# Supplementary *Myotis macropus* and Green and Golden Bell Frog survey – October 2016

Dr Rodney Armistead, Eco Logical Australia, 16 December 2016.

A supplementary assessment of the presence of Myotis breeding habitat and Green and Golden Bell Frog habitat within the Mt Gilead Biocertification Assessment Area (BCAA) was undertaken in November and December 2016 to augment the draft Biocertification assessment report submitted to Campbelltown Council October 2015 and 2016. The additional assessment followed advice from the Office of Environment and Heritage (OEH) on the assessment requirements for *Myotis macropus* as a species credit species.

Following consultation with Office of Environment and Heritage (OEH) in September 2016 regarding how to assess the presence of breeding Myotis, it was agreed that the following methodology would meet OEHs requirements

- Identification of potential breeding habitat (i.e. any hollow bearing tree within a 200m buffer of permanent water/suitable foraging areas)
- Diurnal assessments during the breeding season (November-February) of hollow bearing trees within the potential habitat polygon for signs of bat activity/use
- Visual inspections of accessible hollows by an ecologist (in a cherry picker) with an optical scope and camera
- Stag watching hollow bearing trees (HBT) at dusk, over two suitable nights (warm temperature (10 - 20ºC), moderate wind with a low likelihood of rain) for signs of bats leaving potential roost sites (observing for the characteristic flight patterns of Myotis) with concurrent anabat recording calls to assist in the determination of species

In additional, a targeted *Litoria aurea* (Green and Golden Bell Frog (GGBF)) survey was also conducted whilst on site to further address the potential presence (or absence) of the GGBF in the BCAA following a recent December 2013 and April 2015 records of this species from Biriwiri Creek, approximately 7 km north of the BCAA.

A potential breeding habitat polygon was derived for the BCAA by mapping all of the farm dams and other waterways with permanent water and identifying any HBTs within the 200m buffer that are proposed for development for inspection (**Figure 1**).

The aim of this survey was to determine if breeding female *Myotis macropus* (Large-footed Myotis) are roosting among the hollow bearing trees (HBTs) located within the subject site (**Figure 1**). This survey was conducted on the 30 November, 7 and 12 of December 2016.

***Myotis macropus***

Hollow bearing tree survey

Searches for HBTs were conducted by walking and driving throughout the subject site. The location of each HBT was marked on a GPS (error margin ±5m). The type and approximate location, height, and size of each hollow was recorded.

Internal hollow assessment

Each hollow that could be accessed with a 20m high cherry picker was searched for evidence of fauna occupancy (fur, down, eggs, nest, downy feathers or living animals (**Plate 1** and **2**). Shallow hollows were visually assessed, whilst bright torches and a burrow scope was used to search the deeper hollows. Finally, an anabat recorder was placed in each hollow, with the hope of recording calls from those microbat that might have been disturbed during this process.

Stag watch and anabat ultra-sonic microbat call surveys

The stag watch surveys involved having an ecologist positioned at least 20 m from the base of single or groups of HBTs, watching for microbats as they leave their roosts in the evening to forage. The surveys were undertaken in accordance with DEC (2004) by starting the survey at least half an hour before dusk and continued for an hour afterwards. A total of six HBTs or groups of HBTs were surveyed (**Figure 1 and Plates 1 - 8).**

Hand-held ultra-sonic anabat microbat recorders were used during these surveys to verify the identity of observed microbat species. A total survey effort 13.5 stag watch and anabat recording hours was achieved during this survey. The recorded calls were analysed by Dr Rodney Armistead and where necessary, reviewed by Alicia Scanlon.

The anabat recorders used and a brief description of each HBT surveyed is provided below:

- Wednesday 30 November 2016
    - N82275 was positioned to survey microbat activity at HBT 6 and 7 (**Figure 1**). HBT 6 had six hollows whilst HBT 7 had 10 hollows (**Table 2**)
    - SN81781 (Michael) was positioned to survey microbat activity at HBT 8 and 9 **(Figure** 1). This HBT 8 had multiple spouts and HBT had multiple spouts and one large stem hollow.
    - SN81147 was positioned to survey microbat activity at HBT 10 and 11 **(Figure** 1). HBT 10 had 1 hollow, whilst HBT 11 had eleven hollows (**Table 2**).
    - SN81997 was positioned to survey microbat activity at HBT 19 and 20 (**Figure 1**). HBT 19 had one single medium sized spout with one opening whilst HBT 20 had one large and one small hollow (**Table 2**).
    - SN81081 was positioned to survey microbat activity at HBT 25 and 26 (**Figure 1)**. HBT 25 was dead and had numerous spouts and medium sized hollow entrances that lead into a single hollow stem whilst HBT 26 had two shallow stem hollows (**Table 2**).
- Wednesday 7 December 2016
    - SN81781 was positioned to survey microbat activity at HBT 2 (**Figure 1**). This HBT had 14 hollows, mostly spouts and funnels (**Table 2**).
    - SN82275 was positioned to survey microbat activity at HBT 6 and 7 (**Figure 1**). HBT 6 had six hollows whilst HBT 7 and had 10 (**Table 2**)

- SN81147 was positioned to survey microbat activity at HBT 10 and 11 **(Figure** 1). These HBTs had 1 (HBT10) and 14 hollows (HBT11) (**Table 2**).
- SN81997 was positioned to survey microbat activity at HBT 19 and 20 (**Figure 1**). HBT 19 had at least 2 hollows in the main stem. HBT 19 had one single medium sized spout with one opening whilst HBT 20 had one large and one small hollow (**Table 2**).
- SN81081 (Rod) was positioned to survey microbat activity at HBT 25 and 26 (**Figure 1)**. HBT 25 was dead and had numerous spouts and medium sized hollow entrances that lead into a single hollow stem whilst HBT 26 had two shallow stem hollows (**Table 2**).

Climatic conditions

Temperatures fluctuated from minimums of 9.3 Cº and maximums of 35.8 Cº during the days before and after each survey (**Table 1**). Wind speeds were mild and little rainfall was recorded the week prior to and during the survey period (**Table 1**).

**Table 1. Climatic conditions leading up, during and after the each anabat and Green and Golden Bell Frog survey from the Campbelltown (Mount Annan – Station 06257) weather station**

| Date | Minimum Temperature (Cº) | Maximum temperature (Cº) | Rain fall (mm) | Wind direction and speed | Relative humidity (%) | Rainfall (mm) seven days prior to survey |
|---|---|---|---|---|---|---|
| 24 Nov | 9.3 | 24.6 | 0 | SW / 39km/hr | 35 | 0 |
| 25 Nov | 8.8 | 27.1 | 0 | E / 33km/hr | 38 | 0 |
| 26 Nov | 12.2 | 30.3 | 0 | NE / 35km/hr | 20 | 0 |
| 27 Nov | 16.0 | 26.4 | 0 | E / 31km/hr | 52 | 0 |
| 28 Nov | 18.0 | 32.4 | 0 | N / 26km/hr | 36 | 0 |
| 29 Nov | 19.7 | 26.8 | 0 | ENE / 30km/hr | 51 | 0 |
| 30 Nov | 15.9 | 27.4 | 0 | ESE / 35km/hr | 49 | 0 |
| 1 Dec | 14.9 | 33.6 | 0 | ESE / 33km/hr | 83 | 0 |
| 2 Dec | 14.4 | 35.8 | 0.8 | SW / 39km/hr | 40 | 0.8 |
| 3 Dec | 19.5 | 29.2 | 0 | ESE / 31km/hr | 61 | 0.8 |
| 4 Dec | 15.4 | 31.0 | 0 | N / 31km/hr | 64 | 0.8 |
| 5 Dec | 20.6 | 34.2 | 0.6 | NNW / 52km/hr | 74 | 1.4 |
| 6 Dec | 19.8 | 25.8 | 9.6 | NNE / 17km/hr | 73 | 12 |
| 7 Dec | 15.7 | 26.8 | 0 | ESE / 31km/hr | 72 | 12 |

**Results**

Habitat bearing tree survey

Twenty-nine (29) HBTs were recorded within the subject site (**Table 2**). Of these 25 were living and four were dead stags. A total of 113 hollows were recorded among these 29 HBTs (**Table 2**).

Internal hollow assessment

Of the 113 hollows recorded among the 29 HBTs, 25 HBTs with 75 hollows were internally searched for Large-footed Myotis and other fauna species (**Table 2**). No Large-footed Myotis were recorded. No microbat species were recorded in any of the hollows inspected. Nesting *Sturnis tristis* (Common Myna), *Cacatua galerita* (Sulphur Crested Cockatoos) and *Falco cenchroides* (Nankeen Kestrel) were recorded (**Table 2**). Several *Eulamprus tenuis* (Bar-sided Forest Skink) were observed in HBT 8 and 9. Whist the scats of this species were observed in HBT 14 (**Plate 7**).

Stag watch and anabat ultra-sonic microbat call surveys

Bat activity across both surveys nights was relatively low. Only a relatively small number of bats were observed and their calls were recorded as they flew through the subject site. Two bats were observed leaving a daytime roost (HBT 19). HBT 19 had a large spout over a dam and could not be reached by the cherry picker for inspection as per **Table 2**. These bats were identified, using the calls on the anabat recorders as *Chalinolobus gouldii* (Gould's Wattled Bat).

Fewer foraging bats were observed on the 7 December than on the 30 November. This was unexpected as heavy rains preceded the 7 December survey. It has been assumed that this heavy rain would have encouraged microbat activity.

There were 90 sequences recorded across the two survey periods. Of these, 49 (65.55%) were of sufficient quality or length to enable positive identified to genus or species. The remaining 41 sequences were either to short or of low quality, thus preventing positive identification.

There were at least 10 species identified in this survey. This includes three species that were are listed as vulnerable under the NSW *Threatened Species Conservation Act 1995* (TSC Act) (**Table 3, Table 9** and **Figure 5 - Figure 12**). One threatened species, *C. dwyeri* (Large-eared Pied Bat) listed on the Commonwealth *Environmental Protection and Biodiversity Conservation Act 1999* (EPBC Act) was recorded. The threatened species recorded during this survey were:

- *Chalinolobus dwyeri* (large-eared Pied Bat) (definite record)
- *Myotis macropus* (Large-footed Myotis) (definite record)
- *Mormopterus (Micronomus) norfolkensis*) (definite record)

The most commonly recorded and widespread species included *Chalinolobus gouldii* (Gould's Wattled Bat) and *Mormopterus* (*Ozimops*) *planiceps* (South-eastern Freetail Bat) (**Table 2** – **Table** 9**).** One definite Myotis call was recorded at HBT 2. No bats were seen flying from this HBT, suggesting that this bat may have flown through and not have been roosting at the site. One Myotis or *Nyctophilus* spp. call was recorded at HBT 19 and 20. The calls of *Nyctophilus* spp. and the

Large Footed Myotis can be difficult to separate, however, where high quality recordings are obtained, can be confidently assigned to one or the other species.

The species diversity did not differ greatly across the survey sites with between three to eight species being recorded (**Table 2**). The most diverse survey site was HBT 19 and 20, with at least eight microbat species being recorded (**Table 2**).

Most of the bat calls that were recorded during this survey were clear, often long and easily interpreted. No feeding buzzes were observed in the data set, just search phase pulses. This indicating that even at this early period of the night, bats were only conducted searches of the study site.

A small number of TSC Act and EPBC Act listed *Pteropus poliocephalus* (Grey-headed Flying-fox) were observed flying high in a south-west direction over the subject site whilst the stag watch surveys were being undertaken.

The high flight patterns suggest that these bats still had some distance to fly before they were going to reach their foraging sites.

Survey Limitations

Calls were only positively identified when defining characteristics were present such as call shape and when the characteristic frequency allowed discrimination of a species. In this survey, there were a number of species call profiles that due to similarities among species could not be positively identified to species level. Where this was apparent, those species with similar call profiles were lumped together into groups of two or three potential species depending on the recorded and defining call characteristics. When this occurred these calls were assigned to the lowest certainty level of 'possible' **(Table 3)**

In this survey, the calls of Gould's Wattle Bat and Free-tail Bat species were recorded that were difficult to separate. Calls were identified as Eastern Freetail Bat if the call shape was flat and the frequency was between 28.5 – 31.5 kHz whilst Gould's Wattled Bat was distinguished by a frequency of 27.5 – 33 kHz with alternation in call frequency between pulses. When no distinguishing characteristics were present calls were assigned as follows (Gould's Wattle Bat / Free-tail Bat Species).

The calls of Chocolate Wattled Bat and *Vespadelus spp.* (Forest Bats) can be difficult to separate in the range 50.5 – 53 kHz. Calls were identified as *C. morio* when a down-sweeping tail was present within the call profiles. Alternatively, calls with up-sweeping tails that had an end frequency below 51 kHz were generally identified as a Forest Bat species. When no distinguishing characteristics were present within the calls, they were assigned as Chocolate Wattled Bat / Forest Bat.

The calls of *Falsistrellus tasmaniensis* (Eastern False Pipistrelle), *Scoteanax rueppellii* **(**Greater Broad-nosed Bat) and *Scotorepens orion* (Eastern Broad-nosed Bat) can be difficult to separate in this geographic region as their call frequencies and some other call characteristics overlap falling between 32 and 40 kHz. Calls were only positively identified when defining characteristics were present such as call shape and when the characteristic frequency allowed discrimination of a

species. There were a number of calls that it was not possible to identify to species and they remain grouped together in groups of two or three potential species depending on recorded characteristics. Calls from *S. orion* were recorded during this survey.

The calls of Large-footed Myotis are very similar to all *Nyctophilus* species and it is often difficult to separate these species. Calls were identified as *Nyctophilus* spp. when the time between calls (TBC) was higher than 95 ms and the initial slope (OPS) was lower than 300. Calls were identified as Large-footed Myotis when the TBC was lower than 75 ms and the OPS was greater than 400.

The call profiles that were difficult to separate are not shown in this document as all of the species discussed were positively identified.

**Green and Golden Bell Frog survey results**

*Methods*

The GGBF surveys involved a daylight visual assessment of each dam within or adjacent to land proposed for certification to determine their suitability to support GGBFs (**Figure 2**). An assessment of the suitability of the retained creek lines was also undertaken. A search was also conducted for the invasive *Gambusia affinis* (Mosquito Fish). Mosquito Fish are recognised as Key Threatening Process to GGBFs and generally their presence, typifies an absence in GGBFs.

Those dams deemed likely to support GGBFs, due to the presence of suitable habitats, and an absence of Mosquito Fish, were searched at night using spotlights and hand held torches (**Figure 2**). These searches were undertaken immediately after the stag watch surveys. In addition to the spotlight searches, call play back surveys were conducted. Call play back surveys involved playing recorded male GGBF calls through a loud hailer and / or speaker, with the hope of encouraging other male GGBFs to call in response. The playing of recorded GGBF calls began at dusk. Calls were played over 15 minutes and then followed by a 15-minute listening period.

Results

Of the eleven water bodies, two were deemed to contain suitable GGBF habitat to warrant spotlight and call play back surveys (**Figure 2, Plate 9 - 11).** Most dams present within the subject site lacked the riparian, emergent and floating vegetation that GGBF use for basking, foraging and to call from, due to heavy stocking of cattle and horses (**Plates 9** – **11**). Whilst those dams with riparian and emergent vegetation were found to be infested by Mosquito Fish. As discussed, this fish impacts on GGBFs and generally if they are present within a waterway, it is deemed unlikely that GGBFs will be present.

Nine dams were surveyed at night using GGBFs call play back and spotlighting. None were recorded during these surveys. Three species of frog were observed or heard recorded calling. This were *Crinia signifera* (Common Froglet), *L. dentata* (Bleating Frog) and *L. peronii* (Peron's Tree Frog) (**Plates 12** and **13**).

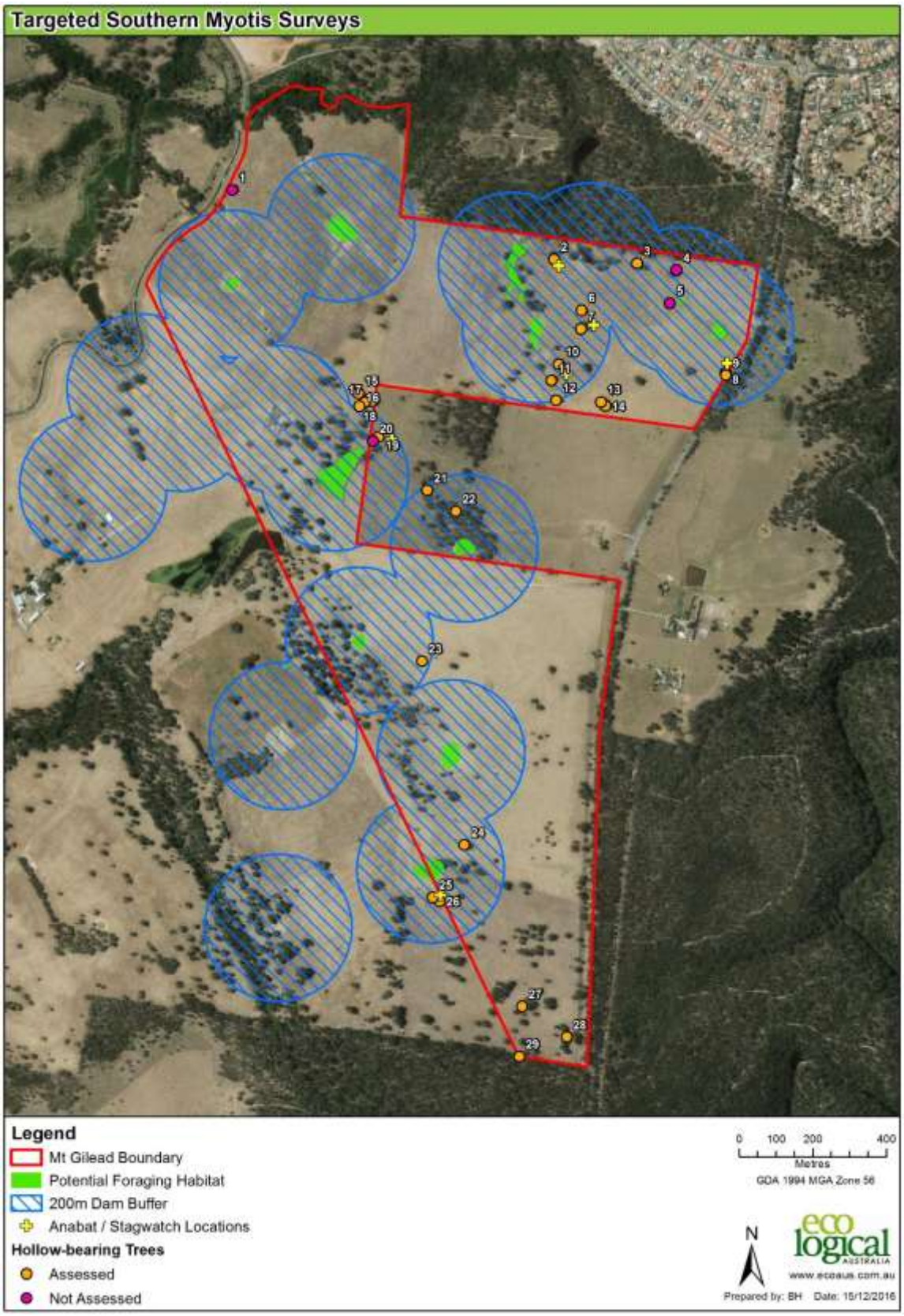


**Figure 1. Locations of trees targeted during the Southern Myotis surveys and associated farms dams (potential foraging habitat)**

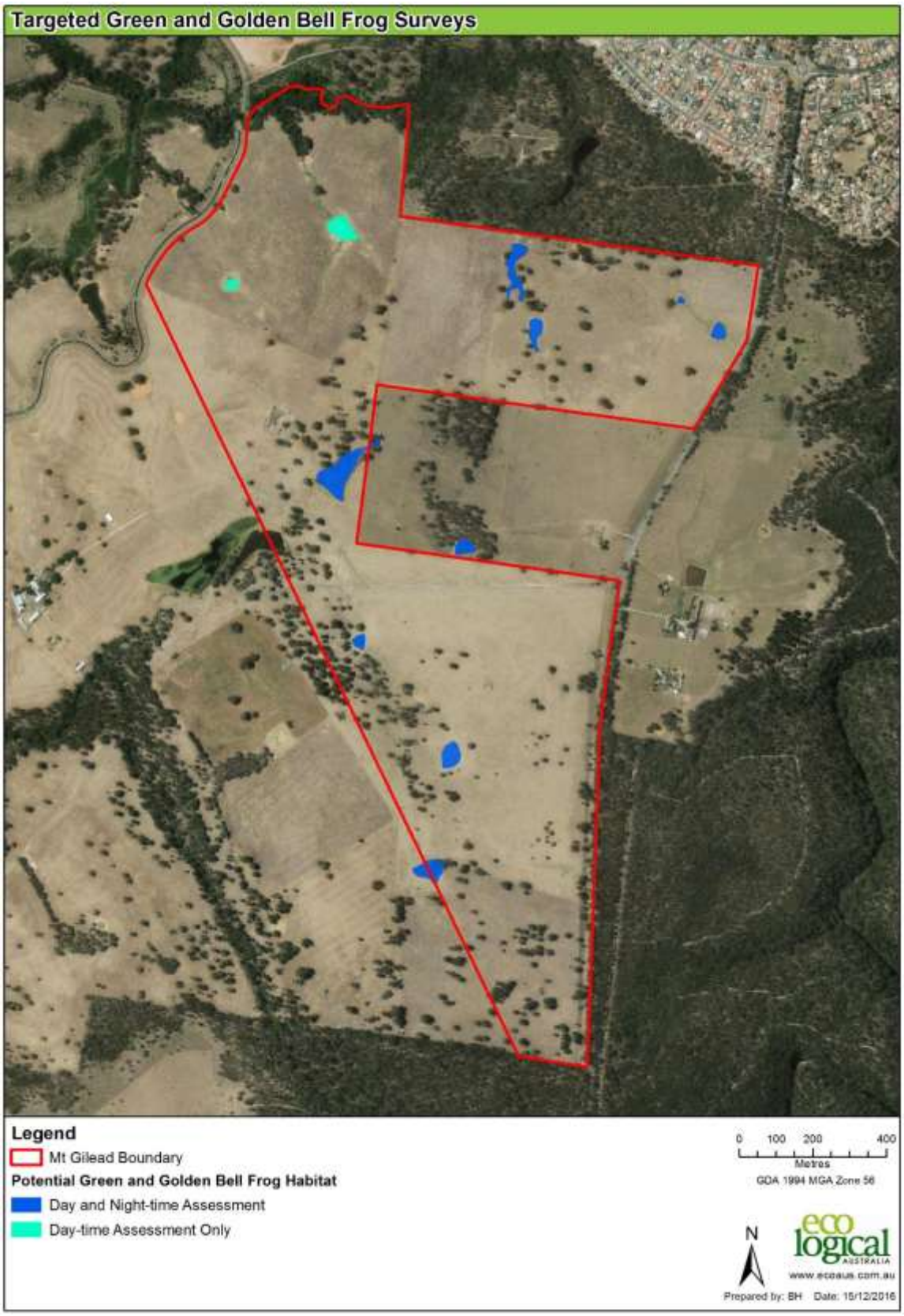


**Figure 2. Locations of farm dams targeted during the Green and Golden Bell Frog surveys**

**Table 2. Habitat bearing trees, number of hollows and results of the hollow assessment**

| Habitat bearing tree (HBT) identification number from unknown arborist report | Species name | Common name | Number of hollows total | Number of Hollows assessed from cherry picker | Results | Comments |
|---|---|---|---|---|---|---|
| 1 | *Eucalyptus tereticornis* | Forest Red Gum | 5 | 0 | No microbats were observed | This tree was not assessed using cherry picker due to limited access by the cherry picker due to the terrain. No fauna observed. |
| 2 (00422) | *Eucalyptus tereticornis* | Forest Red Gum | 8 | 6 | No microbats were observed | Two empty bird nests. The two hollows that were not assessed were left due a large broken branch dangerously hanging from the tree. No fauna observed. |
| 3 (00421) | *Eucalyptus tereticornis* | Forest Red Gum | 1 | 1 | No microbats were observed | No fauna observed. |
| 4 | Eucalyptus fibrosa | Small leafed Ironbark | 1 | 1 | No microbats were observed | Hollow was present in the base of tree, which enabled it to surveyed from the ground. No fauna observed. |
| 5 | *Eucalyptus tereticornis* | Forest Red Gum | 2 | 2 | No microbats were observed | Two openings leading into a dead vertical spout. Could not be accessed by cherry picker. No fauna observed. |
| 6 (00429) | *Eucalyptus moluccana* | Grey Box | 4 | 2 | No microbats were observed | No fauna recorded. |
| 7 (00425) | *Eucalyptus moluccana* | Grey Box | 10 | 6 | No microbats were observed | Old disused bird nest. |

| Habitat bearing tree (HBT) identification number from unknown arborist report | Species name | Common name | Number of hollows total | Number of Hollows assessed from cherry picker | Results | Comments |
|---|---|---|---|---|---|---|
| 8 | *Eucalyptus moluccana* | Grey Box | 5 | 4 | No microbats were observed | Two *Eulamprus tenuis* (Bar-sided Forest Skink) in hollows. |
| 9 | *Eucalyptus tereticornis* | Forest Red Gum | 1 | 1 | No microbats were observed | Old disused bird nest. All hollows were infested by small ants. *Eulamprus tenuis* (Bar-sided Forest Skink) seen in small spout. |
| 10 (00666) | *Eucalyptus fibrosa* | Small leafed Ironbark | 1 | 1 | No microbats were observed | One small hollow that was only 20cm deep and two baby Starlings in a nest. |
| 11 | *Eucalyptus moluccana* | Grey Box | 9 | 5 | No microbats were observed | Old disused bird nests only. No fauna observed. |
| 12 (00433) | *Eucalyptus tereticornis* | Forest Red Gum | 4 | 3 | No microbats were observed | Old disused bird nests only. No fauna observed. |
| 13 (00432) | *Eucalyptus tereticornis* | Forest Red Gum | 2 | 1 | No microbats were observed | No fauna recorded. |
| 14 (00431) | *Eucalyptus tereticornis* | Forest Red Gum | 2 | 2 | | *Eulamprus tenuis* (Bar-sided Forest Skink) scats present at opening of spout. |
| 15 (00463) | Eucalyptus moluccana | Grey Box | 6 | 4 | No microbats were observed | Some of the hollows could not be assessed due to safety reasons. No fauna observed. |
| 16 (00461) | *Eucalyptus tereticornis* | Forest Red Gum | 2 | 2 | Nothing recorded | No fauna observed. Entire tem of tree appeared to be hollow. |

| Habitat bearing tree (HBT) identification number from unknown arborist report | Species name | Common name | Number of hollows total | Number of Hollows assessed from cherry picker | Results | Comments |
|---|---|---|---|---|---|---|
| 17 (00459) | Eucalyptus moluccana | Grey Box | 10 | 6 | No microbats were observed | Lots of hollow spouts that appeared to go deep into the stem of the tree. Possibly the best habitat tree on site. No fauna observed. |
| 18 | *Eucalyptus tereticornis* | Forest Red Gum | 2 | 2 | No microbats were observed | No fauna observed. |
| 19 | *Eucalyptus fibrosa* | Small leafed Ironbark | 1 | 1 | No microbats were observed | One medium sized spout that could not be accessed due to position and direction of opening. Spout was pointing over the top of the dam. No access for cherry picker. |
| 20 | *Eucalyptus tereticornis* | Forest Red Gum | 2 | 2 | No microbats were observed | Disused bird nest in large hollow. No fauna observed. |
| 21 | *Eucalyptus tereticornis* | Forest Red Gum | 1 | 0 | No microbats were observed | Feather down of bird chick was present in this hollow suggesting that it had been used as a nest. |
| 22 | *Eucalyptus fibrosa* | Small leafed Ironbark | 1 | 0 | No microbats were observed | Feather down of bird chick was present in this hollow suggesting that it had been used as a nest. No fauna observed. |
| 23 | Dead stag | | 5 | 4 | No microbats were observed | No fauna observed. |
| 24 | Dead stag | | 4 | 3 | No microbats were observed | No fauna observed. |

| Habitat bearing tree (HBT) identification number from unknown arborist report | Species name | Common name | Number of hollows total | Number of Hollows assessed from cherry picker | Results | Comments |
|---|---|---|---|---|---|---|
| 25 | Dead stag | | 8 | 5 | Spouts leading into a hollow stem | Spouts leading into a hollow stem. A Nankeen Kestrel on three eggs was observed on one of the spouts. |
| 26 | *Dead Stag* | | 2 | 2 | No microbats were observed | Disused bird nest in one of the hollows. No fauna observed. |
| 27 | *Corymbia maculata* | *Spotted Gum* | 2 | 1 | No microbats were observed | Disused bird nest in one of the hollows. No fauna observed. |
| 28 | *Corymbia maculata* | *Spotted Gum* | 10 | 6 | No microbats were observed | One very large tree present in an area that has been mapped as being retained. *Sturnis tristis* (Common Myna) and *Cacatua galerita* (Sulphur Crested Cockatoo) found nesting in two of the hollows. |
| 29 | *Eucalyptus fibrosa* | Small leafed Ironbark | 2 | 2 | No microbats were observed | Nothing recorded |

**Table 3. Microbat species diversity recorded during the anabat microbat ultra-sonic call survey undertaken between 30 November and 7 December 2016**

| Species name | Common name | HBT 2 | | HBT 6 and 7 | | HBT 8 AND 9 | | HBT 10 and 11 | | HBT 19 and 20 | | HBT 22, 23 and 24 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | SN811781 (30 Nov) | | SN82275 (30 Nov) and SN81147 (7 Dec) | | SN81081 (30 Nov) | | SN81147 (30 Nov) and SN82243 (7 Dec) | | SN81997 (30 Nov and 7 Dec) | | SN81997 (12 Oct) and SN82275 (19 Oct) | |
| | | Positively identified | Possibly present | Positively identified | Possibly present | Positively identified | Possibly present | Positively identified | Possibly present | Positively identified | Possibly present | Positively identified | Possibly present |
| *Austronomus australis* | White-Striped Freetail Bat | | | | | | | | | | | X | |
| *Chalinolobus dwyeri*[1] | Large-eared Pied Bat | | | X | | | | | | | | | |
| *Chalinolobus gouldii* | Gould's Wattled Bat | | | | | X | | | X | X | | X | |
| *Chalinolobus morio* | Chocolate Wattled Bat | | | | X | | X | | X | X | | X | |
| *Mormopterus (Micronomus) norfolkensis** | Eastcoast Freetail Bat | | | | | | | | | X | | | |
| Mormopterus (Ozimops) *ridei* | Eastern Freetail Bat | | | X | | | X | | X | X | | X | |
| *Myotis macropus** | Large-footed Myotis | X | | | X | | | | | | X | | |
| *Nyctophilus* spp. | Long-eared Bats | | | | X | | | | | | X | | |
| *Scotorepens orion* | Eastern Broad Nosed Bat | X | | | | | | | | X | | | |
| *Vespadelus vulturnus* | Little Forest Bat | X | | | | X | | X | | X | | X | |
| Species Diversity (Positive identification) | | 3 | | 2 | | 2 | | 1 | | 6 | | 5 | |
| Species Diversity (Possible) | | | 0 | | 3 | | 2 | | 3 | | 2 | | 0 |
| Total (at least) number of species | | 3 | | 5 | | 4 | | 4 | | 8 | | 5 | |

* Threatened species listed under TSC Act

**Table 4. Anabat results for SN81781 at HBT 2 on the 7 December 2016 recorded over a single evening stag watch**

| Species Name | Common name | Positively identified | Potential | Possible | Total |
|---|---|---|---|---|---|
| *Myotis macropus** | Large-footed Myotis | 1 | 0 | 0 | 1 |
| *Scotorepens orion* | Eastern Broad-nosed Bat | 2 | 0 | 0 | 2 |
| *Vespadelus vulturnus* | Little Forest Bat | 2 | 0 | 0 | 2 |
| Low | | | | | 0 |
| Short | | | | | 5 |
| **Useable calls** | | | | | **5** |
| **Total Calls** | | | | | **10** |
| **Percentage usable calls** | | | | | **50.00** |

*Threatened species listed under the TSC Act

**Table 5. The combined Anabat results for SN82275 (30 November) and SN81147 (7 December) positioned at HBT 6 and 7 over two evening stag watches.**

| Species Name | Common name | Positively identified | Potential | Possible | Total |
|---|---|---|---|---|---|
| *Chalinolobus dwyeri*[11] | Large-eared Pied Bat | 1 | 0 | 0 | 1 |
| *Chalinolobus morio* / *Vespadelus vulturnus* | Chocolate Wattled Bat / Little Forest Bat | 0 | 0 | 2 | 2 |
| *Mormopterus* (*Ozimops*) *ridei* | Eastern Freetail Bat | 1 | 0 | 0 | 1 |
| *Nyctophilus spp.* / *Myotis macropus** | Long-eared Bat / Large-footed Myotis | 0 | 0 | 1 | 1 |
| **Low** | | | | | 0 |
| **Short** | | | | | 1 |
| **Useable calls** | | | | | **5** |
| **Total Calls** | | | | | **6** |
| **Percentage usable calls** | | | | | **83.33** |

*Threatened species listed under the TSC Act and [1] identifies those species listed under the EBPC Act

**Table 6. Anabat results for SN81081 positioned at HBT 8 and 9 on the 30 November 2016 recorded over a single evening stag watch**

| Species Name | Common name | Positively identified | Potential | Possible | Total |
|---|---|---|---|---|---|
| *Chalinolobus gouldii* | Gould's wattled Bat | 1 | 0 | 0 | 1 |
| *Chalinolobus morio* | Chocolate Wattled Bat | 0 | 0 | 1 | 1 |
| *Mormopterus* (*Ozimops*) *ridei* | Eastern Freetail Bat | 0 | 1 | 0 | 1 |
| Low | | | | | 2 |
| Short | | | | | 0 |
| **Useable calls** | | | | | **3** |
| **Total Calls** | | | | | **5** |
| **Percentage usable calls** | | | | | **60%** |

**Table 7. Anabat results for SN81147 (30 November) and SN82243 (7 December) positioned at HBT 10 and 11 over two even stag watches**

| Species Name | Common name | Positively identified | Potential | Possible | Total |
|---|---|---|---|---|---|
| *Chalinolobus gouldii* | Gould's wattled Bat | 0 | 1 | 0 | 4 |
| *Chalinolobus morio / Vespadelus vulturnus* | Chocolate Wattled Bat / Little Forest Bat | 0 | 0 | 1 | 2 |
| *Mormopterus* (*Ozimops*) *ridei* | Eastern Freetail Bat | 0 | 0 | 2 | 2 |
| *Vespadelus vulturnus* | Little Forest Bat | 1 | 2 | 0 | 1 |
| **Low** | | | | | 0 |
| **Short** | | | | | 2 |
| **Useable calls** | | | | | **9** |
| **Total Calls** | | | | | **11** |
| **Percentage usable calls** | | | | | **81.81** |

**Table 8. Anabat results for SN81997 (30 November and 7 December) positioned at HBT 19 and 20 over two even stag watches**

| Species Name | Common name | Positively identified | Potential | Possible | Total |
|---|---|---|---|---|---|
| *Chalinolobus gouldii* | Gould's wattled Bat | 4 | 3 | 1 | 8 |
| *Chalinolobus morio* | Chocolate Wattled Bat | 2 | 0 | 0 | 2 |
| *Chalinolobus morio / Vespadelus vulturnus* | Chocolate Wattled Bat / Little Forest Bat | 0 | 0 | 1 | 1 |
| *Mormopterus (Micronomus) norfolkensis** | Eastcoast Freetail Bat | 1 | 0 | 0 | 1 |
| *Mormopterus* (*Ozimops*) *ridei* | Eastern Freetail Bat | 3 | 0 | 0 | 3 |
| *Nyctophilus spp. / Myotis macropus** | Long-eared Bat / Large-footed Myotis | 0 | 0 | 1 | 1 |
| *Scotorepens orion* | Eastern Broad Nosed Bat | 2 | 1 | 0 | 3 |
| *Vespadelus vulturnus* | Little Forest Bat | 3 | 1 | 0 | 4 |
| **Low** | | | | | 3 |
| **Short** | | | | | 18 |
| **Useable calls** | | | | | **23** |
| **Total Calls** | | | | | **44** |
| **Percentage usable calls** | | | | | **52.27** |

*Threatened species listed under the TSC Act

**Table 9. Anabat results for SN81781 (30 November) and SN81081 (7 December) positioned at HBT 25 and 26 over two even stag watches**

| Species Name | Common name | Positively identified | Potential | Possible | Total |
|---|---|---|---|---|---|
| *Austronomus australis* | White-Striped Freetail Bat | 1 | 0 | 0 | 1 |
| *Chalinolobus gouldii* | Gould's wattled Bat | 1 | 1 | 0 | 2 |
| *Chalinolobus morio* | Chocolate Wattled Bat | 1 | 1 | 0 | 2 |
| *Chalinolobus morio / Vespadelus vulturnus* | Chocolate Wattled Bat / Little Forest Bat | 0 | 0 | 2 | 2 |
| *Mormopterus* (*Ozimops*) *ridei* | Eastern Freetail Bat | 3 | 0 | 0 | 3 |
| *Vespadelus vulturnus* | Little Forest Bat | 4 | 0 | 0 | 4 |
| **Low** | | | | | 0 |
| **Short** | | | | | 0 |
| **Useable calls** | | | | | 14 |
| **Total Calls** | | | | | 14 |
| **Percentage usable calls** | | | | | 100 |

**Call profiles**

**Figure 3. Call profile for *Austronomus australis* (White-Striped Freetail Bat) recorded at HBT 25 and 26 at 20.52 (pm), 30 November 2016**

**Figure 4. Call profile for *Chalinolobus dwyeri* (Larger-eared Pied Bat) recorded HBT 6 and 7 at 19.52 (pm), 30 November 2016**

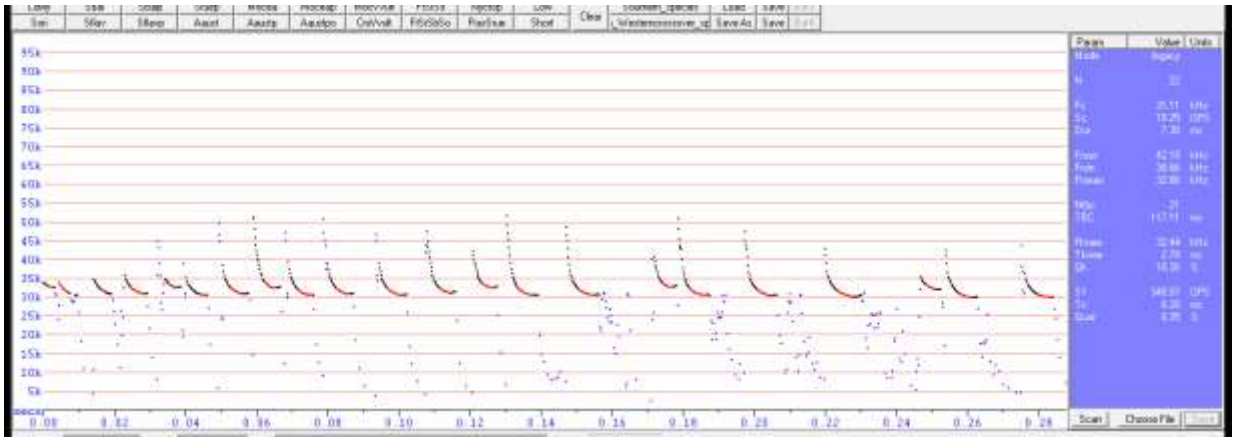

**Figure 5. Call profile for *Chalinolobus gouldii* (Gould's Wattled Bat) recorded HBT 19 and 20 at 20.52 (pm), 7 October 2016**

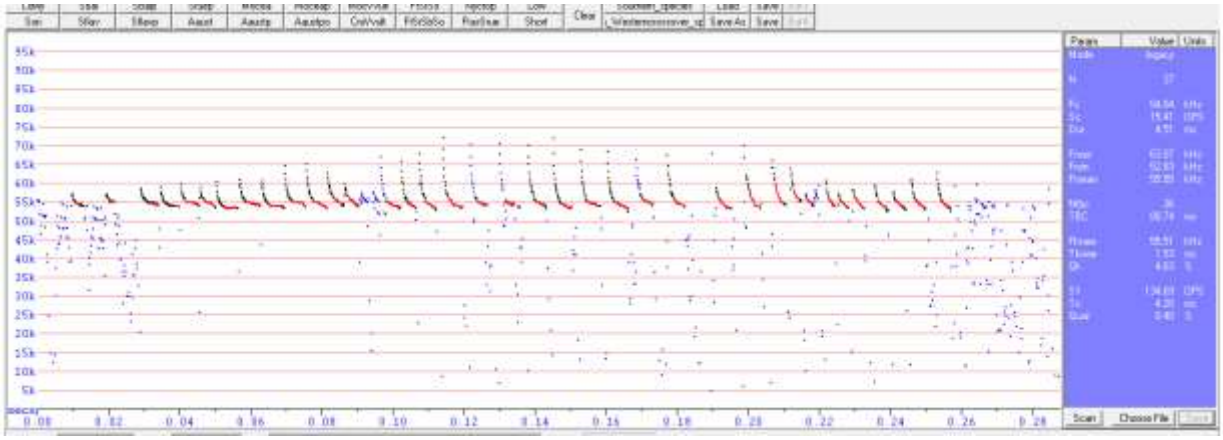

**Figure 6. Definite call profile for *Chalinolobus morio* (Chocolate Wattled Bat) recorded at HBT 19 and 20 at 20.44 (pm), 12 October 2016**

**Figure 7. Call profile for *Mormopterus* (*Micronomus*) *norfolkensis* (Eastcoast Freetail Bat) recorded at HBT 19 and 20 at 20.53, 30 November 2016.**

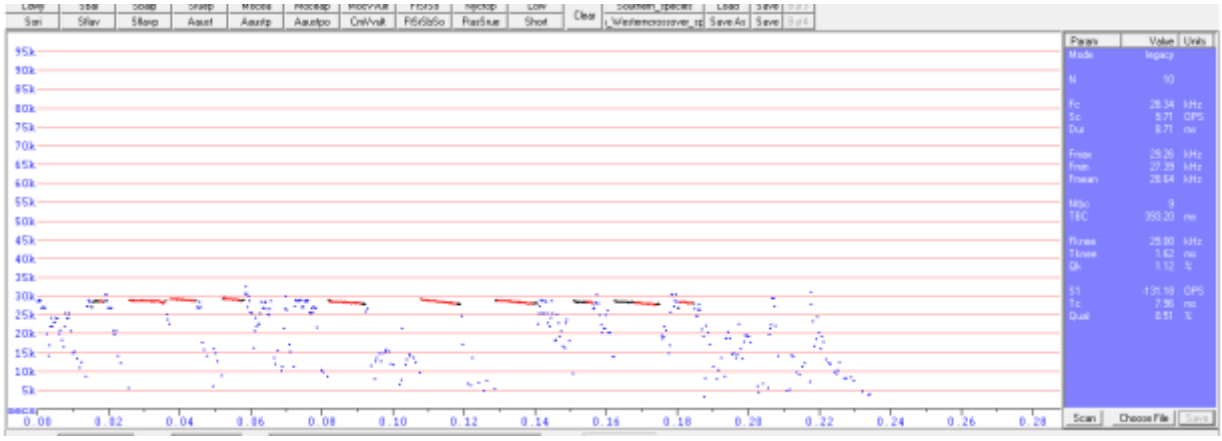

**Figure 8. Call profile for *Mormopterus* (*Ozimops*) *ridei* (Eastern Freetail Bat) recorded at HBT 25 and 26 at 21.04 (pm) 30 November 2016**

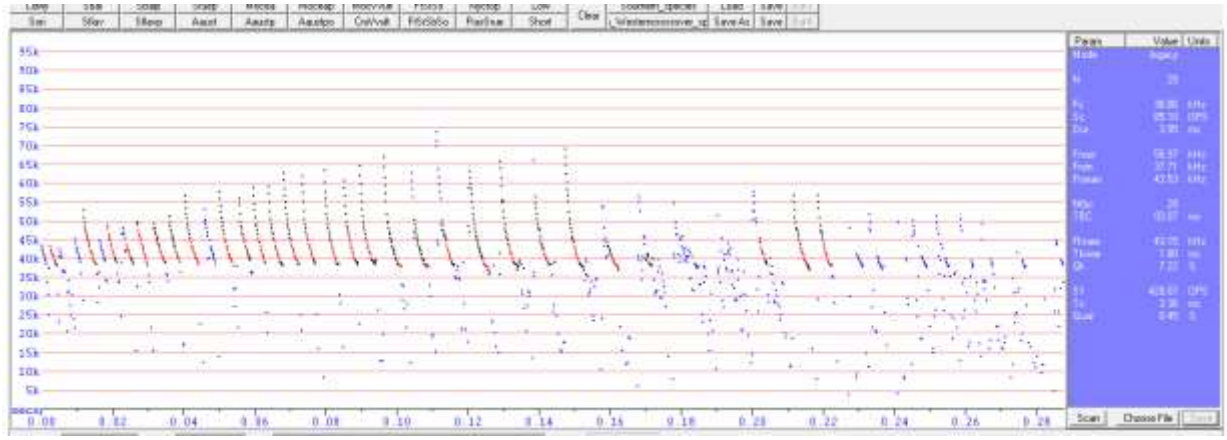

**Figure 9. Call profile for *Myotis macropus* (Large-footed Myotis) recorded at HBT 2, at 21.01 (pm), 7 December 2016**

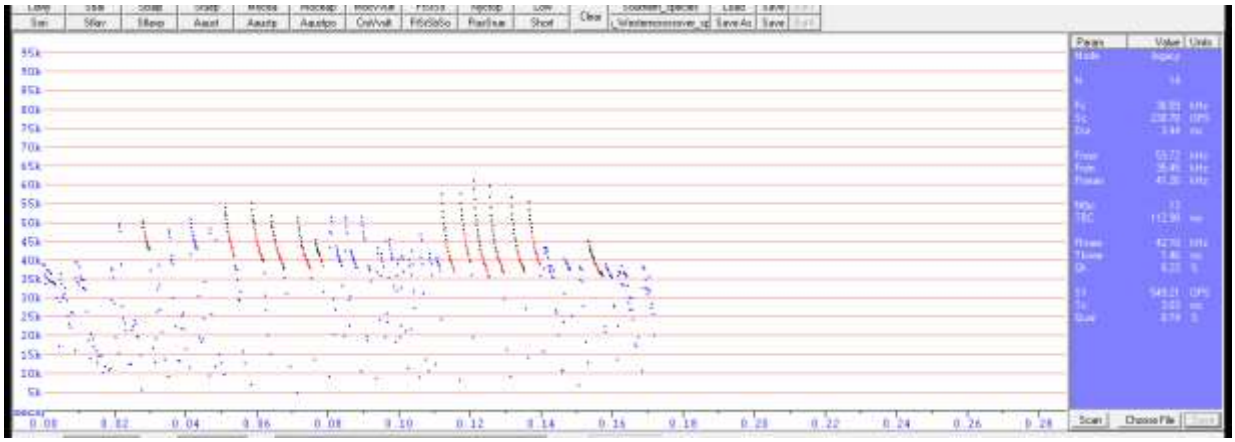

**Figure 10. Possible call profile for *Myotis macropus* (Large-footed Myotis) and *Nyctophilus spp.* (Long-eared Bat) recorded at HBT 19 and 20 at 20.35 (pm) 7 December 2016**

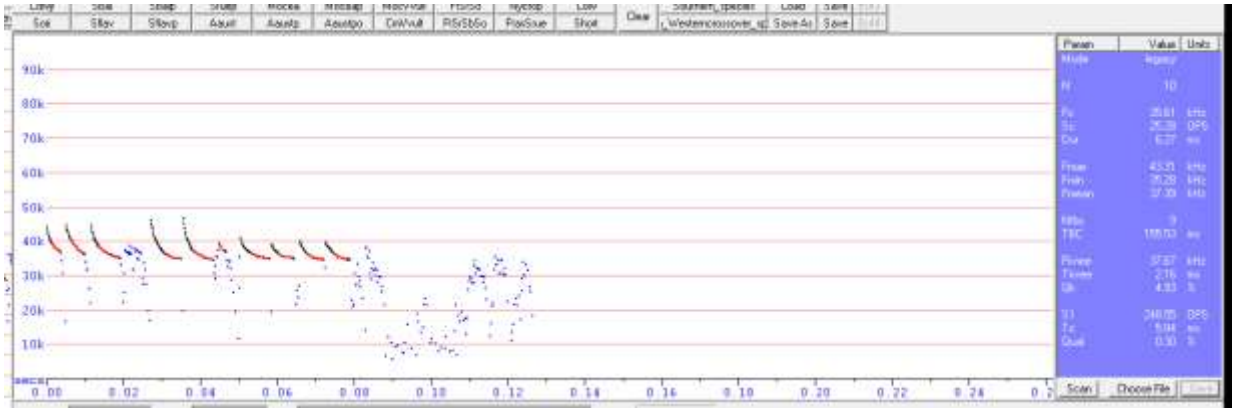

**Figure 11. Call profile for *Scotorepens orion* (Eastern broad-nosed Bat) at HBT 2 at 20.49 (pm), 7 December 2016**

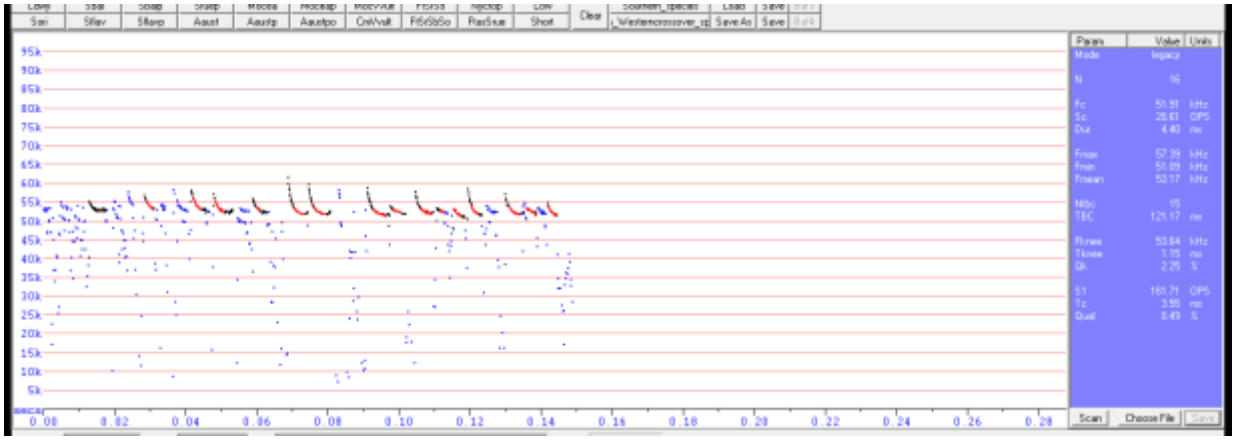

**Figure 12. Call profile for *Vespadelus vulturnus* (Little Forest Bat) recorded at HBT 25 and 26 at 20.46 (pm) 30 November 2016**

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**Plate 1. 20m Cherry picker used to conduct the hollow assessments.**


**Plate 2. View from cherry picker at HBT 8 showing spouts that are shown in Plate 4.**

**Plate 3. View of HBT 8 and 9 from ground showing spouts viewed from behind in Plate 2 and internally in Plat 4.**

**Plate 4. Disused bird nest in HBT 9 observed in shallow spout**

**Plate 5. Spouts in HBT 10**

**Plate 6. The shallow hollows in HBT 2.**

**Plate 7. A spout in HBT 14 with skink scats**

**Plate 8. Nesting Sulphur Crested Cockatoos in HBT 28.**

**Plate 9. View of the only dam with vegetated banks. Mosquito Fish were seen in this waterway.**

**Plate 10. Edge of large pond near HBT 19 and 20.**

**Plate 11. Farm Dam showing the livestock damaged edges and lack of GGBF. This level of stock damage was typical of most dams within the subject site.**

**Plate 12. *Litoria dentata* (Bleating Frog) captured during the GGBF surveys (photograph taken by Jack Talbert)**

**Plate 13.** ***Litoria peronii*** **(Peron's Tree Frog) captured during the GGBF surveys (photograph taken by Jack Talbert)**