

**INQUIRY INTO KOALA POPULATIONS AND HABITAT IN
NEW SOUTH WALES**

Name: Mr David Paull

Date Received: 2 August 2019

**RE: INQUIRY INTO KOALA POPULATIONS AND HABITAT IN NEW SOUTH WALES as undertaken by the
LEGISLATIVE COUNCIL PORTFOLIO COMMITTEE NO 7 - PLANNING AND ENVIRONMENT**

Submission on the dire situation of Koala populations on the north west slopes of NSW and the urgent need for increased habitat protection, detailing a 'Namoi Koala Park'.

Dear Committee,

The terms of Reference for the Inquiry allows submitters to "... report on actions, policies and funding by government to ensure healthy, sustainable koala populations and habitat in New South Wales". In responding to these terms, this submission will focus on the Koala populations on north western NSW, particularly the former species strongholds of the Moree Plains, Pilliga/Warrumbungles, Inverell and the Liverpool Plains areas, within the Brigalow Belt South, Nandewar and Darling Riverine Plains bioregions.

(a) the status of koala populations and koala habitat in New South Wales, including trends, key threats, resource availability, adequacy of protections and areas for further research,

I was previously contracted by the World Wide Fund for Nature (WWF Australia) to assess the latest population status of NSW Koala populations, based on published and unpublished survey data. This report was published in March this year. Meta-populations within the target bioregions and an assessment of their overall resilience to the chief threatening factors are identified below.

Table 1. Current status of Koala populations in north west NSW with resilience assessment.

#	Bioregion	Meta-population	Pop. size	Population Trend	Representation in Reserves	Exposure to Landuse change	Climate Change exposure	Additional Reservation Potential	Future Resilience ^
1	DRP	Darling/Culgoa	?	decline	poor	high	high	low	low
2	DRP	Barwon	?	decline	poor	high	high	low	low
3	BBS	Moree	<100	decline	poor	high	high	low	low
7	BBS	Pilliga	?	decline	moderate	low	high	high	moderate
8	BBS	Gunnedah	>1000	decline	poor	high	moderate	high	moderate
4	Nand	Nth Nandewar	100-500	decline	poor	high	moderate	moderate	moderate
5	Nand	Inverell/Warialda	500-1000	?	poor	high	moderate	low	Low-moderate
6	Nand	Kaputar	?	decline	poor	high	moderate	high	moderate

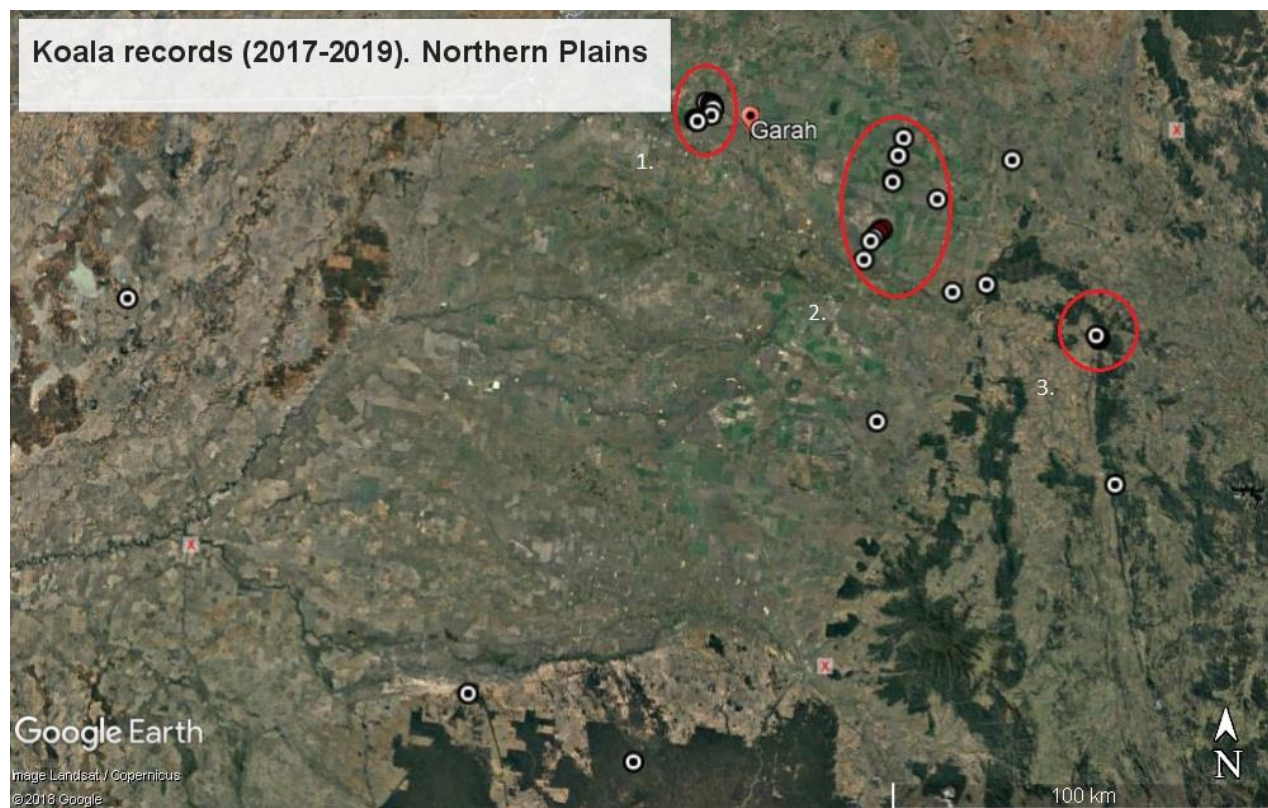
Despite a general lack of genetic information on populations in NSW, nine historically extant meta-populations have been identified with recordings from the last ten years, within the three bioregions. This information gathered from recent unpublished surveys and the public BioNet database (Appendix 1, Map 1). Previous work on this (Paull and Hughes 2016) has also assisted this analysis. Substantial barriers to movement (eg. major rivers, developed areas and mountain ranges) have been used to approximate historic metapopulation boundaries.

While these metapopulation designations once contained a number of genetically distinct populations, ongoing loss of habitat has reduced effective genetic contact between many of these where they have survived. There is growing evidence that many of the populations in the Darling Riverine Plains, Moree and the Pilliga may be functionally extinct (numbers too low to support a viable population).

1. Population size and trend

Records of Koalas from the last two years as well as an update on the status of these populations is provided below.

MAP 1. Recent Koala records from the Northern Plains and Nandewar.



Darling/Culgoa

The first met-population to consider is one which historically occurred along the Darling River and into the Culgoa River system to Goodooga, No Koalas have been seen on the Darling for nearly 20 years, particularly from around Bourke and the only records (2) in last ten years has been from the Culgoa Nature Reserve. Low flows in these rivers over the last 20 years and drought conditions over the last ten years, which has adversely affected water availability and vegetation health, point to a difficult future for this population which may be already extinct.

Barwon

This population covered a large area of NSW historically, from the Mungindi in the north, based around the Barwon River and its tributaries, west to Lightning Ridge and south to Walgett and the lower Namoi River. This area could have

historically supported four or more local populations, though today only one area is known to support a local population (1. on map), from the Gil Gil Creek area, north west of Garah village. This creek flows from the neighbouring Brigalow Belt region and Koala records are known from along this creek. There are probably less than 100 animals left in this population. There have been other recent records from near Lightning Ridge and on the Namoi east of Walgett, but no evidence of any populations in these areas. Most people responding to LALC surveys (P. Sparke pers, comm) remark that koalas seemed to have declined after about 2003 have very few have seen koalas since 2016.

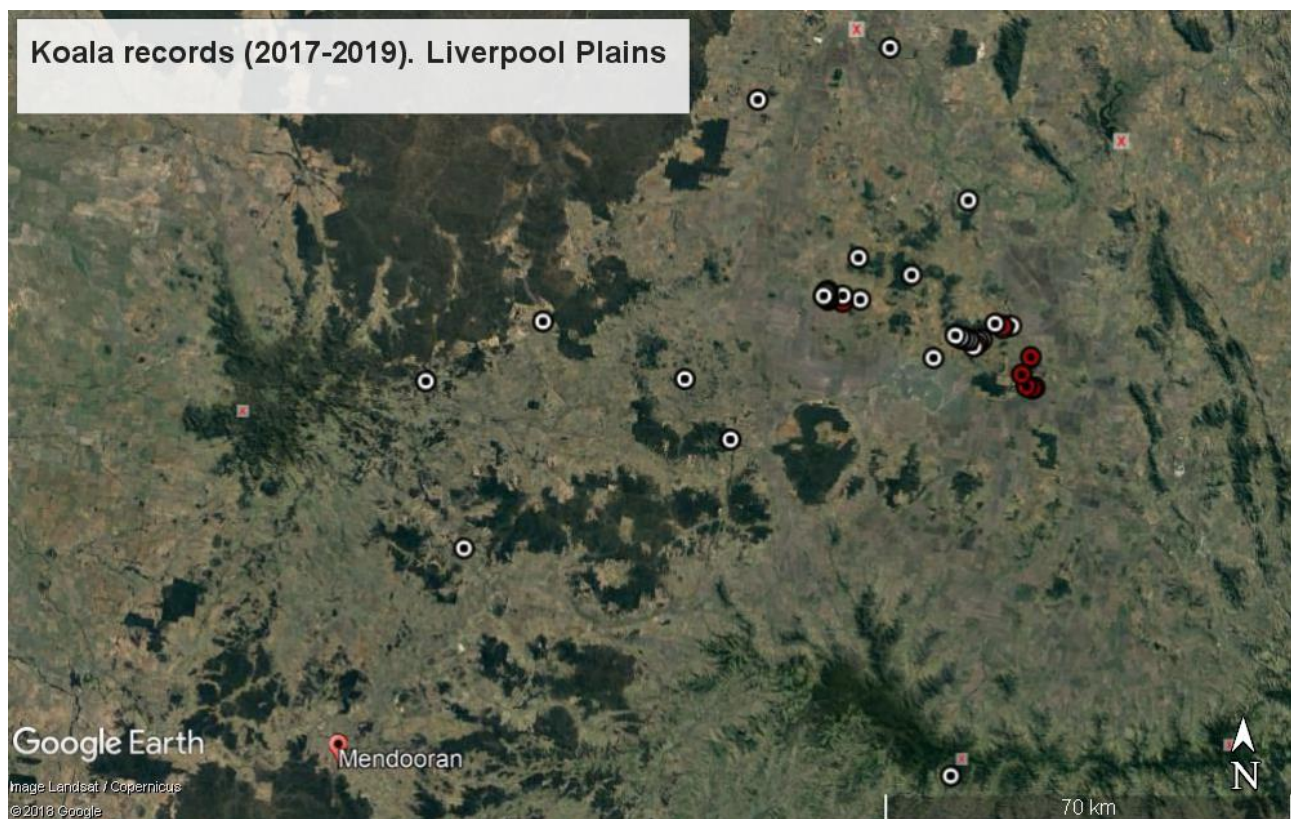
Moree Plains

Once extensive areas of habitat on the Gwydir floodplains has been drastically cleared by over 90%. Records from the last two years (Population 2. On Map 1) indicate most records are from a small area near Croppa Creek and along the roadside margins. There are probably less than 100 animals left and are subject to ongoing dry conditions, lack of water and lack of habitat connectivity. The route of the proposed Inland Rail moves through this remaining area of Koala habitat. Some areas of remnant vegetation to the east may provide some refuge for this population and a number of recent records have come from this area.

Pilliga

Surveys conducted in 2013/2014 (Niche 2015; Lunney et al 2017) showed that Koalas had declined to about 20% of their former distribution in the forest. While numbers were not accurately assessed, only one record of a Koala in the north of the forest has been recorded in the last two years (AWC observation, LLS survey). Recent dry conditions has seen a extensive tree death and loss of foliage quality in favoured species such the red gum. Koalas are at a critically low number in the forest at present, and may become extinct if current conditions persist.

Map 2 shows records more records of koala, south of the forest in the Warrumbungle LGA. A large bush fire reduced habitat and key koala areas in Warrumbungle NP, and since then Koalas have been seen outside of the forest more often, along the Castlereagh River and towards Tambar Springs. It is unclear if any populations have become established in these areas.



Liverpool Plains

Currently there is only one metapopulation in the north west thought to be over 1,000 individuals, that is from the Liverpool Plains (predominately Gunnedah LGA). However trends in sightings have seen a significant decrease of sightings in the northern half of the plains, while koalas have been observed in areas not noticed before in the southern part of the plains.

While recent records are known from several areas, including near Vickery State Forest, on the eastern edge of the Pilliga and Kerringle State Forest, most records now are from three areas, near Mullaley in the centre, south of Curlewis, across to Breeza, east of Gunnedah and more near Caroonah to the south. 80% of these records are from private lands, though some state forests in the southern edge of the plains also seem to be refuges for this southern population.

Nandewar

Three recent surveys in the last three or so years has confirmed the populations of Koalas primarily in two areas of the Nandewars, in the north, north from Ashford to the Queensland Border and another centered around Delungra, but also found in areas near Wialda, Inverell and Bingara.

2016: Cool Country Koala Project (North & South) – Northern Tablelands LLS. The northern project used detection dogs to survey 267 sites around Ashford, Inverell and Delungra (Cristescu and Frere 2017). Findings from these surveys identified koala presence at an additional, 81 sites (with Koala presence at 30.3% of surveyed sites). The results indicate a still healthy population in the Delungra region. These surveys confirm the strategy, finding that koalas use a much wider range of food trees on the northern tablelands and northwest slopes than indicated by the SEPP 44 or other lists.

This study was followed by two more surveys in 2017, one by OEH/ North West Ecological Service confirming good presence near Wialda; and the other by Landcare / University of Sunshine Coast (USC) which surveyed 40 sites in the Wialda, Delungra/Bingara, of which 17 sites (43%) had koalas present (Cristescu pers comm 2018), confirming the importance of this area for regional koalas.

It is known exactly how many koalas are present in these areas, north of Ashford, relatively low levels of scats and sightings suggest a population less than 500 animals, while the Wialda, Delungra, Bingara population may be more significant, perhaps 500-1000 animals. More surveys are certainly needed to confirm population size and trend.

There was historically a population associated with the Kaputar Range and foothills, though there are too few records to determine any kind of persistence in this area.

2. Representation in Reserve system

In the Darling Plains, Brigalow Belt and Nandewar, there are 2,879 historic records with approximately 49% of all koala records are from private lands, highlighting the importance of this tenure to the conservation of koalas. This in fact is likely to be an under-estimate as koalas are less likely to be reported from private lands due to lower overall survey effort. 20% of records are from the current reserve system, 11% from state forests and 16% of records from crown lands other than the previously mentioned two (including TSRs, lands managed by local and state governments).

Table 2. Koala records per land tenure (BioNet accessed October 2018)

Bioregion*	Reserve	State Forest	Crown Land	TSR	Freehold land	Total
BBS	592	313	242	61	1271	2,492
DRP	2	2	53	14	43	114
Nand	7	1	64	37	163	273
Total	601	316	359	112	1,477	2,879

The Darling Riverine Plains (DRP) and the Nandewar have the lowest levels of protection with 1.8% and 2.6% of historic records respectively within the current reserve system. The highest number of records in the DRP are from crown lands but these are largely lease-hold and so subject to ongoing land-clearing.

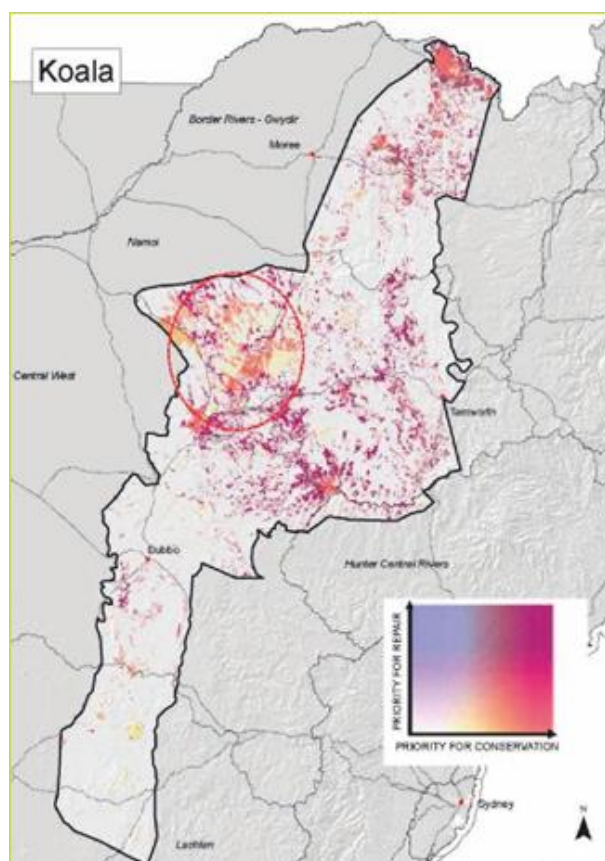
The potential for additional reserves into the system that would be of benefit to koalas is limited, but some key areas have been identified and will be discussed below,

3. Exposure to Land-use Change

Like other parts of Australia, north west New South Wales has historically undergone significant levels of clearing of native vegetation and habitat simplification, in particular, these land practices have disproportionately affected the plains/woodland, floodplain and river-flat ecosystems as they tend to occur on the better, clayey and alluvial soils, which are more agriculturally productive. As a result the two most historically widespread ecosystems which Koalas preferred in the region have declined by over 90% and are listed as threatened.

Perhaps once one of the most widespread communities on the inland tablelands and slopes used by koalas was White Box-Yellow Box-Red Gum Woodland, once occurring over 3,700,000 ha of NSW, It has declined by 93% of its former extent (leaving 250,000 ha in 2002, TSSC 2002), Ongoing clearing, particularly for mining, has occurred since the listing and it is now regarded as being 'critically endangered' under the EPBC Act.

Coolibah - Black Box Woodland of the northern riverine plains in the Darling Riverine Plains and Brigalow Belt South



bioregions once was widespread frequently flooded channels and outer floodplains of the upper Darling tributaries originally had a combined distribution in New South Wales of about 1.2 - 2.0 million hectares. More than two thirds of the original Coolibah woodland communities have been cleared since colonization prompting its recent listing under the EPBC Act. The greatest extent of change has occurred in the northern parts of the , where in some areas less than 20% of the original woodland is thought to remain.

Current overall exposure remains high and includes exposure to land-clearing under current agricultural and mining regulatory regimes. These activities are generally confined to private and leasehold lands, though mining has occurred in state forests (eg. Leard Forest). Ongoing rates of clearing on private lands in this region confirm ongoing loss of koala habitat. Sale of crown lands to private hands has also increased risk of habitat loss.

4. Exposure to Climate Change

Based on Adams-Hoskings *et al.* (2011) and Drielsma *et al.* (2014), the north-west populations are likely to experience most adverse impacts from climate-change within the next 20 years. Populations in the Nandewar and southern Liverpool Plains are likely to be less affected. Taylor and Drielsma (2014, to the left) modelled the distribution of climate refuge areas in the western woodland way study, highlighting refuges associated with higher elevation in the Nandewars, Liverpool Range , southern Pilliga and Tambar Springs areas.

5. Resilience

Looking at all the factors considered above, the overall resilience of populations in the north west, the populations in the north and west of the region the lowest resilience are those forested areas to the north and west. However resilience can be improved through on the ground actions to help the Koala such as private land conservation program and greater levels of on-ground protection.

In conclusion, and based on the above information, koalas in north west NSW are in crisis. Given the poor levels of current protection, the known population trends of existing populations, increasing level of threat, including increased habitat loss and fragmentation and poor legislative safeguards, the koala population in NSW would have qualified to be listed as being 'endangered', however the Common Assessment Method now prevents state listings where species occur in more than one state.

(b) the impacts on koalas and koala habitat from:

(i) the Coastal Integrated Forestry Operations Approvals and Regional Forest Agreements,

The western forests of the north west are currently in a logging hiatus following closure of the last mill at Baradine and winding down of contractor operations. Previously, the logging of timber has been practiced widely in western NSW, particularly among the cypress ironbark forests of north west NSW, the cypress forest of south west and the Red Gum forests of the Murray region.

Past operations in this region have been very destructive leaving low levels of mature tree recruitment, with <10% of the original cover of mature trees in commercial areas of forest. More recent operations included 'integrated' ironbark and cypress harvesting which cleared large gaps in the forest taking the recruitment tree cohort. Despite the benefits of thinning cypress pine for timber production, there has been little attempt to undertake this in public forests since the Western Regional Assessment was completed in 2003.

➤ **In order to maximise the benefit of these public lands, key koala habitat areas should be transferred to the reserve estate as a matter of priority.**

(ii) the Private Native Forestry Code of Practice,

Until the newest Private Native Forest Code of Practice for the River Red Gum Forests, which provides for a koala site assessment protocol based on SEPP44 standards, none of the previous codes for private red gum logging had any koala specific provisions. This Code of Practice is applied throughout all River Red Gum forests (generally found within river basins) in western NSW from the Queensland border to the Victorian border. The fact that at no time until now had adequate koala assessment protocols been in force (at least in principle) reflects the lack of regard by NSW authorities in relation to koala issues. The lack of koala data from the Murray and North West forests suggest the koala has gone unrecorded during timber operations on public land and that this practice has been transferred to the private sector.

➤ **In order to reduce the damage to koala habitat on private lands, PNF Codes need to enforce a Koala management plan where ever koalas or koala habitat occurs.**

(iii) the old growth forest remapping and rezoning program,

NA

(iv) the 2016 land management reforms, including the Local Land Services Amendment Act 2016 and associated regulations and codes

Addressed in detail in WWF Koala Habitat Conservation Plan (March 2019)

(c) the effectiveness of State Environmental Planning Policy 44 - Koala Habitat Protection, the NSW Koala Strategy and the Biodiversity Conservation Act 2016, including the threatened species provisions and associated regulations, in protecting koala habitat and responding to key threats,

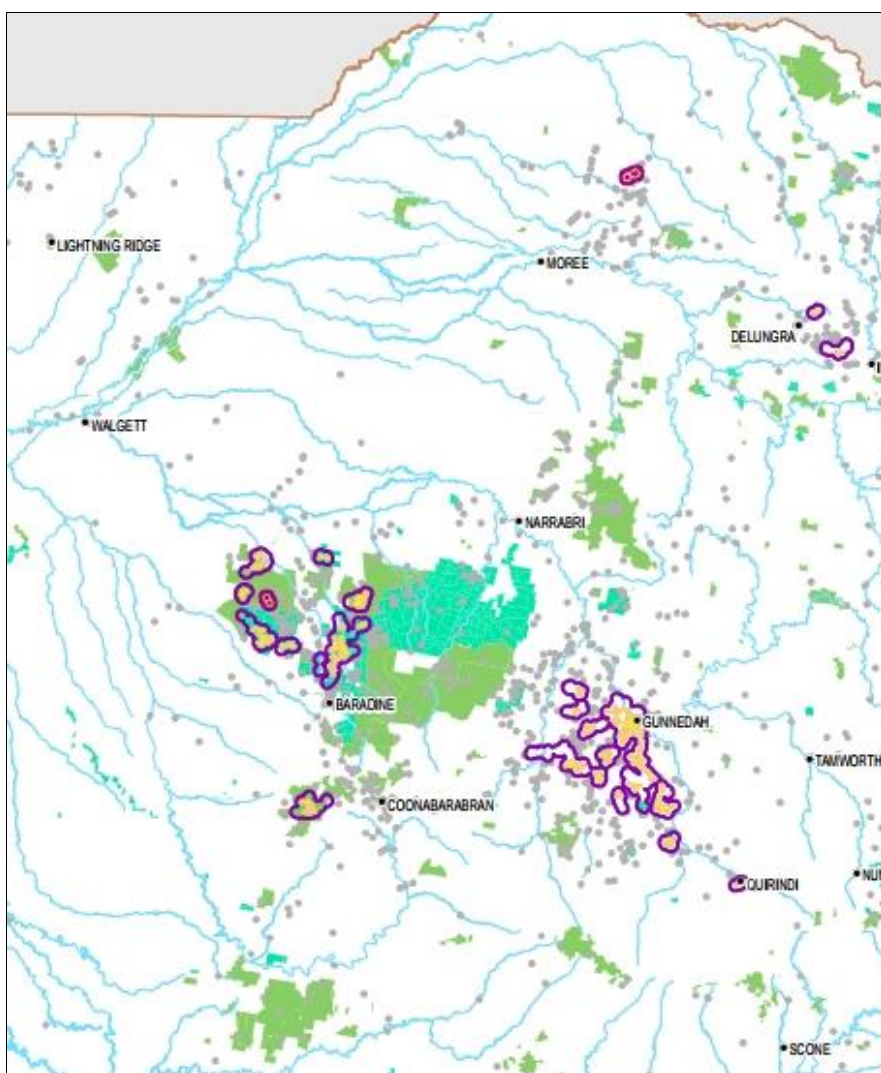
Addressed in detail in WWF Koala Habitat Conservation Plan (March 2019)

(d) identification of key areas of koala habitat on private and public land that should be protected, including areas currently at risk of logging or clearing, and the likely impacts of climate change on koalas and koala distribution,

The Office of Environment and Heritage (OEH) has been involved in developing a Framework for the Spatial Prioritisation of Koala Conservation Actions in NSW (Rennison and Fisher 2018). The process has involved the identification of Areas of Regional Koala Significance (ARKS) across NSW. OEH has identified and mapped 48 ARKS and the distribution of habitat and threats within each. This has been supplemented by analyses of koala records to "define areas of currently known significant koala occupancy that indicate clusters of resident populations known as 'Koala Hubs'".

The WWF conducted a similar analysis to that undertaken by the OEH's 'Hub' analysis except this study, though with main difference, less emphasis on data meeting a 'persistence' threshold for use in the analysis. The reasoning for this was as koala records are quite patchy in extent and frequency, making tight persistence rules for this data may unfairly omit important areas for the koala which have received less intensive levels of field survey.

The resultant tenure blind 'Koala hubs;' is shown below for the north west. Note key areas in the Pilliga, Liverpool Plains and Inverell.



Map 2. WWH Koala Hubs in north west.

This modelling was then overlain land tenure maps of NSW to establish extent of Priority 1 and Priority 2 koala hubs on private and public lands. These are depicted as attachments to this document.

➤ **Key state forest which offer significant refuges for Koalas and would be ideal for transferal to the reserve estate include:**

- **In the Pilliga, Cumbil State Forest, Baradine State Forest, Euligal State Forest, Pilliga West State Forest and Kerringle State Forest.**
- **There are also a series of important koala refuges are found along the southern part of the Liverpool Plains, namely Blackjack, Goran, Breeza and Doona SFs. The latter three form an archipelago central to the koalas present distribution. Therefore, these forests are important climate change refuges for the koala on the Liverpool Plains. Vickery State Forest is also modelled to provide climate refuge for the koala.**

Crown Lands

A total of 3,455 ha of Crown, NSW Government and Australian Government lands identified as known high priorities for protection of koala habitat and linkages. Some of these areas should be made into national parks, and others managed as components of regional systems of retained habitat.

Many of the Crown lands identified through this process are small lots or narrow strips such as TSRs, which were included because of their likely significance in maintaining local populations and facilitating dispersal across the landscape. The Crown lots have an average size of 15.6 ha.

➤ **There needs to a quarantine of further sale of crown lands until an assessment is made as to their environmental significance for the koala.**

Table 3. Potential Koala vegetation according to protection priorities on freehold land within IBRA regions.

Bioregion	Tenure	Lots (no)	Hectares
Brigalow Belt South	Crown	133	3013
Nandewar	Crown	39	442
GRAND TOTAL			3,455

Private lands

Over 100,000 ha of freehold land in the BBS and Nandewar bioregions as being of potential; significance for the koala based on the WWF Hub modelling. Most of this is in the Moree, Liverpool Plains and Inverell regions.

➤ **These regions should form a private conservation priority of highest urgency in order to preserve the remaining habitat of the koalas in the region.**

Table 4. Potential Koala vegetation according to protection priorities on freehold land within IBRA regions.

Bioregion	Priority 1 (ha)	Priority 2 (ha)	TOTALS (ha)
Nandewar	929	8983	9912
Brigalow Belt South	16718	84708	101426
GRAND TOTAL			211,338

(e) the environmental, social and economic impacts of establishing new protected areas to conserve koala habitat, including national parks, and

Given the hiatus of logging operations in the north west forests, it should be time to re-assess their public benefit in light of declining biodiversity and climate change refuge and carbon sinks. Investment in a new Koala park system will have tourism benefits as well as providing a wide range of recreational, climate and biodiversity to the community.

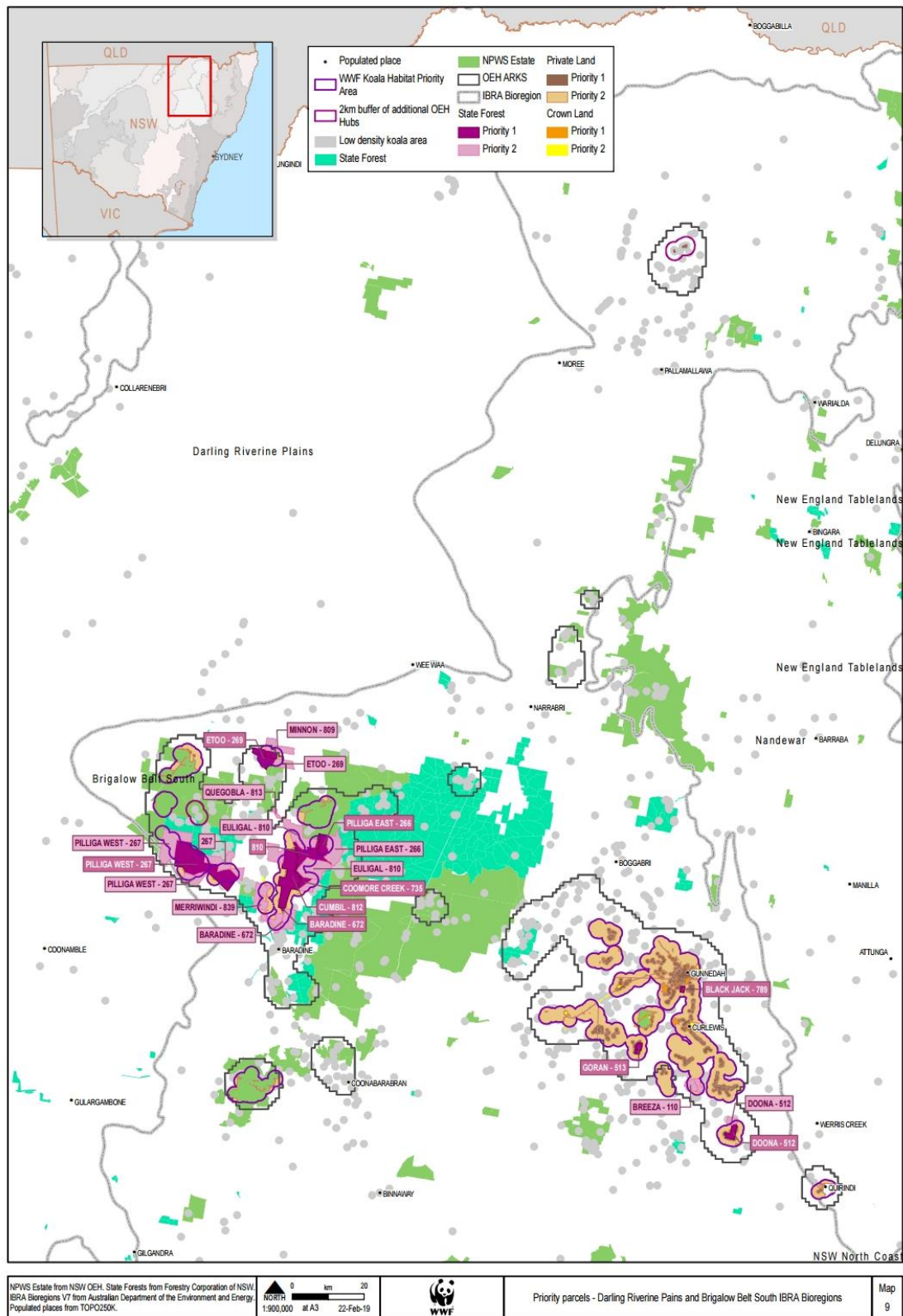
Warm regards,

David Paull

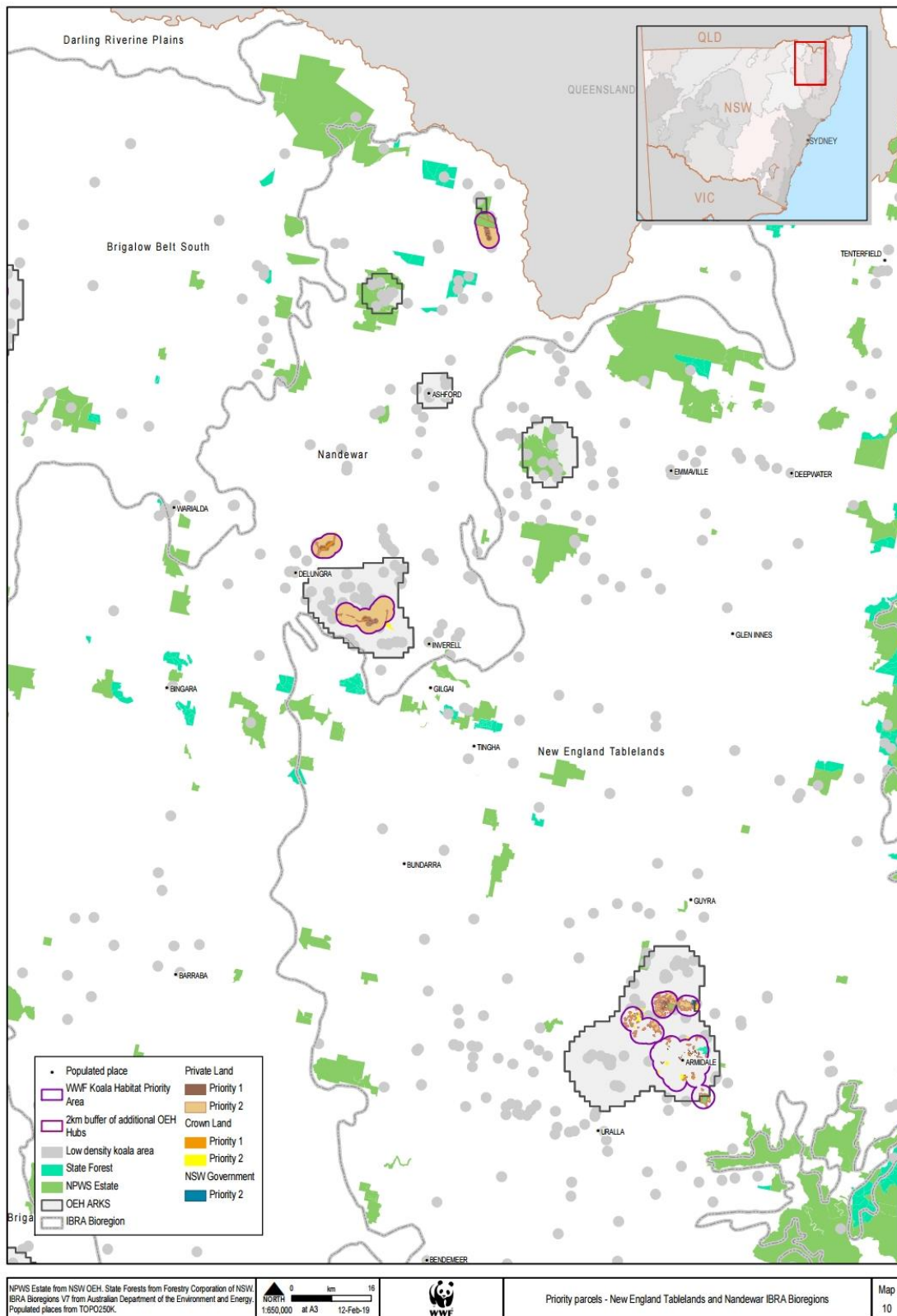
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ATTACHMENT !: Priority lands in the BBS



ATTACHMENT 2. Priority Lands around Inverell, Ashford and Armidale

Attachment 3. Recommended Namoi Koala Park additions

<i>Pilliga region forests</i>				
State forest Name	Area (ha)	Koala Records	Mapped Koala Habitat (ha)	PRIORITY
Baradine	9,884	13	2,738	1
Coomore creek	4,173	15	1,250	2
Cumbil	7,658	162	2,933	1
Etoo	2,951	5	1,105	2
Euligal	10,241	32	4,223	1
Kerringle	6,635	24	871	2
Merriwindi	4,818	10	2,024	1
Minnon	2,415	11	1,422	2
Quegobla	587		267	2
Pilliga east	182,021	21	28,306	2
Pilliga west	31,838	126	18,257	1
Witttenbra	5,567		4,029	1
TOTAL			67,425	

<i>Gunnedah region forests</i>				
Black jack	197	2		2
Breeza	1,361	6		1
Doona	1,319	29		1
Goran	498	19		1
Vickery				2