

Pacific Highway Upgrade - Sapphire to Woolgoolga

Operational Phase Fauna
Crossing Monitoring Program ~
Year 2 (2016)



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Final Report (Version 1)

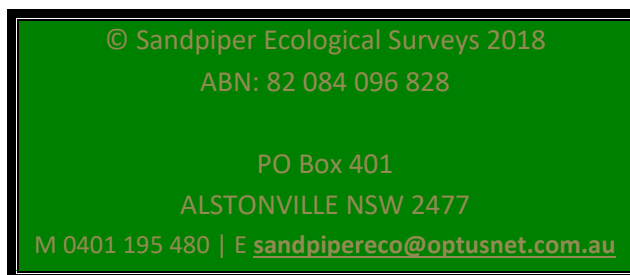
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Cover Photo: A male eastern grey kangaroo (*Macropus giganteus*) is captured by camera traps emerging from a 1200mm pipe that links habitat either side of the Pacific Highway Upgrade at Emerald Beach.

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1. Introduction

The upgrade of the Pacific Highway from Sapphire to Woolgoolga (S2W) involved construction of 25 km of dual carriageway from Campbell Close, Sapphire, to Arrawarra Beach Road, Arrawarra. The upgrade became operational in July 2014.

The Ministerial Conditions of Approval (MCoA) for the S2W upgrade included a requirement (MCoA 3.1) to prepare an Ecological Monitoring Program (EMP) to monitor the effectiveness of mitigation measures identified in MCoA 2.12(e). The EMP was developed and approved in 2009 and later amended to include data obtained during the construction phase (BEM 2014). The final version (version 4) was completed in February 2014 (BEM 2014).

The mitigation measures identified in MCoA 2.12(e) include “fauna crossing measures, including vegetated medians, fauna structures and associated fauna fencing to be installed as part of the project”. The EMP focuses on nine mitigation measures and specifies sample sites, sample duration and methods. Measures relevant to the current study include: underpasses at ch.29200, ch.11500, ch.17500 and ch.17720, vegetated median between ch.29400 and ch.30000, rope bridge at Moonee (ch.10720) and glider poles at Arrawarra Creek (ch.31020) (BEM 2014). Other operational phase monitoring measures include nest boxes, frog pipes, protection of in-situ threatened flora, and translocation areas for affected threatened flora (BEM 2014). The other measures are reported on elsewhere.

The following report presents results of year two operational phase monitoring conducted during 2016. It follows on from the Year 1 report (Sandpiper Ecological 2017a). This report includes information on the background, methods, discussion of results and evaluation of mitigation measures against the potential indicators of success detailed in the EMP (BEM 2014).

1.1 Background

The EMP identified several threatened species targeted by the mitigation measures addressed in this report. These include: common planigale (*Planigale maculata*), spotted-tail quoll (*Dasyurus maculatus*), rufous bettong (*Aepyprymnus rufescens*), long-nosed potoroo (*Potorous tridactylus*), brush-tailed phascogale (*Phascogale tapoatafa*) and eastern pygmy possum (*Cercartetus nanus*) use of fauna underpasses; and, squirrel glider (*Petaurus norfolcensis*) and yellow-bellied glider (*Petaurus australis*) use of the vegetated median, rope bridge and glide poles. Whereas threatened species are the focus of the mitigation measures, the aim of the EMP is “to allow the effectiveness of mitigation and offset measures to be assessed and allow for their modification if necessary” (BEM 2014). This includes selection of underpasses that varied somewhat from those previously monitored along the Pacific Highway, such as pipes, underpasses that cross a vegetated median and a relatively long dedicated underpass.

The EMP further describes several potential indicators of success with which to assess the performance of fauna mitigation measures.

Indicators of success include:

- **Fauna underpasses:**
 1. Low rates of use of fauna underpasses and adjacent habitats by feral predators;
 2. High levels of fauna underpass use by a wide variety of native fauna species;
 3. Evidence of use by dispersing individuals and different age cohorts;

4. Use by cover-dependent species and species with low mobility;
5. Low incidences of fauna road strike mortality.

- **Vegetated median and aerial crossing structures:**

1. Evidence of regular use of the median vegetation by the target glider species;
2. Evidence of use by dispersing individuals and different age cohorts;
3. Use by glider species other than threatened species e.g. sugar glider, greater glider.

2. Study Area

Monitoring sites ranged from the rope bridge at Moonee in the south (ch.10720) to the glide poles at Arrawarra Creek in the north (ch.31000) (Table 1; Figure 1a&b). The study area included habitat within 500m radius of each crossing structure. For the vegetated median, the study area included the vegetated median and habitat within 500m east and west of the highway corridor.

Habitat configuration differed amongst the monitoring sites (Figure 1a&b; Plate 1-7). Habitat surrounding Emerald Beach and Moonee underpasses was highly fragmented, particularly on the west side, and Moonee east and Emerald Beach west adjoined cleared easements (Plate 2 & 3). The section of highway featuring the Arrawarra vegetated median and underpasses traversed Wedding Bells State Forest and was surrounded by contiguous forest (Figure 1a). The Arrawarra glide poles were contiguous with Wedding Bells State Forest to the west and a forested block of private land to the east (Figure 1a). The rope bridge at Moonee connected fragmented but contiguous forest to the west with a large forest block to the east side of the highway (Figure 1b).

Habitat type adjoining crossing structures was mostly dry and moist open forest (Plates 1-7). Emerald Beach and Arrawarra north underpasses also featured areas of swamp forest. The distance between forest edge and underpass entrance ranged between 3.5m (Emerald Beach east) and 29.5m (Emerald Beach west).

Table 1: Location and habitat features of fauna mitigation structures. SF = swamp forest; MOF = moist open forest; DOF = dry open forest; Cl = cleared; E = east; W = west

Chainage	Location	Type	Adjoining Habitat (Distance (m) from structure to adjoining forest)	
			East side of highway	West side of highway
10720	Moonee	Rope bridge	DOF (8.5 to pole)	DOF/MOF (5 to pole)
11500	Moonee	Fauna underpass	Cl/MOF/DOF (20.5)	MOF/DOF (10.5)
17500	Emerald Beach	Fauna underpass	SF (3.5)	Cl/SF (29.5)
29100-30200	Arrawarra	Vegetated median	SF/MOF/DOF	SF/MOF/DOF
29380	Arrawarra south	Fauna underpass	DOF/MOF (15.8)	DOF/MOF (28.4)
29930	Arrawarra north	Fauna underpass	SF/MOF/DOF (20.8)	SF/MOF/DOF (17.6)
31000	Arrawarra creek	Glide poles	MOF/DOF (23.5)	MOF/DOF (36)

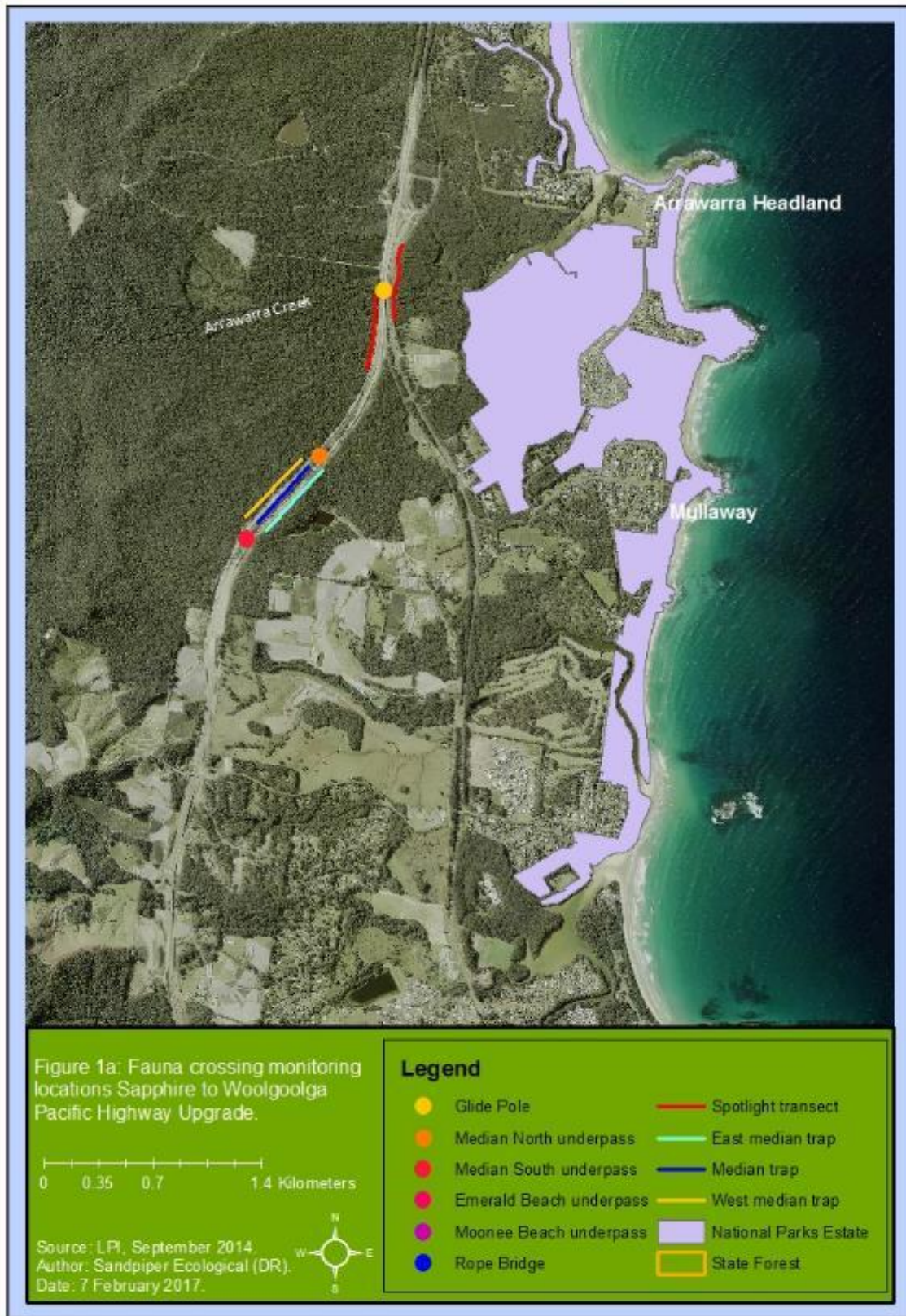






Plate 1: Expanse of the 86m-long Moonee rope bridge (ch.10720) looking north (top). Habitat adjoining rope bridge on the east (middle) and west (bottom) side of the alignment.



Plate 2: Habitat adjoining Moonee underpass (ch.11500) on the east (top) and west (bottom) side of the alignment.



Plate 3: Habitat adjoining Emerald beach underpass (ch.17500) on the east (top) and west (bottom) side of the alignment.



Plate 4: Habitat adjoining Arrawarra underpass south (ch.29380) on the east (top) and west (bottom) side of the alignment and across the vegetated median (middle).



Plate 5: Habitat adjoining Arrawarra underpass north (ch.29930) on the east (top) and west (bottom) side of the alignment and across the vegetated median (middle).



Plate 6: Vegetated median and adjoining habitat at Arrawarra (ch.29100-30200) as viewed along the east/southbound (top) and west/northbound (bottom) side of the alignment. The vegetated median is on the right side of both images. (Image: Google Earth).



Plate 7: Habitat adjoining Arrawarra Creek glide poles (ch.31000) looking north. Cameras were installed on the central pole in the highway median.

3. Methods

3.1 Underpasses

3.1.1 Design features

Underpasses varied in their design and function (Table 2; Plate 8-11). All underpasses were positioned in drainage lines except Arrawarra south, which was positioned mid-slope. Emerald Beach underpass functions as a combined drainage/fauna structure and was constructed as a series of eleven 1.2m diameter reinforced concrete (RC) pipes. Arrawarra and Moonee were dedicated RC box culverts and ranged in opening size from 2.4m x 3.0m (Moonee) to 3.0m x 3.0m (Arrawarra) (Table 2). Dedicated culverts featured a wooden post and rail running the length of the underpass and extending beyond the entrances by up to 10m. Moonee and Emerald Beach underpasses were 102.4m and 74.5m long respectively. Arrawarra underpasses were 19m - 21.8m long split underpasses separated by 31.8m - 38.4m of vegetated median. All underpasses were dry during monitoring except some Emerald Beach pipes featured up to 100mm of standing water.

Table 2: Design features of fauna underpasses. SB = south bound carriageway; NB = northbound carriageway; VM = vegetated median.

Chainage	Location	Type	Function	Length (m)	No. & Size (# x W x H(m))
11500	Moonee	RCBC	Dedicated	102.4	1 x 3 x 2.4
17500	Emerald Beach	RCP	Combined	74.5	11 x 1.2 diam.
29380	Arrawarra south	RCBC	Dedicated	21.4 (NB)	1 x 3 x 3
		RCBC		31.8 (VM)	1 x 3 x 3
29930	Arrawarra north	RCBC	Dedicated	21.4 (SB)	1 x 3 x 3
		RCBC		19 (NB)	1 x 3 x 3
		RCBC		38.4 (VM)	1 x 3 x 3
				21.8 (SB)	1 x 3 x 3



Plate 8: Moonee underpass (ch.11500) viewed from the east (top) and from the west entrance (bottom).



Plate 9: Emerald Beach underpass (ch.17500) viewed from the east (top) and west (bottom).



Plate 10: Arrawarra underpass south (ch.29380) viewed from the east (top), across the vegetated median (middle) and from west (bottom).



Plate 11: Arrawarra underpass north (ch.29930) viewed from the east (top), across the vegetated median (middle) and from west (bottom).

3.1.2 Monitoring fauna using underpasses

Monitoring was undertaken at the four underpasses using Reconyx HC500 infra-red (IR) cameras. To confirm complete crossings by fauna, a camera was installed at each end of the single cell underpasses (i.e. Arrawarra north & south, Moonee). Cameras were mounted to the side wall opposite the wooden rail, approximately 1.5m above floor level and approximately 2m inside the entrance and facing inwards (Plate 12). Cameras were housed in purpose-built security cases. At the Emerald Beach site, the two cameras were positioned (one each end) looking across the 20m-wide pipe series to attain full coverage of the entrance area (Plate 12). At Emerald Beach cameras were only positioned on the east side.



Plate 12: Single cell underpasses were monitored at each end with a Reconyx HC500 camera housed in a security case and mounted to the side wall opposite the wooden rail (e.g. Moonee underpass, Left). For the pipe series at Emerald Beach, a camera was mounted on the wing wall at either side of the pipe series and directed across the entrance area on the east side (Right).

A recommendation of the Year 1 monitoring report was to extend the length of the two 8-week seasonal monitoring periods to increase the likelihood of detecting fauna (Sandpiper 2017). Therefore, monitoring was conducted for 106 days during autumn and 70 days during spring (Table 3). Cameras were set on high sensitivity and to take 5 pictures/activation with no delay between activations. Images were saved onto an 8GB memory card and batteries and memory cards were checked during the middle of the monitoring period. All cameras were active/functioning for the full duration of each monitoring period except flattened batteries/full SD card caused by excessive false triggering at the Emerald Beach site reduced the monitoring period for the north camera in autumn to 89 days and the south camera in spring to 46 days (Table 3).

Table 3: Fauna underpass camera monitoring effort. Days active are for two cameras per underpass.

Method	Autumn 2016		Spring 2016	
	Period	Days active	Period	Days active
Moonee	7/4 – 16/6/2016	106/106	21/9 - 30/11/2016	70/70
Emerald Beach	7/4 – 16/6/2016	89/106	21/9 - 30/11/2016	70/70
Arrawarra south	7/4 – 16/6/2016	106/106	21/9 - 30/11/2016	46/70
Arrawarra north	7/4 – 16/6/2016	106/106	21/9 - 30/11/2016	70/70

3.1.3 Sampling fauna in adjacent habitat

Camera bait stations were installed on either side of each underpass to sample fauna in adjoining habitat. Two bait stations were each positioned at ~45° to and ~50m from each culvert entrance. Each station featured a

Scoutguard KG680V infra-red (IR) camera strapped to a tree or post at ~1m high and focused on a bait chamber ~2m away (Plate 13). Bait chambers were 150mm long PVC pipe (50mm diameter) capped at both ends and perforated with numerous holes. One bait chamber was baited with chicken wings and the other with peanut butter, honey and oats. Fish sauce was drizzled over the chicken bait chambers to serve as an additional attractant. Bait chambers were anchored to the ground with a tent peg.

Adjacent habitat sampling occurred for four weeks and was conducted during the period of underpass monitoring. Cameras were set on medium sensitivity and programmed to take 3 pictures/activation. Images were saved onto 4GB memory cards and retrieved at the end of the four-week period. Due to false triggering caused largely by moving vegetation, cameras were active for varying number of days during the sampling period (Table 4). False triggering was most prevalent at the Emerald Beach site. That site was more open and consequently more vulnerable to vegetation movement caused by wind.



Plate 13: Camera bait stations featured a Scoutguard KG680V strapped to a tree at ~1m high and focused on a bait chamber containing either chicken wings (L) or peanut butter, honey and oats (R).

Table 4: Adjacent habitat camera sampling effort. Days active are for 4 cameras per site.

Method	Autumn 2016		Spring 2016	
	Period	Days active	Period	Days active
Moonee	2/3 – 7/4/2016	36/6/28/36	20/9 – 20/10/2016	30/30/23/20
Emerald Beach	2/3 – 7/4/2016	1/6/21/35	20/9 – 20/10/2016	10/4/8/4
Arrawarra south	1/3 – 7/4/2016	8/36/36/18	20/9 – 20/10/2016	13/9/30/20
Arrawarra north	1/3 – 7/4/2016	25/21/36/8	20/9 – 20/10/2016	30/18/30/11

3.2 Vegetated median

3.2.1 Design and monitoring methods

The vegetated median at Arrawarra (ch.29100-30200) was 1100m long and ranged in width between 10-35m (Plate 6). The vegetation was largely dry open forest with tree heights of up to 35m. The most prominent trees were located in the central 600m of the median. Canopy gaps across the carriageways were approximately 30-60m.

Determining whether gliders, particularly the threatened yellow-bellied glider and squirrel glider, use the vegetated median to cross the highway involved surveys both within the median and within habitat either side

of the upgrade corridor. Nest boxes, trapping (mark-release-recapture), hair funnels and spotlighting (inc. yellow-bellied glider call playback) were conducted during 8-10 week monitoring periods in summer-autumn and winter-spring 2016. A summary of survey effort and timing for each method is detailed in Table 5.

Table 5: Methods used and survey effort to determine use of vegetated median by gliders.

Method	Summer-Autumn 2016		Winter-Spring 2016		Total Effort
	Period	Effort	Period	Effort	
Nest boxes	15/2 & 4/5/2016	2 checks x 20 boxes	12/8 & 20/9/2016	2 checks x 20 boxes	4 checks
Trapping	2-6/5/2016	4 nights x 30 traps	19-23/9/2016	4 nights x 30 traps	240 trap-nights
Spotlighting & call playback	3/5 & 5/5/2016	2 persons x 2 nights x 3 transects	20/9 & 22/9/2016	2 persons x 2 nights x 3 transects	4 nights
Hair funnels	15/2-2/5/2016	76 nights x 30 funnels	19/8-19/9/2016	31 nights x 30 funnels	60 funnels

3.2.2 Nest boxes

At the beginning of the 2015 summer/autumn monitoring period, two 500m-long transects were established in habitat immediately to the east and west of the vegetated median (Figure 1; Plate 6). Each transect ran parallel to the highway and meandered 5-40m from the forest edge. Transects were used for nest box installation, trapping, hair funnels and spotlighting. A third 500m-long transect was also established in the median for installation of traps, hair funnels and spotlighting.

Ten nest boxes targeting squirrel/sugar gliders (rear-entry, plywood box manufactured by Hollow Logs Homes) were each installed on the east and west transects. No boxes were installed in the vegetated median because, as stated in the EMP, “the purpose of the vegetated median and glider crossing structures will be to maintain habitat connectivity for glider species known to occur in the locality in order to maintain genetic variation and to provide opportunity for dispersal and recolonization” (BEM 2014). Installing nest boxes within the median could encourage resident animals to establish home territories within the median and thus act as a possible deterrent to use by non-resident or dispersing individuals. Boxes were installed at a height of 8m on mature rough-barked trees using a ladder (Plate 14). Boxes were spaced at 50m intervals along each transect.

Nest box inspections were conducted at the beginning and end of each monitoring period (Table 5). Two personnel inspected the contents of nest boxes using a purpose-built GoPro camera mounted on an extendable pole. Images from the GoPro camera were wirelessly streamed to an iPad for viewing. Fauna present, signs of use and box condition were recorded for each box. If a box contained gliders, a ladder was used to access the box whereby individuals were removed and placed into cloth bags for processing. Captured gliders were weighed, sexed and breeding status determined. Each individual was then issued a numbered ear tag and returned to the box.



Plate 14: Nest box, Elliott trap and hair funnel mounted on a trap-tree (Left). Nest boxes were inspected using a purpose built, GoPro camera mounted to an extendable pole (Right).

3.2.3 Trapping (Mark-Release-Recapture)

Trapping targeting squirrel and sugar gliders was conducted for four nights during each 8-week monitoring period (Table 5). Ten traps were installed at 50m intervals along each of the three survey transects. Traps comprised Elliott (type B) aluminium treadle traps each mounted on a wooden bracket at approximately 5m height (Plate 14). Traps were baited with a mixture of peanut butter, honey and oats and a dilute mixture of honey water was sprayed up the tree trunk to act as an attractant. Traps were checked at dawn and captured animals were processed as per nest box captures (refer 3.2.2). One hundred and twenty trap-nights were completed during each monitoring period. In spring, black plastic was wrapped around the base of each tree to reduce by-catch of *Antechinus* spp and fawn-footed melomys.

3.2.4 Hair funnels

Hair funnel sampling occurred for a minimum of four weeks during each monitoring period. Hair funnels were installed on all three survey transects. A single hair funnel was screwed to each trap-tree at a height of approximately 4m for a total of 30 funnels (Plate 14). Funnels were baited with a mixture of peanut butter, honey and oats and a dilute mixture of honey water was sprayed up the tree trunk to act as an attractant. Hair funnels were retrieved at the end of each sampling period and sent to B.Triggs, a recognised hair identification expert. Hair funnels were deployed for 76 nights (summer-autumn) and 31 nights (winter-spring) (Table 5).

3.2.5 Spotlighting and call playback

Spotlighting and call playback was conducted on all three survey transects on two non-consecutive nights during each monitoring period (Table 5). Two personnel performed surveys using 200+ lumen spotlights. Each transect survey was preceded by yellow-bellied glider call playback followed by 30 minutes of spotlighting. Species observed were identified and their location and behaviour recorded.

3.3 Rope bridge and glide pole

3.3.1 Rope Bridge - design features

The rope bridge at Moonee (ch.10720) consisted of a 400mm wide ladder design made from 10mm diameter silver rope woven into a 100mm wide grid pattern. The rope ladder was slung between 3mm wire rope and supported by 10mm wire rope (Plate 15). The bridge spans 86m from pole to pole and rests approximately 9m above road level in the centre of the highway and 10m above ground level at the pole ends. Bridge ends/bulkheads are adjacent to the mid-canopy of dry open forest. Lengths of 25mm diameter silver rope extend from the bulkhead to adjacent trees (Plate 15).



Plate 15: A Reconyx camera mounted to a wooden ‘sandwich board’ was positioned approximately 2m from each end of the rope bridge to capture moving fauna (L). Slung rope (25mm diam.) was used to link the bulkhead to surrounding trees (R).

3.3.2 Rope bridge - monitoring

Year 2 monitoring of the rope bridge entailed camera surveillance of the rope bridge surface to determine use by arboreal fauna and spotlight and call playback surveys (targeting yellow-bellied gliders) within adjoining habitat to determine the presence of threatened gliders and other arboreal mammals.

Camera monitoring of the rope bridge was continuous during Year 2 and was required to achieve a minimum of 220 days of surveillance during the period March-November. Reconyx SC950 motion-activated infra-red cameras installed at the beginning of Year 1 monitoring were kept operational during the entirety of Year 2. Cameras were mounted on ‘sandwich’ boards and positioned approximately 2m from, and facing, the end of the rope bridge (Plate 15). Cameras were scheduled to turn on at 1700hrs and turn off at 0500hrs eastern standard time (EST). Cameras were set at high sensitivity and programmed to take five ‘rapidfire’ pictures upon triggering with no delay between triggers. Cameras were checked every 2-3 months via a tree climber to refresh batteries and change memory cards. Cameras were active for a total of 345 days (east camera) and 308 days (west camera) during the extended monitoring period (i.e. 15/12/2015 – 30/11/2016). Loss of monitoring days was caused by battery fatigue. For the period March – November, both cameras exceeded the required 220 days of monitoring (refer EMP) with the east camera active for 268 days and the west camera active for 258 days (Table 6).

Spotlighting and call playback was conducted on four occasions during the monitoring period (11/8/2016, 21/9/2016, 18/10/2016, 20/10/2016). Spotlighting was performed along 500m-long transect running parallel to and within 50m of the highway (Figure 1). Spotlight and call playback surveys were conducted as per method described in section 3.2.5.

Table 6: Monitoring period start and end dates and number of days active for cameras installed on the rope bridge at Moonee.

Structure	Camera position	Start of period	End of period (days)	Total days active/cam	Days active Mar-Nov
Rope Bridge	East	15/12/2015	30/11/2016 (351)	345	268
	West	15/12/2015	30/11/2016 (351)	308	258

3.3.3 Glide pole - design features

Two glide poles were located at Arrawarra Creek (ch.31000) - one between the northbound (NB) and southbound (SB) carriageways and the other between the SB carriageway and Solitary Islands Way immediately to the east (Plate 16). As described in the Year 1 report (Sandpiper 2017), monitoring with cameras was only conducted on the central/median glide pole (Plate 16).

The central glide pole stands 21.5m and the east pole approximately 18m above road level. Both poles are treated hardwood and approximately 500mm diameter at breast height. Two arms for gliders to launch from project east-west (upper arm) and north-south (lower arm). Each arm is approximately 3000mm long and 150 x 100mm thick undressed hardwood and are brace-mounted to the pole. The arms are positioned approximately 200mm and 900mm from the pole top. The central pole is 36m from the closest roadside tree to the west and 25m to the glide pole to the east side, which is a further 23.5m to the closest roadside tree. Roadside tree canopy heights are up to 25m on the west side and up to 22m on the east side.



Plate 16: View of the two glide poles at Arrawarra creek looking north. Cameras were installed on the central glide pole positioned between the carriageways (red circle). Solitary Islands Way adjoins the dual carriageway immediately to the east (right of the photo).

3.3.4 Glide pole - monitoring

Camera monitoring of the central glide pole was continuous during Year 2 and was required to achieve a minimum 220 days of surveillance during the period March-November. Two Reconyx SC950 motion-activated infra-red cameras installed at the beginning of Year 1 monitoring (one camera at north end of north-south oriented arm; one camera at east end of east-west oriented arm; Plate 17) were kept operational throughout

Year 2. Cameras were set to turn on at 1700hrs and turn off at 0500hrs EST. Cameras were set at high sensitivity and programmed to take five ‘rapidfire’ pictures/trigger with no delay between triggers.

In an effort to better determine direction of glide launches from the glide pole, an additional camera was installed on each pole arm on 18/5/2016. A Scoutguard KG680V infra-red (IR) camera attached to the end of a flat metal bar was mounted on the opposite end to the position of the Reconyx camera (Plate 17). Scoutguard’s were set on medium sensitivity and programmed to take 10 seconds of video footage upon triggering. Cameras were scheduled to turn on at 1700 hrs and turn off at 0500hrs EST. Cameras were checked every 2-3 months via a tree climber to refresh batteries and change memory cards.

Early battery fatigue occurred on two occasions in the east Reconyx camera resulting in loss of 96 nights during the monitoring period and in the north Reconyx camera resulting in loss of 45 nights. Reconyx cameras were active for a total of 255 days (east camera) and 306 days (north camera) during the extended monitoring period (i.e. 15/12/2015 – 30/11/2016) (Table 6). Scoutguard cameras were continuously active from 18/5/2016 to the end of the monitoring period (30/11/2016), for a total of 196 days (Table 6). For the period March – November, either camera on each pole arm was active for 268 days (east/west arm) and 274 days (north/south arm), well above the required 220 days minimum (Table 7).

Spotlight surveys and call playback was conducted in forest habitat adjacent to the glide poles to determine the presence of threatened gliders and other arboreal mammals. The two 500m-long roadside transects established in forest either side of the highway at the beginning of year one were spotlighted/call playback on four occasions (3/5/2016, 11/8/2016, 21/9/2016, 18/10/2016) during the monitoring period. Spotlight and call playback surveys were conducted as per method described in section 3.2.5.

Table 7: Monitoring period start and end dates and number of days active for cameras installed on the glide pole at Arrawarra Creek. * = number of days either or both cameras on the respective pole arm were active during the specified period.

Structure	Camera position	Start of period	End of period (days)	Total days active/cam	Total days active (both cams)*	Days active Mar-Nov (both cams)*
Glide pole east/west arm	East (Reconyx)	15/12/2015	30/11/2016 (351)	255	345	268
	West (ScoutGuard)	18/5/2016	30/11/2016 (196)	196		
Glide pole north/south arm	North (Reconyx)	15/12/2015	30/11/2016 (351)	306	351	274
	South (ScoutGuard)	18/5/2016	30/11/2016 (196)	196		



Plate 17: Year 1 and early Year 2 glide pole monitoring featured an SC950 Reconyx camera mounted to the east end of the upper arm and the north end of the lower arm (Left & Middle). During year 2 monitoring (18/5/2016) a Scoutguard KG680V was installed on the end of a flat bar at the opposite end of each arm to the Reconyx cameras (Right).

3.4 Data summary and analysis

All images were uploaded to a computer and viewed using Windows Photo Viewer. Senior staff reviewed all images, with reference to standard field guides (i.e. Menkhurst & Knight 2003; Pizzey & Knight 2007). Data recorded included: site, date, time, species, accuracy (definite (90%+ certainty), probable (75-90% certainty), possible (60-75% certainty)), movement direction (east or west), number of images and image numbers. For rope bridge pictures the portion of rope bridge used (i.e. edge, center) and for the glide pole which part of the pole/arm used was also recorded. A hierarchical approach was adopted to species identification that included: species, genus or group.

Passes were defined as a photo sequence separated by at least 10 minutes or when individuals in consecutive sequences were clearly distinguishable. Pass totals for each structure was summed for the two cameras for each season. A 'definite' crossing of an underpass or rope bridge was scored when an individual was recorded moving away from one camera and then photographed less than 10 minutes later by the opposite camera exiting the structure. A 'probable' crossing was scored when an animal was recorded making directional movement by one camera only and was not recorded again by the same camera within a period of 10 minutes (see Cramer 2013; Goldingay *et al.* 2013; Soanes *et al.* 2015). In the latter scenario, a crossing is inferred based on direction of movement. The absence of photographs at the other end of the structure is presumed to be an instance of detection evasion. A 'possible' crossing was scored when there was demonstrated exploratory movement at the underpass entrance area or the individual stopped and did not show either strong directional movement or movement that suggests it turned around and exited. An 'unlikely' crossing (referred to as a 'visit') was scored when an individual was observed turning around or returning in <10 minutes or, in the case of the Emerald Beach pipes, was observed moving past the pipe entrance area but not into a pipe. Because cameras at Emerald Beach pipes were only on one side of the underpass, photo sequences were scored as either 'probable', 'possible' or 'unlikely' as per the definitions above. Total crossings for the rope bridge and each underpass were the sum of passes scored as either definite, probable or possible crossings.

Road crossings via the glide pole could not be confirmed from still photographs during year 1 and were inferred based on the reasoning that while an individual may glide to the central pole and return to the same side, it likely represents a very small proportion of detections. There is no habitat in the center of the carriageways and, therefore, no apparent reason for gliders to repeatedly access the glide pole without

completing a crossing. This was consistent with analyses of glide pole monitoring records from the Hume Highway which were supported by radio-tracking data (see Soanes et al. 2015). Therefore, a photo sequence or ‘pass’ of an individual glider on the glide pole was scored as a road crossing although it was acknowledged that the total figure may have been an overestimate (Sandpiper Ecological 2017).

After installation of video cameras on glide pole arms during year 2 monitoring, video recordings confirmed road crossings in both directions. To account for the presence of four cameras on the pole arms, images and/or video footage of an individual animal recorded concurrently by any of the cameras and either separated from another photo sequence by at least 10 minutes or clearly showing a different individual if less than 10 minutes was scored as a ‘pass’. Information recorded for each pass, where discernible, included: species, sex, tail tip tone (for sugar gliders), movement type (i.e. explore arm, climb pole, glide east, glide west).

4. Results

4.1 Underpasses and adjacent habitat

4.1.1 Species in adjacent habitat

Twenty-nine species/groups of vertebrate fauna were detected by cameras in habitat adjacent to underpasses (Table 8; Plate 18). Moonee was the most diverse site (20 species) and Emerald Beach and vegetated median north the least (12 species). The number of species on each side of an underpass varied marginally and was most pronounced at vegetated median south (15 spp. versus 11 spp.). An equivalent number of species were recorded in each season at each site except 27% fewer species were recorded in autumn at the Moonee Beach site. Lace monitor (*Varanus varius*) and swamp wallaby (*Wallabia bicolor*) were the most commonly detected species and were recorded at all sites (Plate 18). No threatened species were detected in habitat adjacent the underpasses during the monitoring period.

Full details of adjacent habitat camera monitoring effort are provided in Table A1-3 (Appendix A).

Table 8: Fauna recorded at camera bait stations in habitat adjacent to underpasses during Autumn (A) and Spring (S) survey periods. E = East; W = West; Pr = Probable; # = humans were excluded from the species counts.

Species Name	Common name	Moonee (dedicated)		Emerald Bch (pipes)		Veg Med Sth (dedicated)		Veg Med Nth (dedicated)	
		E	W	E	W	E	W	E	W
<i>Varanus varius</i>	Lace monitor	S	S		A	A, S	A, S	A, S	S
<i>Intellagama lesueurii</i>	Eastern water dragon		S			S			S
<i>Egernia major</i>	Land mullet	A, S	A, S			S			
<i>Tiliqua scincoides</i>	Blue-tongue skink				A				
<i>Pseudechis porphyriacus</i>	Red-bellied black snake		S	S					
<i>Tachyglossus aculeatus</i>	Echidna	A, S	A			A	S	A	A
<i>Antechinus sp.</i>	Antechinus sp.					A	S	A	
<i>Parameles nasuta</i>	Long-nosed bandicoot		S			A	A	A, S	A, S
<i>Isodon macrourus</i>	Northern brown bandicoot			A	A	A, S	A, S	A, S	A, S
<i>Trichosurus caninus</i>	Short-eared brushtail possum	A, S	A, S			A	A		A
<i>Trichosurus vulpecula</i>	Common brushtail possum	S	S			A, S	A		A, S
<i>Trichosurus spp.</i>	Brushtail possum sp.						S		
<i>Macropus giganteus</i>	Eastern grey kangaroo		A	A, S	A, S	A			
<i>Macropus rufogriseus</i>	Red-necked wallaby	A		S					
<i>Wallabia bicolor</i>	Swamp wallaby	A, S	A, S	A, S		A, S	A, S	A, S	A, S
<i>Hydromys chrysogaster</i>	Water rat			S					
<i>Rattus fuscipes</i>	Bush rat	S	S			A, S	S		S
<i>Rattus rattus</i>	Black rat	A		S		A	A		
	Rodent sp.			S			S		
<i>Canis familiaris</i>	Dog						S		A, S
<i>Vulpes vulpes</i>	Red fox	A, S	A, S			S			
<i>Bos taurus</i>	Cow			A	A, S				
<i>Homo sapiens</i>	Human		A						
<i>Alectura lathami</i>	Brush turkey	S						S	
<i>Malurus cyaneus</i>	Superb fairy wren			S					
<i>Eopsaltria australis</i>	Eastern yellow robin	A, S	S						
<i>Psophodes olivaceus</i>	Eastern whipbird	A							
<i>Colluricincla harmonica</i>	Grey shrike-thrush				A				
<i>Leucosarcia melanoleuca</i>	Wonga pigeon		A			A			
<i>Sericornis frontalis</i>	White-browed scrub wren	S							
<i>Orthonyx temminckii</i>	Australian logrunner	S							
Number of species/site		15	14	9	6	15	11	7	10
Number of species/site		20		12		16		12	
Number of species/season/site (A/S)		11/15		7/8		12/12		9/9	



Plate 18: Twenty-nine vertebrate species were recorded in habitat adjoining fauna underpasses, including common brushtail possum (Top Left), echidna (Top Right), lace monitor (Middle Left), long-nosed bandicoot (Middle Right), swamp wallaby (Bottom Left) and eastern grey kangaroo (Bottom Right).

4.1.2 Species using underpasses

Seven fauna species were confirmed using at least one of the four fauna underpasses during autumn and spring monitoring (Table 9). One thousand and twenty-six passes and 757 crossings were recorded by the eight cameras. More passes and crossings were recorded in spring than autumn (433 passes/320 crossings in autumn; 593 passes/437 crossings in spring) although this was largely attributed to high use of Moonee underpass by red fox (*Vulpes vulpes*) during spring. Moonee was the most frequented underpass with 786 passes and 582 crossings although this is similarly attributed to high use by red fox (Table 9). Moonee and

vegetated median south were underpasses most frequented by native fauna (162 passes and 83 passes respectively) with swamp wallaby accounting for 148 of passes at Moonee. Emerald and vegetated median north were the least frequented by native fauna (51 passes and 34 passes respectively). Emerald and vegetated median south featured the greatest diversity of native species users (7 spp. and 5 spp. respectively) although at Emerald Beach only three species (eastern grey kangaroo *Macropus giganteus*, long-nosed bandicoot *Perameles nasuta* and bandicoot sp.) were recorded making crossings.

Eight species/taxa group were recorded making crossings of the underpasses (Table 9; Plate 19 & 20). Swamp wallaby recorded the highest number of underpass crossings amongst native species users, including 83 crossings of the Moonee underpass (72 in autumn, 11 in spring). Swamp wallaby was recorded making crossings at all sites except Emerald Beach. Eastern grey kangaroo recorded the next highest number of crossings, including two of the vegetated median south underpass (autumn) and 33 of the Emerald Beach pipes (31 in autumn, 2 in spring). Three other native species were recorded making crossings in spring only: long-nosed bandicoot at Emerald Beach pipes (n = 4), common brushtail possum (*Trichosurus vulpecular*) at Moonee (n = 2) and lace monitor at vegetated median south (n = 10) and vegetated median north (n = 1).

Two introduced mammal species, red fox and dog (*Canis familiaris*), were recorded at all sites except red fox wasn't recorded at vegetated median north. Red fox was recorded making underpass crossings on 489 occasions (Plate 19). The majority of these crossings occurred at Moonee (n = 484), including 187 crossings in autumn and 297 in spring. At least three individuals were identified. On 11 occasions, red fox was photographed with prey, including a large snake (probable carpet python *Morelia spilota*) and bandicoot sp. (Plate 21). Dogs (up to 2 individuals) were most frequently recorded crossing the two vegetated median sites (n = 20) followed by Moonee (n = 13). Combined, similar numbers of dog crossings were recorded during the two seasons (28 in autumn, 25 in spring).

Full details of underpass camera monitoring effort and detections are provided in Table A1-3 (Appendix A).

Table 9: Species detected and number of camera passes and crossings (passes/crossings) recorded by cameras at each end of fauna underpasses. A = Autumn; S = Spring. # = humans are not included in Passes/Crossings Totals.

Species name	Common name	Moonee		Emerald Beach		Veg Med South		Veg Med North		Total pass/cross
		A	S	A	S	A	S	A	S	
<i>Varanus varius</i>	Lace monitor						11/10		1/1	12/11
<i>Intellagama lesueurii</i>	Eastern water dragon			3/0						3/0
<i>Pseudechis porphyriacus</i>	Red bellied black snake			2/0						2/0
<i>Macropus giganteus</i>	Eastern grey kangaroo	2/0	10/0	2/2	37/31	4/2	2/0			57/35
<i>Wallabia bicolor</i>	Swamp wallaby	121/72	27/11			14/10	50/40	22/19	11/9	245/161
<i>Trichosurus vulpecula</i>	Common brush-tailed possum		2/2							2/2
<i>Perameles nasuta</i>	Long-nosed bandicoot				4/4		1/0			5/4
	Bandicoot sp.				1/1		1/1			2/2
<i>Vulpes vulpes</i>	Red fox	214/187	392/297		4/4		1/1			611/489
<i>Canis familiaris</i>	Dog	8/4	10/9		1/0	27/17	5/3	13/7	21/13	85/53
<i>Homo sapiens</i>	Human #	1/0								
<i>Gallirallus philippensis</i>	Buff-banded rail			1/0						1/0
<i>Centropus phasianinus</i>	Pheasant coucal				1/0					1/0
Native fauna passes		123/72	39/13	8/2	43/36	16/12	65/51	22/19	12/10	330/215
Introduced fauna passes		222/191	402/306	0/0	5/4	27/17	6/4	13/7	21/13	696/542
Total Fauna Passes/Crossings #		345/263	441/319	8/2	48/40	43/29	71/55	35/26	33/23	1026/757

**Plate 19:** Photo sequences show red fox (Top) and eastern grey kangaroo (Bottom) making crossings of the Emerald Beach pipes.



Plate 20: Cameras in the southern vegetated median underpass captured numerous crossings, including eastward crossings by swamp wallaby (Top) and lace monitor (Bottom).



Plate 21: Red fox were recorded at Moonee underpass with prey in their mouth on 11 occasions, including bandicoot sp. (Left) and snake (probable carpet python; Right).

4.1.3 Species in adjacent habitat using underpasses

The proportion of fauna detected in adjacent habitat (excluding birds) and recorded using the respective underpass ranged between 30% and 64% (Table 10). Forest birds detected in adjacent habitat have been excluded from analyses because they are not targeted or recorded using underpasses and potentially confound comparisons.

The highest proportion of adjacent habitat fauna using the respective underpass was recorded at Emerald Beach (64%) and the least at vegetated median north (30%). The proportion of native species detected in adjoining habitat and recorded using the respective underpass ranged from 22% at vegetated median north to 63% at Emerald Beach (Table 10). Native mammals and reptiles detected in adjacent habitat but not recorded using an underpass at any site included: echidna (*Tachyglossus aculeatus*), Antechinus sp., short-eared brushtail possum (*Trichosurus caninus*), red-necked wallaby (*Macropus rufogriseus*), rodents, cow (*Bos taurus*), land mullet (*Egernia major*) and blue-tongued skink (*Tiliqua scincoides*).

Table 10: Species recorded in adjacent habitat and species recorded using underpasses. Data for autumn and spring are pooled. Birds detected in adjoining habitat have not been included as they are not the target of underpass deployment and were not recorded using underpasses.

Species name	Common name	Moonee (dedicated)		Emerald Bch. (pipes)		Veg Med Sth (dedicated)		Veg Med Nth (dedicated)	
		UP	Adj	UP	Adj	UP	Adj	UP	Adj
<i>Tachyglossus aculeatus</i>	Echidna		X				X		X
<i>Antechinus sp.</i>	Antechinus sp.						X		
<i>Parameles nasuta</i>	Long-nosed bandicoot		X	X		X	X		X
<i>Isoodon macrourus</i>	Northern brown b'icoot				X		X		X
	Bandicoot sp.			X		X			
<i>Trichosurus caninus</i>	Short-eared b'tail possum		X				X		X
<i>Trichosurus vulpecula</i>	Common b'tail possum	X	X				X		X
	B'tail possum sp.						X		
<i>Macropus giganteus</i>	Estn grey kangaroo	X	X	X	X	X	X		
<i>Macropus rufogriseus</i>	Red-necked wallaby		X		X				
<i>Wallabia bicolor</i>	Swamp wallaby	X	X		X	X	X	X	X
<i>Hydromys chrysogaster</i>	Water rat				X				
<i>Rattus fuscipes</i>	Bush rat		X				X		X
<i>Rattus rattus</i>	Black rat		X		X		X		
	Rodent sp.				X		X		
<i>Canis familiaris</i>	Dog	X		X		X	X	X	X
<i>Vulpes vulpes</i>	Red fox	X	X	X		X	X		
<i>Bos taurus</i>	Cow				X				
<i>Homo sapiens</i>	Human	X	X						
<i>Varanus varius</i>	Lace monitor		X		X	X	X	X	X
<i>Intellagama lesueurii</i>	Eastern water dragon		X	X			X		X
<i>Egernia major</i>	Land Mullet		X				X		
<i>Tiliqua scincoides</i>	Blue-tongue skink				X				
<i>Pseudechis porphyriacus</i>	Red-bellied Black Snake		X	X	X				
Number of species		6	15	7	11	7	17	3	10
Proportion of species in adjacent habitat using underpass		40		64		41		30	
Number of native species		3	12	5	8	5	13	2	9
Proportion of native species in adjacent habitat using u'pass		25		63		39		22	

4.2 Vegetated median

4.2.1 Species Occurrence

Four arboreal mammal species (including three glider species) and five scansorial species were detected by the various methods during the two monitoring seasons at the vegetated median site (Table 11; Plate 22). More records were obtained during autumn (n = 95) than spring (n = 52), largely due to the high number of captures of brown antechinus (*Antechinus stuartii*) and fawn-footed melomys (*Melomys cervinipes*) in tree traps targeting gliders (56 captures in autumn compared to 13 captures in spring). The markedly lower spring value was attributed to the loss of all males from the Antechinus population in early spring and the installation of black plastic around the base of trap trees during the spring trapping session which reduced scansorial mammal access to the tree traps.

Seven squirrel gliders (*Petaurus norfolcensis*; 3 male, 4 female) were trapped during autumn and two (both females) in spring (Plate 22; Table 12). A female squirrel glider trapped in autumn was also retrieved from a nest box at the beginning of the spring monitoring period. Nest boxes on both sides of the highway revealed moderate evidence of use, as determined by characteristic sugar/squirrel glider nests. Evidence of gliders was

present in seven boxes in the east forest and one in the west forest in autumn and seven in the east forest and two in the west forest in spring (Plate 22). No gliders were present in nest boxes during the inspections. Overall, eight individual squirrel gliders (4 male, 4 female) were marked during year two monitoring. Pouch young were recorded in two females (F3, F4) during autumn and three females (F3, F4, F5) during spring (Table 12). The location of recaptured individuals confirmed three crossings of the southbound carriageway, east forest to median (F2 and F4) and median to east forest (M4).

Sugar gliders (*Petaurus breviceps*) were detected in the east forest (trapping, hair funnels), median (hair funnels, spotlighting) and west forest (hair funnels) during autumn and the median (trapping) and west forest (spotlighting) during spring (Table 11). The trap captures included a female who had previously bred and an adult male. No sugar gliders were recaptured so alignment crossings could not be confirmed. Feathertail glider (*Acrobates pygmaeus*) was the other glider species detected. An individual was observed within the median and the east forest during spring spotlighting. Leaf nests typical of this species were also recorded in nest boxes during inspections in autumn (2 east, 1 west) and spring (1 east, 1 west; Plate 22).

A further six non-volant mammal species were detected at the vegetated median site (Table 11). A common brushtail possum (*Trichosurus vulpecular*) was spotlighted in the west forest during summer. Brown antechinus (*Antechinus stuartii*) and fawn-footed melomys (*Melomys cervinipes*) were captured on both sides of the alignment and within the median (Plate 22). The largely terrestrial bush rat (*Rattus fuscipes*) was detected by hair funnels in the median. Two introduced and highly arboreal species, black rat (*R. rattus*) and house mouse (*Mus musculus*), were also detected by hair funnels in the median and west forest (black rat) and east forest (house mouse).

Full details of vegetated median monitoring are provided in Table B1-B6 (Appendix B).

Table 11: Arboreal mammals recorded within the vegetated median and/or adjoining habitat. Tx = captured in arboreal traps and number of captures; Sx = observed during spotlighting and number of individuals; Nx = recorded in nest boxes and number of individuals; Hx = detected in hair funnels and number of funnels; Pr = probable. ^ = listed as vulnerable on NSW TSC Act. * = introduced species.

Species name	Common Name	Summer-Autumn			Winter-Spring		
		East	Median	West	East	Median	West
<i>Petaurus breviceps</i>	Sugar glider	H1(Pr), T1	H2(Pr), S1	H2(Pr)		T1	S1
<i>Petaurus norfolcensis</i>	Squirrel glider^	T4, S1	T4	T2	T2	T1	N1
<i>Acrobates pygmaeus</i>	Feathertail glider		H1(Pr)		S1	S1	
<i>Trichosurus vulpecular</i>	Common brushtail possum			S1			
<i>Antechinus stuartii</i>	Brown antechinus	H3, T24, N1	H3, T3	H7, T13	H7, T3	H6, T6	H3, T3
<i>Antechinus</i> spp.	Antechinus sp.	H1	H3	H1	H3		H6
<i>Melomys cervinipes</i>	Fawn-footed melomys	T3		T13		T1	H1
<i>Rattus rattus</i>	Black rat*					T1	
<i>Rattus fuscipes</i>	Bush rat					H1(Pr)	
<i>Rattus</i> sp.	Rat sp.			H1		H3	
<i>Mus musculus</i>	House mouse*	H1					
Total records		95			52		



Plate 22: Four arboreal mammal species were recorded at the vegetated median site, including the threatened squirrel glider (top left) and five scansorial mammal species, including brown antechinus (top middle) and fawn-footed melomys (top right). Gliders were detected using nest boxes, including a den constructed by a sugar or squirrel glider in a box featuring an abandoned bee hive (bottom left) and loosely packed eucalypt leaves typical of a feathertail glider (bottom right).

Table 12: Squirrel and sugar glider captures and carriageway crossings at the Arrawarra vegetated median. SqG = squirrel glider; SuG = sugar glider; M = male; F = female; PY = carrying pouch young; NB = northbound carriageway; SB = southbound carriageway; E = east habitat; M = vegetated median; W = west habitat.

Trap & Nest Box Location/ld	Date	Species (recapture)	Sex/ld	Crossings/comments
E2-trap	3/5/16	SqG	F2	
E3-trap	3/5/16	SuG	Fb	
M8-trap	3/5/16	SqG-recapture	M1	
W3-trap	4/5/16	SqG	M2	
M7-trap	4/5/16	SqG	M3	
M6-trap	4/5/16	SqG-Session recapture	F2	Crossed SB carriageway (east > median)
M4-trap	4/5/16	SqG	M4	
W7-trap	5/5/16	SqG	F3 (PY)	
E4-trap	5/5/16	SqG	F4 (PY)	
E6-trap	6/5/16	SqG-Session recapture	F4	
E1-trap	6/5/16	SqG-Session recapture	M4	Crossed SB carriageway (median > east)
W6-nest box	12/8/16	SqG-recapture	F3 (PY)	
E4-trap	21/9/16	SqG-recapture	F4 (PY)	
M4-trap	21/9/16	SuG	Ma	
E6-trap	22/9/16	SqG	F5 (PY)	
M3-trap	23/9/16	SqG-Session recapture	F4 (PY)	Crossed SB carriageway (east > median)

4.3 Rope bridge and glide pole

4.3.1 Rope bridge and adjacent forest - species detections

Feathertail gliders were detected on the rope bridge on seven occasions (Table 13). Most photographs show an individual exploring both the edge and center of the rope bridge within the field of view (Plate 23). On two occasions an individual was recorded moving eastward past the east camera both along the edge of the rope bridge and exiting over the bulkhead (12/9/2017) and along the center of the rope bridge (24/10/2017). The west camera did not record any detections during these times but the strong directional movement suggest probable crossings. On another occasion (1/9/2017), a single photograph by the east camera of an individual positioned in a westerly orientation was recorded as a possible crossing. No other arboreal mammals or reptiles were recorded on the rope bridge during the monitoring period.

Feathertail gliders were detected during spotlight surveys in the east forest (21/9/2016, 18/10/2016) and west forest (18/10/2016) between 10m and 250m from the rope bridge. A sugar glider was detected in the west forest (18/10/2016) approximately 250m north of the rope bridge and a sugar or squirrel glider was recorded in the east forest on two occasions (21/9/2016, 18/10/2016) 150-250m north of the rope bridge. Full details of rope bridge monitoring and adjacent forest spotlight surveys are provided in Table C1-C3 (Appendix C).

Table 13: Photo event records of arboreal mammals on the rope bridge during camera monitoring and arboreal mammals detected during spotlighting in adjoining forest habitat within 400m of the rope bridge (X).

Scientific Name	Common Name	East cam	West cam	Behaviour (position on bridge)	Crossing likelihood	East forest	West forest
<i>Petaurus breviceps</i>	Sugar glider						X
<i>P. breviceps</i> or <i>P. norfolcensis</i>	Sugar or squirrel glider					X	
<i>Acrobates pygmaeus</i>	Feathertail glider	18/1/16		Exploratory east & west movement (edge)	Unlikely	X	X
			10/8/16	East then west (center)	Unlikely		
		1/9/16		Stationary pointing west (center)	Possible		
		11/9/16		Explore (center & edge)	Unlikely		
		12/9/16		Move east (edge)	Probable		
		4/10/16		Exploratory east & west movement (center & edge)	Unlikely		
		24/10/16		Move east (center)	Probable		



Plate 23: Feathertail glider was detected at either end of the rope bridge on seven occasions. On one occasion the east camera captured an individual moving eastward along the edge of the rope bridge and up on to the bulkhead (L), indicating a probable crossing.

4.3.2 Glide poles and adjacent forest - species detections

Cameras on the glide pole arms recorded 106 passes (2.12 passes/week) during 351 days of monitoring (Table 14). A greater number of passes occurred on the upper arm (77 events or 1.56 passes/week) compared with the lower arm (58 passes or 1.16 passes/week). The rate of detection was greater for Scoutguard cameras compared with Reconyx cameras for both the upper arm (2.0 passes/week versus 1.04 passes/week) and lower arm (1.5 passes/week versus 0.43 passes/week). This equates to a greater rate of detection for Scoutguard cameras by a factor of 1.9 (upper arm) and 3.9 (lower arm).

Table 14: Camera performance and passes for cameras installed on arms of glide pole in central median at Arrawarra Creek. Pass rates are calculated using the number of weeks the respective camera was active.

Arm Orientation (Location)	Camera Position (Cam type)	Total Days (Weeks) Active	Total Days (weeks) either or both arm cams active	Passes/cam (per active week)	Passes/arm (per active week)	Passes/both arms (per active week)
East/west (Upper arm)	East end (Reconyx)	255 (36.4)	345 (49.3)	38 (1.04)	77 (1.56)	106 (2.12)
	West End (Scoutguard)	196 (28)		56 (2.0)		
North/south (Lower arm)	North End (Reconyx)	306 (43.7)	351 (50.1)	19 (0.43)	58 (1.16)	
	South End (Scoutguard)	196 (28)		42 (1.5)		

Squirrel glider, sugar glider and feathertail glider were detected using the central median glide pole (Plate 24-25). Two individual squirrel gliders, an adult female (lower glide pole arm) and sub-adult female (both glide pole arms), were each detected on one occasion (8/2/2016 and 10/2/2016). Behaviour on both occasions was exploratory. The adult female was previously captured/tagged at the vegetated median on 30 September 2015, 1.6km to the south (Plate 24).

Sugar gliders were detected on either or both glide pole arms on 32 occasions (0.64 passes/week) during the monitoring period (Table 15). A greater number of passes were recorded by lower arm cameras ($n = 24$; 0.48 passes/week) compared with upper arm cameras ($n = 18$; 0.37 passes/week). The rate of detection was greater for Scoutguard cameras compared with Reconyx cameras for both the lower arm (0.61 passes/week versus 0.21 passes/week) and upper arm (0.36 passes/week versus 0.25 passes/week). This equates to a greater rate of detection for Scoutguard cameras by a factor of 2.9 (lower arm) and 1.4 (upper arm).

Sugar glider behaviour in photos/movies was largely exploratory and mostly featured steady movements along the glide pole arms. On some occasions individuals were observed jumping/climbing higher up the pole from the lower arm. At least four individuals could be discerned from the images/footage – two males (one with dark-tip tail, one with white-tip tail) and two females (one with dark-tip tail, one with white-tip tail). Sugar gliders were recorded launching into a glide to cross the highway on 10 occasions (Table 16). On all occasions, the individual was recorded launching in a westward direction (Plate 25). Scoutguard cameras recorded nine of the ten launch events.

Feathertail gliders were detected on either or both glide pole arms on 69 occasions (1.38 passes/week) during the monitoring period (Table 15). A greater number of passes were recorded by upper arm cameras ($n = 56$; 1.14 passes/week) compared with lower arm cameras ($n = 30$; 0.6 passes/week). The rate of detection was greater for Scoutguard cameras compared with Reconyx cameras for both the upper arm (1.57 passes/week versus 0.71 passes/week) and lower arm (0.82 passes/week versus 0.18 passes/week). This equates to a greater rate of detection for Scoutguard cameras by a factor of 2.2 (upper arm) and 4.6 (lower arm).

Feathertail glider behaviour in photos/movies was largely exploratory and mostly featured rapid movements along the glide pole arms. Individuals were also often observed jumping/climbing higher up the pole from the lower arm and exploring the top of the pole. It is very difficult to discern distinguishing features of individuals from the images/footage but it is very likely that multiple individuals were recorded. Feathertail gliders were recorded launching into a glide to cross the highway on 18 occasions – 5 occasions in an eastward direction, 13 occasions in a westward direction (Table 16; Plate 25). Only Scoutguard cameras recorded launch events.

Spotlight surveys conducted in adjoining forest either side of the alignment recorded a sugar glider approximately 270m northeast of the pole array on 21/9/2017 and approximately 20m southeast on 18/10/2017. A sugar or squirrel glider with dependent back-young was detected approximately 260m northeast of the pole array on 21/9/2017. A feathertail glider was recorded 20m northeast of the pole array on 21/9/2017 and 15m southeast on 18/10/2017. No gliders were detected in adjoining forest on the west side.

Full details of glide pole monitoring and adjacent forest spotlight surveys are provided in Table D1-D3 (Appendix D).

Table 15: Photo/video passes for sugar glider and feathertail glider on Arrawarra Creek glide pole.

Arm Orientation (Position)	Camera Position	Passes/cam (per active week)		Passes /arm (per active week)		Passes /both arms (per active week)	
		Sugar glider	Feathertail Glider	Sugar glider	Feathertail Glider	Sugar glider	Feathertail Glider
East/west (Upper arm)	East end (Reconyx)	9 (0.25)	26 (0.71)	18 (0.37)	56 (1.14)	32 (0.64)	69 (1.38)
	West End (ScoutGuard)	10 (0.36)	44 (1.57)				
North/south (Lower arm)	North End (Reconyx)	9 (0.21)	8 (0.18)	24 (0.48)	30 (0.6)		
	South End (ScoutGuard)	17 (0.61)	23 (0.82)				

Table 16: Photo/video passes including 'launches' (i.e. glider launching into a glide) and direction for sugar glider and feathertail glider on Arrawarra Creek glide pole.

Arm Orientation (Location)	Camera Position	Passes/cam		Launches & Direction /cam	
		Sugar glider	Feathertail Glider	Sugar glider	Feathertail Glider
East/west (Upper arm)	East end (Reconyx)	9	26	0	0
	West End (ScoutGuard)	10	44	5w	3e, 12w
North/south (Lower arm)	North End (Reconyx)	9	8	1w	0
	South End (ScoutGuard)	17	23	4w	2e, 1w



Plate 24: Two individual squirrel gliders (sub-adult female; adult female) were recorded on the glide pole. An adult female captured/tagged at the vegetated median on 30 September 2015, 1.6km to the south was recorded at the glide pole on the 10 February 2016 (above; ear tag discernible in left ear).



Plate 25: Sugar gliders were recorded launching into a glide to cross the highway on 10 occasions during the monitoring year, including westward off the upper/east-west oriented arm (Top Left and Right). Feathertail gliders were recorded launching into a glide to cross the highway on 18 occasions, including eastward off the lower/north-south oriented arm (Bottom Left and Right).

5. Discussion

5.1 Project compliance

5.1.1 Monitoring requirements

Year two fauna mitigation monitoring at S2W satisfied the intent of the EMP and in several cases exceeded its requirements. A small number of survey days were lost during camera-trap surveys of habitat adjacent to Emerald beach pipes due to false triggering caused by moving vegetation and infestation by ants. Such constraints are commonly encountered during ground-based camera-trap surveys. The small loss of survey time is not considered to have compromised data quality, particularly as two cameras were positioned in adjacent habitat each side of the highway to compensate for potential malfunction/data loss of one of the cameras. Cameras in underpass, on the rope bridge and glide poles functioned well and exceeded the required monitoring period durations.

5.1.2 Monitoring aim and indicators of success

The broad aim of the EMP is “to allow the effectiveness of mitigation and offset measures to be assessed and allow for their modification if necessary” (BEM 2014). Moreover, the EMP describes several indicators of success with which to assess the performance of fauna mitigation measures. The following sections discuss the success of the monitoring program with reference to the indicators of success. This is followed by a series of recommendations relevant to year three of the monitoring program.

5.2 Species use of underpasses

5.2.1 Native species use of underpasses

Year 2 monitoring of underpasses at S2W upgrade revealed five (possibly six if bandicoot sp. was a northern brown bandicoot) native fauna species using at least one of four underpasses to cross the highway corridor (Table 9) which is the same number of native species recorded using underpasses in year 1 (Sandpiper 2017). Year two featured two new species recorded making crossings - common brushtail possum and long-nosed bandicoot – but did not include red-necked wallaby, which was recorded crossing vegetated median north during year one. The total number of crossings was almost eight times greater in year two ($n = 215$) compared to year one ($n = 27$) (Sandpiper 2017a) albeit the monitoring duration was almost twice that of year one (refer to section 5.2.4). The greater number of crossings was largely attributed to swamp wallabies which were recorded making 83 crossings at Moonee and 50 crossings at vegetated median south. Notably, eastern grey kangaroo was recorded making 33 crossings of the Emerald Beach 1200mm diameter pipes. This is an important record as it suggests that drainage pipes of this size are viable crossing structures for species as large as an eastern grey kangaroo. Western grey kangaroos have similarly been recorded using a 900mm pipe to cross a highway corridor in Perth (Chachelle *et al.* 2016).

The proportion of native species detected in surrounding habitat and using the respective underpass was greater in year two (22-63%) than year one (14-40%). Native species detected in adjacent habitat and not recorded using an underpass at any of the four sites (i.e. echidna, Antechinus spp. short-eared brushtail possum, red-necked wallaby, rodents, land mullet and blue-tongued skink) have, apart from land mullet and blue-tongued skink, been recorded using underpasses at other locations (Bond and Jones 2008, Taylor and Goldingay 2003, Sandpiper 2014, Sandpiper 2017b). Species recorded using underpasses at S2W are largely those that are not edge-averse and commonly encountered in fragmented landscapes. That is, the prevalence of grassland adjoining underpasses, relatively broad gaps between underpass entrances and forest habitat and

the lack of vegetative cover near underpass entrances likely contributed to the lack of small mammal use (see Connolly-Newman *et al.* 2013). Further, the type of underpass sites chosen for the monitoring program may also explain why aggregate fauna usage was comparatively low.

The selection of underpass monitoring sites, as described in the EMP (BEM 2014), was largely based on a desire to determine whether fauna would use: an underpass positioned on a mid-slope (vegetated median south); a relatively long single-cell, dedicated underpass (Moonee); and combined structures (drainage pipe series at Emerald Beach). As such, these different structures/locations may be expected to feature less fauna use, particularly compared to dedicated underpasses positioned close to high quality habitat (e.g. Sandpiper 2010, 2014, 2017b). Underpass monitoring at Glenugie a site with large areas of contiguous forest adjoining underpasses but equivalent gaps between forest and culvert entrances identified regular passes by short-beaked echidna, water rat, black rat and red-necked wallaby and occasional passes by *Antechinus* spp (Sandpiper 2017b).

The EMP identifies several threatened species targeted by the fauna underpasses, including common planigale, spotted-tail quoll, rufous bettong, long-nosed potoroo, brush-tailed phascogale and eastern pygmy possum. Spotted-tail quoll was the only target species detected in surrounding habitat during the current study (year one at Moonee east, Sandpiper Ecological 2017a), evidence of brush-tailed phascogale has been recorded during nest box monitoring (Sandpiper Ecological 2016), and eastern pygmy possum was detected in the north of the alignment during the Environmental Assessment phase (RTA 2007). No threatened species were detected using underpasses during year two or year one. While eastern pygmy possum and common planigale have not been recorded using underpasses, other operational phase highway studies have reported use by spotted-tail quoll, rufous bettong, long-nosed potoroo and brush-tailed phascogale (e.g. AMBS 2002; Sandpiper 2014, 2017b). Absence or low population densities of threatened species in the vicinity of the investigated structures would contribute to low or no use as would the fragmented nature of adjacent habitat, lack of cover near entrances, and vegetative links to adjoining forest.

5.2.2 Use by introduced predators

Introduced predators are commonly encountered during underpass monitoring though their impact on use by native species remains equivocal (e.g. Fitzgerald 2005; Chambers & Bencini 2014; Sandpiper 2014, Taylor & Goldingay 2014, Sandpiper 2017b). Introduced predators (dog, red fox) were present in adjacent habitat at all sites and both species were recorded making crossings at all sites except vegetated median north which only recorded dog crossings. Dog crossings were more common at the vegetated median sites and red fox crossings more common at the Moonee and Emerald Beach sites. Emerald Beach and Moonee feature disturbed, fragmented and peri-urbanised landscapes which may be more amenable to red fox compared to the continuous forest context of the vegetated median sites.

The prevalence of red fox at the Moonee underpass is of particular concern. This underpass featured 484 red fox crossings during the two seasons (187 in autumn, 297 in spring). This included 11 occasions when photographs showed red fox with prey in its mouth. Four such events were captured during year one monitoring (Sandpiper 2017a). Use of underpasses by red fox with prey has also been reported at Glenugie Pacific Highway upgrade (Sandpiper 2017b). It is unknown if foxes are capturing prey near underpass entrances or simply using underpasses to move between sites. Irrespective, the evidence shows that underpasses enable foxes to readily access habitat on both sides of the Pacific Highway. Construction phase monitoring at Nambucca Heads to Urunga also featured widespread use of recently-constructed underpasses by red fox, cat and dog (Sandpiper 2015b). This suggests that introduced predators habituate rapidly to underpasses and may require control, particularly around underpasses that target high risk (i.e. critical weight range <5000g) species. Both Moonee and Emerald Beach should be targeted for predator control.

5.2.3 Indicators of success

1. Low rates of use of fauna underpasses and adjacent habitats by feral predators.
 - a. *Feral predators were recorded using underpasses at all sites. Dog crossings were more common at the vegetated median sites and red fox crossings more common at the Moonee and Emerald Beach sites. Moonee experienced very high use by red fox, especially during spring.*
 - b. *How can indicator be achieved? Targeted feral predator control at Moonee and Emerald Beach sites.*
2. High levels of fauna underpass use by a wide variety of native fauna species.
 - a. *The proportion of native fauna detected in surrounding habitat and recorded using an underpass ranged between 22% (vegetated median north) and 63% (Emerald Beach). This is regarded as moderate use.*
 - b. *How can indicator be achieved? Improve level of vegetative cover adjacent underpass entrances and improve vegetative links between entrances and adjoining forest through targeted plantings.*
3. Evidence of use by dispersing individuals and different age cohorts.
 - a. *Difficult to determine but likely sub-adult and adult cohorts are using underpasses.*
4. Use by cover-dependent species and species with low mobility.
 - a. *Species recorded using underpasses are known to readily access open and fragmented habitat to either forage in or move through. They are also relatively mobile species.*
 - b. *How can indicator be achieved? Improve level of vegetative cover adjacent underpass entrances and improve vegetative links between entrances and adjoining forest through targeted plantings.*

5.3 Aerial crossing structures and vegetated median

5.3.1 Rope bridge detections and crossings

Rope bridges have enabled arboreal mammals to cross two and four lane roads (Goldingay *et al.* 2013; Soanes *et al.* 2015) and are important in connecting isolated populations (Taylor & Goldingay 2009; van der Ree *et al.* 2010; Taylor & Goldingay 2012). Species recorded using rope bridges across the Pacific and Hume Highways include squirrel, sugar and feathertail gliders, common brushtail and common ringtail possums, brush-tailed phascogale and *Antechinus* sp. (Goldingay *et al.* 2013; Soanes *et al.* 2015; Sandpiper 2017b). Lemuroid, Herbert River, and green ringtail possums, *Melomys* sp. and long-tailed pygmy possum have also been recorded using shorter bridges over two lane roads in north Queensland (Weston *et al.* 2011).

At S2W, feathertail glider was recorded on two occasions by the east camera making strong directional movement suggesting two probable eastward crossings and another photo of a stationary animal pointing west suggested a possible westward crossing. However, these probable/possible crossings should be treated with some caution because the behaviour of feathertail gliders on a rope bridge is typically erratic and exploratory and determining clear, directional movement difficult (see Sandpiper 2017b). The absence of photographs at the other end of the bridge may be an instance of non-detection by that camera or perhaps an individual glided onto the rope bridge (or off, in the case of evading detection at the exit end) and evaded camera detection (see Goldingay *et al.* 2013; Sandpiper Ecological 2017b). A sugar glider was detected in the west forest and a sugar or squirrel glider was detected in the east forest but neither species were recorded on the rope bridge during the monitoring period. A sugar glider was detected at the east end of the rope bridge

during year one monitoring. On that occasion, the individual explored the end of the rope bridge and exited. Overall, the level of rope bridge use has been minimal.

At 86m in length the Moonee rope bridge is one of the longest constructed on the Pacific or Hume Highway's. In comparison, single span, rope bridges at Glenugie range from 55-60m in length, and above road canopy bridges on the Hume Highway from 58 to 86m. The 86m canopy bridge on the Hume Highway has had low use by squirrel glider but regular use by common brushtail and common ringtail possums (Soanes *et al.* 2015). A combination of length, low height above road (9m) and nature of adjoining forest likely contribute to low use at Moonee.

5.3.2 Glide pole detections and crossings

Glide poles are another type of aerial crossing that has also proven effective in enabling sugar and squirrel gliders (Soanes *et al.* 2015; Taylor & Goldingay 2012, 2013) and possibly yellow-bellied gliders (Goldingay 2016) to cross dual carriageways. Squirrel gliders (two individuals) were detected on the central median glide pole on two occasions. Their detection occurred prior to installation of the video camera and direction of launch could not be determined from photographs. Their behaviour on all occasions was exploratory. Interestingly, the adult female squirrel glider was previously captured/tagged at the vegetated median in September 2015, 1.6km to the south. The foray to the glide pole represents a very large dispersal movement (see Sharpe and Goldingay 2007).

Sugar gliders and feathertail gliders demonstrated high rates of use of the glide pole during the monitoring period (0.64 events/week and 1.38 events/week, respectively). The feathertail glider records are particularly significant as there are few reported accounts of their use of highway glide poles. Glide pole monitoring over a three-year period along the Oxley Highway reported detection rates of 0.9-3.6 events/week for sugar glider and 0.3-2.2 events/week for feathertail glider for four roadside glide poles. However, the rates of detection are likely much higher than actual rates of crossing as the author concedes that some of the detections would have related to movements within and along the roadside (Goldingay 2016). In contrast, all glide pole detections at S2W have involved crossing of one carriageway.

Video footage captured by glide pole cameras at S2W confirmed westward glides for both species (10 occasions for sugar glider; 13 occasions for feathertail glider) and eastward glides for feathertail (5 occasions). The lack of confirmed eastward glides by sugar glider may be an artefact of the shorter glide distance required to cross from the median to the east pole (23.5m) compared to crossing from the median to the closest exposed tree trunk on the west side (36m). The shorter eastward glide could be comfortably achieved by launching directly off the pole just below the level of the launch arms. Further to this, a greater number of sugar glider detection events were recorded by the lower north-south facing arm compared to the upper east-west facing arm, suggesting a preference for the lower north-south facing arm. The opposite was the case for the feathertail glider suggesting a preference for the upper east-west facing arm. More data from year three monitoring will assist in determining if this preference is significant. Importantly, the absence of confirmed eastward glides by sugar glider is attributed to camera position not an aversion to crossing the southbound carriageway.

A comparison of Scoutguard and Reconyx camera performance during the period clearly shows superior performance by the Scoutguard cameras. Rates of detection for feathertail and sugar gliders were much greater for Scoutguard cameras (mean for both arms of 0.49 passes/week for sugar glider and 1.2 passes/week for feathertail glider) compared with Reconyx cameras (0.23 events/week for sugar glider and 0.45 events/week for feathertail glider). Further, Scoutguard cameras recorded nine of the ten launch events for sugar gliders and all of the 18 feathertail glider launch events. In light of these compelling results, Reconyx cameras on the glide pole arms will be removed during year three monitoring.

5.3.3 Vegetated median detections and crossings

Vegetated medians are another means of providing opportunity for gliding mammals to cross highway corridors. Their use has been reported for squirrel gliders on the Hume Highway (van der Ree *et al.* 2010) and sugar gliders on the Pacific Highway (Taylor & Rohweder 2013). During year two monitoring, mark-recapture methods confirmed three crossings of the southbound carriageway – east forest to median (two females) and median to east forest (one male). This builds on the year one record of a crossing of the northbound carriageway from the west forest to the median by a male squirrel glider. Overall, nine squirrel gliders (four males, five females (four with pouch young)) have been marked at the vegetated median site, including a male squirrel glider caught during the first trapping session in Year 1. This suggests that the vegetated median is enabling movement between and amongst resident squirrel gliders east and west of the highway. It is likely that individuals are foraging at times within the median and using it as a stepping stone across the highway. It is unlikely that individuals are residing within the median because there are few hollow bearing trees and limited denning potential.

Sugar gliders were detected in the east forest (trapping, hair funnels), median (trapping, hair funnels, spotlighting) and west forest (hair funnels, spotlighting) during spring (Table 10). A male and a female were captured during year two (and a female in year one) but because no recaptures occurred, the direction of alignment crossings could not be confirmed. Feathertail glider was detected in the median (spotlighting, hair funnels), east forest (spotlighting, nest box nests) and west forest (nest box nests). Crossings of the highway were not confirmed for this species although it is plausible. Based on results at the Arrawarra glide pole, it is also plausible that feathertails may be denning within the vegetated median.

Yellow-bellied gliders were not detected during the monitoring period on crossing structures or the vegetated median or within adjoining habitat. This was also the case for year one monitoring. During the clearing phase of the S2W upgrade, yellow-bellied gliders were recorded on several occasions in forest over 100m to the west of Arrawarra Creek (glide pole array). The absence of records at or near the S2W arboreal crossings during the two years of monitoring is probably indicative of very low population abundance in the study area.

5.3.4 Performance indicators

Vegetated median and aerial crossing structures:

1. Evidence of regular use of the median and crossing structures by the target glider species.
 - a. *Five squirrel glider captures within the median. Carriageway crossings confirmed for three directions (i.e. east > median, median > east; year one: west > median).*
 - b. *Use of glide pole by at least two squirrel gliders; crossing direction not confirmed.*
 - c. *No confirmed use of rope bridge by squirrel gliders.*
 - d. *No confirmed use of vegetated median or crossing structures by yellow-bellied glider.*
2. Evidence of use by dispersing individuals and different age cohorts;
 - a. *Squirrel gliders captured within median included adult and sub-adult males and adult females, including two with pouch young.*
3. Use by species other than threatened species e.g. sugar glider, greater glider.
 - a. *Sugar glider (trapped sub-adult male; spotlighted adult) and feathertail glider (individual spotlighted; hair on one hair funnel) were detected within the median.*
 - b. *Sugar glider and feathertail glider were recorded on the central glide pole and launching into glide crossings from that glide pole on 10 and 18 occasions, respectively.*

- c. *Feathertail glider was recorded making two probable and one possible crossing of the rope bridge based on directional movement although the erratic nature of their behavior constrains the level of confidence.*

6. Recommendations

6.1 Underpasses

1. Extend the autumn and spring underpass monitoring periods by one month to increase fauna detections and gain a better understanding of the full suite of species using the underpasses.
2. Continue to observe vegetation regrowth near culvert entrances and between entrance and adjoining forest;
3. Discuss with Country Energy the feasibility of allowing revegetation using understory plants to create a vegetated corridor linking the Moonee underpass across the powerline easement with adjoining forest to the east. Importantly, this was the location of the spotted-tail quoll record during year one.
4. Consider options for predator control around the Moonee underpass. Liaise with landholder to undertake predator control actions in compensatory habitat block on east side of highway. Control should target the pre-breeding period.

6.2 Aerial crossing structures and vegetated median

1. Trial use of camera with video function (e.g. ScoutGuard) on rope bridge to enable greater insight on possible crossings and to enable performance comparison with Reconyx camera.

6.3 Future highway upgrade projects

1. Rope bridges should be installed at mid to upper canopy level to improve accessibility for arboreal fauna;
2. Rope bridges should be a minimum of 12m above road level at their lowest point;
3. Rope bridge ends should be positioned as close to the adjacent canopy as practicable and no more than 5m from the canopy;
4. Disturbance should be minimised where practicable around entrances to dedicated fauna culverts during the construction phase and effective revegetation and furniture installation (i.e. logs and rocks) implemented before completion to provide cover.
5. A strategy for introduced predator control should be developed for dedicated culverts that target high risk (i.e. critical weight range <5000g) species.

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Appendix A – Underpass and adjacent habitat data

Table A1: Camera-trap effort for surveys of underpasses during autumn and spring 2016.

Site (chainage)	Camera	Autumn 2016							Spring 2016						
		Install date	Collect date	Pics	Battery	Days active	Total Days active	Total pics	Install date	Collect date	Pics	Battery	Days active	Total Days active	Total pics
Moonee Bch (ch.11500)	UP-E	2/3/16	16/6/16	622	A	70	106	1302	21/9/16	30/11	1498	A	42	70	2232
	UP-W	2/3/16	16/6/16	807	A	70	106	1206	21/9/16	30/11	1109	A	42	70	1822
Emerald Bch (ch.17500)	UP-E-N	2/3/16	16/6/16	250	A	43	89	7252	21/9/16	30/11	1153	A	42	70	1566
	UP-E-S	2/3/16	16/6/16	607	A	43	106	9279	21/9/16	30/11	15468	F	18	46	16028
Veg Median South (ch.29380)	UP-E	1/3/16	16/6/16	254	A	43	106	627	21/9/16	30/11	349	A	42	70	691
	UP-W	1/3/16	16/6/16	222	A	43	106	539	21/9/16	30/11	75	A	42	70	553
Veg Median North (ch.29930)	UP-E	1/3/16	16/6/16	185	A	43	106	281	21/9/16	30/11	78	A	42	70	315
	UP-W	1/3/16	16/6/16	299	A	43	106	612	21/9/16	30/11	136	A	42	70	376

Appendix A – Underpass and adjacent habitat data

Table A2: Camera-trap effort for surveys of adjacent habitat during autumn and spring 2016.

Site (chainage)	Camera	Esting	Nthing	Autumn 2016						Spring 2016				
				Install date	Collect date	Days Active	Pics	Battery	Bait type	Install date	Collect date	Days Active	Pics	Battery
Moonee Bch (ch.11500)	EN	514243	6657966	2/3/16	7/4/16	36	286	A	C	20/9/16	20/10/16	30	882	A
	ES	514216	6657894	2/3/16	7/4/16	6	25	Flat	O	20/9/16	20/10/16	30	441	A
	WN	514098	6657943	2/3/16	7/4/16	28	325	Flat	O	20/9/16	20/10/16	23	486	F
	WS	514064	6657918	2/3/16	7/4/16	36	151	A	C	20/9/16	20/10/16	20	306	F
Emerald Bch (ch.17500)	EN	516951	6662277	2/3/16	7/4/16	1	1346	A	C	20/9/16	26/10/16	10	4606	F
	ES	516902	6662273	2/3/16	7/4/16	6	1440	A	O	20/9/16	20/10/16	4	2726	F
	WN	516879	6662434	2/3/16	7/4/16	21	1464	Flat	O	20/9/16	20/10/16	8	1472	F
	WS	516830	6662374	2/3/16	7/4/16	35	1471	A	C	20/9/16	20/10/16	4	1581	F
Veg Median South (ch.29380)	EN	516804	6672289	1/3/16	7/4/16	8	342	Flat	O	20/9/16	20/10/16	13	372	F
	ES	516799	6672259	1/3/16	7/4/16	36	322	A	C	20/9/16	20/10/16	9	82	F
	WN	516676	6672349	1/3/16	7/4/16	36	913	A	O	20/9/16	20/10/16	30	912	A
	WS	516648	6672330	1/3/16	7/4/16	18	182	Flat	C	20/9/16	20/10/16	20	339	F
Veg Median North (ch.29930)	EN	517258	6672786	1/3/16	7/4/16	25	1629	Flat	C	20/9/16	20/10/16	30	1396	A
	ES	517243	6672762	1/3/16	7/4/16	21	287	Flat	O	20/9/16	20/10/16	18	1618	F
	WN	517144	6672906	1/3/16	7/4/16	36	632	A	O	20/9/16	20/10/16	30	1107	A
	WS	517123	6672852	1/3/16	7/4/16	8	28	Flat	C	20/9/16	20/10/16	11	58	F

Appendix A – Underpass and adjacent habitat data

Table A3: Fauna recorded by cameras in underpasses during autumn and spring 2015. Accuracy/Likelihood: D = Definite; Pr = Probable; Po = Possible.

Date	Time	Species	Accu- racy	Movement	Pic No.	Crossing Likelihood	Date	Time	Species	Accu- racy	Movement	Pic No.	Crossing Likelihood	Comments
Moonee Bch East							Moonee Bch West							
2/3/16	1850	Fox	D	W	96-100	Pr								
3/3/16	2008	Swamp Wallaby	Pr	W	101-105	D	3/3/16	2010	Swamp Wallaby	D	W	51-52	D	
3/3/16	2057	Fox	D	W	106-110	Pr								
4/3/16	2015	Fox	D	W	111-115	Pr								
4/3/16	2152	Fox	D	E	116-119	Pr								
5/3/16	0459	Swamp Wallaby	Pr	E	121-122	D	5/3/16	0456	Swamp Wallaby	D	E	56-60	D	
5/3/16	2306	Fox	D	EthenW	126-135	Un								
6/3/16	0214	Fox	D	W	136-140	Pr								
6/3/16	1704	Swamp Wallaby	D	W	141-150	Po								
6/3/16	1932	Fox	D	W	151-155	D	6/3/16	1933	Fox	D	W	66-70	D	
							6/3/16	1953	Fox with prey	D	W	71-73		Poss water rat?
6/3/16	2057	Fox	D	W	156-160	D	6/3/16	2059	Fox	D	W	76-79	D	
6/3/16	2349	Fox	D	W	161-165	Pr								
7/3/16	0246	Swamp Wallaby	D	E	166-171	Pr								
7/3/16	0308	Fox	D	E	176-200	Pr								
7/3/16	0412	Swamp Wallaby	D	E	201-203	D	7/3/16	0409	Swamp Wallaby	D	E	86-90	D	
8/3/16	0138	Fox	D	E	211-235	Pr								
							8/3/16	0827	Fox	D	E	91-95	Po	

8/3/16	1839	Swamp Wallaby	D	W	236-240	D	8/3/16	1841	Swamp Wallaby	D	W	96-97	D	
9/3/16	0445	Fox	D	E	241-245	Pr								
							9/3/16	0824	Swamp Wallaby	D	E	101-105	Pr	
9/3/16	1836	Swamp Wallaby	D	W	246-255	D	9/3/16	1838	Swamp Wallaby	D	W	106-107	D	
9/3/16	2130	Swamp wallaby	D	W	256-260	Pr	9/3/16	2141	Swamp Wallaby	D	W	111-112	Pr	
10/3/16	0343	Swamp Wallaby	D	E	261-266	Pr								
10/3/16	0808	Swamp Wallaby	D	E	271-272	D	10/3/16	0806	Swamp Wallaby	D	E	121-12	D	
10/3/16	1352	Fox	D	W	276-280	Pr								
10/3/16	2326	Fox	D	E	281	Pr								
							11/3/16	0151	Fox	D	E	126-130	Po	
11/3/16	1809	Swamp Wallaby	D	W	286-290	D	11/3/16	1813	Swamp Wallaby	D	W	131-132	D	
13/3/16	2100	Swamp Wallaby	D	W	291-300	D	13/3/16	2109	Swamp Wallaby	D	W	136	D	
13/3/16	2100	Microbat spp.	D	E	292	Po								
14/3/16	0245	Swamp Wallaby	D	E	301-302	Pr								
14/3/16	1823	Swamp Wallaby	D	WthenE	306-314	Un								
15/3/16	0400	Swamp Wallaby	Pr	E	316	D	15/3/16	0357	Swamp Wallaby	D	E	146-150	D	
15/3/16	0406	Fox	D	E	321-324	Pr								
15/3/16	1755	Swamp Wallaby	Pr	W	326-330	D	15/3/16	1757	Swamp Wallaby	D	W	151-152	D	
15/3/16	1904	Fox	D	W	331-335	Pr								
16/3/16	0306	Fox	D	E	336-339	Pr								
16/3/16	0352	Fox	D	W	341-345	Pr								
							16/3/16	1638	Fox	D	E	156-160	D	
16/3/16	0714	Swamp Wallaby	D	E	346-350	D	16/3/16	0710	Swamp Wallaby	D	E	161-165	D	

16/3/16	1835	Swamp Wallaby	D	W	351-355	Po								
17/3/16	0053	Fox	D	E	356-360	Pr								
17/3/16	0343	Fox	D	E	361-363	Pr								
17/3/16	0442	Fox	D	E	366-368	Pr								
17/3/16	1650	Swamp Wallaby	D	W	371-375	Po								
							16/3/16	0102	Fox	D	W	166-170	D	
18/3/16	0431	Fox	D	E	376-377	Pr								
19/3/16	0429	Swamp Wallaby	D	E	381-382	D	19/3/16	0427	Swamp Wallaby	D	E	171-174	D	
19/3/16	0440	Fox	D	E	386	Pr								
19/3/16	1253	Fox	D	W	391-395	Pr								
19/3/16	1750	Swamp Wallaby	D	W	396-400	D	19/3/16	1752	Swamp Wallaby	D	W	176-177	D	
19/3/16	1839	Swamp Wallaby	D	W	401-410	D	19/3/16	1846	Swamp Wallaby	D	W	181-182	D	
20/3/16	0047	Fox	D	E	411-414	Pr								
							20/3/16	0203	Fox	D	W	186-189	Po	
							20/3/16	0348	Fox	D	E	191-195	Po	
							20/3/16	0421	Swamp Wallaby	D	E	196-200	Po	
20/3/16	0429	Fox	D	E	416-417	Pr								
20/3/16	1922	Fox	D	W	421-430	Pr								
22/3/16	0305	Fox	D	W	431-435	Pr								
22/3/16	0446	Swamp Wallaby	D	E	436-438	D	22/3/16	0444	Swamp Wallaby	D	E	201-205	D	
22/3/16	0502	Fox	D	E	441-445	Pr								
22/3/16	0540	Fox	D	E	446-447	Pr								
22/3/16	1904	Swamp Wallaby	D	W	451-456	Pr	22/3/16	0713	Swamp Wallaby	D	W	206-210	D	
22/3/16	1955	Fox	D	W	456-460	Pr								
22/3/16	2034	Fox	D	E	461-462	Pr								
							23/3/16	0135	Fox	D	W	211-215	Po	

							23/3/16	0234	Fox	D	W	216-220	Po	
							23/3/16	0439	Fox	D	E	221-225	Po	
24/3/16	1614	Swamp Wallaby	D	W	466-475	D	24/3/16	1618	Swamp Wallaby	D	W	226-227	D	
24/3/16	2159	Fox	D	E	476-489	Pr								
							25/3/16	0403	Swamp Wallaby	D	E	231-235	Po	
25/3/16	1859	Fox	D	W	490-495	D	25/3/16	1851	Fox	D	W	236-239	D	
26/3/16	1804	Swamp Wallaby x2	D	W	496-520	D	26/3/16	1822	Swamp Wallaby x 2	D	W	241-245	D	
26/3/16	1911	Swamp Wallaby	D	E	521-526	Po								
28/3/16	0944	Fox	D	W	531-535	Pr								
28/3/16	1105	Fox	D	W	536-540	Pr								
							28/3/16	1829	Fox	D	W	246-250	Pr	
28/3/16	1839	Fox	D	W	541-545	Pr								
29/3/16	0112	Fox	D	E	546-548	Pr								
29/3/16	0353	Swamp Wallaby	D	E	551-555	D	29/3/16	0350	Swamp Wallaby	D	E	251-255	D	
29/3/16	1615	Swamp Wallaby	D	W	556-565	D	29/3/16	1617	Swamp Wallaby	D	W	256	D	
							29/3/16	1823	Fox	D	W	261-263	Pr	
29/3/16	1843	Fox	D	W	566-570	Po								
							30/3/16	2021	Swamp Wallaby	D	W	267-268	Po	
							30/3/16	2032	Fox x 2	D	W	271-280	Pr	
31/3/16	0216	Swamp Wallaby	D	E	571-575	Pr								
							31/3/16	0413	Swamp Wallaby	D	E	281-285	Po	
31/3/16	2043	Swamp Wallaby	D	W	576-580	D	31/3/16	0845	Swamp Wallaby	D	W	286-287	D	
							1/4/16	0551	Swamp Wallaby	D	E	291-295	Po	

1/4/16	1753	Swamp Wallaby	D	W	581-586	D	1/4/16	1756	Swamp Wallaby	D	W	296-297	D	
1/4/16	2255	Swamp Wallaby	D	NDM	586-590	Un								
2/4/16	0059	Fox	D	E	591-594	Pr								
2/4/16	0243	Fox	D	E	596-597	Pr								
							2/4/16	0324	Swamp Wallaby x 2	D	E	301-315	Pr	Prob crossed, spent time in culvert, one may have turned back
							2/4/16	0356	Swamp Wallaby	D	W	316-317	Po	Prob crossed, spent time in culvert, one may have turned back
2/4/16	0402	Swamp Wallaby	D	E	601-602	Pr	2/4/16	0358	Swamp Wallaby	D	E	321-325	Pr	
							2/4/16	2330	Fox	D	W	326-328	Po	
3/4/16	0417	Swamp Wallaby	D	Graze entrance	606-615	Un								
							3/4/16	0935	Swamp Wallaby x 2	D	EthenW	331-354	Un	
3/4/16	1831	Swamp Wallaby	D	W	616-621	D	3/4/16	1833	Swamp Wallaby	D	W	356	D	
3/4/16	2058	Swamp Wallaby	D	W	621-625	Pr								
3/4/16	2205	Fox	D	E	626-629	Pr								
4/4/16	0052	Fox	D	E	631-633	Pr								
4/4/16	0433	Fox	D	E	636-638	Pr								
5/4/16	0144	Fox	D	W	641-645	Pr								
6/4/16	0323	Swamp Wallaby	D	E	646-647	D	6/4/16	0320	Swamp Wallaby	D	E	361-365	D	
							6/4/16	0557	Fox	D	E	366-370	Pr	
6/4/16	1747	Swamp Wallaby	D	W	651-655	Po	6/4/16	1750	Swamp Wallaby	D	W	371	D	
6/4/16	2205	Fox	D	E	656	Pr								
7/4/16	1825	Fox	D	W	21-25	Pr								
7/4/16	2201	Fox	D	W	26-30	D	7/4/16	2203	Fox	D	W	16-17	D	

8/4/16	0032	Fox	D	E	31-33	Pr								
							8/4/16	0058	Fox	D	W	21-23	Po	
8/4/16	0359	Fox	D	E	36-45	Pr								
							8/4/16	1848	Fox	D	W	26-30	Po	
8/4/16	2028	Fox	D	W	46-50	Pr								
							9/4/16	2027	Fox	D	W	31-32	Po	
10/4/16	0015	Fox	D	E	51-52	Pr								
							10/4/16	0104	Fox x 2	D	W	36-40	Pr	
10/4/16	2012	Fox	D	W	56-60	D	10/4/16	0823	Fox	D	W	41	D	
10/4/16	2200	Fox	D	E	61	Pr								
10/4/16	2303	Fox	D	W	66-70	Pr								
10/4/16	2356	Fox	D	W	71-75	Pr								
							11/4/16	0126	Fox	D	W	46-47	Pr	
							11/4/16	0226	Fox, Microbat sp.	D	E	51-55	Pr	
12/4/16	0259	Fox	D	E	76-79	D	12/4/16	0258	Fox	D	E	56-60	D	
12/4/16	0319	Fox	D	E	81-83	Pr								
12/4/16	0440	Fox	D	E	86-90	Pr								
							12/4/16	0455	Fox	D	W	61-62	Pr	
							13/4/16	1808	Fox	D	W	66-68	Pr	
13/4/16	1942	Fox	D	E	91-93	Pr								
							13/4/16	2001	Fox	D	W	71-73	Pr	
							13/4/16	2021	Fox	D	W	76-78	Pr	
							13/4/16	2157	Fox	D	W	81-82	Pr	
							13/4/16	2207	Fox	D	W	86-87	Pr	
14/4/16	0148	Fox	D	E	96-100	Pr								
15/4/16	1840	Fox	D	W	101-105	D	14/4/16	1850	Fox	D	W	91-92	D	
15/4/16	2053	Swamp Wallaby	D	W	106-115	D	15/4/16	2057	Swamp Wallaby	D	W	96-97	D	
							16/4/16	0513	Swamp Wallaby	D	E	101-105	Pr	

							16/4/16	2030	Fox	D	W	106-107	Pr	
17/4/16	0249	Fox	D	E	116-125	Pr								
18/4/16	2101	Fox	D	E	126-127	Pr								
							19/4/16	1816	Fox	D	W	111-115	Pr	
							19/4/16	1935	Fox	D	W	116-117	Pr	
							19/4/16	2257	Fox	D	W	121-125	Pr	
20/4/16	2202	Fox	D	E	131-132	Pr								
							23/4/16	0224	Fox	D	W	126-128	Pr	
							23/4/16	1833	Fox	D	W	131-134	Pr	
23/4/16	1919	Fox	D	W	136-140	D	23/4/16	1912	Fox x 2	D	W	136-142	D	
							23/4/16	2033	Fox	D	W	151-152	Pr	
							23/4/16	2212	Fox	D	W	156-159	Pr	
23/4/16	2337	Fox	D	E	141-143	D	23/4/16	2354	Fox	D	W	161-164	D	
24/4/16	0009	Fox	D	E	146-149	Pr								
24/4/16	0036	Swamp Wallaby	D	W	151-155	D	24/4/16	0038	Swamp Wallaby	D	W	166-170	D	
24/4/16	0453	Swamp Wallaby	D	E	156	D	24/4/16	0451	Swamp Wallaby	D	E	171-175	D	
							24/4/16	2014	Fox	D	W	176-177	Pr	
							25/4/16	1829	Fox	D	W	181-183	Pr	
25/4/16	2043	Fox	D	E	161-164	D	25/4/16	2041	Fox	D	E	186-190	D	
							25/4/16	2301	Fox	D	E	191-195	Pr	
26/4/16	0049	Fox	D	E	166-170	Pr								
26/4/16	0405	Fox	D	E	171-175	Pr								
							26/4/16	0520	Fox	D	W	196-198	Pr	
26/4/16	2226	Fox	D	E	176-180	Pr								
							27/4/16	0531	Fox	D	W	201-202	Pr	
							27/4/16	1936	Fox	D	W	206-209	Pr	
28/4/16	2127	Swamp Wallaby	D	W	181-195	D	28/4/16	2130	Swamp Wallaby	D	W	211	D	
							28/4/16	2159	Fox	D	W	216-217	Pr	

							29/4/16	0519	Swamp Wallaby	D	E	221-225	Pr	
							29/4/16	1747	Fox	D	W	226-228	Pr	
29/4/16	1939	Fox	D	E	196-200	Pr								
29/4/16	2357	Fox	D	E	201-202	Pr								
							30/4/16	1858	Fox	D	W	231-233	Pr	
							30/4/16	1925	Fox	D	W	236-237	Pr	
							30/4/16	1950	Fox	D	W	241-243	Pr	
30/4/16	2235	Fox	D	E	206-208	Pr								
							1/5/16	0706	Fox	D	W	246-248	Pr	
							2/5/16	0441	Fox	D	W	251	Pr	
2/5/16	2020	Swamp Wallaby	D	W	211-215	D	2/5/16	0823	Swamp Wallaby	D	W	256-258	D	
							2/5/16	2132	Fox	D	W	261-263	Pr	
							3/5/16	0233	Fox x 2	D	W	266-271	Pr	
3/5/16	0401	Fox x 2	D	E	216-219	Pr								
							3/5/16	0537	Swamp Wallaby	D	E	281-285	Po	
							3/5/16	2140	Fox	D	W	286-290	Po	
							4/5/16	0705	Swamp Wallaby	D	E	291-295	Po	
							4/5/16	2246	Swamp Wallaby	D	W	296-300	Po	
5/5/16	1252	Fox	D	W	221-232	Un								
6/5/16	1552	Swamp Wallaby	D	E	236-240	D	6/5/16	1547	Swamp Wallaby	D	E	301-310	D	
8/4/16	0357	Fox	D	E	241-245	Pr								
							9/5/16	1429	Fox	D	E	311-314	Pr	
							9/5/16	1936	Fox	D	E	316-320	Pr	
							9/5/16	2148	Fox	D	W	321-323	Pr	
							9/5/16	2226	Fox	D	W	326-330	Pr	
10/5/16	0042	Fox	D	E	246-250	Pr								
							10/5/16	0057	Fox	D	W	331-332	Pr	

							10/5/16	0148	Fox	D	W	336-339	Pr	
10/5/16	0334	Fox	D	E	251-254	D	10/5/16	0333	Fox	D	E	341-345	D	
10/5/16	0652	Fox	D	W	256-260	Pr								
							10/5/16	0608	Swamp Wallaby	D	W	346-347	Po	
							10/5/16	1817	Fox	D	W	351-353	Pr	
							10/5/16	2055	Fox	D	W	356-358	Pr	
							11/5/16	0039	Fox with UnID prey	D	E	361-365	Pr	
11/5/16	1856	Fox	D	W	261-265	Pr								
							12/5/16	1908	Fox x 2	D	W	366- 370	Pr	
							14/5/16	1808	Fox	D	W	371-373	Pr	
17/5/16	0050	Swamp Wallaby	D	W	266-275	D	17/5/16	0054	Swamp Wallaby	D	W	376-378	D	
17/5/16	0519	Swamp Wallaby	D	E	276-278	D	17/5/16	0515	Swamp Wallaby	D	E	381-390	D	
							17/5/16	1824	Fox	D	W	391-393	Pr	
17/5/16	1946	Fox (blurry)	D	E	281	D	17/5/16	1924	Fox with UnID prey	D	E	396-400	D	
							18/5/16	0028	Fox	D	W	401-403	Pr	
18/5/16	1750	Fox	D	E	286-289	Pr								
							18/5/16	2351	Fox	D	E	406-411	Pr	
							19/5/16	0139	Fox	D	W	411-412	Pr	
19/5/16	1725	Fox	D	E	291-295	Pr								
19/5/16	1801	Swamp Wallaby	D	W	296-300	D	19/5/16	1803	Swamp Wallaby	D	W	416	D	
20/5/16	0425	Swamp Wallaby	D	E	301-303	D	20/5/16	0421	Swamp Wallaby	D	E	421-430	D	
							20/5/16	2145	Fox	D	W	431-433	Pr	
							21/5/16	1716	Fox	D	W	436-437	Pr	
							21/5/16	1907	Fox	D	W	441-445	Pr	
							21/5/16	2348	Fox	D	W	446-447	Pr	
							22/5/16	0045	Fox	D	W	451-454	Pr	

22/5/16	0053	Fox	D	E	306-309	Pr									
							22/5/16	0311	Fox	D	W	456-457	Pr		
22/5/16	2200	Fox	D	E	311-313	Pr									
							24/5/16	1801	Fox with UnID prey	D	E	461-4700	Pr		
24/5/16	1924	Fox	D	W	316-320	D	24/5/16	1926	Fox	D	W	471-472	D		
24/5/16	1752	Swamp Wallaby	D	W	321-330	Pr	24/5/16	1744	Swamp Wallaby	D	W	476	D		
24/5/16	2314	Fox	D	W	331-335	Pr									
							25/5/16	0017	Swamp Wallaby	D	E	481-485	Po		
25/5/16	0429	Dog x 2	D	W	336-365	D	25/5/16	0430	Dog x 2	D	W	486-492	D		
25/5/16	1139	Dog x 2	D	E	366-373	D	15/5/16	1137	Dog x 2	D	E	522-530	D		
							25/5/16	1801	Fox	D	W	531-533	Pr		
							26/5/16	0055	Fox	D	W	536-539	Pr		
							27/5/16	0541	Fox	D	W	541-548	Pr		
							28/5/16	1816	Fox	D	W	551-554	Pr		
							28/5/16	1903	Fox	D	W	556-559	Pr		
							28/5/16	2133	Fox	D	W	561-563	Pr		
29/5/16	1431	EG Kangaroo x 2	D	WthenE	376-421	Un									
29/5/16	2248	Fox	D	E	426-429	Pr									
30/5/16	1827	Fox	D	E	431-433	Pr									
							2/6/16	1735	Fox x 2	D	W	566-579	Pr		
2/6/16	1953	Fox	D	E	436-439	D	2/6/16	1751	Fox	D	W	581-584	D		
							3/6/16	0401	Fox	D	W	586-588	Pr		
							3/6/16	0413	Fox	D	W	591-590			
3/6/16	0432	Swamp Wallaby	D	E	441	D	3/6/16	0429	Swamp Wallaby	D	E	596-600	D		
							3/6/16	0543	Fox	D	W	601-603	Pr		
4/6/16	1828	Swamp Wallaby	Pr	W	446-450	Po									Wallaby wading through flood waters
5/6/16	1949	Fox	D	W	451-455	Po									

6/6/16	0917	Fox	D	E	456-457	D	6/6/16	0916	Fox	D	E	606-610	D	
6/6/16	1947	Fox	D	E	461-465	Pr								
6/6/16	2139	Fox	D	W	466-470	Pr								
7/6/16	1501	Human (M)	D	WthenE	471-484	Un								
8/6/16	0610	Fox	D	NDM	486-515	Un								
							8/6/16	0941	Fox	D	W	611-615	Pr	
9/6/16	0535	Fox	D	E	516-521	Pr								
9/6/16	2153	Swamp Wallaby	D	W	527-545	D	9/6/16	2158	Swamp Wallaby	D	W	616	D	
9/6/16	2158	Swamp Wallaby	D	W	546-555	D	9/6/16	2205	Swamp Wallaby	D	W	621-622	D	
9/6/16	2328	Swamp Wallaby	Pr	E	556-557	Po								
10/6/16	0441	Swamp Wallaby	Pr	E	561-563	D	10/6/16	0437	Swamp Wallaby	D	E	626-630	D	
							11/6/16	1744	Fox	D	W	631-635	Po	
11/6/16	2344	Fox	D	E	566-570	Pr								
12/6/16	0108	Fox	D	E	571-575	Pr								
12/6/16	0230	Fox	D	W	576-585	Pr	12/6/16	0232	Fox	D	W	636-640	D	
12/6/16	2151	Fox	D	E	586-590	Pr								
							15/6/16	1749	Fox	D	W	641-644	Pr	
							15/6/16	1900	Fox	D	EthenW	646-653	Pr	
15/6/16	2052	Fox	D	E	591-593	D	15/6/16	2051	Fox	D	E	656-660	D	
15/6/16	2214	Swamp Wallaby	D	W	596-605	D	15/6/16	2219	Swamp Wallaby	D	W	661-662	D	
15/6/16	2315	Fox	D	E	606-608	Pr								
16/6/16	0606	Swamp Wallaby	D	E	611-613	Pr	16/6/16	1803	Swamp Wallaby	D	W	666-675	D	
							21/9/16	2022	Fox	D	W	71-75	Pr	
							21/9/16	2149	Fox	D	W	76-80	Pr	
							25/9/16	0324	Fox	D	E	81-85	Pr	Animal has broken leg
26/9/16	2310	Fox	D	E	146-150	Pr								

							27/9/16	0728	Swamp Wallaby	D	EE	86-105	Un	
							28/9/16	0337	Swamp Wallaby	D	EE	106-115	Un	
							28/9/16	1833	Fox	D	E	121-125	Po	
28/9/16	1927	Swamp Wallaby	D	W	151-155	D	28/9/16	1938	Swamp Wallaby	D	W	126-135	D	
28/9/16	2254	Swamp Wallaby	D	E	156-162	Pr	28/9/16	2248	Swamp Wallaby	D	E	136-150	D	
29/9/16	0120	Fox	D	E	166-170	Pr	29/9/16	0119	Fox	D	E	151-155	D	
							29/9/16	1749	Swamp Wallaby	D	EE	156-164	Un	
							29/9/16	1835	Fox	D	EthenW	166-173	Un	
							29/9/16	2026	Fox	D	W	176-190	Po	
							29/9/16	2221	Fox	D	W	196-198	Po	
							30/9/16	0052	Fox	D	W	206-209	Po	
30/9/16	0127	EG Kangaroo x 2	D	ETE	171-180	Un								
30/9/16	0354	Fox	D	E	181-183	Pr								
							1/10/16	2042	Fox	D	E	211-215	Po	
1/10/16	2227	Fox	D	E	186-190	Pr								
2/10/16	0206	Fox	D	E	191-195	Pr								
2/10/16	1741	Fox	D	W	196-200	Pr								
2/10/16	1821	Fox with prey	D	E	201-204	D	2/10/16	1821	Fox with prey	D	E	221-225	D	Prey in mouth
2/10/16	1901	Swamp Wallaby	D	W	206-210	D	2/10/16	1908	Swamp Wallaby	D	W	226-233	D	
2/10/16	1911	Fox	D	W	211-216	D	2/10/16	1913	Fox	D	W	236-238	D	
2/10/16	1928	Swamp Wallaby	D	ETE	216-230	Un								
2/10/16	2026	Swamp Wallaby	D	E	231-245	D	2/10/16	2022	Swamp Wallaby	D	E	241-255	D	
2/10/16	2042	Fox	D	E	251-254	Pr	2/10/16	2042	Fox	D	E	256-260	D	
							2/10/16	2123	Fox	D	W	261-264	D	
2/10/16	2128	Fox	D	E	256-258	Pr								

							2/10/16	2156	Fox	D	W	266-270	Po	
							3/10/16	0155	Fox	D	W	271-275	Po	
3/10/16	0305	Fox	D	E	261-264	D	3/10/16	0304	Fox	D	E	276-280	D	
							3/10/16	1546	Swamp Wallaby	D	EthenW	281-303	Un	
							3/10/16	0908	Fox	D	W	306	Pr	
3/10/16	2204	Fox	D	E	266-268	D	3/10/16	2204	Fox	D	E	311-315	D	
							3/10/16	2256	Fox	D	W	316-318	Pr	
4/10/16	0234	Fox	D	E	271-272	D	4/10/16	0233	Fox	D	E	321-325	D	
4/10/16	0358	Fox	D	E	276-280	D	4/10/16	0357	Fox	D	WthenE	326-330	D	
4/10/16	0405	Fox	D	W	281-300	D	4/10/16	0415	Fox	D	W	331-350	D	
							4/10/16	0429	Fox	D	EthenW	351-358	Po	
4/10/16	0344	EG Kangaroo x 2	D	EE	301-428	Un								
4/10/16	2125	Fox	D	E	436-439	Pr								
4/10/16	2249	Fox	D	E	441-444	Pr								
5/10/16	2159	Fox	D	E	446-448	D	5/10/16	2159	Fox	D	E	361-365	D	
							6/10/16	1828	Fox	D	W	366-367	pr	
6/10/16	2044	Fox	D	E	451-454	Pr								
6/10/16	2329	Fox	Pr	E	456	Pr								
7/10/16	2254	Fox	D	E	461-465	D	7/10/16	2242	Fox	D	E	371-375	D	
8/10/16	2200	Fox	D	W	466-470	Pr								
							7/10/16	2243	Fox	D	E	376-385	Po	
							8/10/16	1848	Fox	D	W	386-388	Pr	
							8/10/16	1848	Fox	D	E	391-395	Pr	
							8/10/16	1858	CBtP	D	E	396-400	Po	
							8/10/16	2202	Fox	D	W	401-403	Pr	
8/10/16	2233	Fox	D	W	471-475	Pr								
							8/10/16	2249	Fox	D	W	406-410	Pr	
8/10/16	2329	Fox	D	E	476-480	D	8/10/16	2329	Fox	D	E	416-420	D	

8/10/16	2340	Fox	D	E	481-484	D	8/10/16	2339	Fox	D	E	421-425	D	
9/10/16	0002	Fox	D	E	486-488	D	9/10/16	0002	Fox	D	E	426-430	D	
9/10/16	1814	Fox	D	W	491-495	Pr								
9/10/16	2119	Fox	D	E	496-500	D	9/10/16	2118	Fox	D	E	431-436	D	
9/10/16	2305	Fox	D	E	501-505	Pr								
10/10/16	0035	Fox	D	W	506-510	D	10/10/16	0037	Fox	D	W	436-438	D	
10/10/16	0108	Fox	D	E	511-514	D	10/10/16	0108	Fox	D	E	441-445	D	
10/10/16	0109	Fox	D	W	516-520	D	10/10/16	0110	Fox	D	W	446-448	D	
							10/10/16	0111	Fox	D	EthenW	451-455	D	
							10/10/16	0112	Fox x 2	D	WthenE	456-460	D	
							10/10/16	0115	Fox	D	W	471-475	D	
10/10/16	0119	Fox	D	WthenE	521-529	Un								
10/10/16	0123	Fox	D	E	531-535	D	10/10/16	0118	Fox	D	E	486-490	D	
							10/10/16	0331	CBtP	D	W	516-520	Pr	
							10/10/16	1934	Fox	D	W	521-522	Pr	
							10/10/16	1957	Fox with Python	D	E	526-530	Pr	
							10/10/16	2033	Fox	D	W	531-533	Pr	
							10/10/16	2059	Fox	D	W	536-540	Pr	
10/10/16	2113	Fox	D	E	536-540	Pr								
10/10/16	2128	Fox	D	E	541-545	Pr								
10/10/16	2304	Fox	D	E	546-550	Pr								
							11/10/16	0038	Fox	D	W	556-559	Pr	
11/10/16	0136	Fox	D	E	551-552	D	11/10/16	0135	Fox	D	E	561-565	D	
11/10/16	0244	Fox	D	E	556-559	D	11/10/16	0244	Fox	D	E	566-570	D	
							11/10/16	0310	Fox	D	W	571	Pr	
							11/10/16	0433	Fox	D	W	576-578	Pr	
11/10/16	2011	Fox	D	W	561-565	D	11/10/16	2014	Fox	D	W	581-583	D	
							11/10/16	2025	Fox	D	E	586-590	D	
12/10/16	0035	Fox	D	E	566-569	Pr								
12/10/16	0338	Fox with prey	D	E	571-573	D	12/10/16	0347	Fox	D	W	591-592	D	

12/10/16	2106	Fox	Pr	E	576	Po								
12/10/16	2327	Fox	D	E	581-585	Pr								
							13/10/16	0412	Fox	D	W	596-597	Pr	
14/10/16	1845	Fox	D	E	586-588	Pr								
14/10/16	1930	Fox	D	E	591-593	Pr								
15/10/16	0112	Fox	D	W	596-600	Pr								
15/10/16	0653	Swamp Wallaby	D	W	601-605	Po								
15/10/16	2203	Fox	D	E	606-610	Pr								
							16/10/16	0645	Fox	D	E	606-610	Po	
16/10/16	1837	Fox	D	W	611-615	D	16/10/16	1840	Fox	D	W	611-613	D	
							16/10/16	1929	Fox	D	W	616-617	Po	
16/10/16	2009	Fox	D	E	616-619	Pr								
16/10/16	2140	Fox	D	E	621-625	Pr								
							17/10/16	0038	Fox	D	W	621-623	Po	
17/10/16	0111	Fox	D	W	626-630	D	17/10/16	0113	Fox	D	W	626-630	D	
17/10/16	0245	Fox	D	E	631-633	Pr								
17/10/16	0249	Fox	D	W	636-640	Po								
							18/10/16	0057	Fox	D	W	631-632	Po	
							18/10/16	0142	Fox	D	E	636-640	Pr	
18/10/16	1810	Fox	D	W	641-645	D	18/10/16	1812	Fox	D	W	641-642	D	
18/10/16	1928	Fox	D	E	646-649	Pr								
18/10/16	2248	Fox	D	E	651-655	Pr								
19/10/16	2100	Fox	D	W	71-75 (2nd folder)	Pr	19/10/16	2102	Fox	D	W	66-67	D	
							19/10/16	2103	Fox	D	W	71-73	D	
19/10/16	2209	Fox x 2	D	EE	76-85	Po	19/10/16	2207	Fox	D	E	76-80	Po	
19/10/16	2214	Fox	D	E	86-88	D	19/10/16	2212	Fox	D	W then E	81-90	D	
19/10/16	2314	Fox	D	E	91-94	D	19/10/16	2311	Fox	D	E	91-95	D	
							20/10/16	2030	Fox	D	W	96-97	Po	

20/10/16	2246	Fox	D	E	96-97	D	20/10/16	2244	Fox	D	E	101-105	D	
							20/10/16	2324	Fox	D	W	106-107	Po	
							21/10/16	0023	Fox	D	E	111-115	Pr	
21/10/16	0329	Fox with prey	Pr	W	101-105	Pr								
21/10/16	2053	Fox	D	W	106-110	D	21/10/16	2054	Fox	D	W	116-119	D	
							21/10/16	2137	Fox	D	W	121-123	Pr	
							21/10/16	2212	Fox	D	W	126-128	Po	
21/10/16	2229	Fox	D	E	111-113	D	21/10/16	2227	Fox	D	E	131-135	D	
21/10/16	2307	Fox	D	E	116	D	21/10/16	2304	Fox	D	E	136-140	D	
							22/10/16	128	Fox	D	W	141-143	Po	
22/10/16	0717	EG Kangaroo x 2	D	EE	121-208	Un								
22/10/16	1612	EG Kangaroo x 2	D	EE	211-491	Un								
23/10/16	2107	Fox	D	E	496-498	Pr								
24/10/16	0151	Fox	D	W	501-510	D	24/10/16	152	Fox	D	W	146-148	D	
24/10/16	0353	Fox	D	E	511-527	Po								
							24/10/16	1733	Fox	Pr	W	151	Po	
24/10/16	2159	Swamp Wallaby	D	W	531-535	D	24/10/16	2202	Swamp Wallaby	D	W	156	D	
24/10/16	2322	Swamp Wallaby	D	E	536-550	D	24/10/16	2318	Swamp Wallaby	D	E	161-170	D	
							25/10/16	419	Fox	D	E	171-175	Po	
26/10/16	0009	Fox	D	E	551-555	Pr								
							26/10/16	1845	Fox	D	W	176-178	Po	
26/10/16	1922	Fox with prey	D	E	556-559	D	26/10/16	1920	Fox	D	E	181-185	D	
							26/10/16	1957	Fox	D	W	186-189	Po	
							26/10/16	2056	Fox	D	E	191-195	Po	
26/10/16	2229	Fox	D	E	561-565	Po								
27/10/16	0222	Fox	D	W	566-570	D	27/10/16	0223	Fox	D	W	196-198	D	
27/10/16	0257	Fox	D	E	571-573	Pr								
27/10/16	0315	Fox	D	E	576-580	Pr								

27/10/16	0424	EG Kangaroo x 2	D	EE	581-737	Un								
							27/10/16	1901	Fox	D	W	201-203	Po	
27/10/16	2136	Fox	D	W	741-745	D	27/10/16	2137	Fox	D	W	206-209	D	
27/10/16	2225	Fox	D	E	746-749	D	27/10/16	2224	Fox	D	E	211-215	D	
27/10/16	2254	Fox	D	E	751-752	D	27/10/16	2252	Fox	D	E	216-220	D	
							28/10/16	112	Fox	D	W	221-223	Po	
							28/10/16	117	Fox	D	W	226-229	Po	
28/10/16	0146	Fox	D	E	756-757	Pr								
28/10/16	0152	Fox	D	E	761-763	D	28/10/16	150	Fox	D	E	231-235	D	
28/10/16	1153	Fox	D	W	766-770	Pr								
							28/10/16	1217	Fox	D	E	241-245	Po	With prey (Po reptile sp.)
28/10/16	1818	Fox	D	W	771-775	D	28/10/16	1818	Fox	D	W	246-247	D	
							28/10/16	1838	Fox	D	W	251-255	Po	
28/10/16	1917	Fox	D	E	776-780	D	28/10/16	1915	Fox	D	E	256-260	D	
							28/10/16	2058	Fox	D	W	261-264	Po	
28/10/16	2059	Fox	D	W	781-785	D	28/10/16	2100	Fox	D	W	266-269	D	
28/10/16	2153	Fox	D	E	786-787	Pr								
							28/10/16	2333	Fox	D	W	271-275	Po	
29/10/16	0127	Fox	D	E	791-793	D	29/10/16	0126	Fox	D	E	276-280	D	
							29/10/16	0250	Fox	D	W	281-283	Po	
							29/10/16	2108	Fox	D	W	286-288	Po	
29/10/16	2218	Fox	D	E	796-798	Pr								
							29/10/16	2329	Fox	D	W	291-293	Po	
30/10/16	1551	Swamp Wallaby	D	W	801-810	Po								
							30/10/16	2045	Fox	D	W	301-305	Po	
30/10/16	2149	Swamp Wallaby	D	E	811-815	D	30/10/16	2137	Swamp Wallaby	D	E	306-315	D	Pr pouch young
31/10/16	0004	Fox	D	E	816-818	Pr	31/10/16	0003	Fox	D	E	316-320	D	
							31/10/16	0148	Fox	D	E	321-325	Po	

31/10/16	0359	Fox	D	W	821-825	D	31/10/16	0400	Fox	D	W	326-328	D	
31/10/16	0456	Fox	D	E	826-828	Pr								
							31/10/16	1951	Fox	D	W	331-332	Po	
							31/10/16	2116	Fox	D	E	336-340	Po	
31/10/16	2221	Fox	D	NDM	831-850	Pr	31/10/16	2221	Fox	D	E then W	341-345	Po	Po two foxes at each end of culvert same time?
							31/10/16	2225	Fox	D	W	351-355	Pr	
							31/10/16	2226	Fox	D	E	356-358	Pr	
							31/10/16	2234	Fox	D	W	361-366	Po	
							31/10/16	2234	Fox	D	E	371-375	Pr	
31/10/16	2241	Fox	D	E	851-865	Po								
							1/11/16	0113	Fox	D	E	376-380	Po	
							1/11/16	0212	Fox	D	W	381-383	Po	
							1/11/16	2059	Fox	D	W	386-389	Po	
							1/11/16	2203	Fox	D	E	391-395	Pr	
1/11/16	2226	Fox	D	E	866-869	Pr								
							2/11/16	1914	Fox	D	W	396-397		
2/11/16	2028	Fox	D	E	871-873	Pr								
							2/11/16	2107	Fox	D	E	401-405	Po	
							2/11/16	2224	Fox	D	W	406-408	Po	
							3/11/16	2044	Fox	D	W	411-412	Pr	
3/11/16	2058	Fox	D	E	876-880	Pr	3/11/16	2051	Fox	D	E	416-420	Pr	
3/11/16	2059	Fox	D	E	881-883	Pr								
3/11/16	2203	Fox	D	W	886-890	D	3/11/16	2204	Fox	D	W	421-423	D	
3/11/16	2227	Fox	D	E	891-892	Pr								
3/11/16	2232	Fox	D	E	896-895	Pr								
4/11/16	0033	Fox	D	E	901-905	D	4/11/16	0031	Fox	D	E	426-430	D	
4/11/16	0228	Fox	D	E	906	Pr								
							4/11/16	2146	Fox	D	W	431-432	Po	
							4/11/16	2155	Fox	D	E	436-440	Po	

							4/11/16	2156	Fox	D	W	441-442	ETE	
							4/11/16	2158	Fox	D	W	446-447	Po	
4/11/16	2220	Fox	D	W	911-915	D	4/11/16	2221	Fox	D	W	451-453	D	
4/11/16	2344	Fox	D	E	916-919	Pr								
5/11/16	0326	Fox	D	E	921-923	Pr								
5/11/16	2009	Fox	D	W	926-930	D	5/11/16	2010	Fox	D	W	456-458	D	
5/11/16	2129	Fox	D	E	931-935	Pr	5/11/16	2127	Fox	D	E	461-465	D	
							5/11/16	2226	Fox	D	W	466-467	Po	
5/11/16	2230	Fox	D	E	936	Pr								
5/11/16	2316	Fox	D	E	941-944	Pr								
6/11/16	2126	Fox	D	W	946-950	Pr								
6/11/16	2302	Fox	D	W	951-955	Pr								
6/11/16	2324	Swamp Wallaby	D	WthenE	956-963	Un								
7/11/16	2048	Fox	D	E	966-970	Pr								
							7/11/16	1941	Fox	D	W	471-473	Pr	
							7/11/16	2129	Fox	D	E	476-480	Po ETE	
							7/11/16	2130	Fox	D	W	481-483	Po ETE	Pr same fox as above row
7/11/16	2213	Fox	D	E	971	D	7/11/16	2210	Fox	D	E	486-490	D	
7/11/16	2235	Fox	D	E	976-977	Pr								
							8/11/16	0335	Fox	D	E	491-495	Pr	
							8/11/16	2310	Fox	D	W	496-498	Pr	
8/11/16	2353	Fox with prey	D	E	981-983	Pr								
							9/11/16	0227	Fox	D	NDM	501-505	Po	
							9/11/16	2041	Fox	D	W	506-508	Pr	
9/11/16	2113	Fox	D	E	985-988	Pr								
							9/11/16	2222	Fox	D	E	511-515	Po	
9/11/16	2215	Fox	D	E	991-993	Pr								
9/11/16	2318	Fox	D	E	995-999	Pr								

10/11/16	0310	Fox	D	WthenE	1001-1025	Po									
							10/11/16	0316	Fox	D	W	516-519	Pr		
							10/11/16	2006	Fox	D	W	521-522	Po		
							10/11/16	2143	Fox	D	W	526-528	Po		
							10/11/16	2211	Fox	D	EthenNDM	531-535	Po		
							10/11/16	2337	Fox	D	E	536-540	Pr		
10/11/16	2330	Fox	D	E	1026-1031	Pr									
							11/11/16	1856	Fox	D	W	541-543	Pr	3 x Individualas	
							11/11/16	1921	Fox	D	W	546-549	Pr		
							11/11/16	2037	Fox	D	W	551-554	Pr		
11/11/16	2109	Fox	D	E	1035-1045	D	11/11/16	908	Fox	D	E	556-560	D	3 x Individuals returning	
11/11/16	2114	Fox	D	E	1046-1050	D	11/11/16	2112	Fox	D	E	561-565	D		
11/11/16	2210	Fox	D	E	1051-1055	D	11/11/16	2208	Fox	D	E	566-570	D		
							12/11/16	0244	Fox	D	W	571-573	Po		
12/11/16	0341	Fox	D	E	1056-1060	D	12/11/16	0340	Fox	D	E	576-580	D		
							12/11/16	0457	Fox	D	W	581-583	Pr		
							12/11/16	0604	Fox	D	E	586-590	Pr		
							12/11/16	1923	Fox	D	W	591-593	Pr		
							12/11/16	2026	Fox	D	E	596-600	Pr		
12/11/16	2047	Fox	D	E	1061-1065	Pr									
							12/11/16	2048	Fox	D	W	601-603	Pr		
							12/11/16	2048	Microbat sp.	D		604			
12/11/16	2116	Fox with Bandicoot prey	D	E	1066-1070	D	12/11/16	2114	Fox with prey	D	E	606-610	D	Up to!	
12/11/16	2139	Fox	D	W	1071-1075	Pr	12/11/16	2140	Fox	D	W	611-613	D		
							12/11/16	2018	Fox	D	W	616-618	Pr		

							12/11/16	2321	Fox	D	E	621-625	Pr	
12/11/16	2340	Fox	D	WthenE	1076-1085	Po	12/11/16	2341	Fox	D	W	626-629	Pr	
							12/11/16	2344	Fox	D	E	631-635	Pr	
12/11/16	2350	Fox	D	E	1086-1090	D	12/11/16	2348	Fox	D	E	636-640	D	
							13/11/16	0021	Fox	D	W	641-642	Pr	
13/11/16	0102	Fox	D	E	1091-1093	D	31/11/16	0100	Fox	D	E	646-650	D	
13/11/16	0205	Fox	D	W	1096-1100	D	13/11/16	0206	Fox	D	W	651-654	D	
13/11/16	0214	Fox	D	E	1101-1105	D	13/11/16	0213	Fox	D	E	656-660	D	
13/11/16	0233	Fox	D	W	1106-1110	D	13/11/16	0234	Fox	D	W	661-663	D	
13/11/16	0330	Fox	D	E	1111-1114	Pr	13/11/16	0329	Fox	D	E	666-670	D	
							13/11/16	0335	Fox	D	W	671-672	Pr	
							13/11/16	0444	Fox	D	E	676-680	Pr	
							13/11/16	1955	Fox	D	W	681	Pr	
13/11/16	2054	Fox	D	E	1116	D	13/11/16	2052	Fox	D	E	686-690	D	
14/11/16	0305	Fox	D	W	1121-1125	Pr								
							14/11/16	1736-1935	Dog	D	NDM then E	691-725	Pr	Pr domestic dog. Sleeps in front of cam ~2hs. Starts heading E, returns W 9 hrs later.
							15/11/16	0428	Dog	D	W	726-732	Pr	Same dog, large with light coloured fur, Po Great Dane Cross, male, no collar.
14/11/16	2148	Fox	D	WthenE	1131-1140	Un								
14/11/16	2216	Fox	D	WthenE	1141-1150	Un								
15/11/16	1833	Swamp Wallaby	D	WthenE	1151-1162	Un								

15/11/16	1902	Fox	D	W	1166-1170	D	15/11/16	1905	Fox	D	W	736-740	D	
							15/11/16	2035	Fox	D	W	741-745	Pr	Heading west then stops (dog scent)
15/11/16	2216	Fox	D	NDM	1171	Po	15/11/16	2214	Fox	D	E	746-750	Po	Heading E then stops(dog scent)
15/11/16	2240	Fox	D	W	1176-1180	Pr	15/11/16	2242	Fox	D	W	751-755	Pr	Heading west then stops(dog scent)
16/11/16	0002	Fox	D	E	1181-1185	D	16/11/16	0000	Fox	D	E	756-760	D	
							16/11/16	0516	Dog	D	NDM the E	761-785	Pr	Same dog as rows 616-617
16/11/16	0559	Dog	D	E	1191-1200	Pr								
16/11/16	0723	Dog	D	W	1201-1215	Pr								
16/11/16	1002	Dog	D	E	1216-1235	Pr								
16/11/16	1340	Dog	D	W	1236-1245	Pr	16/11/16	1342	Dog	D	W then E	786-890	Pr	Same dog - Sits in front of cam ~30min then heads E
16/11/16	1820	Dog	D	EthenW	1246-1265	Pr								
16/11/16	2028	Dog	D	E	1266-1275	Pr								
16/11/16	2138	Fox	D	WthenE	1276-1290	Un								
16/11/16	2351	Fox	D	E	1291-1295	Pr								
							17/11/16	0016	Fox	D	W	891-894	Pr	
							17/11/16	0037	Fox	D	W	896-898	Pr	
17/11/16	0114	Fox	D	E	1296-1298	Pr								
17/11/16	0159	Fox	D	W	1301-1315	Pr								
17/11/16	0234	Fox	D	E	1316-1318	D	17/11/16	0232	Fox	D	E	901-905	D	
							17/11/16	0328	Fox	D	E	906-910	Po	Heading E then stops.

17/11/16	1822	Fox	D	W	1321-1325	Pr	17/11/16	1824	Fox	D	W	911-912	D	
17/11/16	1858	Fox	D	E	1326-1330	Pr	17/11/16	1055	Fox	D	NDM	916-925		Stops for dog scent.
							17/11/16	2016	Fox	D	W	926-930	Po	
							17/11/16	2019	Fox	D	E	931-935	Pr	
							17/11/16	2038	Fox	D	W	936-938	Pr	
17/11/16	2139	Fox	D	E	1331-1334	D	17/11/16	2138	Fox	D	E	941-945	D	
18/11/16	0042	Fox	Pr	NDM	1336	Po								
18/11/16	2059	Fox	D	W	1341-1345	D	18/11/16	2100	Fox	D	W	946-947	D	
							18/11/16	2239	Fox	D	E	951-955	Pr	
							19/11/16	2030	Fox	D	W	956-958	Pr	
19/11/16	2139	Fox	D	E	1346-1359	D	19/11/16	2139	Fox	D	E	961-965	D	
							20/11/16	0250	Fox	D	W	966-967	Pr	
20/11/16	1838	Fox	D	E	1351	Pr								
20/11/16	2103	Fox	D	W	1356-1360	Pr								
21/11/16	2303	Fox	D	E	1361-1362	D	21/11/16	2301	Fox	D	E	976-980	D	
22/11/16	2242	Fox	Pr	E	1366	Po								
22/11/16	2320	Fox	D	E	1371-1374	Pr								
							23/11/16	2007	Fox	D	W	981-982	Pr	
							23/11/16	2033	Fox	D	E	986-990	Pr	
							23/11/17	2107	Fox	D	W	991-997	Pr	
							23/11/17	2300	Fox	D	W	1001-1002	Po	
24/11/16	0349	Fox	D	E	1376-1879	Pr								
24/11/16	1900	Swamp Wallaby	D	W	1380-1390	D	24/11/16	1909	Swamp Wallaby	Pr	W	1006	D	

24/11/16	2254	Swamp Wallaby	D	E	1391-1400	Pr	24/11/16	2248	Swamp Wallaby	Pr	E then NDM	1011-1015	Pr	
25/11/16	0340	Fox	D	E	1401-1403	Pr								
							25/11/16	2138	Fox	D	W	1016-1017	Pr	
							25/11/16	2307	Fox	D	W	1021-1023	Pr	
26/11/16	0021	Fox	D	E	1411-1415	Pr								
26/11/16	0108	Fox	D	E	1416-1423	Po								
							26/11/16	2200	Fox	D	W	1026-1028	Pr	
							26/11/16	2221	Fox	D	W	1031-1032	Pr	
26/11/16	2251	Fox	D	E	1426-1435	Po								
							27/11/16	0233	Fox	D	E	1036-1040	Pr	
							27/11/16	2007	Fox	D	W	1041-1042	Pr	
27/11/16	2011	Fox	D	E	1436-1444	D	27/11/16	2010	Fox	D	E	1046-1050	D	
							27/11/16	2258	Fox	D	W	1051-1052	Pr	
27/11/16	2304	Fox	D	W	1446-1450	D	27/11/16	2304	Fox	D	W	1156-1060	D	
28/11/16	0036	Fox with prey	D	E	1451-1452	D	28/11/16	0034	Fox	D	E	1061-1065	D	With prey
							28/11/16	2146	Fox	D	W	1066-1067	Pr	
							28/11/16	2159	Fox	D	W	1071-1072	Pr	
28/11/16	2217	Fox	D	E	1456-1458	Pr								
28/11/16	2243	Fox	Pr	E	1461	Po								

							29/11/16	0006	Fox	D	W	1076-1077	Pr		
							29/11/16	0033	Fox	D	E	1081-1085	Pr		
29/11/16	1941	Fox	D	W	1466-1470	D	29/11/16	1943	Fox x 2	D	W	1086-1093	D		
							29/11/16	1944	Fox x 2	D	NDM	1096-1100	Po		
29/11/16	1954	Fox	D	E	1471-1473	Pr									
29/11/16	2100	Fox	D	E	1476	Pr									
30/11/16	0323	Fox	D	E	1481-1485	Pr									
							30/11/16	0557	Fox	D	E	1101-1105	Pr		
Emerald Bch East-North							Emerald Bch East-South								
12/3/16	1442	RBB Snake	Pr	Explore	1925-1950	Unlikely									
14/3/16	1040	EW Dragon	Pr	Explore	3231-3235	Unlikely									
17/3/16	0759	EW Dragon	Pr	Explore	4981-4990	Unlikely									
20/3/16	1619	Red Browed Finch	D	Drink	6491-6496	Unlikely									
							26/3/16	1555	Buff-banded Rail	Pr	E	761-766	Po		
							6/4/16	0825	EW Dragon	Pr	Explore	3596-3625	Unlikely		
							1/5/16	1308	RBB Snake	D	Explore	3816-3820	Unlikely		
26/5/16	0106	EG Kangaroo	D	Enter	131-178	D									
12/6/16	0330	EG Kangaroo	D	Exit	181-199	D									
23/9/16	0345	EG Kangaroo	D	Exit	91-123	D									
24/9/16	2159	Fox	D	Enter	126-132	D									

25/9/16	1819	EG Kangaroo	D	Exit	136-140	D								
							25/9/16	1834	EG Kangaroo	D	Explore	116-120	Unlikely	
26/9/16	2056	Fox	D	Enter	151-155	D								
30/9/16	0057	LN Bandicoot	D	Explore	156-160	Po								
30/9/16	2326	Fox	D	Enter	166-170	D								
1/10/16	1941	EG Kangaroo	D	Explore	171-215	D								
2/10/16	0226	EG Kangaroo	D	Enter	216-230	D								
							2/10/16	2354	EG Kangaroo	D	Explore	141-150	Po	
3/10/16	0301	LN Bandicoot	D	Explore	231-235	Po								
4/10/16	0455	EG Kangaroo	D	Exit	236-250	D								
4/10/16	1624	EG Kangaroo	D	Enter	251-253	D								
6/10/16	0410	EG Kangaroo	D	Exit	256-259	D								
6/10/16	0947	EG Kangaroo	D	Enter	261-270	D								
6/10/16	2246	EG Kangaroo	D	Explore	276-280	Po								
							7/10/16	0008	EG Kangaroo	D	Explore	156-183	Un	
							7/10/16	1529	EG Kangaroo	D	Explore	186-190	Un	
9/10/16	2157	Fox	D	Enter	281-284	D								
							10/10/16	0228	EG Kangaroo	D	Explore	221-330	Po	
14/10/16	0341	EG Kangaroo	D	Exit	286-296	D								
							14/10/16	1852	EG Kangaroo x 2	D	Enter and Exit	361-415	Un	
14/10/16	1858	EG Kangaroo	D	Explore	301-307	Un								
15/10/16	2319	EG Kangaroo	D	Exit	316-335	D								
17/10/16	0259	EG Kangaroo	D	Exit	336-340	D								
21/10/16	0031	LN Bandicoot	D	Explore	26-30	Po								
							21/10/16	0233	LN Bandicoot	D	Exit	86-90	Po	
25/10/16	0356	EG Kangaroo	D	Exit	36-44	D								
29/10/16	1049	EG Kangaroo	D	Enter	46-57	D								
2/11/16	1643	EG Kangaroo	D	Enter	61-63	D								
3/11/16	1913	EG Kangaroo	D	Explore	66-205	Un								

							4/11/16	1945	EG Kangaroo	D	Explore	1926-2415	Po	
9/11/16	0730	EG Kangaroo	D	Enter	221-225	D								
10/11/16	1635	Pheasant Coucal	D	Explore	226-230	Un								
11/11/16	2116	Dog	D	Explore	231-245	Un								
12/11/16	1752	EG Kangaroo	D	Enter	246-249	D								
14/11/16	0345	EG Kangaroo	Pr	Exit	254-263	D								
14/11/16	0710	EG Kangaroo	D	Enter	266-268	D								
17/11/16	0017	Bandicoot spp.	D	Explore	291-292	Po								
17/11/16	0227	EG Kangaroo	D	Exit	296-309	D								
19/11/16	0235	EG Kangaroo	D	Exit	426-435	D								
21/11/16	2156	EG Kangaroo	D	Exit	561	D								
22/11/16	0316	EG Kangaroo	D	Exit	566-568	D								
25/11/16	2247	EG Kangaroo	D	Explore	826-830	Po								
25/11/16	2312	EG Kangaroo	D	Exit	831-835	D								
29/11/16	0058	EG Kangaroo	D	Exit	1026-1100	Po								
29/11/16	0335	EG Kangaroo	D	Exit	1101-1105	D								
29/11/16	1627	EG Kangaroo	D	Enter	1126-1128	D								
Veg Med South-East							Veg Med South-West							
9/3/16	1156	EG Kangaroo x 2	Pr	W	151-155	Po	9/3/16	2357	EG Kangaroo x 2	Pr	W	86-87	D	
30/3/16	1637	Swamp Wallaby	D	E	156-159	Po								
5/4/16	1204	Swamp Wallaby x 2	D	WthenE	161-180	Un								
26/4/16	0504	Swamp Wallaby	D	W	21-30	Po								
2/5/16	0949	Swamp Wallaby	D	W	31-35	Po								

13/5/16	0852	Swamp Wallaby	D	W	81-90	Pr								
14/5/16	1756	Swamp Wallaby	D	W	91-95	Pr								
24/5/16	0921	Swamp Wallaby	Pr	W	96-100	Pr								
							24/5/16	0818	Swamp Wallaby	D	E	136-140	Po	
25/5/16	1056	Swamp Wallaby	Pr	W	101-105	D	25/5/16	1058	Swamp Wallaby	D	W	141	D	
27/5/16	0919	Dog	Pr	W	111-115	Pr								
27/5/16	1401	Dog x 2	D	E	116-122	D	27/5/16	1359	Dog x 2	D	E	146-160	D	
27/5/16	1613	Dog x 2	D	E	125-128	Pr	27/5/16	1614	Dog	D	E	161-165	D	
28/5/16	0342	Dog	D	W	136-140	Pr								
28/5/16	1714	Dog	D	W	141-145	Pr								
29/5/16	0912	Dog	D	W	146-150	Pr	29/5/16	0913	Dog	D	W	166	D	
29/5/16	2202	Dog	D	E	151-152	Pr								
30/5/16	0545	Dog	D	Ethen W	156-165	Pr								
31/5/16	0752	Dog	D	W	165-170	Pr								
2/6/16	0736	Dog	D	E	171-175	Pr	2/6/16	0735	Dog	D	E	171-175	D	
2/6/16	0852	Dog x 2	D	W	176-186	Pr	2/6/16	2053	Dog x 2	D	W	176-183	D	
3/6/16	0519	Dog x 2	D	W	186-190	Po	3/6/16	0521	Dog x 2	D	W	191-196	D	
7/6/16	0950	Dog	D	E	191-192	Po	7/6/16	0950	Dog	D	E	196-200	D	
8/6/16	1442	Swamp Wallaby	D	E	196-201	Po	8/6/16	1439	Swamp Wallaby	D	E	201-205	D	
13/6/16	0243	Swamp Wallaby	D	W	201-205	Po								
23/9/16	0242	Swamp Wallaby	D	W	131-135	Po								
							24/9/16	0923	Lace Monitor	D	E	321-325	Po	
25/9/16	0058	Swamp Wallaby	D	E	171-172	Pr								
							25/9/16	1255	Swamp Wallaby	D	E	326-330	Pr	

25/9/16	1854	Swamp Wallaby	D	W	176-180	Pr								
27/9/16	0752	Swamp Wallaby	D	W	186-190	D	27/9/16	0755	Swamp Wallaby	D	W	331-333	D	
							1/10/16	1000	Lace Monitor	D	E	336-340	Po	
2/10/16	0824	Dog	D	E	191	D	2/10/16	0822	Dog	D	E	341-345	D	
2/10/16	0927	Lace Monitor	D	E	196-200	Po	2/10/16	0922	Lace Monitor	D	E	346-350	D	
2/10/16	1247	Lace Monitor	D	W	201-205	Po								
3/10/16	1039	Dog	D	E	206-207	D	3/10/16	1038	Dog	D	E	351-360	D	
3/10/16	1236	Swamp Wallaby	D	E	211-213	D	3/10/16	1230	Swamp Wallaby	D	E	361-365	D	
3/10/16	1846	Swamp Wallaby	D	W	216-220	D	3/10/16	1846	Swamp Wallaby	D	W	366	D	
3/10/16	2328	LN Bandicoot	D	NDM	221-225	Un								
							7/10/16	0733	Swamp Wallaby	D	E	371	Pr	
7/10/16	0920	Swamp Wallaby	D	W	231-235	D	7/10/16	0919	Swamp Wallaby	D	W	381	D	
12/10/16	1116	Swamp Wallaby	D	E	241-243	D	12/10/16	1115	Swamp Wallaby	D	E	385-390	D	
12/10/16	1844	Swamp Wallaby	D	W	246-250	Pr								
15/10/16	0746	Swamp Wallaby	D	W	251-255	D	15/10/16	0747	Swamp Wallaby	D	W	391-392	D	
15/10/16	1035	Swamp Wallaby	D	E	256-260	D	15/10/16	1034	Swamp Wallaby	D	E	396-400	D	
15/10/16	2000	Swamp Wallaby	D	W	261-265	Pr								
19/10/16	1235	Swamp Wallaby	D	E	271-280	D	19/10/16	1233	Swamp Wallaby	D	E	401-405	D	
20/10/16	1950	Swamp Wallaby	D	W	26-30 (2nd folder)	Pr								
							21/10/16	1121	Swamp Wallaby	D	E	16 (2nd folder)	Pr	
21/10/16	1417	Lace Monitor	D	E	36-37	Pr								
21/10/16	2251	Bandicoot sp	Pr	E	41	Po								

22/10/16	1830	Swamp Wallaby	D	W	46-50	Pr								
22/10/16	1923	Fox	D	E	51-60	Pr								
24/10/16	1704	Swamp Wallaby	Pr	W	81-85	Pr								
24/10/16	2218	Swamp Wallaby	D	W	86-90	Pr								
							25/10/16	1306	Swamp Wallaby	D	E	31-36	Pr	
26/10/16	1713	Dog	D	W	96-105	Pr								
26/10/16	2041	Swamp Wallaby	D	W	106-110	Pr								
30/10/16	1630	Swamp Wallaby	D	W	116-120	Pr								
							31/10/16	0656	Swamp Wallaby	D	E	41-45	Pr	
1/11/16	1648	Swamp Wallaby	D	W	126-130	Pr								
2/11/16	0844	Swamp Wallaby	D	W	131-135	Pr								
2/11/16	0933	Swamp Wallaby	D	E	136-140	Pr								
3/11/16	0817	Swamp Wallaby	D	E	146-147	D	3/11/16	0816	Swamp Wallaby	D	E	46-49	D	
5/11/16	2121	Swamp Wallaby	D	W	151-155	Pr								
10/11/16	1232	Lace Monitor	D	W	161-165	Pr								
13/11/16	1338	EG Kangaroo	D	WthenE	171-218	Un								
15/11/16	1612	Swamp Wallaby	D	W	221-225	Pr								
15/11/16	1613	Swamp Wallaby	D	WthenE	226-233	Un								
17/11/16	1010	Lace Monitor	D	W	236-240	Po								
18/11/16	0906	Lace Monitor	D	E	241-242	Pr								
18/11/16	0944	EG Kangaroo	D	EE	246-270	Un								
							22/11/16	0647	Swamp Wallaby	D	E	51-55	Pr	

23/11/16	0739	Swamp Wallaby	D	W	281-285	D	23/11/16	0739	Swamp Wallaby	D	W	56-58	D		
23/11/16	0958	Swamp Wallaby x2	D	WthenE	281-301	Po									
23/11/16	1900	Swamp Wallaby	D	W	306-310	Pr									
25/11/16	1609	Swamp Wallaby	D	W	316-320	Pr									
26/11/16	1924	Swamp Wallaby	Pr	E	321	Pr									
26/11/16	2243	Swamp Wallaby	D	W	326-330	Pr									
28/11/16	2102	Lace Monitor	D	E	331-335	Pr									
29/11/16	0843	Lace Monitor	D	W	336-340	Pr									
30/11/16	0651	Swamp Wallaby	D	W	341-345	Pr									
Veg Med North-East							Veg Med North-West								
							8/3/16	1050	Swamp Wallaby	Pr	W	81	Po		
							7/3/16	1421	Swamp Wallaby	D	W	96-100	Po		
							1/4/16	0906	Swamp Wallaby	D	W	101-105	Po		
							3/4/16	1755	Swamp Wallaby	D	W	106-110	Po		
12/4/16	1217	Swamp Wallaby	D	W	26-30	D	12/4/16	1231	Swamp Wallaby	D	W	36-40	D		
12/4/16	1303	Swamp wallaby	D	E	31-32	D	12/4/16	1253	Swamp Wallaby	D	E	41-45	D		
12/4/16	1751	Swamp Wallaby	D	E	36-37	Po									
17/4/16	1517	Swamp Wallaby	Pr	W	41-45	Pr	17/4/16	1538	Swamp Wallaby	D	W	46-50	Pr		

							1/5/16	1502	Swamp Wallaby	D	E	51-55	Po	
							5/5/16	0733	Swamp wallaby	D	E	111-115	Po	
							11/5/16	0823	Swamp wallaby	D	W	181-185	Po	
15/5/16	0429	Swamp Wallaby	D	W	76-80	Pr								
							15/5/16	0848	Swamp Wallaby	D	W	186	Po	
							17/5/17	1702	Swamp Wallaby	D	W	191-195	Po	
							20/5/16	1748	Swamp Wallaby	D	E	196-200	Po	
							28/5/16	0902	Dog	D	E	201-203	Po	
28/5/16	2040	Dog	D	W	81-85	D	28/5/16	2042	Dog x 2	D	W	206-210	D	
29/5/16	1241	Dog	D	E	86-87	D	29/5/16	1241	Dog	D	E	211-215	D	
1/6/16	1047	Swamp wallaby	D	W	91-95	D	1/6/16	1051	Swamp Wallaby	D	W	216-220	D	
1/6/16	1351	Swamp wallaby	D	E	96-100	D	1/6/16	1329	Swamp Wallaby	D	E	221-225	D	
3/6/16	0554	Dog	D	W	101-105	Pr								
7/6/16	1004	Dog	D	W	106-115	Pr	7/6/16	1005	Dog	D	W	226-227	D	
11/6/16	1448	Dog	D	E	116-117	Pr								
12/6/16	0751	Swamp wallaby	D	W	121-130	Pr	12/6/16	0754	Swamp Wallaby	Pr	W	231	Pr	
12/6/16	0823	Dogs	D	multiple	131-160	D	12/6/16	0819	Dogs	D	multiple	236-265	D	
12/6/16	1007	Swamp wallaby	D	E	161	Pr	12/6/16	1003	Swamp Wallaby	D	E	266-270	D	
23/9/16	1646	Swamp Wallaby	D	W	66-70	Pr								
27/9/16	1952	Swamp Wallaby	D	W	71-74	Pr								
							2/10/16	0800	Dog	D	W	116	Pr	
2/10/16	1502	Dog	D	W	76-80	D	2/10/16	1504	Dog	D	W	120-121	D	
2/10/16	1639	Dog	D	E	81-82	D	2/10/16	1639	Dog	D	E	126-130	D	

3/10/16	0432	Dog	D	E	86-87	D	3/10/16	0432	Dog	D	E	131-135	D	
3/10/16	1136	Dog	D	W	96-100	Pr								
							4/10/16	0327	Dog	D	E	136-140	Pr	
4/10/16	1303	Dog	D	E	101	D	4/10/16	1303	Dog	D	E	141-145	D	
4/10/16	1522	Dog	D	W	106-110	D								
5/10/16	0908	Dog	D	E	116-118	D	5/10/16	0907	Dog	D	E	146-150	D	
5/10/16	1436	Dog	D	W	121-125	D	5/10/16	1438	Dog	D	W	151	D	
6/10/16	1428	Dog	D	E	126-130	D	6/10/16	1427	Dog	D	E	156-160	D	
6/10/16	1513	Dog	D	W	131-135	D	6/10/16	1514	Dog	D	W	161	D	Old prey leg in mouth (roadkill?)
8/10/16	2228	Swamp Wallaby	D	W	141-145	Pr								
8/10/16	2329	Swamp Wallaby	D	E	146-147	Pr								
20/10/16	0902	Lace Monitor	D	W	151-155	Po								
6/11/16	0809	Swamp Wallaby	D	E	31-33 (2nd folder)	D	6/11/16	0807	Swamp Wallaby	D	E	121-125 (2nd folder)	D	
6/11/16	1532	Swamp Wallaby	D	W	36-40	Pr								
14/11/16	0726	Swamp Wallaby	D	E	41-45	D	14/11/16	0721	Swamp Wallaby	D	E	126-130	D	
18/11/16	0712	Swamp Wallaby	D	W	51-55	Po								
24/11/16	0203	Swamp Wallaby	D	W	56-59	Pr								
25/11/16	1804	Dog	D	W	61-	Pr								

Appendix B – Vegetated median data

Table B1: Squirrel/sugar glider trap location and effort during 2016.

Easting	Northing	Tree sp	Autumn 2016 (2-6/5/16)	Spring 2016 (19-23/9/16)
516871	6672372	Wh mahog	4 nights	4 nights
516924	6672402	Wh mahog	4 nights	4 nights
516945	6672476	Grey ibk	4 nights	4 nights
516997	6672503	Wh mahog	4 nights	4 nights
517011	6672536	T'wood	4 nights	4 nights
517040	6672580	T'wood	4 nights	4 nights
517097	6672628	B'butt	4 nights	4 nights
517129	6672650	T'wood	4 nights	4 nights
517155	6672704	B'butt	4 nights	4 nights
517222	6672763	Red mahog	4 nights	4 nights
516835	6672411	T'wood	3 nights	4 nights
516890	6672477	Sf gre gum	3 nights	4 nights
516923	6672523	P b'wood	3 nights	4 nights
516952	6672561	Sf gre gum	3 nights	4 nights

516975	6672594	B'butt	3 nights	4 nights
517018	6672607	T'wood	3 nights	4 nights
517061	6672700	P b'wood	3 nights	4 nights
517084	6672718	B'butt	3 nights	4 nights
517127	6672768	T'wood	3 nights	4 nights
517185	6672807	B'butt	3 nights	4 nights
516722	6672454	Sm f gg	4 nights	4 nights
516772	6672480	Wh mahog	4 nights	4 nights
516801	6672530	Grey ibk	4 nights	4 nights
516835	6672540	Wh mahog	4 nights	4 nights
516866	6672594	T'wood	4 nights	4 nights
516911	6672615	Wh sbk	4 nights	4 nights
516973	6672649	B'butt	4 nights	4 nights
516995	6672709	T'wood	4 nights	4 nights
517058	6672758	T'wood	4 nights	4 nights
517075	6672806	B'butt	4 nights	4 nights
			110 trap-nights	120 trap-nights

Appendix B – Vegetated median data

Table B2: Squirrel and sugar glider trap and nest box (NB) captures during 2016. SqG = squirrel glider; SuG = sugar glider; recap = recapture

Location	Date	Species (recapture)	Tag no./L or R/colour	In bag wt	Bag wt	Net wt	Sex	Upr teeth	Lwr teeth	Vent colour	Breeding status	Comments
E2-trap	3/5/16	SqG	F2-512/R/red	310	115	195	F	B	Slight	Cream	Non-parous	
E3-trap	3/5/16	SuG	Fb-505/R/green	210	122	88	F	B	Slight	Cream	Non-parous	White tail tip
M8-trap	3/5/16	SqG-recap	M1	371	125	216	M	B	Sl-mod	Cream	Slight secretions	
W3-trap	4/5/16	SqG	M2-502/L/white	355	135	220	M	B	Sl-mod	Cream	Slight secretions	
M7-trap	4/5/16	SqG	M3-503/L/white	305	105	200	M	B-C	Mod	Cream	Slight secretions	
M6-trap	4/5/16	SqG-Session recap	F2									Crossed: E>med
M4-trap	4/5/16	SqG	M4-514/R&508/L/green	275	111	164	M	A	slight	Cream	Nil secs	
W7-trap	5/5/16	SqG	F3-507/L/green	282	102	180	F	A-B	Slight	Cream	1xPY(10mm)	
E4-trap	5/5/16	SqG	F4-511/R/red	302	102	200	F	B	Slight	Cream	2xPY(30mm)	
E6-trap	6/5/16	SqG-Session recap	F4									
E1-trap	6/5/16	SqG-Session recap	M4									Crossed: med>E
W6-NB	12/8/16	SqG-recap	F3	312	100	212	F	B	Mod	Cream	2xPY(30mm)	
E4-trap	21/9/16	SqG-recap	F4	290	100	190	F	B	Slight	Cream	1xPY (20mm)	
M4-trap	21/9/16	SuG	Ma-515/L	266	115	151ish	M	A-B	Slight	Grey	Nil secretions	
E6-trap	22/9/16	SqG	F5-516/R	320	124	196	F	A-B	mod	Cream	1xPY (25mm)	
M3-trap	23/9/16	SqG-Session recap	F4	235	67	168	F	B	Slight	Cream	1xPY (20mm)	Crossed: E>med

Appendix B – Vegetated median data

Table B2: Other species captures during vegetated median trapping in 2016. F-f = fawn footed; Br = brown.

Location	Date	Species (recapture)	In bag wt	Bag wt	Net wt	Sex	Breeding status	Comments
E4-trap	3/5/16	F-f melomys	191	120	71	M		
E8-trap	3/5/16	Br A'chinus x2				M&?		1 escaped
M5-trap	3/5/16	Br A'chinus	40	10	30	F		
W1-trap	3/5/16	F-f melomys	110	35	75	M		
W4-trap	3/5/16	Br A'chinus	99	62	37	M		
W5-trap	3/5/16	F-f melomys	88	20	68	M		
W10-trap	3/5/16	F-f melomys	98	45	54	M		
W1-trap	4/5/16	F-f melomys	91	25	66	F		
W4-trap	4/5/16	Br A'chinus	59	25	34	M		
W5-trap	4/5/16	F-f melomys	118	55	63	M		
W8-trap	4/5/16	Br A'chinus x2			26&27	Fx2		
W9-trap	4/5/16	Br A'chinus x2			27&26	Fx2		
W10-trap	4/5/16	Br A'chinus	58	25	32	M		
E2-trap	4/5/16	Br A'chinus x2			25&26	M&F		
E3-trap	4/5/16	Br A'chinus x2			27&24	M&F		
E4-trap	4/5/16	F-f melomys	99	22	77	F		
E8-trap	4/5/16	Br A'chinus			25	F		
W1-trap	5/5/16	F-f melomys	120	48	72	F		
W3-trap	5/5/16	F-f melomys	115	52	63	F		
W5-trap	5/5/16	F-f melomys	150	60	90	M		
W6-trap	5/5/16	Br A'chinus	85	40	45	M		
W8-trap	5/5/16	Br A'chinus x2			28&29	M&F		
W10-trap	5/5/16	F-f melomys	130	50	80	M		
M7-trap	5/5/16	Br A'chinus	80	50	30	M		

M5-trap	5/5/16	Br A'chinus	75	48	27	F		
E2-trap	5/5/16	Br A'chinus x2			28&25	M&F		
E3-trap	5/5/16	Br A'chinus	78	51	27	M		
E5-trap	5/5/16	Trap on ground; clean & no bait; prob brushtail possum sp.						
E6-trap	5/5/16	Br A'chinus				?		Escape
E7-trap	5/5/16	Br A'chinus x2			22&25	M&F		
E8-trap	5/5/16	F-f melomys	113	50	63	M		
E10-trap	5/5/16	Br A'chinus x2			22&26	M&M		
W1-trap	6/5/16	F-f melomys	118	50	68	F		
W3-trap	6/5/16	F-f melomys	105	52	58	M		
W4-trap	6/5/16	Br A'chinus				?		Escape
W5-trap	6/5/16	F-f melomys	133	53	70	F		
W6-trap	6/5/16	F-f melomys	115	55	60	M		
W7-trap	6/5/16	Br A'chinus	81	52	29	M		
W10-trap	6/5/16	Br A'chinus	82	50	32	F		
E10-trap	6/5/16	Br A'chinus	79	51	28	F		
E8-trap	5/5/16	Br A'chinus x2				M&M		
E7-trap	6/5/16	Br A'chinus				M		
E5-trap	6/5/16	Trap on ground; clean & no bait; prob brushtail possum sp.						
E4-trap	6/5/16	Br A'chinus x2				M&F		
E3-trap	6/5/16	Br A'chinus				M		
E2-trap	6/5/16	Br A'chinus				M		
M7-trap	20/9/16	Br A'chinus	78	52	26	F	8xPY	
M5-trap	20/9/16	Br A'chinus	55	25	30	F	8xPY	
E2-trap	21/9/16	Br A'chinus	48	26	22	F	8xPY	
E10-trap	21/9/16	Br A'chinus	54	30	24	F	7xPY	
M7-trap	21/9/16	Br A'chinus	54	28	26	F	7xPY	
M5-trap	21/9/16	Br A'chinus	51	30	21	F	7xPY	left eye injury, old
W2-trap	21/9/16	Br A'chinus	68	34	34	F	7xPY	
W5-trap	22/9/16	Br A'chinus	53	27	26	F	8xPY	

M9-trap	22/9/16	Br A'chinus	57	27	30	F	4xPY	
M7-Trap	22/9/16	Black Rat	176	26	150	M		Euthanised
M5-trap	22/9/16	Br A'chinus	56	27	29	F	8xPY	
E1-trap	22/9/16	trap on ground, clean no bait, closed, prob BtP						
E2-trap	22/9/16	trap on ground, clean no bait, closed, prob BtP						
M5-trap	23/9/16	Black Rat	152	26	126	M		Euthanised
M8-trap	23/9/16	f-f melomys	103	26	77	M		
W9-trap	23/9/16	Br A'chinus	51	26	25	F	8xPY	
E2-trap	23/9/16	trap on ground, clean no bait, open, upside down prob CBTP						
E10-trap	23/9/16	Br A'chinus	51	26	25	F	7xPY	

Appendix B – Vegetated median data

Table B3: Nest box inspection data summer/autumn 2016.

Nest Box ID	Install Date	Easting	Northing	Tree sp	Ht	Aspect	Summer/Autumn 2016									
							Inspect date	Fauna	Signs	Condition	Pic no.	Inspect date	Fauna	Signs	Condition	Pic no.
East 1	11/2/15	516871	6672372	Wh mahog	6	Ne	15/2/16	Nil	Nil	Good	396-1206	4/5/16	Nil	Fresh flouncy euc leaf nest (FtG(pr))	Good	1554
East 2	11/2/15	516924	6672402	Wh mahog	6	E	15/2/16	Nil	Nil	Good	395-1203	4/5/16	Nil	Mod Fresh euc leaf nest (Pet (pr))	Good	1548
East 3	12/2/15	516945	6672476	Grey ibk	6	Nne	15/2/16	Nil	old Europ bee hive	Good	3894-1159	4/5/16	Nil	Mod Old euc leaf nest (Pet (pr)); old Europ bee hive	Good	1546
East 4	12/2/15	516997	6672503	Wh mahog	6	Ne	15/2/16	Nil	Old euc leaf nest (Pet (pr));	Good	393-1158	4/5/16	Nil	Mod Fresh euc leaf nest (Pet (pr))	Good	1544
East 5	12/2/15	517011	6672536	T'wood	6	Ne	15/2/16	Nil	Mod Fresh euc leaf nest (Pet (pr))	Good	392-1154	4/5/16	Nil	Old euc leaf nest (Pet (pr))	Good	1540
East 6	12/2/15	517040	6672580	T'wood	6	E	15/2/16	Nil	Nil	Good	391-1152	4/5/16	Nil	Few fresh euc lvs (FtG(pr))	Good	1535
East 7	12/2/15	517097	6672628	B'butt	6	ENE	15/2/16	Nil	Fresh euc leaf nest (Pet (pr))	Good	390-1149	4/5/16	Nil	Old euc leaf nest (Pet (pr))	Good	1531
East 8	12/2/15	517129	6672650	T'wood	6	Ne	15/2/16	Nil	Mod Fresh euc leaf nest (Pet (pr))	Good	389-1145	4/5/16	Nil	Old euc leaf nest (Pet (pr));f	Good	1524

East 9	12/2/15	517155	6672704	B'butt	6	ENE	15/2/16	Nil	Old euc leaf nest (Pet (pr)); old Europ bee hive	Good	388-1140	4/5/16	Brown A'chinus (escaped outside)	Old euc leaf nest & latrine; old Europ bee hive	Good	1515
East 10	12/2/15	517222	6672763	Red mahog	6	Ne	15/2/16	Nil	Old lvs/bark & white ants	Mod termite damage	387-1134	4/5/16	Old lvs/bark & white ants	Mod termite damage	Mod termite damage	1509
West 1	11/2/15	516722	6672454	Sm f gg	6	Ne	15/2/16	Nil	Black ants	Good	377/1057	4/5/16	Nil	Black ants	Good	1417
West 2	11/2/15	516772	6672480	Wh mahog	6	Ne	15/2/16	Nil	Black ants	Good	378-1059	4/5/16	Nil	Black ants	Good	1423
West 3	11/2/15	516801	6672530	Grey ibk	6	Nne	15/2/16	Nil	Black ants	Good	379-1102	4/5/16	Nil	Black ants	Good	1425
West 4	11/2/15	516835	6672540	Wh mahog	6	Ne	15/2/16	Nil	Black ants	Good	380-1105	4/5/16	Nil	Black ants	Good	1427
West 5	11/2/15	516866	6672594	T'wood	6	Ene	15/2/16	Nil	Black ants	Good	381-1109	4/5/16	Nil	Black ants	Good	1431
West 6	11/2/15	516911	6672615	Wh sbk	6	E	15/2/16	Nil	Old flouncy euc leaf nest (FtG (pr)); ants	Good	382-1114	4/5/16	Nil	V Old flouncy euc leaf nest (FtG (pr)); ants	Good	1435
West 7	11/2/15	516973	6672649	B'butt	6	Ne	15/2/16	Nil	Old euc leaf nest (Pet (pr)); ants	Good	383-1118	4/5/16	Nil	Old euc leaf nest & latrine (A'chinus (pr))	Good	1437
West 8	11/2/15	516995	6672709	T'wood	6	Ene	15/2/16	Nil	Nil	Good	384-1121	4/5/16	Nil	Nil	Good	1441
West 9	11/2/15	517058	6672758	T'wood	6	Se	15/2/16	Nil	Black ants	Good	385/1124	4/5/16	Nil	Black ants	Good	1445

West 10	11/2/15	517075	6672806	B'butt	6	Ne	15/2/16	Nil	Black ants	Good	386-1127	4/5/16	Nil	Black ants	Good	1448
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Appendix B – Vegetated median data

Table B4: Nest box inspection data spring 2016.

Nest Box ID	Install Date	Easting	Northing	Tree sp	Ht	Aspect	Spring 2016									
							Inspect date	Fauna	Signs	Condition	Pic time	Inspect date	Fauna	Signs	Condition	Pic time
East 1	11/2/15	516871	6672372	Wh mahog	6	Ne	12/8/16	Nil	Old euc leaf nest (Pet (pr));	Good	1155	20/9/16	Nil	Fresh euc leaf nest (Pet(pr))	Good	0914
East 2	11/2/15	516924	6672402	Wh mahog	6	E	12/8/16	Nil	Old flouncy euc leaf nest (FtG (pr))	Good	1151	20/9/16	Nil	Euc leaves scattered(old FtG nest (pr))	Good	0918
East 3	12/2/15	516945	6672476	Grey ibk	6	Nne	12/8/16	Nil	Old euc leaf nest (Pet (pr));	Good	1141	20/9/16	Nil	Old euc leaves (Pet sp.(pr))	Good	0921
East 4	12/2/15	516997	6672503	Wh mahog	6	Ne	12/8/16	Nil	Old euc leaf nest (Pet (pr));	Good	1129	20/9/16	Nil	Scattered euc leaves(Pet(pr))	Good	0923
East 5	12/2/15	517011	6672536	T'wood	6	Ne	12/8/16	Nil	Old euc leaf nest (Pet (pr));	Good	1120	20/9/16	Nil	Euc leaf nest(Pet sp.(pr))	Good	0925
East 6	12/2/15	517040	6672580	T'wood	6	E	12/8/16	Nil	fresh euc lvs (Pet(pr))	Good	1114	20/9/16	Nil	Few scattered euc leaves-some fresh(Pet(pr))	Good	0927
East 7	12/2/15	517097	6672628	B'butt	6	ENE	12/8/16	Nil	Old euc leaf nest (Pet (pr));	Good	1111	20/9/16	Nil	Old euc leaves (Petaurid(pr))	Good	0931
East 8	12/2/15	517129	6672650	T'wood	6	Ne	12/8/16	Nil	Old euc leaf nest (Pet (pr));	Good	1108	20/9/16	Nil	Old scattered euc leaves (Pet(pr))	Good	0935

East 9	12/2/15	517155	6672704	B'butt	6	ENE	12/8/16	Nil	Old euc leaf nest & latrine (Ant (pr))	Good	1100	20/9/16	Nil	Old scattered euc leaves (A'chinus(pr))	Good	0938
East 10	12/2/15	517222	6672763	Red mahog	6	Ne	12/8/16	nil	Old lvs/bark & white ants	Major termite damage	1053	20/9/16	Nil	Old lvs/bark & white ants	Major termite damage	0940
West 1	11/2/15	516722	6672454	Sm f gg	6	Ne	12/8/16	Nil	Black ants	Good	0949	20/9/16	Nil	Nil; ants	Good	1020
West 2	11/2/15	516772	6672480	Wh mahog	6	Ne	12/8/16	Nil	Black ants	Good	1001	20/9/16	Nil	Nil; ants	Good	1016
West 3	11/2/15	516801	6672530	Grey ibk	6	Nne	12/8/16	Nil	Black ants	Good		20/9/16	Nil	Nil; ants	Good	1012
West 4	11/2/15	516835	6672540	Wh mahog	6	Ne	12/8/16	Nil	Black ants	Good		20/9/16	Nil	Nil; ants	Good	1010
West 5	11/2/15	516866	6672594	T'wood	6	Ene	12/8/16	Nil	Black ants	Good		20/9/16	Nil	Nil; ants	Good	1007
West 6	11/2/15	516911	6672615	Wh sbk	6	E	12/8/16	SqG (F3) recap	Fresh SqG Euc leaf nest	Good	1022	20/9/16	Nil	Fresh euc leaf nest (Pet(pr))	Good	1004
West 7	11/2/15	516973	6672649	B'butt	6	Ne	12/8/16	Nil	Old euc leaf nest & latrine (A'chinus (pr))	Good	1027	20/9/16	Nil	Antechinus nest(pr); ants	Good	1001
West 8	11/2/15	516995	6672709	T'wood	6	Ene	12/8/16	Nil	Old Euc leaf nest(Pet (pr))	Good	1031	20/9/16	Nil	Fresh scattered euc leaves (Pet (pr))	Good	0959
West 9	11/2/15	517058	6672758	T'wood	6	Se	12/8/16	Nil	Black ants	Good		20/9/16	Nil	Nil; ants	Good	0955

West 10	11/2/15	517075	6672806	B'butt	6	Ne	12/8/16	Nil	Old flouncy euc leaf nest (FtG (pr))	Good	1043	20/9/16	Nil	Euc leaves scattered(old FtG nest (pr))	Nil; moderate to severe termite damage.	0948
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Appendix B – Vegetated median data

Table B4: Hair funnel sampling data for summer-autumn and winter-spring 2016.

Funnel id	Easting	Northing	Tree sp	DBH	Height	Summer/Autumn 2016			Spring 2016		
						Install Date	Collect date	Fauna	Install Date	Collect date	Fauna
East 1	516871	6672372	Wh mahog		6	15/2/16	2/5/16	no hairs	19/8/16	19/9/16	A. stuartii
East 2	516924	6672402	Wh mahog		6	15/2/16	2/5/16	A. stuartii	19/8/16	19/9/16	A. stuartii
East 3	516945	6672476	Grey ibk		6	15/2/16	2/5/16	A. stuartii	19/8/16	19/9/16	A. stuartii
East 4	516997	6672503	Wh mahog		6	15/2/16	2/5/16	Antechinus sp.	19/8/16	19/9/16	A. stuartii
East 5	517011	6672536	T'wood		6	15/2/16	2/5/16	no hairs	19/8/16	19/9/16	A. stuartii
East 6	517040	6672580	T'wood		6	15/2/16	2/5/16	P.breviceps (pr)	19/8/16	19/9/16	Antechinus sp.
East 7	517097	6672628	B'butt	650	6	15/2/16	2/5/16	no hairs	19/8/16	19/9/16	Antechinus sp.
East 8	517129	6672650	T'wood	550	6	15/2/16	2/5/16	no hairs	19/8/16	19/9/16	Antechinus sp.
East 9	517155	6672704	B'butt	620	6	15/2/16	2/5/16	Mus musculus	19/8/16	19/9/16	A. stuartii (Pr)
East 10	517222	6672763	Red mahog	400	6	15/2/16	2/5/16	A. stuartii	19/8/16	19/9/16	A. stuartii (Pr)
Median 1	516835	6672411	T'wood	310	4	15/2/16	2/5/16	Antechinus sp.	19/8/16	19/9/16	no hairs
Median 2	516890	6672477	Sf gre gum	550	4	15/2/16	2/5/16	Acrobates pygmaeus	19/8/16	19/9/16	A. stuartii
Median 3	516923	6672523	P b'wood	320	4	15/2/16	2/5/16	no hairs	19/8/16	19/9/16	A. stuartii; R.fuscipes(Pr)
Median 4	516952	6672561	Sf gre gum	380	4	15/2/16	2/5/16	P.breviceps (pr)	19/8/16	19/9/16	Rattus sp.
Median 5	516975	6672594	B'butt	480	4	15/2/16	2/5/16	P.breviceps (pr)	19/8/16	19/9/16	A. stuartii
Median 6	517018	6672607	T'wood	430	4	15/2/16	2/5/16	A. stuartii	19/8/16	19/9/16	A. stuartii
Median 7	517061	6672700	P b'wood	400	4	15/2/16	2/5/16	Antechinus sp.	19/8/16	19/9/16	Rattus sp.
Median 8	517084	6672718	B'butt	480	4	15/2/16	2/5/16	Antechinus sp.	19/8/16	19/9/16	Rattus sp.
Median 9	517127	6672768	T'wood	270	4	15/2/16	2/5/16	A. stuartii	19/8/16	19/9/16	A. stuartii
Median 10	517185	6672807	B'butt	470	4	15/2/16	2/5/16	A. stuartii	19/8/16	19/9/16	A. stuartii
West 1	516722	6672454	Sm f gg		6	15/2/16	2/5/16	no hairs	19/8/16	19/9/16	Antechinus sp.
West 2	516772	6672480	Wh mahog		6	15/2/16	2/5/16	no hairs	19/8/16	19/9/16	Antechinus sp.

West 3	516801	6672530	Grey ibk		6	15/2/16	2/5/16	no hairs	19/8/16	19/9/16	A. stuartii (Pr)
West 4	516835	6672540	Wh mahog		6	15/2/16	2/5/16	no hairs	19/8/16	19/9/16	Antechinus sp.
West 5	516866	6672594	T'wood		6	15/2/16	2/5/16	no hairs	19/8/16	19/9/16	A. stuartii (Pr)
West 6	516911	6672615	Wh sbk		6	15/2/16	2/5/16	P.breviceps (pr)	19/8/16	19/9/16	M. cervinipes
West 7	516973	6672649	B'butt		6	15/2/16	2/5/16	Rattus sp.	19/8/16	19/9/16	A. stuartii
West 8	516995	6672709	T'wood		6	15/2/16	2/5/16	P.breviceps (pr)	19/8/16	19/9/16	Antechinus sp.
West 9	517058	6672758	T'wood		6	15/2/16	2/5/16	no hairs	19/8/16	19/9/16	Antechinus sp.
West 10	517075	6672806	B'butt		6	15/2/16	2/5/16	Antechinus sp.	19/8/16	19/9/16	Antechinus sp.

Appendix B – Vegetated median data

Table B5: Spotlight effort and detections for summer-autumn and winter-spring 2016.

Site	Date	Observers	Start Time	Finish Time	Species	Comments	Flowering	Moon	Wind	Rain	Visibility	Air Temp	Humidity
East	24/3/15	BT/GM	2115	2148	Nil			1st 1/4	MSb	Nil	Dark	24	98
	26/3/15	BT/GM	2035	2110	Nil			1st 1/4	Still	Nil	Detail seen	28	86.6
	30/9/15	BT/GM	1842	1916	Nil		Twood	full	Nil	Nil	Dark	16.5	80
	26/10/15	NP/GM	0025	0055	GHFF (c)		Iron bark	7/8	Nil	Nil	Bright	18.9	100
	3/5/16	BT/GM	1924	2012	SqG	se@250n30e; untagged?	B'butt	0/4	Still	Nil	Dark	20.1	78
	5/5/16	BT/GM	1801	1830	ONj		B'butt	0/4	Still	Nil	Dark	21.4	75
	20/9/16	NP/GM	2003	2038	FtG	Sg@300m, 5mE	bbutt, turp, tallow	0/4	Still	Nil	detail seen	17.9	79.1
	22/9/16	NP/GM	1825	1906	GHFF		bbutt, turp, tallow	0/4	still	nill	dark	19.7	69
Median	24/3/15	BT/GM	2030	2110	FtG	Sg@Mid-tran		1st 1/4	MSb	Nil	Dark	24	98
	26/3/15	BT/GM	2116	2151	Nil			1st 1/4	Still	Nil	Detail seen	28	86.6
	30/9/15	BT/GM	2014	2050	Nil		Twood	full	MSb	Nil	Dark	13.7	94
	26/10/15	NP/GM	2345	0015	Nil		Tallow, Bbutt	7/8	Nil	Nil	Bright	18.5	99
	3/5/16	BT/GM	1840	1921	SuG, LRFF	sm@450n5w; untagged?; white tail tip	B'butt	0/4	Still	Nil	Dark	20.1	78
	5/5/16	BT/GM	1917	1950	LRFF		B'butt	0/4	Still	Nil	Dark	21.4	75
	20/9/16	NP/GM	1917	1953	FtG, GHFF	Sm@450m	bbutt, tallow	0/4	Still	Nil	detail seen	17.9	79.1
	22/9/16	NP/GM	1908	1938	nil		bbutt, tallow	0/4	still	nill	dark	19.7	69
West	24/3/15	BT/GM	1950	2026	Nil		Br-l p'bk	1st 1/4	MSb	Nil	Dark	24	98
	26/3/15	BT/GM	2000	2032	Nil			1st 1/4	Still	Nil	Detail seen	28	86.6
	30/9/15	BT/GM	1931	2005	Nil			full	MSb	Nil	Dark	16.2	84
	26/10/15	NP/GM	2305	2340	Nil		Tallow	7/8	MSb	Nil	Bright	19	100
	3/5/16	BT/GM	1802	1835	CBP; LRFF, GHFF	Se@500n15w	B'butt; b-l pbk	0/4	Still	Nil	Dark	20.1	78
	5/5/16	BT/GM	1838	1914	LRFF, GHFF		B'butt; b-l pbk	0/4	Still	Nil	Dark	21.4	75

	20/9/16	NP/GM	1834	1916	SuG, GHFF	sm@250m, 20mW	b'butt, tallow	0/4	Still	Nil	detail seen	17.9	79.1
	22/9/16	NP/GM	1943	2017	Nil		b'butt, tallow	0/4	still	nill	dark	19.7	69

Appendix C – Rope bridge data

Table C1: Rope bridge camera monitoring survey effort.

Survey period (days)	East cam				West cam			
	Pics	Days active	Batteries	Comments	Pics	Days active	Battery %	Comments
15/12/15 - 16/3/16 (92)	10	92	99% (L)	No change; time ok; 8G>8G	8944	49	0% (L>L)	No change; time ok; cam in-scheduled; re-position cam to face bulkhead 3m out
16/3 - 18/5/16 (63)	10	57	0%(L>L)	No change; time ok; 8G>16G	157	63	0% (L>L)	No change; time ok; SC950>SC950(sched on:1700, off:0500)
18/5 - 17/8/16 (91)	15	91	99% (L)	No change; time ok; 16G>16G	15	91	99% (L)	No change; 1min<; 16G>16G
17/8 - 30/11/16 (105)	75	105	99% (L)	No change; time ok; 16G>8G	10	105	99% (L)	No change; 1min<; 16G>8G

Appendix C – Rope bridge data

Table C2: Rope bridge camera monitoring detections. NDM = No Directional Movement; ME = move east; MW = move west.

Date	Time	Species	Accu- racy	Movement	Bridge sctn	Pic No.	Time	Species	Accu- racy	Movement	Bridge sctn	Pic No.	Crossing Likelihood	Comments
East							West							
18/1/16	0023	Feathertail Glider	D	MW, ME, explore	Edge	5							Unlikely	
10/8/16							0118	Feathertail glider	D	E then W	Centre	1-5	Unlikely	
1/9/16	oo53	Feathertail glider	D	stationary looking west	Mid-edge	1-5							Possible	No return pics; not detected by W cam
11/9/16	328	Feathertail glider	D	NDM; explore	Centre & edge	6-10							Unlikely	
12/9/16	o212	Feathertail glider	D	ME	Edge	11-15							Probable	Not detected by W cam
4/10/16	oo23	Feathertail glider	D	ME, MW, explore	Centre & edge	21-35							Unlikely	Not detected by W cam
24/10/16	219	Feathertail glider	D	ME	center	71-75							Probable	No return pics; not detected by W cam

Appendix C – Rope bridge and glide pole data

Table C3: Rope bridge and glide pole spotlight survey effort and detections. SuG = sugar glider; SqG = squirrel glider; FtG = feathertail glider. GHFF = grey-headed flying fox; TF = tawny frogmouth; BB = boobook owl; Pr = probable.

Site	Date	Observers	Start Time	Finish Time	Species	Comments	Flowering	Moon	Wind	Rain	Visibility	Air Temp	Humidity
Rope east	11/8/16	BT/GM	1818	1853	GHFF			1/4	Msb	Past 24hr	Dark	15.9	88
	21/9/16	NP/GM	1841	1923	FtG; SuG/SqG; GHFF, LRFF	FtG: SG@250n5w; SuG/SqG: sm@150n20w	b'butt, turp	0/4	msb	past 6 hrs	dark	20.2	82
	18/10/16	BT/NP	1942	2015	FtG x2; SuG/SqG; GHFF	FtG: SM@250n5w & sm 10s10w; SuG/SqG: se@250n5w	b'butt; p'bk; t'wood	2/4	Msb	nil	Dark	18.3	61
	20/10/16	BT/NP	1935	2003	nil		b'butt; p'bk; t'wood	3/4	msb	Nil	Dark	19.3	86
Rope west	11/8/16	BT/GM	1909	1941	GHFF		Bbutt	1/4	Msb	Past 24hr	Dark	15.9	88
	21/9/16	NP/GM	1933	2018	GHFF		Bbutt, tallow, turn	0/4	msb	past 6hrs	dark	19.5	82
	18/10/16	BT/NP	2029	2103	FtG; SuG	FtG: SM@200n10w; SuG: hm @250n10w	b'butt; t'wood	2/4	Msb	nil	Dark	18.3	61
	20/10/16	BT/NP	2011	2040	nil		b'butt; t'wood	3/4	msb	Nil	Dark	19.3	86
Pole east	3/5/16	BT/GM	2020	2055	LRFF; grass owl (poss)	Heard trills ~20n40e	Bl butt	0/4	Nil	Nil	Dark	17.8	82
	11/8/16	BT/GM	1958	2023	GHFF		B'butt	1/4	Msb	Past 24hr	Dark	15.7	88

	21/9/16	NP/GM	2112	2142	FtG; SuG, SqG/SuG; GHFF, CBTP	FtG: SM@10n2w, SuG: HC@270n30e, SqG/SuG: SE@270n10e (had back young), CBTP: SE@270n20e	Ironbark, turp, tallow	0/4	msb	past 6hrs	dark	17.2	85.7
	18/10/16	BT/NP	2116	2145	FtG; SuG	FtG: SM@15n5e, SuG: Sm@20s20e	Bbutt; Twood	2/4	Msb	nil	Dark	18.1	64
Pole west	5/5/16	BT/GM	2014	2045	LRFF		B'butt	0/4	Nil	Nil	Dark	17.1	87
	11/8/16	BT/GM	2026	2055	GHFF		B'butt	1/4	Msb	Past 24hr	Dark	15.7	88
	21/9/16	NP/GM	2038	2110	Melomys sp.	feeding in sheoak	bbutt, tallow	0/4	msb	past 6hrs	dark	17.2	85.7
	18/10/16	BT/NP	2147	2211	Nil		Bbutt; Twood	2/4	Msb	nil	Dark	18.3	61

Appendix D – Glide pole data

Table D1: Glide pole camera monitoring effort. A camera was placed at the end of the upper and lower arm.

Survey period (days)	Camera Type	Upper Arm (Reco: face west; SG: face east)				Lower Arm (Reco: face south; SG: face north)			
		Pics	Days active	Battery %	Comments	Pics	Days active	Battery %	Comments
15/12/15 - 16/3/16 (92)	Reco	615	92	99%(L)	No change; 4G>8G	2742	92	99%(L)	No change; 4G>8G
16/3 - 18/5/16 (63)	Reco	540	57	0% (L>L)	No change; 8G>16G	1979	63	99%(L)	No change; 8G>16G
18/5 - 17/8/16 (91)	Reco	0	1	0% (L>L)	Time ok; swap SC950>HC500; 16G>16G	6580	46	0% (L>L)	Time ok; swap HC500>SC950; same settings
	SG	177v	91	2/3 (A>A)	<1 min; (sens=Norm; 3 pic; on:1700, off:0600;	24v	91	2/3 (A>A)	<1 min; (sens=Norm; 3 pic; on:1700, off:0600;
17/8 - 30/11/16 (105)	Reco	6319	105	94% (L>L)	Time ok; swap HC500>SC950; same sched/settings; 16G>8G	380	105	99%(L)	Time ok. No change; 16G >8G
	SG	192v	105	2/3 (A>A)	Time ok; no change; 8g>8g	119v	105	2/3 (A>A)	Time ok. No change; 8G >8G

Appendix D – Glide pole data

Table D2: Glide pole camera monitoring detections. A camera was positioned at the end of the upper and lower arm. D = definite

Date	Upper Arm E-W (SG faces E; Reco faces W)					Lower Arm N-S (Reco faces South; SG faces Nth)					
	Time	Species	Accuracy	Movement	Pic No.	Time	Species	Accuracy	Movement	Pic No.	Comments
17/12/15						1924	Tawny Frogmouth	Pr	Perch	196-200	
20/12/15	0054	Feathertail Glider	D	Explore arm	1-5	0054	Feathertail Glider	D	Explore arm	211-215	
10/1/16	0103	Feathertail Glider	D	Explore arm	116-147						
1/2/16	2201	Feathertail Glider	D	Explore arm	246-255						
8/2/16	0146	Squirrel Glider (F(sub); no ear tag)	D	Explore arm	261-265	0146	Squirrel Glider (?; dark tip)	D	Explore arm	666-670	
10/2/16						2232	Squirrel Glider (F; dark tip)	D	Explore arm	681-774	SQG-F1; captured @ veg med
10/2/16	2354	Feathertail Glider	D	Explore arm	311-323						
13/2/16						2249	Feathertail Glider	D	Explore arm	836-840	
14/2/16	2123	Feathertail Glider	D	Explore arm	361-367						
3/3/16	0331	Sugar Glider (M; white tip)	D	Explore arm	426-430	0330	Sugar Glider (M; white tip)	D	Explore arm	1601-1625	
12/3/16	2315	Sugar Glider (F; white tip)	D	Explore arm	591-600	2258	Sugar Glider (F; tip?)	D	Explore arm	2626-2675	
18/3/16						0037	Sugar glider (F; white tip)	D	explore arm	151-215	
2/4/16						2330	Feathertail Glider	D	Explore arm	436-440	
6/4/16	2027	Feathertail Glider	D	Explore arm	211-215						
12/4/16	0002	Sugar Glider (F; white tip)	D	Explore arm	226-230						
18/4/16						0243	Sugar glider (F; white tip)	D	Explore arm	551-554	

7/5/16						0451	Sugar Glider (?; tip?)	D	Glide West; off inner west edge	1066-1067	
12/5/16	0018	Sugar Glider (M; dark tip)	D	Explore arm	531-536	0018	Sugar Glider (?; dark tip)	D	Explore arm	1401-1405	
30/5/16	0323	Sugar Glider (M; dark tip)	D	Explore arm	V-0002						
30/5/16						0322	Sugar Glider (?; dark tip)	D	Explore arm, climbs to top	V_0001	
9/6/16	0216	Sugar Glider (M; dark tip)	D	Glide West- south off mid- south edge	V_0004						
10/6/16						2213	Sugar Glider (?; tip?)	D	Glide West; off inner west edge	V_0002	
13/6/16	0230	Sugar Glider (M; white tip)	D	Explore arm	V_0006-0014	0226	Sugar Glider (M; white tip)	D	Explores arm, climbs to top	V_0003-0008	
30/6/16						0123	Sugar Glider (?; tip?)	D	Glide West; off inner west edge	V_0009	
4/7/16						0010	Sugar Glider (?; tip?)	D	Glide West; off inner west edge	V_0011	
29/7/16	0130	Sugar Glider (M; dark tip)	D	Explore arm	V_0099-0100	0129	Sugar Glider (M; dark tip)	D	Explores arm, climbs to top	V_0012-0013	
8/8/16						0052	Antechinus sp	D	Explores arm	V_0016-0017	
10/8/16						0016	Feathertail Glider	D	Explores arm, climbs to top	V_0018-0019	
10/8/16	0247	Sugar Glider (?; tip?)	D	Explore arm; glide west off end	V_0105-0106	0246	Sugar Glider (?; tip?)	D	Explores arm	V_0020	
20/8/16	2119	Sugar Glider (?; dark tip)	D	Explores arm; jump up pole	131-35	2119	Sugar Glider (?; dark tip)	D	Explores arm; jump up pole	V_07	
27/8/16						2321	Sugar Glider (?; tip?)	D	Explores arm	V_08	
28/8/16	2039	Feathertail glider	D	explore arm	426-30						
28/8/16	2255	Feathertail glider	D	explore arm	431-35	2255	Feathertail Glider	D	Explores arm	V_012	
29/8/16	2104	Sugar glider (F; Dark tip)	D	Glide West-sth off mid-south edge	V-0036	2101	Sugar Glider (F; dark tip)	D	climb pole	V_015	
1/9/16	0408	Sugar Glider (?; dark tip)	D	explore arm	726-30						

1/9/16	1957	Feathertail glider	D	explore pole/arm	1046-55						
2/9/16	0156	Sugar Glider (?; dark tip)	D	Glide West-sth off mid-south edge	V-37	0155	Sugar Glider (?; dark tip)	D	explore arm	V_020	
2/9/16	1957	Sugar glider (?; white tip)	D	explore arm; Glide off west end	V_38-42						
4/9/16	2134	Sugar Glider (?; dark tip)	D	explore arm	1316-20						
6/9/16						2325	Sugar Glider (?; tip?)	D	climb pole	V_024	
7/9/16						2426	Sugar Glider (M; dark tip)	D	explore arm	26-30	
26/9/16	2137	Feathertail glider	D	explore arm	V_81						
26/9/16	2145	Feathertail glider	D	Glide West off end	V-82						
26/9/16	2212	Feathertail glider	D	explore arm	3651-55	2212	Feathertail Glider	D	Explores arm	V_067	
26/9/16	2213	Feathertail glider	D	explore arm	V_83-84						
27/9/16	1852	Feathertail glider	D	Glide West off end (Prob)	V-86						
27/9/16	2101	Feathertail glider	D	explore arm	3656-60	2101	Feathertail Glider	D	Explores arm	V_068	
27/9/16	2103	Feathertail glider	D	explore arm	V_87						
27/9/16	2131	Sugar Glider (?; dark tip)	D	explore arm	3661-65	2131	Sugar Glider (?; tip?)	D	explore arm	V_069	
28/9/16						2226	Feathertail Glider	D	Glide EAST; off mid east edge	V_070	
30/9/16	2403	Feathertail glider	D	explore arm; jump down to lower arm	V-88						
30/9/16						2421	Feathertail Glider	D	climb pole	V_071	
1/10/16	1942	Sugar glider (?; white tip)	D	explore arm	V_89-90	1940	Sugar Glider (?; dark tip)	D	climb pole	V_079	
2/10/16						2417	Feathertail Glider	D	Glide west-north; off mid west edge	V_080	
2/10/16						0117	Feathertail Glider	D	explore arm	321-25	

5/10/16	2146	Sugar Glider (?; tip?)	D	explore arm	5011-15	2146	Sugar Glider (M; dark tip)	D	climb pole	V_081	
5/10/16	2148	Sugar Glider (?; dark tip)	D	explore arm	V_92-93	2146	Sugar Glider (M; dark tip)	D	explore arm	326-35	
6/10/16	1939	Feathertail glider	D	Glide West; off end	V-94						
7/10/16	2247	Feathertail glider	D	Glide West; off end	V-95						
10/10/16	2441	Feathertail glider	D	explore arm	V_96	2440	Feathertail Glider	D	Explores arm	V_082-84	
18/10/16	1731	Raptor sp (Whistling Kite?)	D	perch; launch	V-97						
20/10/16	2310	Feathertail glider	D	explore arm	V_98	2308	Feathertail Glider	D	Explores arm/climb pole	V_085-87	
22/10/16						0304	Feathertail Glider	D	Explores arm	341-45	
23/10/16						0158	Feathertail Glider	D	Glide EAST; off mid east edge	V_088	
23/10/16	2206	Feathertail glider	D	Glide West; off end	V-99						
24/10/16	2024	Feathertail glider	D	explore arm	5381-85						
24/10/16	2050	Feathertail glider	D	Glide West; off end	V-100						
25/10/16	2155	Feathertail glider	D	explore arm	5396-5400						
26/10/16						2413	Sugar Glider (?; tip?)	D	Glide West-north; off inner west edge	V_089	
29/10/16	2015	Feathertail glider	D	Glide EAST; off end	V-101						
29/10/16	2043	Feathertail glider	D	explore arm	5431-35						
29/10/16	2044	Feathertail glider	D	Glide EAST off end (Prob)	V-102						
29/10/16	2322	Feathertail glider	D	explore arm	V-104-107	2331	Feathertail Glider	D	Explores arm	V_090	
30/10/16	2110	Antechinus sp	D	explore arm	5451-55						
30/10/16	2111	Antechinus sp	D	explore arm	V-108-110						

31/10/16	2001	Antechinus sp	D	explore pole top	5456-60	2000	Antechinus sp	D	Explores arm/climb up and down pole	V_091-92	
31/10/16	2002	Antechinus sp	D	explore pole top	V-111						
2/11/16						2228	Feathertail Glider	D	Explores arm/climb pole	V_095	
6/11/16	0150	Feathertail glider	D	explore arm	V-113						
6/11/16	2139	Feathertail glider	D	explore arm/pole top	5476-80						
6/11/16	2256	Feathertail glider	D	explore arm/pole top	5481-85						
6/11/16	2257	Feathertail glider	D	explore arm/pole top	V-114	2257	Feathertail Glider	D	explore arm	V_097-99	
7/11/16	0147	Feathertail glider	D	explore arm	5486-90	0145	Feathertail Glider	D	explore arm	V_0100-101	
7/11/16	0147	Feathertail glider	D	explore arm	V-116-117	0146	Feathertail Glider	D	explore arm	351-55	
7/11/16	0311	Feathertail glider	D	explore arm	5491-5510						
7/11/16	2226	Feathertail glider	D	explore arm	V-118-119	2228	Feathertail Glider	D	explore arm	V_0103	
7/11/16	2227	Feathertail glider	D	explore arm	5516-20						
18/11/16						2215	Sugar Glider (? : dark tip)	D	explore arm	V_0105	
18/11/16						2216	Sugar Glider (? : dark tip)	D	explore arm	361-65	
18/11/16	2249	Feathertail glider	D	Glide West off end (Prob)	V-123						
18/11/16	2307	Feathertail glider	D	Glide EAST off end (Prob)	V-124						
19/11/16	0150	Feathertail glider	D	explore pole	V-125						
19/11/16	2014	Feathertail glider	D	explore arm; Glide West off end	V-126-131	2011	Feathertail Glider	D	explore arm	366-70	
19/11/16	2017	Feathertail glider	D	explore pole top	5681-85						
19/11/16	2137	Feathertail glider	D	explore arm	V-132-133						
19/11/16						2257	Feathertail Glider	D	explore arm	V_0106	

20/11/16						2039	Feathertail Glider	D	explore arm	V_0110	
20/11/16	2206	Feathertail glider	D	explore pole/arm	V-149-150						
21/11/16	1949	Feathertail glider	D	explore pole/arm	V-155-156						
23/11/16	0307	Feathertail glider	D	explore pole/arm	5741-45	0307	Feathertail Glider	D	climb pole	V_0111	
22/11/16	2031	Feathertail glider	D	explore arm; Glide West-north off end	V-157-158						
22/11/16	2234	Feathertail glider	D	explore arm/camera	V-159						
24/11/16						2034	Feathertail Glider	D	explore arm	376-80	
24/11/16						2156	Feathertail Glider	D	explore arm	V_0113-114	
24/11/16	2414	Feathertail glider	D	explore arm	V-161						
24/11/16	2414	Feathertail glider	D	explore arm	5786-90						
24/11/16	2035	Feathertail glider	D	explore arm	V-162						
24/11/16	2143	Feathertail glider	D	explore arm	5791-95						
24/11/16	2144	Feathertail glider	D	explore arm	V-163-166						
25/11/16	2435	Feathertail glider	D	explore arm	V-167-169	2433	Feathertail Glider	D	explore arm	V_0115	-
25/11/16	0201	Feathertail glider	D	explore arm	5801-05						
25/11/16	0202	Feathertail glider	D	explore arm	V-170						
25/11/16	2034	Feathertail glider	D	Glide West; off end	V-171						
25/11/16	2223	Feathertail glider	D	explore arm	V-172-173						
25/11/16	2307	Feathertail glider	D	Glide West off end (Prob)	V-174						
26/11/16	0248	Feathertail glider	D	explore arm/pole	V-175						
26/11/16	2027	Feathertail glider	D	explore arm/pole	V-177-178	2026	Feathertail Glider	D	explore arm	V_0116	

26/11/16	2332	Feathertail glider	D	explore arm/pole	5921-30							<u>At least 4 different indiv. SuG @27/11</u>
26/11/16	2334	Feathertail glider	D	explore arm/pole	V-179-182							F-white tip & dark tip
26/11/16						2355	Feathertail Glider	D	explore arm	V_0117		M-white tip & dark tip
27/11/16	2103	Feathertail glider	D	explore arm/pole	V-183							
27/11/16	2244	Feathertail glider	D	explore arm/pole	V-184-187	2247	Feathertail Glider	D	explore arm	V_0119		
27/11/16	2249	Feathertail glider	D	explore arm/pole	5931-35							-
28/11/16	2356	Feathertail glider	D	explore arm; Glide West-north off end	V-189-191							
29/11/16	2443	Feathertail glider	D	explore arm/pole	V-192							End of Yr.2

