

Environmental Monitoring at Balijup Farm & Fauna Sanctuary, Tenterden, WA



Balijup Citizen Science Report for June 2018

July 2018

This project is supported by funding from the Western Australian Government's State Natural Resource Management Program, supported by Royalties for Regions.

Green Skills' Balijup, Biodiversity and wetland conservation activities have also received support from the Parks and Wildlife Service of the WA Department of Conservation, Biodiversity and Attractions, Bush Heritage Australia, The University of WA (Albany), and Conservation Council of WA



natural resource
management program



Department of Biodiversity,
Conservation and Attractions



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1 Summary

Bandicoots, Birds and Bushland Monitoring: A Citizen Science Based Ecological Monitoring Project at Balijup Farm and Fauna Sanctuary, Tenterden

Green Skills has established a 111ha fenced fauna conservation sanctuary involving a feral predator exclusion fence in Wandoo & Jarrah forest at Balijup - see <https://chuffed.org/project/balijup>). A recent Green Skills short film on Balijup is viewable at <https://www.youtube.com/watch?v=oLaxA5Lc1Sc>

June 2018 Citizen Science Camp

Between Thursday 17th and Sunday 20th June 2018 Green Skills held a three day citizen science camp at Balijup Farm, 861 Nunijup Road, Tenterden near Cranbrook. The program involved environmental monitoring on Balijup, a special property forming part of the Gondwana Link Forests to Stirling's section.

Fifteen participants worked with Merryn Pryor of the Conservation Council of WA, wildlife ecologist Joe Porter and Basil Schur of Green Skills on a range of citizen science monitoring activities at Balijup farm including: Southern Brown Bandicoot (Quenda) and other fauna trapping; and bird surveying. This report includes the results of that work.

Acknowledgments

This project is supported by funding from the Western Australian Government's State Natural Resource Management Program, supported by Royalties for Regions.

This report was prepared by Basil Schur and Tony Peterson for Green Skills. Merryn Pryor of the Conservation Council of WA provided documentation that contributed to this report based on the June 2018 monitoring activity. Photographs by Basil Schur (Green Skills) Maps prepared by Maren Heckel. Aerial photos by Martin Regtien of AirPix. The Balijup Fauna Sanctuary project was funded through support of Lotterywest, the WA Government's State NRM Office and South Coast NRM as well as public donations. The City of Albany provided the original permission to translocate Quenda from their Mount Melville Reserve and also provided maps and advice. The WA Parks and Wildlife Service (DBCA) and Bush Heritage Australia and UWA Albany have also supported the project by providing technical advice or loaning trap cages. Many volunteers have contributed to the Citizen Science Weekends. Other assistance by Alan Hordacre (co-owner of Balijup), Simon Smale (Bush Heritage Australia), Angela Sanders (Bush Heritage Australia), Peter Speldewinde and David Tunbridge (University of Western Australia, Albany) Peter Collins, Erica Alaks, Sarah Comer and Deon Utber (DBCA), Anne Bondin (BirdLife WA), Sylvia Leighton and Sandra Gilfillan is gratefully acknowledged.

The Balijup Fauna Conservation Sanctuary project has received support from the WA Government's State NRM program, the Parks and Wildlife Service, Bush Heritage Australia, The University of WA (Albany), and Lotterywest. The support and encouragement of the owners of Balijup is also acknowledged.

2 Assessment of Bandicoot Establishment within the Balijup Predator Exclosure

2.1 Background

The Balijup predator exclosure is located on the Hordacre/Vanderbyl farm at Balijup in the Forest to Stirling's segment of the Gondwana Link (www.gondwanalink.org).

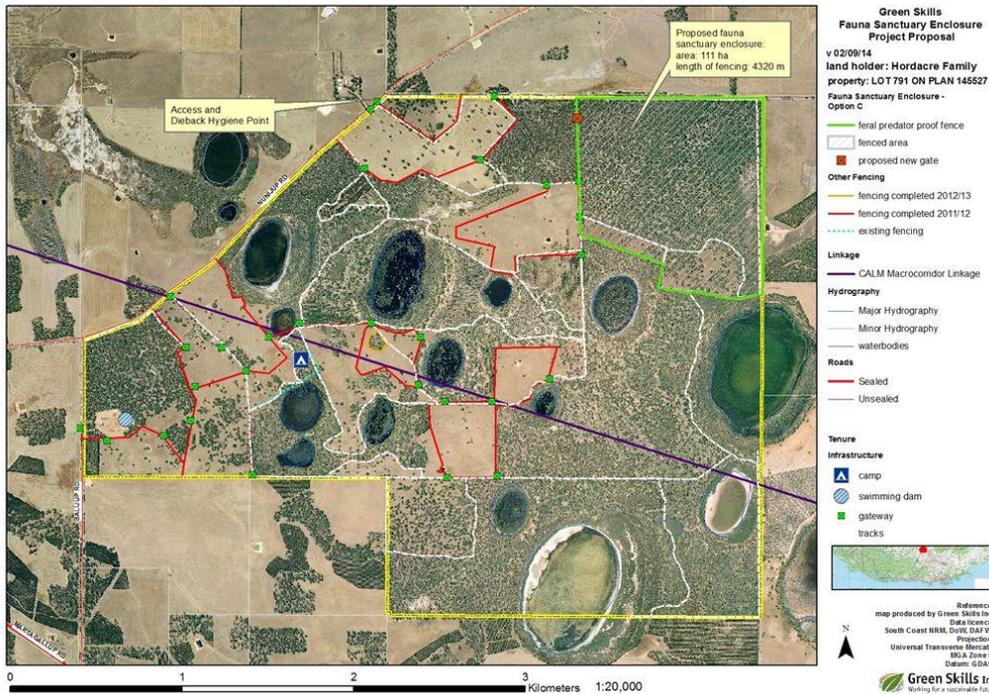


Figure 1: Map of Balijup Farm and Fauna Sanctuary



Figure 2: Photograph: Aerial view of Balijup (Photo by Martin Regtien of AirPix)

During August 2015 sixteen Quenda, *Isoodon obesulus* were translocated from bushland in the town of Albany to the 111 Ha predator enclosure area at Balijup Farm.

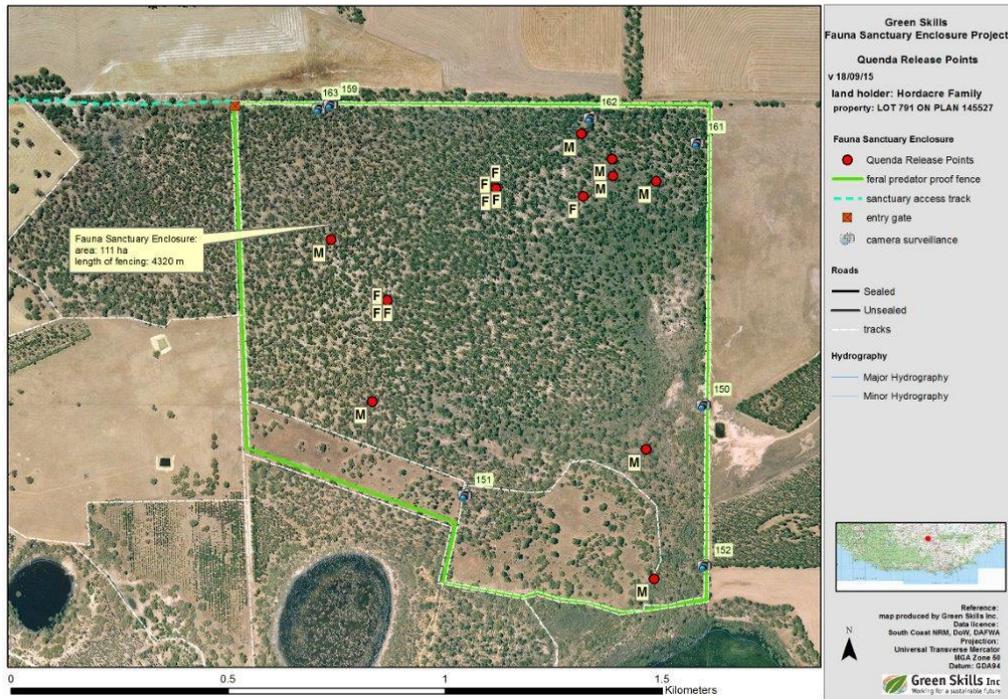


Figure 3: Release points for Bandicoots in the Sanctuary.

The translocated population of 8 males and 8 females (including some females with pouched young) was initially due for monitoring in spring /summer 2016, after the main breeding period, but due to some concerns about the status of the translocated animals a brief trapping program was conducted between 20 & 22 May 2016.

Ongoing monitoring activity has included a brief trapping program between 13 and 16 January 2017, and monitoring of motion-triggered cameras within the enclosure from 2015 to June 2018.

2.2 Balijup June 2018 Fauna Survey

2.2.1 Survey Method

Seventy-nine cage traps baited with cat biscuits and universal bait were set on the nights of 15th and 16th June and during the day of the 16th June. A third night of trapping did not take place due to an adverse weather forecast.

Lines of 10 traps at approximately 20 m spacing (with one line of 9 at approx. 25m spacing) were laid out, with four transects each coming off the northern and southern boundary tracks. The weather was cool with maximums below 20°C and nights around 10°C or less just after a new moon.

The captured Bandicoots were checked for PIT tags (tagged if unmarked), sexed, measured for head, pes and tail length, weighed, and examined for reproductive condition.

The captured Brush-tailed Possums were sexed and examined for reproductive condition.

2.2.2 Quenda Capture Results

During the two trapping nights five adult Bandicoots were captured - three different adult individuals; one female and two males. The female and one of the males were captured on both nights, with the male moving between trap lines before recapture while the female remained on the same transect.

The two males were a result of natural increase in the population as they were not microchipped. The female was microchipped and found to be one of the original bandicoots released into the enclosure from Albany on 2/8/15. She had not been captured since her release into the enclosure until this point.

No animals were caught in the traps during the day.

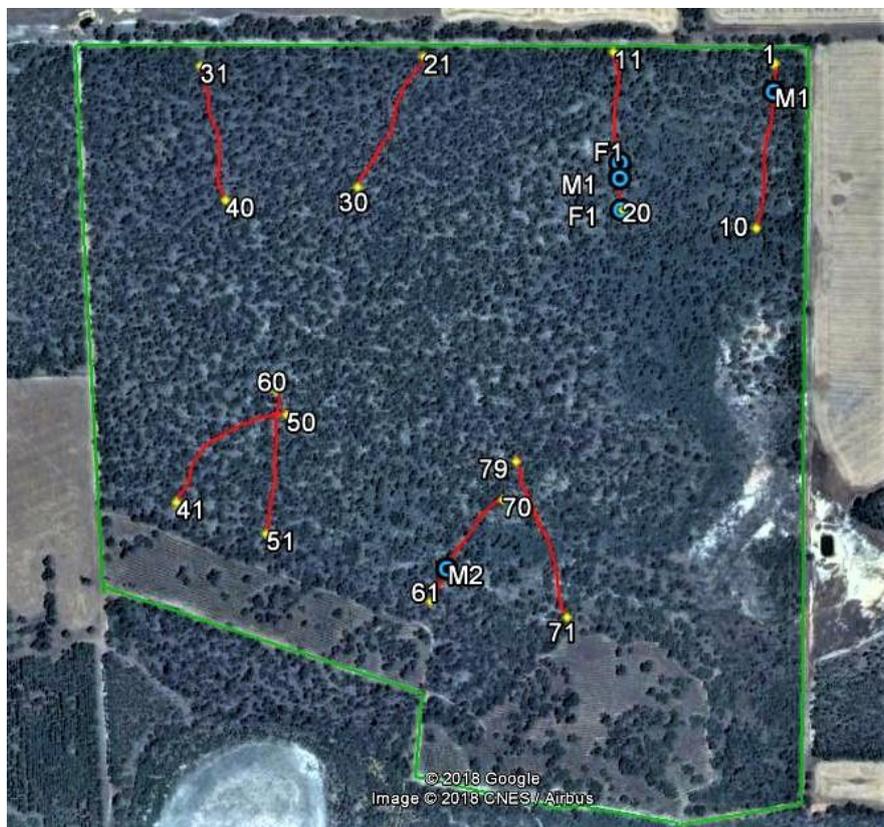


Figure 4: Transect lines and locations of June 2018 Quenda captures (M1, M2 and F1).

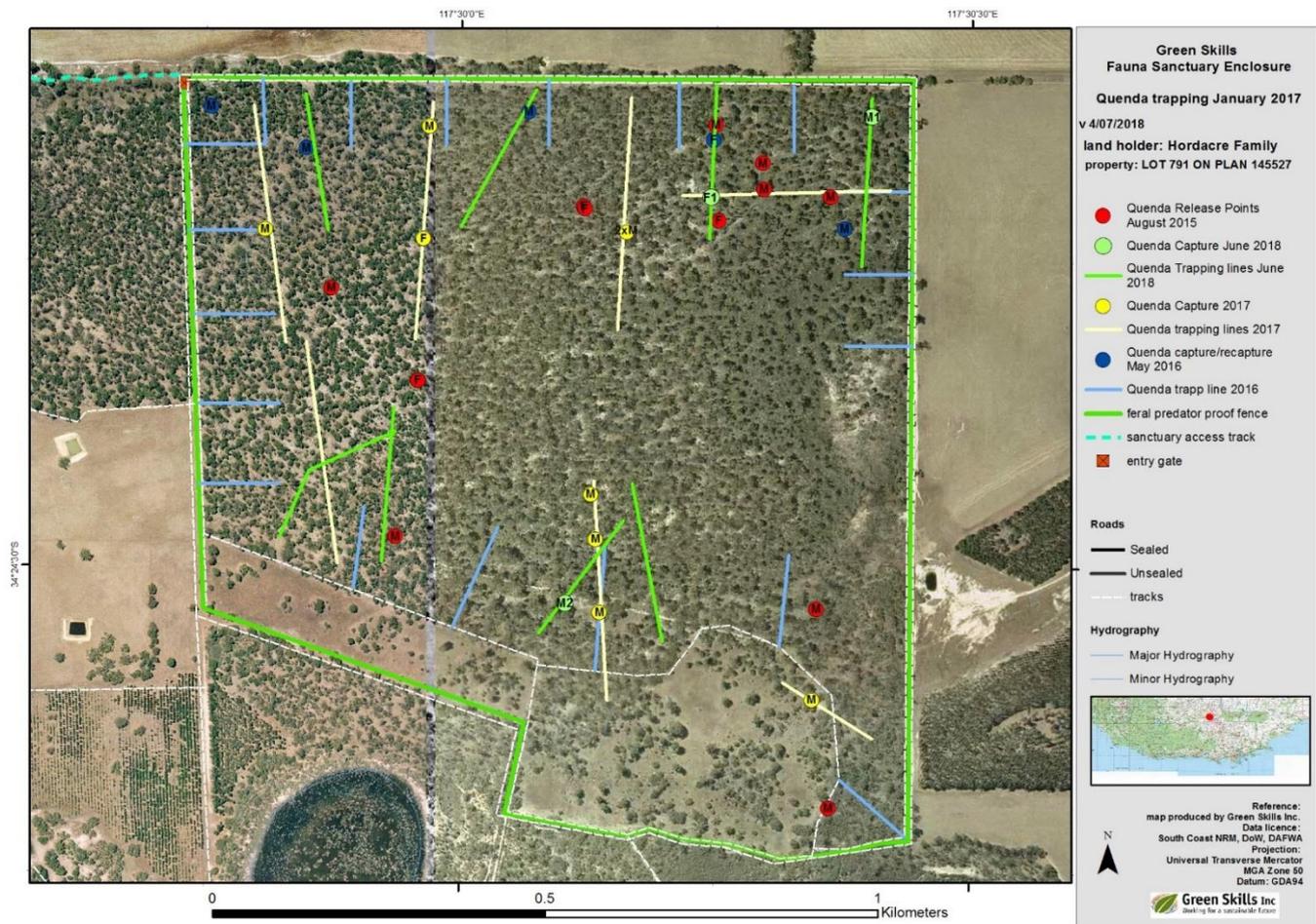


Figure 5: Trapping lines and recapture points for Bandicoots at Baljiup fauna sanctuary. May 2016 to June 2018

The details of each Bandicoot capture are set out in the following Table.

Table 1: June 2018 Quenda captures/recaptures in Baljiup predator enclosure.

TAG No.	RELEASE DATE	RELEASE LOCATION	RECAPTURE/ CAPTURE DATE	LOCATION	SEX / REPRODUCTION DATA
590897	2/8/15	34°24'12.281"S 117°30'7.163"E	16/6/18	Trap #20 ≈ 34°24'14.29"S 117°30'15.56"E	Female, Pouch empty
479043			16/6/18	Trap #2 ≈ 34°24'8.56"S 117°30'24.41"E	Male, SW 30.9mm
475062			17/6/18	Trap #69 ≈ 34°24'31.70"S 117°30'5.36"E	Male, SW 25.7mm

A comparison of measurements between the release and capture of the female Quenda are shown below.

Table 2: Morphometrics of female Bandicoot 590897 upon release and recapture.

Date	Head Length (mm)	Weight (g)	Pes Length (mm)	Tail Length (mm)	Pouch Condition
Mt Melville 2/8/15	72.0	480	46.4	60.5	Pouch empty
Balijup Exclosure 16/6/18	83.6	910	51.8	84.1	Pouch empty

2.2.3 Other Capture results

There was a total of 17 adult Brush-tailed Possums captures over the 158 trap-nights. Possums were not marked or tagged so individuals could not be identified. Six were caught on the first morning, five females and one male. Eleven were caught on the second morning, seven females and four males. All females had unfurred pouch young which ranged in size from 10 – 50 mm in crown-rump measurement.

2.2.4 Bandicoot and Possum Capture Discussion Points

It is difficult to draw firm conclusions from such a short trapping session. The low number of Bandicoots captured could be considered cause for concern, especially since only one of these was female with no signs of breeding. There may well be very low numbers of female bandicoots in the Sanctuary. There is some evidence that individuals have been missed during previous trapping sessions as the female had not been captured since being released into the enclosure. It is unknown whether the two new male bandicoots were born since the last trapping in January 2017 or were previous offspring that were missed in the last monitoring.

Another factor is that the habitat in the middle of the enclosure was not covered by the trapping and may have contributed to the low number of quendas captured. In the January 2017 trapping the transects consisted of 20 cage traps rather than 10, which meant they reached into the middle of the enclosure. It is recommended that another longer trapping session takes place later in the year to get a better idea of the health of the enclosure population. Longer transects reaching further into the enclosure as well as the use of a GPS to get straight lines should be considered if this takes place.

Given the very low number of female Bandicoots caught in both the June 2018 and January 2017 cage trapping session, builds the support for further female bandicoot re-introductions into Balijup, particularly females from sources other than the original Mt Melville Albany population. This would diversify the genetic basis to the bandicoot population within Balijup, and provide greater chance of breeding and a population increase.

The presence of so many possums compared to previous trapping sessions indicates the population is growing – also evidenced by to the number of pouch young. It is quite possible that the large increase of possums is due to the absence of feral predators within the enclosure. It would be interesting to test this theory by performing trapping in the remnant vegetation adjacent to the enclosure at the same time as trapping is taking place within the enclosure. If numbers vary significantly this would support the idea that the enclosure is having the desired effect. While possums are theoretically able to leave the Sanctuary, one option for the future is to release some of the possums trapped inside the Sanctuary into bushland nearby elsewhere on Balijup.

2.2.5 Other Observations

- A reasonable amount of rabbit activity (burrows and sightings) was visible both inside and outside the enclosure.
- Kangaroos were observed within the enclosure on at least three occasions. From camera recordings it appears that as of June 2018 there are 5 Western Grey kangaroos within the enclosure.
- There was no obvious damage or problems with the parts of the enclosure perimeter fence that were traversed.

3 Balijup Sanctuary Bird Surveys

3.1 June 2018 Bird Surveys

Two bird surveys were performed between the 16th and 19th June 2018, one inside and one outside the enclosure, and a bird list was generated for species observed on the Balijup property over the 3 days;

3.1.1 Survey Methods

Inside/Outside Survey:

Area of Inside/Outside Survey:

The areas selected for the inside/outside survey are those bounded by purple lines in Figure 3.

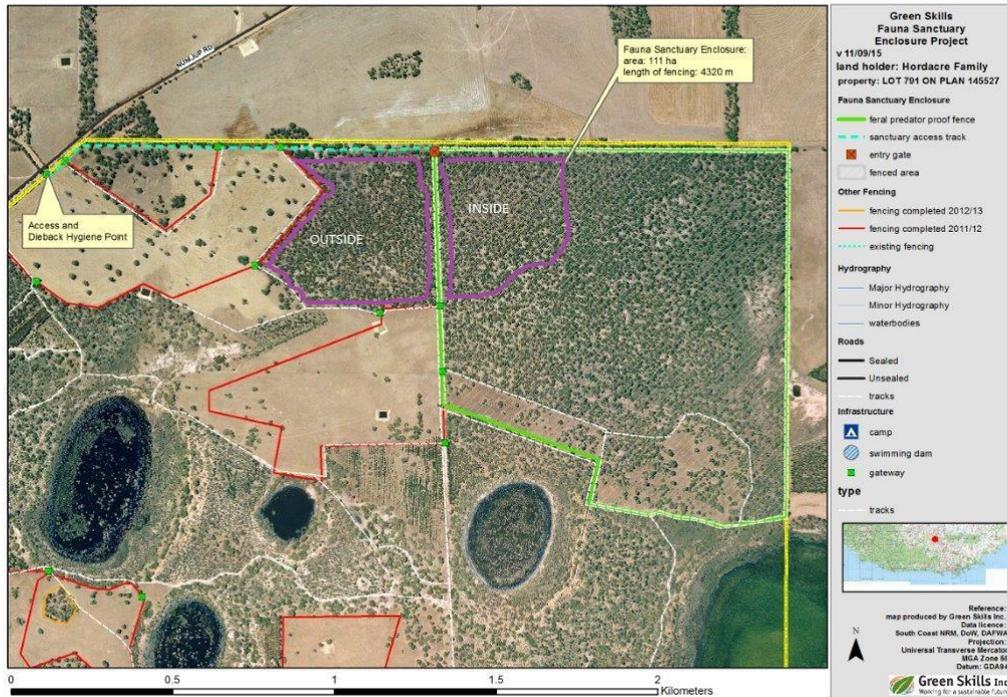


Figure 6: Area of inside/outside bird survey

The outside area was selected as it is the largest block of relatively undisturbed Wandoo / Jarrah woodland that is externally contiguous to the predator-exclusion fence.

The inside area is contiguous to the outside area and the habitat is a similar area of Wandoo dominated Wandoo / Jarrah woodland with a relatively open understory and small patches of thicker shrubby understory. The notional South Eastern boundary of the inside area was along the margin of Jarrah dominated woodland with thicker understory, judged at the time to be a different sub-habitat to the majority of the selected outside area.

A standard two-step search method survey was used whereby the observers:

1. Utilized the standard 20 minute search over 2 Ha (BirdLife Atlas method) to generate an initial species-list and count.
2. Observed more widely in the target area until independent duplicate sightings of half the species previously recorded was achieved (Standard Search Method).

A bird list was also compiled for all 32 bird species sighted or heard over the weekend on the property, including incidental sightings and birds noted in surveys.

3.1.2 Survey Results

“Outside Survey” Results

20Min within 2ha + 50% Breakout Count

Patch Location: Outside enclosure, next to enclosure gate

Start point GPS Coordinate: Not Recorded

Patch Description: Wandoo/Jarrah woodland with sparse understory

Observation notes: Cool < 20° C, mostly overcast, dry, moderately windy

Date: 16/6/18

Start Time: 1153

Finish Time: 1243

	<i>SPECIES</i>	<i>TIME CONTACT 1</i>	<i>TIME CONTACT 2</i>	<i>Count 20 min</i>	<i>Count post 20 min</i>
1	Weebill	1154	1200	1,2,3,2	3
2	Silvereye	1157	1206	2,1	
3	New Holland Honeyeater	1159		1	
4	White-faced Heron	1200		1	
5	Yellow-rumped Thornbill	1202		2	
6	Rufous Treecreeper	1203	1216	1	1
7	Western Rosella	1204	1210	3,2	1
8	Grey Fantail	1205	1209	1,1	1,1
9	Splendid Fairywren	1206		2	
10	Shelduck	1208		2	
11	Gilberts Honeyeater	1208		3	
12	Scarlet Robin	1210	1243	2	2
13	Western Yellow Robin	1213		1	
	Breakout	1214			
14	Western Gerygone	1219	1233		1,1
15	Brown Honeyeater	1220			1
16	Red Wattlebird	1228	1234		1,1
17	Australian Ringneck	1234	1240		1,2
18	Australian Raven	1240			2

“Inside Survey” Results

20Min within 2ha + 50% Breakout Count

Patch Location: Inside enclosure, North-west area

Start point GPS Coordinate: Not Recorded

Patch Description: Wandoo/Jarrah woodland with sparse understory

Observation notes: Cool < 20° C, mostly sunny, dry, windy

Date: 17/6/18

Start Time: 1319

Finish Time: 1438

INCOMPLETE

	<i>SPECIES</i>	<i>TIME CONTACT 1</i>	<i>TIME CONTACT 2</i>	<i>Count 20 min</i>	<i>Count post 20 min</i>
1	Weebill	1320	1336	2,3	2,2,1,2,3,4,∞
2	Grey Fantail	1323	1329	2,1	1,1,2,1
3	Western Yellow Robin	1329	1429	2	2
4	Gilbert's Honeyeater	1329	1345	2	1,1
5	Silvereye	1332		1	
	Breakout	1339			
6	Australian Magpie	1342			2
7	Western Gerygone	1345			1
8	Yellow-plumed Honeyeater	1349			1
9	Australian Ringneck	1354			2
10	Yellow-rumped Thornbill	1449	1435		2,4
11	Dusky Woodswallow	1432			2

Bird List

Australian Ringneck	<i>Barnardius zonarius</i>
Western Wattlebird	<i>Anthochaera lunulata</i>
Silvereye	<i>Zosterops lateralis</i>
Weebill	<i>Smicrornis brevirostris</i>
Scarlet Robin	<i>Petroica boodang</i>
Yellow-rumped Thornbill	<i>Acanthiza chrysorrhoa</i>
Australian Magpie	<i>Cracticus tibicen</i>
Grey Fantail	<i>Rhipidura albiscapa</i>
Black-faced Cuckoo-shrike	<i>Coracina novaehollandiae</i>
New Holland Honeyeater	<i>Phylidonyris Novaehollandiae</i>
Splendid Fairy-wren	<i>Malurus splendens</i>
Australian Raven	<i>Corvus coronoides</i>
Laughing Kookaburra	<i>Dacelo novaeguineae</i>
Common Bronzewing	<i>Phaps chalcoptera</i>
White-faced Heron	<i>Egretta novaehollandiae</i>
Rufous Treecreeper	<i>Climacteris rufus</i>
Western Rosella	<i>Platycercus icterotis</i>
Australian Shelduck	<i>Tadoma tadornoides</i>
Gilberts Honeyeater	<i>Melithreptus chloropsis</i>
Western Yellow Robin	<i>Eopsaltria griseogularis</i>
Western Gerygone	<i>Gerygone fusca</i>
Brown Honeyeater	<i>Lichmera indistincta</i>
Red Wattlebird	<i>Anthochaera carunculata</i>
Inland Thornbill	<i>Acanthiza apicalis</i>
Purple-crowned Lorikeet	<i>Glossopsitta porphyrocephala</i>
Varied Sittella	<i>Daphoenositta chrysoptera</i>
Wedge-tailed Eagle	<i>Aquila audax</i>
Dusky Woodswallow	<i>Artamus cyanopterus</i>
Western Whistler	<i>Pachycephala occidentalis</i>
Grey Shrike-thrush	<i>Colluricincla harmonica</i>
Grey Butcherbird	<i>Cracticus torquatus</i>
Yellow-plumed Honeyeater	<i>Ptilotula ornata</i>

3.1.3 Bird Discussion Points

Conditions were less than optimal for bird surveying, as both surveys were conducted during the middle of the day in windy conditions. This was the only time they could fit in around the trapping schedules. Despite this, a reasonable number of birds were detected in each survey, likely due to the cool weather. The survey within the enclosure remained incomplete due to time restrictions. No conclusions can be drawn from such a small sample size; however the data will be added to the database of bird surveys accumulating on the property for future analysis and records. Further surveys conducted in the early morning and late afternoon would be preferable.

4 Camera Monitoring

4.1 Camera locations

Since the last report of Jan 2017 Green Skills has periodically installed up to 10 motion triggered cameras inside the Balijup Fauna Sanctuary.

Three camera locations at the Gate, the West Fence and the “Salt Flat sump” are positioned close to water sources or routes to water, provide coverage of areas inside and outside the enclosure fence, and are not baited. These cameras are intended to monitor feral predators (none detected in the period) and the movement of people around the enclosure fence.

Four camera locations near the Northern fence, one location 170m south of the Northern fence, one location close to the Southern fence, and one location 150m West of the Eastern Fence are baited with cat biscuits, each time that they are installed or checked, and are intended to monitor quenda and native mammals.

The following summary observations are from the period since the last report of January 2017 to May 2018.

Camera ID	Name/Description	Easting mE Zone 50 H	Northing mN	Quenda	Brush Tailed Possum	Kangaroo	Rabbit
DENGNSKL888	Salt Flat Sump, East Fence	0546623	6192493	N	N	Y	N
DENGNSKL887	150mWest/central from Salt Flat Sump-Sandy Protaceae	0546476	6192500	Y	Y	Y	Y
DENGNSKL007	Northern Fence Most Easterly, Short camera pole	0546351	6193158	Y	Y	Y	Y
DENGNSKL154	Northern Fence Most Easterly, Tall camera pole	0546365	6193166	Y	Y	Y	Y
DENGNSKL979	Northern Fence Central	0545754	6193170	Y	Y	Y	Y
DENGNSKL017	170m South of Northern Fence Central. Waypoint QRCF (<i>quenda recapture point female</i>)	0545895	6192955	Y	Y	Y	Y
DENGNSKL018	Northern Fence, Most Westerly	0545548	6193126	Y	Y	Y	N
DENGNSKL008	Southern Corner Fence	0546050	6192228	Y	Y	Y	Y
DENGNSKL972	Gate	0545540	6193178	N	N	Y	N
DENGNSKL804	West Fence	0545548	6193126	N	N	Y	N

4.2 Results

4.2.1 Feral Predator Monitoring

No feral predators were observed on camera during the reporting period of between January 2017 and May 2018d.

4.2.2 Native Vertebrate Monitoring

Quenda and Brush Tailed Possums were observed at all baited traps during the reporting period.

During the reporting period, camera DENGNSKL979 captured images of what appear to be up to 3 different quendas.

These images highlight the imprecision of photo-traps vs cage trapping, as 3 different environmental scientists have 3 different interpretations of whether there are 1-3 quendas, and have different opinions as to whether the third is "a bristled-up" male, or a female with pouched young.



In some cases it is possible to determine that more than one quenda is visiting a camera location. These images from camera DENGNSKL018 show at least 2 individuals, one with a long tail, and one with a short damaged tail.



Camera DENGNSKL979 captured images of up to 4 different Brush Tailed Possums during the reporting period - An individual with a white tail tip, an individual with a black tail tip, and a female with "piggy-backed" young.



Moultrie 14°C DENGNSKL979 16 APR 2017 09:11 pm



Moultrie 15°C DENGNSKL018 10 APR 2017 07:30 pm



Moultrie 8°C DENGNSKL979 26 MAR 2017 11:57 pm

4.2.3 Herbivorous Competitor Monitoring

Camera images show that there are now 5 kangaroos within the enclosure, up from the 3 recorded in the previous reporting period.

Rabbit observations have been increasing since the last natural calicivirus outbreak in February 2017 and the scheduled RHDV1-K5 Boost release of March 2017

4.3 Camera Monitoring Discussion Points

4.3.1 Technical Discussion

The motion detector cameras are approaching 2 years in age, and several wear and tear issues are becoming apparent. All mounting straps need replacement due to UV-light related deterioration. Five of the cameras are suffering from detector issues, with one losing sensitivity to movement, and three suffering intermittent bouts of continuous triggering from the day of installation until the SD card is full. A strap replacement, general clean-up, and SD card re-initialising is underway to address these issues.

Peer discussion reveals that the cameras are holding up well to almost continuous use since purchase, with a low rate of failure compared to the averages encountered by other organisations. The capital cost per month of use, to date, is around \$6 per month per camera.

Camera triggering issues seem to be reduced when good quality (more expensive) alkali batteries are used. Cheaper batteries have a 1 month effective use in the cameras compared to the 2 month effective life of the more expensive batteries. Battery cost for the camera monitoring is around \$6 per month per camera (8 * batteries @ \$1.5 per battery for a 2 month useful life).

All star-picket mounting-posts for the cameras are now due for re-positioning because they now require re-hammering at each visit to stop “post-wobble”.

4.3.2 Procedural Discussion

Prior to May 2017 the cameras were checked each 4-6 weeks whereas from May 2017 to present the cameras have been checked on an 8-9 weekly basis due to unavailability of the volunteer worker.

Three issues are related to the extended time between checks:

- A reduced number of images are captured once bait has been eaten from the location. (Baits appear to be effective for 2-3 weeks maximum)
- Technical issues with an individual camera results in twice as many “days lost” in capturing images from that site.
- The number of images captured becomes too large for effective processing/analysis in a single day, and too large for easy transfer of images via a USB memory stick.

A 4 week camera monitoring period appears to be optimal, with one day spent retrieving camera cards, checking cards on-site for camera issues, and replacing cards/re-positioning cameras as required, followed by a full day of viewing images, tabulating image-captures, and reporting. This may have to occur every second month if volunteer availability is limited.

4.3.3 Results discussion

Both trapping and camera trap monitoring are occurring in the same areas around the margins of the enclosure. Discussion needs to take place to determine if it will be useful to establish one or two North – South transects across the enclosure to ensure that the centre is monitored, and also to discuss if camera locations need to coincide with trap-lines so that results can be compared.

5 Phascogale Surveys and Investigations

Background

One of the next proposed projects for Balijup Sanctuary is the translocation of Brush-tailed Phascogales (*Phascogale tapoatafa wambenger*) into the enclosure.

Brush-tailed Phascogales were historically observed on the property by the original owners, but were not trapped during the 2011-2013 Fauna Survey. Nor have they been caught in any of the fauna monitoring activities undertaken since that time.

In 2017 it was decided that for the translocation to occur:

- Surveys need to be performed to determine if a Phascogale population currently exists in the Balijup Sanctuary.
- If no population is extant in the Balijup Sanctuary, then a source population needs to be found from which to take individuals for translocation. A translocation plan would be developed based on this information and submitted to the Department of Biodiversity, Conservation and Attractions for approval,

5.1 Balijup Nest-box Monitoring

There are no recent records of Brush-tailed Phascogales occurring on the Balijup property or Sanctuary.

To assist in establishing if Phascogales were present, 25 nest-boxes have already been installed, 15 in September 2017 and 10 in March 2018 as shown in Figure 7. These have been checked and monitored since that time.

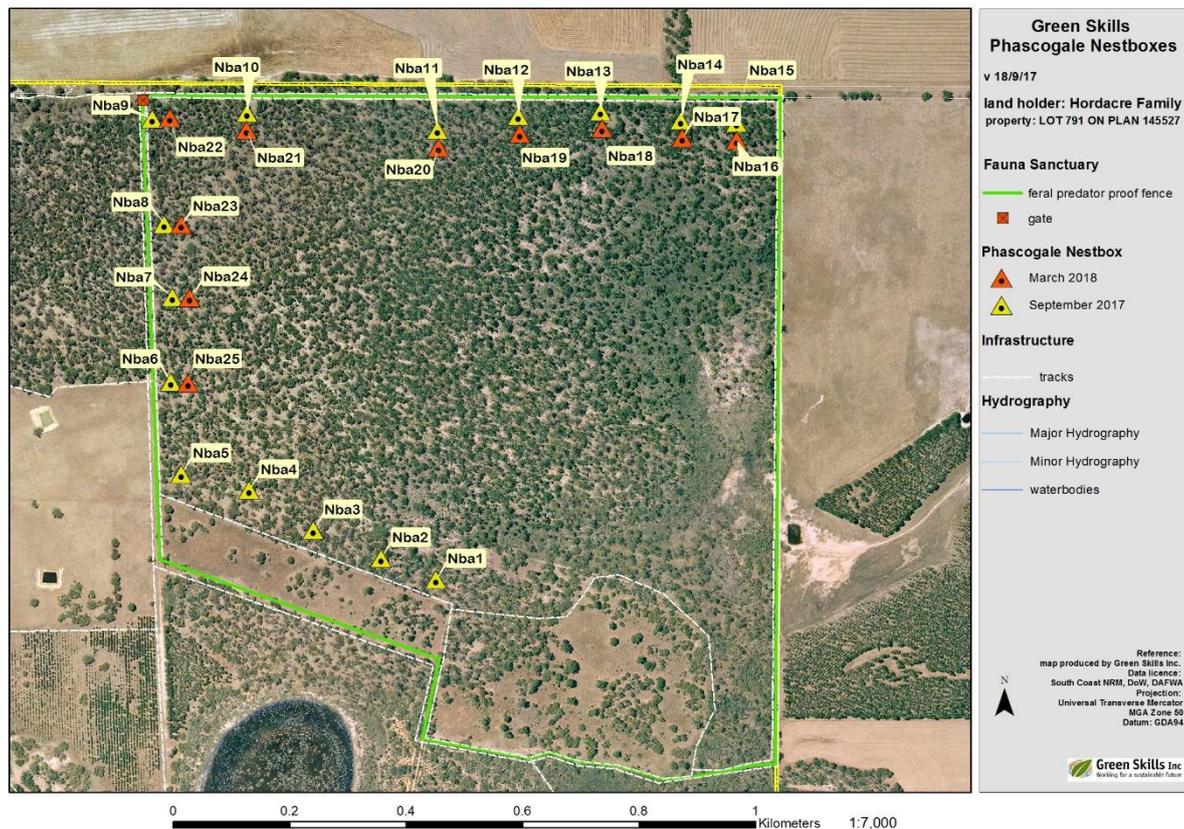


Figure 7: Balijup Nestbox Locations.

5.1.1 Survey Method

Nest-boxes were checked using a ladder to gain access to the boxes to assess activity.

5.1.2 Results

No activity was detected in the boxes apart from bees, spiders and termites. Maintenance was also carried out on some boxes.

Table 3: Balijup Nest box observations and actions.

Nest box ID on map	ID number on box	Phascogale present or absent	Activity	Bees	Comments:	Action:
Nba1	A1	Absent	No	No		None
Nba2	A2	Absent	No	No		None
Nba3	A3	Absent	No	No	Nest box fallen down, back support board eaten out by termites. * rabbit seen here	Removed
Nba4	A4	Absent	No	Yes	Large bee hive established	Opened lid
Nba5	A5	Absent	No	No	Previously removed bees, tape still covering access holes	Removed tape and reset box
Nba6	A6	Absent	No	No	Previously removed bees	None
Nba7	A7	Absent	No	No	Spider in nest box	None
Nba8	A8	Absent	No	No	-	None
Nba9	A9	Absent	No	No	2m nest box.	None
Nba10	A10	Absent	No	No	Previously had bees and tapped. Maintenance require; add carpet	Cleaned; left box closed
Nba11	A11	Absent	No	No	3m nest box, no white ants	Wool added
Nba12	A12	Absent	No	No	No white ants	Wool added
Nba13	A13	Absent	No	No	No white ants	Wool added
Nba14	A14	Absent	No	No	3m nest box, no white ants	Wool added
Nba15	A15	Absent	No	No	Previously had bees and tapped. Cleaned and added carpet	Wool and bark added
Nba16					Nest box not visible	None
Nba17	A17	Absent	No	No	3m nest box, carpet needs staples	None
Nba18	A18	Absent	No	No	3m nest box, no termites	Wool added
Nba19	A19	Absent	No	No	3m nest box, no termites	Wool added
Nba20	A20	Absent	No	No	3m nest box, no termites	Wool added
Nba21	A21	Absent	No	No	3m nest box, no termites	Wool added

Nba22	A22	Absent	No	No	3m nest box, no termites	Wool added
Nba23	A23	Absent	No	No	3m nest box, no termites	None
Nba24	A24	Absent	No	No	3m nest box, no termites	None
Nba25	A25	Absent	No	No	3m nest box, no termites	None

5.1.3 Balijup Phascogale Nest-box discussion Points

Brush-Tailed phascogales were not trapped during the 2011-2013 Fauna Survey on the Property. The 2011-2013 Survey report detailed that 8 Elliot traps were used at each survey-point and it is not recorded whether all traps were ground placed or whether some were placed in trees.

Since installation no Brush-tailed Phascogales have been observed taking up residency in the nest boxes. There has been no evidence or signs of them on the property in previous surveys or monitoring and a translocation has yet to take place. However, maintenance and monitoring of the nest-boxes is still valuable to check for problems such as termites, feral bees or for other possible occupants. If and when Phascogales are translocated into the Sanctuary, monitoring of these nesting boxes will play an important role in measuring how the introduced Phascogales are progressing.

Consideration might be given installing some of the nest boxes in other favourable habitats on Balijup Farm outside the enclosure habitat to try and determine if phascogale populations still exist on the property.

Suggested locations include:

- The *Banksia attenuata* low woodland immediately south of the enclosure (*Eucalyptus marginata*, *Banksia attenuata*, *Nuytsia floribunda*, *Melaleuca thymoides*) near S 34° 25.208 E 117 ° 30.208
- The Flat-Topped Yate and *Eucalyptus decipiens* Open Low Woodland well South of the enclosure near the Southern boundary of the Property (*Eucalyptus decipiens*, *Eucalyptus occidentalis*, *Exocarpos sparteus*, *Melaleuca cuticularis*, *Melaleuca preissiana*) near S 34° 25.583 E 117 ° 30.116
- The Marri and Jarrah Tall Woodland West-South-West of the Farmhouse (*Corymbia calophylla*, *Eucalyptus marginata*, *Banksia grandis*, *Banksia attenuata*)

5.2 Phascogale Source population Investigation

During this June 2018 trip, preliminary trapping was conducted on a farming property, belonging to the Horrocks family, approximately 19 km away from Balijup. The property has large swathes of fenced remnant bushland including areas of Jarrah, Wandoo and Yate woodland. A dead Brush-tailed Phascogale had been found in a remnant area on the property in December 2017, so this was chosen as a site to study and monitor for resident phascogales.

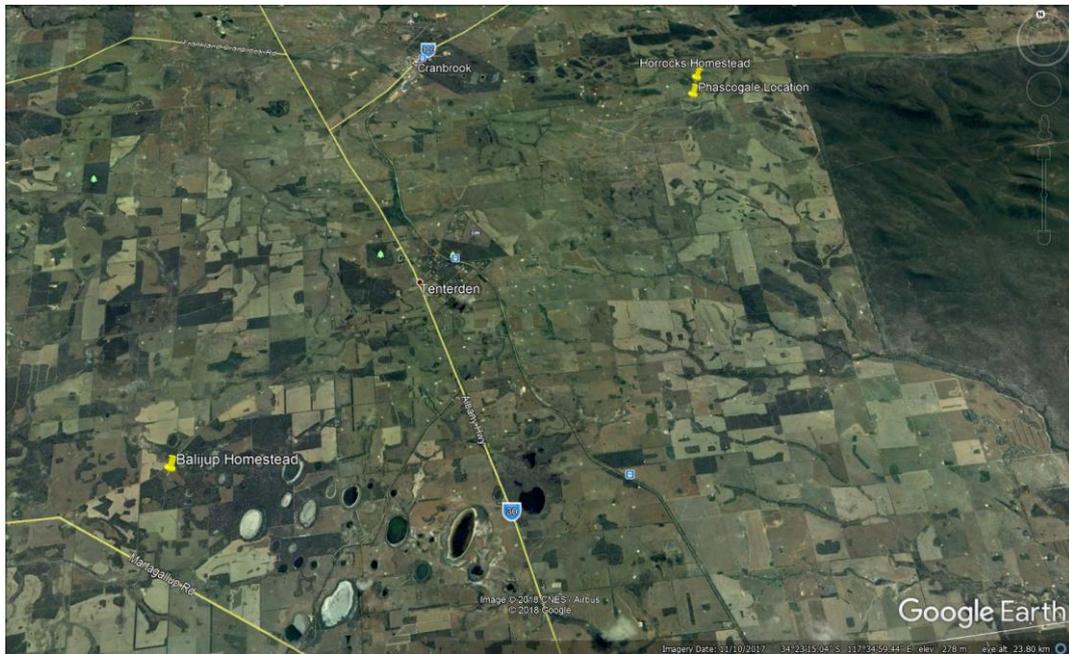


Figure 8: Location of the Horrocks Property in relation to Balijup and Tenterden

5.2.1 Survey Method

Twelve cage traps and forty-eight Elliott box traps baited with cat biscuits and universal bait were deployed on the nights of 15th and 16th June. As with the bandicoots, the third night of trapping did not take place due to the adverse weather forecast. Lines of five traps - one cage trap and four Elliott traps spaced approximately 20 m apart - were laid out in remnant vegetation at various locations around the property, as shown on the maps below. The Elliott traps were either placed on the ground or attached to sturdy tree branches where possible. The nine transects located in the northern half of the property were in remnant wandoo and jarrah bushland. The other three transects were in low lying melaleuca swamp in the south of the property. The dead phascogale was recovered from this melaleuca remnant.



0 0.5 1 2 Kilometers

Legend

◆ Transect Lines

Coordinate System: WGS 1984 Web Mercator Auxiliary Sphere
 Projection: Mercator Auxiliary Sphere
 Datum: WGS 1984
 False Easting: 0.0000
 False Northing: 0.0000
 Central Meridian: 0.0000
 Standard Parallel 1: 0.0000
 Auxiliary Sphere Type: 0.0000
 Units: Meter

**Overview of Phascogale
 survey conducted at
 Horrocks property**



Figure 9: Locations of transects on the Horrocks Property.

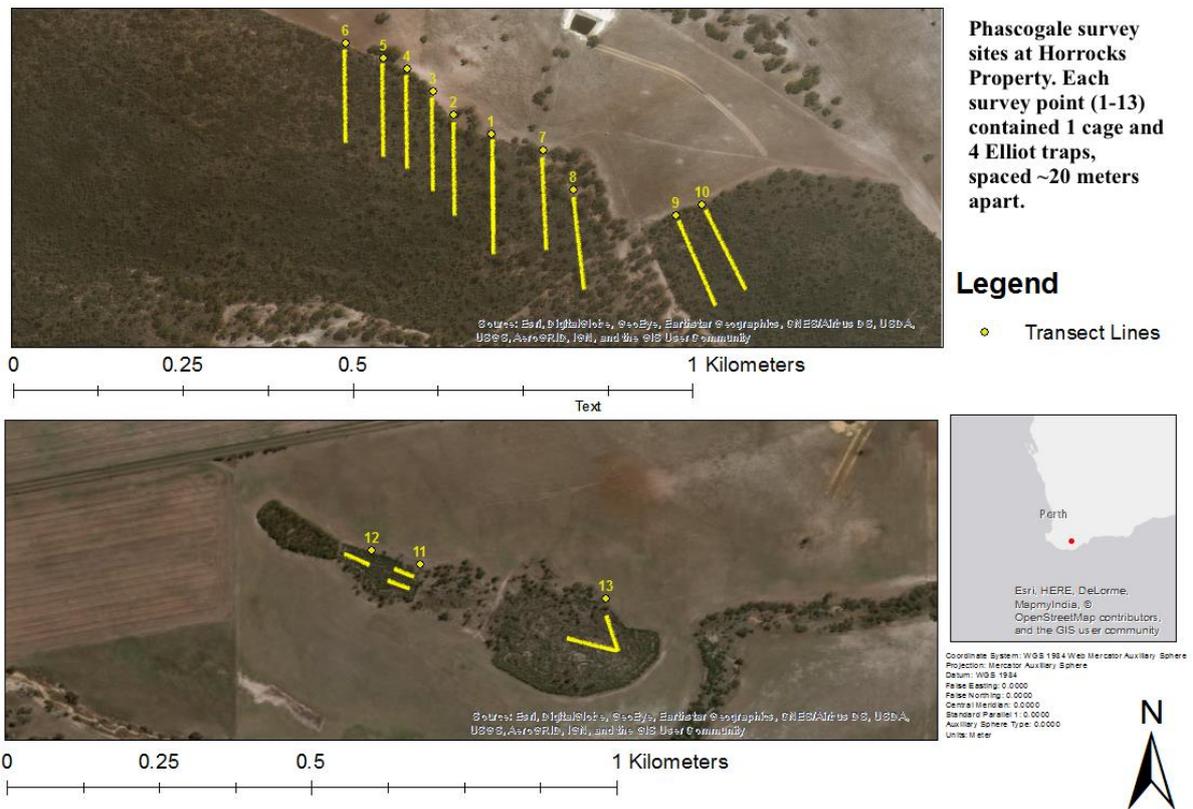


Figure 10: Trapping transect lines located on the Horrocks property.

5.2.2 Results

No Brush-tailed Phascogales were captured over the 120 trap-nights. The only animal caught was a Black Rat captured in the melaleuca swamp on the second morning.

5.2.3 Discussion

It is known that phascogales are generally difficult to trap so the outcome was not unexpected. It was and remains uncertain as to whether an established population exists on the property. The dead phascogale is the only recent sign of phascogale presence. It is possible it was dropped by a bird of prey or was an individual dispersing through the landscape. Before any further trapping sessions take place on the property it is suggested that the presence of phascogales is attempted to be confirmed using baited camera traps. This is also a good alternative for other potential properties before a trapping session is attempted.

5.2.4 Future Work

A potentially good way to monitor and relocate Brush tailed Phascogales (BTP) into Balijup could be to put up a network of phascogale nesting boxes in each of the potential source private land areas, monitor use of the boxes over several months and then in Autumn (prior to the mating season) translocate the boxes with their phascogales in them into Balijup (ie seal them off during day and carry them across gently inside their home so they wake up in a new environment but with their home intact).

For example Stirling Range Retreat (and the bushland property north of the Retreat) has reported BTP in their wandoo/yate bushland. Also Mt Trio Camping Ground 15 km or so away also has extensive bushland, and like Stirling Range Retreat this is adjacent to the National Park.

Another location that may be valuable to put up suites of boxes are in the Denmark area where people have reported BTG on their properties including the Mt Shadforth and Mt Hallowell areas. Sites there could be

chosen which are well away from private residences and targeting Jarrah/Marri forest, both species of which occur in the Balijup Sanctuary.

The proposal would be for Green Skills (under a authorised plan managed by an accredited wildlife consultant) to put up 5- 15 phascogale nesting boxes scattered over the likely bushland habitat for BTP, and then to monitor for occupation till say march 2019. based on the results of the monitoring, to move a number of these boxes in April – May 2019 into Balijup, and to continue to monitor them there, as well as monitoring the remaining boxes on the original properties to see if BTP re occupy them. Success for a Balijup translocation would be able to measured through monitoring of the translocated boxes, as well as seeing if any of the existing 25 boxes become occupied by BTP.



Figure 11: Stirling Range Retreat Centre- Potential Phascogale Monitoring Site.

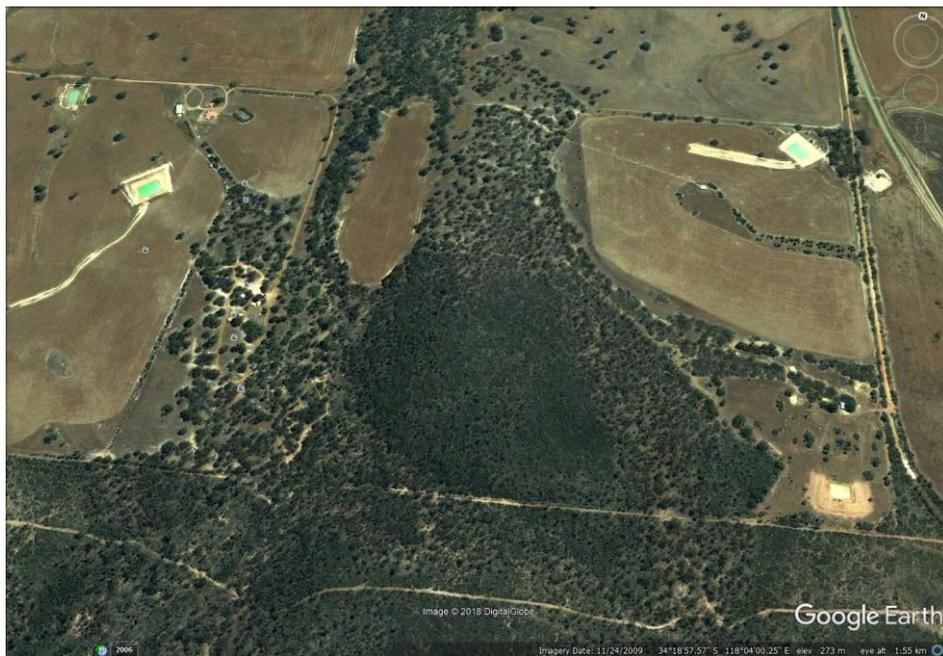


Figure 12: Mt Trio Bush Camp Ground - Potential Phascogale Monitoring Site.



Figure 13: Around Denmark - Potential Phascogale Monitoring Sites.

7 Conclusions and Forward Planning

The environmental monitoring documented in this report provide informative data on which to assess the progress being made with the Balijup Fauna Conservation Sanctuary and in helping plan future activities. These findings are similar to and build on the findings of monitoring as reported in the January 2017 Balijup report (<https://greenskills.org.au/download/environmental-monitoring-balijup-farm-citizen-science-report-2016-17/>).

Some of this monitoring (i.e. bird surveys) will require a long period of surveying before trends can be ascertained.

The surveys indicate that a population southern brown bandicoots (*Isodon obesulus*) have survived in the Sanctuary, since being introduced in August 2015. Only one female Bandicoot was captured in the cage trapping exercise in June 2018. Ongoing monitoring will be required to track the ongoing changes in this population, and in particular to ascertain that a viable breeding population these bandicoots has been established. The offer of the Parks and Wildlife Service of the Department of Biodiversity, Conservation and Attractions (Sarah Comer, personal communication, Jan 2017) to consider relocating bandicoots being displaced by development in the Perth area to Balijup would provide a valuable addition of genetically different bandicoots into the Balijup population. It is recommended that particular focus be placed on introducing additional fertile female bandicoots into Balijup.

It can also be reported that brush tailed possums (*Trichosurus vulpecula*) have established themselves in the Balijup Sanctuary and are actively breeding. The numbers of Brush-tailed Possums should be monitored as over-grazing of the tree canopy may result within an area protected from predators. Camera monitoring indicates that five kangaroos are currently resident within the Sanctuary. It is recommended that they be culled, in part to prevent them increasing their numbers, and also to prevent damage to the Sanctuary fence.

The January 2017 citizen science survey results indicate that Rosenberg's or southern heath monitor (*Varanus rosenbergi*) appear to be doing well in the Sanctuary and their numbers are likely to be increasing. Given that its diet includes mammals (https://en.wikipedia.org/wiki/Rosenberg's_monitor#Description) it is possible that it is preying on bandicoots in the Sanctuary. The numbers of Southern Heath Monitors may also increase above natural levels leading to increased predation on small mammals and bush birds. It is therefore recommended that ongoing monitoring of this species within the Sanctuary take place. One option is for some animals of this species to be re-located to suitable bushland on Balijup outside the fenced area.

There are regularly up to 10 Green Skills' wildlife monitoring motion triggered cameras installed within the Sanctuary on an ongoing basis. This should be an important source data in relation to monitoring of native and feral fauna inside and immediately outside the fence. However it is recommended that further ways of checking for the presence of cat, fox, rabbit and black rat be investigated and implemented for the Sanctuary. It is recommended that the rehabilitation of the edge of the salt affected area to increase habitat for translocated fauna should be considered. This could involve establishing salt tolerant species such as *Melaleuca cuticularis*, and assisting the neighbouring farmer to revegetate part of the catchment above the salt affected area.

Now that the Balijup Fauna Sanctuary project is established and functioning it is recommended that investigation commence into the viability of introducing other native marsupial fauna into the Sanctuary. This could include some of these species documented in the original scoping document for the Sanctuary, the Balijup Fauna Sanctuary project ([http://www.greenskills.org.au/pub/balijup/Balijup Fauna Conservation Enclosure report.pdf](http://www.greenskills.org.au/pub/balijup/Balijup_Fauna_Conservation_Enclosure_report.pdf))

An active program of monitoring Brush-tailed Phascogales (*Phascogale tapoatafa*) has commenced within the Sanctuary exoclosure through installation of 25 phascogale nesting boxes since September 2017. No phascogales have been observed taking up residency.

It is recommended that Green Skills set up a Brush-tailed Phascogale monitoring program through installing nesting boxes on suitable properties as described in section 5.2.4. This would provide the basis for a translocation plan should suitable phascogales take up residence in these boxes. It is recommended that Green Skills continue to investigate collaborative partnerships between the Balijup Sanctuary project and other fenced sanctuaries

It is proposed thus that the priority projects that should be planned and funding sought would include the following: 1) Ongoing camera monitoring within the Sanctuary 2) Extended cage trapping program event focussing in the Sanctuary during the summer months 3) Ongoing monitoring of Southern Heath Monitors within the Sanctuary and relocation of some of these, if captured to suitable bushland on Balijup outside the Sanctuary 4) Control, and if possible complete removal, of rabbits and Western grey Kangaroos within the Sanctuary 5) Ongoing monitoring of the feral proof fence and maintenance of the firebreaks either side of the fence 6) Ongoing monitoring and maintenance of the phascogale boxes installed within the Sanctuary 7) Installation of phascogale nesting boxes on suitable properties in the region, with the view of developing a translocation plan for Brush tailed Phascogales into the Sanctuary. 8) Other vegetation, bird and wetland monitoring both within the Sanctuary and Balijup property as per the Balijup monitoring framework. 9) Development of a fox (and ideally cat) baiting program for the whole of Balijup property and the implementation of this over time.

8 Photos

8.1 June 2018 -Balijup Citizen Science Monitoring - 3 Day Event

	<p>Unloading cages for the trap linkes in the Sanctuary</p> <p>15 June 2018</p>
	<p>Making universal bait for the traps.</p> <p>15 June 2018</p>
	<p>Retrieving an animal from a cage trap</p> <p>16 June 2018</p>
	<p>Retrieving and processing an animal from a cage trap</p> <p>17 June 2018</p>
	<p>Retrieving and processing an animal from a cage trap</p> <p>16 June 2018</p>

	<p>Retrieving and processing an animal from a cage trap 17 June 2018</p>
	<p>Installing carpet into the inside top of Phascogale nesting boxes. 16 June 2018</p>
	<p>Checking Phascogale Nesting Boxesd 16 June 2018</p>
	<p>Checking Phascogale Nesting Boxesd 16 June 2018</p>
	<p>Installing Elliot Traps at the Horrocks far 15 June 2018</p>

	<p>Installing Elliot Traps at the Horrocks far</p> <p>15 June 2018</p>
	<p>Installing Elliot Traps at the Horrocks far</p> <p>15 June 2018</p>
	<p>Cleaning cage traps at the end of the weekend</p> <p>17 June 2018</p>



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Bandicoots, Phascogales and Eco-restoration:

A Citizen Science Ecological Monitoring Project at Balijup and other properties near Cranbrook



2pm Friday 15 June to 10am Monday 18 June 2018

(date subject to weather forecast- may need to adjust)

Venue; Balijup Farm, 861 Nunijup Road, Tenterden, near Cranbrook.

You are invited to participate in a weekend of Bandicoot and Phascogale trapping and other environmental monitoring on Balijup, a special property forming part of the Gondwana Link conservation program.

No cost- but need to supply own food/camping equipment. Come for all or part of the event. Participants will camp around Balijup homestead and using the facilities there.

Participants will work with Merryn Pryor of the Conservation Council of WA, wildlife biologist Joe Porter, Basil Schur and/or Tony Peterson of Green Skills and others on a range of citizen science monitoring activities at and near Balijup farm including bandicoot re-trapping, phascogale monitoring & bushland surveying.

Green Skills has established a 111ha fenced fauna conservation sanctuary in Wandoo & Jarrah forest at Balijup (see <https://chuffed.org/project/balijup>)

For further information and registration: contact Basil Schur at Green Skills Denmark 98483310 or 0429481019 Email bschur@greenskills.org.au

The event is part of Green Skills wetland conservation activities supported through the State Natural Resource Management program. This project is made possible by the State Government's Royalties for Regions program. This project has also been supported by the Conservation Council of WA, and UWA Albany.



natural resource management program

