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Destruction of Koala habitat increased after listing as vulnerable in 2012

Summary

- Federal regulators and environment ministers have failed to adequately enforce Australia's nature laws to protect Koala habitat since 2012, when Koalas were listed as a vulnerable species under the Australian Government's *Environment Protection and Biodiversity Conservation Act* (EPBC Act). Since listing, we have seen an increase - not a decrease - in destruction of Koala habitat, thereby undermining the purpose of the listing.
- Under the EPBC Act a person must not take an action likely to have a significant impact on matters of national environmental significance without approval. Habitat destruction by tree clearing is recognised as a primary threat. Therefore, listing of the Koala as vulnerable should have been followed by a reduction in habitat destroyed.
- We overlaid Queensland and NSW Government maps of tree clearing on known or likely habitats for the Koala as mapped by the Australian Government.
- We found that contrary to expectation, rates of clearing of Koala habitats actually *increased* after 2012 when the species was listed, from an average annual loss of 16,199 ha over the period 2004-12 increasing

to 17,323 ha for 2012-18 in Queensland, and from 11,153 ha over the period 2004-12, increasing to 14,695 ha in the subsequent 2012-17 period in NSW.

- Since the Koala was listed as vulnerable in 2012 a total of 177,411 ha of known or likely Koala habitat has been cleared: 103,936 ha in Qld (up to mid 2018) and 73,475 ha in NSW (up to mid 2017).
- Of this destruction, 80% was for livestock pasture in Queensland, while in NSW, forestry dominated losses of Koala habitat (62%).

Introduction

The Koala is an iconic, forest-dependent, arboreal folivore which was once very common across Australia despite significant population declines in the early 20th century due to hunting.

Following major population declines after 1990, the populations of the species in Queensland (Qld), New South Wales (NSW) and the Australian Capital Territory (ACT) were listed under the Australian Government's *Environment Protection and Biodiversity Conservation Act* (EPBC Act) as "Vulnerable to extinction" in 2012.¹ The Threatened Species Scientific Committee recognised in recommending the listing that habitat loss and fragmentation due to tree clearing was a significant driver of observed population declines, but they also assumed that "[l]arge scale land clearing for agricultural purposes has effectively ceased", unaware that tree clearing laws in both the chief range states Queensland and New South Wales would be subsequently weakened.²

Under the EPBC Act, a person must not take an action that has a significant impact on threatened species without first seeking and obtaining authorisation.³ A significant exemption is for forestry (timber harvest) operations in a Regional Forest Agreement area.⁴

However, compliance with and enforcement of the Act is severely lacking on a large scale. Of all EPBC Act listed threatened species habitats lost nationwide from 2000 to 2017, 93% by area were neither referred nor approved under the EPBC Act.⁵

The purpose of listing is to reduce the destruction of listed species habitats, prevent population decline and promote recovery. Such an outcome has been reported in the United States under the *Endangered Species Act*.⁶ In this analysis we examine rates of clearing of Koala habitat to test if the listing had actually increased the protection of the species, as is the intent of the Act.

Findings

Contrary to expectation, Koala habitat clearing actually *increased* after 2012 when the species was listed. In Queensland, the annual average loss of 16,199 ha over the period 2004-12 increased by 7% to 17,323 ha for 2012-18. In New South Wales, average annual loss of 11,153 ha in the period 2004-12 increased by 32% to 14,695 ha from 2012-17.

However, there were also very different patterns of change over time. In Queensland, habitat loss started high in 2004-05 and declined to a minimum in 2009-10, reflecting the ban on broadscale clearing for agriculture of 2006

¹ Threatened Species Scientific Committee (2012) *Advice to the Minister for Sustainability, Environment, Water, Population and Communities from the Threatened Species Scientific Committee (the Committee) on Amendment to the list of Threatened Species under the Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) (*Phascolarctos cinereus*). URL: <http://www.environment.gov.au/biodiversity/threatened/species/pubs/197-listing-advice.pdf>

² Ibid.

³ EPBC Act Sect 18

⁴ EPBC Act Sects 38-42

⁵ Ward MS et al, (2019) Lots of loss with little scrutiny: The attrition of habitat critical for threatened species in Australia. *Conservation Science and Practice*, 1(11), p.e117.

⁶ Taylor MFJ et al. (2005) The effectiveness of the Endangered Species Act: a quantitative analysis. *BioScience*, 55(4), pp.360-367.

(Fig. 1). But thereafter, Koala habitat clearing rates climbed up again reaching a peak in 2015-16 greater than that in 2006-7, following the significant weakening of the law by the Newman government in 2012-13 (Fig.1).⁷

In NSW, clearing of Koala habitat rose to a peak in 2009-10 (the year of minimum clearing in Qld) despite the restrictions of 2005 under the now repealed *Native Vegetation Act*. From 2010 to 2015, however, Koala habitat clearing rates fell and remained at relatively low levels. Then in 2015-17, habitat clearing rates increased again to a higher level than the 2009-10 peak (Fig. 2). The NSW government whole-of-state statistics for all tree clearing show increases of clearing in 2015-16 and 2016-17 relative to prior years but not as dramatic as that found here considering only Koala habitat.⁸ The reasons for the dramatic recent rise in Koala habitat losses are unclear, but certainly major restructuring of the law in NSW in 2016 is a likely culprit as revealed in a recently leaked report by the NSW Natural Resources Council.⁹

Regardless, it is evident that the listing of the Koala as vulnerable in NSW, Qld and the ACT (not analyzed here) was followed by poorer, rather than improved protection of Koala habitats as mapped by the Commonwealth.

In Queensland, this may be because 80% of habitat destruction was for pasture (Fig. 3) and such clearing is almost never referred for assessment under the EPBC Act. Of the 25 total referrals for agricultural clearing in Queensland, only five appeared to be connected to pasture development and only two fell within the period of study.¹⁰ There is no evidence that the regulator is taking any enforcement action to correct mass non-compliance with the referral obligations of the Act.¹¹ In Queensland, the majority of the habitat cleared was mapped as “likely-to-occur” by the Australian Government, that is, not known to be occupied habitat, but predicted by models to provide habitat (Fig. 1).

In NSW, most of the habitat cleared was mapped as “known-to-occur” by the Australian Government, and 62% of clearing was for Forestry, with Pasture development a distant second (Fig. 3). This may derive from NSW having a Regional Forest Agreement which provides an exemption to the referral obligations of the EPBC Act.¹²

Clearing of Koala habitat is most heavily concentrated in the core of the Koala’s range in South-East Queensland and the Northern Rivers region of NSW (Fig. 4).

Satellite images showing examples of the destruction of known Koala habitat in Queensland are provided in Figs 5 and 6.

⁷ Taylor MFJ (2018) *Bushland destruction in Queensland since laws axed*. WWF-Australia technical briefing. URL: <http://www.wwf.org.au/ArticleDocuments/360/pub-briefing-bushland-destruction-in-queensland-since-laws-axed-9feb18.pdf.aspx>

⁸ NSW Government (2020) *NSW Woody Vegetation Change 2017-18 spreadsheet*. URL: <https://www.environment.nsw.gov.au/topics/animals-and-plants/native-vegetation/reports-and-resources/reports>

⁹ Hannam P (2020) Devastating biodiversity loss made worse by rise in land clearing. *Sydney Morning Herald* news report. URL: <https://www.smh.com.au/environment/conservation/devastating-biodiversity-loss-made-worse-by-rise-in-land-clearing-20200327-p54em2.html>

¹⁰ These referrals are 2003/1090, 2003/962, 2003/988, 2004/1335 and 2015/7440.

¹¹ Taylor MFJ (2019) *Pervasive inaction on national conservation law in Queensland, 2016-18*. WWF-Australia briefing update. Available from: https://docs.google.com/document/d/1IURS6ap6T4RcfsQSZbrUvJzSyyHGwCUvhvLp_pQq7Zk

¹² NSW Government Dept of Primary Industries (2020) *NSW Regional Forest Agreements*. URL <https://www.dpi.nsw.gov.au/forestry/regional-framework>

Conclusions and recommendations

These results show that the listing of the Koala under the EPBC Act has demonstrably failed to protect the habitats of the species. Rather, the pace of destruction of Koala habitat in Queensland and New South Wales, has actually increased since the Koala was listed in 2012. Destruction of Koala habitat appears to be driven largely by changes in state regulatory regimes, namely the weakening of the *Vegetation Management Act* in Queensland in 2012/13, and introduction of self-assessable clearing codes in 2014, followed by repeal of the *Native Vegetation Act* in 2017 in New South Wales.¹³

The EPBC Act could and should have been used to over-rule these state regulatory changes once the Koala was listed. However, chronic lack of enforcement of the referral obligations of the EPBC Act as observed more broadly by Ward et al (2019)¹⁴, and potentially also the EPBC Act exemption provided by the Regional Forest Agreement in NSW has rendered the Act ineffective in regard to prevention of Koala habitat destruction.

Federal regulators have clearly failed in their responsibility to protect Koala habitat under federal law. Instead, the Koala and many other threatened species have been left to the mercy of state native vegetation laws which were substantially weakened in Queensland in 2013 and in NSW in 2016.

The Federal regulator of the EPBC Act must as a matter of urgency begin to effectively enforce the Act to rein in the ongoing destruction of habitat that has led to the Koala being listed as vulnerable, particularly in regard to destruction of forest habitats that go unrefereed and unapproved at a large scale.

The urgency has been made all the greater by the bushfires that have burned through Koala habitats particularly in NSW over the past summer (2019-20). Nearly 7,000 Koalas were estimated killed in the NSW bushfires, which taken together with habitat loss and drought, has prompted a petition to have the Koala uplisted to endangered.¹⁵

The EPBC Act is currently under review.¹⁶ The chronic lack of enforcement and ineffectiveness of listing in preventing habitat loss suggests that the Act itself needs reform. One of the reform priorities should be the institution of an independent regulator insulated from political pressure, such as the proposed Environmental Protection Authority.¹⁷

¹³ Evans MC (2016) Deforestation in Australia: drivers, trends and policy responses. *Pacific Conservation Biology*, 22(2), pp.130-150.

¹⁴ Ward MS et al. (2019) Lots of loss with little scrutiny: The attrition of habitat critical for threatened species in Australia. *Conservation Science and Practice*, 1(11), p.e117.

¹⁵ Lane A et al. (2020) *A review of the conservation status of New South Wales populations of the Koala (Phascolarctos cinereus) leading up to and including part of the 2019/20 fire event*. A Biolink report prepared for the International Fund for Animal Welfare (IFAW).

¹⁶ Australian Government Department of Environment (2020) *Independent review of the Environment Protection and Biodiversity Conservation Act 1999*. URL <https://www.environment.gov.au/epbc/about/review>

¹⁷ As advocated by the Places You Love alliance, URL: <http://www.placesyoulove.org/australiawelove/naturelaws/>

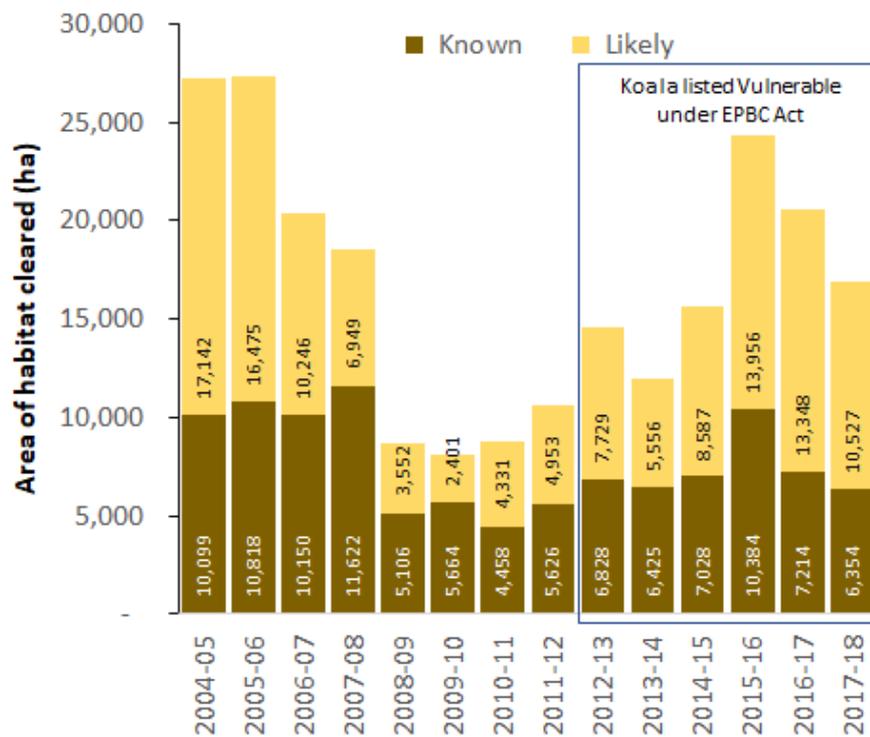


Fig. 1. Areas of Koala habitat cleared in Queensland from 2004 to 2018.

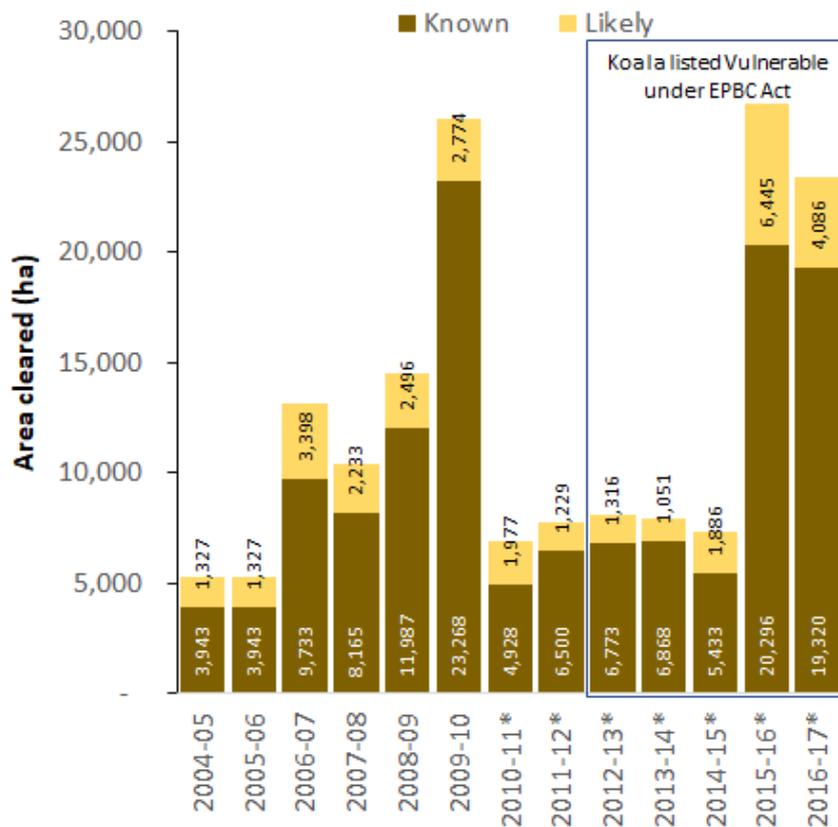


Fig. 2. Areas of Koala habitat cleared in New South Wales 2004 to 2017. * indicates years where Spot or Sentinel 5-10m satellite data was used. In earlier years, Landsat imagery was used.

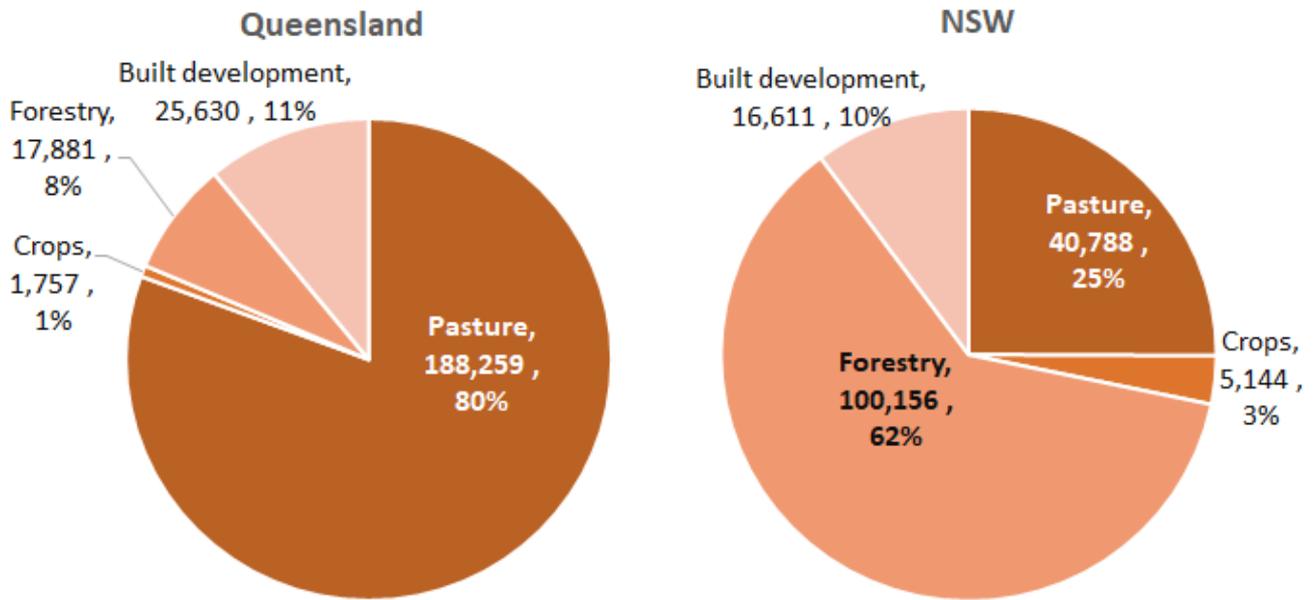


Fig. 3. Purpose as attributed by state governments to clearing of Koala habitats in Queensland (left) and NSW (right). Labels show the purpose of clearing, area in hectares and percentages of all habitat cleared over the study period.

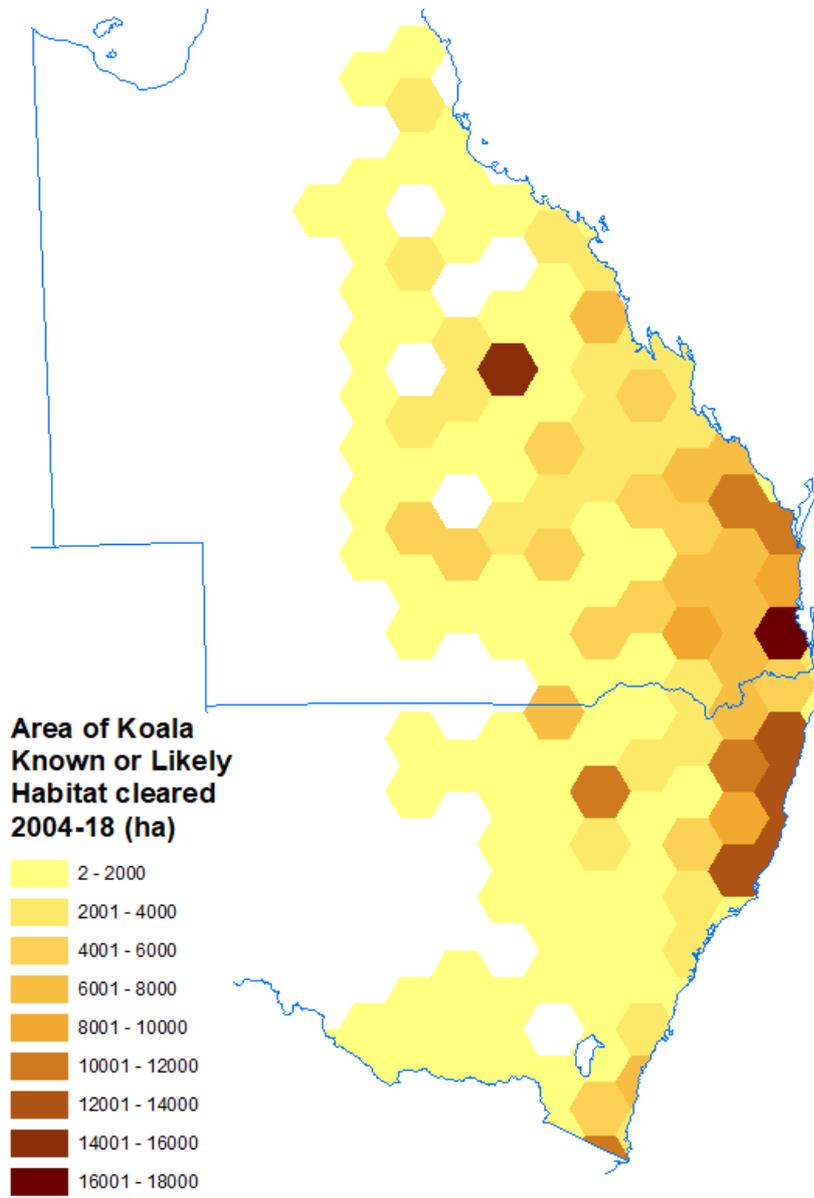


Fig. 4. Map of Koala habitat areas cleared in uniform sized hexagon tiles across Qld and NSW showing which regions had the most absolute loss of habitat.

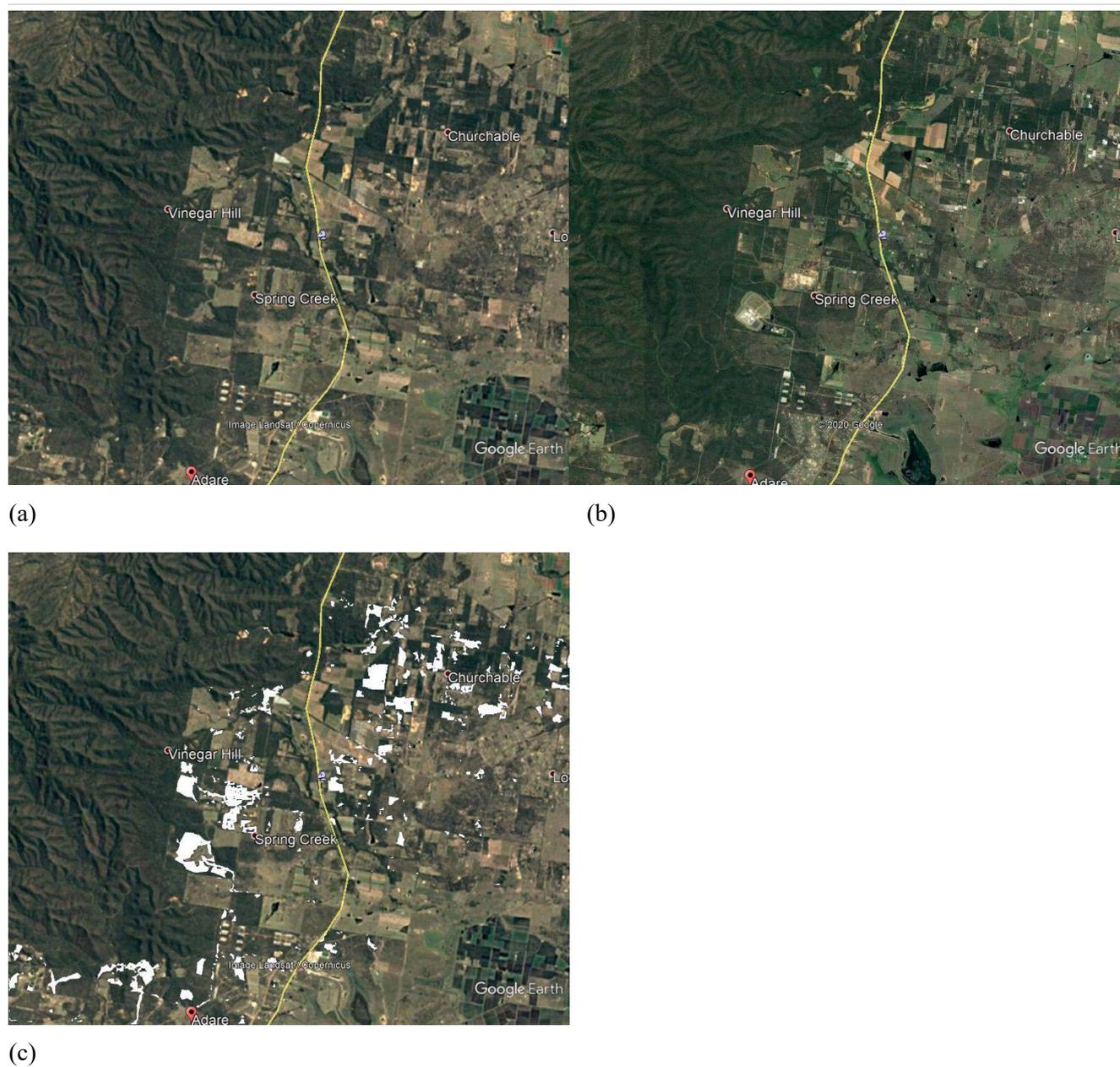


Fig. 5. Example of Koala habitat loss shown from satellite images of the area around Spring Creek Qld, in 2004 (a), and in 2017 (b), and the areas of known Koala habitat (white overlay) reported as cleared by SLATS over the 2004-18 period (c) for a mixture of purposes.



Fig. 6. From the same region shown in Fig. 5, a sample close up of the thinning of forest and creation of a dam for pasture development in known Koala habitat. Thinning was made self-assessable in Queensland in 2013, but was made subject to approval again in 2018. Top image shows the forest as it was in 2014, and bottom as it was in 2018, after the development. Although this development occurred after the Koala was listed in 2012, there was no associated referral under the EPBC Act in the public register.

Methods

The Queensland Government's Statewide Land and Tree Study (SLATS) record of woody vegetation change was downloaded for the period 2004 to 2018.¹⁸ Detections in categories "10- Natural disaster damage" and "11- Natural tree death" were excluded, since they did not involve active destruction of native bushland. Categories of reasons for clearing (purpose categories) reported in the SLATS spatial data were reduced down to just four: 1- pasture (including thinning), 2-crops, 3-forestry and 4-built development (Appendix 1). Polygon layers were converted back to a 30m raster snapped to the original native SLATS rasters. Rasters were then mosaicked to a single raster combining the year of detection and the purpose. Wherever pixels took multiple values in different years, only the earlier year was retained, to avoid double counting of repeat clearing events.

The NSW Government SLATS data for 2004 to 2015 were also downloaded from SEED.¹⁹ The Landsat-derived polygon layers were downloaded for the years 2004 to 2010. For the years 2010 to 2015, the Spot5 derived layers were downloaded. For the years 2015-17, we obtained raster SLATS products under licence from the NSW Government. All these layers were also resampled to 30m pixel rasters snapped to the Queensland rasters and using the same Queensland Albers projection, after excluding fire and other natural causes of forest loss. As for Queensland, purpose categories were reduced to just four levels of pasture, crops, forestry and built development (Appendix 1), and the rasters were mosaicked to a single raster combining detection year and purpose. SLATS for 2017-18 have not been released at time of writing.

The National Greenhouse Gas Inventory's *Forest Cover* 25m rasters for 2004, the commencement of the study period, were obtained from the Australian Government under licence. Rasters were resampled using a majority rule and aligned to the National Vegetation Information System's (NVIS v 5.1) 100m pixel rasters.

We obtained from ABARES catchment scale (50m pixel) Land Use current and archival rasters which enabled us to reconstruct as closely as possible the land use that would have been present in 2004.²⁰ From these we extracted relatively natural land uses to minimise the chance of counting areas that had already been developed or converted to non-natural land covers at the start of the study period. Primary land use categories considered relatively undeveloped were "Conservation and Natural Environments" and "Production from relatively natural environments." Under the primary category of "Water" the secondary category of "marsh or wetlands" was also included because marshes can be wooded and also susceptible to clearing. This "relatively natural in 2004" land use extract was converted to the same 100m pixel raster aligned to NVIS v5.1 rasters.

We created a filter layer combining these two layers: "forested and in a relatively natural undeveloped land use in 2004". The cleared bushland rasters for NSW and QLD as described above were intersected with this filter, to produce a derived product of pre-existing natural forest areas cleared. Importantly, this enabled us to mask out any SLATS clearing attributed to forestry that was actually plantation harvest, not the harvest or conversions of native forests.

The known- or likely-to-occur habitats (KL) of the Koala in NSW and Qld was extracted from the Australian Government *Species of National Environmental Significance* (SNES) spatial database 2016 release and

¹⁸ Statewide Landcover and Trees Study Queensland series:

<http://qldspatial.information.qld.gov.au/catalogue/custom/detail.page?fid={BFE72491-2233-4FDF-8F6A-274E49F42FDC}>

¹⁹ <https://www.seed.nsw.gov.au/>

²⁰ Many thanks to Josie Mewitt in ABARES for assistance.

intersected with the clearing rasters generated as described above. Areas of KL habitat cleared in each state for a given year for a given purpose were summed and tabulated.

Caveats

The known- or likely-to-occur habitats Koala habitats as mapped by the Australian Government in the SNES database were taken at face value. The “may occur” polygons were discarded because they are too broad-brush and include habitats that could not possibly be of value to Koalas. In the spatial database provided to WWF, the Koala habitat polygons were marked with the load date of 21/9/15, roughly the middle of the period between listing and mid 2018 when the SLATS record stops. These data are known to differ significantly from other habitat maps generated by state governments (such as the southeast Queensland model produced recently by the Queensland Government²¹) or by other entities, in particular our own earlier report for Queensland.²² In particular, they include areas known to have been cleared or developed at the commencement of the study period. Hence we have taken steps to remove such areas from this analysis.

The switching of methodologies in NSW is already known to have caused significant changes in areas detected as cleared due to methodology alone (Fig. 2). We did not however make any attempt to validate the data against other sources. Detections of clearing and the clearing purposes ascribed to those instances of clearing as detailed in the SLATS spatial data made available by both state governments were taken at face value.

We did however take steps to remove detections that were repeat clearing events within the study period, or were already developed or non-forested at the start of the period. Any errors in re-categorising SLATS ascribed purposes to the uniform four purpose categories as shown in Fig. 3 and Appendix 1 are however the author’s sole responsibility.

The annual totals of habitats cleared in Figs. 1 and 2 are just the areas of detections as delineated in respective state SLATS spatial data and were not corrected to annual rates by taking account of the different time elapsed between satellite images used to detect clearing, where not exactly one year.

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Citation

Taylor MFJ (2020) *Destruction of Koala habitat increased after listing as vulnerable in 2012*. WWF-Australia technical briefing.

Acknowledgements

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²¹ Queensland Government Department of Environment and Science (2020). *Spatial modelling for koalas in South East Queensland, v 1.0*. URL:

²² Taylor MFJ (2017) *Koalas Lost To Bulldozers In Queensland 2010-16*. WWF-Australia technical briefing. URL: <http://www.wwf.org.au/ArticleDocuments/360/pub-koalas-lost-to-bulldozers-in-queensland-2010-16-22nov17.pdf.aspx>

APPENDIX 1. Reclassification of SLATS purpose codes to a uniform four level code in Qld and NSW.

Table 1. Reclassification of Queensland SLATS

SLATS code	SLATS description	Recoded	Comments
1	Pasture	1 Pasture	
2	Crop	2 Crops	
3	Settlement	4 Built development	
4	Mine	4 Built development	
5	Infrastructure	4 Built development	
6	Timber Plantation	3 Native forestry	Native forest harvest is included not just plantation harvest
7	Thinning	1 Pasture	Most thinning is for pasture
8	Missed clearing in previous era	1 Pasture	Most clearing is for pasture, and this is a small category

Table 2. Reclassification of NSW SLATS up to 2008

SLATS code	SLATS description	Recoded	Comments
40	Agricultural clearing	1 Pasture	Most ag clearing is pasture
41	Clearing to pasture	1 Pasture	
42	Clearing to crop	2 Crops	
55	Thinning	1 Pasture	Most thinning is for pastures
46	Clearing for settlements	4 Built development	
47		4 Built development	Not in SLATS code list but does appear in shapefile
48	Mining	4 Built development	
51	Infrastructure	4 Built development	
53	Establish timber plantation	3 Native forestry	Assuming a native forest conversion to plantation
60	Forestry generic	3 Native forestry	Assuming could be native timber harvest. Plantations filtered out later.
61	Native forest harvest	3 Native forestry	

Table 3. Reclassification of NSW SLATS up to 2008 to 2015

SLATS code	SLATS description	Recoded	Comments
70	Generic agriculture clearing	1 Pasture	Most clearing is for pasture
71	Clearing to pasture	1 Pasture	
72	Clearing to crops	2 Crops	
73	Clearing to horticulture	2 Crops	
74	Clearing for farm infrastructure	2 Crops	Even though infrastructure, likely to be for cropping
75	Thinning for agriculture	1 Pasture	Most thinning is for pasture
77	Clearing regrowth	1 Pasture	Most regrowth clearing is for pasture
80	Urban/industrial	4 Built development	
81	Residential	4 Built development	
82	Industrial/commercial	4 Built development	
83	Mining	4 Built development	
84	General infrastructure	4 Built development	
85	Thinning urban	4 Built development	
86	CSG and mining exploration	4 Built development	
87	Clearing regrowth for development	4 Built development	
88	Rural residential	4 Built development	
90	Forestry -unknown type	3 Native Forestry	Assume is for native forest harvest
91	Native forest harvest	3 Native Forestry	
93	Clearing to establish new plantation	3 Native Forestry	Assuming a native forest conversion to plantation
94	Forestry infrastructure	3 Native Forestry	Even though infrastructure, likely to be for timber harvest

Table 4. Reclassification of NSW SLATS 2015 to 2017

SLATS code	SLATS description	Recoded	Comments
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2	Agriculture	1 Pasture or 2 Crops	Split into 85% pasture and 15% crops based on past division of agriculture clearing
3	Infrastructure	4 Built development	
4	Forestry	3 Forestry	Includes plantation harvest but that is filtered out with land use filter.



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