Year 3 Koala Population Survey Program 2020

Koala Monitoring Program, Yarrabilba PDA

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Cover Photograph – Zara and joey (July 2020) - Heath Agnew

1. Introduction

A *Koala Monitoring Program*[1] has been developed collaboratively between Austecology, University of Queensland's Koala Ecology Group, and Professor Frank Carrick to ensure a robust, scientific, research program to comply with Condition 1b of the EPBC 2013/6791 Approval. The aims of the *Koala Monitoring Program* cover detailed investigations into the ecology, health, and population characteristics of koalas on the site.

In summary, the *Koala Monitoring Program* (KMP) comprises a field program extending over a 3-year period – September 2017 to October 2021, and includes the implementation of three field investigation streams, being:

1. The capture of koalas for the purpose of health assessments and to tag and / or attach monitoring collars in order to assess home range, dispersal into and out of the site, and habitat use. This work includes laboratory analyses of swabs taken from captured koalas in order assess koala health, and genetic diversity of koalas on the site.
2. A monthly program of fieldwork to radio-track koalas in order to visually assess koala condition and collect information on tree species usage.
3. Bi-annual systematic surveys across the site to investigate koala abundance and distribution.

This report presents the results of the 2020 bi-annual systematic surveys across the site.

2. Field Methodology

The primary aim of these field events was to provide a systematic survey across the site in order to collect data on koala presence and distribution.

Consistent with the KMP, the full extent of the Fauna Corridor and EPBCA Offset Areas were systematically surveyed, i.e. the priority survey footprint. Areas of green space adjoining these and the "inholding" of Wal's Block were also included as part of the priority survey footprint. Other separate areas of greenspace were surveyed to augment work within the priority survey footprint, as time permitted.

As directed within the KMP, surveys were implemented twice per year, commencing in March / early-April and six months later in August. The survey timing in August is considered to be important because at that time of the year koala joeys are still dependent, and with their mothers as either back-young or pouch-young, and are large enough to be detected by observers from the ground using binoculars if necessary[2].

The following provides a summary of the work undertaken as part of each event. Survey protocols implemented are regarded as consistent with best practice guidelines and methods used within the region, e.g. DoE 2014, Dique *et al* 2004, QEPA 2006, and DERM 2012.

The on-ground survey protocol provided a systematic and comprehensive search using observers working in unison, to move through habitat, following line transects and methodically searching all trees either side of the nominal centre line of their own transect for koala presence. Visual searches for koalas were augmented by visual scans for koala faecal pellets and diagnostic tree scratching (see **Figure 2-1**).

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[1] Austecology (2017). Koala Monitoring Program Yarrabilba UDA. Report prepared by Lindsay Agnew (Austecology) and Bill Ellis (University of Queensland's Koala Ecology Group).

[2] The presence of observable young may also assist in estimating the proportion of adult breeding females and to monitor trends in breeding rates over time.

Surveyors were spaced approximately 50m to 60m apart either side of the nominal centre line of their own transect in order to minimize the potential for double counting from adjacent transects. One observer used a GPS device to maintain the designated transect direction, and to ensure suitable positioning/separation when undertaking a return transect in the opposite direction (parallel to the previous transect).

Observers regularly referenced their position (via visual and vocal cues) with other observers throughout each transect to maintain correct alignment of the survey transect. Observers cross-checked any koala observation with the relevant adjacent team member to confirm that the observation did not represent a double count.

For any koala observation, the following was undertaken as a minimum: an assessment of the koala's condition, age and gender; GPS location recorded; and identification of the tree species and DBH in which the koala was observed.

All personnel implementing the work were highly experienced in undertaking koala surveys. The average of the total survey team transect coverage for the each of the events was approximately 260 kilometers of foot survey transects.

In April, the koala survey was implemented throughout the period 3 to 7 April inclusive. The survey event provided 14 survey person days. The study team comprised Heath Agnew, Brian Coulter, and Cory Cooper.

In August, the survey event was undertaken during the period 17 to 21 August inclusive. The survey team comprised Heath Agnew, Sean Fitzgibbon, Lindsay Agnew, and Ed Meyer. That event provided 14 survey person days.

There were no site access constraints which were considered to have any material impact to the success of either survey. Field conditions during the early-April event were considered suitable for the survey. During the August event, gusty winds during the mornings of Days 3 and 4 made for less favourable survey conditions, though koalas were still detected in those sessions.

Figure 2-1 Distinctive signs of koala presence

Above – Fresh Koala faecal pellets. **Below** - Fresh koala tree trunk scratching.

3. Survey Results

Figure 3-1 describes the location of koala records from both Year 3 2020 survey events.

Attachment A provides a summary of the data for each koala observed during the 2020 survey program.

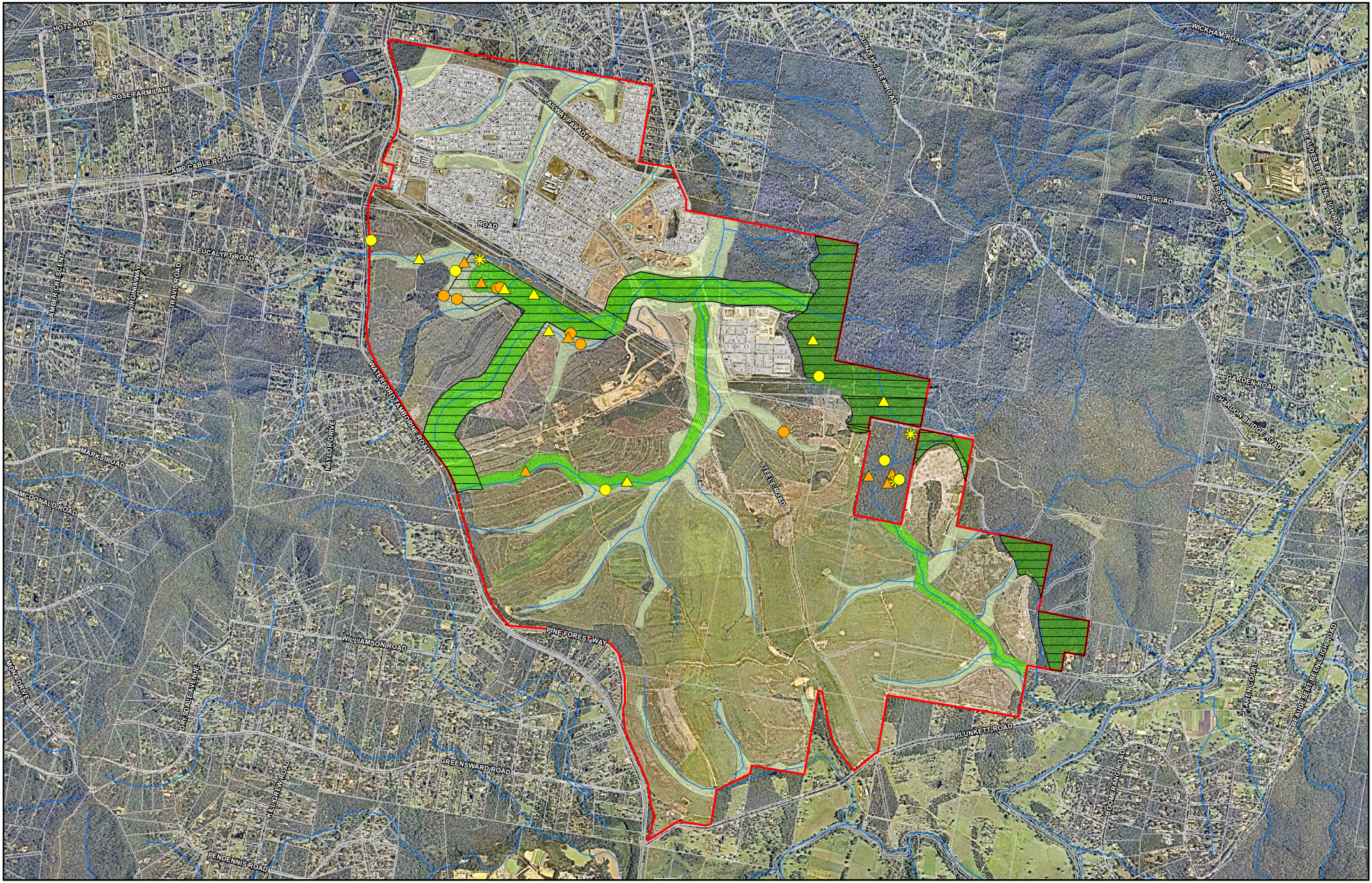
A total of 14 koalas were recorded during the April survey event (see **Attachment A**). This result included six males, seven females, and a young sub-adult for which gender could not be confidently determined.

The majority of those observed were “cleanskins” with koalas recognisable by previous ear tagging, being the males Wooten, Cain, and Lucky, and Jean (adult female). A ‘cleanskin’ female was observed with a bulging pouch, indicating she was carrying a joey. The majority of the koalas observed appeared in good condition.

A total of 16 adult koalas and three joeys (out of pouch) were recorded during the August survey event (see **Attachment A**). Those observations included seven males and nine females. Of the females recorded, three were observed with joeys, with a further female suspected of carrying a joey in her pouch though this could not be confidently confirmed.

As with the results for the April event, the majority of the koalas observed were “cleanskins”. Five koalas were identifiable as a result of previous ear tagging, being the female Millie Mae, and the males Wooten, Lucky, Cain, and Lindsay.

The distribution of 2020 koala survey records (see **Figure 3-1**) is similar to that recorded during the 2018 and 2019 survey events (see **Figure 3-2**).



austecology

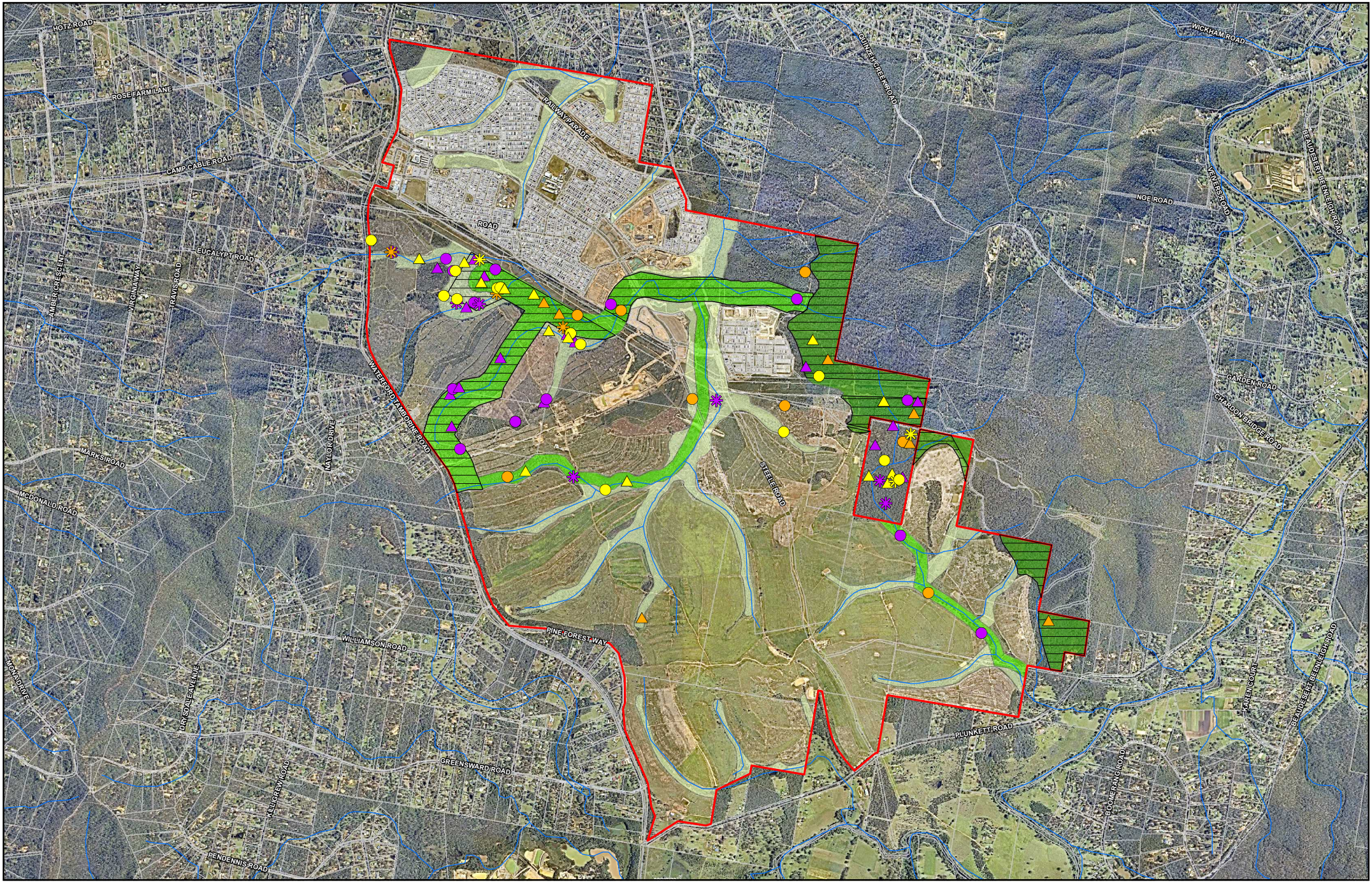
Source:	Watercourses: Department of Environment and Resource Management, VMA Queensland Regrowth Other Watercourses Version 2.1 Cadastral Boundaries / Department of Natural Resources and Mines 2019 Corridors and Assessable Koala Habitat vegetation layers supplied by: Austecology 2014 Offset requirement: Land Lease 2014 Aerial photo: NearMap 2019
Disclaimer:	No warranty is given in relation to the data (including accuracy, reliability, completeness, currency or suitability) and no liability is accepted (including without limitation, liability in negligence) for any loss, damage or costs (including consequential damage) relating to any use of the data. Data must not be used for direct marketing or be used in breach of the privacy laws.
File:	File: Yarrabilba-OffsetMP-Fig3-1-SurveyResults2020-200903 Date: 3/09/2020

0 490 980 1,470 1,960
Meters
A4 Scale 1:40,000
Coordinate System: GDA 1994 MGA Zone 56 Projection: Transverse Mercator

Yarrabilba Priority Development Area
Watercourse
Yarrabilba Offset Requirement under EPBC Act - 195ha
Greenspace Corridor
Fauna Corridor
Environment Protection

April 2020: Females, Males
August 2020: 2020 Males, Females, Females + joey

Figure 3-1:
Population Survey Results - April and August 2020



austecology

Source:	Watercourses: Department of Environment and Resource Management, VMA Queensland Regrowth Other Watercourses Version 2.1 Cadastral Boundaries / Department of Natural Resources and Mines 2019 Corridors and Assessable Koala Habitat vegetation layers supplied by: Austecology 2014 Offset requirement: Lend Lease 2014 Aerial photo: NearMap 2019
Disclaimer:	No warranty is given in relation to the data (including accuracy, reliability, completeness, currency or suitability) and no liability is accepted (including without limitation, liability in negligence) for any loss, damage or costs (including consequential damage) relating to any use of the data. Data must not be used for direct marketing or be used in breach of the privacy laws.
File:	File: Yarrabilba-OffsetMP-Fig3-2-SurveyResults-2018-2019-2020-200903 Date: 3/09/2020

0 490 980 1,470 1,960
Meters
A4 Scale 1:40,000
Coordinate System: GDA 1994 MGA Zone 56 Projection: Transverse Mercator

- Yarrabilba Priority Development Area
- Watercourse
- Yarrabilba Offset Requirement under EPBC Act - 195ha
- Greenspace Corridor
- Fauna Corridor
- Environment Protection

2018	2019	2020
Female	Female	Females
Male	Male	Males
Females + Joey	Females + Joey	Females + Joey

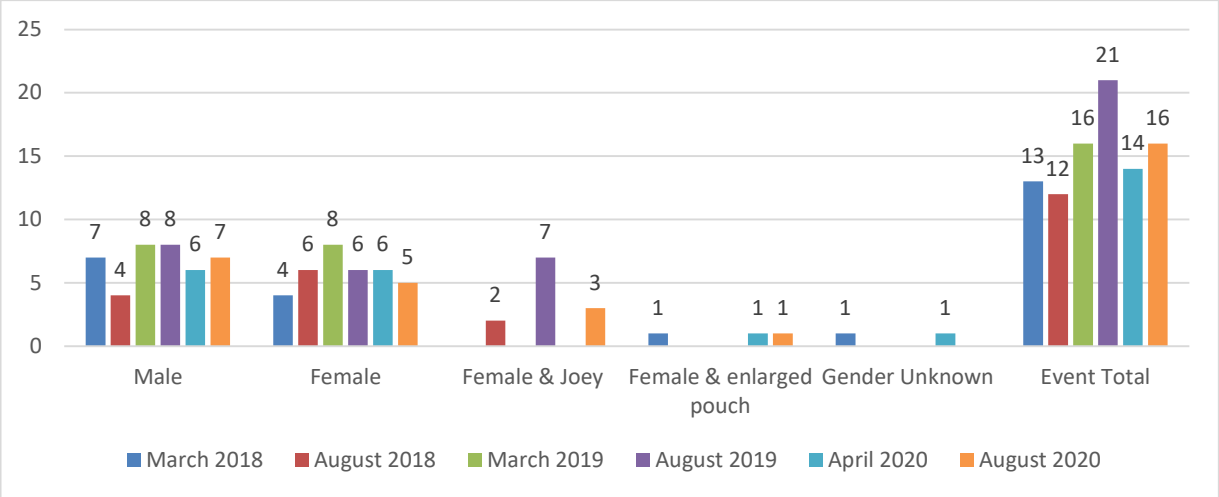
Figure 3-2:
Population Survey Results 2018, 2019, 2020

4. Observations and Conclusions

To date, six similar survey events have been implemented through Years 1, 2, and 3 of the KMP. Each event has involved the same core personnel which provides consistency through the program. During each event, the same priority survey footprint has been systematically surveyed and employing the same set of protocols throughout – again, providing consistency between events. Whilst field conditions (principally weather) have differed, between events, the extent of difference has not been considered to have any material impact to the success of any of the survey events, or of such significance as to confidently contrast or explain differences in survey results.

Figure 4-1 summarises the results from the six survey events. With the exception of the August 2019 results, the 2020 survey events have provided similar results of the other surveys, in terms of event totals, and the composition of those results, e.g. the number of male and female koalas observed.

Figure 4-1 Comparison of Koala Survey Results – March 2018 to August 2020



The data summary shows that a notably higher number of koalas were recorded during the August 2019 survey event. The difference in the results of the August 2019 survey may, in part, be attributable to a comparatively higher proportion of the koalas observed as 'cleanskins'[3] moving into survey areas from surrounding patches of regrowth habitat which were outside greenspace areas and were not previously the subject to systematic surveys under the KMP. That regrowth vegetation was cleared progressively from late-2018 to mid-2019[4], and previously thought to support a very low koala carrying capacity[5] (see discussion within Austecology 2019).

[3] 'Cleanskin' koalas are those which have not been captured and ear-tagged, thus not readily recognisable to the survey team.

[4] Patches of such vegetation were cleared progressively from December 2018 through to May 2019 (total combined area of approximately 95 ha). All vegetation clearing was subject to pre-clearing surveys and the on-going presence of two personnel with previous site familiarity and experience in koala surveys. Observations during that work indicate that possibly four koalas may have occurred within that vegetation, though the nature of their usage (residential or transient) could not be determined.

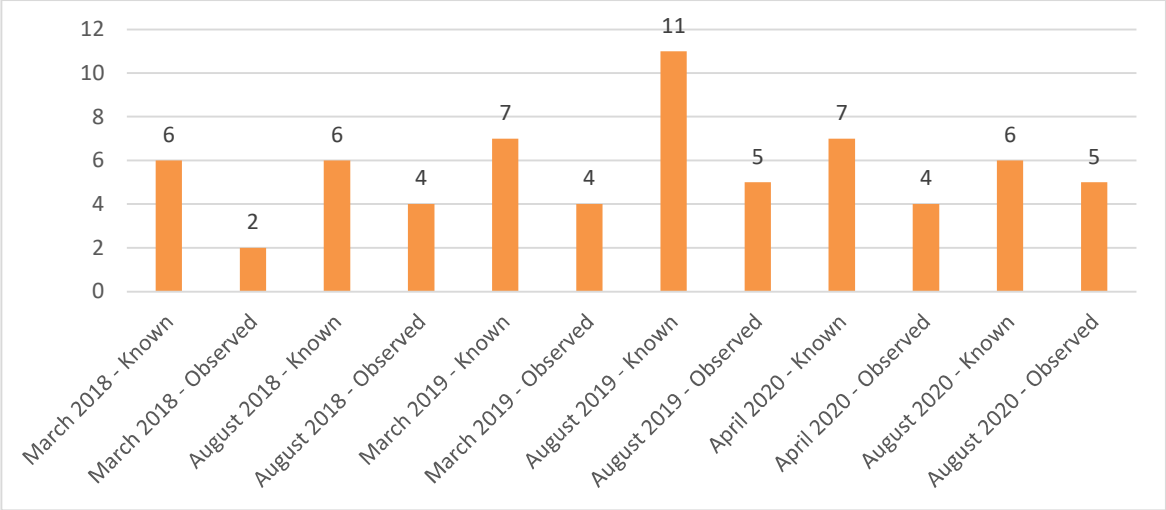
[5] Those areas were dominated by vegetation which is not suitable as forage habitat for koalas (e.g. *Acacia* and *Pinus*), though did support a sparse presence of emergent tree species which are known to provide forage resources for koalas (e.g. *Eucalyptus* and *Corymbia*) (author, *pers. obs.*).

Whilst the abovementioned circumstances may have resulted in a small increase the total number of koalas observed during the August 2019 survey, it is a highly unlikely explanation for the very positive observations of the seven female koalas with joeys. As can be seen from **Figure 4-1**, that result is notably higher than the results for the other two August survey events.

Figure 4-2 provides, for each survey event, a comparison of the number of 'recognisable' koalas[6] (e.g. ear-tagged and / or collared) thought to be present within part of the site at the time of each population survey and the actual survey derived observations. There are no instances where the number of koalas observed during a survey corresponded with the number of "recognisable' koalas thought to be present at that time.

Whilst these results are not necessarily surprising, the results do highlight that despite a systematic field protocol being implemented by experienced observers, the site-wide population survey results are highly likely to be an underestimate of the abundance of koalas at the time of implementing the surveys.

Figure 4-2 Koalas known to be present versus survey records



[6] Collared koalas are radio-tracked on a monthly basis (Austecology), and a capture / collaring event (UQ Koala Ecology Group) is typically implemented a within a month of a population survey event being implemented. Together, that information provides a sound understating of the suite of 'recognisable' koalas which are thought to be present on the site at the time of the population survey event being implemented.

5. References

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Attachment A Koala Survey Records Summary

Date	Koala	Gender	Tree species	Health Appearance	Comments	Easting	Northing
4/04/2020	cleanskin	F	*E. tereticornis*	Eyes & rump appear clean.		513087.58 m E	6922403.36 m S
4/04/2020	Wooten	M	*E. resinifera*	Eyes & rump appear clean.		510943.21 m E	6922080.04 m S
5/04/2020	cleanskin	?	*E. drepanophylla*	difficult to assess	young koala, gender uncertain	513987.51 m E	6922059.18 m S
5/04/2020	cleanskin	M	*E. tereticornis*	Eyes & rump appear clean.		513794.37 m E	6922041.79 m S
6/04/2020	cleanskin	F	*E. tereticornis*	Eyes & rump appear clean.	young female	511317.32 m E	6923221.32 m S
6/04/2020	cleanskin	M	*E. drepanophylla*	Eyes & rump appear clean.	young male	513950.19 m E	6921980.24 m S
6/04/2020	cleanskin	M	*E. crebra*	Eyes & rump appear clean.		511297.40 m E	6923189.87 m S
7/04/2020	cleanskin	F	*E. tereticornis*	Eyes & rump appear clean.	adult female	511399.77 m E	6923129.97 m S
7/04/2020	Jean	F	*E. moluccana*	Eyes & rump appear clean.		510708.20 m E	6923596.73 m S
7/04/2020	cleanskin	F	*E. moluccana*	Eyes & rump appear clean.	adult female	510735.39 m E	6923603.90 m S
7/04/2020	cleanskin	F	*E. moluccana*	Eyes & rump appear clean.	female with bulging pouch	510263.36 m E	6923533.53 m S
7/04/2020	cleanskin	F	*E. moluccana*	Eyes & rump appear clean.		510374.53 m E	6923506.07 m S
7/04/2020	Cain	M	*E. tereticornis*	Eyes & rump appear clean.		510435.76 m E	6923814.52 m S
7/04/2020	Lucky	M	*E. moluccana*	Eyes & rump appear clean.		510576.37 m E	6923647.91 m S
17/08/2020	Wooten	M	*E. tereticornis*	Eyes & rump appear clean.		511785.33 m E	6921996.61 m S
17/08/2020	cleanskin	F	*E. tereticornis*	Eyes & rump appear clean.	close to location of Wooten	511606.00 m E	6921921.00 m S
18/08/2020	cleanskin	F	*E. tereticornis*	Eyes & rump appear clean.	female with joey	510360.65 m E	6923739.70 m S
18/08/2020	Lucky	M	*E. tereticornis*	Eyes & rump appear clean.	left ear tear	510768.18 m E	6923594.13 m S
18/08/2020	cleanskin	M	*E. tereticornis*	Eyes & rump appear clean.		511012.21 m E	6923550.04 m S

Date	Koala	Gender	Tree species	Health Appearance	Comments	Easting	Northing
18/08/2020	Cain	M	*Pinus radiata*	Eyes & rump appear clean.		510061.80 m E	6923845.08 m S
18/08/2020	cleanskin	F	*E. drepanophylla*	Eyes & rump appear clean.		510562.34 m E	6923832.91 m S
18/08/2020	Lindsay	M	*L. suaveolens*	Eyes & rump appear clean.		511136.13 m E	6923246.85 m S
19/08/2020	cleanskin	M	*E. acmenoides*	Eyes & rump appear clean.		513329.12 m E	6923171.30 m S
19/08/2020	cleanskin	F	*E. acmenoides*	Eyes & rump appear clean.		513381.08 m E	6922866.29 m S
19/08/2020	cleanskin	M	*C. intermedia*	Eyes & rump appear clean.		513918.68 m E	6922660.42 m S
20/08/2020	cleanskin	F	*E. tereticornis*	Eyes & rump appear clean.		513924.71 m E	6922166.59 m S
20/08/2020	cleanskin	F	*C. intermedia*	Eyes & rump appear clean.	difficult to gain a good view	514047.13 m E	6922007.49 m S
20/08/2020	cleanskin	F	*E. drepanophylla*	Eyes & rump appear clean.	female with joey	514143.00 m E	6922382.00 m S
20/08/2020	cleanskin	F	*E. acmenoides*	Too difficult to fully assess	female with joey	514015.50 m E	6921991.13 m S
21/08/2020	Millie Mae	F	*E. tereticornis*	Eyes & rump appear clean.	very difficult to gain a good view	509660.35 m E	6923994.81 m S