

## Appendix E. Anabat Results



# Anabat echolocation data interpretation summary

Client: AARC (Dominique Taylor)

Balance Job no.: AARC1107

Project name/location: Ellimatta, Wandoan area (5-8 May 2011)

## Data summary tables

Numbers in columns indicate number of calls attributed to species/group for given night

Date:	5-May	6-May	7-May	8-May
No. sequence files recorded:	356	390	147	24
<b>Species positively identified</b> (i.e. species definitely present)				
<i>Chalinolobus gouldii</i>	23	57	23	
<i>Chalinolobus picatus</i>		7		
<i>Nyctophilus</i> species	1		1	
<i>Scotorepens balstoni</i>		2	1	
<i>Scotorepens greyii</i>	3			
<i>Miniopterus oriana oceanensis</i>		3	17	
<i>Austronomus australis</i>	11		3	
<i>Mormopterus beccarii</i>			2	
<i>Mormopterus</i> species	5		3	
<i>Saccolaimus flaviventris</i>	151	1	4	
Total calls positively identified	194	70	54	0
<b>Calls NOT positively identified *</b>				
<i>Chalinolobus gouldii</i> or <i>Mormopterus</i> species	56	60	48	1
<i>Chalinolobus gouldii</i> or <i>Scotorepens balstoni</i>	1	38	9	
<i>Scotorepens greyii</i> or <i>Chalinolobus picatus</i>	15	6	9	
<i>Vespadelus sp.</i> or <i>Miniopterus oriana oceanensis</i>	4		1	
<i>Austronomus australis</i> or <i>Saccolaimus flaviventris</i>			28	
Unidentified bat calls	9	7	10	
Total calls positively identified	85	111	105	1
<b>Total calls for site/night</b>	<b>279</b>	<b>181</b>	<b>159</b>	<b>1</b>

\* A species listed in the bottom section of the table that is not also listed in the top section should be considered as possibly present. Likelihood of occurrence and call identification issues for these species are discussed in the 'Reliability of species ID' section on the following pages.

## Species nomenclature:

Species names used in this summary follow Churchill (2008).

## Call identification & reporting standard:

No bat call identification guide or key exists for the region from which these data were collected.

Call identification was based on published call descriptions for Qld (Reinhold *et al* 2001) and NSW (Pennay *et al.* 2004); and on reference calls collected from southern inland Queensland.

Determination of species' identification was further refined by considering probability of occurrence based on distributional information presented in Churchill (2008) and van Dyck & Strahan (2008).

The format and content of this report complies with nationally accepted standards for the interpretation and reporting of Anabat data (Reardon 2003); latest version available from the Australasian Bat Society on-line at <http://www.ausbats.org.au/>.

# Anabat echolocation data interpretation summary

Client: AARC (Dominique Taylor)

Balance Job no.: AARC1107

Project name/location: Ellimatta, Wandoan area (5-8 May 2011)

## Reliability of species ID:

### ***Nyctophilus* species**

*Nyctophilus* bats generally produce distinctive calls, but the species within the genus cannot be reliably differentiated from call data. The species most likely to be present in the study area are *N. geoffroyi* and *N. gouldi*. It is also possible that the threatened species *N. corbeni* (formerly *N. timoriensis* south-eastern form) could occur in the area, depending on the extent and type of habitat present. It is generally only found in large tracts of forest/woodland dominated by cypress/eucalypt and/or box/brigalow and/or river redgum associations.

### ***Mormopterus* species**

*Mormopterus ridei* (eastern free-tailed bat) and *M.* species 3 (inland free-tailed bat) both potentially occur in the study area. These species have very similar calls (predominantly flat pulse shape) and seem to overlap in characteristic frequency (Fc) around 30-31kHz. Call characterisation is, however, somewhat incomplete, due to morphological similarities that have resulted in unreliable identification of some individuals from which reference calls were collected. There is also potential for confusion with *Chalinolobus gouldii* (see discussion notes below).

Most calls attributed to *Mormopterus* sp for this survey were at or below 30kHz and, as such, were probably from 'species 3'. There was no evidence of the higher frequency (>33kHz) calls usually attributable to *M. ridei*, but its presence cannot be discounted.

### ***Chalinolobus gouldii* or *Mormopterus* species**

*C. gouldii* (Fc=28-34kHz) has steep and curved pulses that usually alternate in frequency by 2-3kHz. *Mormopterus* spp (Fc=28-34kHz) pulses are generally much flatter; however, curved pulses (often with steep FM sweep) may be produced when flying close to vegetation and such calls may be confused with calls from *C. gouldii*. Numerous calls were positively attributed to each 'species' based on these characteristics; however, a large number of very brief and poor quality recordings could not be reliably identified and could have been from either.

### ***Chalinolobus gouldii* or *Scotorepens balstoni***

*C. gouldii* (Fc=28-34kHz) has steep and curved pulses that usually alternate in frequency by 2-3kHz. *S. balstoni* produces pulses of similar shape that overlap in frequency (Fc=30-25kHz), but which lack frequency alternation. Numerous calls were positively attributable to *C. gouldii*, and a few to *S. balstoni* based on these criteria; however, a number of brief and poor quality calls in the range could have been from either species.

### ***Scotorepens greyii* or *Chalinolobus picatus***

These species' calls overlap around 39-41kHz and have similar pulse shapes (mostly steep FM sweep with cup-shaped body and upward-sloping tail). Good calls from *C. picatus* usually exhibit distinctive frequency alternation of 2-4kHz between successive pulses, but this feature is not reliably detected in brief or poor quality recordings. A few calls were positively identified to each species, but most sequences in the relevant frequency range could not be differentiated.

### ***Vespadelus* sp. or *Miniopterus orianae oceanensis***

*M. o. oceanensis* was positively identified from several calls around 43-46kHz with distinctive steep FM sweep and flat to downward-sloping body and tail. A few calls, however, were very brief or weak and had poorly-defined pulse structure. These were most likely also from *M. o. oceanensis*, but could have been from *Vespadelus baverstocki* or *V. vulturnus*, both of which probably occur in the area.

### ***Austronomus australis* or *Saccolaimus flaviventris***

These species were both positively identified due to frequency differential of search-phase calls - *S. flaviventris* Fc=17-21kHz and *A. australis* Fc=10-13kHz. A series of messy, but strong, call signals recorded on 7th May had inconsistent pulse shape and frequency characteristics that could represent interaction between several individuals of either or both species. These were most like attack-phase or clutter-avoidance signals from *A. australis*, but the frequency ranges and slight pulse shape differentiation suggested perhaps *S. flaviventris* was also involved.

### **Unidentified bat calls**

Some calls were too brief and/or weak to enable reliable identification to species. All such calls were within frequency ranges of one or more species otherwise identified from the data and do not represent additional species.

# Anabat echolocation data interpretation summary

**Client:** AARC (Dominique Taylor)

**Balance Job no.:** AARC1107

**Project name/location:** Ellimatta, Wandoan area (5-8 May 2011)

## References:

Churchill, S. (2008). *Australian Bats*. Jacana Books, Allen & Unwin; Sydney.

Milne, D.J. (2002). *Key to the Bat Calls of the Top End of the Northern Territory*. Technical Report No. 71, Parks and Wildlife Commission of the Northern Territory, Darwin.

Pennay, M., Law, B. and Reinhold, L. (2004). *Bat Calls of New South Wales*. Department of Environment and Conservation, Hurstville.

Reardon, T. (2003). Standards in bat detector based surveys. *Australasian Bat Society Newsletter* **20**, 41-43.

Reinhold, L., Law, B., Ford, G. and Pennay, M. (2001). *Key to the bat calls of south-east Queensland and north-east New South Wales*. Department of Natural Resources and Mines, Brisbane.

van Dyck, S. and Strahan, R. (ed.) (2008). *The Mammals of Australia* (Third Edition); New Holland; Sydney.

# Anabat Data Analysis Summary

Client: AARC (Dominique Taylor)

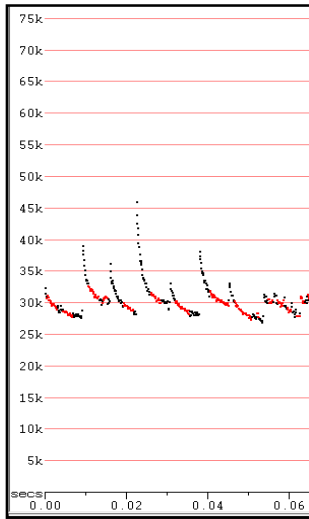
Balance Job no.: AARC1107

Project name/location: Ellimatta, Wandoan area (5-8 May 2011)

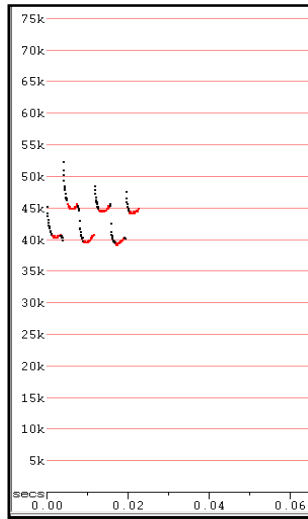
## Sample calls extracted from the survey data.

Scale: 10 msec per tick; time between pulses removed  
(AnalogW F7 compressed mode)

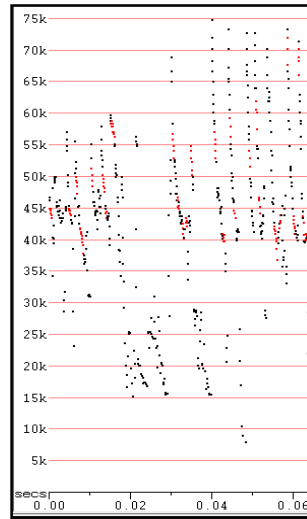
### Species positively identified



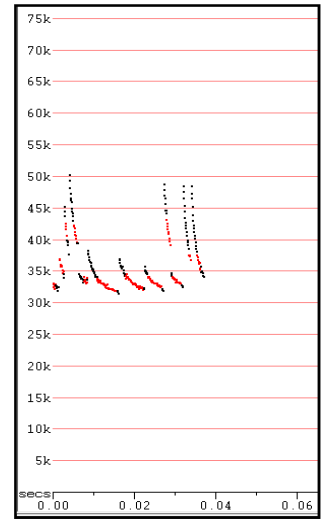
*Chalinolobus gouldii*



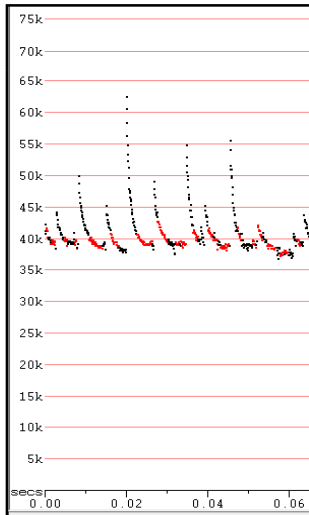
*Chalinolobus picatus*



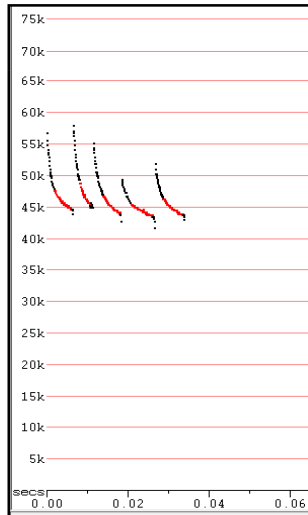
*Nyctophilus* species



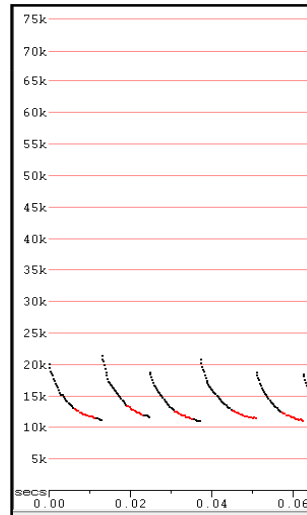
*Scotorepens balstoni*



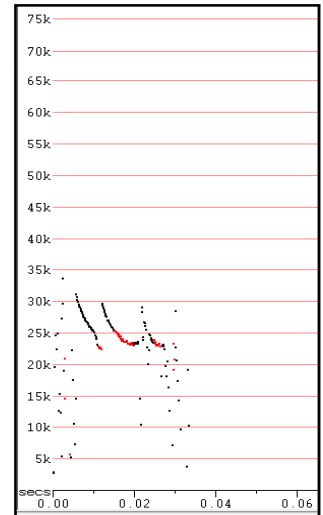
*Scotorepens greyii*



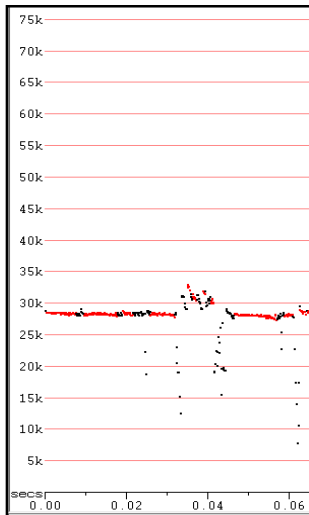
*Minoipterus o. oceanensis*



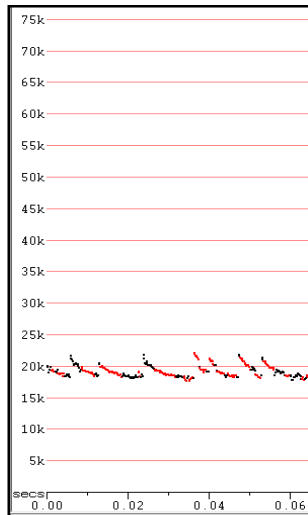
*Austronomus australis*



*Mormopterus beccarii*



*Mormopterus* species



*Saccolaimus flaviventris*

# Anabat Data Analysis Summary

Client: AARC (Dominique Taylor)

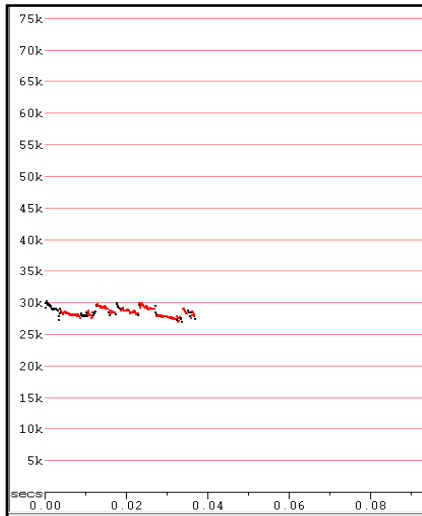
Balance Job no.: AARC1107

Project name/location: Ellimatta, Wandoan area (5-8 May 2011)

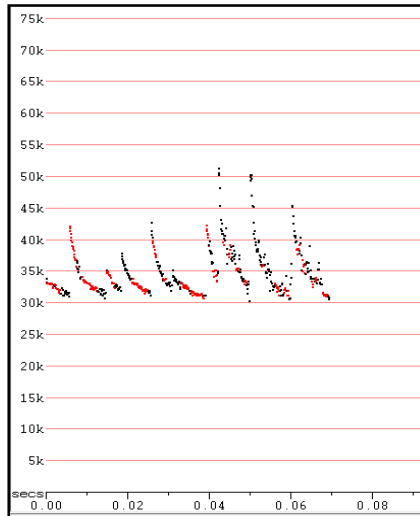
## Sample calls extracted from the survey data.

Scale: 10 msec per tick; time between pulses removed  
(AnalogW F7 compressed mode)

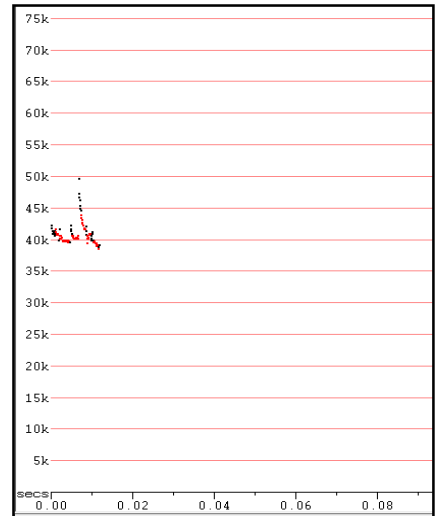
### Calls NOT positively identified



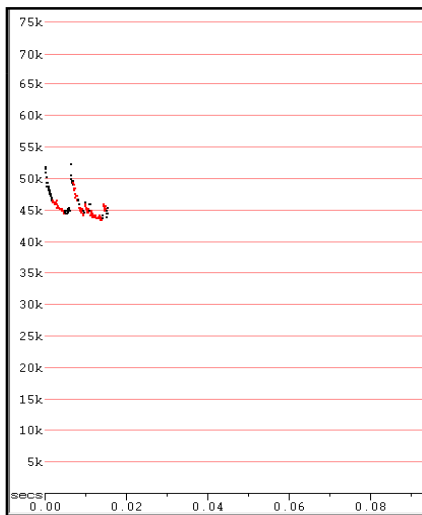
*C. gouldii* or *Mormopterus* species



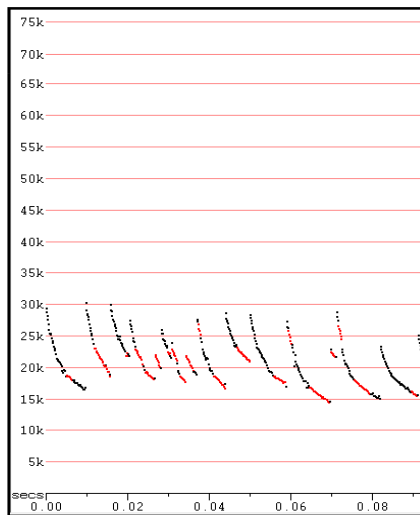
*C. gouldii* or *S. balstoni*



*Scotorepens greyii* or *Chalinolobus picatus*



*Vespadelus sp.* or *M. o. oceanensis*



*A. australis* or *S. flaviventris*

## Appendix F. Flora Site Data



## AARC FLORA SURVEY PROFORMA Secondary Transect

Project	Elimatta
Date	24/8/13
Recorder	AB
Site No.	FT 1
GPS Coordinates	26.05372 149.62030
Site Photo No.	110 - 117

Locality	NE veg patch in southern knement
Site Context	Hillside
RE	
General Notes	Silver-leaf ironbark & Black cypress pine woodland.

Altitude	Erosion Pattern	Slope (°)	Aspect
	Some cattle tracks/ bare ground	15°	W

Soil Description	yellow/grey loamy sand
Geology	Some outcropping, dark sedimentary
Additional Soil Notes	

Disturbance Severity (1 = minor 2 = moderate 3 = severe)	
Storm Damage	1
Road Works	0
Fire	1
Clearing	2
Grazing	1
Weeds	1
Other	



Height (m)	Emergent	T1	T2	T3	S1	S2	Ground
	—	12	7.5	5	<del>2</del> 2	0.5	0.5

Stem Cover (Bitterlich Method)	7
--------------------------------	---

Species Stem Cover (50x10m) – count all woody stems		
Layer (E, T1, T2, T3, S1, S2, G)	Species	Number of stems
mostly S1/S2	<i>E. melanophloia</i>	34 <del>100</del>
	Bark cypress pine	10
	Acacia sp.	3
over	Acacia <i>excelsa</i>	8
see		

Additional Notes (sketch if required)
<p>Tree height calcs</p> <p>canopy <math>0.62 + 0.18 = 0.8 \times 15m</math></p> <p>Subcanopy <math>0.43 + 0.16 = 0.59 \times 12.8m</math></p>

FT 1

Crown Cover Calc.	0m	5m	10m	15m	20m	25m	30m	35m	40m	45m
	0	0	1	2	1	3	0	0	2	5
sub	50	5	0	0	1	1	2	2	0	10

8.5  
45  
0  
~~45~~

D = Dominant, CD = Co-Dominant, A = Associated, O = Occasional

Dominance (D, CD, A, O or ✓)							Species	Sample #	Photo #	Q1	Q2	Q3	Q4	Q5
E	T1	T2	T3	S1	S2	G								
							Bare			45	70	60	58	5
							Litter			45	5	7	7	78
							Rock			15	10	13	20	2
							A <i>Heteropogon contortus</i>			17	3	15	15	15
							A <i>Aristida</i> - dam wire grass			3				
							AD Kangaroo grass							
							O <i>Erneapogon</i>							
							DA <i>Buffel</i>			15	12	5		
							A <i>Acacia excelsa</i>							
	A		D	D	D		<i>E. melanophloia</i>							
	D	D	O				<del>Black</del> <i>Cypress pine (L. glaucophylla)</i>							
					A		<i>velvety tree pear</i>							
			O				<i>wild a</i>							
			A				<i>Acacia</i> <del>st. (tough fibrous leg tree)</del>							
					A		<i>Carissa ovata</i>							
				O			<i>Alectryon diversifolius</i>							
	O						<i>box similar to E. ketivom</i>							✓
							<i>E. microcarpa?</i>							

47.6  
20.4  
812  
~~20~~

## AARC FLORA SURVEY PROFORMA Secondary Transect

Project	Elimatta
Date	17/10/13
Recorder	A.B.
Site No.	FT2
GPS Coordinates	26.06546 149.61711
Site Photo No.	116 - 117

Locality	SE part of southern MLA in southern regrowth patch
Site Context	Gentle undulating hills
RE	
General Notes	Path of mixed <del>Banyan</del> Poplar Box / Silver leaf ironbark open woodland. Heavily disturbed, lots of Encalypt saplings & few other shrubs. Heavily grazed. Very occasional Lingabe

Altitude	Erosion Pattern	Slope (°)	Aspect
	Gully erosion	10	W

Soil Description	Brown sandy loam
Geology	
Additional Soil Notes	

Disturbance Severity (1 = minor 2 = moderate 3 = severe)	
Storm Damage	1
Road Works	0
Fire	1
Clearing	2
Grazing	2
Weeds	1
Other	Dieback - 2

Height (m)	Emergent	T1	T2	T3	S1	S2	Ground
	19	14	12.5	4	2	0.5	0.3
	67, -12 (24m)		70, 20 (14m)				
		90, -11 (14m)					

Stem Cover (Bitterlich Method)	11
--------------------------------	----

Species Stem Cover (50x10m) – count all woody stems		
Layer (E, T1, T2, T3, S1, S2, G)	Species	Number of stems
T2	<i>E. melanophloja</i>	111
T1, mostly S1	<i>E. populnea</i>	111 111 111 111 11
T3	<i>E. mitchelli</i>	11
S2	<i>A. exiela</i>	11
T2, S2	<i>A. karpephylla</i>	111
S2	<i>Cappad. laevis</i>	11

Additional Notes (sketch if required)
<p>Brigalow regrowth stand  45, -9 (14.15m)</p> <p>7.6m</p>

WZ = 16m 5-24 mphug

2570

Crown Cover Calc.	0m	5m	10m	15m	20m	25m	30m	35m	40m	45m
	75	30	10	5	15	30	20	10	5	3
				40	5					5

D = Dominant, CD = Co-Dominant, A = Associated, O = Occasional

Dominance (D, CD, A, O or ✓)							Species	Sample #	Photo #	Q1	Q2	Q3	Q4	Q5
E	T1	T2	T3	S1	S2	G								
							Bare			30	60	55	15	55
							Litter			7	25	12	35	20
							Rock							
							D Kangaroo grass			3	5	25	50	25
							A Eriachne sp			60		5		
							O <del>Enkoppogon</del> rammos							
							A <del>Aristida</del> like grass (previous survey FTI/Quarts)				10	3		2
							O Capparis lasanthalana							
							D Velvety tree pear							
							Eremophila mitchelli							
							Aacia harpophylla							
							Encalyptus populnea							
							Encalyptus melanophloia							
							O A. excelsa							

43  
14.8  
37.2