 1 September and 1 March.

Additional information

The flame robin breeds in spring to late summer, in upland tall moist eucalypt forests and woodlands. Breeding habitat has a ground layer dominated by native grasses and a sparse or dense shrub layer. The flame robin builds nests near the ground in sheltered sites such as shallow cavities in trees, stumps or banks. In winter, the species migrates to drier, more open habitat in dry forests, open woodlands, pastures and native grasslands, and is occasionally seen in heathland or other shrubland.

Scarlet robin (*Petroica boodang*)

Zones for application of prescription

All

Prescription

No forestry operations are permitted within a 25-metre radius of all scarlet robin nests between 1 July and 31 January.

Additional information

The scarlet robin occurs in dry eucalypt forests and woodlands, where logs and fallen timber are important components of its habitat. The species' nest is an open cup made of plant fibres and cobwebs and is built in the fork of a tree more than two metres above the ground.

Hooded robin (*Melanodryas cucullate*)

Zones for application of prescription

All

Prescription

No forestry operations are permitted within a 25-metre radius of all hooded robin nests between 1 July and 30 November.

Additional information

The scarlet robin prefers lightly wooded areas, usually open eucalypt woodland, acacia scrub and mallee, often in or near clearings or open areas. Territories range from around 10 hectares in the breeding season to 30 hectares in the non-breeding season. The species breeds between July and November and often rears several broods. Nest is a small, neat cup of bark and grasses bound with webs, in a tree fork or crevice, from < 1 metre to 5 metres above the ground.

Dusky woodswallow (*Artamus cyanopterus cyanopterus*)

Zones for application of prescription

All

Prescription

No forestry operations are permitted within a 25-metre radius of all dusky woodswallow nests between 1 September and 1 March.

Additional information

Dusky woodswallows inhabit dry, open eucalypt forests and woodland with an open or sparse understorey, but has also been recorded in shrublands, heathlands and occasionally moist forest or rainforest. This species is also found in farmland, usually at the edges of forest or woodland. Nests are open and cup-shaped and occur in a range of sites.

Varied sittella (*Daphoenositta chrysoptera*)

Zones for application of prescription

All

Prescription

No forestry operations are permitted within a 25-metre radius of all varied sittella nests.

Additional information

The varied sittella inhabits eucalypt forests and woodlands, especially those containing rough-barked and mature smooth-barked gums with dead branches, mallee and *Acacia* woodland. Builds a cup-shaped nest of plant fibres and cobwebs in an upright tree fork high in the living tree canopy, and often re-uses the same fork or tree in successive years.

Black-chinned honeyeater (*Melithreptus gularis*)

Zones for application of prescription

All

Prescription

No forestry operations are permitted within a 25-metre radius of all black-chinned honeyeater nests between 1 June and 31 December.

Additional information

The black-chinned honeyeater inhabits dry open forests or woodlands dominated by box and ironbark eucalypts, but also forests of smooth-barked gums, stringybarks, ironbarks, richer sheoaks and tea-trees. The species nests high in the crown of a tree in the uppermost lateral branches, hidden by foliage.

Turquoise parrot (*Neophema pulchella*)

Zones for application of prescription

All except for South Western Slopes

Prescription

No forestry operations are permitted within a 30-metre radius of all turquoise parrot nests.

Additional information

Turquoise parrots occur mainly west of the escarpment on the tablelands and western slopes, but are occasionally found more widely through most of eastern NSW in open woodlands, dry sclerophyll forest and adjacent grasslands. Nests range from 1–20 metres above the ground. They are in hollows in small trees, often dead eucalypts, or in holes or stumps, fence posts or even logs lying on the ground. Nesting season is from August to December and from April to May.

Emu (*Dromaius novaehollandiae*)

Zones for application of prescription

NSW North Coast

Prescription

No forestry operations are permitted within a 100-metre radius of each emu nest.

Additional information

Habitat: Distribution of the North Coast Bioregion and Port Stephens endangered emu population is limited to coastal and near-coastal areas between Evans Head and Red Rock. There is also a small isolated population further west in the Bungawalbin area.

Nesting: Eggs are laid on a platform of grass, twigs, leaves and bark on the ground, often at the base of some vegetation and with clear views from the nest.

Threatened flora – specific prescriptions

Conditions applying to flora species

Table I: Threatened flora: 50-metre exclusion zone, all individuals

Where there is a record of a species to which this condition applies:

- (a) An exclusion zone with at least a 50-metre radius must be implemented around all individuals.
- (b) An exclusion zone at least 50 metres wide must be implemented around all groups of individuals. A group is defined as more than one individual located less than 20 metres apart.

NSW Conservation status*	Scientific name	Common name
EN	<i>Amyema plicatula</i>	Formerly known as <i>A. scandens</i>
EN	<i>Angiopteris evecta</i>	Giant fern
EN	<i>Arthropteris palisotii</i>	Lesser creeping fern
EN	<i>Austromyrtus fragrantissima</i>	Sweet myrtle
VU	<i>Baloghia marmorata</i>	Jointed baloghia
VU	<i>Bertya</i> sp. <i>Cobar-Coolabahopponens</i>	Coolabah bertya
VU	<i>Bosistoa transversa</i>	Yellow satinheart
VU	<i>Cadellia pentastylis</i>	Ooline
EN	<i>Choricarpia subargentea</i>	Giant ironwood
EN	<i>Davidsonia jerseyana</i>	Davidson's plum
EN	<i>Davidsonia johnsonii</i>	Smooth Davidson's plum
EN	<i>Diploglottis campbellii</i>	Small-leafed tamarind
EN	<i>Elaeocarpus</i> sp. 'Rocky Creek'	Minyon quandong
EN	<i>Endiandra floydii</i>	Crystal Creek walnut
VU	<i>Endiandra hayesii</i>	Rusty rose walnut
EN	<i>Endiandra muelleri</i> subsp. <i>bracteata</i>	Green-leaved rose walnut
VU	<i>Floydia praealta</i>	Ball nut
VU	<i>Fontainea australis</i>	Southern fontainea
CR	<i>Fontainea oraria</i>	Coastal fontainea
EN	<i>Grevillea obtusiflora</i> subsp. <i>obtusiflora</i>	<i>Grevillea obtusiflora</i> subsp. <i>obtusiflora</i>
Presumed Extinct	<i>Hypolepis elegans</i>	<i>Hypolepis elegans</i>
EN	<i>Lepidium hyssopifolium</i>	Aromatic peppergrass
EN	<i>Lepidium peregrinum</i>	Wandering peppergrass
EN	<i>Lindsaea fraseri</i>	Fraser's screw fern
EN	<i>Lindsaea incisa</i>	Slender screw fern
EN	<i>Melichrus</i> sp. 'Gibberagee'	Narrow-leaf melichrus
Presumed extinct	<i>Micromelum minutum</i>	<i>Micromelum minutum</i>
EN	<i>Muellerina myrtifolia</i>	Myrtle-leaf mistletoe
CR	<i>Myriophyllum implicatum</i>	<i>Myriophyllum implicatum</i>
EN	<i>Ochrosia moorei</i>	Southern ochrosia

NSW Conservation status*	Scientific name	Common name
VU	<i>Owenia cepiodora</i>	Onion cedar
EN	<i>Prostanthera askania</i>	Cut-leaf mint-bush
EN	<i>Prostanthera junonis</i>	Somersby mint-bush
EN	<i>Randia moorei</i>	Spiny gardenia
EN		Brush sauropus
VU	<i>Sophora fraseri</i>	Brush sophora
VU	<i>Syzygium hodgkinsoniae</i>	Red lilly pilly
VU	<i>Syzygium moorei</i>	Durobby
EN	<i>Triflorensia cameronii</i> <i>Tarenna cameronii</i>	Cameron's tarenna
EN	<i>Tylophora woollsii</i>	Cryptic forest twiner

*CR: Critically endangered; EN: Endangered; VU: Vulnerable

Table J: Threatened and protected flora: 20-metre exclusion zone, all individuals

Where there is a record of a species to which this condition applies:

- (a) An exclusion zone with at least a 20-metre radius must be implemented around all individuals.
- (b) An exclusion zone at least 20 metres wide must be implemented around all groups of individuals. A group is defined as more than one individual located less than 20 metres apart.

NSW Conservation status*	Scientific name	Common name
EN	<i>Acacia acronastes</i>	Pindari wattle
VU	<i>Acacia courtii</i>	North Brother wattle
VU	<i>Acacia macnuttiana</i>	MacNutt's wattle
VU	<i>Acacia pubescens</i>	Downy wattle
EN	<i>Acacia pubifolia</i>	Velvet wattle
VU	<i>Acacia pycnostachya</i>	Bolivia wattle
EN	<i>Angophora exul</i>	Gibraltar rock apple
VU	<i>Angophora inopina</i>	Charmhaven apple
VU	<i>Arthraxon hispidus</i>	Hairy jointgrass
VU	<i>Asperula asthenes</i>	Trailing woodruff
EN	<i>Asterolasia beckersii</i>	Dungowan starbush
EN	<i>Asterolasia elegans</i>	Asterolasia elegans
VU	<i>Boronia granitica</i>	Granite boronia
EN	<i>Caesia parviflora var. minor</i>	Small pale grass-lily
EN	<i>Callitris baileyi</i>	Bailey's cypress pine
VU	<i>Callitris oblonga</i>	Pygmy cypress pine
VU	<i>Corokia whiteana</i>	Corokia – rhyolite
EN	<i>Cyperus aquatilis</i>	Water nutgrass
EN	<i>Dendrocnide moroides</i>	Gympie stinger

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NSW Conservation status*	Scientific name	Common name
EN	<i>Diuris aequalis</i>	Buttercup doubletail
EN	<i>Diuris disposita</i>	Willawarrin doubletail
CR	<i>Diuris flavescens</i>	Pale yellow doubletail
EN	<i>Diuris pedunculata</i>	Small snake orchid
VU	<i>Diuris praecox</i>	Rough double tail
VU	<i>Diuris venosa</i>	Veined doubletail
EN	<i>Drynaria rigidula</i>	Basket fern
VU	<i>Eucalyptus caleyi subsp. ovendenii</i>	Ovenden's ironbark
VU	<i>Eucalyptus camfieldii</i>	Camfield's stringybark
VU	<i>Eucalyptus fracta</i>	Broken back ironbark
VU	<i>Eucalyptus glaucina, (southern population)</i>	Slaty red gum
VU	<i>Eucalyptus nicholii</i>	Narrow-leaved black peppermint
VU	<i>Eucalyptus parramattensis subsp. decadens</i>	Eucalyptus parramattensis subsp. decadens
VU	<i>Eucalyptus pumila</i>	Pokolbn mallee
VU	<i>Eucalyptus rubida subsp. barbigerorum</i>	Blackbutt candlebark
VU	<i>Euphrasia bella</i>	Pretty eyebright
VU	<i>Grevillea banyabba</i>	Banyabba grevillea
EN	<i>Grevillea beadleana</i>	Beadle's grevillea
EN	<i>Grevillea guthrieana</i>	Guthrie's grevillea – Carrai metapopulation
EN	<i>Grevillea masonii</i>	Mason's grevillea
VU	<i>Grevillea scortechinii subsp. sarmentosa</i>	Backwater grevillea
VU	<i>Grevillea shiressii</i>	Grevillea shiressii
VU	<i>Hakea fraseri</i>	Gorge hakea
EN	<i>Harnieria hygrophiloides</i>	Native justicia
EN		Sweet false galium
EN	<i>Hibbertia hexandra</i>	Tree guinea flower
VU	<i>Hicksbeachia pinnatifolia</i>	Red boppel nut
EN	<i>Indigofera baileyi</i>	Bailey's indigo
Presumed extinct	<i>Knoxia sumatrensis</i>	Knoxia sumatrensis
VU	<i>Lasiopetalum longistamineum</i>	Lasiopetalum longistamineum
EN	<i>Leucopogon confertus</i>	Torrington beard-heath
EN	<i>Lindsaea brachypoda</i>	Short-footed screw fern
EN	<i>Marsdenia longiloba</i>	Slender marsdenia
EN	<i>Melaleuca tamariscina subsp. irbyana</i>	Weeping paperbark
EN	<i>Melichrus hirsutus</i>	Hairy melichrus
VU	<i>Olearia cordata</i>	Olearia cordata
EN	<i>Phaius australis</i>	Southern swamp orchid
-	<i>Phaius tankervilleae</i>	Lady Tankerville's swamp orchid

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NSW Conservation status*	Scientific name	Common name
EN	<i>Phebalium glandulosum</i> subsp. <i>eglandulosum</i>	Rusty desert phebalium
VU	<i>Picris evae</i>	Hawkweed
EN	<i>Plectranthus nitidus</i>	Nightcap plectranthus
EN	<i>Polygala linariifolia</i>	Native milkwort
EN	<i>Pomaderris brunnea</i>	Brown pomaderris
EN	<i>Pomaderris queenslandica</i>	Scant pomaderris
EN	<i>Prostanthera staurophylla</i>	Torrington mint-bush
EN	<i>Pseudanthus ovalifolius</i>	Oval-leafed pseudanthus
-	<i>Pterostylis cucullata</i>	Leafy greenhood
VU	<i>Pterostylis elegans</i>	Elegant greenhood
VU	<i>Pterostylis foliata</i>	Slender greenhood
VU	<i>Pterostylis riparia</i>	Pterostylis riparia
CR	<i>Pterostylis ventricosa</i>	Pterostylis ventricosa
VU	<i>Pultenaea parrisiae</i>	Parris' Bush-pea
EN	<i>Quassia</i> sp. 'Moonee Creek'	Moonee quassia
VU	<i>Rhynchosia acuminatissima</i>	Pointed trefoil
VU	<i>Rutidosia heterogama</i>	Heath wrinklewort
VU	<i>Sarcochilus fitzgeraldii</i>	Ravine orchid
VU	<i>Sarcochilus hartmannii</i>	Hartman's sarcochilus
VU	<i>Styphelia perileuca</i>	Montane green five-corners
VU	<i>Tasmannia glaucifolia</i>	Fragrant pepperbush
VU	<i>Tetradthea glandulosa</i>	Tetradthea glandulosa
VU	<i>Tetradthea juncea</i>	Black-eyed Susan
EN	<i>Tinospora smilacina</i>	Tinospora vine
VU	<i>Tinospora tinosporoides</i>	Arrow-head vine
EN	<i>Triplarina imbricata</i>	Creek triplarina
EN	<i>Zieria involucrata</i>	Zieria involucrata

*CR: Critically endangered; EN: Endangered; VU: Vulnerable

Table K: Exclusion of specified forestry activities from 100% of individuals with a 10-metre exclusion zone and a further 10 metre buffer

Where there is a record of a species to which this condition applies:

- (a) An exclusion zone with a 10-metre radius must be implemented around all individuals.
- (b) An additional buffer zone 10 metres wide must be implemented around all exclusion zones. Limited operations (snigging and selective tree removal) may be conducted in the buffer zone.

NSW Conservation status*	Scientific name	Common name
EN	<i>Acalypha eremorum</i>	Acalypha
VU	<i>Eucalyptus mckieana</i>	McKie's stringybark
VU	<i>Eucalyptus robertsonii</i> subsp. <i>hemisphaerica</i>	Robertson's peppermint
EN	<i>Monotaxis macrophylla</i>	Large-leafed monotaxis
VU	<i>Prostanthera densa</i>	Villous mint-bush
VU	<i>Velleia perfoliata</i>	Velleia perfoliata

*EN: Endangered; VU: Vulnerable

Table L: Exclusion of specified forestry activities from 100% of individuals and no buffer

Individuals of the threatened species or protected native plants to which this condition applies must not be picked in the course of carrying out specified forestry activities.

NSW Conservation status*	Scientific name	Common name
VU	<i>Allocasuarina simulans</i>	Nabiac casuarina
EN	<i>Almaleea cambagei</i>	Torrington pea
VU	<i>Amorphospermum whitei</i>	Rusty plum
VU	<i>Angophora robur</i>	Sandstone rough-barked apple
VU	<i>Boronia umbellata</i>	Orara boronia
EN		Native justicia
EN	<i>Corchorus cunninghamii</i>	Native jute
VU	<i>Cryptostylis hunteriana</i>	Leafless tongue orchid – southern populations
EN	<i>Cynanchum elegans</i>	White-flowered wax plant
VU	<i>Desmodium acanthocladum</i>	Thorny pea
EN	<i>Diospyros mabacea</i>	Red-fruited ebony
EN	<i>Diospyros major</i> var. <i>ebenus</i> forma <i>australiensis</i> yandina	Shiny-leaved ebony
-	<i>Dipodium atropurpureum</i> (Protected Native Plant Schedule 13 NP&W Act)	Dipodium atropurpureum

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NSW Conservation status*	Scientific name	Common name
-	<i>Dipodium pulchellum</i> (Protected Native Plant Schedule 13 NP&W Act)	Dipodium pulchellum
VU	<i>Doryanthes palmeri</i> (Protected Native Plant Schedule 13 NP&W Act)	Giant spear lily
-	<i>Eriostemon myoporoides</i> subsp. <i>conduplicatus</i> (Protected Native Plant Schedule 13 NP&W Act)	Long-leaf wax flower
VU	<i>Eucalyptus camphora</i> subsp. <i>relicta</i>	Warra broad-leaved sally
VU	<i>Eucalyptus glaucina</i> , (northern population)	Slaty red gum
VU	<i>Eucalyptus pulverulenta</i>	Silver-leafed gum
VU	<i>Eucalyptus tetrapleura</i>	Square-fruited ironbark
-	<i>Gastrodia sesamoides</i> (Protected Native Plant Schedule 13 NP&W Act)	Cinnamon bells, Potato orchid
-	<i>Goodenia macbarronii</i>	McBarron's goodenia
VU	<i>Grevillea evansiana</i>	Evans grevillea
EN	<i>Grevillea mollis</i>	Soft grevillea
VU	<i>Grevillea parviflora</i> subsp. <i>parviflora</i>	Small-flower grevillea
VU	<i>Grevillea quadricauda</i>	Four-tailed grevillea
VU	<i>Grevillea rhizomatosa</i>	Gibraltar grevillea
VU	<i>Hakea archaeoides</i>	Big Nellie hakea
VU	<i>Haloragis exalata</i> subsp. <i>exalata</i>	Square raspwort
VU	<i>Hibbertia marginata</i>	Bordered guinea flower
VU	<i>Homoranthus lunatus</i>	Crescent-leaved homoranthus
VU	<i>Homoranthus prolixus</i>	Granite homoranthus
EN	<i>Macrozamia johnsonii</i>	Johnson's cycad
VU	<i>Melaleuca biconvexa</i>	Biconvex paperbark
VU	<i>Olax angulata</i>	Square-stemmed olax
VU	<i>Parsonsia dorrigoensis</i>	Milky silkpod
VU	<i>Persicaria elatior</i>	Tall knotweed
EN	<i>Pimelea venosa</i>	Bolivia Hill pimelea
EN	<i>Pterostylis gibbosa</i>	Illawarra greenhood
EN	<i>Senna acclinis</i>	Rainforest cassia
EN	<i>Syzygium paniculatum</i>	Magenta lilly pilly
VU	<i>Tasmannia purpurascens</i>	Broad-leaved pepperbush
VU	<i>Thesium australe</i>	Austral toadflax
EN	<i>Acacia ruppii</i>	Rupp's wattle

* EN: Endangered; VU: Vulnerable

Appendix B: Calculating Minimum Stand Basal Area

- (1) For compliance purposes, average basal area will be calculated using the following method:
 - (a) the sample points must be located systematically across the harvested area with a minimum inter-point distance of 60 metres;
 - (b) samples must be taken using angle count sampling or fixed area plot measurements;
 - (c) where fixed area plot samples are used, plots must be 50 m x 20 m in size; and
 - (d) the total number of samples to be taken must be in accordance with Table M below.

Table M: Minimum number of sample points required for harvested areas

Size of harvested area (hectares)	Minimum number of sample points required
0–30	20
31–50	30
51–100	40
101–200	50
201+	60

- (2) Further limits:
 - (a) all forestry operations must have an average basal area equal to or above the average minimum limit for basal area.
 - (b) the basal area at no more than 25% of sampling points within the harvested area can have a basal area below 7m²/ha, and
 - (c) no more than 50% of sampling points within the harvested area can be below the minimum basal area as specified in Clause 3.2 (2) (Single Tree Selection and Thinning).

Appendix C: Calculating Forest Regeneration

- (1) For compliance purposes, forest regeneration in Single Tree Selection and Thinning harvest areas will be calculated using the following method:
 - (a) the starting point must be randomly located within the harvest area by selecting it on a map before assessment.
 - (b) the sample points must be located at 20 metre intervals along a square that is 200 metres on each side (Figure 10);
 - (c) samples must be taken using fixed area plot measurements with a plot size of approximately 10 m²;
 - (d) plots must be circular with a minimum radius of 1.8 m radius; and
 - (e) each plot is classed as stocked if any part of the plot area:
 - i. is under the canopy of an existing tree, or
 - ii. contains at least one viable seedling (including new seedlings establishing from seed or lignotubers), or
 - iii. contains 'advanced growth' of an upper canopy species that is assessed as having the vigour or capability of reaching a canopy position.
 - (f) for each square (as per clause 1(b-c), convert the numbers of stocked plots to a simple percentage. Where multiple squares are assessed, the outcomes should be averaged to give an overall assessment of the harvest area.
 - (g) the total number of samples to be taken must be in accordance with Table N below.

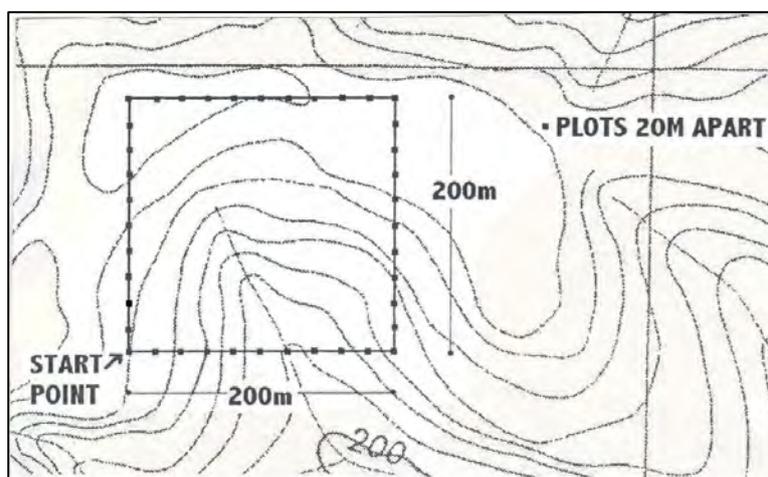


Figure 10: Example of sample point intervals along a square.

Table N: Minimum number of sample points required for harvested areas

Size of harvested area (hectares)	Minimum number of sample points required
0–10	80 (2 squares)
11–50	120 (3 squares)
51–100	200 (5 squares)
101–200	280 (7 squares)
201+	360 (9 squares)

- (2) For compliance purposes, forest regeneration in Australian Group Selection harvest areas will be calculated using the following method:
- (a) All sample points must be located within canopy openings created by AGS
 - (b) the sample points must be located systematically at multiple spots across the canopy opening with a minimum inter-point distance of 20 metres
 - (h) samples must be taken using fixed area plot measurements with a plot size of approximately 10 m²;
 - (c) plots must be circular with a minimum radius of 1.8 m radius at a sample intensity of 50 plots per hectare or equivalent (5%); and
 - (d) each plot is classed as stocked if any part of the plot area:
 - i. is under the canopy of an existing tree, or
 - ii. contains at least one viable seedling (including new seedlings establishing from seed or lignotubers), or
 - iii. contains 'advanced growth' of an upper canopy species that is assessed as having the vigour or capability of reaching a canopy position.
 - (e) for each gap area that is assessed, convert the stocking rate to a percentage figure and then average these percentages across the number of gaps assessed within the harvest area.
 - (f) the minimum number of canopy openings to be sampled must be in accordance with Table O below.

Table O: Minimum sampling requirement for regeneration in canopy openings

Number of canopy openings	Number of canopy openings sampled
0 - 10	2
11-50	5
51-100	10
101-200	20

Appendix D: Assessment criteria for Forest Stewardship Plans

Table P: Assessment criteria for Forest Stewardship Plans

Assessment criteria	Assessment consideration	Related Outcomes Statement
Potential impacts on biodiversity conservation at the local and bioregional scales	<ul style="list-style-type: none"> ▪ Important trees, habitat and environmental features are identified and protected: <ul style="list-style-type: none"> – for shelter and food resources for native species, and to support their persistence – To provide refuge, connectivity and to support forest regeneration. ▪ Site-specific measures are implemented to manage long term forest health and habitat for threatened flora and fauna. 	<p>(1) Maintain forest health and regeneration at site and bioregional scales</p> <p>(3) Maintain the persistence of native species at site and bioregional scales</p>
Potential impacts on the environment at the local scale and bioregional scales	<ul style="list-style-type: none"> ▪ Forest regeneration and management actions are monitored and where necessary interventions made to ensure long-term active and adaptive management. ▪ Vegetation adjacent to drainage features and wetlands is managed effectively in the long-term, and groundcover is retained, to maintain water quality, stream stability, riparian habitat and contribute to habitat connectivity. ▪ Water quality and aquatic habitat are maintained through the implementation of best management practices for roads, tracks and crossings. ▪ Areas of soil erosion hazard are identified and managed effectively ▪ The site and any infrastructure no longer required after operations area rehabilitated according to best management practices 	<p>(2) Maintain the productive capacity of the private native forest estate at a site and bioregional scales</p> <p>(4) Maintains water quality and soil health at site and bioregional scales</p>
The likely suitability of the site, and landholder knowledge and capacity to manage potential risk	<ul style="list-style-type: none"> ▪ Site location, access, slopes, etc, support forestry operations without generating unmanageable or cumulative risks at site and landscape scale. ▪ Harvesting operations can be effectively distributed across the landscape and over time and space, to support a mosaic of forest age-classes and maintenance of forest structure across the landscape. ▪ Operator and/or landholder have sufficient capacity to identify and manage risks and implement best practice forest management. 	<p>(1) Maintain forest health and regeneration at site and bioregional scales</p> <p>(5) Build landholder capacity to deliver best practice forest management</p>
Aboriginal values, places and practices	<ul style="list-style-type: none"> ▪ Site-specific measures ensure the appropriate management, protection and persistence of Aboriginal places and practices ▪ Site specific measures help foster connection and collaboration within Aboriginal communities and/or between Aboriginal communities and landholders ▪ Site specific measures help improve our knowledge of Aboriginal forest management 	<p>(2) Maintain productive capacity of the private native forest estate at a site and bioregional scales</p> <p>(5) Build landholder capacity to deliver best practice forest management</p>
Research, innovation and industry development	<ul style="list-style-type: none"> ▪ Site specific measures encourage active and adaptive management ▪ Site specific measures help improve our knowledge of silviculture and forest ecology ▪ Site specific measures help facilitate innovation and industry development 	<p>(5) Build landholder capacity to deliver best practice forest management.</p> <p>(6) Support the economic resilience of landholders and regional communities.</p>
Relevant legislation	Consideration of relevant legislative requirements.	

Glossary

Expressions that are defined in the *Local Land Services Act 2013* and *Local Land Services Regulation 2014* have the same meanings in this Code as the meanings given to them in that Act and Regulation, unless they are otherwise defined in this Code. All other expressions are defined as in this glossary.

Accidentally felled	A tree is accidentally felled into any area of land only if it is apparent that techniques of directional felling were used in an attempt to fell the tree away from the area. Despite the above, a tree is not accidentally felled into an area if the person responsible knew or could reasonably have been expected to know that the tree would fall into the area.
Armoured	A protective surface that is resistant to erosion or displacement by machinery or vehicles.
Australian Group Selection	A silvicultural system in which groups (small patches or stands) of trees are harvested, allowing for subsequent regeneration and leading to a forest comprising patches of differently aged trees.
Basal area	The sum of cross-sectional area of trees that are greater than 10 centimetres in diameter at breast height (DBH). Basal area is measured at breast height and in square metres per hectare (m ² /ha)
Batter	An earth slope formed from fill material (fill batter) or cut into the natural hillside (cut batter) during road construction.
Bioregion	An Interim Biogeographic Regionalisation for Australia (IBRA) region as defined by <i>Summary Report Revision of the Interim Biogeographic Regionalisation for Australia and Development Version 5.1</i> .
Blading off	The removal of surface soil from a track or road in wet conditions to expose a drier or firmer surface for use by machinery
Canopy opening	An area of forest where there is a gap in the overstorey. Canopy openings may be created by removal of parts of the overstorey to release advance growth or stimulate regeneration of new seedlings.
Cliff	A rocky slope steeper than 70 degrees, more than three metres high and more than 10 lineal metres.
Crossing	A structure designed to allow the crossing of a drainage feature and is either a track crossing or road crossing.
Cypress Forests	A forest dominated by white cypress pine (<i>Callitris glaucophylla</i>), being forests in which at least 80% of the stand basal area comprises trees of that species.
Dead tree	A tree that has no epicormic and/or lignotuber growth at the time of the forestry operation.
Debris	Tree head, tree offcuts or bark that have resulted from a forestry operation.
Diameter at breast height over bark (DBHOB)	The diameter of a tree measured at 1.3 metres above the ground. Measurements are made over the bark and horizontal to the trunk.
Directional felling	The felling of a tree so it falls in a pre-determined direction.
Dispersible soil	A structurally unstable soil which readily disperses into its constituent particles (clay, silt, sand) in water.

Drainage depression	A shallow depression with smoothly concave cross-section that conveys runoff only during or immediately after periods of heavy rainfall.
Drainage feature	A drainage depression, drainage line, river or watercourse.
Drainage line	A channel down which surface water naturally concentrates and flows. Drainage lines exhibit one or more of the following features which distinguish them from drainage depressions: <ul style="list-style-type: none"> • evidence of active erosion or deposition, e.g. gravel, pebble, rock, sand bed, scour hole or nick point • an incised channel more than 30 centimetres deep with clearly defined bed and banks • a permanent flow.
Drainage structure	A structure designed to convey water away from a road, track or area of soil disturbance.
Earth windrow	A mound of soil material or gravel on the edge of a road or snig track formed by the spillage from the edge of a blade or similar machine during earthmoving operations.
Exclusion zone	An area of land within a specified distance of a landscape feature identified in Table B, where forestry operations are prohibited, unless otherwise allowed under this Code.
Extraction track	A track constructed for use by forwarding machinery.
Food resource trees	Trees with recent V-notch incisions or other incisions made by a yellow-bellied glider or squirrel glider. Recent incisions are incisions less than two years old as evidenced by the fact the incision has not closed.
Forest	An area dominated by trees with a mature stand height exceeding 2 metres, overstorey crown cover of greater than 20 per cent.
Forestry operations	Forestry operations means: <p>(a) logging operations – namely the cutting and removal of timber from land for the purpose of timber production, or</p> <p>(b) the harvesting of forest products – namely the harvesting of the products of trees and other vegetation (other than timber) that are of economic value, or</p> <p>(c) ongoing forest management operations – namely activities relating to the management of land for timber production such as thinning, burning and other silvicultural activities, or</p> <p>(d) ancillary activities to enable or assist in the above operations such as the provision of roads, snig tracks, waterway crossings and temporary timber storage facilities.</p>
Girders	High quality logs used in a round or flat faced form to support a deck such as a bridge or wharf or as large end section, heart-free, sawn timber suitable for heavy construction.
Groundcover	Natural or artificial material which covers the ground surface and has the effect of reducing erosion.
Gully stuffer	A drainage feature crossing formed by filling the drainage feature with trees, debris, spoil, soil, rock or other material to the level of the road or track.
Habitat tree	A tree retained for habitat purposes under this Code.
Harvesting operations	Harvesting operations include: <ul style="list-style-type: none"> • timber felling, snigging and extraction

	<ul style="list-style-type: none"> • construction and maintenance of log landings, snig tracks and extraction tracks.
Heathland	Areas dominated (covers more than 50% of the area) by shrubs generally less than 2 metres tall at maturity.
Highly erodible soil	A soil where the particles are readily detached and transported by erosive forces. The presence of these soils may be identified by evidence of existing erosion (gully or rill erosion), or by commonly known problem soil types, e.g. some coarse-grained granites.
Incised channel	A channel more than 30 centimetres deep with clearly defined bed and banks.
Inundation	Flooding of the forested area by water overflowing the banks of a river.
Koala Scat	A scat a with a strong eucalyptus odour, pale green in colour with faint or clear ridges and/or vertical stripes, and a moist mucus coating, and bullet shaped appearance found either above the leaf litter, or less than 50mm below the leaf litter.
Landholding	A single or several parcels of land (whether held under the same title, different titles or different kinds of titles) that constitute or are worked as a single property and that are contiguous with one another or are separated from one another only by a road, river, creek or other watercourse.
Log landing	An area (usually cleared) where timber products are assembled for processing and sorting before being loaded onto a truck.
Mass movement	The downslope movement of greater than 10 cubic metres of soil, where gravity is the primary force or where no transporting medium such as wind, flowing water or ice is involved.
Net harvestable area	The defined area under the Forest Management Plan or Forest Stewardship Plan where harvesting is permitted in accordance with the Code.
Old growth forests	<p>Ecologically mature forest where the effects of disturbance are now negligible. This includes an area of forest greater than 5 hectares where:</p> <ul style="list-style-type: none"> • the overstorey is in late to over-mature growth stage with the presence of relatively large old trees (many containing hollows and often with the presence of dieback or dead branches in the crown) • the age (growth) structure of the stand measured as relative crown cover consists of less than 10% of regeneration and advance growth and more than 10% of late to over-mature (senescent) growth • the effects of unnatural disturbance are now negligible. <p>Old growth woodlands west of the Great Dividing Range, while comprising a characteristic canopy of late to over-mature trees (many with hollows), may comprise a woodland structure with less diverse or often shrubby understorey and a groundcover of grasses and herbs.</p>
PNF koala prescription mapped areas	Areas of contiguous forest identified in Figures 6 – 7, dominated by non-planted native trees species with an average stand height of 2 metres or greater, and an overstorey canopy cover of 20% or more, at elevations of 800 metres or less above sea level and with a minimum patch size of 2 hectares or greater.
Portable mill site	A site where a portable mill (easily movable milling equipment) operates.
Posts	Term generally used to describe posts in round or split form used for fencing.
Prescribed Stream	Stream listed in the Major Rivers database of the Assessment Methodology database available at the DPE webpage.

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Pulp logs	Logs cut and prepared primarily to produce wood pulp for the manufacture of reconstituted products including paper and panel board.
Rainfall erosivity	A measure of the ability of rainfall to cause erosion at any location. It is directly related to the likelihood of high intensity storms and can be used to predict times of the year when erosion risk is greatest.
Rainforest	<p>Tree-dominated vegetation where the tree stratum (over 3 metres in height) which has the greatest crown cover has rainforest species making up 50% or more of the crown cover, except where non-rainforest emergent species (including brushbox and turpentine) occur and exceed 30% or more of the upper stratum crown cover.</p> <p>Rainforest includes all areas of rainforest mappable at a 1:25000 scale. Rainforest also includes areas exceeding 0.5 hectares occurring as isolated clumps or lineal strips of rainforest trees.</p>
Regeneration management actions	Forest management techniques that promote forest regeneration after forestry operations including replanting (including tube-stock), minimising or removing grazing pressure, seeding, weed management, fire management and mechanical soil disturbance.
Relevant legislative requirements	Existing requirements relating to the carrying out of forestry operations on private land contained in the <i>Biodiversity Conservation Act 2015</i> , <i>Environmental Planning and Assessment Act 1979</i> , <i>Fisheries Management Act 1994</i> , <i>Local Land Services Act 2013</i> and <i>Protection of Environmental Operations Act 1997</i> .
River red gum forests	A forest dominated by <i>Eucalyptus camaldulensis</i> consistent with description of Forest Type 199 (River Red Gum) in State Forests of NSW, Research Note 17.
Riparian exclusion zones	Those areas within the distances specified for 'Drainage feature' as listed in clause 6.4(2) where forestry operations are not permitted, unless otherwise allowed by this Code.
Riparian protection measures	Actions that assist in maintaining and protecting riparian areas including revegetation (including tube-stock, native grasses and seed distribution), the placement of artificial erosion control measures such as matting, mulch or geotextiles, and the removal or minimisation of grazing pressures.
Road	Any route used for vehicular access to, and the transport of logs from, the point of loading (log landing) within the forest area.
Road prism	That part of the road from the inflexion point at the toe of the fill batter to the inflexion point at the top edge of the cut batter. Where there is no cut or fill batter as part of the road, the road prism is to be taken from the outside edge of the table drain on either side of the road.
Rocky outcrops	A 'rocky outcrop' has an area of 0.2 hectares or larger, where 70% or more of the surface is composed of exposed boulders of more than 0.6 of a metre in diameter and accompanied by skeletal soils.
Rollover bank	A crossbank constructed with a smooth cross-section and gentle batters, which is well-compacted to provide permanent vehicular trafficability.
Saturated soil	The physical condition of soil where no more moisture can be absorbed or accepted.
Sawlog	Log of a species suitable for processing through a sawmill into solid timber products.

Significant forest disturbance event	An event that impacts and changes the ecological condition of a forest or environmental value associated with that forest in a manner that risks meeting ESFM outcomes. Recovery is unlikely to occur without interventions, risking maintaining ESFM forest value outcomes over a range of spatial scales across the short to long term. Disturbance events can include (but are not limited to) prolonged drought, wildfire, mass tree dieback or a biosecurity event.
Silvicultural operations	The activities associated with the management of trees within a forest for the purpose of meeting sustainable long-term productivity objectives, including thinning, single tree selection and creation of canopy openings.
Single tree selection	A harvesting operation where the trees harvested are either single trees or small groups of trees. For the purposes of this Code, single tree selection operations will not create canopy openings.
Skeletal soils	Thin soils which present a barren, inhospitable surface to vegetation.
Snig track	A track used by snigging or skidding equipment.
Spoon drain	A drain with a semi-circular cross-section, which has no associated ridge of soil. Its capacity is solely defined by the excavated channel dimensions.
Stand basal area	Stand basal area is the sum of the basal area of all trees within a stand expressed in square metres per hectare (m ² /ha).
Stand height	Mean height of the dominant trees in the stand. Measurement of stand height must conform to methods described in approved guidelines.
Stick Nest	A collection of sticks in the branches, fork, trunk and or head of a live or dead tree that, when combined, form a nest that is greater than 50 cm in diameter.
Stocking level	A measure of the frequency of occurrence of tree stems assessed as being capable of growing to canopy level. Measurement of stocking levels must conform with methods described in Appendix C.
Suitably qualified expert	Suitably qualified expert means a person with a minimum undergraduate qualification in natural sciences, ecology, environmental management, forestry or similar from a university and with a minimum 3 years' experience in environmental assessment.
Thinning	A silvicultural practice where some trees are removed in order to increase the growth rates of retained trees.
Threatened populations	Population of a particular species listed in Division 3 of Part 1, Division 4 of Part 2 or Division 4 of Part 3 of Schedule 1 to the <i>Biodiversity Conservation Act 2016</i> as in force from time to time.
Threatened species	Threatened species within the meaning of the <i>Biodiversity Conservation Act 2016</i> as in force from time to time that also meets paragraph (d) of the definition of species with the meaning of that Act as in force from time to time.
Timber products	Commercial timber products removed from or felled within the forest, including but not limited to sawlogs, veneer logs, poles, girders, piles and pulp logs.
Veneer log	High quality logs that are rotary peeled or sliced to produce sheets of veneer.
Walkover techniques	Timber extraction or snigging without removing or unduly disturbing the existing natural groundcover, i.e. where no snig track construction involving soil disturbance is required.
Western Hardwood Forests	A forest that is consistent with the description of any of the Forest Types 99, 103, 104, 124, 171–178, 180–185, 203–210 and 213 in State Forests of NSW Research Note 17.

Wetland

Includes any shallow body of water (such as a marsh, billabong, swamp or sedgeland) that is:

- inundated cyclically, intermittently or permanently with water, and
- vegetated with wetland plant communities.

Private Native Forestry

Code of Practice for Southern NSW

I, the Minister for Agriculture and Western New South Wales, make the following *Private Native Forestry Code of Practice for Northern NSW* under section 60ZT of the *Local Land Services Act 2013*.

Dated this ____ day of [insert month] 2022 at _____ am/pm.

Dugald Saunders, MP
Minister for Agriculture and Western New South Wales

I, the Minister for Environment and Heritage, give concurrence to the following *Private Native Forestry Code of Practice for Northern NSW* under section 60ZT of the *Local Land Services Act 2013*.

Dated this ____ day of [insert month] 2022 at _____ am/pm.

James Griffen, MP
Minister for Environment and Heritage

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Introduction

The Private Native Forestry Code of Practice (the 'Code') supports the long-term sustainable management of native forests on private land and Crown land (other than State forests or other Crown-timber land) for timber production and ecologically sustainable forest management (ESFM).

The Code applies to forestry operations in areas of the State as defined by Part 5B of the *Local Land Services Act 2013*. This Code is made under Part 5B, section 60ZT of the *Local Land Services Act 2013*. The objects of Part 5B of the Act are:

- (a) to authorise the carrying out of private native forestry in accordance with principles of ecologically sustainable forest management, and
- (b) to protect biodiversity and water quality (including threatened species, populations and ecological communities under Part 7A of the *Fisheries Management Act 1994*) in connection with private native forestry operations, and
- (c) to enable landholders to carry out forestry operations in a sustainable manner in areas of the State to which this Part applies, and
- (d) to ensure the differences between private native forestry and native forestry operations in State forests or other Crown-timber land are recognised, including in the application of protocols, codes, standards and other instruments.

'Southern NSW' means that part of the state south of the latitude of Sydney: 33° 52' 02.71 S. These Code prescriptions apply to all forests except those forests that meet the definitions of either River Red Gum Forest or Cypress and Western Hardwood Forests.

Outcomes Statement

- (1) The Code supports the implementation of the following long-term outcomes:
 - (a) Maintain forest health and regeneration at site and bioregional scales.
 - (b) Maintain the productive capacity of the private native forest estate at site and bioregional scales.
 - (c) Maintain the persistence of native species at site and bioregional scales.
 - (d) Maintain water quality and soil health at site and bioregional scales.
 - (e) Build landholder capacity to deliver best practice forest management.
 - (f) Support the economic resilience of landholders and regional communities.
- (2) The outcomes statement is included to improve interpretation and understanding of the long-term objectives of private native forestry but do not form part of the Private Native Forestry Plan (PNF Plan) approval or enforceable requirements of the Private Native Forestry Code.

The Code

1. Private Native Forestry Plans

- (1) Before any forestry operations commence in areas of the State to which Part 5B of the *Local Land Services Act 2013* applies as described in section 60ZS, a Private Native Forestry Plan (PNF Plan) must be prepared by the landholder(s) or by a person nominated by the landholder(s) and approved by Local Land Services in accordance with section 60ZY of the *Local Land Services Act 2013*.
- (2) Forestry operations under an approved PNF Plan must be conducted in accordance with all relevant provisions of this Code.
- (3) Local Land Services will provide all relevant digital information on landscape features (as identified in Table B) and slope angles (where feasible), drainage features (as identified in Table E) and Listed Ecological Prescriptions including areas mapped under the PNF koala prescription map (as identified in Appendix A) when issuing the PNF Plan and prior to the commencement of any forestry operations to ensure plants, animals and ecological communities listed in the schedules of the *Biodiversity Conservation Act 2016* are identified for protection in accordance with the Code.
- (4) Private Native Forestry Plans must identify the landholder(s) and the land to which the plan applies (including the lot and deposited plan number).
- (5) Forestry operations under an approved PNF Plan must be accompanied by either a Forest Management Plan or a Forest Stewardship Plan, except for operations consistent with Clause 3.1.
- (6) A copy of the PNF Plan must be available on-site during any forestry operations.
- (7) Local Land Services will maintain a public register of PNF Plans, Forest Management Plans and Forest Stewardship Plans, including periodic reporting of outcomes associated with independent assessments for Forest Stewardship Plans (Section 2.2).

Note 1: Section 60S of the *Local Land Services Act 2013* and clause 124 of the Local Land Services Regulation 2014 provide that the clearing of native vegetation is not authorised by a land management (native vegetation) code if the clearing is:

- the carrying out of a forestry operation within the meaning of Part 5B (Private native forestry)
- on land that is subject to a PNF Plan that was approved under Part 5C of the *Forestry Act 2012* before the repeal of that Part
- on land that is subject to a PNF Plan under Part 5B of the Act.

Note 2: Section 60ZZ (4) of the *Local Land Services Act 2013* provides that a private native forestry plan may be varied by Local Land Services on application by the landholder.

2. Forest planning and management

2.1 Forest Management Plans

Introduction

Forest Management Plans outline how individual forestry operations will be undertaken within a Private Native Forestry Plan area. The Forest Management Plan includes a map and written section describing the forest condition, forestry operations and forest management activities. A Forest Management Plan is to be used when undertaking forestry operations consistent with the standard requirements of the Code.

- (1) A Forest Management Plan must be prepared by the landholder(s) or a person nominated by the landholder(s) and submitted to Local Land Services before forestry operations commence (other than operations that are conducted consistent with Clause 3.1).
- (2) The net harvestable area under a Forest Management Plan must not exceed 250 hectares. A Forest Stewardship Plan must be prepared if the net harvestable area exceeds this limit.
- (3) A Forest Management Plan must be in an approved form and consistent with the provisions of this Code and the requirements of the Listed Species Ecological Prescriptions set out in Appendix A.
- (4) Local Land Services may require a Forest Management Plan to be revised and re-submitted if the Plan it is not in an approved form or is not consistent with the provisions of this Code, including the requirements of the Listed Species Ecological Prescriptions set out in Appendix A.
- (5) The landholder(s) and anyone else carrying out forestry operations must read, sign and date the Forest Management Plan.
- (6) A copy of the Forest Management Plan must be available on-site during forestry operations.
- (7) A Forest Management Plan must contain the following:
 - (a) a map (or maps) showing:
 - (i) the boundaries of the landholding, area(s) subject to the plan, including areas in which harvest operations and/or forestry operations will occur
 - (ii) Within the area subject to the plan:
 - a. forested areas
 - b. recorded locations of any threatened populations or threatened ecological communities listed under the schedules of the *Biodiversity Conservation Act 2016* and species in the Listed Species Ecological Prescriptions set out in Appendix A
 - c. areas mapped under the PNF koala prescription map (as in Appendix A Koala (*Phascolarctos cinereus*) prescription)
 - d. the location of landscape features as listed in Table B and protection buffers required
 - e. drainage features (including riparian exclusion zones as listed in Clause 6.4 (2) and Table E)
 - f. slope angles (where feasible)
 - g. the location of silvicultural treatments outlined in (7)(b)(viii)
 - h. the indicative location of existing and proposed roads and drainage feature crossings
 - i. the indicative location of log landings and portable mill sites.

- (iii) Within areas adjacent to the area subject to the plan:
 - a. forested areas
 - b. recorded locations of any threatened populations or threatened ecological communities listed under the schedules of the *Biodiversity Conservation Act 2016* and species in the Listed Species Ecological Prescriptions set out in Appendix A
 - c. areas mapped under the PNF koala prescription map (as in Appendix A Koala (*Phascolarctos cinereus*) prescription)
 - d. wetlands and drainage features
 - e. areas of outstanding biodiversity value
- (b) a written component that provides:
 - (i) details of ownership of the land
 - (ii) the landholder's forest management objectives
 - (iii) a contemporary description of the pre-harvest forest condition (including overstorey species type and composition, known disturbance and harvest history, pre-harvest basal area, stand height [where required] and any presence of pests and/or weeds)
 - (iv) the post-harvest basal area objective
 - (v) details of forest access, including any necessary construction, upgrading or maintenance of forest roads and drainage feature crossings
 - (vi) details of harvesting and/or other proposed forestry operations
 - (vii) details of activities to promote regeneration and post-harvest management
 - (viii) details of relevant silvicultural treatments that may be carried out as part of the Forest Management Plan
 - (ix) details of flora and fauna management actions (where applicable)
 - (x) details of tree marking activities (where applicable)
 - (xi) details of pest and weed management (where applicable)
 - (xii) details of fire management (where applicable)
 - (xiii) details of research or monitoring plots within the PNF Plan area (where applicable).
- (7) The Landholder may amend the parts of the Forest Management Plan, except for matters referred to in Clause 2.1 (7) (a) (i), Clause 2.1 (7) (a) (ii) (a-f), Clause 2.1 (7) (a) (iii) and Clause 2.1 (7) (b) (i). Amendments to Clause 2.1 (7) (a) (i), Clause 2.1 (7) (a) (ii) (a-f), Clause 2.1 (7) (a) (iii) and Clause 2.1 (7) (b) (i) may only occur with the approval of Local Land Services.
- (8) Any amendments to either the map or the written component must be noted on the Forest Management Plan and must be consistent with the relevant provision of the Code.
- (9) The landholder must retain a copy of the Forest Management Plan, including any amendments, for the life of the PNF Plan or for three years after completion of the forestry operations for which it was prepared, whichever is the later date.
- (10) The landholder must provide the Forest Management Plan, including a record of any amendments, to an officer from Local Land Services and/or an authorised officer from the Environment Protection Authority if requested to do so.

2.2 Forest Stewardship Plans

Introduction

Forest Stewardship Plans are an alternative to Forest Management Plans and allow alternative requirements to be applied based on individual site-specific circumstances and only after independent expert review. A Forest Stewardship Plan will have conditions that form part of the approval, including specific forestry operation and forest management conditions.

- (1) A Forest Stewardship Plan must, before forestry operations commence, be:
 - (a) prepared by a suitably qualified expert(s),
 - (b) assessed by an independent expert panel against the criteria in Appendix D
 - (c) approved by Local Land Services, after considering the independent expert panel's advice and is satisfied that the Forest Stewardship Plan complies with relevant legislative requirements and the Code.
- (2) Independent expert panel members must have applied knowledge and experience in the principles of ESFM and expertise in at least one of the following areas:
 - (a) forest management, including silviculture (required for all panel assessments)
 - (b) forest ecology (required for all panel assessments)
 - (c) natural resource economics
 - (d) fire management and climate change
 - (e) Aboriginal land management
 - (f) water and soil management
- (3) A Forest Stewardship Plan can:
 - (a) apply the basal area limits in accordance with Clause 3.2 (2) (ii)
 - (b) apply canopy area limits for Australian Group Selection in accordance with Clause 3.3 (2) (c) (ii)
 - (c) include alternative requirements to those in sections 5, 6, 7 and Appendix A of this Code following a significant forest disturbance event(s) and where forestry operations can be used to minimise or manage impacts and/or improve ESFM outcomes. In these circumstances, Local Land Services will conduct a site assessment within the area(s) identified by the landholder(s) to advise on the suitability of a Forest Stewardship Plan.
- (4) A Forest Stewardship Plan must be in an approved form and will include:
 - (a) a map (or maps) consistent with Clause 2.1 (7)(a)
 - (b) a written component that is consistent with Clause 2.1 (7)(b)
 - (c) relevant information to inform Local Land Services assessment of the plan, including:
 - (i) details of proposed forestry operations
 - (ii) details of any alternative requirements as per Clause 2.2 (3)
 - (iii) the results of any pre-harvest flora and fauna assessments and surveys, including any required in accordance with Clause 2.2 (5) (a)
 - (iv) any additional management actions and/or protections that may be proposed, including any required in accordance with Clause 2.2 (5) (b).
 - (v) details of site-specific monitoring and reporting requirements.
- (5) As per Clause 2.2 (1), Local Land Services can only approve a Forest Stewardship Plan after an independent expert panel has assessed the plan against the criteria in Appendix D and provided the assessment to Local Land Services. In conducting an assessment of a Forest Stewardship Plan, the independent expert panel can:

- (a) request further information, additional advice or external expertise to inform its assessment, including additional flora and fauna assessments or surveys, if necessary
 - (b) recommend additional site-specific management actions and/or protections
 - (c) recommend that the Forest Stewardship Plan is approved by Local Land Services
 - (d) recommend that the Forest Stewardship Plan is not approved by Local Land Services.
- (6) The Landholder may amend the parts of the Forest Stewardship Plan referred to in Clause 2.1 (7) (b) (ii) and Clause 2.1 7 (b) (x-xii). Any other amendments to the Forest Stewardship Plan may only occur with the approval of Local Land Services.
- (7) Any amendments to either the map or the written component must be noted on the Forest Stewardship Plan and must be consistent with the relevant provision of the Code.
- (8) The landholder and anyone else carrying out forestry operations must read, sign and date the Forest Stewardship Plan.
- (9) A copy of the Forest Stewardship Plan must be available on-site during forestry operations.
- (10) The landholder(s) must retain a copy of the Forest Stewardship Plan, including a record of any amendments, for the life of the PNF Plan or for three years after completion of the forestry operations for which it was prepared, whichever is the later date.
- (11) The landholder(s) must provide the Forest Stewardship Plan to an officer from Local Land Services and/or an authorised officer from the Environment Protection Authority if requested to do so.

2.3 Reporting

- (1) The landholder must notify Local Land Services of the commencement and completion of forestry operations under clauses 3.1 to 3.3 of the Code.
- (2) In respect of forestry operations under clauses 3.1 to 3.3 of the Code, notification must be provided to Local Land Services within 30 days prior to commencement of the relevant forestry operations.
- (3) In respect of forestry operations under clauses 3.1 to 3.3 of the Code, notification must be provided to Local Land Services within 30 days of the completion of the relevant operations.
- (4) The following information must be included in any commencement notification to Local Land Services:
 - (a) the PNF Plan approval number
 - (b) the Forest Management Plan or Forest Stewardship Plan approval number where applicable
 - (c) the proposed commencement date and estimated time it will take to complete the forestry operations
 - (d) a map showing the location of the proposed forestry operations
 - (e) name and contact details of the landholder.

Note 3: Local Land Services will provide updated information to the landholder on the locations of plants, animals and ecological communities listed in the schedules of the *Biodiversity Conservation Act 2016* at this time to ensure that the relevant Code requirements are applied to the forestry operation.

- (5) The following information must be included in any completion notification to Local Land Services:
 - (a) the PNF Plan approval number
 - (b) a Forest Management Plan or Forest Stewardship Plan approval number where applicable
 - (c) a map showing the location of the forestry operations
 - (d) the approximate volume of forest products harvested
 - (e) the approximate number of hectares on which the forestry operations have occurred
 - (f) the date that the forestry operations were completed
 - (g) name and contact details of the landholder.

2.4 Monitoring, assessment and adaptive management

- (1) A monitoring, evaluation and reporting framework must be jointly approved by the Chief Executive Officer of Local Land Services and the Secretary of DPE.
- (2) The PNF MER framework will be proposed by the NSW Forest Monitoring Steering Committee (or equivalent) independently chaired by the NSW Natural Resources Commission.
- (3) The NSW Forest Monitoring Steering Committee (or equivalent) independently chaired by the NSW Natural Resources Commission will:
 - (a) conduct annual checks that the evidence base is up to date (including relevant maps), identify emerging evidence from monitoring and research, and opportunities for improvement
 - (b) formally assess the data and evidence from the program (and any other lines of evidence) every five years and advise the Minister administering the *Forestry Act 2012*, the Minister administering the *Local Land Services Act 2013* and the Minister administering the *Biodiversity Conservation Act 2016* whether there is sufficient evidence to warrant a review of the PNF Codes.
- (4) Local Land Services can require that forestry operations are rescheduled to help ensure harvest operations are distributed over time and space, to support a mosaic of forest age-classes and forest structures across the landscape. This determination will consider landholder's circumstances and the nature, extent and intensity of forestry operations.
- (5) The Minister administering the *Local Land Services Act 2013* can request harvest operations are reviewed where an unforeseen event (such as wildfire, mass dieback or a forest biosecurity event) has caused, or has the potential risk of causing serious or irreversible environmental damage on private land at a bioregional scale. In these circumstances Local Land Services will conduct a site assessment within the impacted bioregion(s) identified by the Minister. The site assessment will occur prior to harvest operations commencing to determine whether site scale environmental risks:
 - (a) can be managed within the existing provisions of the Code, or
 - (b) can be mitigated and managed with additional management actions and protections through a Forest Stewardship Plan, or
 - (c) cannot be mitigated or managed to avoid serious or irreversible environmental damage. In this event, Local Land Services can suspend or reschedule harvest operations but will agree with the landholder(s) on a timeframe for reassessing the site.
- (6) Where an unforeseen event (such as wildfire, mass dieback or a forest biosecurity event) has caused, or has the potential risk of causing serious or irreversible environmental damage on private land at a bioregional scale, the Chief Executive Officer of the Environment Protection Authority can inform the Chief Executive Officer of Local Land Services that a review under Clause 2.4 (5) may be required.

Note 4: Any research or forest monitoring activities undertaken in PNF Plan areas beyond minimum requirements set out in this Code can only occur with the written consent of the landholder. The written consent must outline the purpose of the research or monitoring, and how the data will be collected, stored and used, including how landholder confidentiality will be managed.

3. Silvicultural operations

3.1 Small scale harvesting

Introduction

A silvicultural system in which single trees of various ages are harvested at a low intensity. This method is suitable for the provision of fence posts, poles and firewood and promoting regeneration of shade-tolerant species, or growth of preferred species or individual trees.

- (1) Forestry operations are permitted after a PNF Plan has been approved.
- (2) Small scale harvesting is permitted provided no more than 5 trees per hectare are harvested and the harvest area is no more than 5 hectares or the volume is no more than 50m³ per year, whichever is smaller.
- (3) Small scale harvesting must not reduce the stand basal area below 12m²/hectare.
- (4) For the purposes of clause 3.1 the minimum stand basal area will be calculated in accordance with Appendix B. The average can only be calculated within contiguous forest areas and must not include isolated patches of forest.
- (5) The landholder must keep a record of the number of trees harvested and the approximate area harvested.

3.2 Single tree selection and thinning

Introduction

A silvicultural system in which single trees or small groups of trees of various ages are harvested. This method is suitable for promoting regeneration of shade-tolerant species, or growth of preferred species or individual trees

- (1) Forestry operations are permitted after the approval of a Forest Management Plan or a Forest Stewardship Plan
- (2) Single tree selection and thinning operations must not reduce the stand basal area below:
 - (i) 12m²/hectare across the net harvestable area of a Forest Management Plan.
 - (ii) 10m²/hectare across the net harvestable area of a Forest Stewardship Plan.
- (3) For the purposes of clause 3.2 the minimum stand basal area will be calculated in accordance with Appendix B. The average can only be calculated within contiguous forest areas and must not include isolated patches of forest.

3.3 Australian Group Selection

Introduction

A silvicultural system in which groups (small patches or stands) of trees are harvested, allowing for subsequent regeneration and leading to a forest comprising patches of differently aged trees. The method is suitable for promoting regeneration of shade intolerant species.

- (1) Forestry operations are permitted after the approval of a Forest Management Plan or a Forest Stewardship Plan.
- (2) Harvest operations that result in canopy openings must conform with the following requirements:
 - (a) be used to encourage the regeneration of forest stands with shade intolerant species and/or where forest regeneration has failed
 - (b) the sum of canopy openings must at no time exceed 20% of the net harvestable area
 - (c) the maximum area of an individual canopy opening must not exceed:
 - (i) 0.5 hectares in area under a Forest Management Plan, or
 - (ii) 0.75 hectares in area under a Forest Stewardship Plan.
 - (d) Australian Group Selection and Single Tree Selection cannot occur within 100 metres of the edge of the canopy opening:
 - (i) within ten years of the completion of harvest operations, or
 - (ii) until the forest stand within canopy openings has reached 10 metres or more
- (3) A **canopy opening** is an area greater than 0.1 hectares in size, measured between canopy perimeters, where any vegetation remaining within the opening is less than one-half of the stand height unless this is a significant habitat feature.
- (4) A **canopy opening** can be an irregular shape to maximise light penetration and optimise the area to boundary ratio, to encourage forest regeneration and account for existing landscape features and significant habitat features (such as hollow bearing trees, dead standing trees, feed trees) provided it does not exceed the maximum area in Clause 3.3 (2)(c) and is non-linear in shape.
- (5) After harvesting, the debris in the gap may be burnt to create an ash bed in which a future crop of shade-intolerant species can regenerate.

3.4 Forest regeneration

- (1) The minimum stand stocking (as determined by the percentage of stocked plots specified in Table A) must be achieved within 2 years of a regeneration event.
- (2) In this clause, **regeneration event** is a harvesting or thinning operation under Clauses 3.1 to 3.3 of the Code.
- (3) A harvesting operation must not occur in a previously harvested area until stocking levels meet the minimum stocked plot requirements in Table A.

Table A: Minimum percentage of stocked plots

Within canopy openings	Elsewhere in the forest
≥ 55%	≥ 65%

- (4) For the purposes of Clause 3.4 and Table A, forest regeneration will be calculated in accordance with Appendix C.
- (5) The landholder must comply with any reasonable requirements of the Environment Protection Authority for the purpose of regenerating or re-establishing the forest, if the minimum percentage of stocked plots has not been reached within a period of 24 months following a regeneration event.
- (6) Landholders must monitor forest regeneration, composition, and condition at 2, 6 and 10 years after a regeneration event. Where the relevant forest is not regenerating along a trajectory that maintains (or improves on) preharvest forest conditions, landholders must implement regeneration management actions.

4. Pest and weed management

Note 5: The landholder may manage pest plants and animals on land to which a PNF Plan applies. Any such management is to be carried out in accordance with all applicable legal requirements. Local Land Services and the relevant local council can provide advice on management of pest plants and animals.

5. Fire management

Note 6: The landholder may carry out burning activities, fire management, bush fire hazard reduction and bush fire recovery and response activities on land to which a PNF Plan applies. However, any such activities may only be carried out in accordance with all applicable legal requirements and any necessary approvals must be obtained. Advice should be sought from the Rural Fire Service and the relevant local council before carrying out any of these activities.

- (1) Fire management should be consistent with the following:
 - (a) flame heights should average one metres, but may be higher in patches of heavy or elevated fuels
 - (b) scorch heights should average less than five metres, but may be higher in patches of heavy or elevated fuels
 - (c) the fire should spread at a slow walking pace.
- (2) Fire management under this part is not permitted on land that:
 - (a) contains peat soils, or
 - (b) is mapped or described as a fire exclusion zone in a bush fire risk management plan, or
 - (c) contains isolated forest, woodland or wetland vegetation formations under Clause 4.1 of the *Bush Fire Environmental Assessment Code for New South Wales*.

Fire management under this part must be conducted in accordance with the *NSW Rural Fire Services Standards for Low Intensity Bush Fire Hazard Reduction Burning* and the *Bush Fire Environmental Assessment Code for New South Wales*.

6. Protection of the environment

6.1 Protection of landscape features of environmental and cultural significance

- (1) Forestry operations in and adjacent to specified landscape features must comply with the requirements in Table B.
- (2) Old growth forests will be identified according to the protocol approved by the relevant Ministers and available at https://www.ils.nsw.gov.au/_data/assets/pdf_file/0003/807420/Protocol-for-re-evaluating-old-growth-forest-on-private-property.pdf.
- (3) Rainforest will be identified according to the protocol approved by the relevant Ministers and available at https://www.ils.nsw.gov.au/_data/assets/pdf_file/0004/807421/Protocol-for-re-evaluating-rainforest-on-private-property.pdf.

Table B: Requirements for protecting landscape features

Landscape feature	Operational conditions
Threatened ecological communities listed in the <i>Biodiversity Conservation Act 2016</i>	Forestry operations may not occur in threatened ecological communities unless authorised by a Forest Stewardship Plan. However, existing roads may be maintained.
Threatened populations listed in the <i>Biodiversity Conservation Act 2016</i>	Forestry operations must not result in any harm to an animal that is a threatened species or a protected animal or result in the picking of any plant that is part of a threatened population, except that existing roads may be maintained.
Areas of outstanding biodiversity value	Forestry operations must not occur in declared areas of outstanding biodiversity value agreed with the written consent of the landholder, except that existing roads may be maintained.
Rainforest	Forestry operations must not occur within rainforest, except that existing roads may be maintained.
Old growth forest	Forestry operations must not occur within old growth forest, except that existing roads may be maintained.
Wetlands	Forestry operations must not occur in any wetland or within 20 metres of any wetland, except that existing roads may be maintained.
Heathland	Forestry operations must not occur in any heathland or within 20 metres of heathland, except that existing roads may be maintained.
Rocky outcrops	Forestry operations must not occur on any rocky outcrop or within 20 metres of a rocky outcrop, except that: <ul style="list-style-type: none"> • existing roads may be maintained • existing snig tracks may be used.
Cliffs, caves, tunnels and disused mineshafts (excluding open pits less than 3 metres deep)	Forestry operations must not occur within 10 metres of cliffs, caves, tunnels or disused mineshafts, except that existing roads may be maintained.
Steep slopes	Forestry operations must not occur on slopes greater than 30 degrees, except that: <ul style="list-style-type: none"> • existing roads and tracks may be maintained • new roads and tracks may be constructed subject to conditions in clause 7.1(18) of the Code.

Aboriginal object or place as defined in the <i>National Parks and Wildlife Act 1974</i>	Forestry operations must not occur within: <ul style="list-style-type: none"> • 50 metres of a known burial site • 20 metres of an Aboriginal scarred or carved tree • 10 metres of a known Aboriginal object or place (this requirement does not apply to Aboriginal objects or places that may lawfully be destroyed).
Areas containing items identified as heritage items in an environmental planning instrument	Forestry operations must not occur within 10 metres of a listed heritage item.
Areas of existing mass movement	Harvesting operations which create canopy openings must not occur within the area, and harvesting machinery must not enter the area, except that existing roads may be maintained. New roads must not be constructed.
Dispersible and highly erodible soils	Existing roads may be maintained. <ul style="list-style-type: none"> • Drainage feature crossings must be armoured with erosion-resistant material. Road batters and table drains must be stabilised using erosion-resistant material, ameliorants, vegetation or slash. • Log landings must be stabilised using erosion-resistant material, vegetation or slash at the completion of forestry operations. • Measures must be taken to immediately stabilise any erosion of roads or snig tracks.

6.2 Protection of habitat and biodiversity

- (1) Habitat trees must be retained in accordance with Table C.
- (2) Hollow bearing trees, recruitment trees, food resource trees, roost trees and nest trees are defined as habitat trees retained for the purposes of this Code.
- (3) An individual tree may satisfy more than one condition in the tree retention standards (see Table C) if it has the appropriate characteristics.
- (4) Where available:
 - (a) retained habitat trees must represent the range of species in mature and late mature growth stages
 - (b) preference must be given to selecting habitat trees that best meet the characteristics of habitat trees as set out in clause 6.2(5)
 - (c) preference must be given to habitat trees that will provide habitat connectivity, build on existing landscape features (Table B), provide additional protections for threatened species, and build on existing habitat islands, refugia and conservation areas adjacent to and within the PNF Plan area.
 - (d) preference must be given to trees with well-developed crowns.

- (5) For the purpose of this clause:
- (a) a **hollow bearing tree** is a tree 30 cm diameter at breast height over bark (DBHOB) or greater, where the trunk or limbs:
 - (i) contain visible hollows, holes or cavities (including basal hollows), or
 - (ii) have inferred hollows as it is an older growth stage tree and has one or more obvious deformities such as a burl, large protuberance or a broken limb
 - (b) if there are more than the minimum required number of habitat trees, preference must be given to trees with the largest hollows, holes or cavities (including basal hollows) and/or greatest number of visible hollows, holes or cavities (including basal hollows). Trees that pose a health or safety risk may be removed and substituted with other hollow bearing trees if available, and if not available, by recruitment trees
 - (c) a **dead standing tree** is a standing dead tree that has hollows, and:
 - (i) the bark is fully separated from the sapwood
 - (ii) is greater than 30cm in diameter, and
 - (iii) is over three metres tall
 - (d) a **feed tree** is a tree that provides a source of nectar or other food for wildlife and is listed in Table D
 - (e) a **recruitment tree** is a large, vigorous tree (30cm or greater in DBHOB) capable of developing hollows to provide habitat for wildlife. Where practical, preference must be given to trees from the next cohort to that of retained hollow bearing trees.
 - (f) **roost, nest and food resource trees** are defined as:
 - (i) trees that support active maternity bat roosts with clear evidence of roosting such as bat guano (faeces)
 - (ii) trees with recent V-notch incisions or other incisions made by a glider species. Recent incisions are incisions that have not closed.

Table C: Minimum standards for tree retention

Trees that must be retained
<ul style="list-style-type: none"> ● 10 hollow bearing trees per 2 hectares, where available. ● A maximum of 2 dead standing trees may contribute to the total of 10 hollow-bearing trees per 2 hectares (see above) where available. ● One recruitment tree, representing the range of species in the forest before forestry operations commenced, must be retained for every hollow bearing tree. ● Where the total number of hollow bearing trees is less than 10 trees per 2 hectares, additional recruitment trees must be retained to bring the total number of retained hollow bearing and recruitment trees up to 20 trees per 2 hectares. ● Up to half of all required recruitment trees can be located in a riparian exclusion zone where the subject 2-hectare area is within 200 metres of, and partly includes, that riparian exclusion zone. ● A minimum of 6 feed trees per 2 hectares should be retained where available. ● All feed trees that have marks or 'V' notches from sap-feeding mammals must be retained. ● All roost, nest or food resource trees to be retained. ● All trees with large stick nests (50cm or larger) to be retained with a 50 metre exclusion zone

Table D: Feed trees

Ironbark – <i>Eucalyptus tricarpa</i>	Swamp mahogany – <i>E. robusta</i>
Grey ironbark – <i>E. paniculata</i>	Yellow stringybark – <i>E. muelleriana</i>
River peppermint – <i>E. elata</i>	Black sallee – <i>E. stellulata</i>
Mountain grey gum – <i>E. cypellocarpa</i>	Swamp gum – <i>E. ovata</i>
Maiden’s gum – <i>E. maidenii</i>	Bloodwood species – <i>Corymbia spp.</i>
Forest red gum - <i>E. tereticornis</i>	Spotted gum – <i>Corymbia spp.</i>
Mountain gum – <i>E. dalrympleana</i>	Blue-leaved stringybark – <i>E. agglomerata</i>
Manna gum – <i>E. viminalis</i>	Red stringybark – <i>E. macrorhyncha</i>
Snow gum – <i>E. pauciflora</i>	Alpine ash – <i>E. delegatensis</i>
White stringybark – <i>E. globoidea</i>	Eurabbie – <i>E. bicostata</i>
White mahogany <i>E. acmenoides</i>	Red ironbark – <i>E. fibrosa</i>
Mugga ironbark – <i>E. sideroxylon</i>	box species - <i>E. rudderi</i> , <i>E. melliodora</i> , <i>E. albens</i> , <i>E. moluccana</i>

6.3 Minimising damage to retained trees and native vegetation

- (1) As far as practicable, forestry operations must not damage or heap debris around protected trees.
- (2) In this clause **protected trees** are defined as:
 - (a) trees required to be retained under clause 6.2
 - (b) plants of the genus *Xanthorrhoea* (grass trees), genus *Allocasuarina* (forest oak) (except bull oak (*Allocasuarina luehmannii*)), and genus *Banksia*
 - (c) other trees that are required to be retained by this Code.

6.4 Drainage feature protection

- (1) For the purposes of this Code, a stream is defined as an incised watercourse with a defined channel, bed and banks and a minimum depth of 30 centimetres. Stream orders are determined according to the Strahler System (see Figure 1).

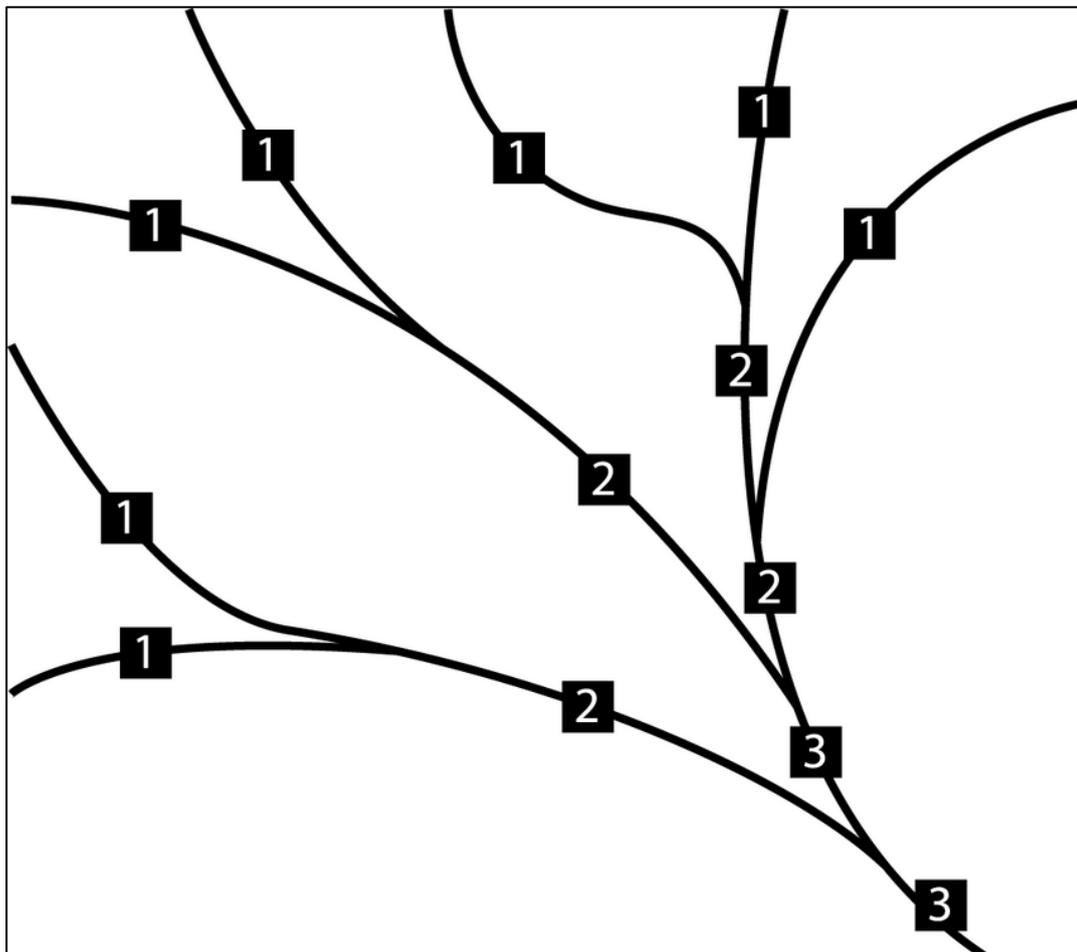


Figure 1: Diagram of stream order (Source: *Water Management (General) Regulation 2018*).

- (2) The riparian exclusion zone must be measured from the top of the defined bank of the stream or where there is no defined bank, from the edge of the channel of the stream for the distance specified in Table E.

Table E: Riparian exclusion zones

Stream order	Riparian exclusion zone
Unmapped and mapped first-order	10 metres
Mapped second-order	20 metres
Mapped third-order or higher	30 metres
Prescribed Streams	

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- (3) Harvesting machinery must not enter riparian exclusion zones, except at designated crossings or where otherwise allowed by this Code.
- (4) Where harvesting is occurring in or adjacent to riparian exclusion zones, all tree felling must employ directional felling to minimise disturbance to streams
- (5) Where a tree is accidentally felled into a riparian exclusion zone, the tree may be removed provided:
 - (a) disturbance to soil, groundcover and native vegetation is limited to the minimum extent necessary, and
 - (b) harvesting machinery does not enter the riparian exclusion zone to retrieve the tree, or part of the tree, unless using walkover techniques, and
 - (c) following the tree's removal, any soil disturbance or furrows are treated to prevent concentration of water flow or soil movement, and
 - (d) the incident must be recorded in the Forest Management Plan or Forest Stewardship Plan, as soon as possible.
- (6) New roads and crossings may be constructed and old roads and crossings re-opened within riparian exclusion zones provided that:
 - (a) the road or crossing is identified in the Forest Management Plan or Forest Stewardship Plan
 - (b) the road prism or crossing intersects with the riparian exclusion zone at right angles or as close to right angles as is practicable
 - (c) clearing and disturbance within the riparian exclusion zone are minimised
 - (d) any other necessary permits have been obtained.
- (7) Trees may be felled within drainage depressions, and machinery may enter, however, disturbance must be minimised by:
 - (a) machinery not operating when the soil is saturated
 - (b) using walkover techniques wherever possible
 - (c) preventing skewing of machinery tracks as much as possible
 - (d) not snigging along drainage depressions.
- (8) Where existing measures are not adequately managing the risk of soil erosion, sediment movement or water turbidity the landholder may implement further riparian protection measures. These additional measures must be recorded in the Forest Management Plan or Forest Stewardship Plan.

7. Construction and maintenance of forest infrastructure

7.1 Construction and maintenance of roads

- (1) Clearing of native vegetation for the purpose of roads, drainage structures, log landings, mill sites, snig tracks or extraction tracks must not occur except in accordance with this Code, and the clearing must be limited to the minimum extent necessary.
- (2) Construction of new roads and drainage feature crossings should be minimised as far as practicable, consistent with the requirements for management, harvesting and fire control in the PNF Plan area.
- (3) As far as practicable, roads must be located on ridgetops or just off the crest of the ridge to facilitate outfall drainage.
- (4) Clearing for road construction is no more than 3 metres from the outside edges of batters or table drains. If it is necessary to clear a wider area, a minimum of 70% groundcover must be established on all the cleared area beyond the road formation within one month of the date of completed construction.
- (5) Trees and other debris must not be stacked in landscape features referred to in Table B or riparian exclusion zones referred to in clause 6.4(2) and Table E.
- (6) Any cut or fill batter must be stabilised.
- (7) Tree stumps or other woody debris must not be used to provide fill for road construction.
- (8) New roads must be constructed, upgraded and maintained with a maximum grade of 10 degrees. The maximum grade may be increased to 15 degrees where it would result in an improved environmental outcome or to avoid difficult ground conditions. The Forest Management Plan or Forest Stewardship Plan must be noted.
- (9) Roads must be maintained according to Table F.
- (10) Roads must be maintained to ensure that road surfaces remain stable and drainage systems and sediment controls remain functional.
- (11) Soil exposure on road verges must be kept to a minimum.
- (12) Roads that are not required for ongoing property management must be stabilised, drained and allowed to revegetate.
- (13) Haulage must not be undertaken over any section of road where the surface has rutting more than 150 millimetres deep for any distance exceeding 20 metres.
- (14) Haulage on natural surface roads must cease when there is runoff from the road surface, except for trucks that have already been loaded or partially loaded. These trucks can travel to their intended destination.
- (15) Where existing roads are overgrown and require re-opening, the clearing width must be minimised to the extent required to make the road suitable for traffic.
- (16) As far as practicable, grass cover must be maintained and disturbance to existing drainage structures must be minimised.
- (17) Blading-off of roads must be used to the minimum extent necessary to rehabilitate the road surface.
- (18) Sections of new road may be constructed on ground slopes exceeding 25 degrees only if:
 - (a) there is no practical alternate route available,
 - (b) the sections are designed by a suitably qualified person using currently acceptable engineering standards to ensure stability, and
 - (c) the section is noted within the Forest Management Plan or Forest Stewardship Plan.

Table F: Maximum distance that water may travel along road surfaces and table drains

Road grade (degrees)	Maximum distance (metres)
0 to ≤ 3	150
> 3 to ≤ 5	100
> 5 to ≤ 10	60
> 10 to ≤ 15	40
> 15 to ≤ 20	30

7.1.1 Road drainage

- (1) All reasonable steps must be taken to minimise soil erosion from roads. Accordingly, one or more of the following measures must be adopted, where appropriate:
 - (a) maintain vegetative cover (that is, plant material, living or dead) that protects the road surface from erosion
 - (b) establish a grass cover on the road surface using a sterile seed or native grass seed
 - (c) crossfall-drain the road with outfall or in-fall drainage (preferably with the outward or inward slope being between 4% and 6%) or by shaping the road to a crown so water drains to both of its sides
 - (d) construct drainage structures on the road surface to convey water away from the road formation (for example, cross drains, mitre drains or relief culverts).
- (2) Any drainage structure must be designed to convey the peak flow from a 1-in-5-year storm event.
- (3) Drainage structures must be established on a road if concentrated water flow on the road surface or table drains is likely to occur for distances exceeding the relevant spacing, as shown in Table F.
- (4) Earth windrows resulting from road construction and upgrading operations must be removed from the shoulders of all roads unless they are specifically constructed to prevent erosion of fill batters or where in-fall drainage is used.
- (5) Earth windrows from road maintenance must be cut through at regular intervals to ensure that water flow on road surfaces does not exceed the distances specified in Table F.
- (6) Rollover banks must have a minimum effective bank height of 15 centimetres (consolidated). Spoon drains must have a minimum effective depth of 15 centimetres.
- (7) Drainage structures must divert water onto a stable surface and must be kept free of debris that may impede flow of water.
- (8) Drainage structures must not be designed to directly divert sediment laden water into drainage features.
- (9) A drop-down structure and dissipater must be installed where drainage structures divert water over an exposed fill batter more than 1 metre high.

7.1.2 Roads crossing drainage features

- (1) Drainage feature crossings must be stable causeways, culverts or bridges. Existing gully stuffers may be used if they are stable, but new gully stuffers must not be constructed.
- (2) Crossings must be designed, constructed and maintained to minimise disturbance to the passage of fish and other aquatic fauna. They must be located and constructed to cause minimum disturbance to stream banks, stream beds and natural flows. The base of the crossing must be made of erosion-resistant material such as rock, concrete or heavy timber and must conform to the natural level of the stream bed.
- (3) Crossings must be constructed as close as practicable to right angles to the water flow unless an angled approach reduces soil and ground disturbance.
- (4) Disturbance to the bed and banks of the drainage feature during crossing construction or maintenance must be minimised. Disturbed areas must be reshaped and stabilised as soon as possible following crossing construction or maintenance.
- (5) The approaches to a crossing over a stream must be drained, using a drainage structure, between 5 metres and 30 metres of the crossing. Where this is impracticable, a drainage structure must be constructed as near as practicable to the crossing.
- (6) Permanent drainage crossing structures must be designed to convey a 1-in-5-year storm event and withstand a 1-in-10-year storm event. Bridges must be designed and constructed so the natural stream flow is not restricted and erosion is minimised.
- (7) The surface of any crossing and the approaches on both sides of it must be made of stable material that is unlikely to be displaced during normal use of the crossing or approach, or by any flood up to and including peak flow of a 1-in-10-year storm event.
- (8) Causeways must be constructed of stable, non-soil material such as crushed gravel, rock, bitumen, concrete, logs or other stable material that is unlikely to produce water turbidity.
- (9) Construction equipment must minimise disturbance or damage to the stream bed and banks.
- (10) Fill and construction material must not be placed into streams, and surplus fill must be located outside the riparian exclusion zone.
- (11) Stream banks and bridge embankments must be protected to minimise erosion.
- (12) Soil stabilisation must be undertaken in all areas disturbed by crossing construction, upgrading or maintenance.

7.2 Log landings, portable mill sites and snig tracks

- (1) Wherever practicable, log landings and portable mill sites must be located on ridge-tops or spurs.
- (2) Log landings and portable mill sites must be no larger than the minimum size necessary for efficient operations.
- (3) If topsoil is removed, it must be stockpiled and respread at completion of harvesting operations.
- (4) Log landings and portable mill sites must be located and constructed as far as practicable to allow effective crossfall drainage during harvesting operations.
- (5) The construction of new log landings and portable mill sites must not be located nearer than 10 metres to an exclusion zone or riparian exclusion zone.

- (6) Existing log landings located within riparian exclusion zones may only be used with the prior written approval of Local Land Services, and provided:
 - (a) clearing for a new log landing would cause greater environmental harm; and
 - (b) disturbance to soils and groundcover is minimised, and
 - (c) erosion and sediment control measures must be in place for the duration of the log landing's use, and upon its completion, and
 - (d) at least 70% ground cover must be reinstated within one month of the completion of the relevant log landings used for the forestry operations.
- (7) Runoff from log landings and portable mill sites must not be directly discharged into a drainage feature.
- (8) Log landings must not be used when the log landing soil is saturated.
- (9) Vegetation and debris from log landings and portable mill sites must not be deposited in an exclusion zone or riparian exclusion zone.
- (10) Woody waste and debris on log landings and portable mill sites must not be stacked against retained trees.
- (11) Bark accumulated on log landings, and sawdust on mill sites, must be progressively dispersed away from the site during harvesting operations. Alternatively, bark can be placed in a discrete area on a log landing provided:
 - (a) Bark heaps are not located adjacent to or under crowns of retained trees, and
 - (b) Bark heaps are surrounded by a 5-metre earth or mineral break, and
 - (c) Timber off-cuts are staked at least 5 metres away from any bark heap, and
 - (d) Upon completion of forestry operations bark heaps are positioned at the centre of the log landing. Bark heaps must be burnt in accordance with all applicable legal requirements and necessary approvals.
- (12) On completion of operations, log landings and portable mill sites must be drained and reshaped to disperse runoff onto surrounding vegetation, and topsoil must be respread evenly over the landing.

7.2.1 Snig tracks and extraction tracks

- (1) Snig track or extraction track construction must be minimised and, as far as practicable, walkover extraction must be used and slash retained on snig and extraction tracks.
- (2) Soil disturbance and exposure on snig and extraction tracks must be minimised.
- (3) As far as practicable, snig tracks from previous operations must be used.
- (4) Existing snig tracks or extraction tracks must not be used if they are incised and cannot be drained.
- (5) In re-opening existing snig tracks and extraction tracks, the use of blades must be restricted to the removal of obstructions such as understorey vegetation, logs/tree heads and surface rock, and ensuring that the track is adequately drained.
- (6) Wherever practicable, snigging and timber extraction must be uphill.
- (7) Snig tracks and extraction tracks must be located where they can be drained effectively, and should be located where there is sufficient natural crossfall to remove runoff from the track surface.
- (8) Snig tracks and extraction tracks must not encroach on exclusion zones or riparian exclusion zones except at designated crossings and where permitted by clause 6.4 (5-6).
- (9) Blading-off of snig tracks and extraction tracks must not occur.

- (10) The grade of snig tracks must not exceed 25 degrees, except in the following circumstances:
 - (a) it will result in a better environmental outcome than construction and/or use of a side cut snig track to access the same area using a snig track of less than 25 degrees, and
 - (b) the Forest Management Plan or Forest Stewardship Plan is noted, and
 - (c) the snig track can be effectively drained, and
 - (d) the maximum grade is 28 degrees, and
 - (e) the maximum combined length of the snig track exceeding 25 degrees, commencing from the serviced log landing, is not greater than 75 metres.
- (11) Where downhill snigging is necessary, snig tracks and extraction tracks must enter the log landing from beside or below. Where this is not possible, a drainage structure must be installed at the entrance to the log landing at the end of each day's operations.
- (12) Drainage must be incorporated as soon as possible at the completion of operations on each extraction track or snig track, and in any event within two days, unless the soil is saturated.
- (13) Temporary drainage must be installed on any snig or extraction track that will not be used for a period of five days or more.
- (14) Track drainage structures must be located, constructed and maintained to divert water onto a stable surface which can handle concentrated water flow, and which provides for efficient sediment trapping. Drainage structures must not be designed to directly divert sediment laden water directly into streams.
- (15) Snig tracks and extraction tracks must be located and constructed to ensure that water flow on the track surface does not exceed the distances specified in Table G. This could be achieved by one of the following techniques or a combination:
 - (a) retain the existing groundcover using walkover techniques
 - (b) retain or cover the track surface with slash and harvesting debris
 - (c) construct outfall drainage or maintain the track's outfall drainage
 - (d) construct track drainage structures.

Table G: Maximum distance that water may run along snig and extraction tracks

Track grade (degrees)	Maximum distance (metres)
0 to ≤ 5	100
> 5 to ≤ 10	60
> 10 to ≤ 15	40
> 15 to ≤ 20	25
> 20 to ≤ 25	20
> 25 to ≤ 28	15

- (16) On completion of operations, the following measures must be implemented:
 - (a) where practicable, snig tracks and extraction tracks must be reshaped, all earth windrows, wheel ruts and log furrows removed, and recoverable topsoil spread back over the track, and
 - (b) crossfall drainage must be reinstated on snig tracks or, where this is not sufficient to divert runoff from the track, crossbanks must be installed consistent with the spacings in Table G.
- (17) Crossbanks must be constructed to have a minimum effective height of 35 centimetres unconsolidated, or 25 centimetres consolidated, and as a guide should not be greater than 50 centimetres in height.

- (18) Crossbanks must not be constructed of bark or woody debris.

7.2.2 Snig track and extraction track crossings on drainage features

- (1) The location of log landings and snig/extraction tracks must be planned to minimise the number of crossings required.
- (2) Temporary crossings may be constructed if this construction will enable access to a forested area that cannot be practically accessed by other means, and negates the need to construct new roads, snig tracks or extraction tracks which are likely to cause greater environmental harm.
- (3) Snig track and extraction track crossings must be stable causeways (including natural surface causeways), culverts or bridges. Existing gully stuffers may only be used if they are stable. New gully stuffers must not be constructed.
- (4) Machinery must not cross a drainage feature which is running water or when the soil is saturated, unless by means of a stable crossing.
- (5) Approaches to crossings must be as close as possible to right angles to the flow of water.
- (6) A crossbank must be installed on each approach, between 5 and 20 metres from the drainage feature crossing. The distance must be measured from the top of the bank of the incised channel or, where there is no defined bank, from the edge of the channel or centre of the depression. The drainage structure must divert water onto a stable surface. If such a surface is not available, sediment control measures must be used to prevent sediment entering the drainage feature. Drainage structures must not be designed to directly divert sediment laden water directly into streams.
- (7) Disturbance to the bed and banks of the drainage feature must be minimised, and any spoil must be removed from the drainage feature.
- (8) All areas disturbed during crossing construction and use, including approaches, must be rehabilitated following completion of use. Rehabilitation includes the reshaping of the crossing to conform as closely as possible to the original ground surface. If groundcover is not likely to recover naturally, sowing with a suitable sterile seed or endemic native seed/fertiliser mix must be undertaken to establish effective groundcover.

7.2.3 Wet weather limitations for snigging, log landing and portable mill operations

- (1) Harvesting operations must not occur when:
 - (a) there is runoff from the snig track surface, or
 - (b) soils are saturated, or
 - (c) soil is rutted to a depth of more than 200 millimetres below the track surface over a 20 metre section or longer, until the soil has dried and/or rehabilitation has restored the stability of the track surface.
- (2) Forwarders, excavators and truck-mounted loaders may be used as stationary loaders when there is runoff from the log landing.
- (3) All other machinery on the log landing must remain stationary when there is runoff from the log landing surface, unless the log landing is constructed of gravel or other stable material.

Appendix A: Listed species ecological prescriptions

Introduction

These prescriptions must be applied within the forestry operations area where there is a **known record, site evidence**, or in relation to koalas potential habitat (see Figure 4), of a threatened species.

- (a) A known record is a sighting or record of the species in the NSW BioNet (<http://www.bionet.nsw.gov.au/>) that is less than 20 years old with a reliability level and/or Source Code of 1 to 4 and a coordinate accuracy of 100 metres or less,
- (b) Site evidence is a sign a species has visited or regularly uses a site, and includes observations of, for example, faecal pellets or scats, chewed seed cones or a nest, or evidence that the site has been used as a latrine.
- (c) recorded by a suitably qualified expert(s) as part of a fauna survey and/or flora survey during the planning and assessment of harvest operations

A list of threatened species under the *Biodiversity Conservation Act 2016* and species profiles for each species can be viewed on the Department of Planning, Industry and Environment (DPIE) website at <https://www.environment.nsw.gov.au/topics/animals-and-plants/threatened-species>.

The prescriptions set out below assist in the protection of threatened species, and include:

- (1) additional widths to stream exclusion zones
- (2) exclusion zones and/or buffer zones around locations of threatened species records
- (3) additional tree retention requirements around locations of threatened species records.

Exclusion zones and buffer zones requiring additional tree retention requirements must be applied within the PNF Plan area subject to the area of the forestry operation described in the Forest Management Plan or Forest Stewardship Plan.

Some species prescriptions vary according to the Bioregion in which they occur. Unless otherwise stated, the regions referred to in the prescriptions are based on the Interim Biogeographic Regionalisation of Australia (IBRA) shown in Figure 2.

General conditions

For all threatened species prescriptions, the following applies:

- where a retained eucalypt tree (as required by these prescriptions) also meets the requirements of a habitat tree, the eucalypt tree may be counted as a habitat tree
- where other exclusion zones form part of the habitat area required for threatened species prescriptions, the exclusion zones may count towards the area of habitat required to be retained
- where public conservation/reserved land (for example National Parks) falls within buffer or exclusion zone areas requiring additional tree retention requirements as part of threatened species prescriptions, then the area of public conservation/reserved land may contribute towards the area of habitat required to be retained
- buffer and exclusion zones are to be marked in the field where they adjoin the area, subject to forestry operations. This marking has to be visible while forestry operations are occurring.

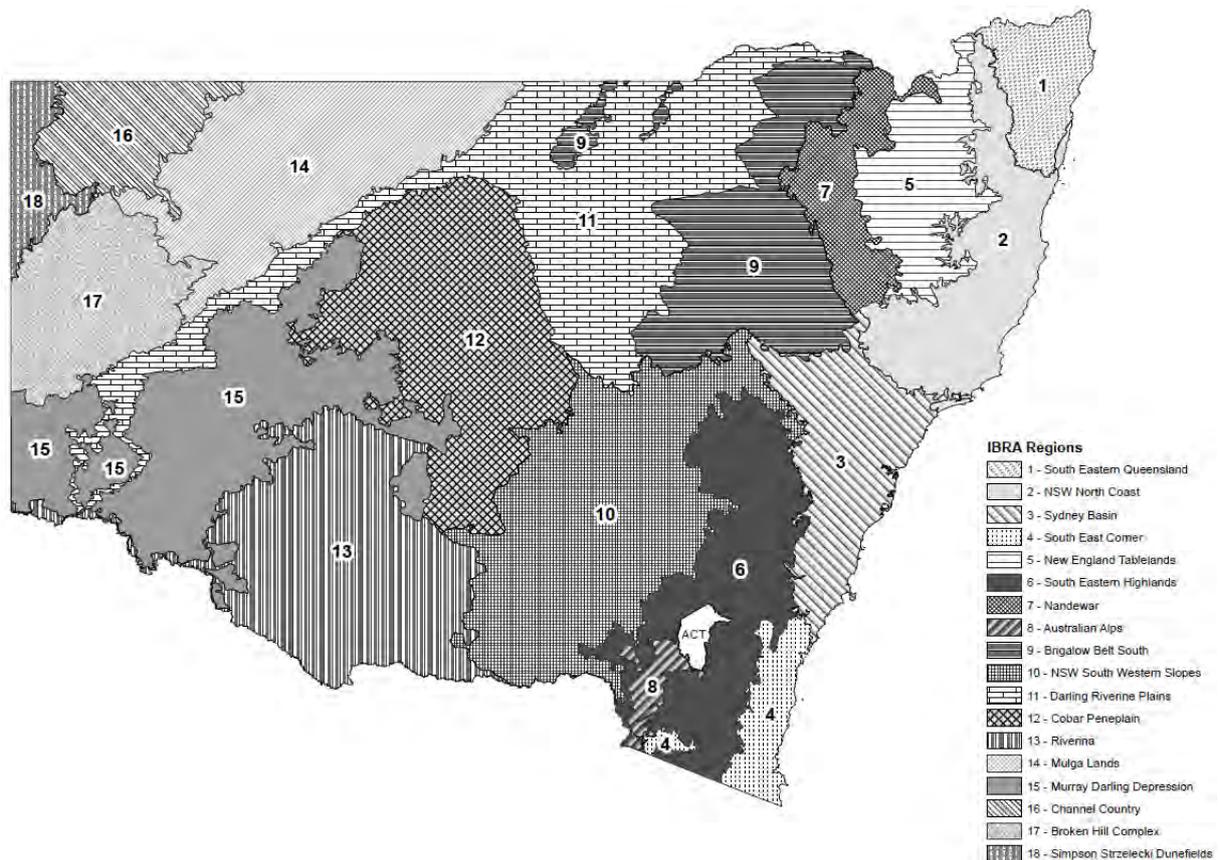


Figure 2: Interim Biogeographic Regionalisation of Australia (IBRA) regions, where prescriptions for some threatened species may vary

Further information about individual threatened species may be sourced from the Environment, Energy and Science Group (EES) of DPE. The DPE EES website provides species profiles and additional information. Visit <https://www.environment.nsw.gov.au/topics/animals-and-plants/threatened-species>.

Amphibians

Northern corroboree frog (*Pseudophryne pengilley*)

Zones for application of prescription

South Eastern Highlands, Australian Alps. For information on the more specific area of distribution, refer to Figure 3.

Prescription

- (a) A 30-metre exclusion zone must be established around all bogs, soaks and seepages. The exclusion zone must be measured from the outer edge of the bog, soak or seepage. Where the bog, soak or seepage is fringed by tea-tree, the exclusion zone must be measured from the outer edge of the tea-tree.
- (b) All bogs, soaks and seepages that are protected by this prescription must be clearly recorded on the Forest Management Plan or Forest Stewardship Plan map.
- (c) The width of exclusion areas must be measured from greatest extent of the bog, soak or seepage.

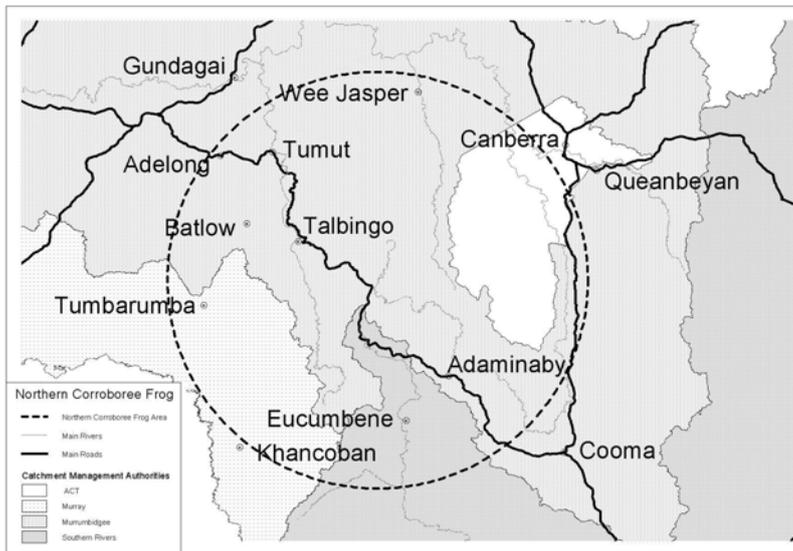


Figure 3: Area of application of northern corroboree frog prescription

Mammals

Brush-tailed phascogale (*Phascogale tapoatafa*)

Zones for application of prescription

Australian Alps, NSW South Western Slopes, South East Corner, South Eastern Highlands, Sydney Basin

Prescription

Where there is a brush-tailed phascogale record within the area of forest operations, the following must apply:

- (a) A 50 metre exclusion zone must be implemented around den trees, and
- (b) coarse woody debris within 200 metres of the record must be retained where practicable.

Additional information

Potential brush-tailed phascogale habitat is dry sclerophyll open forest or woodland with a generally open understorey, preferably containing large trees with rough bark and hollows to provide optimal foraging and denning habitat.

Eastern pygmy-possum (*Cercartetus nanus*)

Zones for application of prescription

Australian Alps, NSW South Western Slopes, South East Corner, South Eastern Highlands, Sydney Basin

Prescription

Where there is an eastern pygmy-possum record within the area of forest operations, the following must apply:

- (a) An exclusion zone with a 50-metre radius (about 0.8 hectares) must be identified, centred on the location of the record, with no forestry operations or removal of understorey plants permitted.
- (b) Within a 100-metre radius (about 3.5 hectares) of the exclusion zone, a buffer zone must be identified within which the following additional prescriptions must be implemented:
 - (i) Only single-tree selection and thinning operations can occur (i.e. no canopy openings).
 - (ii) Single-tree selection and thinning operations must not reduce the stand basal area below 12m²/hectare
 - (iii) A minimum of 26 trees with visible hollows must be retained where available.
 - (iv) Disturbance to understorey trees and shrubs (particularly banksias, bottlebrush and acacias), ground logs, rocks and litter must be minimised.
- (v) coarse woody debris must be retained where practicable

Additional information

Potential eastern pygmy-possum habitat is found in a broad range of habitats including rainforest, sclerophyll (including box-ironbark) forest, woodland and heath. In most areas, woodlands and heath appear to be preferred, except in north-eastern NSW where they are most frequently encountered in rainforest.

Spotted-tailed quoll (*Dasyurus maculatus*)

Zones for application of prescription

Australian Alps, NSW South Western Slopes, South East Corner, South Eastern Highlands, Sydney Basin

Prescription

Where there is a record of a spotted-tailed quoll den site, maternal den or latrine site within the area of forest operations, the following must apply:

- (a) An exclusion zone with a 200-metre radius (about 12.5 hectares), centred on the location of the record, must be implemented around a spotted-tailed maternal quoll den site or latrine site. This exclusion area must be linked to riparian exclusion zones where practicable.
- (b) An exclusion zone with a 100-metre radius (about 3.5 hectares), centred on the location of the record, must be implemented around spotted-tailed quoll den sites. This exclusion zone must be linked to riparian exclusion zones where practicable.
- (c) Areas of riparian exclusion and protection zone must not be counted towards exclusion zones for the spotted-tailed quoll.

Squirrel glider (*Petaurus norfolcensis*)

Zones for application of prescription

Australian Alps, NSW South Western Slopes, South East Corner, South Eastern Highlands, Sydney Basin

Prescription

Where there is a squirrel glider record in an area of forest operations, the following must apply:

- (a) A buffer zone with a 250-metre radius (about 20 hectares) must be identified, centred on the location of the record or records.
- (b) Within this buffer zone, the following additional prescriptions must be implemented:
 - (i) A minimum of 15 trees per 2 hectares with visible hollows must be retained where available.
 - (ii) A recruitment tree must be retained for each hollow bearing tree retained. Where the total number of hollow bearing trees and recruitment trees is less than 30 trees per 2 hectares, additional recruitment trees must be retained to bring the number up to 30 trees per 2 hectares.
 - (iii) Disturbance to understorey trees and shrubs (particularly banksias and acacias), ground logs, rocks and litter must be minimised.
- (c) Where there are records of dens or roosts, these must be contained within buffer zones encompassing suitable habitat.
- (d) Where there are more than two squirrel glider records closer than 250 metres apart within the forest operation area, advice on the location of the buffer area must be sought from EES before commencing forestry operations.

Additional information

Squirrel glider habitat is generally dry eucalypt forest and woodland. In coastal areas, potential habitat is blackbutt, bloodwood and ironbark forest with a heathy understorey. In the absence of these forest types, areas of mature or old growth forest must be retained.

Southern brown bandicoot (eastern) (*Isoodon obesulus*)

Zones for application of prescription

South East Corner, South Eastern Highlands, Sydney Basin

Prescription

Where there is a southern brown bandicoot (eastern) record in an area of forest operations, the following must apply:

- (a) a 200 metre radius exclusion zone (about 12.5 hectares) must be identified, centred on the record
- (b) within this exclusion zone, the following additional prescriptions must be implemented:
 - (i) no forestry operations, or removal of understorey plants or groundcover, are permitted
 - (ii) no post-harvesting burning is permitted
 - (iii) disturbance to understorey trees and shrubs, ground logs, and rocks and litter must be minimised.

Additional information

Potential habitat for the southern brown bandicoot is generally heath or open forest with a healthy understorey on sandy or friable soils. Bandicoots eat various ground-dwelling invertebrates and the fruit-bodies of hypogeous (underground-fruited) fungi. Their searches for food often create distinctive conical holes in the soil.

Yellow-bellied glider (*Petaurus australis*)

Zones for application of prescription

Australian Alps, NSW South Western Slopes, South East Corner, South Eastern Highlands, Sydney Basin

Prescription

- (a) An exclusion zone with a 50-metre radius must be implemented around trees used as dens by yellow-bellied gliders.
- (b) All yellow-bellied glider sap feed trees must be retained and marked for retention. A sap feed tree is a tree with recent V-notch incisions or other incisions made by a glider. Recent incisions are incisions that have not closed.
- (c) The feed trees retained as above must be of the same species as the identified sap feed tree or identified den tree, or should be trees that shed their bark in long strips, e.g. species from blue, flooded, grey, red and white gum groups.
- (d) The retained feed trees must be marked for retention.

Additional information

Yellow-bellied gliders occur in tall mature eucalypt forest, generally in areas with high rainfall and nutrient-rich soils. Forest type preferences vary with latitude and elevation: mixed coastal forests to dry escarpment forests in the north, and moist coastal gullies and creek flats to tall montane forests in the south. The gliders feed primarily on plant and insect exudates, including nectar, sap, honeydew and manna with pollen and insects providing protein. They extract sap by incising or biting into the trunks and branches of favoured food trees, often leaving a distinctive 'V'-shaped scar.

Greater glider (*Petauroides volans*)

Zones for application of prescription

South East Corner, South Eastern Highlands, Sydney Basin

Prescription

No forestry operations are permitted within 50 metres of each greater glider den site.

Additional information

Greater gliders occur in woodlands and eucalypt forests along the ranges and coastal plains of NSW, favouring tall, montane, and moist forests with a diversity of eucalypt species, relatively old trees and abundant hollows. They tend to occupy a relatively small home range, between 1 to 4 hectares, though this range becomes larger in lower productivity forests and more open woodlands. Greater gliders shelter during the day in hollows of large trees, which may be lined with leaf matter, and typically use between 2 to 18 hollows in their home range. They are usually solitary, though mated pairs and offspring will share a den during the breeding season and until the young are independent.

Long-footed potoroo (*Potorous longipes*)

Zones for application of prescription

South East Corner

Prescription

Where there is a long-footed potoroo record within an area of forest operations, the following must apply:

- (a) a 200 metre radius exclusion zone (about a 12.5 hectares) must be identified, centred on the record
- (b) within this exclusion zone, the following prescriptions must be implemented:
 - (i) no forestry operations, or removal of understorey plants or groundcover, are permitted
 - (ii) no post-harvest burning is permitted
 - (iii) disturbance to ground logs, rocks and litter must be minimised.

Additional information

Potential habitat for the long-footed potoroo includes moist forests from montane wet sclerophyll forests over 1000 metres in altitude to lowland forests at 150 metres in altitude. Moist soil throughout the year is an essential component of habitat, allowing the potoroo's primary food source, the fruit-bodies of hypogeous (underground fruiting) fungi, to persist.

Long-nosed potoroo (*Potorous tridactylus*)

Zones for application of prescription

South East Corner, South Eastern Highlands, Sydney Basin

Prescription

Where there is a record of a long-nosed potoroo in an area of forest operations, the following must apply:

- (a) Forestry operations must be excluded from a 5-metre radius buffer around 12 retained trees per 2 hectares. These 12 trees can include trees retained under other prescriptions.
- (b) No post-harvest burning is permitted within or adjacent to the 5-metre radius buffers identified in point (a) above.

Additional information

The long-nosed potoroo inhabits coastal heaths, and dry and wet sclerophyll forests. Dense understorey with occasional open areas is an essential part of habitat and may consist of grass-trees, sedges, ferns or heath, or of low shrubs of tea-trees or melaleucas. A sandy loam soil is also common. The fruit-bodies of hypogeous (underground-fruiting) fungi are a large component of the diet of the long-nosed potoroo.

Koala (*Phascolarctos cinereus*)

Prescription

- (a) Where there is a record of a koala within the area of forestry operations, or within 500 metres of an area of forestry operations, or where 1 or more koala scats are found beneath the canopy of a primary or secondary koala feed tree during pre-harvest surveys or harvest operations, or within areas mapped under the PNF koala prescription map as shown in Figure 4, the following must apply:
- (i) A minimum of 15 primary koala feed trees and 5 secondary koala feed trees must be retained per hectare in the forestry operations area (not including other exclusion or buffer zones), where available.
 - (ii) Where possible, preference should be given to trees that provide habitat connectivity and/or build on existing landscape features (Table B), existing habitat islands, refugia and conservation areas adjacent to and within the PNF Plan area, have leafy, broad crowns and be in a range of size classes with a minimum of 20 centimetres diameter at breast height over bark.
 - (iii) Damage to retained trees must be minimised by directional felling techniques.
 - (iv) Post-harvest burns must minimise damage to the trunks and foliage of retained trees.
 - (v) Each tree must be visually assessed for koalas immediately prior to it being felled.
 - (vi) Where 20 koala feed trees per hectare are present in areas mapped under the PNF koala prescription map but either 15 primary or 5 secondary feed trees for the relevant KMA cannot be met, then the landholder must retain as many koala feed trees as are available, including substituting primary feed trees for secondary (or vice versa) up to a maximum of 20 koala feed trees per hectare. Primary feed trees are to be prioritised for retention over secondary feed trees.
 - (vii) Where there are not 20 koala feed trees per hectare present in areas mapped under the PNF koala prescription map then conditions (a) (i)-(iv) and (a) (vi) do not apply but the landholder(s) must retain as many koala feed trees as are available. However, if in the course of harvest operations one or more koala scats are found beneath the canopy of a koala feed tree or where the presence of a koala is clearly identifiable by recent scratches, the landholder must also reinstate conditions (a) (ii) – (v). These areas will remain part of the PNF koala prescription map unless surveyed consistent with (viii).
 - (viii) Where the landholder considers the PNF koala prescription map is inaccurate on their property, including where the required number of koala feed trees cannot be found (as per koala prescription clause vi-vii), the landholder may request that the area(s) is verified by a suitably qualified expert(s) as described in Note 8.
- (b) Any tree containing a koala, or any tree beneath which 1 or more koala scats are found, or where the presence of a koala is clearly identifiable by recent scratches must be retained, and an exclusion zone of 20 metres (50 metres in Central and Southern Tablelands Koala Management Area) must be implemented around each retained tree.
- (i) Where signs of koala presence outlined in (b) are identified during pre-harvest surveys, those trees must be visually assessed for koala presence during harvest operations.

Note 7: Landholders will be provided with the PNF koala prescription mapping held by the NSW Government as part of their PNF Plan approval. Updates to this map will be overseen by the NSW Forest Monitoring Steering Committee (or equivalent) independently chaired by the NSW Natural Resources Commission. Notwithstanding this the PNF koala prescription map may be updated at a property scale consistent with Note 8.

Note 8: Verifying areas mapped as highly suitable koala habitat on private land

Where the landholder(s) consider the mapping of koala habitat is inaccurate, and/or where the required number of koala feed trees cannot be found (as per Koala Prescription Clause (a)(vi)), the landholder may commission a review be undertaken by a suitably qualified expert(s).

The koala habitat suitability of the area must be reassessed based on an on-ground koala habitat verification survey conducted by a suitably qualified expert(s). The landholder(s) will need to identify the disputed area and provide their written permission for a habitat verification survey to be conducted.

The survey must be conducted in accordance with the protocol available at www.ils.nsw.gov.au/pnforestry.

Depending on the results of the assessment, Local Land Services will provide the landholder(s) with:

- (a) an amended map to show any revised areas of highly suitable koala habitat, or
- (b) the original map, showing the highly suitable koala habitat areas mapped before the review.

Where the survey has determined that the disputed area is not highly suitable koala habitat, Local Land Services will approve an amendment to the Private Native Forestry Plan and an amended Forest Management Plan or Forest Stewardship Plan to apply the revised highly suitable koala habitat mapping.

Trees with koalas present that are identified during surveys must be marked and this information provided to the landholder(s) by Local Land Services prior to forestry operations commencing.

Additional information

Generally, koala habitat comprises eucalypt forest and woodland containing primary and secondary food trees (see Table H). Koala droppings (scats) have a strong eucalyptus odour, are pale green in colour with faint or clear ridges and/or vertical stripes, have a moist mucus coating and bullet shaped appearance.

For further information on the identification of koala scats, contact DPE or refer to the DPE website – <https://www.environment.nsw.gov.au/>

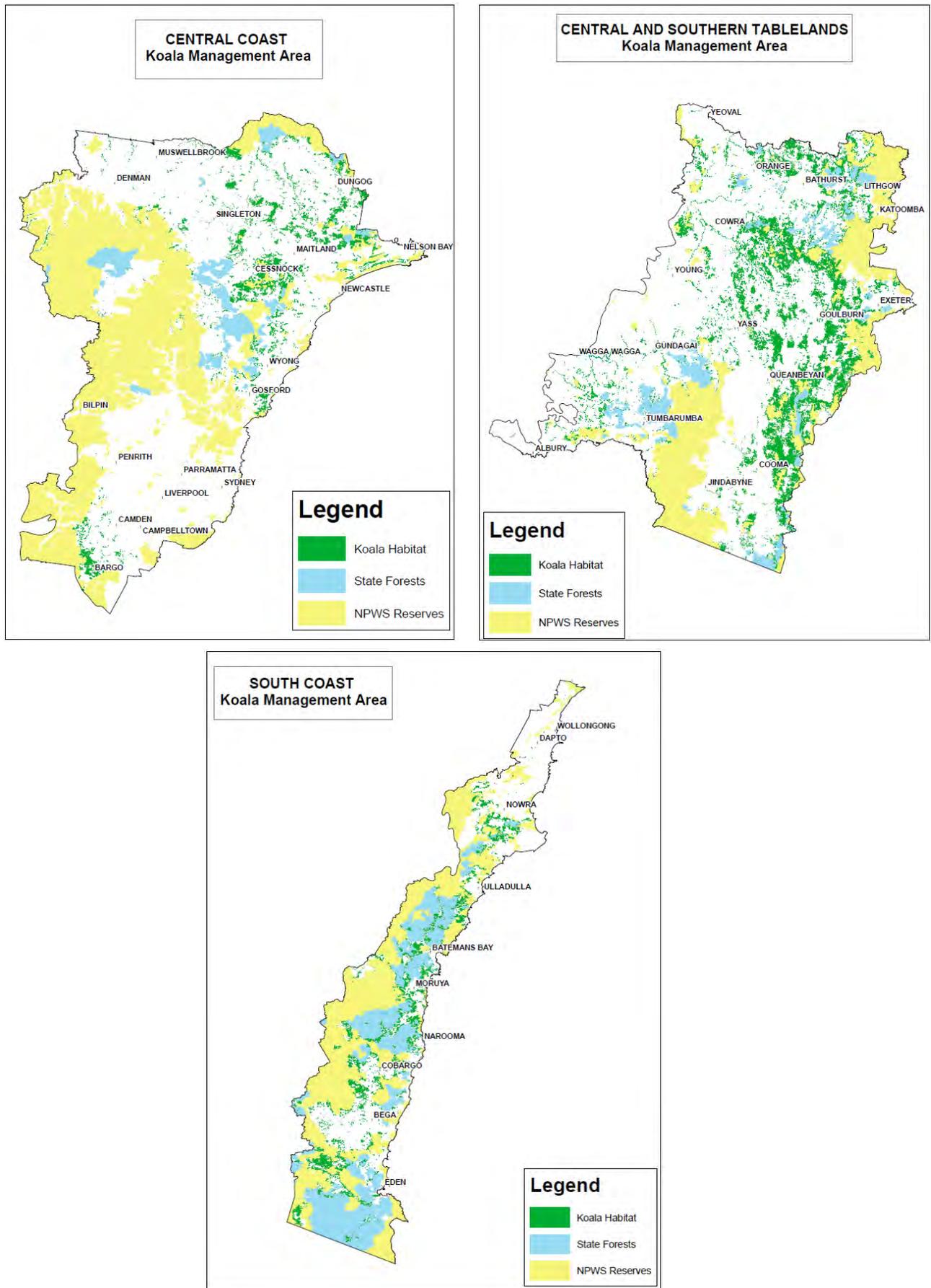


Figure 4: PNF koala prescription map (green) in Central Coast (top left), Central and Southern Tablelands (top right) and South Coast (bottom) Koala Management Areas.

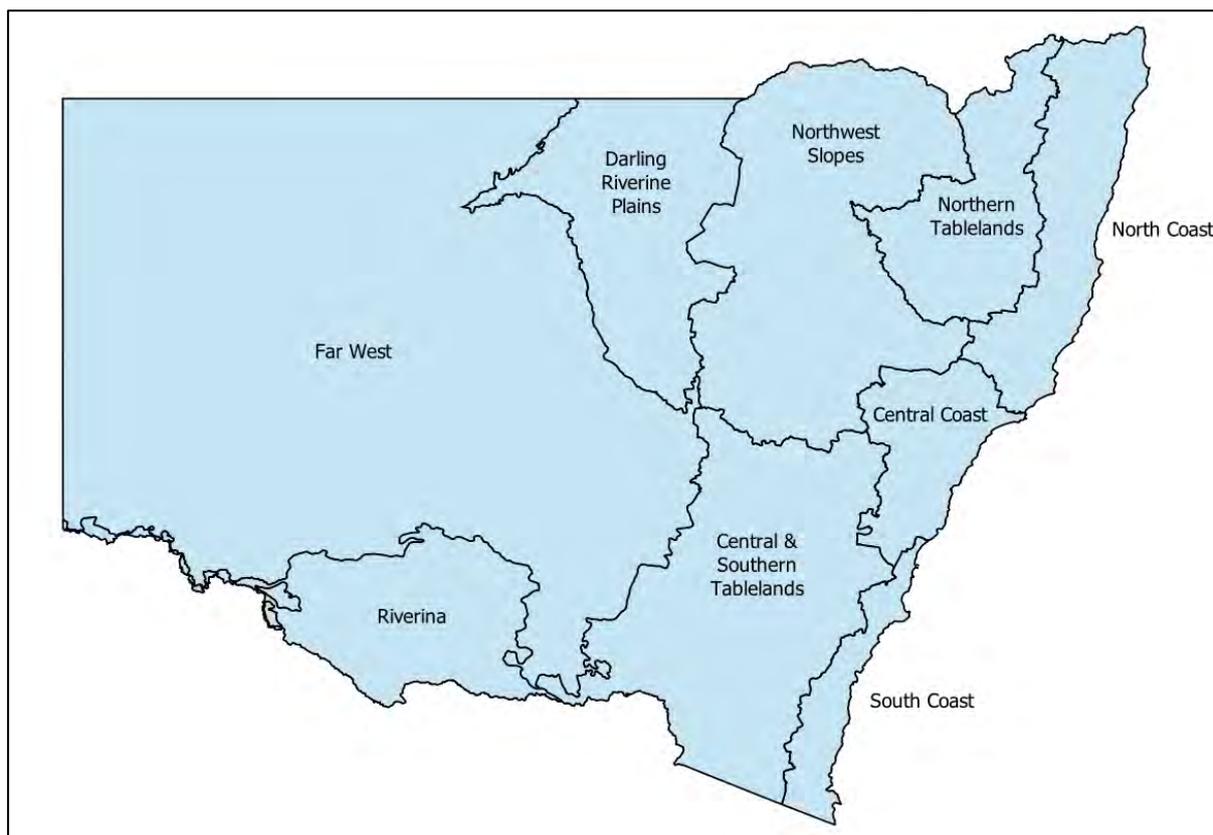


Figure 5: Koala Management Areas in NSW

Table H: Primary and secondary koala use trees for Koala Management Areas in the Southern PNF Code areas

Koala food tree species		Koala Management Area		
Common name	Scientific name	Central Coast	South Coast	Central and Southern Tablelands
Primary tree species				
Blakley’s red gum	<i>Eucalyptus blakelyi</i>			X
River red gum	<i>Eucalyptus camaldulensis</i>			X
Mountain grey gum	<i>Eucalyptus cypellocarpa</i>		X	
White stringybark	<i>Eucalyptus globoidea</i>	X	X	
Woollybutt	<i>Eucalyptus longifolia</i>		X	
Brittle gum	<i>Eucalyptus mannifera</i>			X
Tallowwood	<i>Eucalyptus microcorys</i>	X		
Parramatta red gum	<i>Eucalyptus parramattensis</i>	X		
Grey gum	<i>Eucalyptus punctata</i>	X		X
Swamp mahogany	<i>Eucalyptus robusta</i>	X		
Inland scribbly gum	<i>Eucalyptus rossii</i>			X
Forest red gum	<i>Eucalyptus tereticornis</i>	X	X	X
Ribbon gum	<i>Eucalyptus viminalis</i>			X
Secondary tree species				
White box	<i>Eucalyptus albens</i>	X		X
Cabbage gum	<i>Eucalyptus amplifolia</i>	X		

Koala food tree species	Koala Management Area			
	Common name	Scientific name	Central Coast	South Coast
Beyer's ironbark	<i>Eucalyptus beyeriana</i>	X		
Blakley's red gum	<i>Eucalyptus blakelyi</i>	X		
Coastal grey box	<i>Eucalyptus bosistoana</i>	X	X	
Yertchuk	<i>Eucalyptus consideriana</i>		X	
Mountain grey gum	<i>Eucalyptus cypellocarpa</i>	X		X
Broad-leaved peppermint	<i>Eucalyptus dives</i>			X
Thin-leaved stringybark	<i>Eucalyptus eugenioides</i>		X	
White stringybark	<i>Eucalyptus globoidea</i>			X
Woolybutt	<i>Eucalyptus longifolia</i>	X		
Red stringybark	<i>Eucalyptus macrorhyncha</i>			X
Maiden's gum	<i>Eucalyptus maidenii</i>		X	
Brittle gum	<i>Eucalyptus mannifera</i>	X		
Yellow box	<i>Eucalyptus melliodora</i>	X		
Western grey box	<i>Eucalyptus microcarpa</i>			X
Grey box	<i>Eucalyptus moluccana</i>	X		
Messmate	<i>Eucalyptus obliqua</i>		X	
Grey ironbark	<i>Eucalyptus paniculata</i>	X		
Snow gum	<i>Eucalyptus pauciflora</i>			X
Sydney peppermint	<i>Eucalyptus piperita</i>			X
Small-fruited grey gum	<i>Eucalyptus propinqua</i>	X		
White-topped box	<i>Eucalyptus quadrangulata</i>	X		
Hard-leaved scribbly gum	<i>Eucalyptus sclerophylla</i>			X
Red ironbark	<i>Eucalyptus tricarpa</i>		X	
Ribbon gum	<i>Eucalyptus viminalis</i>	X		

Grey-headed flying-fox (*Pteropus poliocephalus*) camps

Zones for application of prescription

NSW South Western Slopes, South East Corner, South Eastern Highlands, Sydney Basin

Prescription

Forestry operations and any associated activities must be excluded within a flying-fox camp, and within a 50-metre exclusion zone around any camp which contains grey-headed flying-foxes.

Additional information

Flying-foxes congregate (roost) in large numbers known as 'camps'. These areas are typically within 20 kilometres of known food sources, and 'camp' localities vary over different seasons depending on regional food availability. Camps are often located in riparian vegetation such as rainforest remnants, swamp forest (paperbarks) or casuarina forests. They are often used annually. Camps are extremely important for day-time roosting and socialising and are used as maternity sites for rearing young.

Reptiles

Broad-headed snake (*Hoplocephalus bungaroides*)

Zones for application of prescription

NSW South Western Slopes, South East Corner, South Eastern Highlands, Sydney Basin

Prescription

Where there is a broad-headed snake record in the area of forestry operations, the following must apply:

- (a) A buffer zone with a 100-metre radius (about 3 hectares) must be identified, centred on the location of the record.
- (b) Within this buffer zone, the following additional prescriptions must be implemented:
 - (i) A minimum of 26 trees with visible hollows with openings greater than 10 centimetres must be retained where available.
 - (ii) Disturbance to understorey trees and shrubs, ground logs and, in particular, rock outcrops and ledges must be minimised.

Additional information

Potential habitat for the broad-headed snake is largely confined to Triassic sandstones, including the Hawkesbury, Narellan and Shoalhaven formations on the coast and in the ranges, in an area within approximately 250 kilometres of Sydney. The snake shelters in rock crevices and under flat sandstone rocks on exposed cliff edges during autumn, winter and spring, and shelters in hollows in large trees within 200 metres of escarpments in summer.

Rosenberg's goanna (*Varanus rosenbergi*)

Zones for application of prescription

Australian Alps, NSW South Western Slopes, South Eastern Highlands, Sydney Basin

Prescription

Where there is a Rosenberg's goanna record in the area of forestry operations, the following must apply:

- (a) A buffer zone with a 200-metre radius (about 12.5 hectares) must be identified, centred on the location of the record.
- (b) Within this buffer zone, the following additional prescriptions must be implemented:
 - (i) All termite mounds must be protected from any disturbance.
 - (ii) Disturbance to understorey trees and shrubs and, in particular, ground logs and rock outcrops and ledges must be minimised.
 - (iii) No post-harvest burning is permitted.

Additional information

Rosenberg's goanna occurs on Sydney sandstone in Wollemi National Park north-west of Sydney, in the Goulburn and ACT regions and near Cooma in the south. There are records from the south-west slopes near Khancoban and the Tooma River. It is found in heath, open forest and woodland. This species nests in termite mounds, which are a critical component of its habitat.

Birds

Powerful owl (*Ninox strenua*), masked owl (*Tyto novaehollandiae*), sooty owl (*Tyto tenebricosa*) and barking owl (*Ninox connivens*)

Zones for application of prescription

Australian Alps, NSW South Western Slopes, South East Corner, South Eastern Highlands, Sydney Basin

Prescription

Where there is a record within the area of forestry operations for the powerful owl, masked owl, sooty owl or barking owl, the following prescriptions apply:

- (a) Nest trees (trees with hollows containing a nest of a powerful, masked, sooty or barking owl) must be retained and protected by a 50-metre exclusion zone.
- (b) Roost trees (trees where a powerful, masked, sooty or barking owl have been observed roosting or signs of roosting are observed) must be retained and protected by a 25-metre exclusion zone.
- (c) Within 1000 metres of the record, the following additional prescriptions must be implemented:
 - a. a minimum of 15 hollow bearing trees per two hectares must be retained, where available.
 - b. a recruitment tree must be retained for each hollow bearing tree, where available.
 - c. where there are not 15 hollow bearing trees available recruitment trees must be substituted for hollow bearing trees up to a maximum of 30 trees per two hectares, where available.
 - d. Disturbance to the understorey, coarse woody debris and ground cover should be limited to the minimum extent necessary.

Additional information

Potential owl habitat comprises rainforest, wet and dry sclerophyll forest, and woodland.

Regent honeyeater (*Xanthomyza Phrygia*)

Zones for application of prescription

NSW South Western Slopes, South East Corner, South Eastern Highlands, Sydney Basin

Prescription

Where there is a regent honeyeater record in an area of forestry operations, the following must apply:

- (a) at least 10 eucalypt feed trees (refer to Table D) must be retained within every two hectares of the net harvest area. These must be marked for retention. Where retained eucalypt feed trees also meet the requirements of habitat or recruitment trees, the retained eucalypt feed trees can be counted as habitat or recruitment trees
- (b) where a regent honeyeater is observed feeding, the tree in which it is feeding must be retained
- (c) trees containing regent honeyeater nests must be retained, with a 20 metre radius exclusion zone around them.

Additional information

This species inhabits dry open forest and woodland, particularly box–ironbark woodland and riparian forests of river she-oak. Regent honeyeaters inhabit woodlands that support a significantly high abundance and richness of bird species. These woodlands have many mature trees and mistletoes and high canopy cover. The bird also forages in winter-flowering coastal swamp mahogany and spotted gum forests on the central coast and the upper north coast. These birds are also occasionally seen on the south coast.

Swift parrot (*Lathamus discolor*)

Zones for application of prescription

NSW South Western Slopes, South East Corner, South Eastern Highlands, Sydney Basin

Prescription

Where there is a record of a swift parrot in an area of forestry operations, the following must apply:

- (a) An exclusion zone of 25 metres applies to all swift parrot roost trees
- (b) At least 10 eucalypt feed trees (refer to Table D) must be retained within every two hectares of the net harvest area. These must be marked for retention. Where retained eucalypt feed trees also meet the requirements of habitat or recruitment trees, the retained eucalypt feed trees can be counted as habitat or recruitment trees
- (c) Where a swift parrot is observed feeding, the tree in which it is feeding must be retained.

Additional information

Swift parrots migrate to the Australian south-east mainland between March and October. On the mainland, they occur where eucalypts are flowering profusely or where there are abundant lerps (from sap-sucking bugs). Favoured feed trees include winter-flowering species such as swamp mahogany (*Eucalyptus robusta*), spotted gum (*Corymbia maculata*), red bloodwood (*C. gummifera*), mugga ironbark (*E. sideroxylon*) and white box (*E. albens*). Commonly used lerp-infested trees include grey box (*E. microcarpa*), grey box (*E. moluccana*) and blackbutt (*E. pilularis*).

Bush stone-curlew (*Burhinus grallarius*)

Zones for application of prescription

NSW South Western Slopes, South East Corner, South Eastern Highlands, Sydney Basin

Prescription

- (a) No forestry operations are permitted within a 50-metre radius of all bush stone-curlew ground nests.
- (b) coarse woody debris within 200 metres of the nest must be retained where practicable

Additional information

Bush stone-curlew nests are found in areas of dry, grassy open forest or woodland and are a small scrape on bare ground, often near a bush or tree or beside a fallen limb. Nest sites can be re-used in consecutive years. Eggs are stone-coloured, blotched dark brown and grey. Nesting season is August through to January.

Glossy black-cockatoo (*Calyptorhynchus lathamii*)

Zones for application of prescription

NSW South Western Slopes, South East Corner, South Eastern Highlands, Sydney Basin

Prescription

- (a) There must be a 50-metre-radius exclusion zone around all glossy black-cockatoo nests, within which no forestry operations may occur.
- (b) Within a 200-metre radius of any location of a glossy black-cockatoo record, damage to stands of she-oaks (*Allocasuarina* and *Casuarina* spp.) containing trees more than 3 metres in height and seed cones must be minimised.
- (c) Any she-oaks with evidence of foraging by glossy black-cockatoos (i.e. chewed seed cones under the tree) must be protected.

Additional information

Glossy black-cockatoos nest in tree hollows usually in larger, mature trees. Nest locations are indicative of where a glossy black-cockatoo is seen entering a hollow. Nesting season is from March to August.

The presence of she-oaks (*Allocasuarina* and *Casuarina* spp.) is a key indicator of likely feeding habitat. Mature trees with hollows are required for nesting.

Gang-gang cockatoo (*Callocephalon fimbriatum*)

Zones for application of prescription

All

Prescription

No forestry operations are permitted within a 25-metre radius of all gang-gang cockatoo nests.

Additional information

The gang-gang cockatoo is generally found in tall mountain forests and woodlands (particularly heavily timbered and mature wet sclerophyll forests) in spring and summer, and moves to lower altitudes in drier, more open eucalypt forests and woodlands (particularly box-gum, box-ironbark and dry coastal areas) in autumn and winter. The species favours old growth forest and woodland for nesting and roosting. Nests are located in hollows that are 10 cm in diameter or larger and at least 9 m above the ground in eucalypts.

Brown treecreeper (*Climacteris picumnus*)

Zones for application of prescription

All

Prescription

No forestry operations are permitted within a 25-metre radius of all brown treecreeper nests between 1 June and 31 January.

Additional information

The brown treecreeper occurs in eucalypt woodlands and dry open forest, mainly inhabiting woodlands dominated by stringybarks or other rough-barked eucalypts. Fallen timber is an important habitat component for foraging. This species depends on hollows in standing dead or live trees for nesting, and are generally present at a site year-round.

Speckled warbler (*Chthonicola sagittate*)

Zones for application of prescription

All

Prescription

No forestry operations are permitted within a 25-metre radius of all speckled warbler nests between 1 August and 31 January.

Additional information

The speckled warbler occurs in a range of *Eucalyptus* dominated communities that have a grassy understorey. Pairs occupy a breeding territory of about 10 hectares, with a slightly larger home range outside of the breeding season. They nest in a rounded, domed, roughly built nest of dry grass and strips of bark at the base on a low dense plant, often among fallen branches and other litter.

Diamond firetail (*Stagonopleura guttata*)

Zones for application of prescription

All

Prescription

No forestry operations are permitted within a 25-metre radius of all diamond firetail nests between 1 August and 31 January.

Additional information

The diamond firetail occurs in grassy eucalypt woodlands, but also occurs in open forest, mallee, and grasslands. It is often found in riparian areas, and sometimes in lightly wooded farmland. Nests are globular structures built either in the shrubby understorey or higher up, especially under hawk or raven nests.

Flame robin (*Petroica phoenicea*)

Zones for application of prescription

All

Prescription

No forestry operations are permitted within a 25-metre radius of all flame robin nests between 1 September and 1 March.

Additional information

The flame robin breeds in spring to late summer, in upland tall moist eucalypt forests and woodlands. Breeding habitat has a ground layer dominated by native grasses and a sparse or dense shrub layer. The flame robin builds nests near the ground in sheltered sites such as shallow cavities in trees, stumps or banks. In winter, the species migrates to drier, more open habitat in dry forests, open woodlands, pastures and native grasslands, and is occasionally seen in heathland or other shrubland.

Scarlet robin (*Petroica boodang*)

Zones for application of prescription

All

Prescription

No forestry operations are permitted within a 25-metre radius of all scarlet robin nests between 1 July and 31 January.

Additional information

The scarlet robin occurs in dry eucalypt forests and woodlands, where logs and fallen timber are important components of its habitat. The species' nest is an open cup made of plant fibres and cobwebs and is built in the fork of a tree more than two metres above the ground.

Hooded robin (*Melanodryas cucullate*)

Zones for application of prescription

All

Prescription

No forestry operations are permitted within a 25-metre radius of all hooded robin nests between 1 July and 30 November.

Additional information

The scarlet robin prefers lightly wooded areas, usually open eucalypt woodland, acacia scrub and mallee, often in or near clearings or open areas. Territories range from around 10 hectares in the breeding season to 30 hectares in the non-breeding season. The species breeds between July and November and often rears several broods. Nest is a small, neat cup of bark and grasses bound with webs, in a tree fork or crevice, from < 1 metre to 5 metres above the ground.

Dusky woodswallow (*Artamus cyanopterus cyanopterus*)

Zones for application of prescription

All

Prescription

No forestry operations are permitted within a 25-metre radius of all dusky woodswallow nests between 1 September and 1 March.

Additional information

Dusky woodswallows inhabit dry, open eucalypt forests and woodland with an open or sparse understorey, but has also been recorded in shrublands, heathlands and occasionally moist forest or rainforest. This species is also found in farmland, usually at the edges of forest or woodland. Nests are open and cup-shaped and occur in a range of sites.

Varied sittella (*Daphoenositta chrysoptera*)

Zones for application of prescription

All

Prescription

No forestry operations are permitted within a 25-metre radius of all varied sittella nests.

Additional information

The varied sittella inhabits eucalypt forests and woodlands, especially those containing rough-barked and mature smooth-barked gums with dead branches, mallee and *Acacia* woodland. Builds a cup-shaped nest of plant fibres and cobwebs in an upright tree fork high in the living tree canopy, and often re-uses the same fork or tree in successive years.

Black-chinned honeyeater (*Melithreptus gularis*)

Zones for application of prescription

All

Prescription

No forestry operations are permitted within a 25-metre radius of all black-chinned honeyeater nests between 1 June and 31 December.

Additional information

The black-chinned honeyeater inhabits dry open forests or woodlands dominated by box and ironbark eucalypts, but also forests of smooth-barked gums, stringybarks, ironbarks, richer sheoaks and tea-trees. The species nests high in the crown of a tree in the uppermost lateral branches, hidden by foliage.

Turquoise parrot (*Neophema pulchella*)

Zones for application of prescription

NSW South Western Slopes, South East Corner, South Eastern Highlands, Sydney Basin

Prescription

No forestry operations are permitted within a 30-metre radius of all turquoise parrot nests.

Additional information

Turquoise parrots occur mainly west of the escarpment on the tablelands and western slopes, but are occasionally found more widely through most of eastern NSW in open woodlands, dry sclerophyll forest and adjacent grasslands. Nests range from 1–20 metres above the ground. They are in hollows in small trees, often dead eucalypts, or in holes or stumps, fence posts or even logs lying on the ground. Nesting season is from August to December and from April to May.

Threatened flora – specific prescriptions

Conditions applying to flora species

Table I: Threatened flora: 50 metre exclusion zone, all individuals

Where there is a record of a species to which this condition applies:

- (a) an exclusion zone with at least a 50 metre radius must be implemented around all individuals
- (b) an exclusion zone at least 50 metres wide must be implemented around all groups of individuals. A group is defined as more than one individual located less than 20 metres apart.

NSW Conservation status*	Scientific name	Common name
EN	<i>Arthropteris palisotii</i>	Lesser creeping fern
CR	<i>Eucalyptus recurva</i>	Mongarlowe mallee
EN	<i>Lepidium hyssopifolium</i>	Aromatic peppergrass

*CR: Critically endangered; EN: Endangered; VU: Vulnerable

Table J: Threatened and protected flora: 20 metre exclusion zone, all individuals

Where there is a record of a species to which this condition applies:

- (a) an exclusion zone with at least a 20 metre radius must be implemented around all individuals
- (b) an exclusion zone at least 20 metres wide must be implemented around all groups of individuals. A group is defined as more than one individual located less than 20 metres apart

NSW Conservation status*	Scientific name	Common name
VU	<i>Callitris oblonga</i>	Pygmy cypress pine
EN	<i>Diuris pedunculata</i>	Small snake orchid
EN	<i>Euphrasia collina</i> subsp. <i>Muelleri</i>	Mueller's eyebright
EN	<i>Pomaderris brunnea</i>	Brown pomaderris
EN	<i>Pseudanthus ovalifolius</i>	Oval-leafed pseudanthus

*CR: Critically endangered; EN: Endangered; VU: Vulnerable

Table K: Exclusion of specified forestry activities from 100% of individuals with a 10 metre exclusion zone and a further 10 metre buffer

Where there is a record of a species to which this condition applies:

- (a) an exclusion zone with a 10 metre radius must be implemented around all individuals
- (b) an additional buffer zone 10 metres wide must be implemented around all exclusion zones. Limited operations (snigging and selective tree removal) may be conducted in the buffer zone.

NSW Conservation status*	Scientific name	Common name
VU	<i>Eucalyptus robertsonii</i> subsp. <i>hemisphaerica</i>	Robertson's peppermint
EN	<i>Euphrasia scabra</i>	Rough eyebright
EN	<i>Monotaxis macrophylla</i>	Large-leafed monotaxis
VU	<i>Prostanthera densa</i>	Villous mint-bush

*CR: Critically endangered; EN: Endangered; VU: Vulnerable

Table L: Exclusion of specified forestry activities from 100% of individuals and no buffer

Individuals of the threatened species or protected native plants to which this condition applies must not be picked in the course of carrying out specified forestry activities.

NSW Conservation status*	Scientific name	Common name
VU	<i>Ammobium craspedioides</i>	Yass daisy
VU	<i>Bossiaea oligosperma</i>	Few-seeded bossiaea
VU	<i>Callitris oblonga</i> ssp. <i>Corangensis</i>	<i>Callitris oblonga</i> ssp. <i>corangensis</i>
VU	<i>Cryptostylis hunteriana</i>	Leafless tongue orchid – southern populations
EN	<i>Cynanchum elegans</i>	White-flowered wax plant
EN	<i>Daphnandra johnsonii</i>	Illawarra socketwood
EN	<i>Dillwynia glaucula</i>	Michelago parrot-pea
EN	<i>Eucalyptus parvula</i>	Small-leaved gum
VU	<i>Eucalyptus pulverulenta</i>	Silver-leafed gum
EN	<i>Eucalyptus saxatilis</i>	Suggan buggan mallee
-	<i>Gastrodia sesamoides</i> (Protected Native Plant Schedule 13 NP&W Act)	Cinnamon bells, potato orchid
-	<i>Goodenia macbarronii</i>	McBarron's goodenia
CR	<i>Grevillea iaspicula</i>	Wee Jasper grevillea
VU	<i>Grevillea parviflora</i> subsp. <i>Parviflora</i>	Small-flower grevillea
EN	<i>Grevillea wilkinsonii</i>	Tumut grevillea
VU	<i>Haloragis exalata</i> subsp. <i>exalata</i>	Square raspwort
VU	<i>Melaleuca biconvexa</i>	Biconvex paperbark
EN	<i>Monotoca rotundifolia</i>	Trailing monotoca
VU	<i>Persicaria elatior</i>	Tall knotweed
EN	<i>Persoonia glaucescens</i>	Mittagong geebung
EN	<i>Pimelea spicata</i>	Spiked rice-flower
CR	<i>Plinthanthesis rodwayi</i>	Budawang's wallaby grass
EN	<i>Pomaderris cotoneaster</i>	Cotoneaster pomaderris
EN	<i>Pomaderris elachophylla</i>	Lacy pomaderris
VU	<i>Pomaderris pallida</i>	Pale pomoderris
EN	<i>Pterostylis gibbosa</i>	Illawarra greenhood
EN	<i>Senna acclinis</i>	Rainforest cassia
EN	<i>Syzygium paniculatum</i>	Magenta lilly pilly
VU	<i>Thesium australe</i>	Austral toadflax

*CR: Critically endangered; EN: Endangered; VU: Vulnerable

Appendix B: Calculating Minimum Stand Basal Area

- (1) For compliance purposes, average basal area will be calculated using the following method:
- (a) the sample points must be located systematically across the harvested area with a minimum inter-point distance of 60 metres;
 - (b) samples must be taken using angle count sampling or fixed area plot measurements;
 - (c) where fixed area plot samples are used, plots must be 50 m x 20 m in size; and
 - (d) the total number of samples to be taken must be in accordance with Table M below.

Table M: Minimum number of sample points required for harvested areas

Size of harvested area (hectares)	Minimum number of sample points required
0–30	20
31–50	30
51–100	40
101–200	50
201+	60

- (2) Further limits:
- (a) all forestry operations must have an average basal area equal to or above the average minimum limit for basal area;
 - (b) the basal area at no more than 25% of sampling points within the harvested area can have a basal area below 7m²/ha, and
 - (c) no more than 50% of sampling points within the harvested area can be below the minimum basal area as specified in Clause 3.2 (2) (Single Tree Selection and Thinning).

Appendix C: Calculating Forest Regeneration

- (1) For compliance purposes, forest regeneration in Single Tree Selection and Thinning harvest areas will be calculated using the following method:
 - (a) the starting point must be randomly located within the harvest area by selecting it on a map before assessment;
 - (b) the sample points must be located at 20 metre intervals along a square that is 200 metres on each side (Figure 6);
 - (c) samples must be taken using fixed area plot measurements with a plot size of approximately 10 m²;
 - (d) plots must be circular with a minimum radius of 1.8 m radius; and
 - (e) each plot is classed as stocked if any part of the plot area:
 - i. is under the canopy of an existing tree, or
 - ii. contains at least one viable seedling (including new seedlings establishing from seed or lignotubers), or
 - iii. contains 'advanced growth' of an upper canopy species that is assessed as having the vigour or capability of reaching a canopy position.
 - (f) for each square (as per clause 1(b-c), convert the numbers of stocked plots to a simple percentage. Where multiple squares are assessed, the outcomes should be averaged to give an overall assessment of the harvest area.
 - (g) the total number of samples to be taken must be in accordance with Table N below.

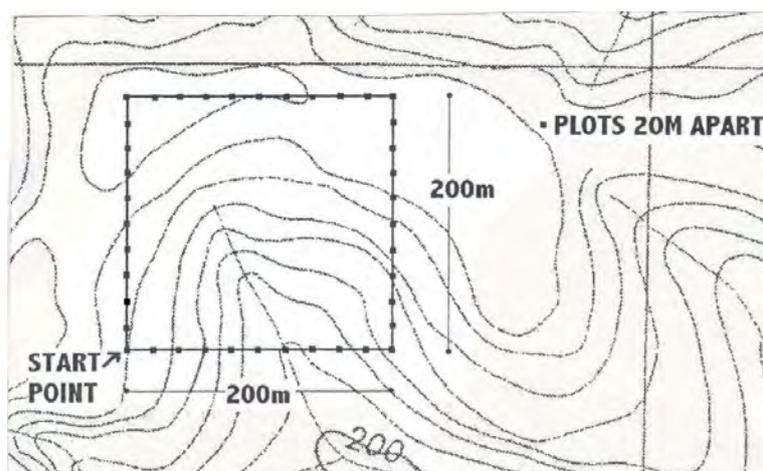


Figure 6: Example of sample point intervals along a square.

Table N: Minimum number of sample points required for harvested areas

Size of harvested area (hectares)	Minimum number of sample points required
0–10	80 (2 squares)
11–50	120 (3 squares)
51–100	200 (5 squares)
101–200	280 (7 squares)
201+	360 (9 squares)

- (2) For compliance purposes, forest regeneration in Australian Group Selection harvest areas will be calculated using the following method:
- (a) all sample points must be located within canopy openings created by AGS
 - (b) the sample points must be located systematically at multiple spots across the canopy opening with a minimum inter-point distance of 20 metres
 - (c) samples must be taken using fixed area plot measurements with a plot size of approximately 10 m²;
 - (d) plots must be circular with a minimum radius of 1.8 m radius at a sample intensity of 50 plots per hectare or equivalent (5%); and
 - (e) each plot is classed as stocked if any part of the plot area:
 - i. is under the canopy of an existing tree, or
 - ii. contains at least one viable seedling (including new seedlings establishing from seed or lignotubers), or
 - iii. contains 'advanced growth' of an upper canopy species that is assessed as having the vigour or capability of reaching a canopy position.
 - (f) for each gap area that is assessed, convert the stocking rate to a percentage figure and then average these percentages across the number of gaps assessed within the harvest area.
 - (g) the minimum number of canopy openings to be sampled must be in accordance with Table O below.

Table O: Minimum sampling requirement for regeneration in canopy openings

Number of canopy openings	Number of canopy openings sampled
0 - 10	2
11-50	5
51-100	10
101-200	20

Appendix D: Assessment criteria for Forest Stewardship Plans

Table P: Assessment criteria for Forest Stewardship Plans

Assessment criteria	Assessment consideration	Related Outcomes Statement
Potential impacts on biodiversity conservation at the local and bioregional scales	<ul style="list-style-type: none"> ▪ Important trees, habitat and environmental features are identified and protected: <ul style="list-style-type: none"> – for shelter and food resources for native species, and to support their persistence – To provide refuge, connectivity and to support forest regeneration. ▪ Site-specific measures are implemented to manage long term forest health and habitat for threatened flora and fauna. 	<p>(1) Maintain forest health and regeneration at site and bioregional scales</p> <p>(3) Maintain the persistence of native species at site and bioregional scales</p>
Potential impacts on the environment at the local scale and bioregional scales	<ul style="list-style-type: none"> ▪ Forest regeneration and management actions are monitored and where necessary interventions made to ensure long-term active and adaptive management. ▪ Vegetation adjacent to drainage features and wetlands is managed effectively in the long-term , and groundcover is retained, to maintain water quality, stream stability, riparian habitat and contribute to habitat connectivity. ▪ Water quality and aquatic habitat are maintained through the implementation of best management practices for roads, tracks and crossings. ▪ Areas of soil erosion hazard are identified and managed effectively ▪ The site and any infrastructure no longer required after operations area rehabilitated according to best management practices 	<p>(2) Maintain the productive capacity of the private native forest estate at a site and bioregional scales</p> <p>(4) Maintains water quality and soil health at site and bioregional scales</p>
The likely suitability of the site, and landholder knowledge and capacity to manage potential risk	<ul style="list-style-type: none"> ▪ Site location, access, slopes, etc, support forestry operations without generating unmanageable or cumulative risks at site and landscape scale. ▪ Harvesting operations can be effectively distributed across the landscape and over time and space, to support a mosaic of forest age-classes and maintenance of forest structure across the landscape. ▪ Operator and/or landholder have sufficient capacity to identify and manage risks and implement best practice forest management. 	<p>(1) Maintain forest health and regeneration at site and bioregional scales</p> <p>(5) Build landholder capacity to deliver best practice forest management</p>
Aboriginal values, places and practices	<ul style="list-style-type: none"> ▪ Site-specific measures ensure the appropriate management, protection and persistence of Aboriginal places and practices ▪ Site specific measures help foster connection and collaboration within Aboriginal communities and/or between Aboriginal communities and landholders ▪ Site specific measures help improve our knowledge of Aboriginal forest management 	<p>(2) Maintain productive capacity of the private native forest estate at a site and bioregional scales</p> <p>(5) Build landholder capacity to deliver best practice forest management</p>
Research, innovation and industry development	<ul style="list-style-type: none"> ▪ Site specific measures encourage active and adaptive management ▪ Site specific measures help improve our knowledge of silviculture and forest ecology ▪ Site specific measures help facilitate innovation and industry development 	<p>(5) Build landholder capacity to deliver best practice forest management.</p> <p>(6) Support the economic resilience of landholders and regional communities.</p>
Relevant legislation	Consideration of relevant legislative requirements.	

Glossary

Expressions that are defined in the *Local Land Services Act 2013* and *Local Land Services Regulation 2014* have the same meanings in this Code as the meanings given to them in that Act and Regulation, unless they are otherwise defined in this Code. All other expressions are defined as in this glossary.

Accidentally felled	A tree is accidentally felled into any area of land only if it is apparent that techniques of directional felling were used in an attempt to fell the tree away from the area. Despite the above, a tree is not accidentally felled into an area if the person responsible knew or could reasonably have been expected to know that the tree would fall into the area.
Armoured	A protective surface that is resistant to erosion or displacement by machinery or vehicles.
Australian Group Selection	A silvicultural system in which groups (small patches or stands) of trees are harvested, allowing for subsequent regeneration and leading to a forest comprising patches of differently aged trees
Basal area	The sum of cross-sectional area of trees that are greater than 10 centimetres in diameter at breast height (DBH). Basal area is measured at breast height and in square metres per hectare (m ² /ha)
Batter	An earth slope formed from fill material (fill batter) or cut into the natural hillside (cut batter) during road construction.
Bioregion	An Interim Biogeographic Regionalisation for Australia (IBRA) region as defined by <i>Summary Report Revision of the Interim Biogeographic Regionalisation for Australia and Development Version 5.1</i> .
Blading off	The removal of surface soil from a track or road in wet conditions to expose a drier or firmer surface for use by machinery
Canopy opening	An area of forest where there is a gap in the overstorey. Canopy openings may be created by removal of parts of the overstorey to release advance growth or stimulate regeneration of new seedlings.
Cliff	A rocky slope steeper than 70 degrees, more than three metres high and more than 10 lineal metres.
Crossing	A structure designed to allow the crossing of a drainage feature and is either a track crossing or road crossing.
Cypress Forests	A forest dominated by white cypress pine (<i>Callitris glaucophylla</i>), being forests in which at least 80% of the stand basal area comprises trees of that species.
Dead tree	A tree that has no epicormic and/or lignotuber growth at the time of the forestry operation.
Debris	Tree head, tree offcuts or bark that have resulted from a forestry operation.
Diameter at breast height over bark (DBHOB)	The diameter of a tree measured at 1.3 metres above the ground. Measurements are made over the bark and horizontal to the trunk.
Directional felling	The felling of a tree so it falls in a pre-determined direction.
Dispersible soil	A structurally unstable soil which readily disperses into its constituent particles (clay, silt, sand) in water.

Drainage depression	A shallow depression with smoothly concave cross-section that conveys runoff only during or immediately after periods of heavy rainfall.
Drainage feature	A drainage depression, drainage line, river or watercourse.
Drainage line	<p>A channel down which surface water naturally concentrates and flows. Drainage lines exhibit one or more of the following features which distinguish them from drainage depressions:</p> <ul style="list-style-type: none">• evidence of active erosion or deposition, e.g. gravel, pebble, rock, sand bed, scour hole or nick point• an incised channel more than 30 centimetres deep with clearly defined bed and banks• a permanent flow.
Drainage structure	A structure designed to convey water away from a road, track or area of soil disturbance.
Earth windrow	A mound of soil material or gravel on the edge of a road or snig track formed by the spillage from the edge of a blade or similar machine during earthmoving operations.
Exclusion zone	An area of land within a specified distance of landscape features identified in Table B, where forest operations are prohibited, unless otherwise allowed under this Code.
Extraction track	A track constructed for use by forwarding machinery.
Food resource trees	Trees with recent 'V' notch incisions or other incisions made by a yellow-bellied glider or squirrel glider. Recent incisions are incisions less than two years old as evidenced by the fact the incision has not closed.
Forest	An area dominated by trees with a mature stand height exceeding 2 metres, overstorey crown cover of greater than 20 per cent.
Forestry operations	<p>Forestry operations means:</p> <p>(a) logging operations – namely the cutting and removal of timber from land for the purpose of timber production, or</p> <p>(b) the harvesting of forest products – namely the harvesting of the products of trees and other vegetation (other than timber) that are of economic value, or</p> <p>(c) ongoing forest management operations – namely activities relating to the management of land for timber production such as thinning, burning and other silvicultural activities, or</p> <p>(d) ancillary activities to enable or assist in the above operations such as the provision of roads, snig tracks, waterway crossings and temporary timber storage facilities..</p>
Girders	High quality logs used in a round or flat faced form to support a deck such as a bridge or wharf or as large end section, heart-free, sawn timber suitable for heavy construction.
Groundcover	Natural or artificial material which covers the ground surface and has the effect of reducing erosion.
Gully stuffer	A drainage feature crossing formed by filling the drainage feature with trees, debris, spoil, soil, rock or other material to the level of the road or track.
Habitat tree	A tree retained for habitat purposes under this Code.

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Harvesting operations	Harvesting operations include: <ul style="list-style-type: none">• timber felling, snigging and extraction• construction and maintenance of log landings, snig tracks and extraction tracks.
Heathland	Areas dominated (covers more than 50% of the area) by shrubs generally less than 2 metres tall at maturity.
Highly erodible soil	A soil where the particles are readily detached and transported by erosive forces. The presence of these soils may be identified by evidence of existing erosion (gully or rill erosion), or by commonly known problem soil types, e.g. some coarse-grained granites.
Incised channel	A channel more than 30 centimetres deep with clearly defined bed and banks.
Inundation	Flooding of the forested area by water overflowing the banks of a river.
Koala Scat	A scat a with a strong eucalyptus odour, pale green in colour with faint or clear ridges and/or vertical stripes, and a moist mucus coating, and bullet shaped appearance found either above the leaf litter, or less than 50mm below the leaf litter.
Landholding	A single or several parcels of land (whether held under the same title, different titles or different kinds of titles) that constitute or are worked as a single property and that are contiguous with one another or are separated from one another only by a road, river, creek or other watercourse.
Log landing	An area (usually cleared) where timber products are assembled for processing and sorting before being loaded onto a truck.
Mass movement	The downslope movement of greater than 10 cubic metres of soil, where gravity is the primary force or where no transporting medium such as wind, flowing water or ice is involved.
Net harvestable area	The defined area under the Forest Management Plan or Forest Stewardship Plan where harvesting is permitted in accordance with the Code.
Old growth forests	Ecologically mature forest where the effects of disturbance are now negligible. This includes an area of forest greater than 5 hectares where: <ul style="list-style-type: none">• the overstorey is in late to over-mature growth stage with the presence of relatively large old trees (many containing hollows and often with the presence of dieback or dead branches in the crown)• the age (growth) structure of the stand measured as relative crown cover consists of less than 10% of regeneration and advance growth and more than 10% of late to over-mature (senescent) growth• the effects of unnatural disturbance are now negligible. Old growth woodlands west of the Great Dividing Range, while comprising a characteristic canopy of late to over-mature trees (many with hollows), may comprise a woodland structure with less diverse or often shrubby understorey and a groundcover of grasses and herbs.
PNF koala prescription mapped areas	Areas of contiguous forest identified in Figure 4, dominated by non-planted native trees species with an average stand height of 2 metres or greater, and an overstorey canopy cover of 20% or more, at elevations of 800 metres or less above sea level and with a minimum patch size of 2 hectares or greater.

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Portable mill site	A site where a portable mill (easily movable milling equipment) operates.
Posts	Term generally used to describe posts in round or split form used for fencing.
Prescribed Stream	Stream listed in the Major Rivers database of the Assessment Methodology database available at the DPE webpage.
Pulp logs	Logs cut and prepared primarily to produce wood pulp for the manufacture of reconstituted products including paper and panel board.
Rainforest	<p>Tree-dominated vegetation where the tree stratum (over 3 metres in height) which has the greatest crown cover has rainforest species making up 50% or more of the crown cover, except where non-rainforest emergent species (including brushbox and turpentine) occur and exceed 30% or more of the upper stratum crown cover.</p> <p>Rainforest includes all areas of rainforest mappable at a 1:25000 scale. Rainforest also includes areas exceeding 0.5 hectares occurring as isolated clumps or lineal strips of rainforest trees.</p>
Regeneration management actions	Forest management techniques that promote forest regeneration after forestry operations including replanting (including tube-stock), minimising or removing grazing pressure, seeding, weed management, fire management and mechanical soil disturbance.
Relevant legislative requirements	Existing requirements relating to the carrying out of forestry operations on private land contained in the <i>Biodiversity Conservation Act 2015</i> , <i>Environmental Planning and Assessment Act 1979</i> , <i>Fisheries Management Act 1994</i> , <i>Local Land Services Act 2013</i> and <i>Protection of Environmental Operations Act 1997</i> .
River red gum forests	A forest dominated by <i>Eucalyptus camaldulensis</i> consistent with description of Forest Type 199 (River Red Gum) in State Forests of NSW, Research Note 17.
Riparian exclusion zones	Those areas within the distances specified for 'Drainage feature' as listed in clause 6.4(2) where forestry operations are not permitted, unless otherwise allowed by this Code.
Riparian protection measures	Actions that assist in maintaining and protecting riparian areas including revegetation (including tube-stock, native grasses and seed distribution), the placement of artificial erosion control measures such as matting, mulch or geotextiles, and the removal or minimisation of grazing pressures.
Road	Any route used for vehicular access to, and the transport of logs from, the point of loading (log landing) within the forest area.
Road prism	That part of the road from the inflexion point at the toe of the fill batter to the inflexion point at the top edge of the cut batter. Where there is no cut or fill batter as part of the road, the road prism is to be taken from the outside edge of the table drain on either side of the road.
Rocky outcrops	A 'rocky outcrop' has an area of 0.2 hectares or larger, where 70% or more of the surface is composed of exposed boulders of more than 0.6 of a metre in diameter and accompanied by skeletal soils.
Rollover bank	A crossbank constructed with a smooth cross-section and gentle batters, which is well-compacted to provide permanent vehicular trafficability.

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Saturated soil	The physical condition of soil where no more moisture can be absorbed or accepted.
Sawlog	Log of a species suitable for processing through a sawmill into solid timber products.
Significant forest disturbance event	An event that impacts and changes the ecological condition of a forest or environmental value associated with that forest in a manner that risks meeting ESFM outcomes. Recovery is unlikely to occur without interventions, risking maintaining ESFM forest value outcomes over a range of spatial scales across the short to long term. Disturbance events can include (but are not limited to) prolonged drought, wildfire, mass tree dieback or a biosecurity event.
Silvicultural operations	The activities associated with the management of trees within a forest for the purpose of meeting sustainable long-term productivity objectives, including thinning, single tree selection and creation of canopy openings.
Single tree selection	A harvesting operation where the trees harvested are either single trees or small groups of trees. For the purposes of this Code, single tree selection operations will not create canopy openings.
Skeletal soils	Thin soils which present a barren, inhospitable surface to vegetation.
Snig track	A track used by snigging or skidding equipment.
Spoon drain	A drain with a semi-circular cross-section, which has no associated ridge of soil. Its capacity is solely defined by the excavated channel dimensions.
Stand basal area	Stand basal area is the sum of the basal area of all trees within a stand expressed in square metres per hectare (m ² /ha).
Stand height	Mean height of the dominant trees in the stand. Measurement of stand height must conform to methods described in approved guidelines.
Stick Nest	A collection of sticks in the branches, fork, trunk and or head of a live or dead tree that, when combined, form a nest that is greater than 50 centimetres in diameter.
Stocking level	A measure of the frequency of occurrence of tree stems assessed as being capable of growing to canopy level. Measurement of stocking levels must conform with methods described in Appendix C.
Suitably qualified expert	Suitably qualified expert means a person with a minimum undergraduate qualification in natural sciences, ecology, environmental management, forestry or similar from a university and with a minimum 3 years' experience in environmental assessment.
Thinning	A silvicultural practice where some trees are removed in order to increase the growth rates of retained trees.
Threatened populations	Population of a particular species listed in Division 3 of Part 1, Division 4 of Part 2 or Division 4 of Part 3 of Schedule 1 to the <i>Biodiversity Conservation Act 2016</i> as in force from time to time.
Threatened species	Threatened species within the meaning of the <i>Biodiversity Conservation Act 2016</i> as in force from time to time that also meets paragraph (d) of the definition of species with the meaning of that Act as in force from time to time.
Timber products	Commercial timber products removed from or felled within the forest, including but not limited to sawlogs, veneer logs, poles, girders, piles and pulp logs.

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Veneer log	High quality logs that are rotary peeled or sliced to produce sheets of veneer.
Walkover techniques	Timber extraction or snigging without removing or unduly disturbing the existing natural groundcover, i.e. where no snig track construction involving soil disturbance is required.
Western Hardwood Forests	A forest that is consistent with the description of any of the Forest Types 99, 103, 104, 124, 171–178, 180–185, 203–210 and 213 in State Forests of NSW Research Note 17.
Wetland	<p>Includes any shallow body of water (such as a marsh, billabong, swamp or sedgeland) that is:</p> <ul style="list-style-type: none">• inundated cyclically, intermittently or permanently with water, and• vegetated with wetland plant communities.

Private Native Forestry

Code of Practice for the River Red Gum Forests

I, the Minister for Agriculture and Western New South Wales, make the following *Private Native Forestry Code of Practice for Northern NSW* under section 60ZT of the *Local Land Services Act 2013*.

Dated this ____ day of [insert month] 2022 at _____ am/pm.

Dugald Saunders, MP
Minister for Agriculture and Western New South Wales

I, the Minister for Environment and Heritage, give concurrence to the following *Private Native Forestry Code of Practice for Northern NSW* under section 60ZT of the *Local Land Services Act 2013*.

Dated this ____ day of [insert month] 2022 at _____ am/pm.

James Griffen, MP
Minister for Environment and Heritage

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Introduction

The Private Native Forestry Code of Practice (the 'Code') supports the long-term sustainable management of native forests on private land and Crown land (other than State forests or other Crown-timber land) for timber production and ecologically sustainable forest management (ESFM).

The Code applies to forestry operations in areas of the State as defined by Part 5B of the *Local Land Services Act 2013*. This Code is made under Part 5B, section 60ZT of the *Local Land Services Act 2013*. The objects of Part 5B of the Act are:

- (a) to authorise the carrying out of private native forestry in accordance with principles of ecologically sustainable forest management, and
- (b) to protect biodiversity and water quality (including threatened species, populations and ecological communities under Part 7A of the *Fisheries Management Act 1994*) in connection with private native forestry operations, and
- (c) to enable landholders to carry out forestry operations in a sustainable manner in areas of the State to which this Part applies, and
- (d) to ensure the differences between private native forestry and native forestry operations in State forests or other Crown-timber land are recognised, including in the application of protocols, codes, standards and other instruments.

'River Red Gum Forests' means forests dominated by *Eucalyptus camaldulensis*, being forests that are consistent with the description of Forest Type 199 (River Red Gum) set out in the document called *State Forests of NSW, Research Note 17*.

Outcomes Statement

- (1) The Code supports the implementation of the following long-term outcomes:
 - (a) Maintain forest health and regeneration at site and bioregional scales.
 - (b) Maintain the productive capacity of the private native forest estate at site and bioregional scales.
 - (c) Maintain the persistence of native species at site and bioregional scales.
 - (d) Maintain water quality and soil health at site and bioregional scales.
 - (e) Build landholder capacity to deliver best practice forest management.
 - (f) Support the economic resilience of landholders and regional communities.
- (2) The outcomes statement is included to improve interpretation and understanding of the long-term objectives of private native forestry but do not form part of the Private Native Forestry Plan (PNF Plan) approval or enforceable requirements of the Private Native Forestry Code.

The Code

1. Private Native Forestry Plans

- (1) Before any forestry operations commence in areas of the State to which Part 5B of the *Local Land Services Act 2013* applies as described in section 60ZS, a Private Native Forestry Plan (PNF Plan) must be prepared by the landholder(s) or by a person nominated by the landholder(s) and approved by Local Land Services in accordance with section 60ZY of the *Local Land Services Act 2013*.
- (2) Forestry operations under an approved PNF Plan must be conducted in accordance with all relevant provisions of this Code.
- (3) Local Land Services will provide all relevant digital information on landscape features (as identified in Table A) and slope angles (where feasible), drainage features (as identified in Table C) and Listed Ecological Prescriptions including areas mapped under the PNF koala prescription map (as identified in Appendix A) when issuing the PNF Plan and prior to the commencement of any forestry operations to ensure plants, animals and ecological communities listed in the schedules of the *Biodiversity Conservation Act 2016* are identified for protection in accordance with the Code.
- (4) Private Native Forestry Plans must identify the landholder(s) and the land to which the plan applies (including the lot and deposited plan number).
- (5) Forestry operations under an approved PNF Plan must be accompanied by either a Forest Management Plan or a Forest Stewardship Plan, except for operations consistent with Clause 3.1.
- (6) A copy of the PNF Plan must be available on-site during any forestry operations.
- (7) Local Land Services will maintain a public register of PNF Plans, Forest Management Plans and Forest Stewardship Plans, including periodic reporting of outcomes associated with independent assessments for Forest Stewardship Plans (Section 2.2).

Note 1: Section 60S of the *Local Land Services Act 2013* and clause 124 of the Local Land Services Regulation 2014 provide that the clearing of native vegetation is not authorised by a land management (native vegetation) code if the clearing is:

- the carrying out of a forestry operation within the meaning of Part 5B (Private native forestry)
- on land that is subject to a PNF Plan that was approved under Part 5C of the *Forestry Act 2012* before the repeal of that Part
- on land that is subject to a PNF Plan under Part 5B of the Act.

Note 2: Section 60ZZ (4) of the *Local Land Services Act 2013* provides that a private native forestry plan may be varied by Local Land Services on application by the landholder.

2 Forest planning and management

2.1 Forest Management Plans

Introduction

Forest Management Plans outline how individual forestry operations will be undertaken within a Private Native Forestry Plan area. The Forest Management Plan includes a map and written section describing the forest condition, forestry operations and forest management activities. A Forest Management Plan is to be used when undertaking forestry operations consistent with the standard requirements of the Code.

- (1) A Forest Management Plan must be prepared by the landholder(s) or a person nominated by the landholder(s) and submitted to Local Land Services before forestry operations commence (other than operations that are conducted consistent with Clause 3.1).
- (2) The net harvestable area under a Forest Management Plan must not exceed 500 hectares. A Forest Stewardship Plan must be prepared if the net harvestable area exceeds this limit.
- (3) A Forest Management Plan must be in an approved form and consistent with the provisions of this Code and the requirements of the Listed Species Ecological Prescriptions set out in Appendix A.
- (4) Local Land Services may require a Forest Management Plan to be revised and re-submitted if the Plan it is not in an approved form or is not consistent with the provisions of this Code, including the requirements of the Listed Species Ecological Prescriptions set out in Appendix A.
- (5) The landholder(s) and anyone else carrying out forestry operations must read, sign and date the Forest Management Plan.
- (6) A copy of the Forest Management Plan must be available on-site during forestry operations.
- (7) A Forest Management Plan must contain the following:
 - (a) a map (or maps) showing:
 - (i) the boundaries of the landholding, area(s) subject to the plan, including areas in which harvest operations and/or forestry operations will occur
 - (ii) Within the area subject to the plan:
 - a. forested areas
 - b. recorded locations of any threatened populations or threatened ecological communities listed under the schedules of the *Biodiversity Conservation Act 2016* and species in the Listed Species Ecological Prescriptions set out in Appendix A
 - c. areas mapped under the PNF koala prescription map (as in Appendix A Koala (*Phascolarctos cinereus*) prescription)
 - d. the location of landscape features as listed in Table A and protection buffers required
 - e. drainage features (including riparian exclusion zones as listed in Clause 6.4 (2) and Table C)
 - f. slope angles (where feasible)
 - g. the location of silvicultural treatments outlined in (7)(b)(viii)
 - h. the indicative location of existing and proposed roads and drainage feature crossings
 - i. the indicative location of log landings and portable mill sites.

- (iii) Within areas adjacent to the area subject to the plan:
 - a. forested areas
 - b. recorded locations of any threatened populations or threatened ecological communities listed under the schedules of the *Biodiversity Conservation Act 2016* and species in the Listed Species Ecological Prescriptions set out in Appendix A
 - c. areas mapped under the PNF koala prescription map (as in Appendix A Koala (*Phascolarctos cinereus*) prescription)
 - d. wetlands and drainage features
 - e. areas of outstanding biodiversity value

- (b) a written component that provides:
 - (i) details of ownership of the land
 - (ii) the landholder's forest management objectives
 - (iii) a contemporary description of the pre-harvest forest condition (including overstorey species type and composition, known disturbance and harvest history, pre-harvest basal area, stand height [where required] and any presence of pests and/or weeds)
 - (iv) the post-harvest basal area objective
 - (v) details of forest access, including any necessary construction, upgrading or maintenance of forest roads and perennial stream crossings
 - (vi) details of harvesting and/or other proposed forestry operations
 - (vii) details of activities to promote regeneration and post-harvest management
 - (viii) details of relevant silvicultural treatments that may be carried out as part of the Forest Management Plan
 - (ix) details of flora and fauna management actions (where applicable)
 - (x) details of tree marking activities (where applicable)
 - (xi) details of pest and weed management (where applicable)
 - (xii) details of fire management (where applicable)
 - (xiii) details of research or monitoring plots within the PNF Plan area (where applicable).

- (9) The Landholder may amend the parts of the Forest Management Plan, except for matters referred to in Clause 2.1 (7) (a) (i), Clause 2.1 (7) (a) (ii) (a-f), Clause 2.1 (7) (a) (iii) and Clause 2.1 (7) (b) (i). Amendments to Clause 2.1 (7) (a) (i), Clause 2.1 (7) (a) (ii) (a-f), Clause 2.1 (7) (a) (iii) and Clause 2.1 (7) (b) (i) may only occur with the approval of Local Land Services.

- (10) Any amendments to either the map or the written component must be noted on the Forest Management Plan and must be consistent with the relevant provision of the Code.

- (11) The landholder must retain a copy of the Forest Management Plan, including any amendments, for the life of the PNF Plan or for three years after completion of the forestry operations for which it was prepared, whichever is the later date.

- (12) The landholder must provide the Forest Management Plan, including a record of any amendments, to an officer from Local Land Services and/or an authorised officer from the Environment Protection Authority if requested to do so.

2.2 Forest Stewardship Plans

Introduction

Forest Stewardship Plans are an alternative to Forest Management Plans and allow alternative requirements to be applied based on individual site-specific circumstances and only after independent expert review. A Forest Stewardship Plan will have conditions that form part of the approval, including specific forestry operation and forest management conditions.

- (1) A Forest Stewardship Plan must, before forestry operations commence, be:
 - (a) prepared by a suitably qualified expert(s),
 - (b) assessed by an independent expert panel against the criteria in Appendix D
 - (c) approved by Local Land Services, after considering the independent expert panel's advice and is satisfied that the Forest Stewardship Plan complies with relevant legislative requirements and the Code.
- (2) Independent expert panel members must have applied knowledge and experience in the principles of ESFM and expertise in at least one of the following areas:
 - (a) forest management, including silviculture (required for all panel assessments)
 - (b) forest ecology(required for all panel assessments)
 - (c) natural resource economics
 - (d) fire management and climate change
 - (e) Aboriginal land management
 - (f) water and soil management
- (3) A Forest Stewardship Plan can:
 - (a) apply the basal area limits in accordance with Clause 3.2 (2) (ii)
 - (b) apply canopy area limits for Australian Group Selection in accordance with Clause 3.3 (2) (c) (ii)
 - (c) include alternative requirements to those in sections 5, 6, 7 and Appendix A of this Code following a significant forest disturbance event(s) and where forestry operations can be used to minimise or manage impacts and/or improve ESFM outcomes. In these circumstances, Local Land Services will conduct a site assessment within the area(s) identified by the landholder(s) to advise on the suitability of a Forest Stewardship Plan.
- (4) A Forest Stewardship Plan must be in an approved form and will include:
 - (a) a map (or maps) consistent with Clause 2.1 (7)(a)
 - (b) a written component that is consistent with Clause 2.1 (7)(b)
 - (c) relevant information to inform Local Land Services assessment of the plan, including:
 - (i) details of proposed forestry operations
 - (ii) details of any alternative requirements as per Clause 2.2 (3)
 - (iii) the results of any pre-harvest flora and fauna assessments and surveys, including any required in accordance with Clause 2.2 (5) (a)
 - (iv) any additional management actions and/or protections that may be proposed, including any required in accordance with Clause 2.2 (5) (b).
 - (v) details of site-specific monitoring and reporting requirements.
- (5) As per Clause 2.2 (1), Local Land Services can only approve a Forest Stewardship Plan after an independent expert panel has assessed the plan against the criteria in Appendix D and provided the assessment to Local Land Services. In conducting an assessment of a Forest Stewardship Plan, the independent expert panel can:

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- (a) request further information, additional advice or external expertise to inform its assessment, including additional flora and fauna assessments or surveys, if necessary
 - (b) recommend additional site-specific management actions and/or protections
 - (c) recommend that the Forest Stewardship Plan is approved by Local Land Services
 - (d) recommend that the Forest Stewardship Plan is not approved by Local Land Services.
- (6) The Landholder may amend the parts of the Forest Stewardship Plan referred to in Clause 2.1 (7) (b) (ii) and Clause 2.1 7 (b) (x-xii). Any other amendments to the Forest Stewardship Plan may only occur with the approval of Local Land Services.
- (7) Any amendments to either the map or the written component must be noted on the Forest Stewardship Plan and must be consistent with the relevant provision of the Code.
- (8) The landholder and anyone else carrying out forestry operations must read, sign and date the Forest Stewardship Plan.
- (9) A copy of the Forest Stewardship Plan must be available on-site during forestry operations.
- (10) The landholder(s) must retain a copy of the Forest Stewardship Plan, including a record of any amendments, for the life of the PNF Plan or for three years after completion of the forestry operations for which it was prepared, whichever is the later date.
- (11) The landholder(s) must provide the Forest Stewardship Plan to an officer from Local Land Services and/or an authorised officer from the Environment Protection Authority if requested to do so.

2.3 Reporting

- (1) The landholder must notify Local Land Services of the commencement and completion of forestry operations under clauses 3.1 to 3.3 of the Code.
- (2) In respect of forestry operations under clauses 3.1 to 3.3 of the Code, notification must be provided to Local Land Services within 30 days prior to commencement of the relevant forestry operations.
- (3) In respect of forestry operations under clauses 3.1 to 3.3 of the Code, notification must be provided to Local Land Services within 30 days of the completion of the relevant operations.
- (4) The following information must be included in any commencement notification to Local Land Services:
 - (a) the PNF Plan approval number
 - (b) the Forest Management Plan or Forest Stewardship Plan approval number where applicable
 - (c) the proposed commencement date and estimated time it will take to complete the forestry operations
 - (d) a map showing the location of the proposed forestry operations
 - (e) name and contact details of the landholder.

Note 3: Local Land Services will provide updated information to the landholder on the locations of plants, animals and ecological communities listed in the schedules of the *Biodiversity Conservation Act 2016* at this time to ensure that the relevant Code requirements are applied to the forestry operation.

- (5) The following information must be included in any completion notification to Local Land Services:
 - (a) the PNF Plan approval number
 - (b) a Forest Management Plan or Forest Stewardship Plan approval number where applicable
 - (c) a map showing the location of the forestry operations
 - (d) the approximate volume of forest products harvested
 - (e) the approximate number of hectares on which the forestry operations have occurred
 - (f) the date that the forestry operations were completed
 - (g) name and contact details of the landholder.

2.4 Monitoring, assessment and adaptive management

- (1) A monitoring, evaluation and reporting framework must be jointly approved by the Chief Executive Officer of Local Land Services and the Secretary of DPE.
- (2) The PNF MER framework will be proposed by the NSW Forest Monitoring Steering Committee (or equivalent) independently chaired by the NSW Natural Resources Commission.
- (3) The NSW Forest Monitoring Steering Committee (or equivalent) independently chaired by the NSW Natural Resources Commission will:
 - (a) conduct annual checks that the evidence base is up to date (including relevant maps), identify emerging evidence from monitoring and research, and opportunities for improvement
 - (b) formally assess the data and evidence from the program (and any other lines of evidence) every five years and advise the Minister administering the *Forestry Act 2012*, the Minister administering the *Local Land Services Act 2013* and the Minister administering the *Biodiversity Conservation Act 2016* whether there is sufficient evidence to warrant a review of the PNF Codes.
- (4) Local Land Services can require that forestry operations are rescheduled to help ensure harvest operations are distributed over time and space, to support a mosaic of forest age-classes and forest structures across the landscape. This determination will consider landholder's circumstances and the nature, extent and intensity of forestry operations.
- (5) The Minister administering the *Local Land Services Act 2013* can request harvest operations are reviewed where an unforeseen event (such as wildfire, mass dieback or a forest biosecurity event) has caused, or has the potential risk of causing serious or irreversible environmental damage on private land at a bioregional scale. In these circumstances Local Land Services will conduct a site assessment within the impacted bioregion(s) identified by the Minister. The site assessment will occur prior to harvest operations commencing to determine whether site scale environmental risks:
 - (a) can be managed within the existing provisions of the Code, or
 - (b) can be mitigated and managed with additional management actions and protections through a Forest Stewardship Plan, or
 - (c) cannot be mitigated or managed to avoid serious or irreversible environmental damage. In this event, Local Land Services can suspend or reschedule harvest operations but will agree with the landholder(s) on a timeframe for reassessing the site.
- (6) Where an unforeseen event (such as wildfire, mass dieback or a forest biosecurity event) has caused, or has the potential risk of causing serious or irreversible environmental damage on private land at a bioregional scale, the Chief Executive Officer of the Environment Protection Authority can inform the Chief Executive Officer of Local Land Services that a review under Clause 2.4 (5) may be required.

Note 4: Any research or forest monitoring activities undertaken in PNF Plan areas beyond minimum requirements set out in this Code can only occur with the written consent of the landholder. The written consent must outline the purpose of the research or monitoring, and how the data will be collected, stored and used, including how landholder confidentiality will be managed.

3 Silvicultural operations

3.1 Small scale harvesting

Introduction

A silvicultural system in which single trees of various ages are harvested at a low intensity. This method is suitable for the provision of fence posts, poles and firewood and promoting regeneration of shade-tolerant species, or growth of preferred species or individual trees.

- (1) Forestry operations are permitted after a PNF Plan has been approved.
- (2) Small scale harvesting is permitted provided no more than 5 trees per hectare are harvested and the harvest area is no more than 5 hectares or the volume is no more than 50m³ per year, whichever is smaller.
- (3) Small scale harvesting must not reduce the stand basal area below 12m²/hectare.
- (4) For the purposes of clause 3.1 the minimum stand basal area will be calculated in accordance with Appendix B. The average can only be calculated within contiguous forest areas and must not include isolated patches of forest.
- (5) The landholder must keep a record of the number of trees harvested and the approximate area harvested.

3.2 Single tree selection and thinning

Introduction

A silvicultural system in which single trees or small groups of trees of various ages are harvested. This method is suitable for promoting regeneration of shade-tolerant species, or growth of preferred species or individual trees

- (1) Forestry operations are permitted after the approval of a Forest Management Plan or a Forest Stewardship Plan
- (2) Single tree selection and thinning operations must not reduce the stand basal area below:
 - (i) 12m²/hectare across the net harvestable area of a Forest Management Plan.
 - (ii) 10m²/hectare across the net harvestable area of a Forest Stewardship Plan.

Ideally, single tree selection and thinning should aim to space trees according to the formula $\frac{1}{4}$ diameter at breast height over bark (cm)*100.

- (3) For the purposes of clause 3.2 the minimum stand basal area will be calculated in accordance with Appendix B. The average can only be calculated within contiguous forest areas and must not include isolated patches of forest.

3.3 Australian Group Selection

Introduction

A silvicultural system in which groups (small patches or stands) of trees are harvested, allowing for subsequent regeneration and leading to a forest comprising patches of differently aged trees. The method is suitable for promoting regeneration of shade intolerant species.

- (1) Forestry operations are permitted after the approval of a Forest Management Plan or a Forest Stewardship Plan.
- (2) Harvest operations that result in canopy openings must conform with the following requirements:
 - (a) be used to encourage the regeneration of forest stands with shade intolerant species and/or where forest regeneration has failed
 - (b) the sum of canopy openings must at no time exceed 20% of the net harvestable area
 - (c) the maximum area of an individual canopy opening must not exceed:
 - (i) 0.5 hectares in area under a Forest Management Plan, or
 - (ii) 0.75 hectares in area under a Forest Stewardship Plan.
 - (d) Australian Group Selection and Single Tree Selection cannot occur within 100 metres of the edge of the canopy opening:
 - (i) within ten years of the completion of harvest operations, or
 - (ii) until the forest stand within canopy openings has reached 10 metres or more
- (3) A **canopy opening** is an area greater than 0.1 hectares in size, measured between canopy perimeters, where any vegetation remaining within the opening is less than one-half of the stand height unless this is a significant habitat feature.
- (4) A **canopy opening** can be an irregular shape to maximise light penetration and optimise the area to boundary ratio, to encourage forest regeneration and account for existing landscape features and significant habitat features (such as hollow bearing trees, dead standing trees, feed trees) provided it does not exceed the maximum area in Clause 3.3 (2)(c) and is non-linear in shape.
- (5) After harvesting, the debris in the gap may be burnt to create an ash bed in which a future crop of shade-intolerant species can regenerate.

3.4 Forest regeneration

- (1) As determined by the percentage of stocked plots, a minimum stand stocking of 60%, within canopy openings and 70% elsewhere in the forest must be achieved within 3 years of a regeneration event.
- (2) In this clause, **regeneration event** is the second period of inundation following a harvesting or thinning operation under clauses 3.1 to 3.3 of the Code.
- (3) A harvesting operation must not occur in a previously harvested area until stocking levels meet the minimum stocked plot requirements in clause 3.4(1).
- (4) For the purposes of clause 3.4, forest regeneration will be calculated in accordance with Appendix C.
- (5) The landholder must comply with any reasonable requirements of the Environment Protection Authority for the purpose of regenerating or re-establishing the forest, if the minimum percentage of stocked plots has not been reached within a period of 36 months following a regeneration event.
- (6) Landholders must monitor forest regeneration, composition, and condition at 2, 6 and 10 years after a regeneration event. Where the relevant forest is not regenerating along a trajectory that maintains (or improves on) preharvest forest conditions, landholders must implement regeneration management actions.

4. Pest and weed management

Note 5: The landholder may manage pest plants and animals on land to which a PNF Plan applies. Any such management is to be carried out in accordance with all applicable legal requirements. Local Land Services and the relevant local council can provide advice on management of pest plants and animals.

5. Fire management

Note 6: The landholder may carry out burning activities, fire management, bush fire hazard reduction and bush fire recovery and response activities on land to which a PNF Plan applies. However, any such activities may only be carried out in accordance with all applicable legal requirements and any necessary approvals must be obtained. Advice should be sought from the Rural Fire Service and the relevant local council before carrying out any of these activities.

- (1) Fire management should be consistent with the following:
 - (a) flame heights should average one metres, but may be higher in patches of heavy or elevated fuels
 - (b) scorch heights should average less than five metres, but may be higher in patches of heavy or elevated fuels
 - (c) the fire should spread at a slow walking pace.
- (2) Fire management under this part is not permitted on land that:
 - (a) contains peat soils, or
 - (b) is mapped or described as a fire exclusion zone in a bush fire risk management plan, or
 - (c) contains isolated forest, woodland or wetland vegetation formations under Clause 4.1 of the *Bush Fire Environmental Assessment Code for New South Wales*.

Fire management under this part must be conducted in accordance with the *NSW Rural Fire Services Standards for Low Intensity Bush Fire Hazard Reduction Burning* and the *Bush Fire Environmental Assessment Code for New South Wales*

6. Protection of the environment

6.1 Protection of landscape features of environmental and cultural significance

- (1) Forestry operations in and adjacent to specified landscape features must comply with the requirements in Table A.
- (2) Old growth forests will be identified according to the protocol approved by the relevant Ministers, and available at https://www.ils.nsw.gov.au/_data/assets/pdf_file/0003/807420/Protocol-for-re-evaluating-old-growth-forest-on-private-property.pdf.

Table A: Requirements for protecting landscape features

Landscape feature	Operational conditions
Threatened ecological communities listed in the <i>Biodiversity Conservation Act 2016</i>	Forestry operations may not occur in threatened ecological communities unless authorised by a Forest Stewardship Plan. However, existing roads may be maintained.
Threatened populations listed in the <i>Biodiversity Conservation Act 2016</i>	Forestry operations must not result in any harm to an animal that is a threatened species or a protected animal or result in the picking of any plant that is part of a threatened population, except that existing roads may be maintained.
Areas of outstanding biodiversity value	Forestry operations must not occur in declared areas of outstanding biodiversity value agreed with the written consent of the landholder, except that existing roads may be maintained.
Old growth forest	Forestry operations must not occur within old growth forest, except that existing roads may be maintained.
Wetlands	Forestry operations must not occur in any wetland other than wetlands that comprise a River Red Gum broad forest type or within 20 metres of any wetland, except that existing roads may be maintained.
Disused mineshafts (excluding open pits less than 3 metres deep)	Forestry operations must not occur within 10 metres of disused mineshafts, except that existing roads may be maintained.
Aboriginal object or place as defined in the <i>National Parks and Wildlife Act 1974</i>	Forestry operations must not occur within: <ul style="list-style-type: none"> • 50 metres of a known burial site • 20 metres of an Aboriginal scarred or carved tree • 10 metres of a known Aboriginal object or place (this requirement does not apply to Aboriginal objects or places that may lawfully be destroyed).
Areas containing items identified as heritage items in an environmental planning instrument	Forestry operations must not occur within 10 metres of a listed heritage item.

6.2 Protection of habitat and biodiversity

- (1) Habitat trees must be retained in accordance with Table B.
- (2) Hollow bearing trees, recruitment trees, food resource trees, roost trees and nest trees are defined as habitat trees retained for the purposes of this Code.
- (3) An individual tree may satisfy more than one condition in the tree retention standards (see Table B) if it has the appropriate characteristics.
- (4) Where available:
 - (a) retained habitat trees must represent the range of species in mature and late mature growth stages
 - (b) preference must be given to selecting habitat trees that best meet the characteristics of habitat trees as set out in clause 6.2(5)
 - (c) preference must be given to habitat trees that will provide habitat connectivity, build on existing landscape features (Table A), provide additional protections for threatened species, and build on existing habitat islands, refugia and conservation areas adjacent to and within the PNF Plan area
 - (d) preference must be given to trees with well-developed crowns.
- (5) For the purpose of this clause:
 - (a) a **hollow bearing tree** is a tree 30 cm diameter at breast height over bark (DBHOB) or greater, where the trunk or limbs:
 - (i) contain visible hollows, holes or cavities (including basal hollows), or
 - (ii) have inferred hollows as it is an older growth stage tree and has one or more obvious deformities such as a burl, large protuberance or a broken limb
 - (b) if there are more than the minimum required number of habitat trees, preference must be given to trees with the largest hollows, holes or cavities (including basal hollows) and/or greatest number of visible hollows, holes or cavities (including basal hollows). Trees that pose a health or safety risk may be removed and substituted with other hollow bearing trees if available, and if not available, by recruitment trees.
 - (c) a **recruitment tree** is a large, vigorous tree (30cm or greater DBHOB) capable of developing hollows to provide habitat for wildlife. Where practical, preference must be given to trees from the next cohort to that of retained hollow bearing trees.
 - (d) **roost, nest and food resource trees** are defined as:
 - (i) trees that support active maternity bat roosts with clear evidence of roosting such as bat guano (faeces)
 - (ii) trees with recent 'V' notch incisions or other incisions made by a glider species. Recent incisions are incisions that have not closed
 - (iii) River Red Gum broad forest type trees with a diameter at breast height over bark of 125 centimetres or larger
 - (iv) trees containing active nests of colonial-nesting water birds (groups of stick-nests).

Table B: Minimum standards for tree retention

Trees that must be retained
<ul style="list-style-type: none"> ● 5 hollow bearing trees per hectare, within 50 metres of any permanent watercourse, water bodies or major wetlands must be retained, where available. ● 2 hollow bearing trees per hectare in all other areas must be retained, where available. ● One recruitment tree representing the range of species in the forest before forestry operations commenced must be retained for every hollow bearing tree. ● Where the total number of hollow bearing trees is less than 5 trees per hectare within 50 metres of any permanent water course, water bodies or major wetlands or 2 per hectare elsewhere, additional recruitment trees must be retained to bring the total number of trees retained up to 10 and 4 per hectare, respectively. ● All roost, nest or food resource trees to be retained. ● Clumps of habitat trees must be retained in River Red Gum broad forests where they constitute rookeries for water bird species such as herons, cormorants, spoonbills and egrets. ● All trees with large stick nests (50cm or larger) to be retained with a 50 metre exclusion zone

6.3 Minimising damage to retained trees and native vegetation

- (1) As far as practicable, forestry operations must not damage protected trees or heap debris around protected trees.
- (2) In this clause **protected trees** are defined as:
 - (a) trees required to be retained under clause 6.2
 - (b) plants of the genus *Xanthorrhoea* (grass trees), genus *Allocasuarina* (forest oak) (except bull oak [*Allocasuarina luehmannii*]), and genus *Banksia*
 - (c) *Acacia salicina* (Cooba), *Exocarpos strictus* (dwarf cherry) and *Eucalyptus microcarpa* (grey box)
 - (d) other trees that are required to be retained by this Code.

6.4 Drainage feature protection

- (1) For the purposes of this Code, a stream is defined as an incised watercourse with a defined channel, bed and banks and a minimum depth of 30 centimetres. Stream orders are determined according to the Strahler System (see Figure 1).

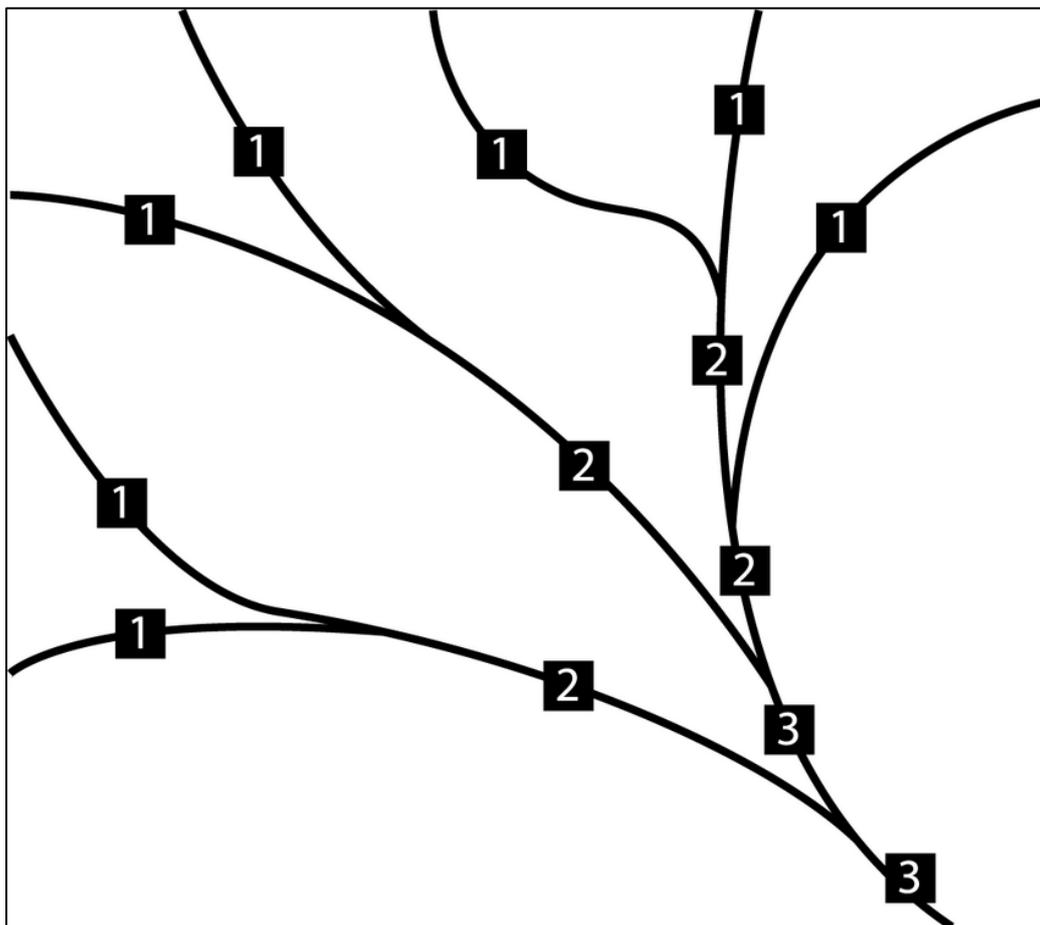


Figure 1: Diagram of stream order (Source: *Water Management (General) Regulation 2018*).

- (2) The riparian exclusion zone must be measured from the top of the defined bank of the stream or where there is no defined bank, from the edge of the channel of the stream for the distance specified in Table C.

Table C: Riparian exclusion zones

Drainage feature	Riparian exclusion zone
Drainage feature	5 metres
Prescribed Streams	30 metres

- (3) Harvesting machinery must not enter riparian exclusion zones, except at designated crossings or where otherwise allowed by this Code.
- (4) Where harvesting is occurring in or adjacent to riparian exclusions zones, all tree felling must employ directional felling to minimise disturbance to streams

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- (5) Where a tree is accidentally felled into a riparian exclusion zone, the tree may be removed provided:
 - (a) disturbance to soil, groundcover and native vegetation is limited to the minimum extent necessary, and
 - (b) harvesting machinery does not enter the riparian exclusion zone to retrieve the tree, or part of the tree, unless using walkover techniques, and
 - (c) following the tree's removal, any soil disturbance or furrows are treated to prevent concentration of water flow or soil movement, and
 - (d) the incident must be recorded in the Forest Management Plan or Forest Stewardship Plan, as soon as possible.
- (6) New roads and crossings may be constructed and old roads and crossings re-opened within riparian exclusion zones provided that:
 - (a) the road or crossing is identified in the Forest Management Plan or Forest Stewardship Plan
 - (b) the road prism or crossing intersects with the riparian exclusion zone at right angles or as close to right angles as is practicable
 - (c) clearing and disturbance within the riparian exclusion zone are minimised
 - (d) any other necessary permits have been obtained.
- (7) Trees may be felled within drainage depressions, and machinery may enter, however, disturbance must be minimised by:
 - (a) machinery not operating when the soil is saturated
 - (b) using walkover techniques wherever possible
 - (c) preventing skewing of machinery tracks as much as possible
 - (d) not snagging along drainage depressions.
- (8) Where existing measures are not adequately managing the risk of soil erosion, sediment movement or water turbidity the landholder may implement further riparian protection measures. These additional measures must be recorded in the Forest Management Plan or Forest Stewardship Plan.

7. Construction and maintenance of forest infrastructure

7.1 Construction and maintenance of roads

- (1) Clearing of native vegetation for the purpose of roads, drainage structures, log landings, mill sites, snig tracks or extraction tracks must not occur except in accordance with this Code, and the clearing must be limited to the minimum extent necessary.
- (2) Construction of new roads and drainage feature crossings should be minimised as far as practicable, consistent with the requirements for management, harvesting and fire control in the PNF Plan area.
- (3) As far as practicable, roads must be located to facilitate outfall drainage.
- (4) Clearing for road construction is no more than 3 metres from the outside edges of batters or table drains. If it is necessary to clear a wider area, a minimum of 70% groundcover must be established on all the cleared area beyond the road formation within one month of the date of completed construction.
- (5) Trees and other debris must not be stacked in landscape features referred to in Table A or riparian exclusion zones referred to in clause 6.4(2) and Table C.
- (6) Roads must be maintained according to Table D.
- (7) Roads must be maintained to ensure that road surfaces remain stable and drainage systems and sediment controls remain functional.
- (8) Soil exposure on road verges must be kept to a minimum.
- (9) Roads that are not required for ongoing property management must be stabilised and allowed to revegetate.
- (10) Haulage must not be undertaken over any section of road where the surface has rutting more than 150 millimetres deep for any distance exceeding 20 metres.
- (11) Haulage on natural surface roads must cease when there is runoff from the road surface, except for trucks that have already been loaded or partially loaded. These trucks can travel to their intended destination.
- (12) Where existing roads are overgrown and require re-opening, the clearing width must be minimised to the extent required to make the road suitable for traffic.
- (13) As far as practicable, grass cover must be maintained and disturbance to existing drainage structures minimised.
- (14) Blading-off of roads must be used to the minimum extent necessary to rehabilitate the road surface.

Table D: Maximum distance that water may travel along road surfaces, table drains and snig tracks

Road or snig track grade (degrees)	Maximum distance (metres)
0 to ≤ 1	250
> 1 to ≤ 2	200
> 2 to ≤ 3	150
> 3 to ≤ 4	125
> 4 to ≤ 5	100
> 5 to ≤ 6	90
> 6 to ≤ 7	80
> 7 to ≤ 8	70
> 8 to ≤ 9	65
> 9 to ≤ 10	60

7.1.1 Road drainage

- (1) All reasonable steps must be taken to minimise soil erosion from roads. Accordingly, one or more of the following measures must be adopted, where appropriate:
 - (a) maintain vegetative cover (that is, plant material, living or dead) that protects the road surface from erosion
 - (b) establish a grass cover on the road surface using a sterile seed or native grass seed
 - (c) crossfall-drain the road with outfall or infall drainage (preferably with the outward or inward slope being between 4% and 6%) or by shaping the road to a crown so water drains to both of its sides
 - (d) construct drainage structures on the road surface to convey water away from the road formation (for example, cross drains, mitre drains or relief culverts).
- (2) Any drainage structure must be designed to convey the peak flow from a 1-in-5-year storm event.
- (3) Drainage structures must be established on a road if concentrated water flow on the road surface or table drains is likely to occur for distances exceeding the relevant spacing, as shown in Table D.
- (4) Earth windrows resulting from road construction and upgrading operations must be removed from the shoulders of all roads unless they are specifically constructed to prevent erosion of fill batters or where infall drainage is used.
- (5) Earth windrows from road maintenance must be cut through at regular intervals to ensure that water flow on road surfaces does not exceed the distances specified in Table D.
- (6) Rollover banks must have a minimum effective bank height of 15 centimetres (consolidated). Spoon drains must have a minimum effective depth of 15 centimetres.
- (7) Drainage structures must divert water onto a stable surface and kept free of debris that may impede flow of water.
- (8) Drainage structures must not be designed to directly divert sediment laden water into streams.

7.1.2 Roads crossing drainage features

- (1) Drainage feature crossings must be stable causeways, culverts or bridges. Existing gully stuffers may be used if they are stable, but new gully stuffers must not be constructed.
- (2) Crossings must be designed, constructed and maintained to minimise disturbance to the passage of fish and other aquatic fauna. They must be located and constructed to cause minimum disturbance to stream banks, stream beds and natural flows. The base of the crossing must be made of erosion-resistant material such as rock, concrete or heavy timber and must conform to the natural level of the stream bed.
- (3) Crossings must be constructed as close as practicable to right angles to the water flow unless an angled approach reduces soil and ground disturbance.
- (4) Disturbance to the bed and banks of the drainage feature during crossing construction or maintenance must be minimised. Disturbed areas must be reshaped and stabilised as soon as possible following crossing construction or maintenance.
- (5) The approaches to a crossing over a stream must be drained, using a drainage structure, between 5 metres and 30 metres of the crossing. (Where this is impracticable, a drainage structure must be constructed as near as practicable to the crossing.)
- (6) Permanent drainage crossing structures must be designed to convey a 1-in-5-year storm event and withstand a 1-in-10-year storm event. Bridges must be designed and constructed so the natural stream flow is not restricted and erosion is minimised.
- (7) The surface of any crossing and the approaches on both sides of it must be made of stable material that is unlikely to be displaced during normal use of the crossing or approach.
- (8) Causeways must be constructed of stable, non-soil material such as crushed gravel, rock, bitumen, concrete, logs, or other stable material that is unlikely to produce water turbidity.
- (9) Construction equipment must minimise disturbance or damage to the stream bed and banks.
- (10) Fill and construction material must not be placed into streams, and surplus fill must be located outside the riparian exclusion zone.
- (11) Stream banks and bridge embankments must be protected to minimise erosion.
- (12) Soil stabilisation must be undertaken in all areas disturbed by crossing construction, upgrading or maintenance.

7.2 Log landings, portable mill sites and snig tracks

- (1) Wherever practicable, log landings and portable mill sites must not be located in flood runners or drainage depressions.
- (2) Log landings and portable mill sites must be no larger than the minimum size necessary for efficient operations.
- (3) Log landings and portable mill sites must be located and constructed as far as practicable to allow effective crossfall drainage during harvesting operations.
- (4) The construction of new log landings and portable mill sites must not be located nearer than 10 metres to an exclusion zone or riparian exclusion zone.
- (5) Existing log landings located within riparian exclusion zones may only be used with the prior written approval of Local Land Services, and provided:
 - (a) clearing for a new log landing would cause greater environmental harm; and
 - (b) disturbance to soils and groundcover is minimised, and
 - (c) erosion and sediment control measures must be in place for the duration of the log landings use, and upon its completion, and
 - (d) at least 70% ground cover must be reinstated within one month of the completion of the relevant log landing's used for the forestry operations.
- (6) Runoff from log landings and portable mill sites must not be directly discharged into a drainage feature.
- (7) Log landings must not be used when the log landing soil is saturated.
- (8) Vegetation and debris from log landings and portable mill sites must not be deposited in an exclusion zone, riparian exclusion zone or flood runner.
- (9) Woody waste and debris on log landings and portable mill sites must not be stacked against retained trees.
- (10) Bark accumulated on log landings, and sawdust on mill sites, must be progressively dispersed away from the site during harvesting operations. Alternatively, bark can be placed in a discrete area on a log landing provided:
 - (a) Bark heaps are not located adjacent to or under crowns of retained trees, and
 - (b) Bark heaps are surrounded by a 5-metre earth or mineral break, and
 - (c) Timber off-cuts are staked at least 5 metres away from any bark heap, and
 - (d) Upon completion of forestry operations bark heaps are positioned at the centre of the log landing. Bark heaps must be burnt in accordance with all applicable legal requirements and necessary approvals.
- (11) On completion of operations, log landings and portable mill sites must be drained and reshaped to disperse runoff onto surrounding vegetation.

7.2.1 Snig tracks and extraction tracks

- (1) Snig track or extraction track construction must be minimised, and as far as practicable, walkover extraction must be used and slash retained on snig and extraction tracks.
- (2) Soil disturbance and exposure on snig and extraction tracks must be minimised.
- (3) As far as practicable, snig tracks from previous operations must be used.
- (4) Existing snig tracks or extraction tracks must not be used if they are incised and cannot be drained.
- (5) In re-opening existing snig tracks and extraction tracks, the use of blades must be restricted to the removal of obstructions such as understorey vegetation, logs/tree heads and surface rock, and ensuring that the track is adequately drained.

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- (6) Snig tracks and extraction tracks must not encroach on exclusion zones or riparian exclusion zones except at designated crossings and where permitted by clause 6.4(5-6).
- (7) Blading off of snig tracks and extraction tracks must not occur.
- (8) Snig tracks and extraction tracks must be located and constructed to ensure that water flow on the track surface does not exceed the distances specified in Table D. This could be achieved by one or a combination of the following techniques:
 - (a) retain existing groundcover using walkover techniques
 - (b) retain or cover the track surface with slash and harvesting debris
 - (c) construct or maintain the track with outfall drainage
 - (d) construct track drainage structures.
- (9) On completion of operations, the following measures must be implemented:
 - (a) where practicable, snig tracks and extraction tracks must be reshaped, all earth windrows, wheel ruts and log furrows removed, and recoverable topsoil spread back over the track, and
 - (b) crossfall drainage must be reinstated on snig tracks or, where this is not sufficient to divert runoff from the track, crossbanks must be installed consistent with the spacings in Table D.
- (10) Crossbanks must be constructed to have a minimum effective height of 35 centimetres unconsolidated, or 25 centimetres consolidated, and as a guide should not be greater than 50 centimetres in height.
- (11) Crossbanks must not be constructed of bark or woody debris.

7.2.2 Snig track and extraction track crossings on drainage features

- (1) The location of log landings and snig/extraction tracks must be planned to minimise the number of crossings required.
- (2) Temporary crossings may be constructed if this construction will enable access to a forested area that cannot be practically accessed by other means, and negates the need to construct new roads, snig tracks or extraction tracks which are likely to cause greater environmental harm.
- (3) Snig track and extraction track crossings must be stable causeways (including natural surface causeways), culverts or bridges. Existing gully stuffers may only be used if they are stable. New gully stuffers must not be constructed.
- (4) Machinery must not cross a drainage feature which is running water or when the soil is saturated, unless by means of a stable crossing.
- (5) Approaches to crossings must be as close as possible to right angles to the flow of water.
- (6) A crossbank must be installed on each approach, between five and 20 metres from the drainage feature crossing. The distance must be measured from the top of the bank of the incised channel or, where there is no defined bank, from the edge of the channel or centre of the depression. The drainage structure must divert water onto a stable surface. If such a surface is not available, sediment control measures must be used to prevent sediment entering the drainage feature. Drainage structures must not be designed to directly divert sediment laden water directly into streams.
- (7) Disturbance to the bed and banks of the drainage feature must be minimised, and any spoil must be removed from the drainage feature.

- (8) All areas disturbed during crossing construction and use, including approaches, must be rehabilitated following completion of use. Rehabilitation includes the reshaping of the crossing to conform as closely as possible to the original ground surface. If groundcover is not likely to recover naturally, sowing with a suitable sterile seed or endemic native seed/fertiliser mix must be undertaken to establish effective groundcover.

7.2.3 Wet weather limitations for snigging, log landing and portable mill operations

- (1) Harvesting operations must not occur when:
 - (a) there is runoff from the snig track surface, or
 - (b) soils are saturated, or
 - (c) soil is rutted to a depth of more than 200 millimetres below the track surface over a 20 metre section or longer until the soil has dried and/or rehabilitation has restored the stability of the track surface.
- (2) Forwarders, excavators and truck-mounted loaders may be used as stationary loaders when there is runoff from the log landing.
- (3) All other machinery on the log landing must remain stationary when there is runoff from the log landing surface, unless the log landing is constructed of gravel or other stable material.

Appendix A: Listed species ecological prescriptions

Introduction

These prescriptions must be applied within the forestry operations area where there is a **known record, site evidence**, or in relation to koalas potential habitat (see Figure 3), of a threatened species.

- (a) A known record is a sighting or record of the species in the NSW BioNet (<http://www.bionet.nsw.gov.au/>) that is less than 20 years old with a reliability level and/or Source Code of 1 to 4 and a coordinate accuracy of 100 metres or less,
- (b) Site evidence is a sign a species has visited or regularly uses a site, and includes observations of, for example, faecal pellets or scats, chewed seed cones or a nest, or evidence that the site has been used as a latrine.
- (c) recorded by a suitably qualified expert(s) as part of a fauna survey and/or flora survey during the planning and assessment of harvest operations.

A list of threatened species under the *Biodiversity Conservation Act 2016* and species profiles for each species can be viewed on the Department of Planning, Industry and Environment (DPIE) website at <https://www.environment.nsw.gov.au/topics/animals-and-plants/threatened-species>.

The prescriptions set out below assist in the protection of threatened species, and include:

- (1) additional widths to stream exclusion zones
- (2) exclusion zones and/or buffer zones around locations of threatened species records
- (3) additional tree retention requirements around locations of threatened species records.

Exclusion zones and buffer zones requiring additional tree retention requirements must be applied within the PNF Plan area subject to the area of the forestry operation described in the Forest Management Plan or Forest Stewardship Plan.

Some species prescriptions vary according to the Bioregion in which they occur. Unless otherwise stated, the regions referred to in the prescriptions are based on the Interim Biogeographic Regionalisation of Australia (IBRA) shown in Figure 2.

General conditions

For all threatened species prescriptions, the following applies:

- where a retained eucalypt tree (as required by these prescriptions) also meets the requirements of a habitat tree, the eucalypt tree may be counted as a habitat tree
- where other exclusion zones form part of the habitat area required for threatened species prescriptions, the exclusion zones may count towards the area of habitat required to be retained
- where public conservation/reserved land (for example National Parks) falls within buffer or exclusion zone areas requiring additional tree retention requirements as part of threatened species prescriptions, then the area of public conservation/reserved land may contribute towards the area of habitat required to be retained
- buffer and exclusion zones are to be marked in the field where they adjoin the area, subject to forestry operations. This marking has to be visible while forestry operations are occurring.

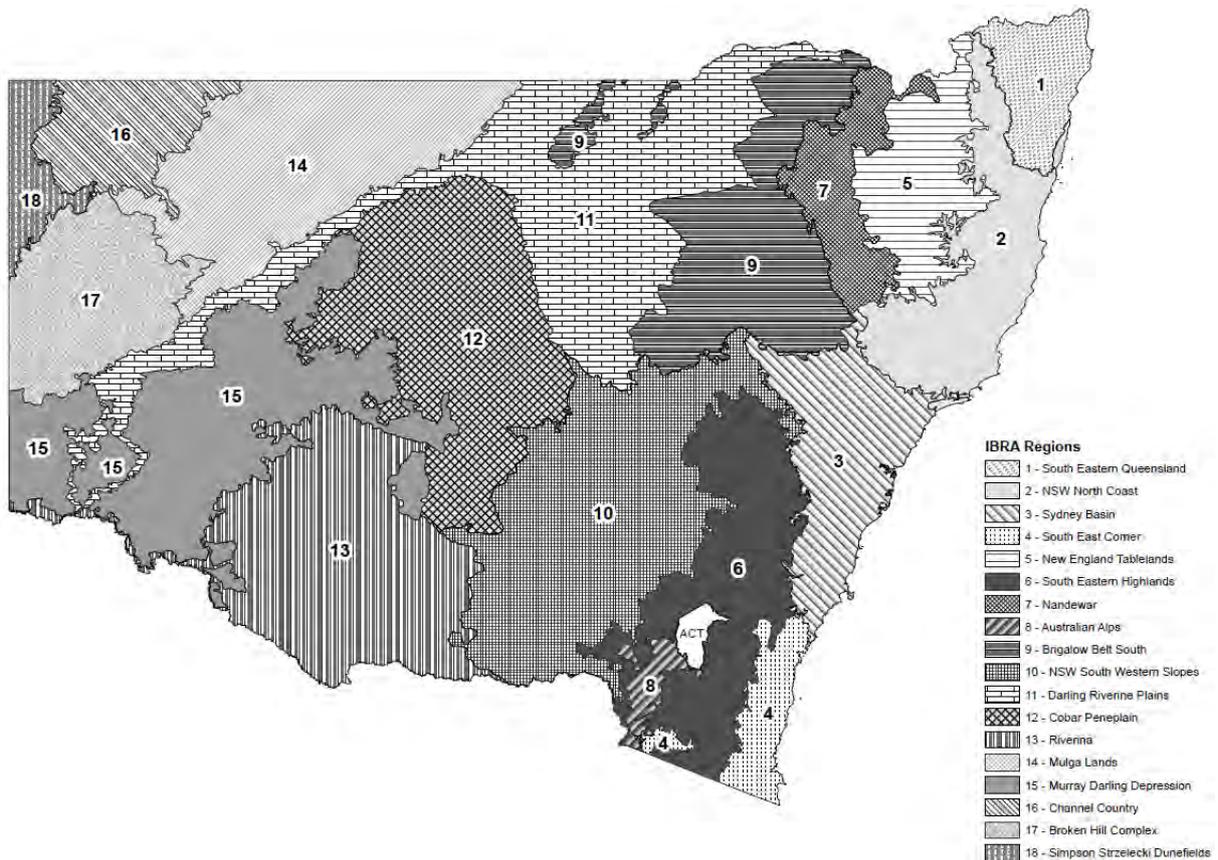


Figure 2: Interim Biogeographic Regionalisation of Australia (IBRA) regions, where prescriptions for some threatened species may vary

Further information about individual threatened species may be sourced from the Environment, Energy and Science Group (EES) of DPE. The DPE EES website provides species profiles and additional information. Visit <https://www.environment.nsw.gov.au/topics/animals-and-plants/threatened-species>.

Amphibians

Southern bell frog (*Litoria raniformis*)

Zones for application of prescription

Cobar Peneplain, Murray Darling Depression, NSW South Western Slopes, Riverina, South Eastern Highlands

Where there is a record within an area of forest operations, an exclusion zone with a 20-metre radius must be implemented around the location of the record.

Additional information

The southern bell frog is known to exist in isolated populations in the Coleambally Irrigation Area, the Lowbidgee floodplain and around Lake Victoria. The species breeds from September to April following a rise in water levels. During the breeding season the southern bell frog is found amongst aquatic vegetation in or at the edge of slow-moving streams, marches, lagoons, lakes, dams and rice crops. Outside the breeding season animals move away from the water and shelter under ground debris such as fallen timber and bark, rocks, grass clumps and deep soil cracks.

Mammals

Squirrel glider (*Petaurus norfolcensis*)

Zones for application of prescription

Brigalow Belt South, Nandewar, NSW South Western Slopes, Riverina, South Eastern Highlands

Prescription

Where there is a squirrel glider record in an area of forest operations, the following must apply:

- (a) A buffer zone with a 250-metre radius (about 20 hectares) must be identified, centred on the location of the record or records.
- (b) Within this buffer zone, the following additional prescriptions must be implemented:
 - (i) A minimum of 15 trees per 2 hectares with visible hollows must be retained where available.
 - (ii) A recruitment tree must be retained for each hollow bearing tree retained. Where the total number of hollow bearing trees and recruitment trees is less than 30 trees per 2 hectares, additional recruitment trees must be retained to bring the number up to 30 trees per 2 hectares.
 - (iii) Disturbance to understorey trees and shrubs (particularly banksias and acacias), ground logs, rocks and litter must be minimised.
- (c) Where there are records of dens or roosts, these must be contained within buffer zones encompassing suitable habitat.
- (d) Where there are more than two squirrel glider records closer than 250 metres apart within the forest operation area, advice on the location of the buffer area must be sought from EES before commencing forestry operations.

Additional information

Squirrel glider habitat is generally dry eucalypt forest and woodland. In coastal areas, potential habitat is blackbutt, bloodwood and ironbark forest with a heathy understorey. In the absence of these forest types, areas of mature or old growth forest must be retained.

Koala (*Phascolarctos cinereus*)

Zones for application of prescription

Prescription

- (a) Where there is a record of a koala within the area of forestry operations, or within 500 metres of an area of forestry operations, or where 10 or more koala scats are found beneath the canopy of a primary or secondary koala feed tree during pre-harvest surveys or harvest operations, or within areas mapped under the PNF koala prescription map as shown in Figures 3-4, the following must apply:
- (i) A minimum of 15 primary koala feed trees and 5 secondary koala feed trees must be retained per hectare in the forestry operations area (not including other exclusion or buffer zones), where available.
 - (ii) Where possible, preference should be given to trees that provide habitat connectivity and/or build on existing landscape features (Table A), existing habitat islands, refugia and conservation areas adjacent to and within the PNF Plan area, have leafy, broad crowns and be in a range of size classes with a minimum of 20 centimetres diameter at breast height over bark.
 - (iii) Damage to retained trees must be minimised by directional felling techniques.
 - (iv) Post-harvest burns must minimise damage to the trunks and foliage of retained trees.
 - (v) Each tree must be visually assessed for koalas immediately prior to it being felled.
 - (vi) Where 20 koala feed trees per hectare are present in areas mapped under the PNF koala prescription map but either 15 primary or 5 secondary feed trees for the relevant KMA cannot be met, then the landholder must retain as many koala feed trees as are available, including substituting primary feed trees for secondary (or vice versa) up to a maximum of 20 koala feed trees per hectare. Primary feed trees are to be prioritised for retention over secondary feed trees.
 - (vii) Where there are not 20 koala feed trees per hectare present in areas mapped under the PNF koala prescription map then conditions (a) (i)-(iv) and (a) (vi) do not apply but the landholder(s) must retain as many koala feed trees as are available. However, if in the course of harvest operations 10 or more koala scats are found beneath the canopy of a koala feed tree (or one or more koala scats in Central and Southern Tablelands and South Coast KMAs) or where the presence of a koala is clearly identifiable by recent scratches, the landholder must also reinstate conditions (a) (ii) – (v). These areas will remain part of the PNF koala prescription map unless surveyed consistent with (viii).
 - (viii) Where the landholder considers the PNF koala prescription map is inaccurate on their property, including where the required number of koala feed trees cannot be found (as per koala prescription clause vi-vii), the landholder may request that the area(s) is verified by a suitably qualified expert(s) as described in Note 8.

- (b) In the Far West, Riverina, Darling Riverine Plains and Central and Southern Tablelands Koala Management Areas (refer to Figure 5), any tree containing a koala, or any tree beneath which one or more koala scats are found, or where the presence of a koala is clearly identifiable by recent scratches must be retained, and an exclusion zone of 50 metres implemented around each retained tree.
- (i) Where signs of koala presence outlined in (b) are identified during pre-harvest surveys, those trees must be visually assessed for koala presence during harvest operations.

Note 7: Landholders will be provided with the PNF koala prescription mapping held by the NSW Government as part of their PNF Plan approval. Updates to this map will be overseen by the NSW Forest Monitoring Steering Committee (or equivalent) independently chaired by the NSW Natural Resources Commission. Notwithstanding this the PNF koala prescription map may be updated at a property scale consistent with Note 8.

Note 8: Verifying areas mapped as highly suitable koala habitat on private land

Where the landholder(s) consider the mapping of koala habitat is inaccurate, and/or where the required number of koala feed trees cannot be found (as per Koala Prescription Clause (a)(vi)), the landholder may commission a review be undertaken by a suitably qualified expert(s).

The koala habitat suitability of the area must be reassessed based on an on-ground koala habitat verification survey conducted by a suitably qualified expert(s). The landholder(s) will need to identify the disputed area and provide their written permission for a habitat verification survey to be conducted.

The survey must be conducted in accordance with the protocol available at www.ils.nsw.gov.au/pnforestry.

Depending on the results of the assessment, Local Land Services will provide the landholder(s) with:

- (a) an amended map to show any revised areas of highly suitable koala habitat, or
(b) the original map, showing the highly suitable koala habitat areas mapped before the review.

Where the survey has determined that the disputed area is not highly suitable koala habitat, Local Land Services will approve an amendment to the Private Native Forestry Plan and an amended Forest Management Plan or Forest Stewardship Plan to apply the revised highly suitable koala habitat mapping.

Trees with koalas present that are identified during surveys must be marked and this information provided to the landholder(s) by Local Land Services prior to forestry operations commencing.

Additional information

Generally, koala habitat comprises eucalypt forest and woodland containing primary and secondary food trees (see Table E). Koala droppings (scats) have a strong eucalyptus odour, are pale green in colour with faint or clear ridges and/or vertical stripes, have a moist mucus coating and bullet shaped appearance. For further information on the identification of koala scats, contact DPE or refer to the DPE website – <https://www.environment.nsw.gov.au/>

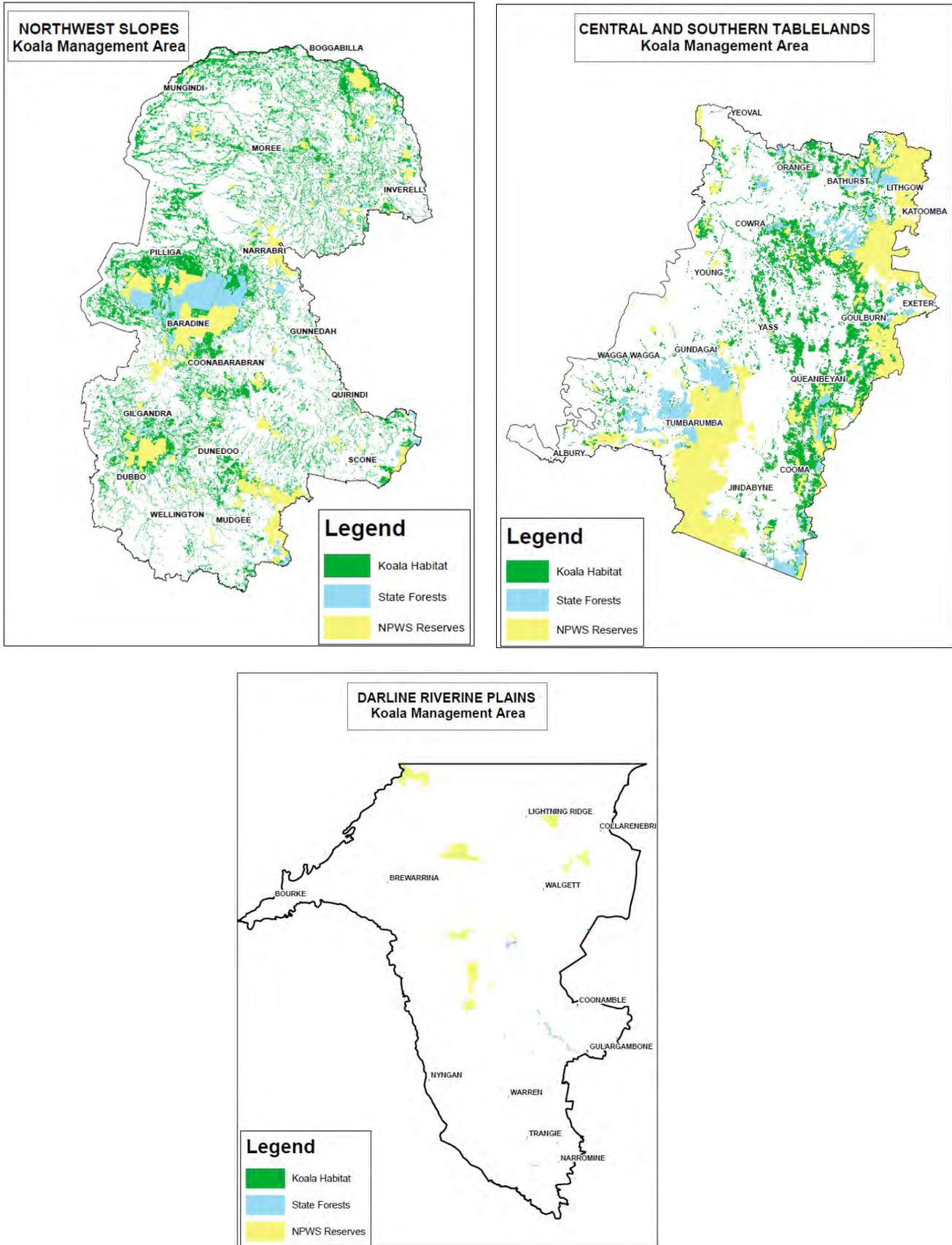


Figure 3: PNF koala prescription map (green) in Northwest Slopes (top left), Central and Southern Tablelands (top right) and Darling Riverine Plains (bottom) Koala Management Areas.

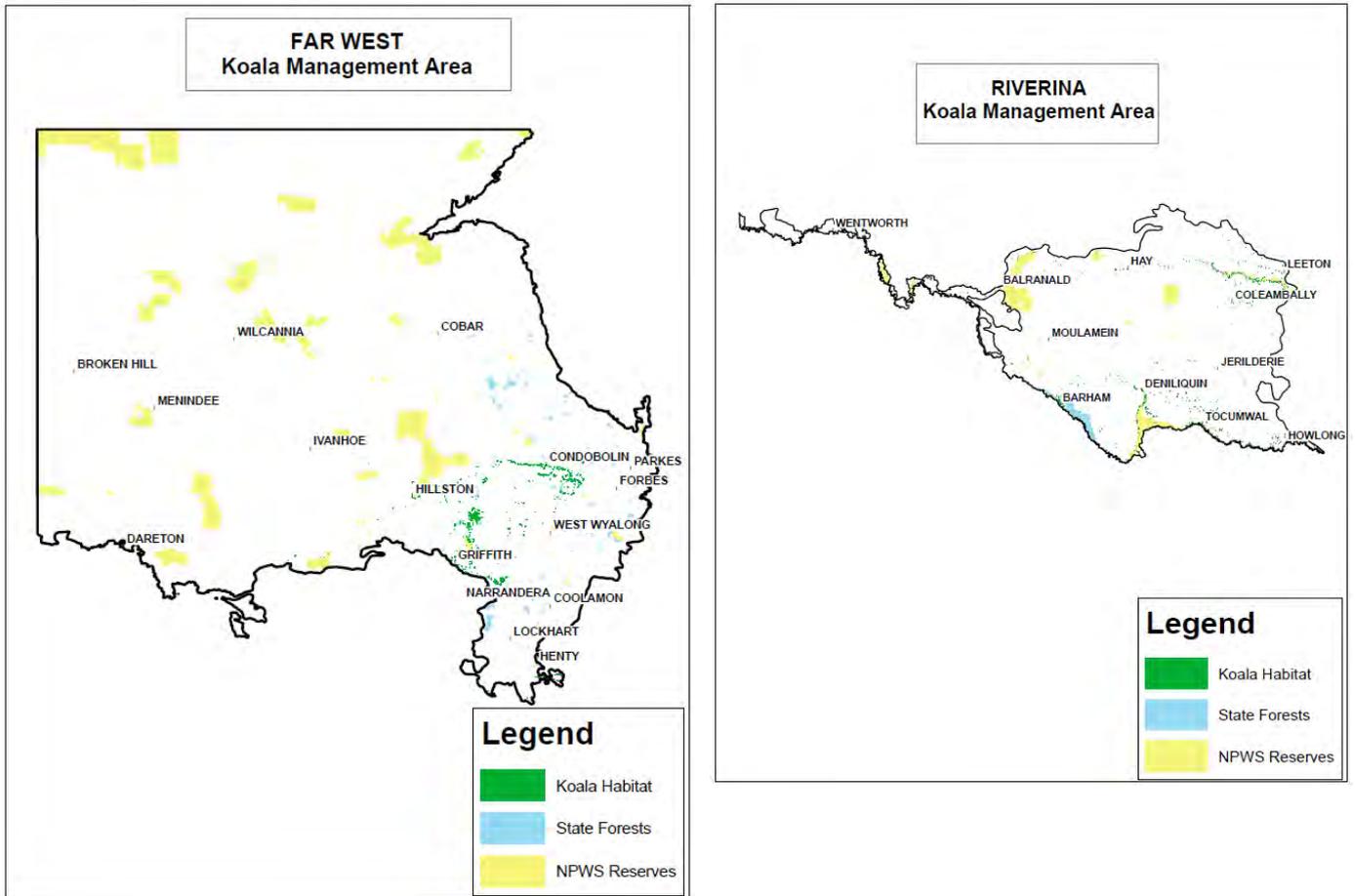


Figure 4: PNF koala prescription map (green) in Far West (left) and Riverina (right) Koala Management Areas.

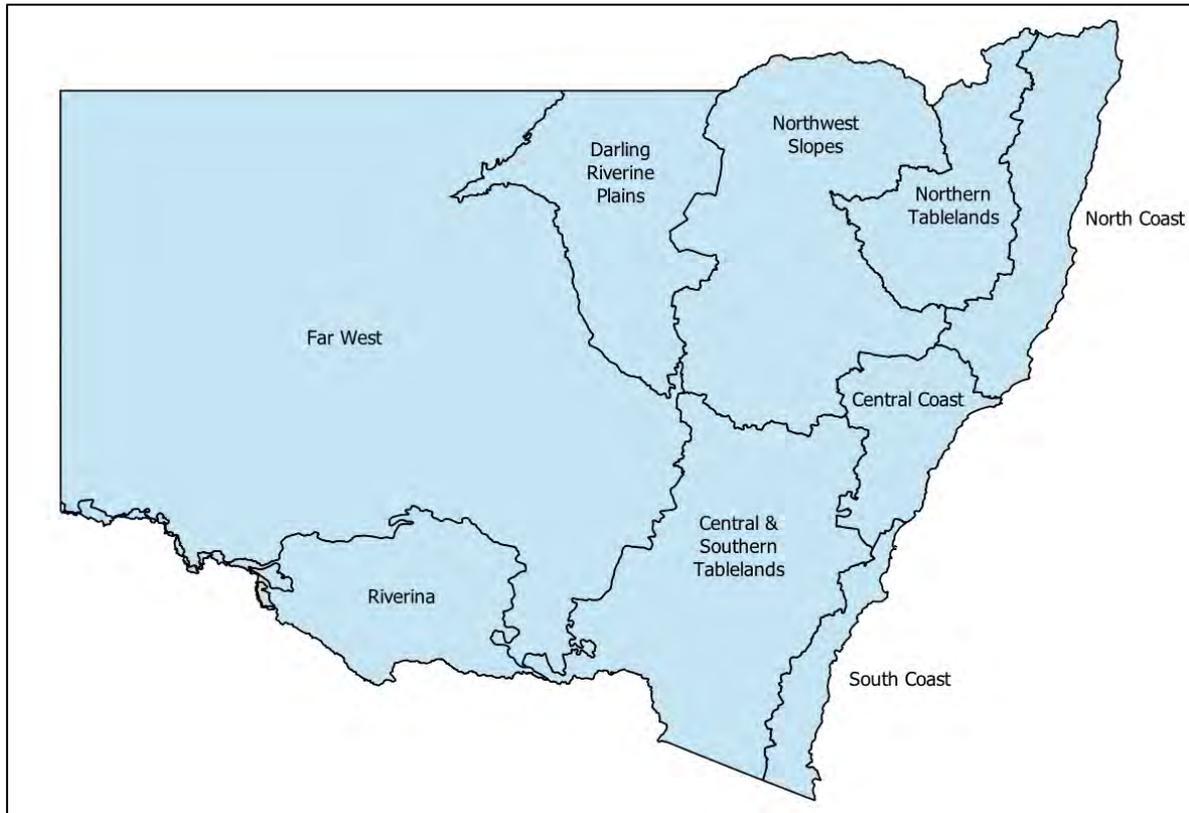


Figure 5: Koala Management Areas in NSW

Table E: Primary and secondary koala use trees for Koala Management Areas in the River Red Gum forests

Koala food tree species		Koala Management Area				
Common name	Scientific name	Central and Southern Tablelands	North West Slopes	Darling Riverine Plains	Riverina	Far West
Primary tree species						
Blakley's red gum	<i>Eucalyptus blakelyi</i>	X	X	X		
River red gum	<i>Eucalyptus camaldulensis</i>	X	X	X	X	X
Coolibah	<i>Eucalyptus coolabah</i>		X	X	X	X
Brittle gum	<i>Eucalyptus mannifera</i>	X				
Grey gum	<i>Eucalyptus punctata</i>	X				
Inland scribbly gum	<i>Eucalyptus rossii</i>	X				
Forest red gum	<i>Eucalyptus tereticornis</i>	X				
Ribbon gum	<i>Eucalyptus viminalis</i>	X				
Secondary tree species						
White box	<i>Eucalyptus albens</i>	X	X	X		

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Koala food tree species		Koala Management Area				
Common name	Scientific name	Central and Southern Tablelands	North West Slopes	Darling Riverine Plains	Riverina	Far West
Dirty gum	<i>Eucalyptus chloroclada</i>		X	X		
Mountain grey gum	<i>Eucalyptus cypellocarpa</i>	X				
Tumbledown red gum	<i>Eucalyptus dealbata</i>		X	X		
Broad-leaved peppermint	<i>Eucalyptus dives</i>	X				
White stringybark	<i>Eucalyptus globoidea</i>	X				
Black box	<i>Eucalyptus largiflorens</i>		X	X	X	X
Red stringybark	<i>Eucalyptus macrorhyncha</i>	X				
Silver-leafed ironbark	<i>Eucalyptus melanophloia</i>		X	X		
Yellow box	<i>Eucalyptus melliodora</i>		X	X	X	X
Western grey box	<i>Eucalyptus microcarpa</i>	X	X	X	X	X
Grey box	<i>Eucalyptus moluccana</i>		X			
Snow gum	<i>Eucalyptus pauciflora</i>	X	X			
Narrow-leafed grey box	<i>Eucalyptus pilligaensis</i>		X			
Sydney peppermint	<i>Eucalyptus piperita</i>	X				
Bimble box	<i>Eucalyptus populnea</i>		X	X		
Orange gum	<i>Eucalyptus prava</i>		X			
Grey gum	<i>Eucalyptus punctata</i>		X			
Hard-leaved scribbly gum	<i>Eucalyptus sclerophylla</i>	X				

Birds

Masked owl (*Tyto novaehollandiae*) and barking owl (*Ninox connivens*)

Zones for application of prescription

Brigalow Belt South, Cobar Peneplain, Darling Riverine Plains, Murray Darling Depression, Nandewar, NSW South Western Slopes, Riverina, South Eastern Highlands

Prescription

Where there is a record within the area of forestry operations for the masked owl or barking owl, the following prescriptions apply:

- (a) Nest trees (trees with hollows containing a nest of a masked or barking owl) must be retained and protected by a 50-metre exclusion zone.
- (b) Roost trees (trees where a masked or barking owl has been observed roosting or signs of roosting are observed) must be retained and protected by a 25-metre exclusion zone.
- (c) Within 1000 metres of the record, the following additional prescriptions must be implemented:
 - (i) a minimum of 15 hollow bearing trees per two hectares must be retained, where available.
 - (ii) a recruitment tree must be retained for each hollow bearing tree, where available.
 - (iii) where there are not 15 hollow bearing trees available recruitment trees must be substituted for hollow bearing trees up to a maximum of 30 trees per two hectares, where available.
 - (iv) Disturbance to the understorey, coarse woody debris and ground cover should be limited to the minimum extent necessary.

Swift parrot (*Lathamus discolor*)

Zones for application of prescription

Brigalow Belt South, Cobar Peneplain, Murray Darling Depression, Nandewar, NSW South Western Slopes, Riverina, South Eastern Highlands

Prescription

Where there is a record of a swift parrot in an area of forestry operations, the following must apply:

- (a) An exclusion zone of 25 metres applies to all swift parrot roost trees
- (b) At least ten eucalypt feed trees must be retained within every two hectares of the net harvest area. These must be marked for retention. Where retained eucalypt feed trees also meet the requirements of habitat or recruitment trees, the retained eucalypt feed trees can be counted as habitat or recruitment trees.
- (c) Where a swift parrot is observed feeding, the tree in which it is feeding must be retained.

Additional information

Swift parrots migrate to the Australian south-east mainland between March and October. On the mainland, they occur where eucalypts are flowering profusely or where there are abundant lerps (from sap-sucking bugs). Favoured feed trees include winter-flowering species such as swamp mahogany (*Eucalyptus robusta*), spotted gum (*Corymbia maculata*), red bloodwood (*C. gummifera*), mugga ironbark (*E. sideroxylon*) and white box (*E. albens*). Commonly used lerp-infested trees include grey box (*E. microcarpa*), grey box (*E. moluccana*) and blackbutt (*E. pilularis*).

Regent parrot (*Polytelis anthopeplus monarchoides*)

Zones for application of prescription

See Figure 6

Prescription

There should be no harvesting of mallee within the areas shown on Figure 6:

- (a) within 20 kilometres of the Lower Wakool River defined as downstream of the junction of the Edward and Wakool Rivers, with the eastern boundary line being drawn perpendicular to the river at that point
- (b) within 20 kilometres of the Murray River.

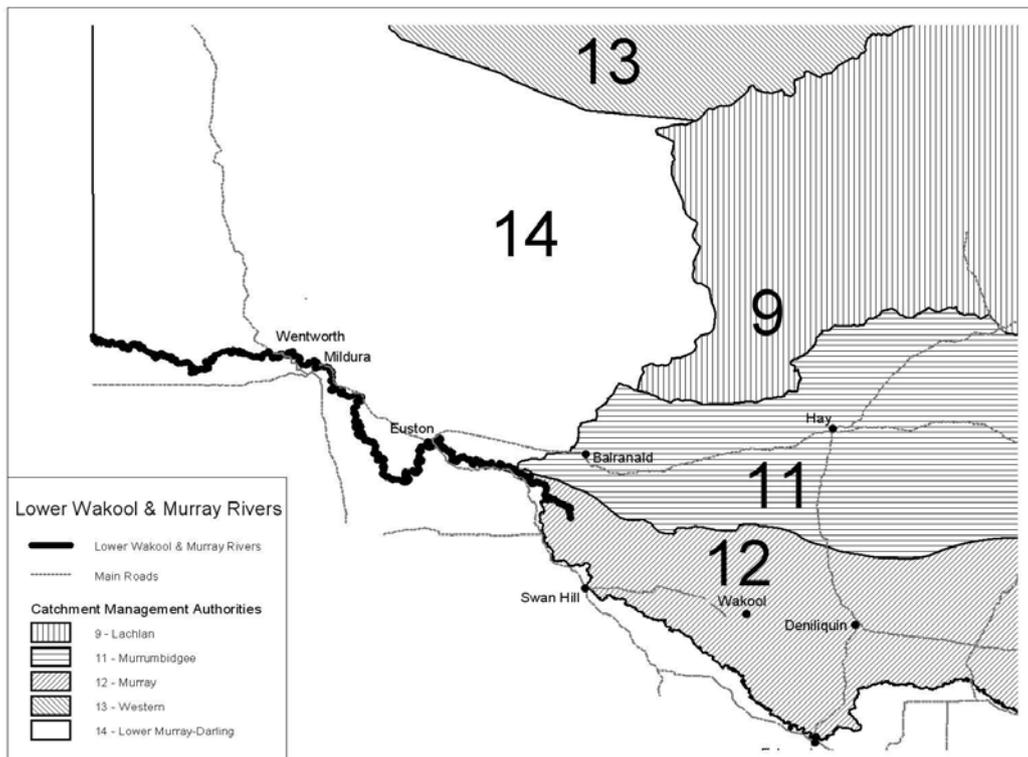


Figure 6: Area of application of regent parrot prescription

Mallee within this zone can only be harvested by obtaining approval under the *Local Land Services Act 2013*.

Bush stone-curlew (*Burhinus grallarius*)

Zones for application of prescription

Brigalow Belt South, Cobar Peneplain, Darling Riverine Plains, Murray Darling Depression, Nandewar, NSW South Western Slopes, Riverina, South Eastern Highlands

Prescription

- (a) No forestry operations are permitted within a 50-metre radius of all bush stone-curlew ground nests.
- (b) coarse woody debris within 200 metres of the nest must be retained where practicable

Additional information

Bush stone-curlew nests are found in areas of dry, grassy open forest or woodland and are a small scrape on bare ground, often near a bush or tree or beside a fallen limb. Nest sites can be re-used in consecutive years. Eggs are stone coloured, blotched dark brown and grey. Nesting season is August through to January.

Red-tailed black-cockatoo (*Calyptorhynchus banksii*)

Zones for application of prescription

Brigalow Belt South, Cobar Peneplain, Darling Riverine Plains, Murray Darling Depression

Prescription

No forestry operations are permitted within a 50-metre radius of all red-tailed black-cockatoo nests.

Additional information

Red-tailed black-cockatoos nest in tree hollows usually in larger, mature trees. Nest locations are indicative of where a bird is seen entering a hollow. Nesting season is from March to August.

Red-tailed black-cockatoos are found in a wide variety of habitats.

Gang-gang cockatoo (*Callocephalon fimbriatum*)

Zones for application of prescription

Nandewar, NSW South Western Slopes, South Eastern Highlands

Prescription

No forestry operations are permitted within a 25-metre radius of all gang-gang cockatoo nests.

Additional information

The gang-gang cockatoo is generally found in tall mountain forests and woodlands (particularly heavily timbered and mature wet sclerophyll forests) in spring and summer, and moves to lower altitudes in drier, more open eucalypt forests and woodlands (particularly box-gum, box-ironbark and dry coastal areas) in autumn and winter. The species favours old growth forest and woodland for nesting and roosting. Nests are located in hollows that are 10 cm in diameter or larger and at least 9 m above the ground in eucalypts.

Brown treecreeper (*Climacteris picumnus*)

Zones for application of prescription

Brigalow Belt South, Darling Riverine Plains, Nandewar, NSW South Western Slopes, Riverina, South Eastern Highlands

Prescription

No forestry operations are permitted within a 25-metre radius of all brown treecreeper nests between 1 June and 31 January.

Additional information

The brown treecreeper occurs in eucalypt woodlands and dry open forest, mainly inhabiting woodlands dominated by stringybarks or other rough-barked eucalypts. Fallen timber is an important habitat component for foraging. This species depends on hollows in standing dead or live trees for nesting, and are generally present at a site year-round.

Speckled warbler (*Chthonicola sagittate*)

Zones for application of prescription

All

Prescription

No forestry operations are permitted within a 25-metre radius of all speckled warbler nests between 1 August and 31 January.

Additional information

The speckled warbler occurs in a range of *Eucalyptus* dominated communities that have a grassy understorey. Pairs occupy a breeding territory of about 10 hectares, with a slightly larger home range outside of the breeding season. They nest in a rounded, domed, roughly built nest of dry grass and strips of bark at the base on a low dense plant, often among fallen branches and other litter.

Diamond firetail (*Stagonopleura guttata*)

Zones for application of prescription

All

Prescription

No forestry operations are permitted within a 25-metre radius of all diamond firetail nests between 1 August and 31 January.

Additional information

The diamond firetail occurs in grassy eucalypt woodlands, but also occurs in open forest, mallee, and grasslands. It is often found in riparian areas, and sometimes in lightly wooded farmland. Nests are globular structures built either in the shrubby understorey or higher up, especially under hawk or raven nests.

Grey-crowned babbler (*Pomatostomus temporalis*)

Zones for application of prescription

Brigalow Belt South, Cobar Peneplain, Darling Riverine Plains, Murray Darling Depression, Nandewar, NSW South Western Slopes, Riverina, South Eastern Highlands

Prescription

No forestry operations are permitted within a 25-metre radius of all grey-crowned babbler nests.

Additional information

The grey-crowned babbler occurs in open box-gum woodlands on the slopes, box-cypress pine and open box woodlands on alluvial plains, and woodlands on fertile soils in coastal regions. The species builds and maintains several conspicuous, dome-shaped stick nests about the size of a football, which is used as a dormitory for roosting each night. Nests are maintained year-round.

Flame robin (*Petroica phoenicea*)

Zones for application of prescription

All

Prescription

No forestry operations are permitted within a 25-metre radius of all flame robin nests between 1 September and 1 March.

Additional information

The flame robin breeds in spring to late summer, in upland tall moist eucalypt forests and woodlands. Breeding habitat has a ground layer dominated by native grasses and a sparse or dense shrub layer. The flame robin builds nests near the ground in sheltered sites such as shallow cavities in trees, stumps or banks. In winter, the species migrates to drier, more open habitat in dry forests, open woodlands, pastures and native grasslands, and is occasionally seen in heathland or other shrubland.

Scarlet robin (*Petroica boodang*)

Zones for application of prescription

All

Prescription

No forestry operations are permitted within a 25-metre radius of all scarlet robin nests between 1 July and 31 January.

Additional information

The scarlet robin occurs in dry eucalypt forests and woodlands, where logs and fallen timber are important components of its habitat. The species' nest is an open cup made of plant fibres and cobwebs and is built in the fork of a tree more than two metres above the ground.

Hooded robin (*Melanodryas cucullate*)

Zones for application of prescription

All

Prescription

No forestry operations are permitted within a 25-metre radius of all hooded robin nests between 1 July and 30 November.

Additional information

The hooded robin prefers lightly wooded areas, usually open eucalypt woodland, acacia scrub and mallee, often in or near clearings or open areas. Territories range from around 10 hectares in the breeding season to 30 hectares in the non-breeding season. The species breeds between July and November and often rears several broods. Nest is a small, neat cup of bark and grasses bound with webs, in a tree fork or crevice, from < 1 metre to 5 metres above the ground.

Dusky woodswallow (*Artamus cyanopterus cyanopterus*)

Zones for application of prescription

All

Prescription

No forestry operations are permitted within a 25-metre radius of all dusky woodswallow nests between 1 September and 1 March.

Additional information

Dusky woodswallows inhabit dry, open eucalypt forests and woodland with an open or sparse understorey, but has also been recorded in shrublands, heathlands and occasionally moist forest or rainforest. This species is also found in farmland, usually at the edges of forest or woodland. Nests are open and cup-shaped and occur in a range of sites.

Varied sittella (*Daphoenositta chrysoptera*)

Zones for application of prescription

All

Prescription

No forestry operations are permitted within a 25-metre radius of all varied sittella nests.

Additional information

The varied sittella inhabits eucalypt forests and woodlands, especially those containing rough-barked and mature smooth-barked gums with dead branches, mallee and *Acacia* woodland. Builds a cup-shaped nest of plant fibres and cobwebs in an upright tree fork high in the living tree canopy, and often re-uses the same fork or tree in successive years.

Black-chinned honeyeater (*Melithreptus gularis*)

Zones for application of prescription

All

Prescription

No forestry operations are permitted within a 25-metre radius of all black-chinned honeyeater nests between 1 June and 31 December.

Additional information

The black-chinned honeyeater inhabits dry open forests or woodlands dominated by box and ironbark eucalypts, but also forests of smooth-barked gums, stringybarks, ironbarks, richer sheoaks and tea-trees. The species nests high in the crown of a tree in the uppermost lateral branches, hidden by foliage.

Turquoise parrot (*Neophema pulchella*)

Zones for application of prescription

Brigalow Belt South, Cobar Peneplain, Darling Riverine Plains, Murray Darling Depression, Nandewar, NSW South Western Slopes, Riverina, South Eastern Highlands

Prescription

No forestry operations are permitted within a 30-metre radius of all turquoise parrot nests.

Additional information

Turquoise parrots occur mainly west of the escarpment on the tablelands and western slopes, but are occasionally found more widely through most of eastern NSW, in open woodlands, dry sclerophyll forest and adjacent grasslands. Nests range from 1–20 metres above the ground. They are in hollows in small trees, often dead eucalypts, or in holes or stumps, fence posts or even logs lying on the ground. Nesting season is from August to December and from April to May.

Threatened flora – specific prescriptions

Conditions applying to flora species **Table F: Damage to individuals avoided**

Damage to individuals of the species to which this condition applies should be avoided to the greatest extent practicable.

NSW Conservation status*	Scientific name	Common name
VU	<i>Amphibromus fluitans</i>	Floating swamp wallaby-grass

VU: Vulnerable

Appendix B: Calculating Minimum Stand Basal Area

- (1) For compliance purposes, average basal area will be calculated using the following method:
- (a) the sample points must be located systematically across the harvested area with a minimum inter-point distance of 60 metres;
 - (b) samples must be taken using angle count sampling or fixed area plot measurements;
 - (c) where fixed area plot samples are used, plots must be 50 m x 20 m in size; and
 - (d) the total number of samples to be taken must be in accordance with Table G below.

Table G: Minimum number of sample points required for harvested areas

Size of harvested area (hectares)	Minimum number of sample points required
0–30	20
31–50	30
51–100	40
101–200	50
201+	60

- (2) Further limits:
- (a) all forestry operations must have an average basal area equal to or above the average minimum limit for basal area;
 - (b) the basal area at no more than 25% of sampling points within the harvested area can have a basal area below 7m²/hectare, and
 - (c) no more than 50% of sampling points within the harvested area can be below the minimum basal area as specified in Clause 3.2 (2) (Single Tree Selection and Thinning).

Appendix C: Calculating Forest Regeneration

- (1) For compliance purposes, forest regeneration in Single Tree Selection and Thinning harvest areas will be calculated using the following method:
 - (a) the starting point must be randomly located within the harvest area by selecting it on a map before assessment;
 - (b) the sample points must be located at 20 metre intervals along a square that is 200 metres on each side (Figure 7);
 - (c) samples must be taken using fixed area plot measurements with a plot size of approximately 10 m²;
 - (d) plots must be circular with a minimum radius of 1.8 m radius; and
 - (e) each plot is classed as stocked if any part of the plot area:
 - i. is under the canopy of an existing tree, or
 - ii. contains at least one viable seedling (including new seedlings establishing from seed or lignotubers), or
 - iii. contains 'advanced growth' of an upper canopy species that is assessed as having the vigour or capability of reaching a canopy position.
 - (f) for each square (as per clause 1(b-c), convert the numbers of stocked plots to a simple percentage. Where multiple squares are assessed, the outcomes should be averaged to give an overall assessment of the harvest area.
 - (g) the total number of samples to be taken must be in accordance with Table H below.

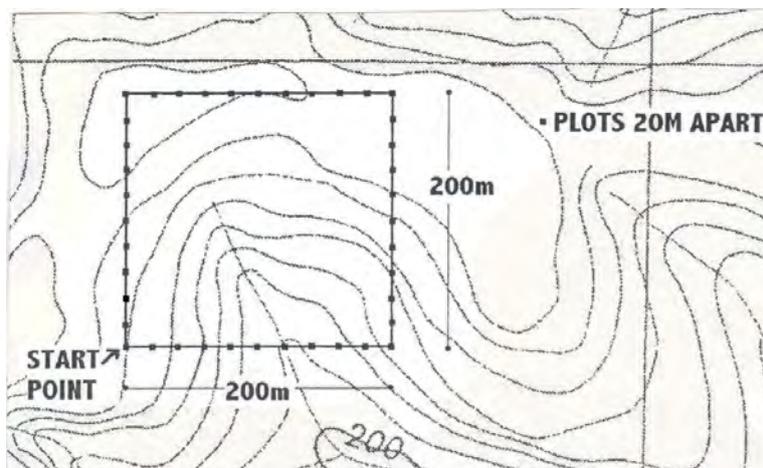


Figure 7: Example of sample point intervals along a square.

Table H: Minimum number of sample points required for harvested areas

Size of harvested area (hectares)	Minimum number of sample points required
0–10	80 (2 squares)
11–50	120 (3 squares)
51–100	200 (5 squares)
101–200	280 (7 squares)
201+	360 (9 squares)

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- (2) For compliance purposes, forest regeneration in Australian Group Selection harvest areas will be calculated using the following method:
- (a) all sample points must be located within canopy openings created by AGS
 - (b) the sample points must be located systematically at multiple spots across the canopy opening with a minimum inter-point distance of 20 metres
 - (c) samples must be taken using fixed area plot measurements with a plot size of approximately 10 m²;
 - (d) plots must be circular with a minimum radius of 1.8 m radius at a sample intensity of 50 plots per hectare or equivalent (5%); and
 - (e) each plot is classed as stocked if any part of the plot area:
 - i. is under the canopy of an existing tree, or
 - ii. contains at least one viable seedling (including new seedlings establishing from seed or lignotubers), or
 - iii. contains 'advanced growth' of an upper canopy species that is assessed as having the vigour or capability of reaching a canopy position.
 - (f) for each gap area that is assessed, convert the stocking rate to a percentage figure and then average these percentages across the number of gaps assessed within the harvest area.
 - (g) the minimum number of canopy openings to be sampled must be in accordance with Table I below.

Table I: Minimum sampling requirement for regeneration in canopy openings

Number of canopy openings	Number of canopy openings sampled
0 - 10	2
11-50	5
51-100	10
101-200	20

Appendix D: Assessment criteria for Forest Stewardship Plans

Table P: Assessment criteria for Forest Stewardship Plans

Assessment criteria	Assessment consideration	Related Outcomes Statement
Potential impacts on biodiversity conservation at the local and bioregional scales	<ul style="list-style-type: none"> ▪ Important trees, habitat and environmental features are identified and protected: <ul style="list-style-type: none"> – for shelter and food resources for native species, and to support their persistence – To provide refuge, connectivity and to support forest regeneration. ▪ Site-specific measures are implemented to manage long term forest health and habitat for threatened flora and fauna. 	<p>(1) Maintain forest health and regeneration at site and bioregional scales</p> <p>(3) Maintain the persistence of native species at site and bioregional scales</p>
Potential impacts on the environment at the local scale and bioregional scales	<ul style="list-style-type: none"> ▪ Forest regeneration and management actions are monitored and where necessary interventions made to ensure long-term active and adaptive management. ▪ Vegetation adjacent to drainage features and wetlands is managed effectively in the long-term , and groundcover is retained, to maintain water quality, stream stability, riparian habitat and contribute to habitat connectivity. ▪ Water quality and aquatic habitat are maintained through the implementation of best management practices for roads, tracks and crossings. ▪ Areas of soil erosion hazard are identified and managed effectively ▪ The site and any infrastructure no longer required after operations area rehabilitated according to best management practices 	<p>(2) Maintain the productive capacity of the private native forest estate at a site and bioregional scales</p> <p>(4) Maintains water quality and soil health at site and bioregional scales</p>
The likely suitability of the site, and landholder knowledge and capacity to manage potential risk	<ul style="list-style-type: none"> ▪ Site location, access, slopes, etc, support forestry operations without generating unmanageable or cumulative risks at site and landscape scale. ▪ Harvesting operations can be effectively distributed across the landscape and over time and space, to support a mosaic of forest age-classes and maintenance of forest structure across the landscape. ▪ Operator and/or landholder have sufficient capacity to identify and manage risks and implement best practice forest management. 	<p>(1) Maintain forest health and regeneration at site and bioregional scales</p> <p>(5) Build landholder capacity to deliver best practice forest management</p>
Aboriginal values, places and practices	<ul style="list-style-type: none"> ▪ Site-specific measures ensure the appropriate management, protection and persistence of Aboriginal places and practices ▪ Site specific measures help foster connection and collaboration within Aboriginal communities and/or between Aboriginal communities and landholders ▪ Site specific measures help improve our knowledge of Aboriginal forest management 	<p>(2) Maintain productive capacity of the private native forest estate at a site and bioregional scales</p> <p>(5) Build landholder capacity to deliver best practice forest management</p>
Research, innovation and industry development	<ul style="list-style-type: none"> ▪ Site specific measures encourage active and adaptive management ▪ Site specific measures help improve our knowledge of silviculture and forest ecology ▪ Site specific measures help facilitate innovation and industry development 	<p>(5) Build landholder capacity to deliver best practice forest management.</p> <p>(6) Support the economic resilience of landholders and regional communities.</p>
Relevant legislation	Consideration of relevant legislative requirements.	

Glossary

Expressions that are defined in the *Local Land Services Act 2013* and *Local Land Services Regulation 2014* have the same meanings in this Code as the meanings given to them in that Act and Regulation, unless they are otherwise defined in this Code. All other expressions are defined as in this glossary.

Accidentally felled	A tree is accidentally felled into any area of land only if it is apparent that techniques of directional felling were used in an attempt to fell the tree away from the area. Despite the above, a tree is not accidentally felled into an area if the person responsible knew or could reasonably have been expected to know that the tree would fall into the area.
Armoured	A protective surface that is resistant to erosion or displacement by machinery or vehicles.
Australian Group Selection	A silvicultural system in which groups (small patches or stands) of trees are harvested, allowing for subsequent regeneration and leading to a forest comprising patches of differently aged trees.
Basal area	The sum of cross-sectional area of trees that are greater than 10 centimetres in diameter at breast height (DBH). Basal area is measured at breast height and in square metres per hectare (m ² /ha)
Batter	An earth slope formed from fill material (fill batter) or cut into the natural hillside (cut batter) during road construction.
Bioregion	An Interim Biogeographic Regionalisation for Australia (IBRA) region as defined by <i>Summary Report Revision of the Interim Biogeographic Regionalisation for Australia and Development Version 5.1</i> .
Blading off	The removal of surface soil from a track or road in wet conditions to expose a drier or firmer surface for use by machinery
Canopy opening	An area of forest where there is a gap in the overstorey. Canopy openings may be created by removal of parts of the overstorey to release advance growth or stimulate regeneration of new seedlings.
Clumps of habitat trees forming rookeries for waterbirds	A group of adjoining trees, together with a 20-metre surrounding buffer, in which there are multiple stick nests comprising the breeding rookeries of colonial waterbirds such as herons, cormorants, spoonbills or egrets. Nests usually comprise platforms of sticks, often near each other. They are usually found in trees in or near water bodies such as swamps. Such breeding rookeries can contain hundreds of nests and birds, and are often revisited annually.
Crossing	A structure designed to allow the crossing of a drainage feature and is either a track crossing or road crossing.
Dead tree	A tree that has no epicormic and/or lignotuber growth at the time of the forestry operation.
Debris	Tree head, tree offcuts or bark that have resulted from a forestry operation.
Diameter at breast height over bark (DBHOB)	The diameter of a tree measured at 1.3 metres above the ground. Measurements are made over the bark and horizontal to the trunk.
Directional felling	The felling of a tree so it falls in a pre-determined direction.

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Drainage depression	A shallow depression with smoothly concave cross-section that conveys runoff only during or immediately after periods of heavy rainfall.
Drainage feature	An incised watercourse with a defined channel, bed and banks and a minimum depth of 30 centimetres.
Drainage line	<p>A channel down which surface water naturally concentrates and flows. Drainage lines exhibit one or more of the following features which distinguish them from drainage depressions:</p> <ul style="list-style-type: none">• evidence of active erosion or deposition, e.g. gravel, pebble, rock, sand bed, scour hole or nick point• an incised channel more than 30 centimetres deep with clearly defined bed and banks• a permanent flow.
Drainage structure	A structure designed to convey water away from a road, track or area of soil disturbance.
Earth windrow	A mound of soil material or gravel on the edge of a road or snig track formed by the spillage from the edge of a blade or similar machine during earthmoving operations.
Exclusion zone	An area of land within a specified distance of landscape features identified in Table A where forestry operations are prohibited, unless otherwise allowed under this Code.
Extraction track	A track constructed for use by forwarding machinery.
Flood runner	A natural depression that carries the initial flood flows before complete inundation occurs.
Food resource trees	Trees with recent V-notch incisions or other incisions made by a yellow-bellied glider or squirrel glider. Recent incisions are incisions less than two years old as evidenced by the fact the incision has not closed.
Forest	An area dominated by trees with a mature stand height exceeding 2 metres, overstorey crown cover of greater than 20 per cent.
Forestry operations	<p>Forestry operations means:</p> <p>(a) logging operations – namely the cutting and removal of timber from land for the purpose of timber production, or</p> <p>(b) the harvesting of forest products – namely the harvesting of the products of trees and other vegetation (other than timber) that are of economic value, or</p> <p>(c) ongoing forest management operations – namely activities relating to the management of land for timber production such as thinning, burning and other silvicultural activities, or</p> <p>(d) ancillary activities to enable or assist in the above operations such as the provision of roads, snig tracks, waterway crossings and temporary timber storage facilities..</p>
Girders	High quality logs used in a round or flat-faced form to support a deck such as a bridge or wharf or as large end section, heart-free, sawn timber suitable for heavy construction.
Groundcover	Natural or artificial material which covers the ground surface and has the effect of reducing erosion.

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Gully stuffer	A drainage feature crossing formed by filling the drainage feature with trees, debris, spoil, soil, rock or other material to the level of the road or track.
Habitat tree	A tree retained for habitat purposes under this Code.
Harvesting operations	Harvesting operations include: <ul style="list-style-type: none">• timber felling, snigging and extraction• construction and maintenance of log landings, snig tracks and extraction tracks.
Heathland	Areas dominated (covers more than 50% of the area) by shrubs generally less than 2 metres tall at maturity.
Incised channel	A channel more than 30 centimetres deep with clearly defined bed and banks.
Inundation	Flooding of the forested area by water overflowing the banks of a river.
Koala Scat	A scat a with a strong eucalyptus odour, pale green in colour with faint or clear ridges and/or vertical stripes, and a moist mucus coating, and bullet shaped appearance found either above the leaf litter, or less than 50mm below the leaf litter.
Landholding	A single or several parcels of land (whether held under the same title, different titles or different kinds of titles) that constitute or are worked as a single property and that are contiguous with one another or are separated from one another only by a road, river, creek or other watercourse.
Log landing	An area (usually cleared) where timber products are assembled for processing and sorting before being loaded onto a truck.
Machinery exclusion zone	Land within 10 metres of the top edge of the bank of any unmapped drainage line.
Net harvestable area	The defined area under the Forest Management Plan or Forest Stewardship Plan where harvesting is permitted in accordance with the Code.
Old growth forests	<p>Ecologically mature forest where the effects of disturbance are now negligible. This includes an area of forest greater than 5 hectares where:</p> <ul style="list-style-type: none">• the overstorey is in late to over-mature growth stage with the presence of relatively large old trees (many containing hollows and often with the presence of dieback or dead branches in the crown)• the age (growth) structure of the stand measured as relative crown cover consists of less than 10% of regeneration and advance growth, and more than 10% of late to over-mature (senescent) growth• the effects of unnatural disturbance are now negligible. <p>Old growth woodlands west of the Great Dividing Range, while comprising a characteristic canopy of late to over-mature trees (many with hollows), may comprise a woodland structure with less diverse or often shrubby understorey and a groundcover of grasses and herbs.</p>
PNF koala prescription mapped areas	Areas of contiguous forest identified in Figures 3 – 4, dominated by non-planted native trees species with an average stand height of 2 metres or more, and an overstorey canopy cover of 20% or more, at elevations of 800 metres or less above sea level and with a minimum patch size of 2 hectares or greater.
Portable mill site	A site where a portable mill (easily movable milling equipment) operates.
Posts	Term generally used to describe posts in round or split form used for fencing.

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Prescribed Stream	Stream listed in the Major Rivers database of the Assessment Methodology database available at the DPE webpage.
Pulp logs	Logs cut and prepared primarily to produce wood pulp for the manufacture of reconstituted products including paper and panel board.
Regeneration management actions	Forest management techniques that promote forest regeneration after forestry operations including replanting (including tube-stock), minimising or removing grazing pressure, seeding, weed management, fire management and mechanical soil disturbance.
Relevant legislative requirements	Requirements relating to the carrying out of forestry operations on private land contained in the <i>Biodiversity Conservation Act 2015</i> , <i>Environmental Planning and Assessment Act 1979</i> , <i>Fisheries Management Act 1994</i> , <i>Local Land Services Act 2013</i> and <i>Protection of Environmental Operations Act 1997</i> .
River Red Gum Forests	A forest dominated by <i>Eucalyptus camaldulensis</i> consistent with description of Forest Type 199 (River Red Gum) in State Forests of NSW, Research Note 17.
Riparian exclusion zones	Those areas within the distances specified for 'Drainage feature' as listed in clause 6.4 (2) where forest operations are not permitted, unless otherwise allowed by this Code.
Riparian protection measures	Actions that assist in maintaining and protecting riparian areas including revegetation (including tube-stock, native grasses and seed distribution), the placement of artificial erosion control measures such as matting, mulch or geotextiles, and the removal or minimisation of grazing pressures.
Road	Any route used for vehicular access to, and the transport of logs from, the point of loading (log landing) within the forest area.
Road prism	That part of the road from the inflexion point at the toe of the fill batter to the inflexion point at the top edge of the cut batter. Where there is no cut or fill batter as part of the road, the road prism is to be taken from the outside edge of the table drain on either side of the road.
Rollover bank	A crossbank constructed with a smooth cross section and gentle batters, which is well-compacted to provide permanent vehicular trafficability.
Saturated soil	The physical condition of soil where no more moisture can be absorbed or accepted.
Sawlog	Log of a species suitable for processing through a sawmill into solid timber products.
Significant forest disturbance event	An event that impacts and changes the ecological condition of a forest or environmental value associated with that forest in a manner that risks meeting ESFM outcomes. Recovery is unlikely to occur without interventions, risking maintaining ESFM forest value outcomes over a range of spatial scales across the short to long term. Disturbance events can include (but are not limited to) prolonged drought, wildfire, mass tree dieback or a biosecurity event.
Silvicultural operations	The activities associated with the management of trees within a forest for the purpose of meeting sustainable long-term productivity objectives, including thinning, single tree selection and creation of canopy openings.
Single tree selection	A harvesting operation where the trees harvested are either single trees or small groups of trees. For the purposes of this Code, single tree selection operations will not create canopy openings.

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Snig track	A track used by snigging or skidding equipment.
Spoon drain	A drain with a semi-circular cross-section, which has no associated ridge of soil. Its capacity is solely defined by the excavated channel dimensions.
Stand basal area	Stand basal area is the sum of the basal area of all trees within a stand expressed in square metres per hectare (m ² /ha).
Stand height	Mean height of the dominant trees in the stand. Measurement of stand height must conform to methods described in approved guidelines.
Stick Nest	A collection of sticks in the branches, fork, trunk and or head of a live or dead tree that, when combined, form a nest that is greater than 50 centimetres in diameter.
Stocking level	A measure of the frequency of occurrence of tree stems assessed as being capable of growing to canopy level. Measurement of stocking levels must conform with methods described in Appendix C..
Suitably qualified expert	Suitably qualified expert means a person with a minimum undergraduate qualification in natural sciences, ecology, environmental management, forestry or similar from a university and with a minimum 3 years' experience in environmental assessment.
Thinning	A silvicultural practice where some trees are removed in order to increase the growth rates of retained trees.
Threatened populations	Population of a particular species listed in Division 3 of Part 1, Division 4 of Part 2 or Division 4 of Part 3 of Schedule 1 to the <i>Biodiversity Conservation Act 2016</i> as in force from time to time.
Threatened species	Threatened species within the meaning of the <i>Biodiversity Conservation Act 2016</i> as in force from time to time that also meets paragraph (d) of the definition of species with the meaning of that Act as in force from time to time.
Timber products	Commercial timber products removed from or felled within the forest, including but not limited to sawlogs, veneer logs, poles, girders, piles and pulp logs.
Veneer log	High quality logs that are rotary peeled or sliced to produce sheets of veneer.
Walkover techniques	Timber extraction or snigging without removing or unduly disturbing the existing natural groundcover, i.e. where no snig track construction involving soil disturbance is required.
Wetland	Includes any shallow body of water (such as a marsh, billabong, swamp or sedgeland) that is: <ul style="list-style-type: none">• inundated cyclically, intermittently or permanently with water, and• vegetated with wetland plant communities.

Private Native Forestry

Code of Practice for Cypress and Western Hardwood Forests

I, the Minister for Agriculture and Western New South Wales, make the following *Private Native Forestry Code of Practice for Northern NSW* under section 60ZT of the *Local Land Services Act 2013*.

Dated this ____ day of [insert month] 2022 at _____ am/pm.

Dugald Saunders, MP
Minister for Agriculture and Western New South Wales

I, the Minister for Environment and Heritage, give concurrence to the following *Private Native Forestry Code of Practice for Northern NSW* under section 60ZT of the *Local Land Services Act 2013*.

Dated this ____ day of [insert month] 2022 at _____ am/pm.

James Griffen, MP
Minister for Environment and Heritage

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Introduction

The Private Native Forestry Code of Practice (the 'Code') supports the long-term sustainable management of native forests on private land and Crown land (other than State forests or other Crown-timber land) for timber production and ecologically sustainable forest management (ESFM).

The Code applies to forestry operations in areas of the State as defined by Part 5B of the *Local Land Services Act 2013*. This Code is made under Part 5B, section 60ZT of the *Local Land Services Act 2013*. The objects of Part 5B of the Act are:

- (a) to authorise the carrying out of private native forestry in accordance with principles of ecologically sustainable forest management, and
- (b) to protect biodiversity and water quality (including threatened species, populations and ecological communities under Part 7A of the *Fisheries Management Act 1994*) in connection with private native forestry operations, and
- (c) to enable landholders to carry out forestry operations in a sustainable manner in areas of the State to which this Part applies, and
- (d) to ensure the differences between private native forestry and native forestry operations in State forests or other Crown-timber land are recognised, including in the application of protocols, codes, standards and other instruments.

'Cypress Forests' mean forests dominated by white cypress pine (*Callitris glaucophylla*), being forests in which at least 80% of the stand basal area comprises trees of that species.

'Western Hardwood Forests' mean forests that are consistent with the description of any of the Forest Types 99, 103, 104, 124, 171–178, 180–185, 203–210 and 213 set out in the document called *State Forests of NSW Research Note 17*.

Outcomes Statement

- (1) The Code supports the implementation of the following long-term outcomes:
 - (a) Maintain forest health and regeneration at site and bioregional scales.
 - (b) Maintain the productive capacity of the private native forest estate at site and bioregional scales.
 - (c) Maintain the persistence of native species at site and bioregional scales.
 - (d) Maintain water quality and soil health at site and bioregional scales.
 - (e) Build landholder capacity to deliver best practice forest management.
 - (f) Support the economic resilience of landholders and regional communities.
- (2) The outcomes statement is included to improve interpretation and understanding of the long-term objectives of private native forestry but do not form part of the Private Native Forestry Plan (PNF Plan) approval or enforceable requirements of the Private Native Forestry Code.

The Code

1. Private Native Forestry Plans

- (1) Before any forestry operations commence in areas of the State to which Part 5B of the *Local Land Services Act 2013* applies as described in section 60ZS, a Private Native Forestry Plan (PNF Plan) must be prepared by the landholder(s) or by a person nominated by the landholder(s) and approved by Local Land Services in accordance with section 60ZY of the *Local Land Services Act 2013*.
- (2) Forestry operations under an approved PNF Plan must be conducted in accordance with all relevant provisions of this Code.
- (3) Local Land Services will provide all relevant digital information on landscape features (as identified in Table D) and slope angles (where feasible), drainage features (as identified in Table G) and Listed Ecological Prescriptions including areas mapped under the PNF koala prescription map (as identified in Appendix A) when issuing the PNF Plan and prior to the commencement of any forestry operations to ensure plants, animals and ecological communities listed in the schedules of the *Biodiversity Conservation Act 2016* are identified for protection in accordance with the Code.
- (4) Private Native Forestry Plans must identify the landholder(s) and the land to which the plan applies (including the lot and deposited plan number).
- (5) Forestry operations under an approved PNF Plan must be accompanied by either a Forest Management Plan or a Forest Stewardship Plan, except for operations consistent with Clause 3.1.
- (6) A copy of the PNF Plan must be available on-site during any forestry operations.
- (7) Local Land Services will maintain a public register of PNF Plans, Forest Management Plans and Forest Stewardship Plans, including periodic reporting of outcomes associated with independent assessments for Forest Stewardship Plans (Section 2.2).

Note 1: Section 60S of the *Local Land Services Act 2013* and clause 124 of the Local Land Services Regulation 2014 provide that the clearing of native vegetation is not authorised by a land management (native vegetation) code if the clearing is:

- the carrying out of a forestry operation within the meaning of Part 5B (Private native forestry)
- on land that is subject to a PNF Plan that was approved under Part 5C of the *Forestry Act 2012* before the repeal of that Part
- on land that is subject to a PNF Plan under Part 5B of the Act.

Note 2: Section 60ZZ (4) of the *Local Land Services Act 2013* provides that a private native forestry plan may be varied by Local Land Services on application by the landholder.

2. Forest planning and management

2.1 Forest Management Plans

Introduction

Forest Management Plans outline how individual forestry operations will be undertaken within a Private Native Forestry Plan area. The Forest Management Plan includes a map and written section describing the forest condition, forestry operations and forest management activities. A Forest Management Plan is to be used when undertaking forestry operations consistent with the standard requirements of the Code.

- (1) A Forest Management Plan must be prepared by the landholder(s) or a person nominated by the landholder(s) and submitted to Local Land Services before forestry operations commence (other than operations that are conducted consistent with Clause 3.1).
- (2) The net harvestable area under a Forest Management Plan must not exceed 1000 hectares. A Forest Stewardship Plan must be prepared if the net harvestable area exceeds this limit.
- (3) A Forest Management Plan must be in an approved form and consistent with the provisions of this Code and the requirements of the Listed Species Ecological Prescriptions set out in Appendix A.
- (4) Local Land Services may require a Forest Management Plan to be revised and re-submitted if the Plan it is not in an approved form or is not consistent with the provisions of this Code, including the requirements of the Listed Species Ecological Prescriptions set out in Appendix A.
- (5) The landholder(s) and anyone else carrying out forestry operations must read, sign and date the Forest Management Plan.
- (6) A copy of the Forest Management Plan must be available on-site during forestry operations.
- (7) A Forest Management Plan must contain the following:
 - (a) a map (or maps) showing:
 - (i) the boundaries of the landholding, area(s) subject to the plan, including areas in which harvest operations and/or forestry operations will occur
 - (ii) Within the area subject to the plan:
 - a. forested areas
 - b. recorded locations of any threatened populations or threatened ecological communities listed under the schedules of the *Biodiversity Conservation Act 2016* and species in the Listed Species Ecological Prescriptions set out in Appendix A
 - c. areas mapped under the PNF koala prescription map (as in Appendix A Koala (*Phascolarctos cinereus*) prescription)
 - d. the location of landscape features as listed in Table D and protection buffers required
 - e. drainage features (including riparian exclusion zones as listed in Table G)
 - f. slope angles (where feasible)
 - g. the location of silvicultural treatments outlined in (7)(b)(viii)
 - h. the indicative location of existing and proposed roads and drainage feature crossings
 - i. the indicative location of log landings and portable mill sites.

- (iii) Within areas adjacent to the area subject to the plan:
 - a. forested areas
 - b. recorded locations of any threatened populations or threatened ecological communities listed under the schedules of the *Biodiversity Conservation Act 2016* and species in the Listed Species Ecological Prescriptions set out in Appendix A
 - c. areas mapped under the PNF koala prescription map (as in Appendix A Koala (*Phascolarctos cinereus*) prescription)
 - d. wetlands and drainage features
 - e. areas of outstanding biodiversity value
- (b) a written component that provides:
 - (i) details of ownership of the land
 - (ii) the landholder's forest management objectives
 - (iii) a contemporary description of the pre-harvest forest condition (including overstorey species type and composition, known disturbance and harvest history, pre-harvest basal area, stand height [where required] and any presence of pests and/or weeds)
 - (iv) the post-harvest basal area objective
 - (v) details of forest access, including any necessary construction, upgrading or maintenance of forest roads and drainage feature crossings
 - (vi) details of harvesting and/or other proposed forestry operations
 - (vii) details of activities to promote regeneration and post-harvest management
 - (viii) details of relevant silvicultural treatments that may be carried out as part of the Forest Management Plan
 - (ix) details of flora and fauna management actions (where applicable)
 - (x) details of tree marking activities (where applicable)
 - (xi) details of pest and weed management (where applicable)
 - (xii) details of fire management (where applicable)
 - (xiii) details of research or monitoring plots within the PNF Plan area (where applicable).
- (8) The Landholder may amend the parts of the Forest Management Plan, except for matters referred to in Clause 2.1 (7) (a) (i), Clause 2.1 (7) (a) (ii) (a-f), Clause 2.1 (7) (a) (iii) and Clause 2.1 (7) (b) (i). Amendments to Clause 2.1 (7) (a) (i), Clause 2.1 (7) (a) (ii) (a-f), Clause 2.1 (7) (a) (iii) and Clause 2.1 (7) (b) (i) may only occur with the approval of Local Land Services.
- (9) Any amendments to either the map or the written component must be noted on the Forest Management Plan and must be consistent with the relevant provision of the Code.
- (10) The landholder must retain a copy of the Forest Management Plan, including any amendments, for the life of the PNF Plan or for three years after completion of the forestry operations for which it was prepared, whichever is the later date.
- (11) The landholder must provide the Forest Management Plan, including a record of any amendments, to an officer from Local Land Services and/or an authorised officer from the Environment Protection Authority if requested to do so.

2.2 Forest Stewardship Plans

Introduction

Forest Stewardship Plans are an alternative to Forest Management Plans and allow alternative requirements to be applied based on individual site-specific circumstances and only after independent expert review. A Forest Stewardship Plan will have conditions that form part of the approval, including specific forestry operation and forest management conditions.

- (1) A Forest Stewardship Plan must, before forestry operations commence, be:
 - (a) prepared by a suitably qualified expert(s),
 - (b) assessed by an independent expert panel against the criteria in Appendix D
 - (c) approved by Local Land Services, after considering the independent expert panel's advice and is satisfied that the Forest Stewardship Plan complies with relevant legislative requirements and the Code.
- (2) Independent expert panel members must have applied knowledge and experience in the principles of ESFM and expertise in at least one of the following areas:
 - (a) forest management, including silviculture (required for all panel assessments)
 - (b) forest ecology (required for all panel assessments)
 - (c) natural resource economics
 - (d) fire management and climate change
 - (e) Aboriginal land management
 - (f) water and soil management
- (3) A Forest Stewardship Plan can include alternative requirements to those in sections 5, 6, 7 and Appendix A of this Code following a significant forest disturbance event(s) and where forestry operations can be used to minimise or manage impacts and/or improve ESFM outcomes. In these circumstances, Local Land Services will conduct a site assessment within the area(s) identified by the landholder(s) to advise on the suitability of a Forest Stewardship Plan.
- (4) A Forest Stewardship Plan must be in an approved form and will include:
 - (a) a map (or maps) consistent with Clause 2.1 (7)(a)
 - (b) a written component that is consistent with Clause 2.1 (7)(b)
 - (c) relevant information to inform Local Land Services assessment of the plan, including:
 - (i) details of proposed forestry operations
 - (ii) details of any alternative requirements as per Clause 2.2 (3)
 - (iii) the results of any pre-harvest flora and fauna assessments and surveys, including any required in accordance with Clause 2.2 (5) (a)
 - (iv) any additional management actions and/or protections that may be proposed, including any required in accordance with Clause 2.2 (5) (b).
 - (v) details of site-specific monitoring and reporting requirements.

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- (5) As per Clause 2.2 (1), Local Land Services can only approve a Forest Stewardship Plan after an independent expert panel has assessed the plan against the criteria in Appendix D and provided the assessment to Local Land Services. In conducting an assessment of a Forest Stewardship Plan, the independent expert panel can:
 - (a) request further information, additional advice or external expertise to inform its assessment, including additional flora and fauna assessments or surveys, if necessary
 - (b) recommend additional site-specific management actions and/or protections
 - (c) recommend that the Forest Stewardship Plan is approved by Local Land Services
 - (d) recommend that the Forest Stewardship Plan is not approved by Local Land Services.
- (6) The Landholder may amend the parts of the Forest Stewardship Plan referred to in Clause 2.1 (7) (b) (ii) and Clause 2.1 7 (b) (x-xii). Any other amendments to the Forest Stewardship Plan may only occur with the approval of Local Land Services.
- (7) Any amendments to either the map or the written component must be noted on the Forest Stewardship Plan and must be consistent with the relevant provision of the Code.
- (8) The landholder and anyone else carrying out forestry operations must read, sign and date the Forest Stewardship Plan.
- (9) A copy of the Forest Stewardship Plan must be available on-site during forestry operations.
- (10) The landholder(s) must retain a copy of the Forest Stewardship Plan, including a record of any amendments, for the life of the PNF Plan or for three years after completion of the forestry operations for which it was prepared, whichever is the later date.
- (11) The landholder(s) must provide the Forest Stewardship Plan to an officer from Local Land Services and/or an authorised officer from the Environment Protection Authority if requested to do so.

2.3 Reporting

- (1) The landholder must notify Local Land Services of the commencement and completion of forestry operations under clauses 3.1 and 3.2 of the Code.
- (2) In respect of forestry operations under clauses 3.1 and 3.2 of the Code, notification must be provided to Local Land Services within 30 days prior to commencement of the relevant forestry operations.
- (3) In respect of forestry operations under clauses 3.1 and 3.2 of the Code, notification must be provided to Local Land Services within 30 days of the completion of the relevant operations.
- (4) The following information must be included in any commencement notification to Local Land Services:
 - (a) the PNF Plan approval number
 - (b) the Forest Management Plan or Forest Stewardship Plan approval number where applicable
 - (c) the proposed commencement date and estimated time it will take to complete the forestry operations
 - (d) a map showing the location of the proposed forestry operations
 - (e) name and contact details of the landholder.

Note 3: Local Land Services will provide updated information to the landholder on the locations of plants, animals and ecological communities listed in the schedules of the *Biodiversity Conservation Act 2016* at this time to ensure that the relevant Code requirements are applied to the forestry operation.

- (5) The following information must be included in any completion notification to Local Land Services:
 - (a) the PNF Plan approval number
 - (b) a Forest Management Plan or Forest Stewardship Plan approval number where applicable
 - (c) a map showing the location of the forestry operations
 - (d) the approximate volume of forest products harvested
 - (e) the approximate number of hectares on which the forestry operations have occurred
 - (f) the date that the forestry operations were completed
 - (g) name and contact details of the landholder.

2.4 Monitoring, assessment and adaptive management

- (1) A monitoring, evaluation and reporting framework must be jointly approved by the Chief Executive Officer of Local Land Services and the Secretary of DPE.
- (2) The PNF MER framework will be proposed by the NSW Forest Monitoring Steering Committee (or equivalent) independently chaired by the NSW Natural Resources Commission.
- (3) The NSW Forest Monitoring Steering Committee (or equivalent) independently chaired by the NSW Natural Resources Commission will:
 - (a) conduct annual checks that the evidence base is up to date (including relevant maps), identify emerging evidence from monitoring and research, and opportunities for improvement
 - (b) formally assess the data and evidence from the program (and any other lines of evidence) every five years and advise the Minister administering the *Forestry Act 2012*, the Minister administering the *Local Land Services Act 2013* and the Minister administering the *Biodiversity Conservation Act 2016* whether there is sufficient evidence to warrant a review of the PNF Codes.
- (4) Local Land Services can require that forestry operations are rescheduled to help ensure harvest operations are distributed over time and space, to support a mosaic of forest age-classes and forest structures across the landscape. This determination will consider landholder's circumstances and the nature, extent and intensity of forestry operations.
- (5) The Minister administering the *Local Land Services Act 2013* can request harvest operations are reviewed where an unforeseen event (such as wildfire, mass dieback or a forest biosecurity event) has caused, or has the potential risk of causing serious or irreversible environmental damage on private land at a bioregional scale. In these circumstances Local Land Services will conduct a site assessment within the impacted bioregion(s) identified by the Minister. The site assessment will occur prior to harvest operations commencing to determine whether site scale environmental risks:
 - (a) can be managed within the existing provisions of the Code, or
 - (b) can be mitigated and managed with additional management actions and protections through a Forest Stewardship Plan, or
 - (c) cannot be mitigated or managed to avoid serious or irreversible environmental damage. In this event, Local Land Services can suspend or reschedule harvest operations but will agree with the landholder(s) on a timeframe for reassessing the site.
- (6) Where an unforeseen event (such as wildfire, mass dieback or a forest biosecurity event) has caused, or has the potential risk of causing serious or irreversible environmental damage on private land at a bioregional scale, the Chief Executive Officer of the Environment Protection Authority can inform the Chief Executive Officer of Local Land Services that a review under Clause 2.4 (5) may be required.

Note 4: Any research or forest monitoring activities undertaken in PNF Plan areas beyond minimum requirements set out in this Code can only occur with the written consent of the landholder. The written consent must outline the purpose of the research or monitoring, and how the data will be collected, stored and used, including how landholder confidentiality will be managed.

3. Silvicultural operations

3.1 Small scale harvesting

Introduction

A silvicultural system in which single trees of various ages are harvested at a low intensity. This method is suitable for the provision of fence posts, poles and firewood and promoting regeneration of shade-tolerant species, or growth of preferred species or individual trees.

- (1) Forestry operations are permitted after a PNF Plan has been approved.
- (2) Small scale harvesting is permitted provided no more than 5 trees per hectare are harvested and the harvest area is no more than 5 hectares or the volume is no more than 100m³ per year, whichever is smaller.
- (3) Small scale harvesting must not reduce the stand basal area below the limits set out in Table A.

Table A: Minimum stand basal areas for small scale harvesting

Broad forest type	Basal Area
Cypress	6 m ² /ha
Western Hardwood	8 m ² /ha

- (4) For the purposes of clause 3.1 the minimum stand basal area will be calculated in accordance with Appendix B. The average can only be calculated within contiguous forest areas and must not include isolated patches of forest.
- (5) The landholder must keep a record of the number of trees harvested and the approximate area harvested.

3.2 Single tree selection and thinning

Introduction

A silvicultural system in which single trees or small groups of trees of various ages are harvested. This method is suitable for promoting regeneration of shade-tolerant species, or growth of preferred species or individual trees

- (1) Forestry operations are permitted after the approval of a Forest Management Plan or a Forest Stewardship Plan.
- (2) Single tree selection and thinning operations must not reduce the stand basal area below the limits set out in Table B across the net harvestable area of the Forest Management Plan or Forest Stewardship Plan.

Table B: Minimum stand basal areas for single tree selection and thinning operations

Broad forest type	Basal Area
Cypress	6 m ² /ha
Western Hardwood	8 m ² /ha

- (3) For the purposes of clause 3.2 the minimum stand basal area will be calculated in accordance with Appendix B. The average can only be calculated within contiguous forest areas and must not include isolated patches of forest.

3.2.1 Non-commercial thinning

- (1) Non-commercial thinning may be applied to Cypress forest regrowth which is usually about 4–6 metres tall. It is essential to free regeneration that is in a state of ‘lock-up’. Stands should be thinned to a spacing of about 6 metres x 6 metres (280 stems/hectare).
- (2) The stems to be retained should be:
- the largest and tallest stems
 - the straightest stems
 - stems with smaller limbs
 - stems without double leaders or bends in the upper crown
 - stems that have not been damaged.

3.2.2 Oldest age class harvest (release operation)

- (1) Final harvesting of the largest age class in Cypress forests may be undertaken when there is a regenerating age class about 4–6 metres high beneath the overstorey.
- (2) All trees in the older age class not required for habitat retention may be removed.
- (3) Damage to the younger age class should be minimised as far as practicable.

3.3 Forest regeneration

- (1) The minimum stand stocking (as determined by the percentage of stocked plots specified in Table C) must be achieved within 3 years of a regeneration event.
- (2) In this clause, **regeneration event** is:
- (a) a harvesting or thinning operation for Western Hardwoods, or
 - (b) the second successive wet summer following a harvesting or thinning operation for Cypress Pine Forests.
- (3) A harvesting operation must not occur in a previously harvested area until stocking levels meet the minimum stocked plot requirements in Table C.

Table C: Minimum percentage of stocked plots

Broad forest type	Minimum percentage of stocked plots
Cypress	80%
Western Hardwood	55%

- (4) For the purposes of clause 3.3 and Table C, forest regeneration will be calculated in accordance with Appendix C.
- (5) The landholder must comply with any reasonable requirements of the Environment Protection Authority for the purpose of regenerating or re-establishing the forest, if the minimum percentage of stocked plots has not been reached within a period of 24 months following a regeneration event.

- (6) Landholders must monitor forest regeneration, composition, and condition at 2, 6 and 10 years after a regeneration event. Where the relevant forest is not regenerating along a trajectory that maintains (or improves on) preharvest forest conditions, landholders must implement regeneration management actions.

4. Pest and weed management

Note 5: The landholder may manage pest plants and animals on land to which a PNF Plan applies. Any such management is to be carried out in accordance with all applicable legal requirements. Local Land Services and the relevant local council can provide advice on management of pest plants and animals.

5. Fire management

Note 6: The landholder may carry out burning activities, fire management, bush fire hazard reduction and bush fire recovery and response activities on land to which a PNF Plan applies. However, any such activities may only be carried out in accordance with all applicable legal requirements and any necessary approvals must be obtained. Advice should be sought from the Rural Fire Service and the relevant local council before carrying out any of these activities.

- (1) Fire management should be consistent with the following:
 - (a) flame heights should average one metres, but may be higher in patches of heavy or elevated fuels
 - (b) scorch heights should average less than five metres, but may be higher in patches of heavy or elevated fuels
 - (c) the fire should spread at a slow walking pace.
- (2) Fire management under this part is not permitted on land that:
 - (a) contains peat soils, or
 - (b) is mapped or described as a fire exclusion zone in a bush fire risk management plan, or
 - (c) contains isolated forest, woodland or wetland vegetation formations under Clause 4.1 of the *Bush Fire Environmental Assessment Code for New South Wales*.

Fire management under this part must be conducted in accordance with the *NSW Rural Fire Services Standards for Low Intensity Bush Fire Hazard Reduction Burning* and the *Bush Fire Environmental Assessment Code for New South Wales*.

6. Protection of the environment

6.1 Protection of landscape features of environmental and cultural significance

- (1) Forestry operations in and adjacent to specified landscape features must comply with the requirements in Table D.
- (2) Old growth forests will be identified according to the protocol approved by the relevant Ministers and available at https://www.ils.nsw.gov.au/_data/assets/pdf_file/0003/807420/Protocol-for-re-evaluating-old-growth-forest-on-private-property.pdf.

Table D: Requirements for protecting landscape features

Landscape feature	Operational conditions
Threatened ecological communities listed in the <i>Biodiversity Conservation Act 2016</i>	Forestry operations may not occur in threatened ecological communities unless authorised by a Forest Stewardship Plan. However, existing roads may be maintained.
Threatened populations listed in the <i>Biodiversity Conservation Act 2016</i>	Forestry operations must not result in any harm to an animal that is a threatened species or a protected animal or result in the picking of any plant that is part of a threatened population, except that existing roads may be maintained.
Areas of outstanding biodiversity value	Forestry operations must not occur in declared areas of outstanding biodiversity value agreed with the written consent of the landholder, except that existing roads may be maintained.
Old growth forest	Forestry operations must not occur within old growth forest, except that existing roads may be maintained.
Wetlands	Forestry operations must not occur in any wetland or within 20 metres of any wetland, except that existing roads may be maintained.
Heathland	Forestry operations must not occur in any heathland or within 20 metres of heathland, except that existing roads may be maintained.
Rocky outcrops	Forestry operations must not occur on any rocky outcrop or within 20 metres of a rocky outcrop, except that: <ul style="list-style-type: none"> • existing roads may be maintained • existing snig tracks may be used.
Cliffs, caves, tunnels and disused mineshafts (excluding open pits less than 3 metres deep)	Forestry operations must not occur within 10 metres of cliffs, caves, tunnels or disused mineshafts, except that existing roads may be maintained.
Aboriginal object or place as defined in the <i>National Parks and Wildlife Act 1974</i>	Forestry operations must not occur within: <ul style="list-style-type: none"> • 50 metres of a known burial site • 20 metres of an Aboriginal scarred or carved tree • 10 metres of a known Aboriginal object or place (this requirement does not apply to Aboriginal objects or places that may lawfully be destroyed).

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Landscape feature	Operational conditions
Areas containing items identified as heritage items in an environmental planning instrument	Harvesting operations must not occur within 10 metres of a listed heritage item.
Areas of existing mass movement	Harvesting operations which create canopy openings must not occur within the area, and harvesting machinery must not enter the area except that existing roads may be maintained. New roads must not be constructed.
Dispersible and highly erodible soils	<p>Existing roads may be maintained.</p> <ul style="list-style-type: none"> • drainage feature crossings must be armoured with erosion-resistant material • road batters and table drains must be stabilised using erosion-resistant material, ameliorants, vegetation or slash • log landings must be stabilised using erosion-resistant material, vegetation or slash at the completion of forestry operations • measures must be taken to immediately stabilise any erosion of roads or snig tracks

6.2 Protection of habitat and biodiversity

- (1) Habitat trees must be retained in accordance with Table E.
- (2) Hollow bearing trees, recruitment trees, food resource trees, roost trees and nest trees are defined as habitat trees retained for the purposes of this Code.
- (3) An individual tree may satisfy more than one condition in the tree retention standards (see Table E) if it has the appropriate characteristics.
- (4) Where available:
 - (a) retained habitat trees must represent the range of species in mature and late mature growth stages
 - (b) preference must be given to selecting habitat trees that best meet the characteristics of habitat trees as set out in clause 6.2(5)
 - (c) preference must be given to habitat trees that will provide habitat connectivity, build on existing landscape features (Table D), provide additional protections for threatened species, and build on existing habitat islands, refugia and conservation areas adjacent to and within the PNF Plan area
 - (d) preference must be given to trees with well-developed crowns.
- (5) For the purpose of this clause:
 - (a) a **hollow bearing tree** is a tree 30 cm diameter at breast height over bark (DBHOB) or greater, where the trunk or limbs:
 - (i) contain visible hollows, holes or cavities (including basal hollows), or
 - (ii) have inferred hollows as it is an older growth stage tree and has one or more obvious deformities such as a burl, large protuberance or a broken limb
 - (b) if there are more than the minimum required number of habitat trees, preference must be given to trees with the largest hollows, holes or cavities (including basal hollows) and/or greatest number of visible hollows, holes or cavities (including basal hollows). Trees that pose a health or safety risk may be removed and substituted with other hollow bearing trees if available, and if not available, by recruitment trees.
 - (c) a **feed tree** is a tree that provides a source of nectar or other food for wildlife and is listed in Table F
 - (d) a **recruitment tree** is a large, vigorous tree (30cm or greater in DBHOB) capable of developing hollows to provide habitat for wildlife. Where practical, preference must be given to trees from the next cohort to that of retained hollow bearing trees.
 - (e) an **Old Grey** is a late-mature/over-mature cypress tree that has regenerated before the 1890s, has bark that is bleached to a characteristic light grey colour, and is weathered to a smoother surface texture than is typical of younger trees
 - (f) **roost, nest and food resource trees** are defined as:
 - (i) trees that support active maternity bat roosts with clear evidence of roosting such as bat guano (faeces)
 - (ii) trees with recent 'V' notch incisions or other incisions made by a glider species. Recent incisions are incisions that have not closed.

Table E: Minimum standards for tree retention

Broad forest types	Trees that must be retained
Cypress	<ul style="list-style-type: none"> All Old Greys, and 2 hollow-bearing eucalypt trees per hectare, where available. One recruitment tree of the same species must be retained for every Old Grey and hollow-bearing tree retained. Where the total Old Grey and cypress recruitment trees are less than 5 trees per hectare, additional recruitment trees must be retained to bring the number up to 5 per hectare. Where the total hollow bearing eucalypt and eucalypt recruitment trees are less than 4 trees per hectare, additional recruitment trees must be retained to bring the number up to 4 per hectare. All roost, nest or food resource trees to be retained. All trees with large stick nests (50cm or larger) to be retained with a 50 metre exclusion zone
Western Hardwood	<ul style="list-style-type: none"> All Old Greys. 20 mature healthy eucalypt trees, from the oldest age classes per 5 hectares. Preference must be given to hollow bearing trees where available. One recruitment tree must be retained for every hollow bearing tree retained up to a maximum of 10 recruitment trees per 5 hectares. Retained recruitment trees can be counted towards meeting the 20 mature healthy trees per 5 hectares. All roost, nest or food resource trees to be retained. All trees with large stick nests (50cm or larger) to be retained with a 50 metre exclusion zone

Table F: Feed trees

Zones: Nandewar, Brigalow Belt South, Darling Riverine Plains (see Figure 2)	
Forest red gum – <i>Eucalyptus tereticornis</i>	Red stringybark – <i>E. macrorhyncha</i>
Narrow-leaved ironbark – <i>E. crebra</i>	White box – <i>E. albens</i>
Ferguson’s ironbark – <i>E. fergusonii</i>	Yellow box – <i>E. melliodora</i>
Caley’s ironbark – <i>E. caleyi</i>	Fuzzy box – <i>E. conica</i>
Grey ironbark – <i>E. paniculata</i>	Grey box – <i>E. molucanna</i>
Mugga ironbark – <i>E. sideroxylon</i>	Bloodwood and spotted gum species – <i>Corymbia</i> spp.
Red ironbark - <i>E. fibrosa</i>	Mountain gum - <i>E. dalrympleana</i>
Manna gum - <i>E.viminalis</i>	Black sallee - <i>E. stellulata</i>
Snow gum - <i>E. pauciflora</i>	Eurabbie - <i>E. bicostata</i>
<i>E. agglomerata</i>	<i>E. globoidea</i>
Mountain Grey Gum - <i>E. cypellocarpa</i>	Needlebark stringybark - <i>E. planchoniana</i>
Tyndale stringybark - <i>E. tindaliae</i>	White mahogany - <i>E. acmenoides</i>
<i>E. carnea</i>	<i>E.ophitica</i>
Zones: Cobar Penepplain, Riverina, Mulga Lands, Murray Darling Depression, Channel Country, Broken Hill Complex (see Figure 2)	
Grey ironbark – <i>E. paniculata</i>	White stringybark – <i>E. globoidea</i>
Eurabbie – <i>E. bicostata</i>	Red stringybark – <i>E. macrorhyncha</i>
Forest red gum – <i>E. tereticornis</i>	Mountain gum - <i>E. dalrympleana</i>
Manna gum - <i>E.viminalis</i>	Black sallee - <i>E. stellulata</i>

Snow gum - <i>E. pauciflora</i>	Yellow box – <i>E. melliodora</i>
<i>E. agglomerata</i>	White box – <i>E. albens</i>
<i>E. muelleriana</i>	Ferguson's ironbark – <i>E. fergusonii</i>
Caley's ironbark – <i>E. caleyi</i>	Narrow-leaved ironbark – <i>E. crebra</i>
Red ironbark - <i>E. fibrosa</i>	Mugga ironbark – <i>E. sideroxylon</i>
River Peppermint - <i>E. elata</i>	Mountain Grey Gum - <i>E. cypellocarpa</i>
Maiden's Gum - <i>E. maidenii</i>	Swamp Gum - <i>E. ovata</i>
Bloodwood and spotted gum species – <i>Corymbia</i> spp.	Fuzzy box – <i>E. conica</i>
Grey box – <i>E. molucanna</i>	

6.3 Minimising damage to retained trees and native vegetation

- (1) As far as practicable, forestry operations must not damage or heap debris around protected trees.
- (2) In this clause **protected trees** are defined as:
 - (a) trees required to be retained under clause 6.2
 - (b) plants of the genus *Xanthorrhoea* (grass trees), genus *Allocasuarina* (forest oak) (except bull oak [*Allocasuarina luehmannii*]), and genus *Banksia*
 - (c) other trees that are required to be retained by this Code.

6.4 Drainage feature protection

- (1) For the purposes of this Code, a stream is defined as an incised watercourse with a defined channel, bed and banks and a minimum depth of 30 centimetres. Stream orders are determined according to the Strahler System (see Figure 1).

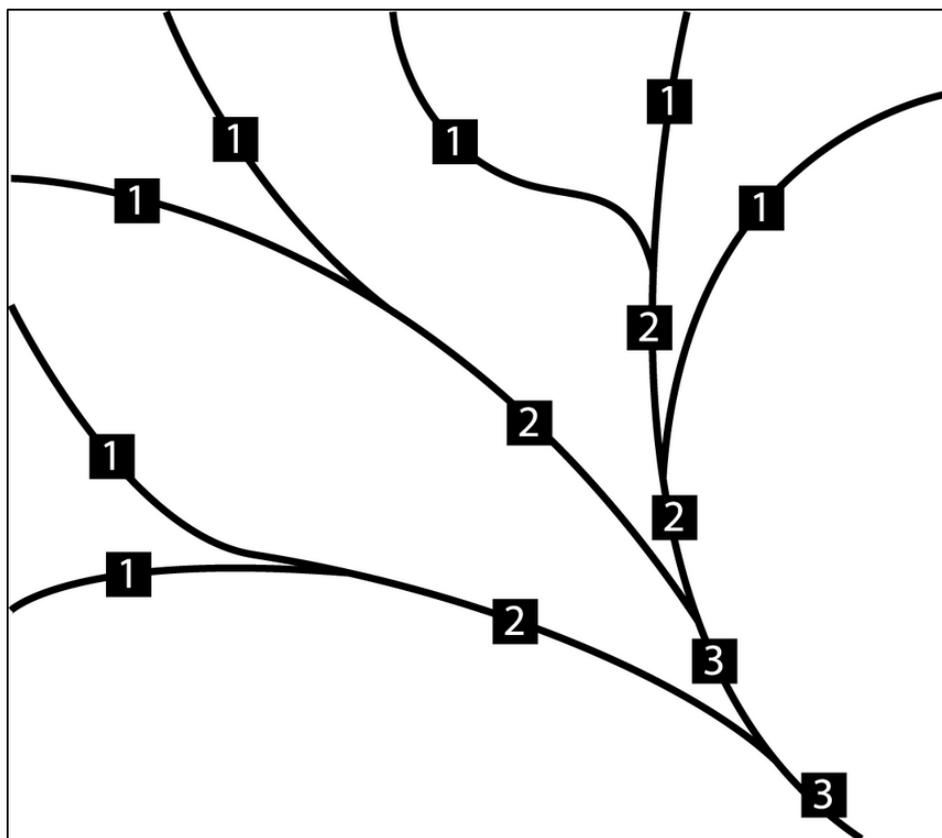


Figure 1: Diagram of stream order (Source: *Water Management (General) Regulation 2018*).

- (2) The riparian exclusion zone must be measured from the top of the defined bank of the stream or where there is no defined bank, from the edge of the channel of the stream for the distance specified in Table G.

Table G: Riparian exclusion zones

Stream order	Riparian exclusion zone
Unmapped and mapped first-order	10 metres
Mapped second-order	20 metres
Mapped third-order or higher	30 metres
Prescribed Streams	

- (3) Harvesting machinery must not enter riparian exclusion zones, except at designated crossings or where otherwise allowed by this Code.
- (4) Where harvesting is occurring in or adjacent to riparian exclusions zones, all tree felling must employ directional felling to minimise disturbance to streams
- (5) Where a tree is accidentally felled into a riparian exclusion zone, the tree may be removed provided:
- (a) disturbance to soil, groundcover and native vegetation is limited to the minimum extent necessary, and

- (b) harvesting machinery does not enter the riparian exclusion zone to retrieve the tree, or part of the tree, unless using walkover techniques, and
 - (c) following the tree's removal, any soil disturbance or furrows are treated to prevent concentration of water flow or soil movement, and
 - (d) the incident must be recorded in the Forest Management Plan or Forest Stewardship Plan, as soon as possible.
- (6) New roads and crossings may be constructed and old roads and crossings re-opened within riparian exclusion zones provided that:
- (a) the road or crossing is identified in the Forest Management Plan or Forest Stewardship Plan
 - (b) the road prism or crossing intersects with the riparian exclusion zone at right angles or as close to right angles as is practicable
 - (c) clearing and disturbance within the riparian exclusion zone are minimised
 - (d) any other necessary permits have been obtained.
- (7) Trees may be felled within drainage depressions, and machinery may enter, however, disturbance must be minimised by:
- (a) machinery not operating when the soil is saturated
 - (b) using walkover techniques wherever possible
 - (c) preventing skewing of machinery tracks as much as possible
 - (d) not snagging along drainage depressions.
- (8) Where existing measures are not adequately managing the risk of soil erosion, sediment movement or water turbidity the landholder may implement further riparian protection measures. These additional measures must be recorded in the Forest Management Plan or Forest Stewardship Plan.

7. Construction and maintenance of forest infrastructure

7.1 Construction and maintenance of roads

- (1) Clearing of native vegetation for the purpose of roads, drainage structures, log landings, mill sites, snig tracks or extraction tracks must not occur except in accordance with this Code, and the clearing must be limited to the minimum extent necessary.
- (2) Construction of new roads and drainage feature crossings should be minimised as far as practicable, consistent with the requirements for management, harvesting and fire control in the PNF Plan area.
- (3) As far as practicable, roads must be located on ridgetops or just off the crest of the ridge to facilitate outfall drainage.
- (4) Clearing for road construction is no more than 3 metres from the outside edges of batters or table drains. If it is necessary to clear a wider area, a minimum of 70% groundcover must be established on all the cleared area beyond the road formation within one month of the date of completed construction.

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- (5) Trees and other debris must not be stacked in landscape features referred to in Table D or riparian exclusion zones referred to in Table G.
- (6) Any cut or fill batter must be stabilised.
- (7) Tree stumps or other woody debris must not be used to provide fill for road construction.
- (8) New roads must be constructed, upgraded and maintained with a maximum grade of 10 degrees. The maximum grade may be increased to 15 degrees where it would result in an improved environmental outcome or to avoid difficult ground conditions. The Forest Management Plan or Forest Stewardship Plan must be noted.
- (9) Roads must be maintained according to Table H.
- (10) Roads must be maintained to ensure that road surfaces remain stable and drainage systems and sediment controls remain functional.
- (11) Soil exposure on road verges must be kept to a minimum.
- (12) Roads that are not required for ongoing property management must be stabilised, drained and allowed to revegetate.
- (13) Haulage must not be undertaken over any section of road where the surface has rutting more than 150 millimetres deep for any distance exceeding 20 metres.
- (14) Haulage on natural surface roads must cease when there is runoff from the road surface, except for trucks that have already been loaded or partially loaded. These trucks can travel to their intended destination.
- (15) Where existing roads are overgrown and require re-opening, the clearing width must be minimised to the extent required to make the road suitable for traffic.
- (16) As far as practicable, grass cover must be maintained and disturbance to existing drainage structures must be minimised.
- (17) Blading-off of roads must be used to the minimum extent necessary to rehabilitate the road surface.
- (18) Sections of new road may be constructed on ground slopes exceeding 25 degrees only if:
 - (a) there is no practical alternate route available,
 - (b) the sections are designed by a suitably qualified person using currently acceptable engineering standards to ensure stability, and
 - (c) the section is noted within the Forest Management Plan or Forest Stewardship Plan.

Table H: Maximum distance that water may travel along road surfaces, table drains, snig and extraction tracks

Road grade (degrees)	Maximum distance (metres)
0 to ≤ 3	175
> 3 to ≤ 5	100
> 5 to ≤ 8	80
> 8 to ≤ 10	60
> 10 to ≤ 15	40
> 15 to ≤ 20	25
> 20 to ≤ 25	20

7.1.1 Road drainage

- (1) All reasonable steps must be taken to minimise soil erosion from roads. Accordingly, one or more of the following measures must be adopted, where appropriate:
 - (a) maintain vegetative cover (that is, plant material, living or dead) that protects the road surface from erosion
 - (b) establish a grass cover on the road surface using a sterile seed or native grass seed
 - (c) crossfall-drain the road with outfall or infall drainage (preferably with the outward or inward slope being between 4% and 6%) or by shaping the road to a crown so water drains to both of its sides
 - (d) construct drainage structures on the road surface to convey water away from the road formation (for example, cross drains, mitre drains or relief culverts).
- (2) Any drainage structure must be designed to convey the peak flow from a 1-in-5-year storm event.
- (3) Drainage structures must be established on a road if concentrated water flow on the road surface or table drains is likely to occur for distances exceeding the relevant spacing, as shown in Table H.
- (4) Earth windrows resulting from road construction and upgrading operations must be removed from the shoulders of all roads unless they are specifically constructed to prevent erosion of fill batters or where infall drainage is used.
- (5) Earth windrows from road maintenance must be cut through at regular intervals to ensure that water flow on road surfaces does not exceed the distances specified in Table H.
- (6) Rollover banks must have a minimum effective bank height of 15 centimetres (consolidated). Spoon drains must have a minimum effective depth of 15 centimetres.
- (7) Drainage structures must divert water onto a stable surface and must be kept free of debris that may impede flow of water.
- (8) Drainage structures must not be designed to directly divert sediment laden water into streams.
- (9) A drop-down structure and dissipater must be installed where drainage structures divert water over an exposed fill batter more than 1 metre high.

7.1.2 Roads crossing drainage features

- (1) Drainage feature crossings must be stable causeways, culverts or bridges. Existing gully stuffers may be used if they are stable, but new gully stuffers must not be constructed.
- (2) Crossings must be designed, constructed and maintained to minimise disturbance to the passage of fish and other aquatic fauna. They must be located and constructed to cause minimum disturbance to stream banks, stream beds and natural flows. The base of the crossing must be made of erosion-resistant material such as rock, concrete or heavy timber and must conform to the natural level of the stream bed.
- (3) Crossings must be constructed as close as practicable to right angles to the water flow unless an angled approach reduces soil and ground disturbance.
- (4) Disturbance to the bed and banks of the drainage feature during crossing construction or maintenance must be minimised. Disturbed areas must be reshaped and stabilised as soon as possible following crossing construction or maintenance.
- (5) The approaches to a crossing over a stream must be drained, using a drainage structure, between 5 metres and 40 metres of the crossing. Where this is

- impracticable, a drainage structure must be constructed as near as practicable to the crossing.
- (6) Permanent drainage crossing structures must be designed to convey a 1-in-5-year storm event and withstand a 1-in-10-year storm event. Bridges must be designed and constructed so the natural stream flow is not restricted and erosion is minimised.
 - (7) The surface of any crossing and the approaches on both sides of it must be made of stable material that is unlikely to be displaced during normal use of the crossing or approach, or by any flood up to and including peak flow of a 1-in-10-year storm event.
 - (8) Causeways must be constructed of stable, non-soil material such as crushed gravel, rock, bitumen, concrete, logs or other stable material that is unlikely to produce water turbidity.
 - (9) Construction equipment must minimise disturbance or damage to the stream bed and banks.
 - (10) Fill and construction material must not be placed into streams, and surplus fill must be located outside the riparian exclusion zone.
 - (11) Stream banks and bridge embankments must be protected to minimise erosion.
 - (12) Soil stabilisation must be undertaken in all areas disturbed by crossing construction, upgrading or maintenance, within 40 metres of either side of the crossing. These areas do not include the road surface, road drainage structures or cut batters.

7.2 Log landings, portable mill sites and snig tracks

- (1) Wherever practicable, log landings and portable mill sites must be located on ridge-tops or spurs.
- (2) Log landings and portable mill sites must be no larger than the minimum size necessary for efficient operations.
- (3) If topsoil is removed, it must be stockpiled and respread at completion of harvesting operations.
- (4) Log landings and portable mill sites must be located and constructed as far as practicable to allow effective crossfall drainage during harvesting operations.
- (5) The construction of new log landings and portable mill sites must not be located nearer than 40 metres where possible but a least 10 metres from an exclusion zone or riparian exclusion zone.
- (6) Existing log landings within 10 metres of a riparian exclusion zone may only be used with the prior written approval of Local Land Services, and provided:
 - (a) clearing for a new log landing would cause greater environmental harm; and
 - (b) disturbance to soils and groundcover is minimised, and
 - (c) erosion and sediment control measures must be in place for the duration of the log landings use, and upon its completion, and
 - (d) at least 70% ground cover must be reinstated within one month of the completion of the relevant log landings used for the forestry operations.
- (7) Runoff from log landings and portable mill sites must not be directly discharged into a drainage feature.
- (8) Log landings must not be used when the log landing soil is saturated.
- (9) Vegetation and debris from log landings and portable mill sites must not be deposited in an exclusion zone or riparian exclusion zone.

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- (10) Woody waste and debris on log landings and portable mill sites must not be stacked against retained trees.
- (11) Bark accumulated on log landings, and sawdust on mill sites, must be progressively dispersed away from the site during harvesting operations. Alternatively, bark can be placed in a discrete area on a log landing provided:
 - (a) Bark heaps are not located adjacent to or under crowns of retained trees, and
 - (b) Bark heaps are surrounded by a 5-metre earth or mineral break, and
 - (c) Timber off-cuts are staked at least 5 metres away from any bark heap, and
 - (d) Upon completion of forestry operations bark heaps are positioned at the centre of the log landing. Bark heaps must be burnt in accordance with all applicable legal requirements and necessary approvals.
- (12) On completion of operations, log landings and portable mill sites must be drained and reshaped to disperse runoff onto surrounding vegetation, and topsoil must be respread evenly over the landing.

7.2.1 Snig tracks and extraction tracks

- (1) Snig track or extraction track construction must be minimised and, as far as practicable, walkover extraction must be used, and slash retained on snig and extraction tracks.
- (2) Soil disturbance and exposure on snig and extraction tracks must be minimised.
- (3) As far as practicable, snig tracks from previous operations must be used.
- (4) Existing snig tracks or extraction tracks must not be used if they are incised and cannot be drained.
- (5) In re-opening existing snig tracks and extraction tracks, the use of blades must be restricted to the removal of obstructions such as understorey vegetation, logs/tree heads and surface rock, and ensuring that the track is adequately drained.
- (6) Wherever practicable, snigging and timber extraction must be uphill.
- (7) Snig tracks and extraction tracks must be located where they can be drained effectively, and should be located where there is sufficient natural crossfall to remove runoff from the track surface.
- (8) Snig tracks and extraction tracks must not encroach on exclusion zones, or riparian exclusion zones except at designated crossings and where permitted by this Code.
- (9) Blading-off of snig tracks and extraction tracks must not occur.
- (10) The grade of snig tracks must not exceed 25 degrees, except in the following circumstances:
 - (a) it will result in a better environmental outcome than construction and/or use of a side cut snig track to access the same area using a snig track of less than 25 degrees, and
 - (b) the Forest Management Plan or Forest Stewardship Plan is noted, and
 - (c) the snig track can be effectively drained, and
 - (d) the maximum grade is 28 degrees, and
 - (e) the maximum combined length of the snig track exceeding 25 degrees, commencing from the serviced log landing, is not greater than 75 metres.
- (11) Where downhill snigging is necessary, snig tracks and extraction tracks must enter the log landing from beside or below. Where this is not possible, a drainage structure

- must be installed at the entrance to the log landing at the end of each day's operations.
- (12) Drainage must be incorporated as soon as possible at the completion of operations on each extraction track or snig track, and in any event within two days, unless the soil is saturated.
 - (13) Temporary drainage must be installed on any snig or extraction track that will not be used for a period of five days or more.
 - (14) Track drainage structures must be located, constructed and maintained to divert water onto a stable surface which can handle concentrated water flow, and which provides for efficient sediment trapping. Drainage structures must not be designed to directly divert sediment laden water directly into streams.
 - (15) Snig tracks and extraction tracks must be located and constructed to ensure that water flow on the track surface does exceed the distances specified in Table H. This could be achieved by one of the following techniques or a combination:
 - (a) retain the existing groundcover using walkover techniques
 - (b) retain or cover the track surface with slash and harvesting debris
 - (c) construct outfall drainage or maintain the track's outfall drainage
 - (d) construct track drainage structures.
 - (16) Upon completion of operations, the following measures must be implemented:
 - (a) where practicable, snig tracks and extraction tracks must be reshaped, all earth windrows, wheel ruts and log furrows removed, and recoverable topsoil spread back over the track; and
 - (b) crossfall drainage must be reinstated on snig tracks or, where this is not sufficient to divert runoff from the track, crossbanks must be installed consistent with the spacings in Table H.
 - (17) Crossbanks must be constructed to have a minimum effective height of 35 centimetres unconsolidated, or 25 centimetres consolidated, and as a guide should not be greater than 50 centimetres in height.
 - (18) Crossbanks must not be constructed of bark or woody debris.

7.2.2 Snig track and extraction track crossings on drainage features

- (1) The location of log landings and snig/extraction tracks must be planned to minimise the number of crossings required.
- (2) Temporary crossings may be constructed if this construction will enable access to a forested area that cannot be practically accessed by other means, and negates the need to construct new roads, snig tracks or extraction tracks which are likely to cause greater environmental harm.
- (3) Snig track and extraction track crossings must be stable causeways (including natural surface causeways), culverts or bridges. Existing gully stuffers may only be used if they are stable. New gully stuffers must not be constructed.
- (4) Machinery must not cross a drainage feature which is running water or when the soil is saturated, unless by means of a stable crossing.
- (5) Approaches to crossings must be as close as possible to right angles to the flow of water.
- (6) A crossbank must be installed on each approach, between 5 and 20 metres from the drainage feature crossing. The distance must be measured from the top of the bank of the incised channel or, where there is no defined bank, from the edge of the channel or centre of the depression. The drainage structure must divert water onto a

stable surface. If such a surface is not available, sediment control measures must be used to prevent sediment entering the drainage feature. Drainage structures must not be designed to directly divert sediment laden water directly into streams.

- (7) Disturbance to the bed and banks of the drainage feature must be minimised, and any spoil must be removed from the drainage feature.
- (8) All areas disturbed during crossing construction and use, including approaches, must be rehabilitated following completion of use. Rehabilitation includes the reshaping of the crossing to conform as closely as possible to the original ground surface. If groundcover is not likely to recover naturally, sowing with a suitable sterile seed or endemic native seed/fertiliser mix must be undertaken to establish effective groundcover.

7.2.3 Wet weather limitations for snigging, log landing and portable mill operations

- (1) Harvesting operations must not occur when:
 - (a) there is runoff from the snig track surface, or
 - (b) soils are saturated, or
 - (c) soil is rutted to a depth of more than 200 millimetres below the track surface over a 20 metre section or longer until the soil has dried and/or rehabilitation has restored the stability of the track surface.
- (2) Forwarders, excavators and truck-mounted loaders may be used as stationary loaders when there is runoff from the log landing.
- (3) All other machinery on the log landing must remain stationary when there is runoff from the log landing surface, unless the log landing is constructed of gravel or other stable material.

Appendix A: Listed species ecological prescriptions

Introduction

These prescriptions must be applied within the forestry operations area where there is a **known record, site evidence**, or in relation to koalas potential habitat (see Figures 3-4), of a threatened species.

- (a) A known record is a sighting or record of the species in the NSW BioNet (<http://www.bionet.nsw.gov.au/>) that is less than 20 years old with a reliability level and/or Source Code of 1 to 4 and a coordinate accuracy of 100 metres or less,
- (b) Site evidence is a sign a species has visited or regularly uses a site, and includes observations of, for example, faecal pellets or scats, chewed seed cones or a nest, or evidence that the site has been used as a latrine.
- (c) recorded by a suitably qualified expert(s) as part of a fauna survey and/or flora survey during the planning and assessment of harvest operations.

A list of threatened species under the *Biodiversity Conservation Act 2016* and species profiles for each species can be viewed on the Department of Planning, Industry and Environment (DPIE) website at <https://www.environment.nsw.gov.au/topics/animals-and-plants/threatened-species>

The prescriptions set out below assist in the protection of threatened species, and include:

- (1) additional widths to stream exclusion zones
- (2) exclusion zones and/or buffer zones around locations of threatened species records
- (3) additional tree retention requirements around locations of threatened species records.

Exclusion zones and buffer zones requiring additional tree retention requirements must be applied within the PNF Plan area subject to the area of the forestry operation described in the Forest Management Plan or Forest Stewardship Plan.

Some species prescriptions vary according to the Bioregion in which they occur. Unless otherwise stated, the regions referred to in the prescriptions are based on the Interim Biogeographic Regionalisation of Australia (IBRA) shown in Figure 2.

General conditions

For all threatened species prescriptions, the following applies:

- where a retained eucalypt tree (as required by these prescriptions) also meets the requirements of a habitat tree, the eucalypt tree may be counted as a habitat tree
- where other exclusion zones form part of the habitat area required for threatened species prescriptions, the exclusion zones may count towards the area of habitat required to be retained
- where public conservation/reserved land (for example National Parks) falls within buffer or exclusion zone areas requiring additional tree retention requirements as part of threatened species prescriptions, then the area of public conservation/reserved land may contribute towards the area of habitat required to be retained
- buffer and exclusion zones are to be marked in the field where they adjoin the area, subject to forestry operations. This marking has to be visible while forestry operations are occurring.

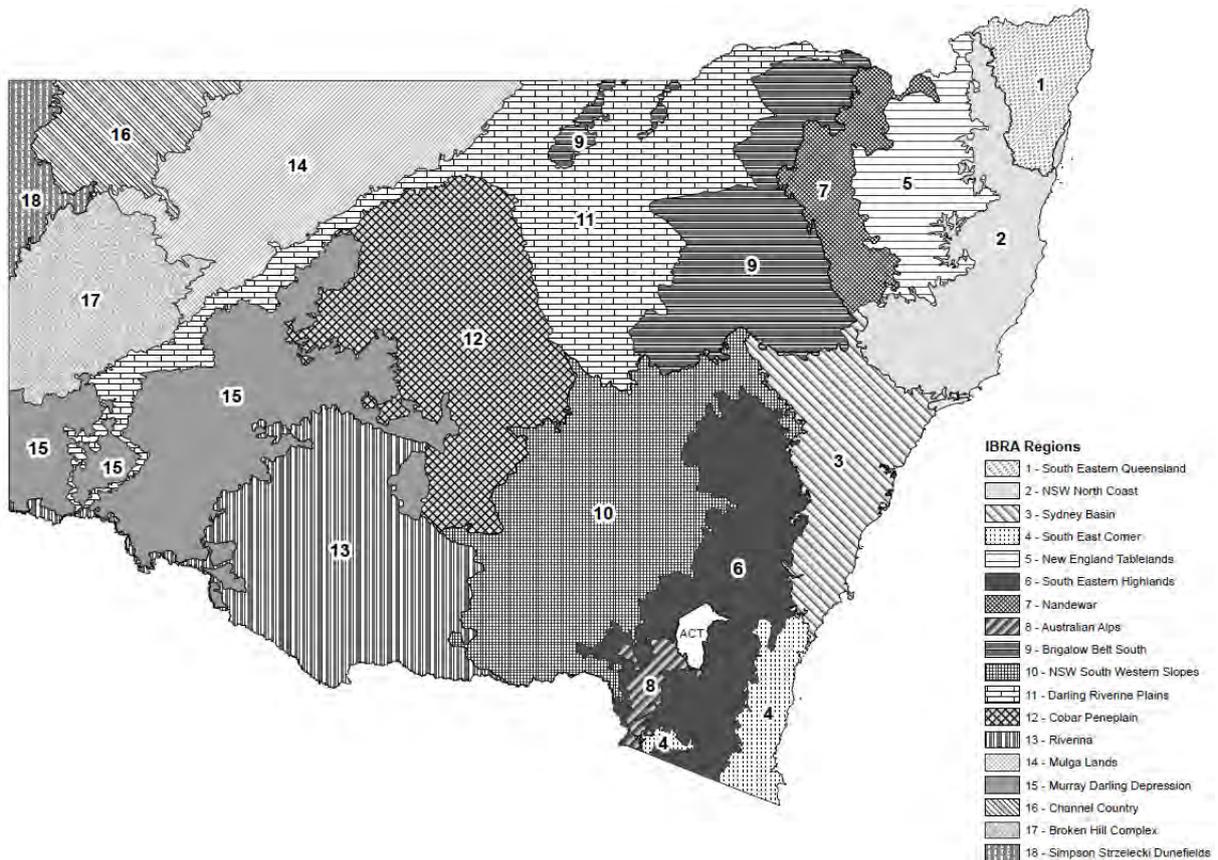


Figure 2: Interim Biogeographic Regionalisation of Australia (IBRA) regions, where prescriptions for some threatened species may vary.

Further information about individual threatened species may be sourced from the Environment, Energy and Science Group (EES) of DPE. The DPE EES website provides species profiles and additional information. Visit <https://www.environment.nsw.gov.au/topics/animals-and-plants/threatened-species>.

Mammals

Brush-tailed phascogale (*Phascogale tapoatafa*)

Zones for application of prescription

New England Tablelands, Nandewar, Brigalow Belt South, Darling Riverine Plains, South Eastern Highlands, NSW South Western Slopes, Riverina

Prescription

Where there is a brush-tailed phascogale record within the area of forestry operations, the following must apply:

- (a) A 50 metre exclusion zone must be implemented around den trees, and
- (b) coarse woody debris within 200 metres of the record must be retained where practicable.

Additional information

Potential brush-tailed phascogale habitat is dry sclerophyll open forest or woodland with a generally open understorey, preferably containing large trees with rough bark and hollows to provide optimal foraging and denning habitat

Eastern pygmy-possum (*Cercartetus nanus*)

Zones for application of prescription

Brigalow Belt South, Nandewar, New England Tablelands, NSW South Western Slopes, South Eastern Highlands

Prescription

Where there is an eastern pygmy-possum record within the area of forestry operations, the following must apply:

- (a) An exclusion zone with a 50-metre radius (about 0.8 hectares) must be identified, centred on the location of the record, with no forestry operations or removal of understorey plants permitted.
- (b) Within a 100-metre radius (about 3.5 hectares) of the exclusion zone, a buffer zone must be identified within which the following additional prescriptions must be implemented:
 - (i) Only single-tree selection and thinning operations can occur (i.e. no canopy openings).
 - (ii) Single-tree selection and thinning operations must not reduce the stand basal area below 12m²/hectare
 - (iii) A minimum of 26 trees with visible hollows must be retained where available.
 - (iv) Disturbance to understorey trees and shrubs (particularly banksias, bottlebrush and acacias), ground logs, rocks and litter must be minimised.
 - (v) coarse woody debris must be retained where practicable

Additional information

Potential eastern pygmy-possum habitat is found in a broad range of habitats including rainforest, sclerophyll (including box-ironbark) forest, woodland and heath. In most areas, woodlands and heath appear to be preferred, except in north-eastern NSW where they are most frequently encountered in rainforest

Spotted-tailed quoll (*Dasyurus maculatus*)

Zones for application of prescription

Brigalow Belt South, Cobar Peneplain, Darling Riverine Plains, Nandewar, New England Tablelands, NSW South Western Slopes, Riverina, South Eastern Highlands

Prescription

Where there is a record of a spotted-tailed quoll den site, maternal den or latrine site within the area of forestry operations, the following must apply:

- (a) An exclusion zone with a 200-metre radius (about 12.5 hectares), centred on the location of the record must be implemented around a spotted-tailed quoll maternal den site or latrine site. This exclusion area must be linked to the riparian exclusion zone where practicable.
- (b) An exclusion zone with a 100-metre radius (about 3.5 hectares), centred on the location of the record must be implemented around spotted-tailed quoll den sites. This exclusion area must be linked to the riparian exclusion zone where practicable.
- (c) Areas of riparian exclusion and protection zone must not be counted towards exclusion zones for the spotted-tailed quoll.

Squirrel glider (*Petaurus norfolcensis*)

Zones for application of prescription

Brigalow Belt South, Nandewar, New England Tablelands, NSW South Western Slopes, Riverina, South Eastern Highlands

Prescription

Where there is a squirrel glider record in an area of forestry operations, the following must apply:

- (a) A buffer zone with a 250-metre radius (about 20 hectares) must be identified, centred on the location of the record or records.
- (b) Within this buffer zone, the following additional prescriptions must be implemented:
 - (i) A minimum of 15 trees per 2 hectares with visible hollows must be retained where available.
 - (ii) A recruitment tree must be retained for each hollow bearing tree retained. Where the total number of hollow bearing trees and recruitment trees is less than 30 trees per 2 hectares, additional recruitment trees must be retained to bring the number up to 30 trees per 2 hectares.
 - (iii) Disturbance to understorey trees and shrubs (particularly banksias and acacias), ground logs, rocks and litter must be minimised.
- (c) Where there are records of dens or roosts, these must be contained within buffer zones encompassing suitable habitat.
- (d) Where there are more than two squirrel glider records closer than 250 metres apart within the forest operation area, advice on the location of the buffer area must be sought from EES before commencing forest operations.

Additional information

Squirrel glider habitat is generally dry eucalypt forest and woodland. In coastal areas, potential habitat is blackbutt, bloodwood and ironbark forest with a healthy understorey. In the absence of these forest types, areas of mature or old growth forest must be retained.

Yellow-bellied glider (*Petaurus australis*)

Zones for application of prescription

Brigalow Belt South, Nandewar, New England Tablelands, NSW South Western Slopes, South Eastern Highlands

Prescription

- (a) An exclusion zone with a 50-metre radius must be implemented around trees used as dens by yellow-bellied gliders.
- (b) All yellow-bellied glider sap feed trees must be retained and marked for retention. A sap feed tree is a tree with recent V-notch incisions or other incisions made by a glider. Recent incisions are incisions that have not closed.
- (c) The feed trees retained as above must be of the same species as the identified sap feed tree or identified den tree, or should be trees that shed their bark in long strips, e.g. species from blue, flooded, grey, red and white gum groups.
- (d) The retained feed trees must be marked for retention.

Additional information

Yellow-bellied gliders occur in tall mature eucalypt forest, generally in areas with high rainfall and nutrient-rich soils. Forest type preferences vary with latitude and elevation – mixed coastal forests to dry escarpment forests in the north, and moist coastal gullies and creek flats to tall montane forests in the south. The gliders feed primarily on plant and insect exudates, including nectar, sap, honeydew and manna with pollen and insects providing protein. They extract sap by incising or biting into the trunks and branches of favoured food trees, often leaving a distinctive 'V'-shaped scar.

Greater glider (*Petauroides volans*)

Zones for application of prescription

Australian Alps, New England Tablelands, Nandewar, Brigalow Belt South, NSW South Western Slopes, South Eastern Highlands

Prescription

No forestry operations are permitted within 50 metres of each greater glider den site.

Additional information

Greater gliders occur in woodlands and eucalypt forests along the ranges and coastal plains of NSW, favouring tall, montane, and moist forests with a diversity of eucalypt species, relatively old trees and abundant hollows. They tend to occupy a relatively small home range, between 1 to 4 hectares, though this range becomes larger in lower productivity forests and more open woodlands. Greater gliders shelter during the day in hollows of large trees, which may be lined with leaf matter, and typically use between 2 to 18 hollows in their home range. They are usually solitary, though mated pairs and offspring will share a den during the breeding season and until the young are independent.

Koala (*Phascolarctos cinereus*)

Prescription

- (a) Where there is a record of a koala within the area of forestry operations, or within 500 metres of an area of forestry operations, or where 10 or more koala scats (or one or more koala scats in the Central and Southern Tablelands and South Coast Koala Management Areas (KMA)) are found beneath the canopy of a primary or secondary koala feed tree during pre-harvest surveys or harvest operations, or within areas identified under the PNF koala prescription map as shown in Figures 3-4, the following must apply:
- (i) A minimum of 15 primary koala feed trees and 5 secondary koala feed trees must be retained per hectare in the forestry operations area (not including other exclusion or buffer zones), where available.
 - (ii) Where possible, preference should be given to trees that provide habitat connectivity and/or build on existing landscape features (Table D), existing habitat islands, refugia and conservation areas adjacent to and within the PNF Plan area, have leafy, broad crowns and be in a range of size classes with a minimum of 20 centimetres diameter at breast height over bark.
 - (iii) Damage to retained trees must be minimised by directional felling techniques.
 - (iv) Post-harvest burns must minimise damage to the trunks and foliage of retained trees.
 - (v) Each tree must be visually assessed for koalas immediately prior to it being felled.
 - (vi) Where 20 koala feed trees per hectare are present in areas mapped under the PNF koala prescription map but either 15 primary or 5 secondary feed trees for the relevant KMA cannot be met, then the landholder must retain as many koala feed trees as are available, including substituting primary feed trees for secondary (or vice versa) up to a maximum of 20 koala feed trees per hectare. Primary feed trees are to be prioritised for retention over secondary feed trees.
 - (vii) Where there are not 20 koala feed trees per hectare present in areas mapped under the PNF koala prescription map then conditions (a) (i)-(iv) and (a) (vi) do not apply but the landholder(s) must retain as many koala feed trees as are available. However, if in the course of harvest operations 10 or more koala scats are found beneath the canopy of a koala feed tree (or one or more koala scats in Central and Southern Tablelands and South Coast KMAs) or where the presence of a koala is clearly identifiable by recent scratches, the landholder must also reinstate conditions (a) (ii) – (v). These areas will remain part of the PNF koala prescription map unless surveyed consistent with (viii).
 - (viii) Where the landholder considers the PNF koala prescription map is inaccurate on their property, including where the required number of koala feed trees cannot be found (as per koala prescription clause vi-vii), the landholder may request that the area(s) is verified by a suitably qualified expert(s) as described in Note 8.

- (b) In the Far West, Riverina, Darling Riverine Plains, Northwest Slopes and Central and Southern Tablelands Koala Management Areas (refer to Figure 5), any tree containing a koala, or any tree beneath which one or more koala scats are found, or where the presence of a koala is clearly identifiable by recent scratches must be retained, and an exclusion zone of 50 metres must be implemented around each retained tree.
- (i) Where signs of koala presence outlined in (b) are identified during pre-harvest surveys, those trees must be visually assessed for koala presence during harvest operations.

Note 7: Landholders will be provided with the PNF koala prescription mapping held by the NSW Government as part of their PNF Plan approval. Updates to this map will be overseen by the NSW Forest Monitoring Steering Committee (or equivalent) independently chaired by the NSW Natural Resources Commission. Notwithstanding this the PNF koala prescription map may be updated at a property scale consistent with Note 8.

Note 8: Verifying highly suitable koala habitat on private land

Where the landholder(s) consider the mapping of koala habitat is inaccurate, and/or where the required number of koala feed trees cannot be found (as per Koala Prescription Clause (a)(vi)), the landholder may commission a review be undertaken by a suitably qualified expert(s).

The koala habitat suitability of the area must be reassessed based on an on-ground koala habitat verification survey conducted by a suitably qualified expert(s). The landholder(s) will need to identify the disputed area and provide their written permission for a habitat verification survey to be conducted.

The survey must be conducted in accordance with the protocol available at www.ils.nsw.gov.au/pnforestry.

Depending on the results of the assessment, Local Land Services will provide the landholder(s) with:

- (a) an amended map to show any revised areas of highly suitable koala habitat, or
- (b) the original map, showing the highly suitable koala habitat areas mapped before the review.

Where the survey has determined that the disputed area is not highly suitable koala habitat, Local Land Services will approve an amendment to the Private Native Forestry Plan and an amended Forest Management Plan or Forest Stewardship Plan to apply the revised highly suitable koala habitat mapping.

Trees with koalas present that are identified during surveys must be marked and this information provided to the landholder(s) by Local Land Services prior to forestry operations commencing.

Additional information

Generally, koala habitat comprises eucalypt forest and woodland containing primary and secondary food trees (see Table I). Koala droppings (scats) have a strong eucalyptus odour, are pale green in colour with faint or clear ridges and/or vertical stripes, have a moist mucus coating and bullet shaped appearance. For further information on the identification of koala scats, contact DPE or refer to the DPE website – <https://www.environment.nsw.gov.au/>

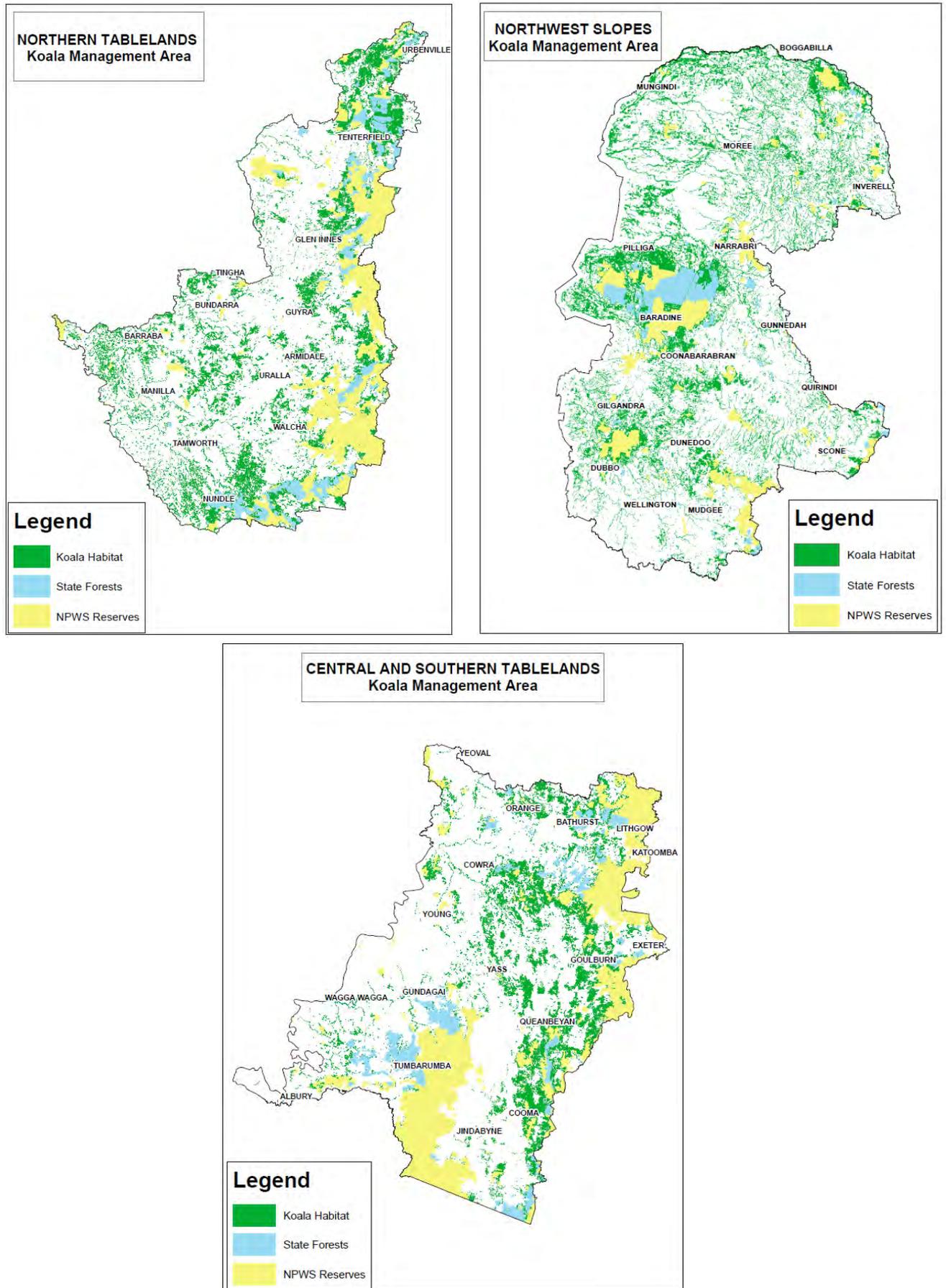


Figure 3: PNF koala prescription map (green) in Northern Tablelands (top left), Northwest Slopes (top right) and Central and Southern Tablelands (bottom) Koala Management Areas.

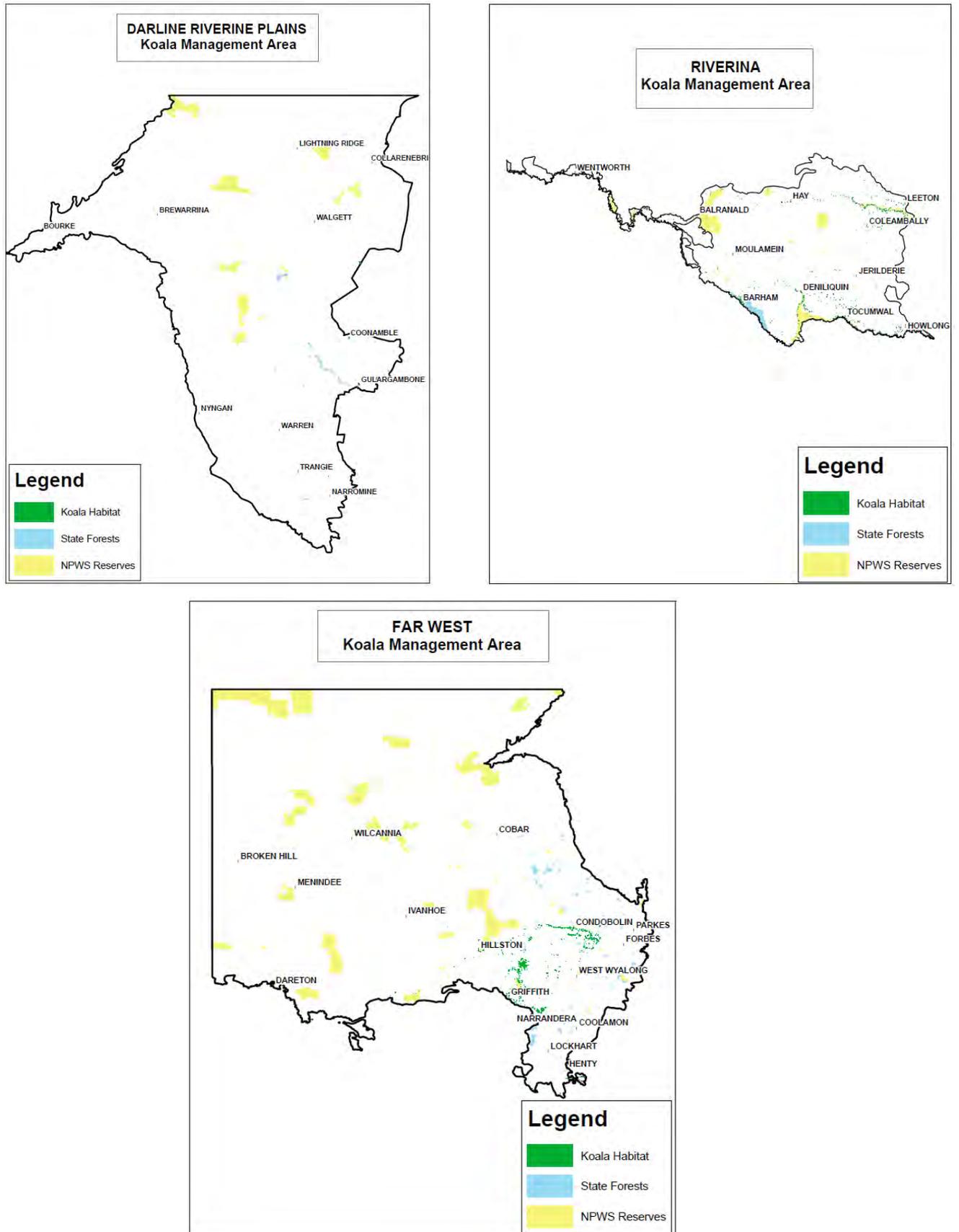


Figure 4: PNF koala prescription map (green) in Darling Riverine Plains (top left), Riverina (top right) and Far West (bottom) Koala Management Areas.

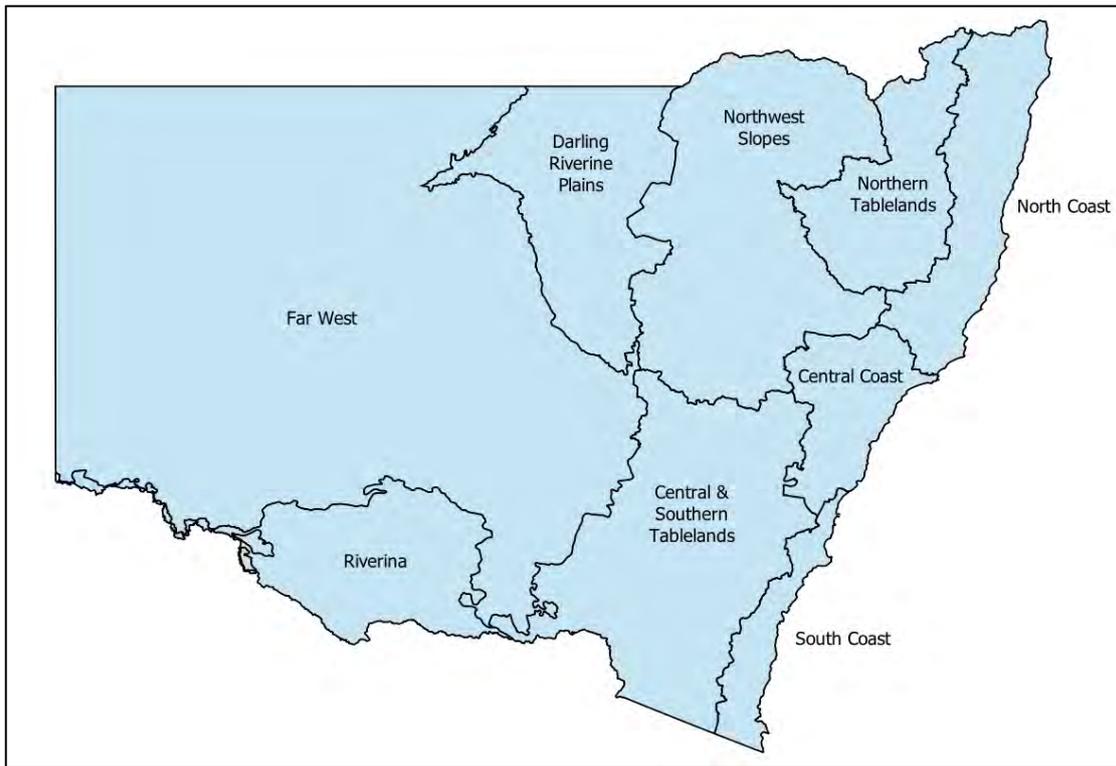


Figure 5: Koala Management Areas in NSW

Table I: Primary and secondary koala use trees for Koala Management Areas in the Cypress and Western Hardwood forests

Koala feed tree species		Koala Management Area					
Common name	Scientific name	Northern Tablelands	Central and Southern Tablelands	North West Slopes	Darling Riverine Plains	Riverina	Far West
Primary tree species							
Blakley's red gum	<i>Eucalyptus blakelyi</i>	X	X	X	X		
River red gum	<i>Eucalyptus camaldulensis</i>	X	X	X	X	X	X
Coolibah	<i>Eucalyptus coolabah</i>			X	X	X	X
Brittle gum	<i>Eucalyptus mannifera</i>		X				
Tallowwood	<i>Eucalyptus microcorys</i>	X					
Grey gum	<i>Eucalyptus punctata</i>		X				
Inland scribbly gum	<i>Eucalyptus rossii</i>		X				
Forest red gum	<i>Eucalyptus tereticornis</i>	X	X				
Ribbon gum	<i>Eucalyptus viminalis</i>	X	X				

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Koala feed tree species		Koala Management Area					
Common name	Scientific name	Northern Tablelands	Central and Southern Tablelands	North West Slopes	Darling Riverine Plains	Riverina	Far West
Secondary tree species							
Wattle-leaved peppermint	<i>Eucalyptus acaciiformis</i>	X					
White box	<i>Eucalyptus albens</i>	X	X	X	X		
Apple box	<i>Eucalyptus bridgesiana</i>	X					
Mountain blue gum	<i>Eucalyptus brunnea</i>	X					
Broad-leaved stringybark	<i>Eucalyptus caliginosa</i>	X					
Dirty gum	<i>Eucalyptus chloroclada</i>			X	X		
Mountain grey gum	<i>Eucalyptus cypellocarpa</i>		X				
Mountain gum	<i>Eucalyptus dalrympleana</i>	X					
Tumbledown red gum	<i>Eucalyptus dealbata</i>	X		X	X		
Broad-leaved peppermint	<i>Eucalyptus dives</i>		X				
White stringybark	<i>Eucalyptus globoidea</i>		X				
Silver-top stringybark	<i>Eucalyptus laevopinea</i>	X					
Black box	<i>Eucalyptus largiflorens</i>			X	X	X	X
Red stringybark	<i>Eucalyptus macrorhyncha</i>	X	X				
Silver-leafed ironbark	<i>Eucalyptus melanophloia</i>			X	X		
Yellow box	<i>Eucalyptus melliodora</i>	X		X	X	X	X
Western grey box	<i>Eucalyptus microcarpa</i>		X	X	X	X	X
Grey box	<i>Eucalyptus moluccana</i>	X		X			
Narrow-leaved black peppermint	<i>Eucalyptus nicholii</i>	X					
Giant white gum	<i>Eucalyptus nobilis</i>	X					
Snow gum	<i>Eucalyptus pauciflora</i>	X	X	X			
Narrow-leaved grey box	<i>Eucalyptus pilligaensis</i>			X			

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Koala feed tree species		Koala Management Area					
Common name	Scientific name	Northern Tablelands	Central and Southern Tablelands	North West Slopes	Darling Riverine Plains	Riverina	Far West
Sydney peppermint	<i>Eucalyptus piperita</i>		X				
Bimble box	<i>Eucalyptus populnea</i>			X	X		
Orange gum	<i>Eucalyptus prava</i>	X		X			
Grey gum	<i>Eucalyptus punctata</i>			X			
Narrow-leaved peppermint	<i>Eucalyptus radiata</i>	X					
Hard-leaved scribbly gum	<i>Eucalyptus sclerophylla</i>		X				
Black sally	<i>Eucalyptus stellulata</i>	X					
Youman's stringybark	<i>Eucalyptus youmanii</i>	X					

Grey-headed flying-fox (*Pteropus poliocephalus*) camps

Zones for application of prescription

New England Tablelands, Nandewar, Brigalow Belt South, Darling Riverine Plains, NSW South Western Slopes, South Eastern Highlands

Prescription

Forestry operations and any associated activities must be excluded within a flying-fox camp, and within a 50-metre exclusion zone around any camp which contains grey-headed flying-foxes.

Additional information

Flying-foxes congregate (roost) in large numbers known as 'camps'. These areas are typically within 20 kilometres of known food sources, and camp localities vary over different seasons, depending on regional food availability. Camps are often located in riparian vegetation such as rainforest remnants, swamp forest (paperbarks) or casuarina forests. They are often used annually. Camps are extremely important for day-time roosting and socialising and are used as maternity sites for rearing young.

Reptiles

Broad-headed snake (*Hoplocephalus bungaroides*)

Zones for application of prescription

NSW South Western Slopes, South Eastern Highlands

Prescription

Where there is a broad-headed snake record in the area of forestry operations, the following must apply:

- (a) A buffer zone with a 100-metre radius (about 3 hectares) must be identified, centred on the location of the record.
- (b) Within this buffer zone, the following additional prescriptions must be implemented:
 - (i) A minimum of 26 trees with visible hollows with openings greater than 10 centimetres must be retained where available.
 - (ii) Disturbance to understorey trees and shrubs, ground logs and, in particular, rock outcrops and ledges must be minimised.

Additional information

Potential habitat for the broad-headed snake is largely confined to Triassic sandstones, including the Hawkesbury, Narellan and Shoalhaven formations, on the coast and in the ranges in an area within approximately 250 kilometres of Sydney. The snake shelters in rock crevices and under flat sandstone rocks on exposed cliff edges during autumn, winter and spring, and shelters in hollows in large trees within 200 metres of escarpments in summer.

Rosenberg's goanna (*Varanus rosenbergi*)

Zones for application of prescription

NSW South Western Slopes, South Eastern Highlands

Prescription

Where there is a Rosenberg's goanna record in the area of forestry operations, the following must apply:

- (a) A buffer zone with a 200-metre radius (about 12.5 hectares) must be identified, centred on the location of the record.
- (b) Within this buffer zone, the following additional prescriptions must be implemented:
 - (i) All termite mounds must be protected from any disturbance.
 - (ii) Disturbance to understorey trees and shrubs and, in particular, ground logs and rock outcrops and ledges must be minimised
 - (iii) No post-harvest burning is permitted.

Additional information

Rosenberg's goanna occurs on Sydney sandstone in Wollemi National Park north-west of Sydney, in the Goulburn and ACT regions and near Cooma in the south. There are records from the south-west slopes near Khancoban and the Tooma River. It is found in heath, open forest and woodland. This species nests in termite mounds, which are a critical component of its habitat.

Pale-headed snake (*Hoplocephalus bitorquatus*)

Zones for application of prescription

Brigalow Belt South, Darling Riverine Plains, Nandewar, New England Tablelands, NSW South Western Slopes

Prescription

Where there is a record of the pale-headed snake in an area of forestry operations, the following must apply:

- (a) An exclusion zone with at least a 100-metre radius must be implemented around the location of the record.
- (b) If forestry operations are being conducted during the months of May, June, July, August or September, an additional 200 metre-wide buffer zone must be implemented around the exclusion zone. Within this buffer zone, the following must apply:
 - (i) A minimum of 26 trees with visible hollows with openings greater than 10 centimetres must be retained where available.
 - (ii) All dead standing trees must be retained where it is safe to do so.
 - (iii) During forestry operations, the potential for damage to these trees must be minimised by utilising techniques of directional felling.

Additional information

Distribution: The snake has a patchy distribution from north-eastern NSW to north Queensland. It is found in NSW on both sides of the Great Dividing Ranges as far south as Tuggerah.

Macrohabitat: The snake is mainly found in dry eucalypt forests and woodlands and occasionally in rainforest or moist eucalypt forest.

Microhabitat: The snake shelters during the day between loose bark and tree trunks, or in hollow trunks and limbs of dead trees, especially near watercourses.

Birds

Powerful owl (*Ninox strenua*), masked owl (*Tyto novaehollandiae*) and barking owl (*Ninox connivens*)

Zones for application of prescription

Australian Alps, Brigalow Belt South, Cobar Penneplain, Darling Riverine Plains, Murray Darling Depression, Nandewar, New England Tablelands, NSW South Western Slopes, Riverina, South Eastern Highlands

Prescription

Where there is a record within the area of forestry operations for the powerful owl, masked owl or barking owl, the following prescriptions apply:

- (a) Nest trees (trees with hollows containing a nest of a powerful, masked or barking owl) must be retained and protected by a 50-metre exclusion zone.
- (b) Roost trees (trees where a powerful, masked or barking owl have been observed roosting or signs of roosting are observed) must be retained and protected by a 25-metre exclusion zone.
- (c) Within 1000 metres of the record, the following additional prescriptions must be implemented:
 - (i) a minimum of 15 hollow bearing trees per two hectares must be retained, where available.
 - (ii) a recruitment tree must be retained for each hollow bearing tree, where available.
 - (iii) where there are not 15 hollow bearing trees available recruitment trees must be substituted for hollow bearing trees up to a maximum of 30 trees per two hectares, where available.
 - (iv) Disturbance to the understorey, coarse woody debris and ground cover should be limited to the minimum extent necessary.

Additional information

Potential owl habitat comprises rainforest; wet and dry sclerophyll forest, and woodland.

Regent honeyeater (*Xanthomyza phrygia*)

Zones for application of prescription

Brigalow Belt South, Nandewar, New England Tablelands, NSW South Western Slopes, Riverina, South Eastern Highlands

Prescription

Where there is a record of a regent honeyeater in an area of forestry operations, the following must apply:

- (a) At least ten eucalypt feed trees (refer to Table F) must be retained within every two hectares of the net harvest area. These must be marked for retention. Where retained

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eucalypt feed trees also meet the requirements of habitat or recruitment trees, the retained eucalypt feed trees can be counted as habitat or recruitment trees.

- (b) Where a regent honeyeater is observed feeding, the tree in which it is feeding must be retained.
- (c) Trees containing regent honeyeater nests must be retained, with a 20-metre radius exclusion zone around them.

Additional information

This species inhabits dry open forest and woodland, particularly box–ironbark woodland and riparian forests of river she-oak. Regent honeyeaters inhabit woodlands that support a significantly high abundance and species richness of bird species. These woodlands have many mature trees and mistletoes and high canopy cover. The bird also forages in winter-flowering coastal swamp mahogany and spotted gum forests on the central coast and the upper north coast. Birds are also occasionally seen on the south coast.

Swift parrot (*Lathamus discolor*)

Zones for application of prescription

Brigalow Belt South, Murray Darling Depression, Nandewar, New England Tablelands, NSW South Western Slopes, Riverina, South Eastern Highlands

Prescription

Where there is a record of a swift parrot in an area of forestry operations, the following must apply:

- (a) An exclusion zone of 25 metres applies to all Swift Parrot roost trees
- (b) At least ten eucalypt feed trees (refer to Table F) must be retained within every two hectares of the net harvest area. These must be marked for retention. Where retained eucalypt feed trees also meet the requirements of habitat or recruitment trees, the retained eucalypt feed trees can be counted as habitat or recruitment trees.
- (c) Where a swift parrot is observed feeding, the tree in which it is feeding must be retained.

Additional information

Swift parrots migrate to the Australian south-east mainland between March and October. On the mainland, they occur where eucalypts are flowering profusely or where there are abundant lerps (from sap-sucking bugs). Favoured feed trees include winter-flowering species such as swamp mahogany (*Eucalyptus robusta*), spotted gum (*Corymbia maculata*), red bloodwood (*C. gummifera*), mugga ironbark (*E. sideroxylon*) and white box (*E. albens*). Commonly used lerp-infested trees include grey box (*E. microcarpa*), grey box (*E. moluccana*) and blackbutt (*E. pilularis*)

Regent parrot (*Polytelis anthopeplus monarchoides*)

Zones for application of prescription

See Figure 6

Prescription

There should be no harvesting of mallee within the areas shown on Figure 6:

- (a) within 20 kilometres of the Lower Wakool River defined as downstream of the junction of the Edward and Wakool Rivers, with the eastern boundary line being drawn perpendicular to the river at that point
- (b) within 20 kilometres of the Murray River.

Mallee within this zone can only be harvested by obtaining approval under the *Local Land Services Act 2013*.

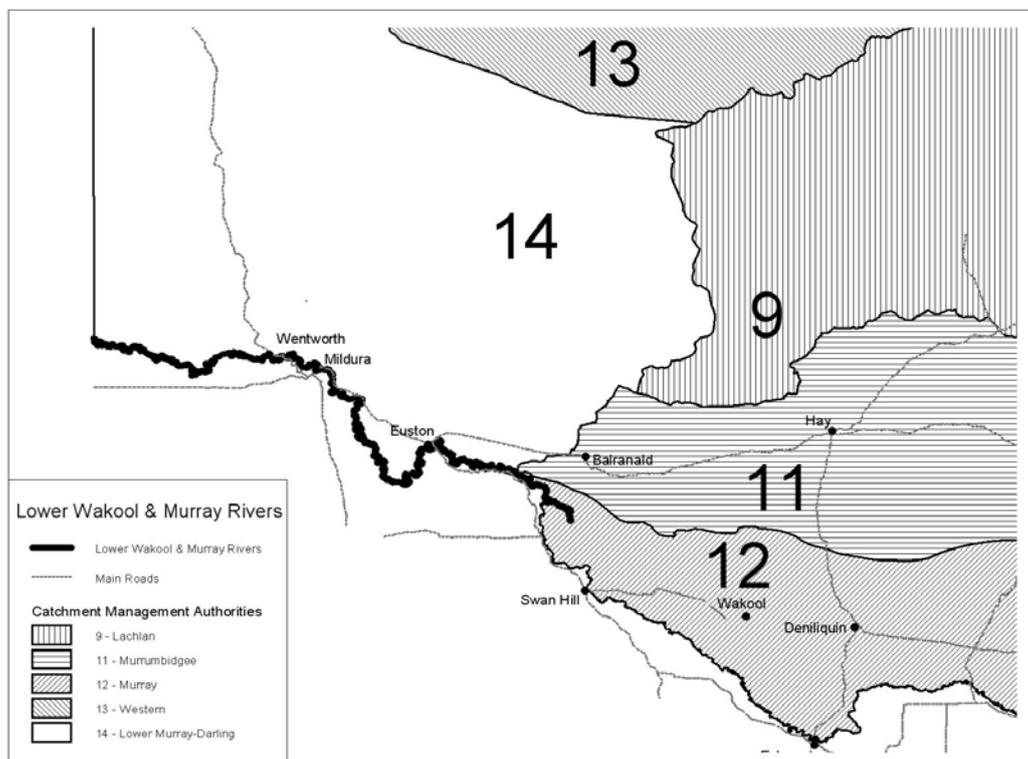


Figure 6: Area of application of regent parrot prescription

Black-eared miner (*Manorina flavigula melanotis*)

Zones for application of prescription

Murray Darling Depression

Prescription

High conservation value mallee must not be harvested. High conservation mallee is defined as mallee with:

- (a) stems higher than 20 centimetres measured 20 centimetres above the ground
- (b) stems with hollows, cracks or fissures more than 5 centimetres wide
- (c) stems on dune crests.

Malleefowl (*Leipoa ocellata*)

Zones for application of prescription

Brigalow Belt South, Cobar Peneplain, Darling Riverine Plains, Murray Darling Depression, NSW South Western Slopes, Riverina

Prescription

There must be no forestry operations within a 100-metre radius exclusion zone around all malleefowl ground nests.

Additional information

Malleefowl nests comprise large mounds of ground litter (dry leaves, twigs and bark) covered with sand and dirt. They may be 2–5 metres wide and up to 1.5 metres high. Egg-laying occurs from September to April. Nest sites can be re-used in consecutive years.

Bush stone-curlew (*Burhinus grallarius*)

Zones for application of prescription

Brigalow Belt South, Cobar Peneplain, Darling Riverine Plains, Murray Darling Depression, Nandewar, New England Tablelands, NSW South Western Slopes, Riverina, South Eastern Highlands

Prescription

- (a) No forestry operations are permitted within a 50-metre radius of all bush stone-curlew ground nests.
- (b) coarse woody debris within 200 metres of the nest must be retained where practicable

Additional information

Bush stone-curlew nests are found in areas of dry, grassy open forest or woodland and are a small scrape on bare ground, often near a bush or tree or beside a fallen limb. Nest sites can be re-used in consecutive years. Eggs are stone coloured, blotched dark brown and grey. Nesting season is August through to January.

Glossy black-cockatoo (*Calyptorhynchus lathamii*)

Zones for application of prescription

Brigalow Belt South, Cobar Peneplain, Darling Riverine Plains, Nandewar, New England Tablelands, NSW South Western Slopes, South Eastern Highlands

Prescription

- (a) There must be a 50-metre radius exclusion zone around all glossy black-cockatoo nests, within which no forestry operations may occur.
- (b) Within a 200-metre radius of any location of a glossy black-cockatoo record, damage to stands of she-oaks (*Allocasuarina* and *Casuarina* spp.) containing trees more than 3 metres in height and seed cones, is to be minimised.
- (c) Any she-oaks with evidence of foraging by glossy black-cockatoos (i.e. chewed seed cones under the tree) are to be protected.

Additional information

Glossy black-cockatoos nest in tree hollows usually in larger, mature trees. Nest locations are indicative of where a glossy black-cockatoo is seen entering a hollow. Nesting season is from March to August.

The presence of she-oaks (*Allocasuarina* and *Casuarina* spp.) is a key indicator of likely feeding habitat. Mature trees with hollows are required for nesting.

Red-tailed black-cockatoo (*Calyptorhynchus banksii*)

Zones for application of prescription

Brigalow Belt South, Cobar Peneplain, Darling Riverine Plains, Murray Darling Depression

Prescription

No forestry operations are permitted within a 50-metre radius of all red-tailed black-cockatoo nests.

Additional information

Red-tailed black-cockatoos nest in tree hollows usually in larger, mature trees. Nest locations are indicative of where a bird is seen entering a hollow. Nesting season is from March to August.

Red-tailed black-cockatoos are found in a wide variety of habitats. In coastal north-east NSW they have been recorded in dry open forest and areas of mixed rainforest/eucalypt forest.

Gang-gang cockatoo (*Callocephalon fimbriatum*)

Zones for application of prescription

Australian Alps, Nandewar, NSW South Western Slopes, South Eastern Highlands

Prescription

No forestry operations are permitted within a 25-metre radius of all gang-gang cockatoo nests.

Additional information

The gang-gang cockatoo is generally found in tall mountain forests and woodlands (particularly heavily timbered and mature wet sclerophyll forests) in spring and summer, and moves to lower altitudes in drier, more open eucalypt forests and woodlands (particularly box-gum, box-ironbark and dry coastal areas) in autumn and winter. The species favours old growth forest and woodland for nesting and roosting. Nests are located in hollows that are 10 cm in diameter or larger and at least 9 m above the ground in eucalypts.

Brown treecreeper (*Climacteris picumnus*)

Zones for application of prescription

Australian Alps, Brigalow Belt South, Darling Riverine Plains, Nandewar, New England Tablelands, NSW South Western Slopes, Riverina, South Eastern Highlands

Prescription

No forestry operations are permitted within a 25-metre radius of all brown treecreeper nests between 1 June and 31 January.

Additional information

The brown treecreeper occurs in eucalypt woodlands and dry open forest, mainly inhabiting woodlands dominated by stringybarks or other rough-barked eucalypts. Fallen timber is an important habitat component for foraging. This species depends on hollows in standing dead or live trees for nesting, and are generally present at a site year-round.

Speckled warbler (*Chthonicola sagittate*)

Zones for application of prescription

All

Prescription

No forestry operations are permitted within a 25-metre radius of all speckled warbler nests between 1 August and 31 January.

Additional information

The speckled warbler occurs in a range of *Eucalyptus* dominated communities that have a grassy understorey. Pairs occupy a breeding territory of about 10 hectares, with a slightly larger home range outside of the breeding season. They nest in a rounded, domed, roughly built nest of dry grass and strips of bark at the base on a low dense plant, often among fallen branches and other litter.

Diamond firetail (*Stagonopleura guttata*)

Zones for application of prescription

All

Prescription

No forestry operations are permitted within a 25-metre radius of all diamond firetail nests between 1 August and 31 January.

Additional information

The diamond firetail occurs in grassy eucalypt woodlands, but also occurs in open forest, mallee, and grasslands. It is often found in riparian areas, and sometimes in lightly wooded farmland. Nests are globular structures built either in the shrubby understorey or higher up, especially under hawk or raven nests.

Grey-crowned babbler (*Pomatostomus temporalis*)

Zones for application of prescription

Brigalow Belt South, Cobar Peneplain, Darling Riverine Plains, Murray Darling Depression, Nandewar, New England Tablelands, NSW South Western Slopes, Riverina, South Eastern Highlands

Prescription

No forestry operations are permitted within a 25-metre radius of all grey-crowned babbler nests.

Additional information

The grey-crowned babbler occurs in open box-gum woodlands on the slopes, box-cypress pine and open box woodlands on alluvial plains, and woodlands on fertile soils in coastal regions. The species builds and maintains several conspicuous, dome-shaped stick nests about the size of a football, which is used as a dormitory for roosting each night. Nests are maintained year-round.

Flame robin (*Petroica phoenicea*)

Zones for application of prescription

Australian Alps, Brigalow Belt South, Cobar Peneplain, Darling Riverine Plains, Murray Darling Depression, Nandewar, New England Tablelands, NSW South Western Slopes, Riverina, South Eastern Highlands

Prescription

No forestry operations are permitted within a 25-metre radius of all flame robin nests between 1 September and 1 March.

Additional information

The flame robin breeds in spring to late summer, in upland tall moist eucalypt forests and woodlands. Breeding habitat has a ground layer dominated by native grasses and a sparse or dense shrub layer. The flame robin builds nests near the ground in sheltered sites such as shallow cavities in trees, stumps or banks. In winter, the species migrates to drier, more open habitat in dry forests, open woodlands, pastures and native grasslands, and is occasionally seen in heathland or other shrubland.

Scarlet robin (*Petroica boodang*)

Zones for application of prescription

Australian Alps, Brigalow Belt South, Darling Riverine Plains, Nandewar, New England Tablelands, NSW South Western Slopes, Riverina, South Eastern Highlands

Prescription

No forestry operations are permitted within a 25-metre radius of all scarlet robin nests between 1 July and 31 January.

Additional information

The scarlet robin occurs in dry eucalypt forests and woodlands, where logs and fallen timber are important components of its habitat. The species' nest is an open cup made of plant fibres and cobwebs and is built in the fork of a tree more than two metres above the ground.

Hooded robin (*Melanodryas cucullate*)

Zones for application of prescription

All

Prescription

No forestry operations are permitted within a 25-metre radius of all hooded robin nests between 1 July and 30 November.

Additional information

The scarlet robin prefers lightly wooded areas, usually open eucalypt woodland, acacia scrub and mallee, often in or near clearings or open areas. Territories range from around 10 hectares in the breeding season to 30 hectares in the non-breeding season. The species breeds between July and November and often rears several broods. Nest is a small, neat cup of bark and grasses bound with webs, in a tree fork or crevice, from < 1 metre to 5 metres above the ground.

Dusky woodswallow (*Artamus cyanopterus cyanopterus*)

Zones for application of prescription

All

Prescription

No forestry operations are permitted within a 25-metre radius of all dusky woodswallow nests between 1 September and 1 March.

Additional information

Dusky woodswallows inhabit dry, open eucalypt forests and woodland with an open or sparse understorey, but has also been recorded in shrublands, heathlands and occasionally moist forest or rainforest. This species is also found in farmland, usually at the edges of forest or woodland. Nests are open and cup-shaped and occur in a range of sites.

Varied sittella (*Daphoenositta chrysoptera*)

Zones for application of prescription

All

Prescription

No forestry operations are permitted within a 25-metre radius of all varied sittella nests.

Additional information

The varied sittella inhabits eucalypt forests and woodlands, especially those containing rough-barked and mature smooth-barked gums with dead branches, mallee and *Acacia* woodland. Builds a cup-shaped nest of plant fibres and cobwebs in an upright tree fork high in the living tree canopy, and often re-uses the same fork or tree in successive years.

Black-chinned honeyeater (*Melithreptus gularis*)

Zones for application of prescription

All

Prescription

No forestry operations are permitted within a 25-metre radius of all black-chinned honeyeater nests between 1 June and 31 December.

Additional information

The black-chinned honeyeater inhabits dry open forests or woodlands dominated by box and ironbark eucalypts, but also forests of smooth-barked gums, stringybarks, ironbarks, richer sheoaks and tea-trees. The species nests high in the crown of a tree in the uppermost lateral branches, hidden by foliage.

Turquoise parrot (*Neophema pulchella*)

Zones for application of prescription

Brigalow Belt South, Cobar Peneplain, Darling Riverine Plains, Murray Darling Depression, Nandewar, New England Tablelands, NSW South Western Slopes, Riverina, South Eastern Highlands

Prescription

No forestry operations are permitted within a 30-metre radius of all turquoise parrot nests.

Additional information

Turquoise parrots occur mainly west of the escarpment on the tablelands and western slopes, but are occasionally found more widely through most of eastern NSW, in open woodlands, dry sclerophyll forest and adjacent grasslands. Nests range from 1–20 metres above the ground. They are in hollows in small trees, often dead eucalypts, or in holes or stumps, fence posts or even logs lying on the ground. Nesting season is from August to December and from April to May.

Threatened flora – specific prescriptions

Conditions applying to flora species

Table J: Threatened flora: 50 metre exclusion zone, all individuals

Where there is a record of a species to which this condition applies:

- (a) an exclusion zone with at least a 50 metre radius must be implemented around all individuals
- (b) an exclusion zone at least 50 metres wide must be implemented around all groups of individuals. A group is defined as more than one individual located less than 20 metres apart.

NSW Conservation status*	Scientific name	Common name
VU	<i>Bertya opponens</i>	Coolabah bertya
VU	<i>Cadellia pentastylis</i>	Ooline

*VU: Vulnerable

Table K: Threatened and protected flora: 20 metre exclusion zone, all individuals

Where there is a record of a species to which this condition applies:

- (a) an exclusion zone with at least a 20 metre radius must be implemented around all individuals
- (b) an exclusion zone at least 20 metres wide must be implemented around all groups of individuals. A group is defined as more than one individual located less than 20 metres apart.

NSW Conservation status*	Scientific name	Common name
VU	<i>Boronia granitica</i>	Granite boronia
VU	<i>Eucalyptus caleyi</i> subsp. <i>ovendenii</i>	Ovenden's ironbark
VU	<i>Picris evae</i>	Hawkweed
EN	<i>Pomaderris queenslandica</i>	Scant pomaderris
VU	<i>Rutidosis heterogama</i>	Heath wrinklewort

*EN: Endangered; VU: Vulnerable

Table L: Exclusion of specified forestry activities from 100% of individuals and no buffer

Individuals of the threatened species or protected native plants to which this condition applies must not be picked in the course of carrying out specified forestry activities.

NSW Conservation status*	Scientific name	Common name
-	<i>Goodenia macbarronii</i>	McBarron's goodenia
VU	<i>Thesium australe</i>	Austral toadflax

*VU: Vulnerable

Appendix B: Calculating Minimum Stand Basal Area

- (1) For the purpose of calculating average basal area for compliance purposes:
- (a) the sample points must be located systematically across the harvested area with a minimum inter-point distance of 60 metres;
 - (b) samples must be taken using angle count sampling or fixed area plot measurements;
 - (c) where fixed area plot samples are used, plots must be 50 m x 20 m in size; and
 - (d) the total number of samples to be taken must be in accordance with Table M below.

Table M: Minimum number of sample points required for harvested areas

Size of harvested area (hectares)	Minimum number of sample points required
0–30	20
31–50	30
51–100	40
101–200	50
201+	60

- (2) Further limits:
- (a) all forestry operations must have an average basal area equal to or above the average minimum limit for basal area;
 - (b) the basal area at no more than 25% of sampling points within the harvested area can have a basal area below:
 - i) 5 m²/hectare in Cypress Forests
 - ii) 6 m²/hectare in Western Hardwoods Forests, and
 - (c) no more than 50% of sampling points within the harvested area can be below the minimum basal area as specified in Clause 3.2 (2) (Single Tree Selection and Thinning).

Appendix C: Calculating Forest Regeneration

- (1) For compliance purposes, forest regeneration in Single Tree Selection and Thinning harvest areas will be calculated using the following method:
 - (a) the starting point must be randomly located within the harvest area by selecting it on a map before assessment;
 - (b) the sample points must be located at 20 metre intervals along a square that is 200 metres on each side (Figure 7);
 - (c) samples must be taken using fixed area plot measurements with a plot size of approximately 10 m²;
 - (d) plots must be circular with a minimum radius of 1.8 m radius; and
 - (e) each plot is classed as stocked if any part of the plot area:
 - i. is under the canopy of an existing tree, or
 - ii. contains at least one viable seedling (including new seedlings establishing from seed or lignotubers), or
 - iii. contains 'advanced growth' of an upper canopy species that is assessed as having the vigour or capability of reaching a canopy position.
 - (f) for each square (as per clause 1(b-c), convert the numbers of stocked plots to a simple percentage. Where multiple squares are assessed, the outcomes should be averaged to give an overall assessment of the harvest area.
 - (g) the total number of samples to be taken must be in accordance with Table N below.

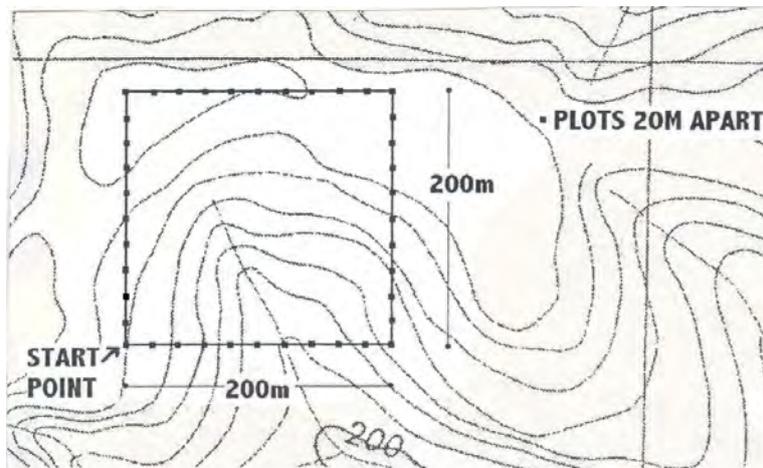


Figure 7: Example of sample point intervals along a square.

Table N: Minimum number of sample points required for harvested areas

Size of harvested area (hectares)	Minimum number of sample points required
0–10	80 (2 squares)
11–50	120 (3 squares)
51–100	200 (5 squares)
101–200	280 (7 squares)
201+	360 (9 squares)

Appendix D: Assessment criteria for Forest Stewardship Plans

Table P: Assessment criteria for Forest Stewardship Plans

Assessment criteria	Assessment consideration	Related Outcomes Statement
Potential impacts on biodiversity conservation at the local and bioregional scales	<ul style="list-style-type: none"> ▪ Important trees, habitat and environmental features are identified and protected: <ul style="list-style-type: none"> – for shelter and food resources for native species, and to support their persistence – To provide refuge, connectivity and to support forest regeneration. ▪ Site-specific measures are implemented to manage long term forest health and habitat for threatened flora and fauna. 	<p>(1) Maintain forest health and regeneration at site and bioregional scales</p> <p>(3) Maintain the persistence of native species at site and bioregional scales</p>
Potential impacts on the environment at the local scale and bioregional scales	<ul style="list-style-type: none"> ▪ Forest regeneration and management actions are monitored and where necessary interventions made to ensure long-term active and adaptive management. ▪ Vegetation adjacent to drainage features and wetlands is managed effectively in the long-term , and groundcover is retained, to maintain water quality, stream stability, riparian habitat and contribute to habitat connectivity. ▪ Water quality and aquatic habitat are maintained through the implementation of best management practices for roads, tracks and crossings. ▪ Areas of soil erosion hazard are identified and managed effectively ▪ The site and any infrastructure no longer required after operations area rehabilitated according to best management practices 	<p>(2) Maintain the productive capacity of the private native forest estate at a site and bioregional scales</p> <p>(4) Maintains water quality and soil health at site and bioregional scales</p>
The likely suitability of the site, and landholder knowledge and capacity to manage potential risk	<ul style="list-style-type: none"> ▪ Site location, access, slopes, etc, support forestry operations without generating unmanageable or cumulative risks at site and landscape scale. ▪ Harvesting operations can be effectively distributed across the landscape and over time and space, to support a mosaic of forest age-classes and maintenance of forest structure across the landscape. ▪ Operator and/or landholder have sufficient capacity to identify and manage risks and implement best practice forest management. 	<p>(1) Maintain forest health and regeneration at site and bioregional scales</p> <p>(5) Build landholder capacity to deliver best practice forest management</p>
Aboriginal values, places and practices	<ul style="list-style-type: none"> ▪ Site-specific measures ensure the appropriate management, protection and persistence of Aboriginal places and practices ▪ Site specific measures help foster connection and collaboration within Aboriginal communities and/or between Aboriginal communities and landholders ▪ Site specific measures help improve our knowledge of Aboriginal forest management 	<p>(2) Maintain productive capacity of the private native forest estate at a site and bioregional scales</p> <p>(5) Build landholder capacity to deliver best practice forest management</p>
Research, innovation and industry development	<ul style="list-style-type: none"> ▪ Site specific measures encourage active and adaptive management ▪ Site specific measures help improve our knowledge of silviculture and forest ecology ▪ Site specific measures help facilitate innovation and industry development 	<p>(5) Build landholder capacity to deliver best practice forest management.</p> <p>(6) Support the economic resilience of landholders and regional communities.</p>
Relevant legislation	Consideration of relevant legislative requirements.	

Glossary

Expressions that are defined in the *Local Land Services Act 2013* and *Local Land Services Regulation 2014* have the same meanings in this Code as the meanings given to them in that Act and Regulation, unless they are otherwise defined in this Code. All other expressions are defined as in this glossary.

Accidentally felled	A tree is accidentally felled into any area of land only if it is apparent that techniques of directional felling were used in an attempt to fell the tree away from the area. Despite the above, a tree is not accidentally felled into an area if the person responsible knew or could reasonably have been expected to know that the tree would fall into the area.
Armoured	A protective surface that is resistant to erosion or displacement by machinery or vehicles.
Basal area	The sum of cross-sectional area of trees that are greater than 10 centimetres in diameter at breast height (DBH). Basal area is measured at breast height and in square metres per hectare (m ² /ha)
Batter	An earth slope formed from fill material (fill batter) or cut into the natural hillside (cut batter) during road construction.
Bioregion	An Interim Biogeographic Regionalisation for Australia (IBRA) region as defined by <i>Summary Report Revision of the Interim Biogeographic Regionalisation for Australia and Development Version 5.1</i> .
Blading off	The removal of surface soil from a track or road in wet conditions to expose a drier or firmer surface for use by machinery
Cliff	A rocky slope steeper than 70 degrees, more than three metres high and more than 10 lineal metres.
Crossing	A structure designed to allow the crossing of a drainage feature and is either a track crossing or road crossing.
Debris	Tree head, tree offcuts or bark that have resulted from a forestry operation.
Diameter at breast height over bark (DBHOB)	The diameter of a tree measured at 1.3 metres above the ground. Measurements are made over the bark and horizontal to the trunk.
Directional felling	The felling of a tree so it falls in a pre-determined direction.
Dispersible soil	A structurally unstable soil which readily disperses into its constituent particles (clay, silt, sand) in water.
Drainage depression	A shallow depression with smoothly concave cross-section that conveys runoff only during or immediately after periods of heavy rainfall.
Drainage feature	A drainage depression, drainage line, river or watercourse.

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Drainage line	<p>A channel down which surface water naturally concentrates and flows. Drainage lines exhibit one or more of the following features which distinguish them from drainage depressions:</p> <ul style="list-style-type: none">• evidence of active erosion or deposition, e.g. gravel, pebble, rock, sand bed, scour hole or nick point• an incised channel more than 30 centimetres deep with clearly defined bed and banks• a permanent flow.
Drainage structure	<p>A structure designed to convey water away from a road, track or area of soil disturbance.</p>
Earth windrow	<p>A mound of soil material or gravel on the edge of a road or snig track formed by the spillage from the edge of a blade or similar machine during earthmoving operations.</p>
Exclusion zone	<p>An area of land within a specified distance of landscape features identified in Table D, where forestry operations are prohibited, unless otherwise allowed under this Code.</p>
Extraction track	<p>A track constructed for use by forwarding machinery.</p>
Food resource trees	<p>Trees with recent V-notch incisions or other incisions made by a yellow-bellied glider or squirrel glider. Recent incisions are incisions less than two years old as evidenced by the fact the incision has not closed.</p>
Forest	<p>An area dominated by trees with a mature stand height exceeding 2 metres, overstorey crown cover of greater than 20%.</p>
Forestry operations	<p>Forestry operations means:</p> <p>(a) logging operations – namely the cutting and removal of timber from land for the purpose of timber production, or</p> <p>(b) the harvesting of forest products – namely the harvesting of the products of trees and other vegetation (other than timber) that are of economic value, or</p> <p>(c) ongoing forest management operations – namely activities relating to the management of land for timber production such as thinning, burning and other silvicultural activities, or</p> <p>(d) ancillary activities to enable or assist in the above operations such as the provision of roads, snig tracks, waterway crossings and temporary timber storage facilities.</p>
Girders	<p>High quality logs used in a round or flat faced form to support a deck such as a bridge or wharf or as large end section, heart-free, sawn timber suitable for heavy construction.</p>
Groundcover	<p>Natural or artificial material which covers the ground surface and has the effect of reducing erosion.</p>
Gully stuffer	<p>A drainage feature crossing formed by filling the drainage feature with trees, debris, spoil, soil, rock or other material to the level of the road or track.</p>
Habitat tree	<p>A tree retained for habitat purposes under this Code.</p>

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Harvesting operations	<p>Harvesting operations include:</p> <ul style="list-style-type: none">• timber felling, snigging and extraction• construction and maintenance of log landings, snig tracks and extraction tracks.
Heathland	<p>Areas dominated (covers more than 50% of the area) by shrubs generally less than 2 metres tall at maturity.</p>
Highly erodible soil	<p>A soil where the particles are readily detached and transported by erosive forces. The presence of these soils may be identified by evidence of existing erosion (gully or rill erosion), or by commonly known problem soil types, e.g. some coarse-grained granites.</p>
Incised channel	<p>A channel more than 30 centimetres deep with clearly defined bed and banks.</p>
Inundation	<p>Flooding of the forested area by water overflowing the banks of a river.</p>
Koala Scat	<p>A scat a with a strong eucalyptus odour, pale green in colour with faint or clear ridges and/or vertical stripes, and a moist mucus coating, and bullet shaped appearance found either above the leaf litter, or less than 50mm below the leaf litter.</p>
Landholding	<p>A single or several parcels of land (whether held under the same title, different titles or different kinds of titles) that constitute or are worked as a single property and that are contiguous with one another or are separated from one another only by a road, river, creek or other watercourse.</p>
Log landing	<p>An area (usually cleared) where timber products are assembled for processing and sorting before being loaded onto a truck.</p>
Mass movement	<p>The downslope movement of greater than 10 cubic metres of soil, where gravity is the primary force or where no transporting medium such as wind, flowing water or ice is involved.</p>
Net harvestable area	<p>The defined area under the Forest Management Plan or Forest Stewardship Plan where harvesting is permitted in accordance with the Code.</p>
Old grey	<p>A late-mature/over-mature cypress tree that regenerated before the 1890s and which has bark that is bleached to a characteristic light grey colour and that is weathered to a smoother surface texture than is typical of younger trees.</p>
Old growth forests	<p>Ecologically mature forest where the effects of disturbance are now negligible. This includes an area of forest greater than 5 hectares where:</p> <ul style="list-style-type: none">• the overstorey is in late to over-mature growth stage with the presence of relatively large old trees (many containing hollows and often with the presence of dieback or dead branches in the crown)• the age (growth) structure of the stand measured as relative crown cover consists of less than 10% of regeneration and advance growth and more than 10% of late to over-mature (senescent) growth• the effects of unnatural disturbance are now negligible. <p>Old growth woodlands west of the Great Dividing Range, while comprising a characteristic canopy of late to over-mature trees (many with hollows), may comprise a woodland structure with less diverse or often shrubby understorey and a groundcover of grasses and herbs.</p>

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PNF koala prescription mapped areas	Areas of contiguous forest identified in Figures 3 – 4, dominated by non-planted native trees species with an average stand height of 2 metres or more, and an overstorey canopy cover of 20% or more, at elevations of 800 metres or less above sea level and with a minimum patch size of 2 hectares or greater.
Portable mill site	A site where a portable mill (easily movable milling equipment) operates.
Posts	Term generally used to describe posts in round or split form used for fencing.
Prescribed Stream	Stream listed in the Major Rivers database of the Assessment Methodology database available at the DPE webpage.
Pulp logs	Logs cut and prepared primarily to produce wood pulp for the manufacture of reconstituted products including paper and panel board.
Regeneration management actions	Forest management techniques that promote forest regeneration after forestry operations including replanting (including tube-stock), minimising or removing grazing pressure, seeding, weed management, fire management and mechanical soil disturbance.
Relevant legislative requirements	Requirements relating to the carrying out of forestry operations on private land contained in the <i>Biodiversity Conservation Act 2015</i> , <i>Environmental Planning and Assessment Act 1979</i> , <i>Fisheries Management Act 1994</i> , <i>Local Land Services Act 2013</i> and <i>Protection of Environmental Operations Act 1997</i> .
Riparian exclusion zones	Those areas within the distances specified for 'Drainage feature' as listed in Table G where forestry operations are not permitted, unless otherwise allowed by this Code.
Riparian protection measures	Actions that assist in maintaining and protecting riparian areas including revegetation (including tube-stock, native grasses and seed distribution), the placement of artificial erosion control measures such as matting, mulch or geotextiles, and the removal or minimisation of grazing pressures.
Road	Any route used for vehicular access to, and the transport of logs from, the point of loading (log landing) within the forest area.
Road prism	That part of the road from the inflexion point at the toe of the fill batter to the inflexion point at the top edge of the cut batter. Where there is no cut or fill batter as part of the road, the road prism is to be taken from the outside edge of the table drain on either side of the road.
Rocky outcrops	A 'rocky outcrop' has an area of 0.2 hectares or larger, where 70% or more of the surface is composed of exposed boulders of more than 0.6 of a metre in diameter and accompanied by skeletal soils.
Rollover bank	A crossbank constructed with a smooth cross-section and gentle batters, which is well-compacted to provide permanent vehicular trafficability.
Saturated soil	The physical condition of soil where no more moisture can be absorbed or accepted.
Sawlog	Log of a species suitable for processing through a sawmill into solid timber products.
Significant forest disturbance event	An event that impacts and changes the ecological condition of a forest or environmental value associated with that forest in a manner that risks meeting ESFM outcomes. Recovery is unlikely to occur without interventions, risking maintaining ESFM forest value outcomes over a range of spatial scales across the short to long term. Disturbance events can include (but are not limited to) prolonged drought, wildfire, mass tree dieback or a biosecurity event.

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Silvicultural operations	The activities associated with the management of trees within a forest for the purpose of meeting sustainable long-term productivity objectives, including thinning, single tree selection and creation of canopy openings.
Single tree selection	A harvesting operation where the trees harvested are either single trees or small groups of trees. For the purposes of this Code, single tree selection operations will not create canopy openings.
Skeletal soils	Thin soils which present a barren, inhospitable surface to vegetation.
Snig track	A track used by snigging or skidding equipment.
Spoon drain	A drain with a semi-circular cross-section, which has no associated ridge of soil. Its capacity is solely defined by the excavated channel dimensions.
Stand basal area	Stand basal area is the sum of the basal area of all trees within a stand expressed in square metres per hectare (m ² /ha).
Stand height	Mean height of the dominant trees in the stand. Measurement of stand height must conform to methods described in approved guidelines.
Stick Nest	A collection of sticks in the branches, fork, trunk and or head of a live or dead tree that, when combined, form a nest that is greater than 50 centimetres in diameter.
Stocking level	A measure of the frequency of occurrence of tree stems assessed as being capable of growing to canopy level. Measurement of stocking levels must conform with methods described in Appendix C.
Suitably qualified expert	Suitably qualified expert means a person with a minimum undergraduate qualification in natural sciences, ecology, environmental management, forestry or similar from a university and with a minimum 3 years' experience in environmental assessment.
Thinning	A silvicultural practice where some trees are removed in order to increase the growth rates of retained trees.
Threatened populations	Population of a particular species listed in Division 3 of Part 1, Division 4 of Part 2 or Division 4 of Part 3 of Schedule 1 to the <i>Biodiversity Conservation Act 2016</i> as in force from time to time.
Threatened species	Threatened species within the meaning of the <i>Biodiversity Conservation Act 2016</i> as in force from time to time that also meets paragraph (d) of the definition of species with the meaning of that Act as in force from time to time.
Timber products	Commercial timber products removed from or felled within the forest, including but not limited to sawlogs, veneer logs, poles, girders, piles and pulp logs.
Veneer log	High quality logs that are rotary peeled or sliced to produce sheets of veneer.
Walkover techniques	Timber extraction or snigging without removing or unduly disturbing the existing natural groundcover, i.e. where no snig track construction involving soil disturbance is required.
Wet summer	Summer with above average rainfall persisting through the summer period.
Wetland	Includes any shallow body of water (such as a marsh, billabong, swamp or sedgeland) that is: <ul style="list-style-type: none">• inundated cyclically, intermittently or permanently with water, and• vegetated with wetland plant communities.

Attachment 3 – Objects of the Local Land Services Act 2013

Local Land Services Act 2013 No 51

Part 5B Private native forestry – 60ZR – Objects of Part

The objects of this Part are:

- (a) to authorise the carrying out of private native forestry in accordance with principles of ecologically sustainable forest management [see **Attachment 3**], and
- (b) to protect biodiversity and water quality (including threatened species, populations and ecological communities under Part 7A of the *Fisheries Management Act 1994*) in connection with private native forestry operations, and
- (c) to enable landholders to carry out forestry operations in a sustainable manner in areas of the State to which this Part applies, and
- (d) to ensure that differences between private native forestry and native forestry operations in State forests or other Crown-timber land are recognised, including in the application of protocols, codes, standards and other instruments.

Attachment 4 - Principles of Ecologically Sustainable Forest Management

Local Land Services Act 2013 No 51

Part 5B Private native forestry – 60ZQ – Definitions: Part 5B

- (1) In this Part – principles of ecologically sustainable forest management means the following:
- (a) maintaining forest values for future and present generations, including—
 - (i) forest biological diversity, and
 - (ii) the productive capacity and sustainability of forest ecosystems, and
 - (iii) the health and vitality of native forest ecosystems, and
 - (iv) soil and water quality, and
 - (v) the contribution of native forests to global geochemical cycles, and
 - (vi) the long term social and economic benefits of native forests, and
 - (vii) natural heritage values,
 - (b) ensuring public participation, provision of information, accountability and transparency in relation to the carrying out of forestry operations,
 - (c) providing incentives for voluntary compliance, capacity building and adoption of best-practice standards,
 - (d) applying best-available knowledge and adaptive management processes to deliver best-practice forest management,
 - (e) applying the precautionary principle (as referred to in section 6(2)(a) of the *Protection of the Environment Administration Act 1991* [see below]) in preventing environmental harm.

Protection of the Environment Administration Act 1991

Part 3 Objectives of the Environment Protection Authority

(6) Objectives of the Authority:

(2) For the purposes of subsection (1)(a), ecologically sustainable development requires the effective integration of social, economic and environmental considerations in decision-making processes. Ecologically sustainable development can be achieved through the implementation of the following principles and programs:

(a) the precautionary principle—namely, that if there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation.

In the application of the precautionary principle, public and private decisions should be guided by—

- (i) careful evaluation to avoid, wherever practicable, serious or irreversible damage to the environment, and
- (ii) an assessment of the risk-weighted consequences of various options.

Attachment 5 – Criteria for assessing fulfilment of requirements

Assessment scale for principles of ESFM

Overall assessment	Criteria	Action
Sufficiently met in code	1. The relevant code prescriptions are highly likely to manage short-term risks of forestry operations at the site scale and maintain ESFM principles in the long-term.	Limited scope for actions or improvements.
	2. The relevant code prescriptions are likely to manage short-term risks of forestry operations at the site scale and maintain ESFM principles in the long-term.	Some scope for actions or improvements to better manage risks and improve outcomes.
Not sufficiently met in code	3. The relevant code prescriptions are unlikely to manage short-term risks of forestry operations at the site scale and maintain ESFM principles in the long-term.	Substantial actions or improvements are necessary in order to manage risks and improve outcomes.
	4. The relevant code prescriptions are highly unlikely to manage short-term risks of forestry operations at the site scale and maintain ESFM principles in the long-term.	Major actions or improvements are essential in order to manage risks and improve outcomes.
Not applicable	5. Requirement does not have to be met.	No further action currently required

Assessment scale for response to OCSE recommendations

Score	Description	Action
Sufficiently met	Response fully addresses the OCSE recommendation.	No further improvements to the draft codes
	Response mostly addresses the OCSE recommendation.	Some actions or improvements to the draft codes
Not sufficiently met	Response partially addresses the OCSE recommendation.	Substantial actions or improvements to the draft codes
	Response does not address the OCSE recommendation.	Major actions or improvements to the draft codes
Not applicable	Requirement does not have to be met.	No further action currently required to the draft codes.

Attachment 6 – Assessment of LLS response to OCSE recommendations

OCSE rec (summary)	Key amendments	Assessment
<p>2 DPI Forestry Science, LLS, EPA and EES should collaborate on koala habitat maps to ensure consistency in mapping products for regulators and landholders and find solutions for uncertainty and inconsistencies.</p>	<p>Commission has led a collaborative approach to develop a fit-for-purpose interim PNF Koala Prescription Map</p>	<p>Sufficiently met</p> <p>The LLS initial response did not fulfil OCSE Recommendation 2, which requests LLS to work with other agencies to ensure a consistent approach to mapping products. Although LLS made adjustments to the mapping, there were outstanding issues regarding the koala habitat mapping approach that need to be resolved collaboratively. The Commission has since worked with scientists from DPE EES and DPI Forest Science Unit to develop a fit-for-purpose interim PNF Koala Prescription Map. Additional collaborative efforts will take place in the next 12 months to further refine and field validate the mapping.</p>
<p>3 Median and mean values for basal area are important. 50% of land should remain at a basal area above the average minimum basal area.</p>	<p>Code updated to ensure no more than 50 percent of sampling points within the harvested area can be below minimum basal area.</p>	<p>Sufficiently met</p> <p>The updated clause proposed by LLS addresses OCSE Recommendation 3, and text in the draft PNF code has been further refined to improve clarity. It may be beneficial for LLS to develop guidance material to help landholders comply with this requirement.</p>
<p>4 (i) There are no cumulative or scale limits to the area under PNF plans in a region, and the landholder can harvest at any time during the 15 years approval. This does not encourage approaches such as mosaic harvests that maximise undisrupted habitat.</p> <p>i) A ceiling level of habitat that can be forested from each Area of Regional Koala Significance (ARKS) should be agreed to stop wide-spread, contiguous, coincident, high-impact forestry in a region.</p>	<p>LLS can request forestry operations are rescheduled to help ensure harvest operations are distributed over time and space.</p> <p>There are scale-based limits for Forest Management Plans – larger scale operations require additional assessment and approval processes via a Forest Stewardship Plan.</p> <p>New provision allowing for a response where an unforeseen event has caused serious or irreversible environmental damage.</p>	<p>Sufficiently met</p> <p>The draft PNF code does not specify a ceiling level of harvesting in each ARKS or other regional scale. That said, the Commission has concerns about the implications of this approach, such as how to maintain equity between landholders, risk of perverse outcomes whereby landholders are incentivised to harvest to ensure their actions are within any set limits and impacts on landholder consistency and certainty.</p> <p>While there are no cumulative or regional limits to the area under PNF plans, the draft PNF code has been updated such that LLS can require forestry operations be rescheduled to help ensure harvest operations are distributed over time and space. The Minister and LLS can also respond to major disturbance events if there is a risk of serious or irreversible environmental impact. If LLS determines risks cannot be mitigated or managed under the code or an Forest Stewardship Plan, LLS can suspend or reschedule forestry operations. The EPA CEO can also write to the LLS CEO and recommend the Ministerial review clause is triggered in response to a significant bioregional-scale disturbance. LLS is developing a process to guide the assessment of cumulative PNF impacts. In addition, for plans above the specified Net Harvestable Area limits a Forest Stewardship Plan is required, and the proposed plan is subject to approval by LLS informed by an independent expert panel assessment against set criteria.</p> <p>The Commission also notes that high impact forestry types are not allowed. Small scale and single tree selection are typically recognised as being lower intensity compared with other harvesting approaches like alternate coupe selection in south coast state forests. Australian Group Selection is allowed, but again is less intensive compared to intensive harvesting on north coast state forests.</p>

OCSE rec (summary)	Key amendments	Assessment
<p>4 (ii) (ii) PNF Plans, FMPs and FSPs should be informed by broader scale considerations and mapping including accounting for habitat beyond the landowner's property, including koala habitat (moderate, high and very high suitability), location of Areas of Regional Koala Significance (ARKS), presence of neighbouring cleared land on farms, PNF approvals on neighbouring land and neighbouring forests, and cumulative impacts.</p>	<p>Forest Management Plans and Forest Stewardship Plans must show landscape features adjacent to the PNF plan area.</p> <p>LLS can request forestry operations are rescheduled to help ensure harvest operations are distributed over time and space.</p>	<p>Sufficiently met</p> <p>The final draft PNF code requires that Forest Management Plans and Forest Stewardship Plans show landscape features adjacent to the PNF plan area, including forested areas, recorded locations of any threatened populations or threatened ecological communities, areas mapped as highly suitable koala habitat, wetlands and drainage features, and areas of outstanding biodiversity values. This accounts for habitat beyond the landowner's property, thus addressing OCSE Recommendation 4(ii). Slope angles should also be included in plan mapping where feasible.</p> <p>The draft PNF code does not require information about PNF approvals on neighbouring land or written information on cumulative impacts. LLS does not circulate private landholder details to third parties without written consent. Instead, the onus is on LLS to check and consider cumulative impacts rather than the landholder, and LLS can now request forestry operations are adjusted temporally to help ensure harvest operations are distributed over time and space (see OCSE Recommendation 4(i)).</p>
<p>4 (iii) (iii) The outcomes of PNF should be monitored, and the relevant maps kept up to date.</p>	<p>Code amended to establish need for PNF MER framework and require monitoring of regeneration.</p>	<p>Sufficiently met</p> <p>The final draft PNF code establishes the need for a PNF MER framework, which will deliver landscape scale monitoring of outcomes and impacts (see also OCSE Recommendation 4(i) regarding additional ability to respond to cumulative PNF impacts). The PNF MER framework will also ensure other relevant mapping or will be kept up to date. This improves the monitoring of outcomes compared to previous arrangements, thus partly fulfilling OCSE Recommendation 4(iii).</p> <p>It also requires that forest regeneration be monitored at 2, 6 and 10 years after a regeneration event (see OCSE Recommendation 8).</p> <p>LLS have indicated they intend to use reported harvesting information to model the harvesting impacts.</p>

OCSE rec (summary)	Key amendments	Assessment
<p>5 The following attributes should be built into (or alongside) the habitat suitability mapping approach:</p> <ul style="list-style-type: none"> i. Identify and address mapping issues, e.g. disagreement between EES and DPI maps for very high suitability. ii. Include both high and moderate suitability koala habitat iii. Include koala corridors or connectivity structures iv. Map and include areas of drought and bushfire refugia for koalas (work by EES) v. Areas of Regional Koala Significance (ARKS) should include koala prescriptions vi. Use Koala Likelihood mapping to help interpret suitability maps where threshold suitability scores are not met and there is no, limited or low confidence in koala data. 	<p>The Commission has worked with scientists from DPE EES and DPI Forest Science Unit to develop a fit-for-purpose interim PNF Koala Prescription Map including high and very high suitability habitat.</p> <p>Koala tree retention requirements increased to 15 primary + 5 secondary feed trees per hectare, compared with 10 primary + 5 secondary feed trees per hectare previously.</p> <p>Preferred minimum diameter at breast height over bark for retained koala trees reduced from 30 to 20 centimetres.</p> <p>Koala use tree list replaced with koala feed tree list.</p>	<p>Sufficiently met</p> <p>The Commission has worked with scientists from DPE EES and DPI Forest Science Unit to develop a fit-for-purpose interim PNF Koala Prescription Map (fulfilling OCSE Recommendation 5(i)). LLS adopted both moderate and high suitability habitat in their koala habitat mapping but concerns over the accuracy of mapping of moderate habitat has led the Commission to remove moderate habitat from the koala habitat mapping (thus fulfilling a part of OCSE Recommendation 5(ii)). Further, the Government's policy objective in PNF is to provide 'robust protections for koalas in high value koala habitat', not moderate and high value habitat.</p> <p>LLS have increased the koala tree retention requirements within the final draft PNF code to 15 primary + 5 secondary feed trees per hectare (where available), compared with 10 primary + 5 secondary feed trees per hectare previously. This aligns with the OCSE recommendations and Government's objective. The Commission agrees that a 20 centimetre minimum diameter for retained trees is acceptable based on recent research on species composition and use of smaller trees. LLS also replaced koala use tree list with koala feed tree list.</p> <p>OCSE Recommendation 5(iii): LLS indicates that the Forest Management Plans and Forest Stewardship Plans have to provide mapping showing forested areas and key landscape features, including highly suitable koala habitat. Enhanced riparian exclusions will also aid koala movement through the landscape.</p> <p>OCSE Recommendation 5(iv): use of EES koala drought and bushfire refugia work not specified.</p> <p>OCSE Recommendation 5(v): no application of koala prescriptions in all ARKS.</p> <p>OCSE Recommendation 5(vi): use of koala likelihood mapping not specified.</p> <p>As a priority, remaining outstanding issues around koala habitat mapping will be resolved collaboratively. This includes outstanding issues or opportunities for improvement identified in OCSE Recommendation 5.</p>

OCSE rec (summary)	Key amendments	Assessment
<p>6 Amendments to scat triggers:</p> <ul style="list-style-type: none"> i. the presence of koala scats should again trigger koala tree retention prescriptions ii. one rather than 10 scats in Southern Coastal region should trigger a prescription iii. the number of scats in the RGbSAT survey should match trigger values for scat numbers for that PNF Code. 	<p>The presence of 10 or more koala scats under a primary koala use tree triggers koala tree retention prescriptions.</p> <p>Scat trigger in the South Coast KMA has been reduced to one or more for both the exclusion zone and tree retention prescription.</p>	<p>Sufficiently met</p> <p>OCSE Recommendation 6(i) is fulfilled as a scat trigger for tree retention has been reinstated. The Commission notes, however, that the proposed trigger is higher than the existing requirement – 10 scats are now required under a primary or secondary food tree.</p> <p>Regarding OCSE Recommendation 6(ii), the one scat trigger for the south coast has now been applied for the exclusion zone prescription and the tree retention prescription.</p> <p>OCSE Recommendation 6(iii) is no longer relevant as the focus has shifted to habitat verification surveys, as outlined in the koala prescriptions in Appendix A (refer to Note 9).</p>
<p>7 At least two surveys methods should be employed for any form of monitoring and/or surveying at a site. The PNF Code should require two methods and to use the guidance in the NSW Koala Monitoring Framework.</p>	<p>The dispute resolution process now focuses on confirmation of whether suitable koala habitat is present, not the presence or absence of koalas.</p>	<p>Not applicable</p> <p>It is important to clarify that the surveys in Appendix D are being conducted because the landholder believes the koala habitat mapping is incorrect. As such, the Commission’s position is that the dispute resolution process should focus on confirmation of whether suitable <u>koala habitat</u> is present, not the presence or absence of koalas. This distinction is now made clear in the final draft PNF code.</p>
<p>8 PNF should not reduce koala habitat suitability and value in the landscape. An approach to deliver on this should be agreed, and could include enhanced regeneration provisions to maintain the species composition in harvested areas. By 7 years (one koala generation) after harvesting, the habitat should have the same (or higher) koala suitability score as pre-harvest.</p>	<p>Landholders must monitor regeneration in harvested areas at 2, 6 and 10 years post-regeneration event, consider forest composition, and must implement regeneration management actions if required.</p>	<p>Sufficiently met</p> <p>The draft PNF codes now specify that regeneration and composition must be monitored at 2, 6 and 10 years after a regeneration event, and that where the forest is not regenerating in a way that maintains (or improves on) preharvest forest conditions, landholders must implement regeneration management actions as described in the Glossary. This meets the intent of OCSE Recommendation 8.</p> <p>The Commission notes that maintaining a suitable mosaic of forest structure is also important for other forest-dependent species – e.g. hollows for arboreal mammals.</p>

OCSE rec (summary)	Key amendments	Assessment
<p>9 There is not sufficient evidence to demonstrate that the koala prescriptions as set out in the proposed PNF Codes will provide suitable protection for koalas given the increased intensity of harvesting allowed. The stand basal area average minimum values should be increased until proportionate protections and procedures for koalas are included, and their beneficial effect can be demonstrated, in particular in the Areas of Regional Koala Significance (ARKS).</p>	<p>Basal area for single tree selection and thinning and small scale harvesting increased to 14 m2/ha in Northern NSW.</p>	<p>Sufficiently met</p> <p>In the Northern code, the basal area limits for single tree selection and thinning and small scale harvesting within Forest Management Plans increased from the consultation draft of 10 m2/ha to 14 m2/ ha. Basal areas remain unchanged in the Southern, River Red Gum, Western Hardwood and Cypress Forests draft PNF codes. The proposed amendments in the Northern region meet OCSE Recommendation 9.</p> <p>The Commission notes that basal areas limits can be varied within Forest Stewardship Plans down to 10 m2/ha in the Northern, Southern and River Red Gum regions, but this must be approved by LLS following an independent expert panel review of the potential impacts of the proposed activities. During this process the expert panel can request additional assessments and surveys if necessary, as well as specify additional protections that may be required as a condition of approval.</p> <p>Importantly, the Codes provide increased proportionate protections for koalas – namely increased koala feed tree retention of 20 trees per hectare over some 2.8 million hectares as well as other protections including mandatory spotting requirements.</p> <p>OCSE’s recommendation refers to a lack of evidence that the proposed koala prescriptions will provide suitable protection for koalas given the intensity of harvesting allowed. The PNF MER framework should address these knowledge gaps over time. There is also recent research that indicated that selective harvesting at the treatment sites on state forests did not negatively impact koala populations.</p>
<p>10 A standard policy approach for PNF and other forestry that if forestry limits and restrictions are being relaxed (such as increased harvest volumes or lower basal area limits), there should be increased protections or risk mitigation (such as increased regulatory protections, planning rigour, environmental set asides/offsets, and/or pre- and post-harvest monitoring).</p>	<p>Basal area for single tree selection and thinning and small scale harvesting increased to 14 m2/ha in Northern NSW.</p> <p>Noted the LLS Act provides for differences between PNF and operations on public land.</p>	<p>Not applicable</p> <p>This is a policy issue that sits outside of the PNF codes.</p> <p>The NSW Government’s current policy objectives are to provide for certainty and consistency for landholders and protection of koalas in areas of high-value koala habitat.</p>

Attachment 7 – Assessment against Principles of ESFM

Principle		Assessment
(a)	<p>maintaining forest values for present and future generations</p> <p>(i) forest biological diversity</p>	<p>Sufficiently met</p> <p><i>Mosaic of forest type and structure:</i></p> <p>Small scale, selective harvesting and Australian Group Selection methods, while relatively low intensity, may impact forest biology over the long-term or large spatial scales without active monitoring and intervention. Post-harvest regeneration should therefore be monitored and managed to ensure that forests are likely to maintain their biological diversity following PNF activities. The final draft PNF codes include mandatory monitoring and management of regeneration composition and condition. The codes also allow for landholders to seek to vary code provisions under a Forest Stewardship Plan where necessary to manage impacts or improve outcomes following a significant disturbance event, including to improve regeneration outcomes.</p> <p>LLS can also require forestry operations be rescheduled if operations are underway on adjacent properties to minimise impacts on forest mosaics, or where an unforeseen event may cause significant or irreversible harm to environmental values (see Principle (e) for further discussion).</p> <p><i>Habitat fragmentation</i></p> <p>The final draft PNF codes require that planning identifies and retains landscape features that contribute to landscape connectivity, including forested areas and high suitability koala habitat. The code requires that planning considers land adjacent to the PNF area in identifying existing and potential corridors. However, the home ranges of forest-dependent species can be large. Identifying areas contributing to landscape-scale connectivity and climate refugia requires a regional scale understanding of forest distribution. As such, LLS could maintain a regional scale map of forest extent and potential corridors to inform PNF planning and assess the impact of PNF proposals to habitat connectivity.</p> <p>Enhanced riparian exclusions will strengthen landscape connectivity and aid fauna dispersal and movement through the landscape.</p> <p><i>Forest-dwelling species</i></p> <p>The final draft PNF codes have provisions for hollow-bearing trees, recruitment trees, food resource trees, roost trees, and nest trees are defined as habitat trees. They also support habitat outcomes by protecting landscape features of environmental significance, including by excluding operations from areas of outstanding biodiversity value, old growth forests, wetlands and riparian exclusion zones. Planning requires the identification and protection of known records or site evidence of threatened species populations or ecological communities. LLS have updated the Appendix A (Listed species ecological prescriptions) of the final draft PNF codes based on expert advice and agency feedback since late 2019 including. Some species have been removed where general provisions, including enhanced riparian zones, now provide similar protections as previous species-specific prescriptions. In other cases, new species have been included, including bird and frog species, with new protections. There have been other adjustments such as exclusions around large stick nests and retention of coarse woody debris for species such as reptiles.</p> <p>Regarding koala protection, the draft PNF codes apply tree retention prescriptions across mapped koala habitat. This mapping focuses on high- and very high-suitability habitat, and higher tree retention rates of 15 primary and 5 secondary feed trees (where available) are applied in these areas. Where koala habitat mapping is disputed by a landholder, koala habitat verification surveys may be conducted.</p>

Principle	Assessment
(ii) the productive capacity and sustainability of forest ecosystems	<p>Sufficiently met</p> <p>The yield of timber products from an area of forest must be at a level that ensures the ongoing function of the forest ecosystem. The final draft PNF codes have simplified the basal area retention requirements by making them consistent across a range of different forest types. Expert advice supports a lower basal area retention rate to improve long-term productivity and sustainability and to guard against “high grading”. A conservative minimum threshold has been set for the Northern region of 14 metres squared per hectare for Forest Management Plans.</p> <p>The basal areas limits can also be varied within Forest Stewardship Plans down to 10 m2/ha in specified regions at the landholder’s request. These variations must be approved by LLS following an independent expert panel review of the potential impacts of the proposed activities. During this process the expert panel can request additional assessments and surveys if necessary, as well as specify additional protections that may be required as a condition of approval.</p> <p>Ongoing research and monitoring will be in place under a PNF MER framework to check the resulting yield is sustainable for the range of ecosystem goods and service in each of the forest types (e.g., soil organic carbon).</p> <p>The uncertainty regarding regeneration on private land (discussed above in Principle (a)(i)) also applies to this Principle. The calculation of sustainable yield generally assumes natural regeneration. The final draft PNF codes include provisions that ensure both adequate restocking and suitable composition of regeneration in harvested areas in a timely manner.</p>
(iii) the health and vitality of native forest ecosystems	<p>Sufficiently met</p> <p>A variety of agents and processes such as fire, pests, weeds, disease and insect infestations can affect forest ecosystem health and vitality. PNF planning requires the identification of the presence of pests and weeds and details of proposed pest and weed management actions (where applicable). The pest and weed management clause in the final draft PNF codes notes that landholders may manage pest plants and animals on land to which a PNF Plan applies and that any such management is to be carried out in accordance with all applicable legal requirements (noting that pest plant and animal management governed under the Biosecurity Act).</p> <p>There are, however, considerable potential risks that large-scale events such as wildfire, such as those experienced in 2019/20, that can severely impact upon forest ecosystem and health. There is now provision in the regulatory framework for the suspension of PNF forest operations in such an instance – this is discussed further under Principle (e) precautionary principle. A range of provisions may also be varied within Forest Stewardship Plans in response to a large-scale disturbance event, subject to LLS approval informed by an independent expert panel assessment.</p>
(iv) soil and water quality	<p>Sufficiently met</p> <p>Planning and operational prescriptions are used to manage risks to soil and the hydrological functions of forests. The final draft PNF codes have protections for wetlands, as well as enhanced stream protections via expanded riparian exclusion zones that apply to both mapped and unmapped streams. These riparian exclusion zones vary depending on the region and stream class or type and offer an appropriate level of protection given the range of PNF activities permitted under the codes. The final draft PNF codes include expanded harvest exclusion zones in most cases compared with the existing codes. They are also easier to implement and enforce in the Northern and Southern region as riparian buffer zones (which allow harvesting within limits) have been removed and replaced with a single expanded riparian exclusion zone.</p> <p>They also require the identification and mapping of steep slopes, dispersible and highly erodible soils and areas of mass movement, the indicative location of details of forest access, including any necessary construction, upgrading or maintenance of forest roads and drainage feature crossings</p>

Principle	Assessment
	<p>and the indicative location of log landings and portable mill sites. Operational exclusion conditions apply to identified areas of soil risk. The North Coast code has seasonal limitations to avoid machine operation during high compaction risk periods.</p> <p>Section 7 provides detailed controls on the planning, design, construction and maintenance of infrastructure including roads, culverts and landing sites associated with PNF operations. Riparian exclusion zones must also be identified in the preparation of Forest Management Plans and Forest Stewardship Plans.</p> <p>The slope of the land is a key design criterion guiding the design and construction of roading infrastructure. Slope angles should also be included in PNF plans where feasible to assist in assessment against the code.</p> <p>The road construction provisions are very detailed and may be difficult for landholders to interpret without additional guidance.</p> <p>Any variation of these provisions following a large-scale disturbance is subject to LLS approval informed by an independent expert panel assessment. During this process the expert panel can request additional assessments and surveys if necessary, as well as specify additional protections that may be required as a condition of approval.</p>
<p>(v) the contribution of native forests to global geochemical cycles;</p>	<p>Sufficiently met</p> <p>NSW forests contribute to the global carbon cycle. Management of forest on private land including PNF operations can affect the global greenhouse gas balance. The carbon dimensions of forest management are likely to become increasingly important globally as efforts to reach net zero by 2050 accelerate, as noted by the Intergovernmental Panel on Climate Change's <i>Special Report on Climate Change and Land</i> that identify agroforestry and forest management as climate adaptation and mitigation strategies.¹⁰²</p> <p>A greater understanding of the carbon implications of PNF will assist in the development of policy such as incentives for carbon sequestration. Capturing information regarding the carbon implications of PNF will improve the accuracy of carbon accounting.</p>
<p>(vi) the long-term socio-economic benefits of native forests</p>	<p>Sufficiently met</p> <p>The NSW Government's forestry industry roadmap commits to building a 'stronger, more competitive and ecological sustainable forestry industry.' Part 5B of the LLS Act enables this mandate by authorising landholders to carry out PNF in a sustainable manner.</p> <p>The draft codes require property scale reporting on the approximate volume of forest products harvested. However, the codes do not require reporting on the socio-economic benefits of PNF. A better understanding of the contribution of PNF to regional economies will help improve regional development policy. This could include research and monitoring of the socio-economic benefits of PNF and its contribution to the regional and state economies, or targeted research into the barriers to better utilisation of PNF resources to the benefit of regional economies. In time, this may be addressed through the PNF MER framework.</p>

¹⁰² IPCC, (2019). *Summary for Policymakers*. In: *Climate Change and Land: an IPCC special report on climate change, desertification, land degradation, sustainable land management, food security, and greenhouse gas fluxes in terrestrial ecosystems* [P.R. Shukla, J. Skea, E. Calvo Buendia, V. Masson-Delmotte, H.-O. Pörtner, D. C. Roberts, P. Zhai, R. Slade, S. Connors, R. van Diemen, M. Ferrat, E. Haughey, S. Luz, S. Neogi, M. Pathak, J. Petzold, J. Portugal Pereira, P. Vyas, E. Huntley, K. Kissick, M. Belkacemi, J. Malley, (eds.)]. In press.

Principle	Assessment
vii) Natural heritage values	Sufficiently met PNF planning must map the location of landscape features including threatened ecological species, communities and populations, areas of outstanding biodiversity value, rainforest, old growth forest, wetlands, heathlands, rocky outcrops, cliffs and caves. Forestry operations in and adjacent to these specified landscape features must comply with identified restrictions. There will also be monitoring and reporting on the impact of forestry operations on retained landscape features and /or whether the identified restrictions are appropriate under the PNF MER framework.
(b) ensuring public participation, provision of information, accountability and transparency in relation to the carrying out of forestry operations	Sufficiently met LLS undertook public consultation on the PNF review Terms of Reference and published the public submissions. The development of the draft PNF Codes of Practice involved several additional stages of public and institutional consultation. LLS sought feedback from a wide range of stakeholders using a variety of methods. LLS conducted public consultation on a set of draft PNF codes, thus meeting the legislative requirements for public consultation under the LLS Act. However, there has been little visibility for the public regarding this feedback or in the latter stages of the Codes review and re-drafting. Greater transparency in PNF code reviews, PNF planning, operations and monitoring is needed. There are now provisions within the final draft PNF codes that supports annual reporting on PNF activities under the PNF MER framework. The timely transfer of information in relation to PNF, including about PNF plan approvals and approved variations, from the LLS to the EPA to support compliance monitoring and enforcement activities will be addressed under a Memorandum of Understanding. A Public information register of approvals, amendments and refusals under part 5B of the LLS Act (including Forest Stewardship Plan independent expert panel assessment outcomes) is also required under the final draft PNF codes, which will improve transparency, openness and accountability in decision making processes and improve performance. In the final draft PNF codes, LLS have addressed potential conflict of interests by separating their PNF advice and approval functions.

Principle	Assessment
<p>(c) providing incentives for voluntary compliance, capacity building and adoption of best practice standards</p>	<p>Sufficiently met</p> <p>The LLS Act provides considerable penalties for contravening PNF plans or codes, but does not use positive incentives for landholder PNF compliance and performance. LLS is planning to conduct two pilots that focus on extension, training and incentives for private native forest managers. One Pilot will test the use of financial incentives paired with expert advice to facilitate improved practices in private native forestry, with the second Pilot developing a targeted engagement approach for Aboriginal forest managers - one for Aboriginal Stewardship and another for non-Aboriginal PNF landholders. These are important and welcome initiatives in line with Prof. Vanclay's recommendations¹⁰³. There may be further scope for LLS to consider how incentives could be used to help improve participation and compliance in future.</p> <p>LLS has also developed a supporting package under the Programme for the Endorsement of Forest Certification (PEFC) standard. This package and the draft PNF Codes has been independently audited and found to be compliant with the relevant Australian and international standard. A pilot program is due to commence with landholders in 2022 and would be the first of its kind in Australia.</p> <p>Face-to-face extension services (including field days and farm visits) are part of the PNF oversight and enabling program, along with training. PNF Plans will identify landholder objectives so LLS can provide relevant advice and capacity building. LLS will need adequate funding to deliver these important services. Government should also increase support for LLS in its role to build landholder capacity through training and education, and opportunities to encourage voluntary compliance and best practice.</p> <p>The codes are legal instruments and may be difficult for a landholder to interpret. There is considerable scope for developing best practice guidelines to support compliance. This could include plain English guides to PNF that interpret the regulations in a more accessible form, and priority best practice guidelines to support capacity building and regulation, for example for forestry road construction on private land. The Commission notes that LLS has commissioned the Forest Research Centre at Southern Cross University to develop this material.</p> <p>The scale of the maps accompanying PNF plans must also be at an appropriate scale to inform landholders of their compliance obligations.</p>
<p>(d) apply best available knowledge and adaptive management processes to deliver best-practice forest management</p>	<p>Sufficiently met</p> <p>The final draft PNF codes establish the requirement for a PNF MER framework, as well as monitoring requirements for forest regeneration. The LLS and Southern Cross University are also working together on research to address key information gaps. This research should link to the PNF MER framework and NSW FMIP once developed.</p> <p>The LLS Act provides for the amendment of codes without further consultation or concurrence if minor in nature. The legislative review process provides opportunities for amendment and continual improvement.</p> <p>The final draft PNF codes have also identified appropriate review points under the PNF MER program, including annual checks that the evidence base is up to date. It also specifies a review every 5 years of the PNF evidence base by the NSW Forest Monitoring Steering Committee chaired by the Commission to help determine whether there is sufficient evidence to warrant a formal review of the PNF Codes.</p>

¹⁰³ Vanclay, J. (2021). *PNF Review: Recommendations Report*. Prepared for Local Land Services by J. Vanclay, Southern Cross University, Lismore, NSW.

Principle	Assessment
<p>(e) apply precautionary principles in preventing environmental harm (as defined in the POEA Act)</p>	<p>Sufficiently met</p> <p>The final draft PNF codes have been updated such that LLS can require forestry operations be rescheduled to ensure harvest operations are distributed over time and space. The final draft PNF codes also allow the Minister and LLS to respond to major disturbance events if there is risk of significant or irreversible harm to environmental values at a bioregional scale. For example, due to widespread droughts and severe fire driven by climate change, or mass dieback events. If LLS determines risks cannot be mitigated or managed under the code or a Forest Stewardship Plan, LLS can suspend or reschedule forestry operations. A range of provisions may also be varied within Forest Stewardship Plans in response to a large-scale disturbance event, subject to LLS approval informed by an independent expert panel assessment. The EPA CEO can also write to the LLS CEO and recommend the Ministerial review clause is triggered in response to a significant bioregional-scale disturbance.</p> <p>LLS is developing a process to guide the assessment of cumulative PNF impacts. LLS should consider maintaining a regional scale forest inventory to facilitate the cumulative impact assessment.</p>