



Private Native Forestry Monitoring Program

Validating the PNF Koala Prescription Maps

This note provides a summary of the findings and analyses from a technical report on the evaluation of the existing Private Native Forestry (PNF) Koala Prescription Maps.

The analyses were undertaken by Honorary Professor Jane Elith, University of Melbourne, with input and review from a cross-agency technical review team and independent experts.

Professor Elith found that although sensible relationships between the PNF Koala Prescription Maps and independent data exist, these are not as strong as expected and do not explain much of the variation. This warrants revisiting the way in which the modelling and maps were developed.

Background

In May 2022, the NSW Government released revised [Private Native Forestry \(PNF\) codes of practice \(PNF codes\)](#). The codes include PNF Koala Prescription Maps. For land mapped as 'high koala habitat suitability', additional rules apply to PNF operations including retaining koala feed trees.

In [advice on finalising the PNF codes](#), the Natural Resources Commission recommended that the maps be adopted as interim due to time constraints when preparing the maps, available information and modelling, and koala habitat suitability being used as a proxy for koala habitat value. To ensure koala prescriptions would be better targeted to high value koala habitat, the maps would require verification, updates and improvements over time.

The PNF Koala Prescription Maps were developed by combining outputs from modelled predictions of koala habitat suitability by the then Department of Planning, Industry and Environment (DPIE) and the Department of Primary Industries (DPI). The DPIE model used koala feed tree modelled distributions to create an index, which was one input to their koala habitat model. A layer of high suitability habitat was created with the outputs from these models, which was then clipped to regulated private land to make the PNF Koala Prescription Maps.



What are the PNF Koala Prescription Maps?

The PNF Koala Prescription Maps show areas of high koala habitat suitability on private land regulated by the PNF codes of practice.

In these mapped areas of high suitability, the PNF codes of practice require landholders to retain additional koala feed trees during forestry operations under an approved PNF Plan.

The PNF codes also have other prescriptions for koala, such as mapped areas of PNF core koala habitat where forestry operations are prohibited.

The evaluation presented in this note only considers the PNF Koala Prescription Maps. It has not considered mapped PNF core koala habitat.

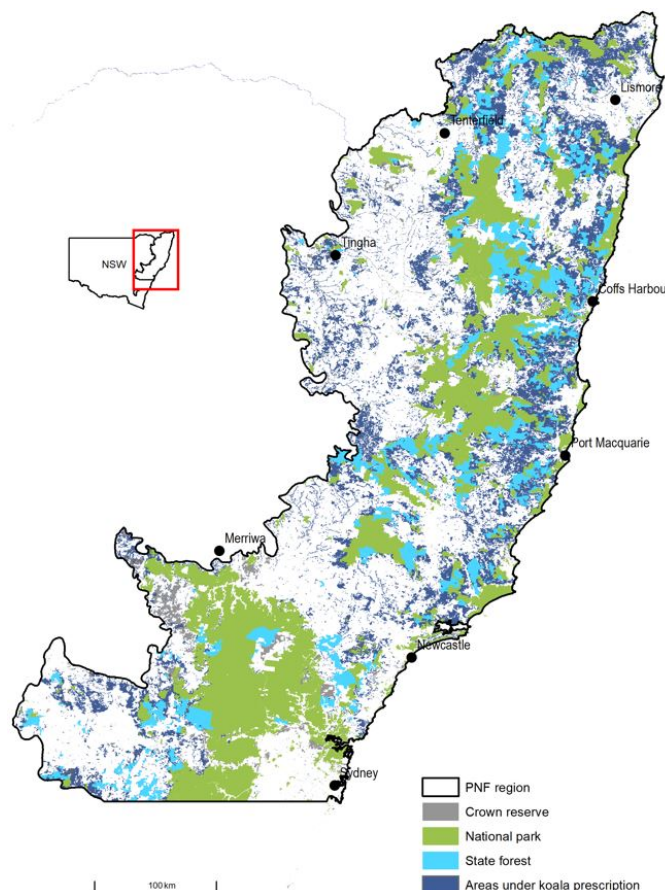


Figure 1: PNF Koala Prescription Map for Northern NSW

Analysis supports revisiting map development including underlying models

Professor Elith's evaluation (described in the following section) showed that the PNF Koala Prescription Maps have sensible and positive relationships with relevant independent data. However, the relationships are not as strong as expected and there is a lot of variation that cannot be explained.

While the exact cause of the unexplained variation can't be identified in the evaluation, the likely reasons include: the data used for the evaluation were limited and did not fully represent good koala habitat, potential errors in the underlying models or the layers used to remove non-native areas, and/or there was noise introduced by the steps taken to convert the koala habitat suitability models to the PNF Map.

The findings support revisiting the steps in making the PNF Koala Prescription Maps and underlying models. This includes the koala feed tree distribution models, the summary of those models in an index, the modelling of koala habitat distribution, and the conversion of those distribution maps to a final binary product that intends to represent high suitability koala habitat.

Approach, data and limitations of the evaluation

As noted in the Background, the PNF Koala Prescription Maps were put together using available koala habitat modelling. High suitability habitat predictions from these models were selected, filtered, and then clipped to private native forests. A key input that helps these models predict koala habitat is knowing where koala feed trees are in the landscape.

Noting that koala feed tree inputs had an important influence in the regional DPIE koala habitat suitability models, it was assumed that the presence and cover of koala feed trees would be positively related to the mapped areas of high koala habitat suitability. Professor Elith undertook a desktop assessment to evaluate the PNF Koala Prescription Maps using independent field data reporting the presence and cover of feed trees collected after September 2018. This data had not been used in the koala habitat models and provided more than 3,000 vegetation survey sites for the analyses. The evaluation also considered how suitable climatically sites were for koalas.

While the PNF Koala Prescription Maps show high koala habitat suitability on private native forest only, the koala habitat modelling covers all tenures and habitat suitability. To maximise the available data for the evaluation, the map inputs across public and private native forests were used for the analyses. This approach enabled testing of areas mapped as high, and not high suitability koala habitat.

A statistical approach involving Boosted Regression Trees (BRTs) was applied. Data inputs to the BRTs included tree species presence-absence and cover records, cross-tenure map inputs, as well as climate suitability mapping for the koala.¹ However, koala presence-absence or abundance records were not available for the analyses. The NSW Koala Strategy baseline survey is gathering this data now.

What is being done to address the maps?

The [NSW Forest Monitoring Steering Committee](#), independently chaired by the Natural Resources Commission, is now overseeing [a process to verify and improve the maps, and underlying models](#). The Committee established a cross-agency technical review team including independent experts to support this process, including:

- independent experts: Professor Jane Elith, University of Melbourne, Dr Alistair Melzer, Central Queensland University, and Dr Natalie Briscoe, University of Melbourne
- representatives from Local Land Services, Department of Primary Industries and Regional Development, Environment Protection Authority, Department of Climate Change, Energy, the Environment and Water (DCCEEW), Forestry Corporation of NSW and the Natural Resources Commission.

As part of this work, DCCEEW modellers and scientists are now updating the koala habitat suitability model for NSW, working collaboratively with the independent experts, agencies on the technical review team and the Commission. When the updated model is ready, the outputs will be used to prepare revised draft PNF Koala Prescription Maps. Onground verification will be an important step.

Changes to the maps require the joint approval of the Minister for Agriculture and the Minister for Environment. Landholders are able to request a review of the map on their property by following the [Protocol for verifying high koala habitat suitability](#).

More information

The technical report by Professor Elith detailing the validation of the existing PNF Koala Prescription Maps is available on the [Commission's website](#).

¹ Briscoe, N.J., Kearney, M.R., Taylor, C.A. and Wintle, B.A. (2016). [Unpacking the mechanisms captured by a correlative species distribution model to improve predictions of climate refugia](#). *Glob Change Biol*, 22: 2425-2439.