# Koala Monitoring Program

## Yarrabilba Priority Development Area

### Koala Capture / Monitoring Event, February 2022

### Summary Report

Image: Drs Ben Barth and Bill Ellis anaesthetising a koala during the February 2022 fieldtrip.

## Introduction

This report presents the latest findings from the Koala Monitoring Program that has been implemented for the Yarrabilba Priority Development Area 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 February 2022, our research team conducted a *Koala Capture / Monitoring Event* at the Yarrabilba site. This was the first such event for the year. The aims of the fieldtrip were to 1. Radio-track koalas fitted with transmitters to visually check their well-being, 2. Check that the LX remote monitoring system was functioning correctly and that the solar-powered base stations were free of debris, 3. Search for other tagged and cleanskin koalas to log their locations at the site, and 4. Deploy any available LX tags on captured koalas.

A further aim for the fieldtrip was to trial the use of a recently purchased drone, to efficiently search habitat and locate koalas. The drone was equipped with a high-quality thermal-imaging camera that can detect the radiant heat produced by koalas, which have a body temperature of approximately 35°C.

This report summarises the main findings from the February 2022 koala capture/monitoring event.

## Methodology

The koala monitoring event occurred from the 14 – 16 February 2022. The research team comprised three personnel from the Koala Ecology Group (Ben Barth, Bill Ellis, and Sean FitzGibbon).

At the start of the fieldtrip, two koalas were fitted with collars (Ella & Gladys). Two collars had fallen off koalas (Bilba & Jana) since the previous trip (November 2021). A main aim of the February trip was to get these two collars re-deployed, preferably on different koalas.

Where possible, koalas fitted with collars or ear tag transmitters were located by radio tracking, using their unique VHF radio signal.

Throughout the fieldtrip, habitat searches were conducted to try to locate new/untagged koalas ("cleanskins") at the site to potentially 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, the "fence trap" technique may be used 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 30-45mins per animal, during which time the koala was briefly anaesthetised (3-5mins) 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 provided with sufficient resting time to fully recover from anaesthesia before being released in the same tree from which they were captured.

## Results & Discussion

During the fieldtrip, nine previously tagged and independent koalas were sighted (1. Cain, 2. Bilba, 3. Ella, 4. Gladys, 5. Jana, 6. Kamala, 7. Lucky, 8. Scarlet, 9. Zara). In addition, numerous cleanskin (untagged) koalas were observed during the trip. Ten observations of cleanskins were made, which comprised at least seven different individuals (as these observations were made on the same day). Therefore, a total of 16 independent koalas were sighted during the February 2022 field trip. The locations of these koalas are presented in Figures 1 and 2. Three cleanskins were captured and tagged.

The number of detected koalas (16) was considerably higher than normal. During most previous fieldtrips we have sighted between 6-12 independent koalas. During the previous 3-day fieldtrip in November 2021, eight independent koalas were sighted. The high number of koalas sighted during the February 2022 trip was largely attributable to the use of the thermal-imaging drone. The drone proved highly effective at finding koalas, even during mid-morning on cloudy days. The drone pilot (B. Barth) was able to systematically search habitat areas, generally flying at a height of ~40m. Once a koala was detected, the location (GPS coordinate) was recorded. We were able to subsequently

sight the koala by navigating to the location using a hand-held GPS. The trial demonstrated that this technology holds enormous potential for efficiently conducting future koala surveys.

Four koalas were caught during the February 2022 *Koala Capture / Monitoring Event*, including one tagged individual (Cain) and three cleanskins (Miso, Larabee and Clancy).

Two attempts were made to recatch the tagged male 13508 (Lucky) on the 14th and 16th February. On both occasions the koala was unresponsive and ignored the flags at the ends of our extendable poles. He had responded in a similar way during previous catch attempts. The tree climber was very close to Lucky during the first attempted catch and could see that he appeared to be in good condition (Figure 3).

During habitat searches we came across the decomposed carcass of female 13486 (Jean). Her skull was completely clean (i.e. no decaying tissue remained) and her ear tags were still present (Figure 4). Jean was first caught in October 2017 as part of the initial koala surveys at the site. Her movements, reproduction and well-being were monitored for several years before her tracking collar was removed. She was last seen alive during November 2020, with a large young. It was not possible to ascertain the likely cause of Jean's death. She was estimated to be approximately 10yrs old.

No koalas were found within the main fauna corridor (to the south of the main study area) despite this area being thoroughly searched on foot and with the thermal-imaging drone.

Further details concerning the health and examinations of the captured koalas are provided below, with pictures taken during the fieldtrip. All updated tag and transmitter details are provided in Appendices 1 and 2.

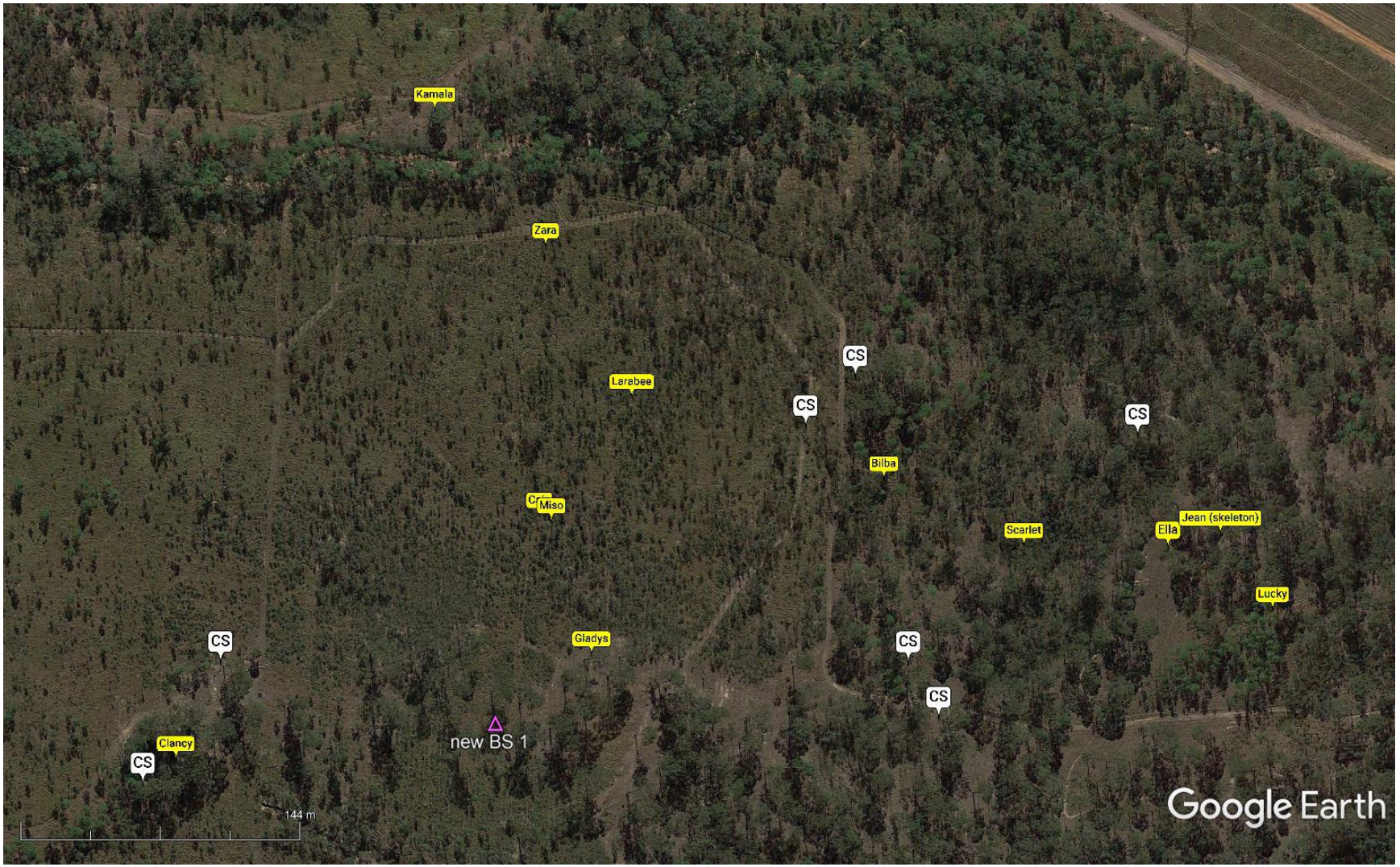


Figure 1. Plot of the locations of koalas sighted in the main study area during the February 2022 fieldtrip (CS = cleanskin; BS = base station). Note, the label for Cain is obscured by Miso's; these koalas were located very close to each other.

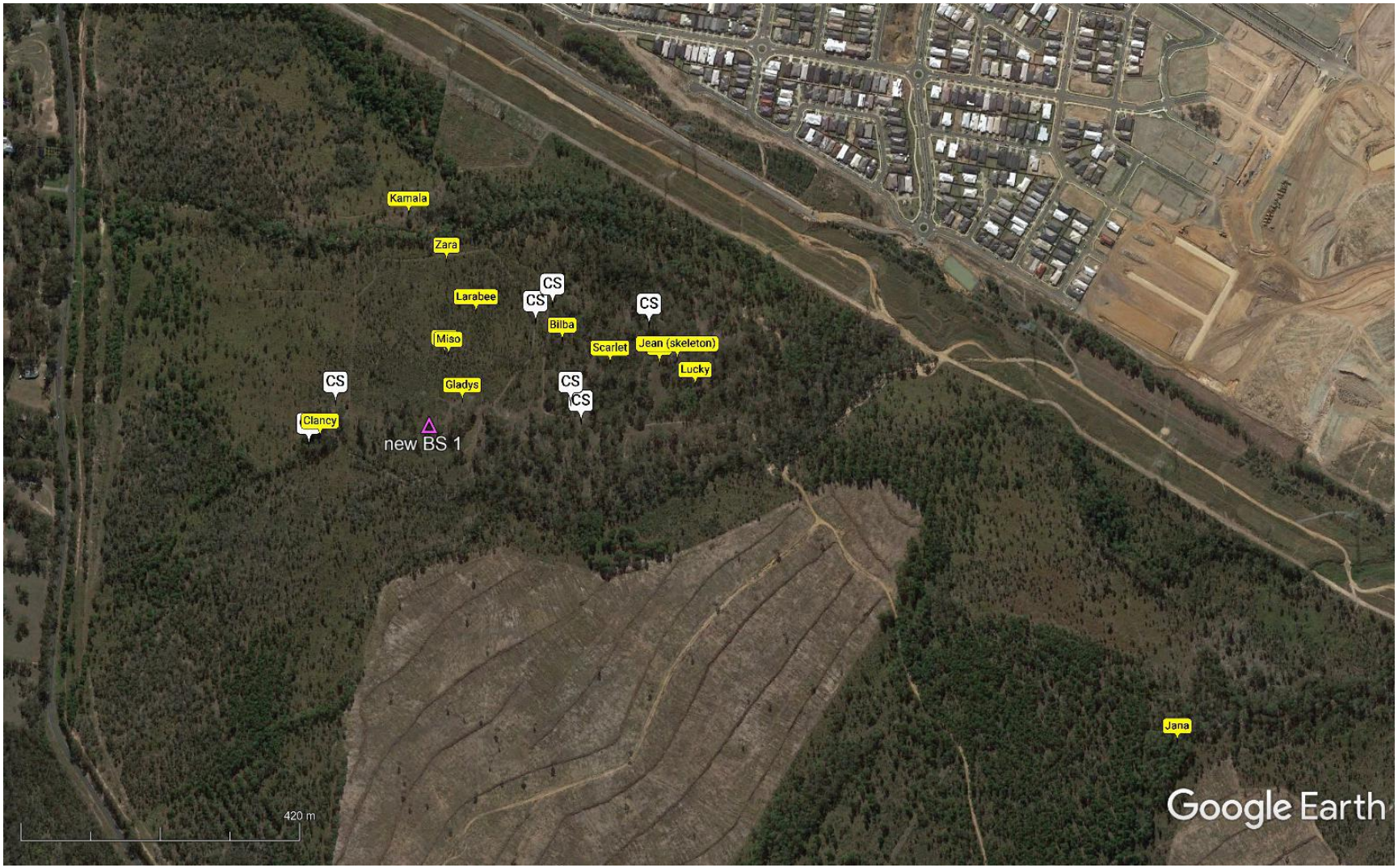


Figure 2. Aerial image at greater extent showing locations of all koalas sighted during the February 2022 fieldtrip, including Jana south of the main study area.

Figure 3. Image of male 13508 (Lucky) that was unresponsive to the flagging poles during a failed catch attempt. He looked to be in good physical condition.


Figure 4. Image showing the decomposed carcass of female 13486 (Jean), which was found opportunistically during a habitat search for koalas. Jean was originally tagged in October 2017.

### *Cain (13488)*

Cain was first captured in October 2017 and was immediately taken to AZWH for treatment of a severely infected right eye. The treatment was successful, and he was released back at the site in December of that year. Three years later (Nov'20), Cain become reinfected with *Chlamydia*, after twice testing negative in the intervening period (Oct'18 and Mar'19). He was captured and taken into care, once again, for treatment of a severely inflamed right eye. His rump also appeared to have minor staining.

After another lengthy stay (2 months) at the wildlife hospital, where Cain underwent treatment with antibiotics to clear his chlamydial infection, he was released back at the Yarrabilba study site in early January 2021.

During the recent fieldtrip (Feb'22), Cain was recaptured. His body score (6/10) had improved since release in Jan'21 (5/10), and he had gained 300g to weigh 8.4kg. He showed no visual signs of chlamydial infection and the collected ocular and penile swabs tested negative in the laboratory.

The examination of Cain's teeth revealed his premolar is now worn flat and there is some wear on the molars. This suggests Cain is between 5-10 years old (mean 7.3yrs) based on the published tooth wear chart for koalas,

Cain was fitted with a new coloured ear tag as the old one had torn out. He was also fitted with a collar containing an A5 model LX tag and VHF transmitter. After processing, Cain has released back at the point of capture, in the stand of dense gum-topped box regrowth (Fig. 1). A small female koala was observed in an adjacent tree (see '*Miso*' below).


Figure 5. Image of male 13488 at recapture. Cain was initially tagged in October 2017.

### *Miso (13332)*

A small, cleanskin female koala (named Miso) was caught from the gum-topped box regrowth area (Fig. 1). She was too small to fit an LX collar, weighing just 3.1kg. Instead, she was fitted with a lightweight collar containing only a VHF transmitter. Miso had no tooth wear, suggesting she was between 1-3 years old. Her pouch was empty and had clearly not been used previously.

Miso was in good condition (BCS 8/10) and showed no obvious signs of disease or inflammation. She was briefly anaesthetised so that swabs could be collected from her eyes and urogenital sinus. These swabs were sent for laboratory PCR analysis. All swabs returned negative test results, indicating that no *Chlamydia* DNA was detected.

Given her small size, it is likely that Miso is the offspring of one of the mature females in that area of the study site. She may undergo a dispersal movement in the near future in search of habitat to establish a home range, as has happened previously with some sub-adults that have been monitored at the site. Alternatively, she may have dispersed into the area from another nearby location.

After examination and collaring, Miso was released at the point of capture.


Figure 6. Image of the new female koala Miso, taken while she recovered from the brief anaesthesia.

### *Larabee (13333)*

A cleanskin male (Larabee) was found in a small acacia in the area dominated by gum-topped box regrowth (Fig. 1). He was caught in the usual manner, using flagging poles, and was then examined. Larabee weighed 4.1kg and was in good condition (8/10 body condition score). He displayed only slight wear of his pre-molars and was estimated to be 2-3 years old.

Larabee was briefly anaesthetised to allow a thorough physical examination and the collection of biological samples. A small tissue biopsy was taken from his left ear and a coloured ear tag was inserted through the punch. A small metal tag was inserted in his right ear to provide back-up identification (see Appendix 1 for all tag details).

While anaesthetised, swab samples were taken from Larabee's urethra and eyes. These swabs were sent for laboratory PCR analysis and returned negative test results, indicating that no *Chlamydia* DNA was detected.

Larabee was fitted with a collar containing an LX tag and a VHF transmitter so that his movements and activity levels can be monitored. After his examination, Larabee was allowed sufficient time to recover from anaesthesia and was then released back at the base of the tree from which he was captured.


Figure 7. Image of male 13333 Larabee, after being fitted with ear tags.

Figure 7. Larabee being released at the base of a small acacia.

### *Clancy (13334)*

On the first day of the fieldtrip (14th Feb), a cleanskin male (13334 Clancy) was captured from a large blue gum at the edge of the small dam at the western end of the main study area (Figure 1). During the capture, the climber noticed that the koala's left eye was inflamed and had a build-up of crusty exudate that was likely impairing vision. Fortunately, Clancy calmly descended the large tree and was gently put into the cloth catch bag.

The examination of Clancy revealed he was a young koala, estimated at 2-4 years based on tooth wear and weight (5.6kg). He was fitted with ear tags in the usual manner (small metal tag right ear, coloured tag left ear; see Appendix 1 for details).

Clancy was skinny and in poor condition (body score 4/10), and his left eye appeared infected and inflamed (Figure 8). The collected swab samples confirmed Clancy was infected with *Chlamydia*. The sample taken from his urethra/penis returned a strong positive test result, highlighting a urogenital infection in addition to the inflamed left eye. However, Clancy's rump looked clean and dry, and showed no signs of the internal infection.

Figure 8. Images of male 13334 Clancy at capture, showing the inflammation of his left eye.

Given that Clancy clearly needed veterinary treatment, the decision was made to temporarily fence a small area to house him until the last day of the fieldtrip, when he could be transported to Australia Zoo Wildlife Hospital. Clancy was placed inside a temporary fence enclosing three small food trees (Figure 9). This was the same style of fence that is used when attempting to trap a koala, except that no cage trap was incorporated. Clancy was checked on day two of the trip (15th Feb) and then recaptured the next day and taken to AZWH for veterinary assessment and treatment.

Figure 9. Clancy inside the temporarily fenced area that was used to house him during the February fieldtrip.

Clancy required an extended period of care at AZWH (2mths), so that his chlamydial infection could be resolved with antibiotics. Because he was in poor body condition, this included an initial period in the intensive care unit where he was provided fluids intravenously (Figure 10).

At the end of his treatment, Clancy's eyes had returned to normal, he had greatly improved body condition, and his chlamydial infection had been cleared (Figure 11). He was fitted with a VHF tracking collar and returned to the study site on 13th April 2022.

Figure 10. Clancy being examined by Dr Amber Gillett in the intensive care unit at Australia Zoo Wildlife Hospital.

Figure 11. Clancy in an AZWH enclosure at the end of his treatment, just prior to release back at Yarrabilba. His chlamydial infection had been resolved and his left eye was no longer inflamed.

## Conclusion

The *Koala Capture / Monitoring Event* conducted during February 2022 was the first for the year, under the modified Koala Monitoring Program. The following points summarise what was achieved:

- A large number of tagged and untagged (cleanskin) koalas were detected during the three-day fieldtrip (16 total). This was largely due to the successful trial use of a thermal-imaging drone. The drone proved highly effective at detecting the body heat of koalas, which displayed as white lumps in the canopies of the scanned trees (Figure 12 below).
- Nine previously tagged and independent koalas were sighted (1. Cain, 2. Bilba, 3. Ella, 4. Gladys, 5. Jana, 6. Kamala, 7. Lucky, 8. Scarlet, 9. Zara)
- At least seven cleanskins were sighted, three of which were caught and tagged (1. Miso, 2. Larabee, 3. Clancy).
- Two attempts were made to recatch the tagged male 13508 (Lucky); both were unsuccessful as the koala did not respond to the flagging poles.
- The carcass of female 13486 (Jean) was found on the ground. She was estimated to be 10 years old. Cause of death could not be determined.
- No koalas were found within the main fauna corridor despite this area being thoroughly searched on foot and with the thermal-imaging drone.
- All four LX tags were deployed on koalas. The LX system has continued to perform very well, with regular uploads of each koala's location and activity level.
- At the end of the February 2022 fieldtrip, five koalas were fitted with tracking collars (see Appendices 1 & 2).

The next *Koala Capture / Monitoring Event* is scheduled for July 2022.

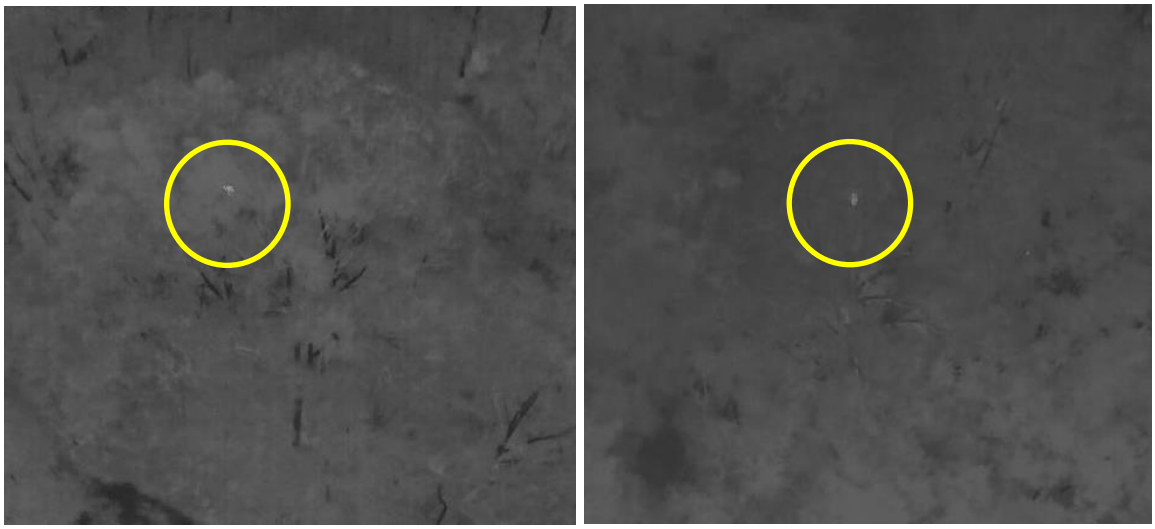

Figure 12. Two examples of images taken with the thermal-imaging drone. Koalas appear as white bodies in the canopies of searched trees (yellow circles). Location is recorded with an on-board GPS.

Appendix 1. Summary of tag and other details for all koalas captured at the site to date (February 2022). Koalas fitted with transmitters at the end of the most recent fieldtrip are highlighted yellow.

| UQ # | Name | Sex | Mass | Age 1st capture | Left ear tag | Right ear tag | 1st Capture | Latitude | Longitude | Notes from latest trip (February 2022) |
|---|---|---|---|---|---|---|---|---|---|---|
| 13007 | Heath | M | 3.83 | 2+ | Orange F10 | Yellow H10 | 17/05/2017 | -27.8113490 | 153.1062150 | Previously taken to AZWH; later euthanised. |
| 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 | Unsighted. |
| 13486 | Jean | F | 5.56 | 3-6 | metal UQ800 | Orange F15 | 9/10/2017 | -27.8121559 | 153.1086764 | Deceased; found decomposed carcass & ear tag |
| 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 | - | metal UQ796 & yellow front / red back | 9/10/2017 | -27.8132431 | 153.1039776 | Recaptured and fitted with A5 LX collar. |
| 13489 | Scarlet | F | 4.81 | 1-3 | metal UQ753 | Royal Blue G14 | 10/10/2017 | -27.8110978 | 153.1049627 | Sighted; rump looked stained. |
| 13490 | Sue-Bob | F | 5.66 | 5-10 | metal UQ799 | Orange F20 | 10/10/2017 | -27.8122096 | 153.1063710 | Unsighted since de-collared March 2019. |
| 13495 | Kobe | F | 5.06 | 3-6 | metal UQ175 | Yellow C20 | 20/03/2018 | -27.8137242 | 153.1169157 | Previously taken to AZWH; euthanised August 2018. |
| 13304 | Zara | F | 6.17 | 5-10 | Maroon A16 front / Green Q18 back | Yellow C4 | 6/06/2018 | -27.8097031 | 153.1034546 | Sighted. |
| 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 | Unsighted; presume has dispersed off site beyond tracking detection limits. |
| 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 | Sighted. |

| UQ # | Name | Sex | Mass | Age 1st capture | Left ear tag | Right ear tag | 1st Capture | Latitude | Longitude | Notes from latest trip (February 2022) |
|---|---|---|---|---|---|---|---|---|---|---|
| 13509 | Nyunga | F | 3.24 | 1-2 | Metal UQ955 | White T7 | 28/05/2019 | -27.815716 | 153.115121 | Unsighted. |
| 13518 | Marlee | F | not weighed | <1 | Metal UQ118 | - | 1/08/2019 | -27.812705 | 153.108693 | Unsighted. |
| 13307 | Lilly | F | 5.55 | 4-8 | Green E9 | White T3 | 19/11/2019 | -27.823554 | 153.108909 | Deceased; carcass radio-tracked April 2020. Cause of death uncertain. |
| 13308 | Wooten | M | 1.40 | <1 | UQ170 & Blue B19 | - | 20/11/2019 | -27.823554 | 153.108909 | Unsighted since collar removed off-site Nov'20. |
| 13533 | Millie-Mae | F | 7.26 | 4-8 | Metal UQ158 | Green Q18 | 21/11/2019 | -27.8094187 | 153.0999413 | Unsighted. |
| 13557 | Kamala | F | 2.47 | 1 | Metal UQ940 | Green Q12 | 10/11/2020 | -27.81368903 | 153.1133787 | Sighted. |
| 13269 | Bilba | F | 2.08 | 1 | Metal UQ329 | Blue B18 | 10/11/2020 | -27.81070544 | 153.1030701 | Sighted. Large young on her |
| 13558 | Gladys | F | 4.93 | 2-4 | Metal UQ939 | Maroon A2 | 11/11/2020 | -27.81102459 | 153.1056022 | Tracked until sighted; still fitted with new A5 LX collar; not recaptured |
| 13564 | Ella | F | 5.23 | 3-6 | Metal UQ934 | Grey blue R10 | 19/04/2021 | -27.811320 | 153.106273 | Tracked until sighted; still fitted with new A5 LX collar; not recaptured |
| 13565 | Banjo | M | 2.54 | 1 | Maroon A3 | Metal UQ987 | 20/04/2021 | -27.810577 | 153.103908 | Unsighted. |
| 13316 | Jana | F | 5.28 | 5-10 | Metal UQ114 | Light Blue B16 | 21/04/2021 | -27.815245 | 153.110754 | Sighted. |
| 13328 | Amelia | F | 0.74 | <1 | Metal UQ917 | - | 22/11/2021 | -27.811498 | 153.104591 | Unsighted. |
| 13334 | Clancy | M | 5.55 | 2-4 | Brown I12 | UQ534 | 14/02/2022 | -27.81277532 | 153.1013763 | Taken to AZWH for treatment of infected left eye. |

| UQ # | Name | Sex | Mass | Age 1st capture | Left ear tag | Right ear tag | 1st Capture | Latitude | Longitude | Notes from latest trip (February 2022) |
|---|---|---|---|---|---|---|---|---|---|---|
| 13332 | Miso | F | 3.09 | 1-3 | Metal UQ916 | Orange (no #) | 15/02/2022 | -27.81167394 | 153.1033398 | Fitted with VHF-only collar. |
| 13333 | Larabee | M | 4.12 | 2-3 | Orange front / light blue back | Metal UQ952 | 16/02/2022 | -27.81109974 | 153.1037605 | Fitted with A5 LX collar. |

Appendix 2. Summary of radio frequency details for all koalas fitted with collars at the end of the February 2022 fieldtrip.

**Tracking frequencies**

| Koala | Collar freq | Turn on time | Collar details |
|---|---|---|---|
| Ella | 150.142 | 7:00am 12hr | LX collar A5-549 |
| Larabee | 150.101 | 7:00am 12hr | LX collar A5-639 |
| Gladys | 150.043 | 7:00am 12hr | LX collar A5-617 |
| Cain | 150.283 | 7:00am 12hr | LX collar A5-578 |
| Miso | 150.063 | 7:30am 12hr | no LX tag |
| Clancy | 150.682 | 7:10am 12hr | no LX tag |