Koala Monitoring Program

Yarrabilba Priority Development Area

Koala Capture / Monitoring Event July-August 2019

Summary Report

Picture of Jean's pouch young, named Marlee

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Introduction

This report presents the latest findings from the Koala Monitoring Program that has been implemented for the Yarrabilba Priority Development Area by the Koala Ecology Group (University of Queensland) in partnership with Austecology. The Koala Monitoring Program has been developed to monitor koala health and use of koala habitat offsets under the Commonwealth's EPBC 2013/6791 Approval.

The *Koala Monitoring Program* comprises three key elements:

1. ***Koala Capture / Monitoring Events*** - This component of the program will involve fieldwork to catch, examine and tag selected koalas for monitoring purposes.
2. ***Koala Monitoring Events*** - This component is designed to track and establish the location of collared koalas in order to visually assess their well-being (using binoculars) as well as their tree use preferences.
3. ***Koala Population Survey Events*** – This component will provide a series of systematic transect searches throughout the full extent of the designated "Fauna Corridor", and the seven EPBCA Offset Areas.

During March 2019 a *Koala Capture / Monitoring Event* was conducted at the Yarrabilba site. The aims of the fieldtrip were to: 1. Radio-track collared koalas to visually check their well-being, 2. Visually check the condition of the tree-mounted LX base stations, 3. Attempt to catch koalas that need health checks/treatment, and 4. Search for new koalas at the site.

This report summarises the main findings from the recent koala capture/monitoring event.

Methodology

The koala monitoring event occurred from the 4th – 6th March 2019. The study team comprised three personnel from the Koala Ecology Group (Ben Barth, Bill Ellis, and Sean FitzGibbon).

At the time of the fieldtrip five koalas were collared, including three males (Cain, Heath & Kevin) and two females (Jean & Nyunga). These koalas were located by radio-tracking using the unique VHF radio signal emitted from each collar. Two of these collared koalas were scheduled for recapture to assess their health and check that their collar was still fitting well.

Throughout the fieldtrip, habitat searches were conducted to try and locate new/untagged koalas ("cleanskins") at the site to tag and fit with collars. The nominated target habitat area within EPBCA Offset Area 1 was prioritised for these searches and when a koala was detected, suitability for capture was assessed. Capture attempts were made using the previously described methods, involving a tree climber and a ground support team implementing the extendable pole "flagging" method. Alternatively, we also used the "fence trap" technique where the situation allowed (e.g. isolated tree, flat ground).

Captured koalas were restrained in a cloth bag in a cool location and processed at the site. Processing took approximately 45mins per animal, during which time the koala was briefly anaesthetised (5mins) to facilitate a basic health examination and the collection of body measurements, as well as eye and urogenital swabs for disease testing. Measurements included body weight, head length and width, testes width (males), and an assessment of tooth wear (to age the koala) and body condition (from 1 to 10; 1 = very poor condition, 10 = excellent condition).

Cleanskin koalas were fitted with a coloured ear tag stamped with a unique number, following previous protocols (right ear for females and left for males). A small stainless steel numbered tag was inserted in the opposite ear as back-up identification. It is important to note that the coloured tags are often visible from the ground, permitting easy identification of study animals by anyone that observes a koala at the site. Binoculars would be required if the koala was located high in a tree.

Cleanskin koalas were then fitted with collars to enable them to be radio-tracked (during Koala Monitoring Events) as well as monitored using the online Koala Tracker system (see http://trackkoalas.com.au/ for further information on this koala-specific tracking system). For koalas that were already collared, the collar fit was checked to ensure it was neither too tight nor loose.

After processing, captured koalas were allowed time to fully recover from anaesthesia before being released in the same tree from which they were captured. All procedures were in accordance with our current DES Scientific Purposes Permit and University of Queensland Animal Ethics Certificate.

Results & Discussion

A total of seven independent koalas were sighted during the July-August 2019 field trip, within the focal area of the Yarrabilba Priority Development Area (Fig. 1). All seven were tagged koalas and five were already fitted with collars; we did not observe any adult ‘cleanskins’ (i.e. koalas not previously caught and tagged).

The seven tagged koalas that were sighted during the trip included two females (Jean & Nyunga) and five males (Cain, Kevin, Heath, Bomber & Lucky). Two of these koalas (Bomber & Lucky) were no longer collared, but they were sighted, recaptured and fitted with collars again.

An unsuccessful attempt was made to recapture Kevin. The catch was aborted when the koala started behaving in a very nervous manner, jumping between branches in the crown of a blue gum.

In total, three independent koalas were captured during the July-August 2019 *Koala Capture / Monitoring Event*. Further details concerning the health and examination of these koalas are provided below, with pictures taken during the fieldtrip. In addition, the female koala named Jean was recaptured and found to be carrying a well-developed pouch young. This offspring was large enough to be examined and details are also provided below.

Swabs collected during the fieldtrip were sent for laboratory testing to determine if any of the sampled koalas were positive for chlamydia; the test results are presented in Table 1. All updated tag and collar details are provided in Appendices 1 and 2.

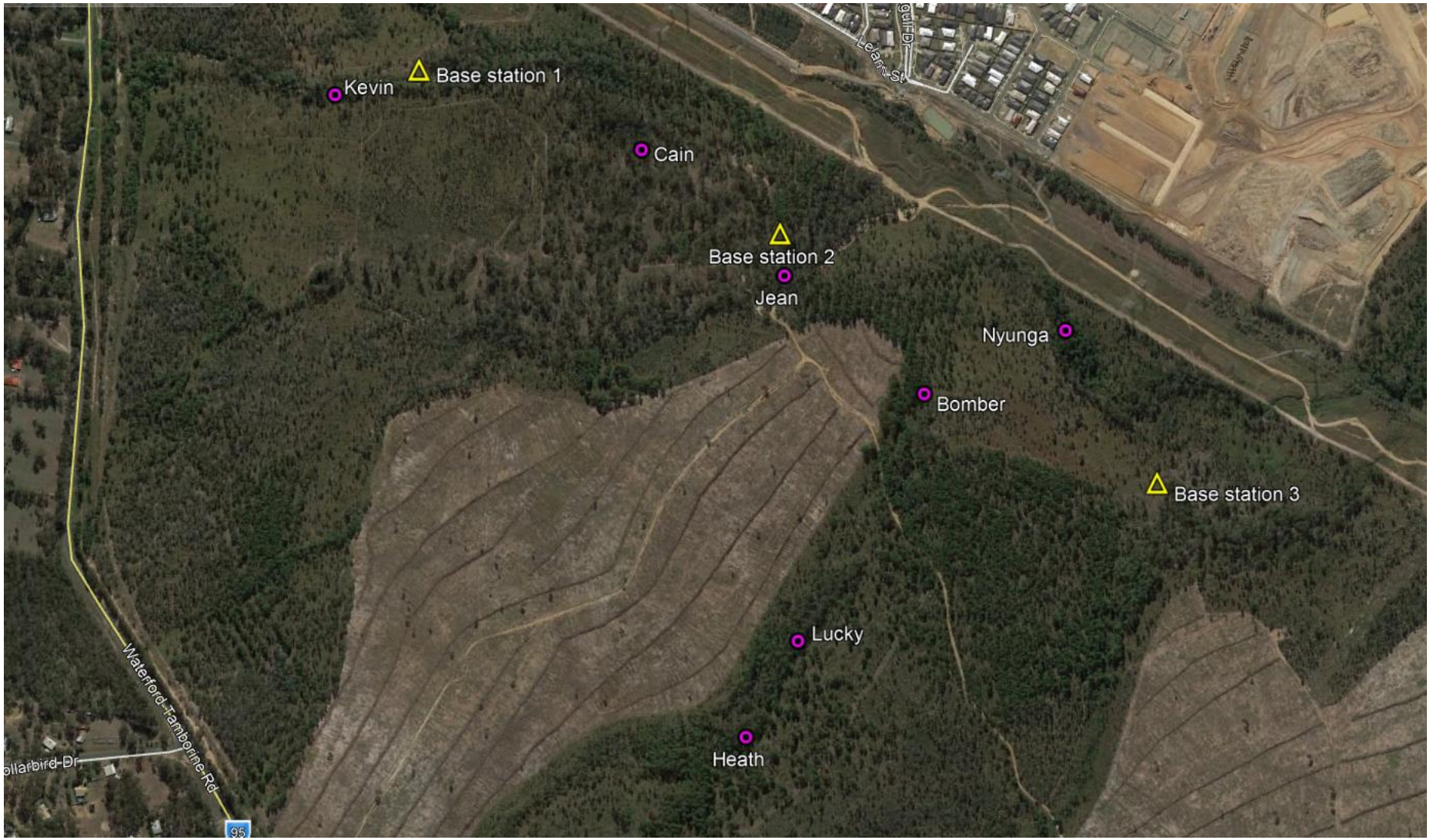

Figure 1. Plot of the initial locations of koalas that were sighted during the July-August 2019 fieldtrip, and the locations of the solar-powered base stations that have been deployed to monitor their movements.

Jean (13486) & offspring Marlee (13518)

After numerous unsuccessful attempts to recapture Jean over several previous fieldtrips, she was finally caught using the fence trap method on 1st August 2019. Jean was residing up a very large gum-topped box that was relatively isolated, making it suitable for using the fence trap (Figure 2).

A motion sensor camera was used to monitor the fence trap and it showed that Jean descended the occupied tree at approximately 3:30am and then entered the cage trap on the ground (Figure 3). The catch team were alerted immediately as the camera was programmed to send a notification. This ensured that Jean did not spend long in the trap before she was safely transferred to a cloth holding bag, ready for detailed examination later that morning.

Figure 2. Image of the fence trap that was set up to catch female koala Jean; she was radio-tracked and found to be occupying a very large gum-topped box.

Figure 3. Images showing A) the cage trap set into the lower edge of the corflute fencing; B) the motion sensor camera that was used to monitor the trap, and C) the image sent by the camera once Jean had entered the trap.

The examination of Jean revealed she was in good condition (body score 7/10) and was carrying a young in her pouch estimated to be seven months of age. The young female was also examined and was given the name Marlee, which was one of the community suggested names. Marlee was fitted with a small metal ear tag to enable identification once she becomes independent.

While Jean was anaesthetised, ocular and urogenital swabs were collected to determine if she was infected with Chlamydia; the laboratory test results were negative (Table 1). Jean's LX collar was fitted with a new VHF transmitter as the battery on the old one had expired. After examination and processing she was released back at the point of capture with Marlee on her back.

Figure 4. Image of Jean's female pouch young, named Marlee, which was estimated at seven months of age. Jean was anaesthetised to facilitate her health check and examination of the offspring.

Lucky (13508)

This male koala was first captured in May 2019 and was fitted with a collar and ear tag transmitter. Since that time Lucky had dropped his collar and torn out his ear tag. Ear tags rarely tear out but we presume this is usually the result of an aggressive encounter with another koala.

Lucky was sighted during a search of habitat in one of the vegetation corridors and was able to be recaptured. He was found occupying a narrow-leaved blue gum (*Eucalyptus seeana*) and was flagged down by our tree climber and ground team.

The examination of Lucky revealed he was still in excellent body condition (score 9/10). He did not have any clinical signs of chlamydial disease, however, the swab collected from his right eye in May 2019 did return a very slight positive test result (see Table 1). The decision was made to monitor Lucky's right eye given that the test suggests it has a very low level chlamydial infection. We have observed in the past that such infections can resolve naturally, avoiding the need for lengthy antibiotic treatment in care. As can be seen in Figure 5, Lucky's right eye does not currently show any signs of inflammation. The situation will be monitored through future catches and health examinations, including follow-up swab tests.

Lucky was fitted with an LX tracking collar and ear tag with micro-transmitter, and then released at the point of capture.

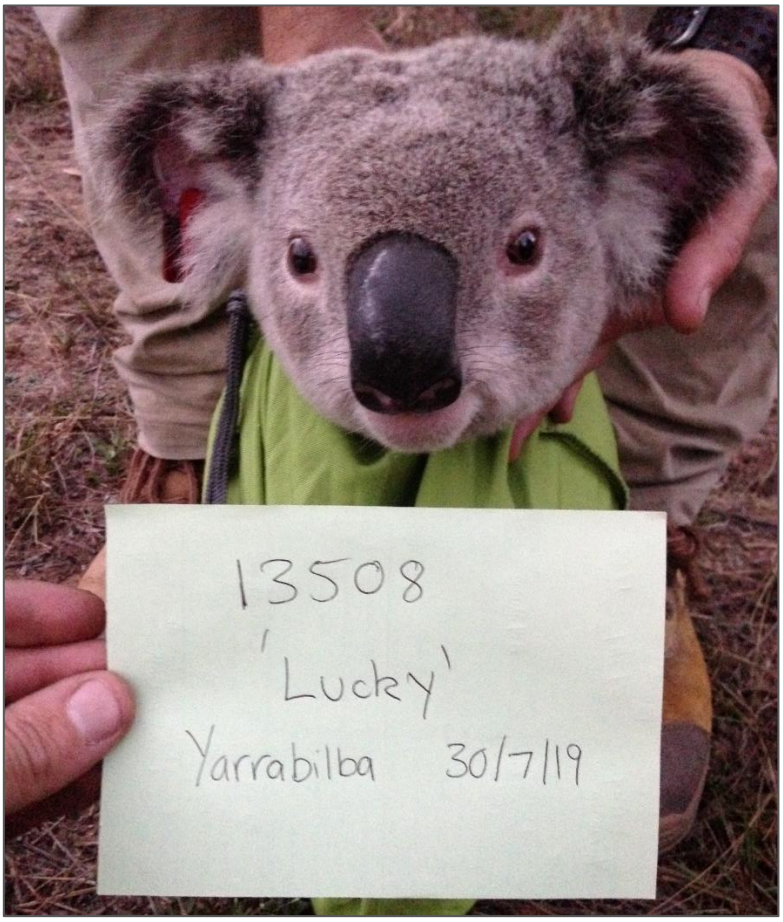

Figure 5. Image of Lucky after he was recaptured from a narrow-leaved blue gum.

Bomber (13008)

The male koala named Bomber was last captured in August 2018. He was radio-tracked later that year (10th October) but then dropped his collar. During the recent fieldtrip he was spotted within a stand of blue gums that he was known to utilise regularly while collared. The catch effort required our climber to ascend the occupied tree and flag Bomber down to a height where the ground team could take over. This process went smoothly and the koala was safely recaptured.

The examination of Bomber suggested he was still in fair condition (body score 6/10, same as August 2018), and still rates as the largest koala captured at the site (>9kg). Two small areas of fungal infection were observed: one on the right finger and the other on the left leg. Such fungal patches are not uncommon in koalas (Cain also has a small fungal patch on top of his head). They are not generally cause for concern, and are best monitored through time to detect any potentially negative changes.

Bomber's eyes were clear (Figure 6) and he did not present any obvious signs of disease. Swabs were collected from Bomber's eyes and urethra and sent for laboratory testing. The test results revealed that Bomber has a low level infection in his urogenital tract (see Table 1). Although the infection is currently low level, there is the potential for Bomber to transmit the bacterial pathogen during mating with females. For this reason, it is advisable from a management perspective to have Bomber treated in captivity so that his infection can be cleared with antibiotics. This risk may be heightened given that Bomber had an extremely large and active sternal gland on his chest (Figure 7), suggesting he is physiologically primed for mate attraction and copulation. We recommend that Bomber be taken into care during the next Koala Capture / Monitoring Event (planned for November 2019).

Bomber was fitted with a standard LX collar and then released at the point of capture (Figure 8).

Figure 6. Image of Bomber showing that his eyes were clear and free of obvious infection.

Figure 7. Image of Bomber showing his large sternal gland (yellow arrow). This gland is thought to produce secretions that are important in mate attraction as well as territory marking.

Figure 8. Dr Bill Ellis releasing Bomber after examination and collar fitting.

Laboratory testing of swab samples

Table 1 displays the laboratory test results for swab samples that were collected over the past two *Koala Capture / Monitoring Events* (May and July-August). The swabs were tested for the presence of chlamydial DNA; *Chlamydia pecorum* is a bacterial pathogen that commonly causes inflammation and disease in the eyes and urogenital tracts of koalas.

The results show that all three of the examined male koalas (Lucky, Heath & Bomber) returned positive test results from at least one swab site. The two females (Nyunga & Jean) returned negative test results, which was extremely encouraging as both are mature females (and Jean is carrying a pouch young).

Table 1. Laboratory test results for swab samples collected during May and July-August fieldtrips.

ID	Name	Sex	Swab date	Swab site	*Chlamydia pecorum* DNA	IFU/mL
13508	LUCKY	M	27/05/2019	Left eye	NEGATIVE	
				Right eye	**POSITIVE**	94
				Penis (urethra)	NO RESULT	
13007	HEATH	M	29/05/2019	Left eye	**POSITIVE**	68,774
				Right eye	NEGATIVE	
				Penis (urethra)	**POSITIVE**	295
13509	NYUNGA	F	28/05/2019	Left eye	NEGATIVE	
				Right eye	NEGATIVE	
				Urogenital tract	NEGATIVE	
13008	BOMBER	M	31/07/2019	Left eye	NEGATIVE	
				Right eye	NEGATIVE	
				Penis (urethra)	**POSITIVE**	666
13486	JEAN	F	1/08/2019	Left eye	NEGATIVE	
				Right eye	NEGATIVE	
				Urogenital tract	NEGATIVE	

As stated above, the swab collected from Lucky's right eye in May 2019 did return a very slight positive result, suggesting it has a very low level chlamydial infection. The decision was made to monitor the condition of this eye as the infection may resolve naturally, avoiding the need for lengthy antibiotic treatment in care. Lucky's right eye does not currently show any signs of inflammation.

The test results revealed that Bomber has a low level infection in his urogenital tract. Although the infection is currently low level, there is the potential for Bomber to transmit the bacterial pathogen during mating with females. As such, we recommend that Bomber be taken into care for antibiotic

treatment at the next *Koala Capture / Monitoring Event* (planned for November 2019). Early treatment of low grade infections is more likely to be successful and achieved efficiently (e.g. 2wks of antibiotics vs 4wks).

Heath was the only koala that returned positive test results from two swab sites (collected May 2019); although the penial swab suggested a low grade infection of the urethra, the left eye swab revealed a high grade infection (>50,000 copies of chlamydial DNA per ml). As was noted in the May 2019 report, during the visual examination of Heath his left eye was regarded as having minor inflammation of the conjunctiva (Figure 9). The laboratory test results have confirmed that this is due to a serious chlamydial infection. As such, we recommend that Bomber be taken into care for antibiotic treatment at the next *Koala Capture / Monitoring Event* (planned for November 2019).

Figure 9. Image of Heath's head, taken from the May 2019 report. The picture shows the inflammation of his left eye conjunctiva (orange arrow).

Conclusion

The *Koala Capture / Monitoring Event* conducted during July-August 2019 was the third for the year under the adopted Koala Monitoring Program. The following points summarise what was achieved:

- A total of seven independent koalas were sighted within the priority area, all of which were already tagged. No untagged (cleanskin) individuals were observed.
- Three of these koalas were captured (Jean, Bomber & Lucky). Both Lucky and Bomber had dropped their previously fitted collars, so they were re-collared so that their movements could be monitored with the LX system.
- The female koala named Jean was finally recaptured after several unsuccessful attempts over recent fieldtrips. Jean was found to be carrying a well-developed pouch young (named Marlee) which was large enough to be examined and fitted with a small metal ear tag.
- An unsuccessful attempt was made to recapture Kevin. The catch was aborted when the koala started behaving in a very nervous manner, jumping between branches in the crown of a blue gum.
- All collared koalas were radio-tracked during the fieldtrip and their locations recorded.
- Laboratory testing of collected swab samples revealed that three of the collared males (Lucky, Bomber & Heath) have chlamydial infections. Lucky has a very low level infection and no management action is recommended at this stage, other than to monitor his health and level of infection over future trips; the infection may resolve naturally. Bomber and Heath have more serious infections and it is recommended that they be taken to Australia Zoo Wildlife Hospital for treatment with antibiotics, as occurred successfully with Cain.

At the end of the July-August 2019 fieldtrip, seven koalas were fitted with collars (see Appendices 1 and 2). This was the third *Koala Capture / Monitoring Event* for 2019 under the current contract. The koalas that are currently collared will continue to be routinely radio-tracked under the *Koala Monitoring Events* component of the program until the end of the year.

Appendix 1. Summary of tag and other details for all koalas captured at the site to date (August 2019). Koalas fitted with collars at the end of the August 2019 fieldtrip are highlighted yellow.

UQ #	Name	Sex	Mass	Age	Left ear tag	Right ear tag	1st Capture	Latitude	Longitude	Notes from latest trip (August 2019)
13007	Heath	M	3.83	2+	Orange F10	Yellow H10	17/05/2017	-27.8113490	153.1062150	Sighted; not recaptured
13009	Caitlin	F	5.92	4	Pink 866	Yellow H6	18/05/2017	-27.8219730	153.1313310	Unsighted since first capture
13008	Bomber	M	9.28	5-10	Light Blue 621	Pink 886	18/05/2017	-27.8121970	153.1072190	Recaptured 31/7/19 and collared; fair condition.
13486	Jean	F	5.56	3-6	metal UQ800	Orange F15	9/10/2017	-27.8121559	153.1086764	Recaptured 1/8/19 and replaced collar transmitter. Has pouch young (Marlee).
13487	Emily	F	1.07	1	metal UQ724	metal UQ789	9/10/2017	-27.8121559	153.1086764	Unsighted since first capture
13488	Cain	M	8.07	2-4	Royal Blue G8	metal UQ796	9/10/2017	-27.8132431	153.1039776	Sighted; not recaptured
13489	Scarlet	F	4.81	1-3	metal UQ753	Royal Blue G14	10/10/2017	-27.8110978	153.1049627	Sighted 6th and 7th August 2018, with back young
13490	Sue-Bob	F	5.66	5-10	metal UQ799	Orange F20	10/10/2017	-27.8122096	153.1063710	Recaptured March 2019 and de-collared; very poor condition

13495	Kobe	F	5.06	3-6	metal UQ175	Yellow C20	20/03/2018	-27.8137242	153.1169157	Taken to AZWH; euthanised August 2018
13304	Zara	F	6.17	5-10	Maroon A16	Yellow C4	6/06/2018	-27.8097031	153.1034546	Unsighted since March 2019
13497	Lindsay	M	5.8	2-4	Yellow C10	metal UQ958	10/10/2018	-27.8170122	153.1096012	Unsighted since May 2019
12341	Kevin	M	2.15	1-2	Light Blue B5	Metal UQ991	4/03/2019	-27.811086	153.104432	Sighted; not recaptured
12342	Meghan	F	5.02	3-6	Metal UQ965	Light Blue B3	5/03/2019	-27.818168	153.108581	Unsighted since first capture
13508	Lucky	M	7.4	2-4	Yellow C19	Maroon A19	27/05/2019	-27.809771	153.103803	Recaptured and collared; excellent condition
13509	Nyunga	F	3.24	1-2	Metal UQ955	White T7	28/05/2019	-27.815716	153.115121	Sighted; not recaptured

Appendix 2. Summary of radio frequency details for all koalas fitted with collars at the end of the August 2019 fieldtrip

KOALA	COLLAR FREQ	ON TIME	COLLAR DETAILS	EAR TX FREQ*	EAR TX START	EAR TX EXPIRY
JEAN	149.033	6:00am 12hr	LX collar A4-222	-		
CAIN	151.383	7:30am 12hr	LX collar A4-069	-		
LUCKY	151.403	7:30am 12hr	LX collar A4-203	150.550	27/05/2019	8/02/2020
BOMBER	149.412	6:00am 12hr	LX collar A4-095	-		
HEATH	151.524	5:30am 12hr	LX collar A4-134	150.408	29/05/2019	10/02/2020
KEVIN	151.282	7:30am 12hr	VHF-only collar	-		
NYUNGA	151.483	7:30am 12hr	VHF-only collar	-		

*** ALL EAR TAG TRANSMITTERS ARE CONSTANT TICKERS (I.E. NO DUTY CYCLE) AND HAVE AN ESTIMATED BATTERY LIFE OF 257 DAYS**