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Working for a sustainable future

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

Balijup Citizen Science Report- January 2020

Draft Report Release March 2020- for Review and Feedback

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. The January 2020 citizen science event formed part of the South Coast Festival of Birds & Biodiversity, which was supported by Lotterywest, BirdLife Australia and Green Skills.

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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 woodland at Balijup - see https://chuffed.org/project/balijup). A Green Skills short film on Balijup is viewable at https://www.youtube.com/watch?v=oLaxA5Lc1Sc

Between Thursday 16 January and Monday 20 January 2020 Green Skills held a four day citizen science camp focussing on Balijup Farm Eco Sanctuary, 704 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.

Fourteen participants worked with Andrew McCreery, wildlife biologist and Basil Schur of Green Skills and WA on a range of citizen science monitoring activities at Balijup farm including: Southern Brown Bandicoot (Quenda) and other fauna trapping; Tree Hollow surveying, woody weed removal and bird surveying. This report details 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 for Green Skills. Andy McCreery coordinated the fauna trapping for the January 2020 citizen science event and provided information for various sections of the report. The input of Alisia Lampropoulos and the 11 or so other volunteers to this event is also gratefully acknowledged. *Tony Peterson, Green Skills volunteer, has played a key role in citizen science work at Balijup including managing the wildlife cameras. The support of Green Skills staff including Helen Heydentych and Nicole Robinson is acknowledged. . Phtotgraphs by Basil Schur (Green Skills) and Susan Foster. 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 Servuce (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 eventss. Other assistance by Alan Hordacre (co-owner of Bailjup), Simon Smale (Bush Heritage Australia), Angela Sanders (Bush Heritge 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 Feb 2019 citizen science event formed part of the South Coast Festival of Birds & Biodiversity, which was supported by Lotterywest, BirdLife Australia and Green Skills.*

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

2 History 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).

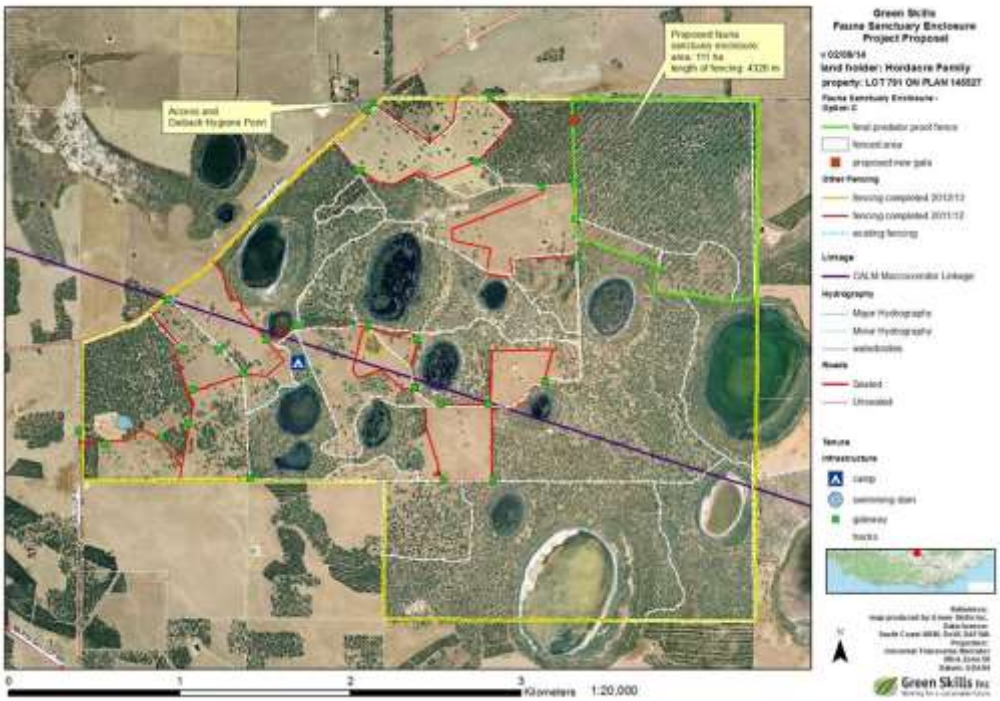


Figure 1: Map of Balijup Farm and Fauna Sanctuary

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 exclosure area at Balijup Farm.

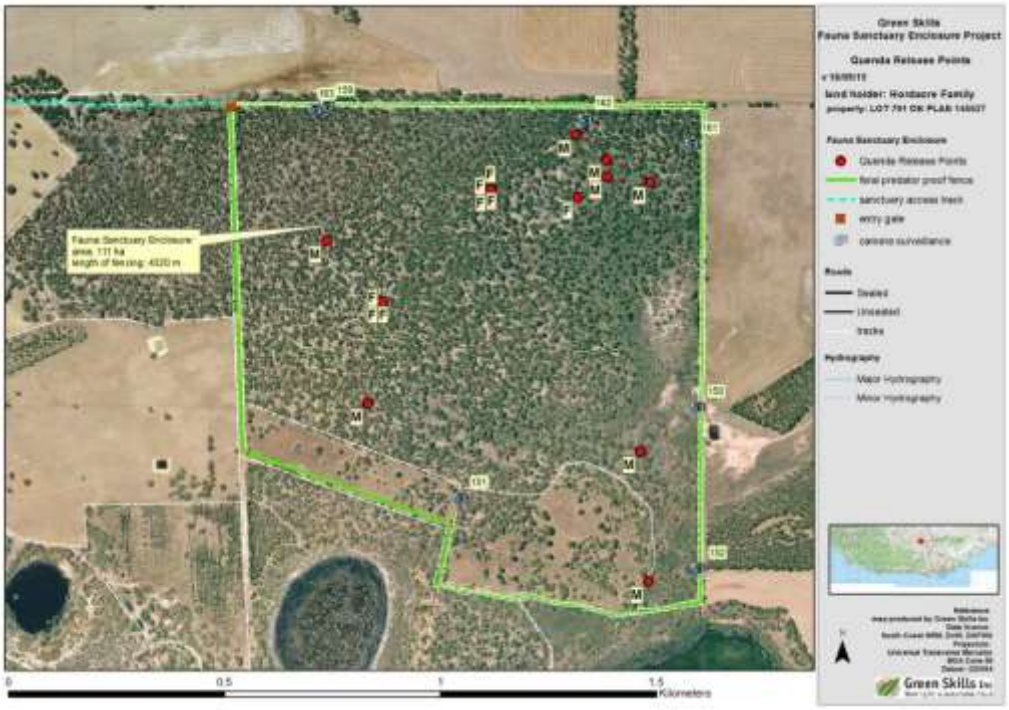


Figure 3: Release points for Bandicoots in the Sanctuary.

This introduced population has been sampled using cage traps on at least an annual basis since these animals were released into the protected area. Indirectly this trapping has also provided some information on other fauna populations within the exclosure including Brush-tailed Possum's, Black Rats and Heath Monitors..

Ongoing monitoring activity has included brief trapping programs between 13 and 16 January 2017, between 17 and 20 June 2018, 31 Jan – 4 Feb 2019, and monitoring of motion-triggered cameras within the enclosure from 2015.

2.2 Balijup February 2020 Citizen Science Eco Event and Fauna Survey

2.2.1 Survey Method

Between Thursday 16 January and Monday 20th Jan 2020, 100 cage traps were set on 10 traplines to deliver a survey of 400 cage-trap nights. The trap layout was similar to the 2019 layout (Figure 4) except no cages were set in the South East corner. . Trapping was conducted only at night with no traps set during the day.

The areas sampled were similar to the January 2019 event deliberately to make the results comparable .

Cage trapping within the Balijup sanctuary was undertaken over four nights. 100 cages were deployed on the afternoon of the 17th January armed with universal bait balls (Oats, peanut butter and sardines) and retrieved on the morning of the 20th, resulting in 400 trap nights. Cages were checked every morning and closed during the heat of the day to avoid by-catch, then reopened in the late afternoon when conditions were cooler. Fauna captured in traps were lured into cotton bags, then processed with the welfare of the animal being priority. Brush-tailed Phascogale and Quenda were weighed, micro-chipped, measured, assessed for sex; where females were checked for pouch young and/or enlarged teats. Animals were then released near the point of capture. Brush-tailed Possums were not the target species, therefore did not endure the same level of process. Possums were weighed, sexed and then released.

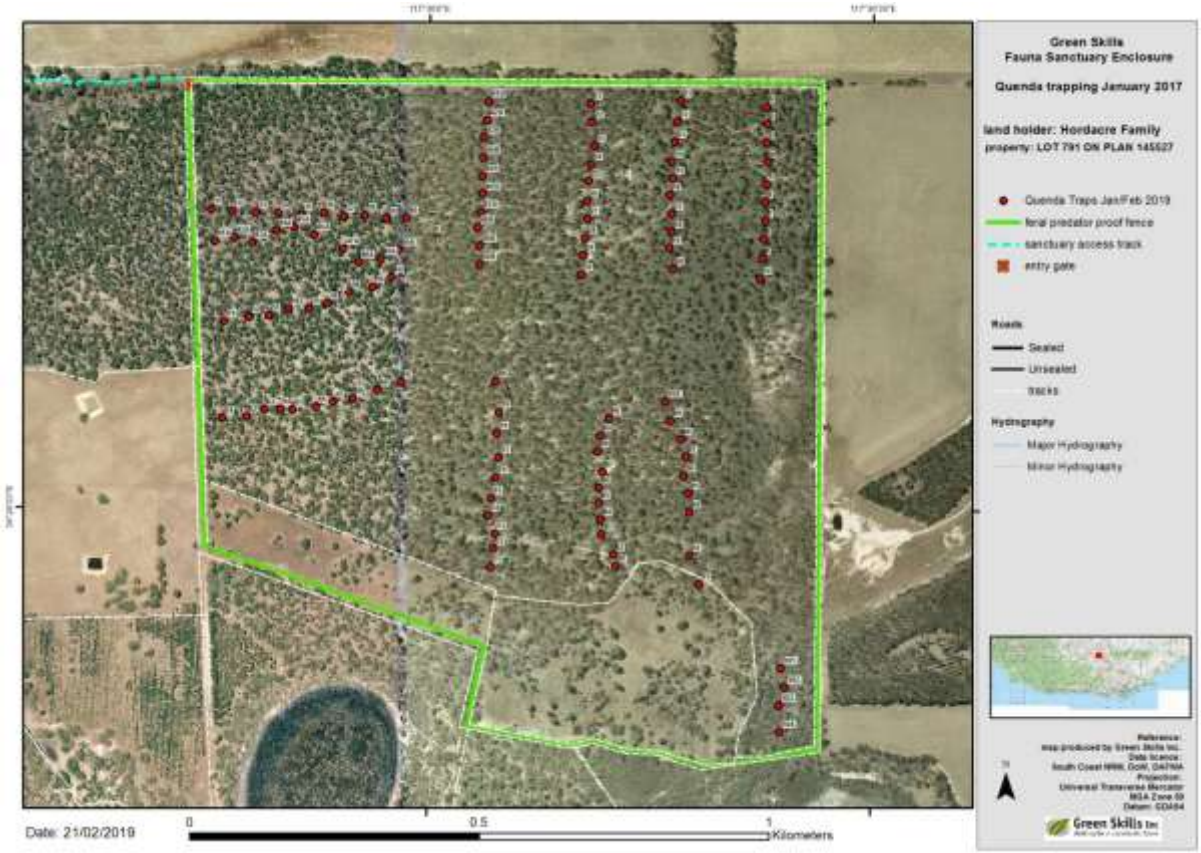


Figure 4: Transect lines and locations of the February 2019 Quenda Survey (very similar to the 2020 trap lines except without traps 101 to 104 in the South East Corner)

2.2.2 Quenda Capture Results

In January 2019 Quenda's were captured 29 times. There were 4 animals previously tagged with implantable transponders (PIT). Two of these animals were then recaptured 3 times and two twice. None of

these animals was from the founder population of 2015. One of these recaptures (5592897) was a founder. This old adult female was not breeding when first recaptured in June 2018 but had one advanced pouch young in February 2019. Two of the other recaptures were very recent (tagged in June 2018). Based on sex and measurements there were at least another 12 individuals captured (8 females and 4 males). These were almost all young, half grown animals that will have been mainly produced from the late winter and spring months of 2018. All Quendas handled were healthy and in good condition.

Weather conditions and seasonal factors clearly have an impact on catch rates, however the February 2019 monitoring period indicated a significant jump in population size. This is the first time that we can confidently predict that the current population is larger than the founder population, meeting an important milestone for successful establishment. Further, the population is for the first time dominated by young animals. Maximum life expectancy for Quenda is about 4 years and the last known surviving founder is about that age. So the current generations have been produced entirely from within the exclosure, a second milestone for establishment. The reason for the sudden increase in productivity within the exclosure are not known.

In January 2020, there were total of 130 captures were recorded over the four nights. Of those, 80 were Brush-tailed Possum, 49 Quenda and one Brush-tailed Phascogale. Of the 49 Quenda captures there were 24 or 25 individuals (one could not be determined due to being an escapee), and 22 of those were micro-chipped. One Quenda was a re-capture from a previous survey; that male was also captured as a re-capture during the February 2019 survey, indicating that it had been micro-chipped prior to this date. Of the 24 confirmed individuals, sixteen were female, four of which had pouch young. The one capture of Brush-tailed Phascogale was the first for Balijup sanctuary. Brush-tailed Possum were by far the most numerous species captured, recording 39 individuals (19 female, 11 male, 9 unknown). Results for the Quenda and Phascogale data is displayed in figure 1.

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

Table 1: Quenda and Brush-tailed Phascogale captures for the 4 day Survey in Jan 2020

Q = Quenda BTPH = Brush-tailed Phascogale N = New RE = Recapture PY = Pouch young

Species	Status	Sex	Microchip no.	Weight	Head length (mm)	Pes length (mm)	Tail length (mm)	No. of PY	Females: PY size (mm)	PY fur (pink/ fur)	Enlarged teats	Males: scrotum width (mm)	Number of times captured	Comments
Q	N	F	956000010882393	750	80.6	53.1	125	1	45	Pink	0		4	
Q	N	F	956000010882325	795	76	52	32.1	PE			2		3	short tail
Q	N	F	956000010882438	1055	-	-	-	1	80	Fur	0		2	Ejected young, soft release
Q	N	F	956000010882733	785	80.6	51.9	115	PE			3		3	
Q	N	F	956000010892080	795	81.3	49.1	107.1	3	-	Pink	0		3	
Q	N	F	956000010882814	720	78.2	50.1	121.8	PE			2		3	
Q	N	F	956000010892574	410	75.9	48.4	93.6	PE			0		1	
Q	N	F	956000010882115	960	84.2	51.8	135	2	25	Pink	0		3	
Q	N	F	956000010881988	715	75.5	30.1	112.7	PE			4		2	
Q	N	F	956000010892551	230	-	43.9	57.7	PE			0		3	tip of tail missing
Q	N	F	956000010867666	700	79.3	50.3	114.9	PE			4		1	very large teets
Q	N	F	did not micro-chip	220	-	423	85	PE			0		1	too small to micro-chip
Q	N	F	956000010892549	715	80.2	52.1	119	PE			4		1	
Q	N	F	956000010867237	660	77.2	50.2	106.6	PE			2		1	
Q	N	F	956000010882050	485	73.8	48.6	109.8	PE			0		1	
Q	N	F	956000010882300	780	-	51.6	99.3	PE			5		1	
Q	RE	M	982000365479043	1450	84.7	58.3	143					32.9	3	
Q	N	M	956000010882685	1410	86.6	58.9	123.6					25	3	
Q	N	M	956000010882032	655	80.1	53.8	120.6					22.2	1	
Q	N	M	956000010867886	1285	101.4	55.5	129.8					27.5	4	
Q	N	M	956000010894362	340	69.9	44.9	108.9					8.4	1	
Q	N	M	did not micro-chip	355	70.7	49.5	99.8					-	1	too small to micro-chip
Q	N	M	956000010882368	980	87.9	53.4	4.6					23.2	1	short tail
Q	N	M	956000010893249	1720	91.2	62	65					30.9	1	short tail
Q	U	U	did not micro-chip	-	-	-	-						?	Escaped
BTPH	N	F	956000010867014	95	47.3	33.7	202	PE			0		1	

A tabular summary of the Quenda capture data, including Morphometrics is attached as Appendix 1 of this report.

2.2.3 Brush-tailed Possum Capture Results and Discussion

Results are presented in Table 2 below.

Sixty Brush-tailed Possum's were captured which was an extraordinary catch-rate, even allowing for the frequent re-capture of some trap-happy individuals). Although arboreal, Brush-tailed Possum's do benefit from fox control and is likely the exclosure is allowing the density of these animals to increase, possibly above sustainable levels. More management attention should now be directed at the possum population including that Brush-tailed Possum's also be micro-chipped during the Bandicoot snapshot mark-release-recapture project. Also that Possum densities should also be assessed outside the exclosure and any movements across the fence detected. The option of getting Departmental approval for relocation of some brush-tailed possums to bushland on Balijup outside the Balijup Sanctuary should be investigated.

Table 2 Jan 2020 Brush-tailed Possum data including Morphometrics

Date:	Trap #	Species Q= Quenda Bl=Balck Rat, BP= Brushtail Phascogale Write other sp.	N=new R= Retrap RE= recap	sex (M/F)	Total wt (g)	Bag wt (g)	Body wt (g)	Number	Head length (mm)	Right Pes (long) (mm)	Tail length (mm)	No. of PY	PY size (mm)	PY fur (pink/ fur)	Enlarged teets	Males: scrotum width (mm)	Fate R=released D=died E=escaped)	Comments
17/01/2020	3	Brush-tailed Possum	N	F	1520	215	1305	2	77.2	48.4	250				1		R	
17/01/2020	18	Brush-tailed Possum	N	F	1610	215	1395	4	72.6	50	270	E			1		R	
17/01/2020	31	Brush-tailed Possum	N	F	1775	215	1560	6	82.2	40.6	214	E			1		R	diarrhoea
17/01/2020	34	Brush-tailed Possum	N	F	1920	70	1850	7	73.1	60.8	270	E			1		R	
17/01/2020	45	Brush-tailed Possum	N	F	2100	70	2030	8	78.1	57.8	270	1	40	P			R	
18/01/2020	1	Brush-tailed Possum	N	F	1680	190	1490	9		52.9		PE			2		R	
18/01/2020	30	Brush-tailed Possum	N	F	1675	200	1475	11				PE			1		R	
19/01/2020	29	Brush-tailed Possum	N	F	1675	135	1540	16				PE			1		R	
19/01/2020	50	Brush-tailed Possum	N	F	1775	120	1655	19							1		R	

17/01/2020	81	Brush-tailed Possum	N	F	1745	115	1630	52									R	
17/01/2020	67	Brush-tailed Possum	N	F	1620	120	1500	55				PE					R	
18/01/2020	96	Brush-tailed Possum	N	F	1865	120	1745	56									R	
18/01/2020	88	Brush-tailed Possum	N	F	1785	120	1665	57				PE					R	
18/01/2020	85	Brush-tailed Possum	N	F	1920	120	1800	58				PE					R	
19/01/2020	77	Brush-tailed Possum	N	F	1945	200	1745	60		60.8	210	PE					R	
19/01/2020	62	Brush-tailed Possum	N	F	1190	200	990	61		45.2	265	PE					R	
20/01/2020	22	Brush-tailed Possum	N	F	990	135	855										R	good looking possum!
20/01/2020	29	Brush-tailed Possum	N	F	960	135	825					PE					R	
20/01/2020	71	Brush-tailed Possum	N	F	2115	85	2030			55.4	280				1		R	
17/01/2020	1	Brush-tailed Possum	N	M	1120	215	905	1	67.2	50	247					20	R	
17/01/2020	6	Brush-tailed Possum	N	M	2040	215	1825	3	86.3	53.3	260					40	R	
17/01/2020	25	Brush-tailed Possum	N	M	2135	215	1920	5	82.2	66.3	270					43	R	
18/01/2020	45	Brush-tailed Possum	N	M	2025	190	1835	12		67.2						44	R	ticks removed 8-9
18/01/2020	50	Brush-tailed Possum	N	M	2065	195	1870	13		57.4	260					36	R	
19/01/2020	18	Brush-tailed Possum	N	M	1915	125	1790	15									R	
19/01/2020	45	Brush-tailed Possum	N	M	2260	120	2140	17									R	
17/01/2020	96	Brush-tailed Possum	N	M	2500	120	2380	51									R	
17/01/2020	64	Brush-tailed Possum	N	M	1930	125	1805	54									R	
18/01/2020	62	Brush-tailed Possum	N	M	1285	120	1165	59									R	small testicles
20/01/2020	86	Brush-tailed Possum	N	M	2440	85	2355			55.5						38	R	
20/01/2020	63	Brush-tailed Possum	N	U				New									R	not processed due to heat
19/01/2020	47	Brush-tailed Possum	N		2210	120	2090	18				1	100	fur			R	

17/01/2020	80	Brush-tailed Possum	N		1575	125	1450	53									E	
20/01/2020	36	Brush-tailed Possum	R					New									R	not processed due to heat

A tabular summary of the Possum capture data, including Morphometrics is attached as Appendix 2 of this report.

2.2.4 Rabbits

A reasonable amount of rabbit activity (burrows and sightings) was visible both inside and outside the exclosure.

In March and April 2020, Alan Hordacre, Balijup co-landowner undertook approved rabbit calicvirus release both insider and outside the Balijup Eco Sanctuary.

It appears from camera monitoring installed before and after the release of the Calivirus baits that this has reduced rabbit numbers both inside and outside the Sanctuary.

A dead rabbit, shortly after calicivirus release at Balijup and nearby farm by Alan Hordace. Photo taken by Alan Hordacre 31 March on the Oldfield Family farm, about 8 km from Balijup Sanctuary.

Eliminating rabbits from the Balijup Sanctuary remains an important management objective.

2.2.5 Other Observations

- Kangaroos were observed within the enclosure on at least three occasions.From camera recordings it appears that as of October 2019 there are about 17 Western Grey kangaroos within the enclosure.
- There was no obvious damage or problem with the parts of the exclosure perimeter fence that were traversed.

3 Balijup Sanctuary Bird Surveys

3.1 January 2020 Bird Surveys

Standard Search Bush-bird Sampling
Eight more replicate Standard Search Counts (4 inside and 4 outside the exclosure) were completed in January 2019, and a bird list was generated for species observed on the Balijup property over the 4 days .

The data is now accumulating but is not as yet sufficient to analyse trends.

3.1.1 Survey Methods

A standard two-step search count 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 34 bird species sighted or heard over the weekend on the property, including incidental sightings and birds noted in surveys.

3.1.2 Survey Results

Theee are recorded in the Appendix.

3.1.3 February 2019 Bird list

Common Bronzewing	*Phaps chalcoptera*
Crested Pigeon	*Ocyphaps lophotes*
White-faced Heron	*Egretta novaehollandiae*
Wedge-tailed Eagle	*Aquila audax*
Carnaby's Cockatoo	*Calyptorhynchus latirostris*
Australian Ringneck	*Barnardius zonarius semitorquatus*
Western Rosella	*Platycercus icterotis*
Purple-crowned Lorikeet	*Glossopsitta porphyrocephala*
Rufous Treecreeper	*Climacteris rufus*
Splendid Fairy-wren	*Malurus splendens*
Western Gerygone	*Gerygone fusca*
Inland Thornbill	*Acanthiza apicalis*
Yellow-rumped Thornbill	*Acanthiza chrysorrhoa*
Western Thornbill	*Acanthiza inornata*
Weebill	*Smicrornis brevirostris*
Striated Pardalote	*Pardalotus striatus*
Spotted Pardalote	*Pardalotus punctatus*
New-holland Honeyeater	*Phylidonyris Novaehollandiae*
Gilbert's Honeyeater	*Melithreptus chloropsis*
Varied Sitella	*Daphoenositta chrysoptera pileata*

Black-faced Cuckoo-shrike	*Coracina novaehollandiae*
Western Whistler	*Pachycephala occidentalis*
Grey Shrike Thrush	*Colluricincla harmonica*
Australian Magpie	*Cracticus tibicen dorsalis*
Australian Raven	*Corvus coronoides*
Willie Wagtail	*Rhipidura leucophrys*
Grey Fantail	*Rhipidura albiscapa*
Restless Flycatcher	*Myiagra inquieta*
Scarlet Robin	*Petroica boodang*
Western Yellow Robin	*Eopsaltria griseogularis*
Silvereye	*Zosterops lateralis*
Tree Martin	*Petrochelidon nigricans*
Western Wattlebird	*Anthochaera lunulata*
Red-capped Parrot	*Purpureicephalus spurius*

4 Camera Monitoring

4.1 Camera locations

Since the last report of October 2019 Green Skills has periodically installed up to 7 motion triggered cameras inside the Balijup Fauna Sanctuary.

Two camera locations at the Gate, and the "Salt Flat sump", are positioned close to water sources or routes to water, provide coverage of areas inside and outside the exclosure 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 exclosure fence.

Four camera locations near the Northern fence and one location close to the Southern fence were baited with cat biscuits when installed or checked, and are intended to monitor quenda and native mammals.

The following summary observations are from the period in November 2019 to March 2020

4.2 Results

4.2.1 Feral Predator Monitoring

No feral predators, either inside the exclosure, were observed on camera during the period . However foxes were regularly noted patrolling around the outside of the Fence.

4.2.2 Native Vertebrate Monitoring

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

4.2.3 Roo Drive Event & followup.

On Saturday 18th January, Alan Hordace and Green Skills organised a 'Roo Drive' to try to drive the 17 or so Kangaroos inside the Sanctuary through the teimporarily open gate to outside the Sanctuary. Cameras were set up outside and inside the gate to monitor this event and some are included in this report, below. The Roo Drive was unsuccessful with the Kangaroos being most unwilling to move to the Gate corner of the Sanctuary. Alan Hordacre, Balijup co-owner has commissioned a local farmer Ben Parsons, to commence shooting the remaining kangaroos inside the Sanctuary.

Fox on outside of Fence. Comment: Multiple pictures of foxes patrolling the outside the fence, highlights the importance of commencing fox baiting on the outside of the fence in 2020.

Fox on outside of Sanctuary gate. Comment: Multiple pictures of foxes patrolling the outside the fence, highlights the importance of commencing fox baiting on the outside of the fence in 2020.

Al Hordacre, Co-owner of Balijup about to the open the Sanctuary gate.

Western Grey Kangaroo inside Sanctuary near the Gate.

Rossenberg Heath Monitor inside the Sanctuary.

Fox on outside of Sanctuary gate. Comment: Multiple pictures of foxes patrolling the outside the fence, highlights the importance of commencing fox baiting on the outside of the fence in 2020.

Al Hordacre, Co-owner of Balijup about to the open the Sanctuary gate.

Participants on the Green Skills Citizen Science Four Day Eco camp, about to set out on the 'Roo Drive' an attempt to shepherd the 17 or so Kangaroos inside the Sanctuary out of the fenced area. 18 Jan 2020

The Camera monitoring the Sanctuary Gate during the 'Roo Drive' an attempt to shepherd the 17 or so Kangaroos inside the Sanctuary out of the fenced area. 18 Jan 2020. No kangaroos were noted leaving the Sanctuary during this 2 hour event.

The Camera monitoring the Sanctuary Gate during the 'Roo Drive' an attempt to shepherd the 17 or so Kangaroos inside the Sanctuary out of the fenced area. 18 Jan 2020. No kangaroos were noted leaving the Sanctuary during this 2 hour event.

Participants on the Green Skills Citizen Science Four Day Eco camp, returning from the 'Roo Drive' an attempt to shepherd the 17 or so Kangaroos inside the Sanctuary out of the fenced area. 18 Jan 2020

4.2.4 Herbivorous Competitor Monitoring

Camera images show that there are now 8 kangaroos within the exclosure, up from the 5 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.

5 Black Cockatoo Habitat Tree Survey

Methods

4 teams of 3 people recorded all Wandoo trees over 300mm and all other Eucalypts over 500mm in the north-eastern section of the sanctuary. Using a GPS, all teams walked in an easterly direction covering a width of 25m recording all suitable eucalypts in their allocated region. The teams measured the trunk at diameter at breast height (DBH), recorded the tree species, whether it was alive or dead and graded each tree based on suitability for potential fauna nesting, focussing primarily on Black-Cockatoos. The grading system is based on hollows and is summarised in the table below:

Class	Description of tree and hollows /activity
1	Active nest observed; adult (or immature) bird seen entering or emerging from hollow.
2	Hollow of suitable size and angle (i.e. near-vertical) visible with Black Cockatoo chew marks around entrance.
3	Potentially suitable Black Cockatoo hollow visible but no chew marks present; that display these characteristics: - Vertical or near-vertical - At least 3 metres high - Inner hollow diameter of >30cm (estimate) - Hollow entrance of >10cm
4	Tree with small to large hollows or broken branches that might contain hollows that are not vertical or near-vertical; thus a tree not suitable for Black Cockatoos but may be for other fauna, ie: Brush-tailed possum, Brush-tailed Phascogale.
5	Tree lacking hollows or broken branches that might have hollows; a tree with more or less intact branches and a spreading crown. While currently not suitable for nesting, this class of tree may develop suitable nesting hollows in the future.

Results

On the 17th January 2020 the four teams recorded 80 trees that met the basic DBH criteria of 300mm for Wandoo and 500mm for all other Eucalypts. The results of the tree grading criteria is displayed in the table below:

Tree grade	Number of trees
2	2
3	21
4	29
5	28
Total	**80**

The results suggest a large number of trees that are currently suitable for Black-Cockatoo nesting, demonstrated by 23 of the 80 recorded trees with a score of 2 or 3. This particular area within the sanctuary is a mature woodland with very little regrowth. Some very large trees were recorded with 6 trees with a DBH of 750mm or larger. Of the trees recorded, most were Wandoo (63) and the remaining were Jarrah (17). Small numbers of Marri are present in the sanctuary; however, none were recorded during the survey. Stags often produce large hollows that may provide suitable roosting and nesting habitats for a number of fauna species, 8 stags were recorded.

A total area of several hectares was covered by all teams, which equates to xx trees/ha for trees that meet the basic criteria. All data collected for the tree hollow assessment is presented in Appendix 1.

Future

In future citizen science surveys, it is recommended to undertake further tree hollow assessments using the same methods in a different section of the sanctuary.

Appendix 1. Black-Cockatoo nest tree assessment.

Date	Transect number	Northings range	Waypoint number	Diameter at breast height (DBH)	Tree species	Score	Status (Alive or dead)	Comments
17/01/2020	1	6193125 - 6193150	119	380	Wandoo	5	A	
17/01/2020	1	6193125 - 6193150	120	550	Jarrah	5	A	
17/01/2020	1	6193125 - 6193150	121	490	Wandoo	3	A	diagonal to vertical
17/01/2020	1	6193125 - 6193150	122	850	Wandoo	3	A	big vertical hollow
17/01/2020	1	6193125 - 6193150	123	500	Jarrah	5	D	
17/01/2020	1	6193125 - 6193150	125	550	Jarrah	5	D	
17/01/2020	1	6193125 - 6193150	126	600	Wandoo	2	A	
17/01/2020	1	6193125 - 6193150	127	560	Jarrah	3	A	
17/01/2020	1	6193125 - 6193150	128	640	Wandoo	3	A	
17/01/2020	1	6193125 - 6193150	129	550	Jarrah	5	A	
17/01/2020	1	6193125 - 6193150	130	570	Wandoo	5	A	
17/01/2020	1	6193125 - 6193150	131	680	Jarrah	3	D	
17/01/2020	1	6193125 - 6193150	132	540	Jarrah	3	A	
17/01/2020	1	6193125 - 6193150	133	540	Jarrah	3	A	
17/01/2020	1	6193125 - 6193150	134	800	Jarrah	3	A	
17/01/2020	1	6193125 - 6193150	135	600	Wandoo	4	A	
17/01/2020	1	6193125 - 6193150	136	510	Wandoo	5	A	scatch marks. Possum?
17/01/2020	1	6193125 - 6193150	137	550	Jarrah	4	D	
17/01/2020	1	6193125 - 6193150	138	360	Wandoo	5	A	
17/01/2020	1	6193125 - 6193150	139	300	Wandoo	5	A	
17/01/2020	1	6193125 - 6193150	140	320	Wandoo	5	A	
17/01/2020	1	6193125 - 6193150	141	300	Wandoo	5	A	

Date	Transect number	Northings range	Waypoint number	Diameter at breast height (DBH)	Tree species	Score	Status (Alive or dead)	Comments
17/01/2020	2	6193100 - 6193125	57	600	Wandoo	3	A	Claw marks present, possibly possum
17/01/2020	2	6193100 - 6193125	58	630	Jarrah	4	A	
17/01/2020	2	6193100 - 6193125	59	500	Wandoo	5	A	
17/01/2020	2	6193100 - 6193125	60	400	Wandoo	4	A	
17/01/2020	2	6193100 - 6193125	61	500	Jarrah	3	D	
17/01/2020	2	6193100 - 6193125	62	300	Wandoo	5	A	
17/01/2020	2	6193100 - 6193125	64	390	Wandoo	4	A	claw marks
17/01/2020	2	6193100 - 6193125	65	460	Wandoo	2	A	
17/01/2020	2	6193100 - 6193125	66	360	Wandoo	5	A	
17/01/2020	2	6193100 - 6193125	67	500	Jarrah	3	A	
17/01/2020	2	6193100 - 6193125	68	670	Wandoo	3	A	
17/01/2020	2	6193100 - 6193125	69	520	Wandoo	3	A	
17/01/2020	2	6193100 - 6193125	70	680	Jarrah	3	A	
17/01/2020	2	6193100 - 6193125	71	390	Wandoo	4	A	
17/01/2020	2	6193100 - 6193125	72	380	Wandoo	4	A	
17/01/2020	2	6193100 - 6193125	73	400	Wandoo	5	A	
17/01/2020	2	6193100 - 6193125	74	620	Wandoo	3	A	
17/01/2020	3	6193075 - 6193100	40	750	Wandoo	4	A	
17/01/2020	3	6193075 - 6193100	41	440	Wandoo	5	A	
17/01/2020	3	6193075 - 6193100	42	520	Jarrah	4	A	
17/01/2020	3	6193075 - 6193100	43	430	Wandoo	4	A	
17/01/2020	3	6193075 - 6193100	44	400	Wandoo	4	D	
17/01/2020	3	6193075 - 6193100	45	440	Wandoo	5	A	
17/01/2020	3	6193075 - 6193100	46	330	Wandoo	4	A	
17/01/2020	3	6193075 - 6193100	47	460	Wandoo	4	A	feeding debris
17/01/2020	3	6193075 - 6193100	48	620	Wandoo	4	A	
17/01/2020	3	6193075 - 6193100	49	430	Wandoo	4	A	

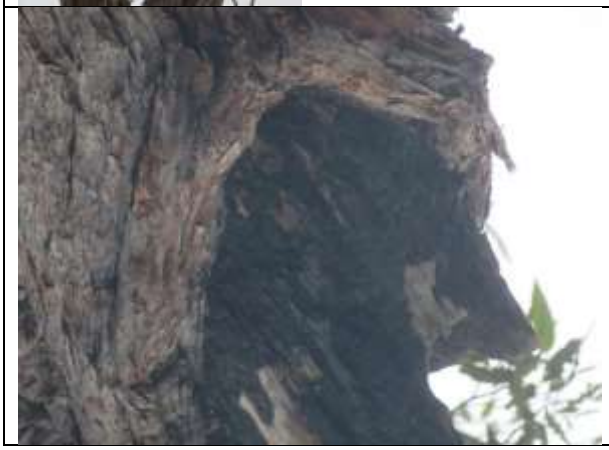
Date	Transect number	Northings range	Waypoint number	Diameter at breast height (DBH)	Tree species	Score	Status (Alive or dead)	Comments
17/01/2020	3	6193075 - 6193100	50	510	Wandoo	4	A	
17/01/2020	3	6193075 - 6193100	51	540	Wandoo	4	A	
17/01/2020	3	6193075 - 6193100	52	520	Wandoo	4	A	raptor nest, many branches
17/01/2020	3	6193075 - 6193100	53	550	Wandoo	4	A	
17/01/2020	3	6193075 - 6193100	54	650	Wandoo	3	A	
17/01/2020	3	6193075 - 6193100	55	330	Wandoo	4	A	
17/01/2020	4	6193050 - 6193075	404	550	Wandoo	4	A	Bees using small hollow
17/01/2020	4	6193050 - 6193075	405	530	Wandoo	5	A	
17/01/2020	4	6193050 - 6193075	406	750	Wandoo	3	A	
17/01/2020	4	6193050 - 6193075	407	500	Jarrah	5	A	
17/01/2020	4	6193050 - 6193075	408	390	Wandoo	4	A	
17/01/2020	4	6193050 - 6193075	409	400	Wandoo	4	A	
17/01/2020	4	6193050 - 6193075	410	410	Wandoo	4	A	
17/01/2020	4	6193050 - 6193075	411	510	Jarrah	4	A	
17/01/2020	4	6193050 - 6193075	412	380	Wandoo	5	A	
17/01/2020	4	6193050 - 6193075	413	610	Wandoo	4	A	bees using hollow
17/01/2020	4	6193050 - 6193075	414	470	Wandoo	5	A	
17/01/2020	4	6193050 - 6193075	415	410	Wandoo	5	A	
17/01/2020	4	6193050 - 6193075	416	470	Wandoo	5	A	
17/01/2020	4	6193050 - 6193075	417	760	Wandoo	4	A	
17/01/2020	4	6193050 - 6193075	418	430	Wandoo	5	A	
17/01/2020	4	6193050 - 6193075	419	370	Wandoo	5	A	
17/01/2020	4	6193050 - 6193075	420	590	Wandoo	3	A	
17/01/2020	4	6193050 - 6193075	421	410	Wandoo	5	A	
17/01/2020	4	6193050 - 6193075	422	400	Wandoo	3	D	
17/01/2020	4	6193050 - 6193075	423	300	Wandoo	4	D	
17/01/2020	4	6193050 - 6193075	424	550	Wandoo	4	A	

Date	Transect number	Northings range	Waypoint number	Diameter at breast height (DBH)	Tree species	Score	Status (Alive or dead)	Comments
17/01/2020	4	6193050 - 6193075	425	530	Wandoo	3	A	
17/01/2020	4	6193050 - 6193075	426	430	Wandoo	5	A	
17/01/2020	4	6193050 - 6193075	427	310	Wandoo	5	A	
17/01/2020	4	6193050 - 6193075	428	870	Wandoo	3	A	

Photographs

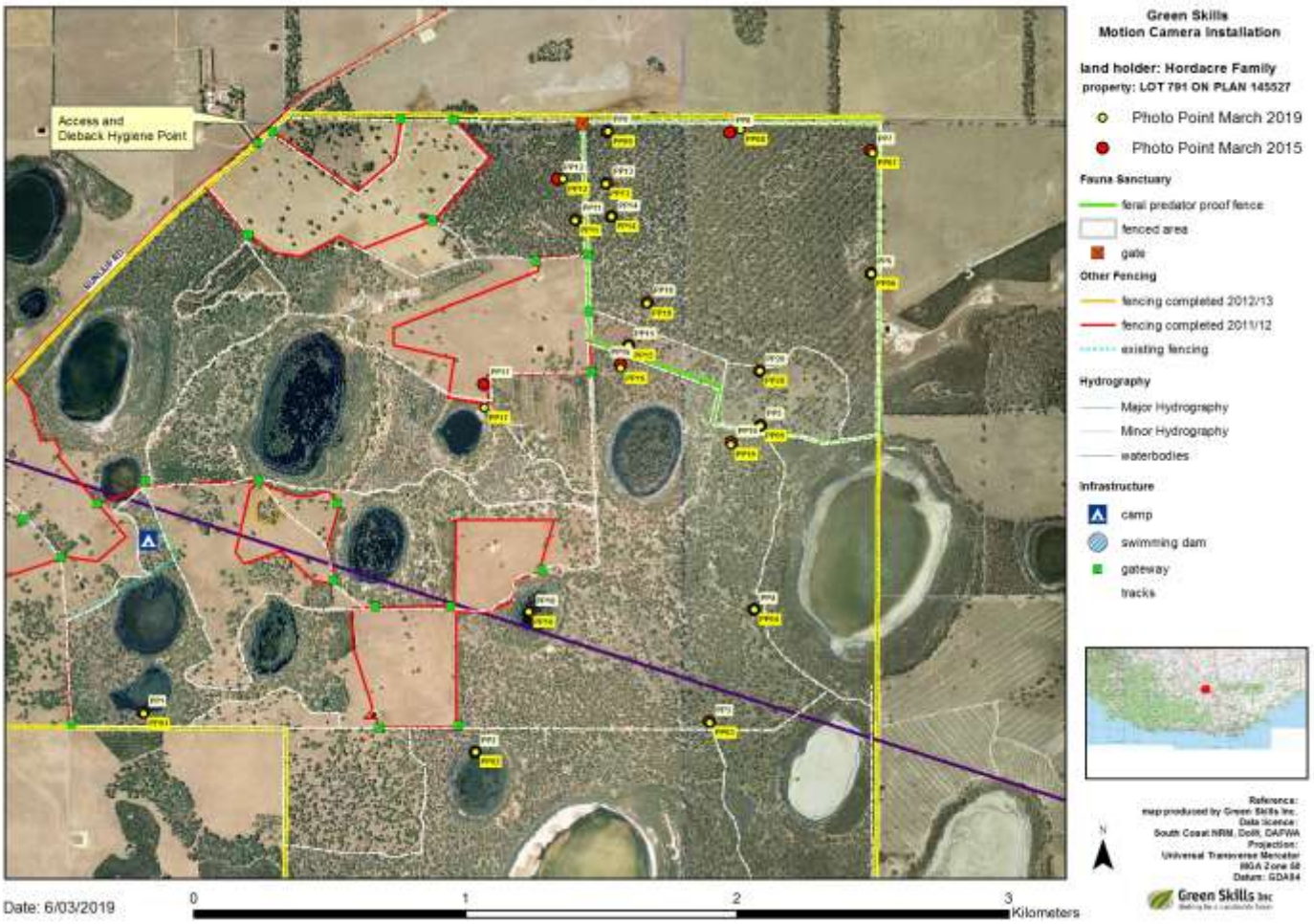
Photo	Caption
	Andy McCeery, Wilslife biologist, training participants on the Ciitzen Science event how to undertake the survey. Photo Basil Schur. Taken 17 Jan 2020
	Andy McCeery, Wilslife biologist, training participants on the Ciitzen Science event how to undertake the survey. Photo Basil Schur. Taken 17 Jan 2020
	Participants on the Ciitzen Science event how to undertake the survey. Photo Basil Schur. Taken 17 Jan 2020

	Participants on the Ciitzen Science event how to undertake the survey. Photo Basil Schur. Taken 17 Jan 2020
	Participants on the Ciitzen Science event how to undertake the survey. Photo Basil Schur. Taken 17 Jan 2020
	Participants on the Ciitzen Science event how to undertake the survey. Photo Basil Schur. Taken 17 Jan 2020

	View towards hollow Photo Basil Schur. Taken 17 Jan 2020
	View towards hollow Photo Basil Schur. Taken 17 Jan 2020

6 Vegetation Photopoint monitoring

The Twenty permanent photo monitoring points on Balijup were last photographed on Sunday 3rd February 2019 . It was decided to undertake the next photomonitoring run either rin late 2019 or early 2020.



7 Conclusions and Forward Planning

7.1.1 Key Questions

Key questions are worth addressing including such one as:

1) Can the results of the 2020 as compared to the 2019 trapping effort (both with 100 cage traps over 4 four nights at the same time of year) indicate the Quenda population in Balijup is increasing? By what percentage over the year ?

   Yes, the results between 2020 and 2019 are comparable. They do indicate that the number of different individuals of Quenda increased from 16 in 219 to 24 or 25 in 2020. This represented a 50 % between the two years.

2) Can the results of the 2020 as compared to the 2019 trapping effort (both with 100 cage traps over 4 four nights at the same time of year) indicate in relative or absolute terms what the population of quenda in the Sanctuary is ?

Yes the results do indicate that the Quenda population is likely to have increased between the two years, and that this may well have been by approximately 50 %

3) Can the results of the 2020 as compared to the 2019 trapping effort (both with 100 cage traps over 4 four nights at the same time of year) indicate the Brush Tailed Possum population in Balijup is increasing? By what percentage over the year ?

Yes, the results between 2020 and 2019 are comparable. They do indicate that the number of BT Possums appears to have increased. However as the total number of indviduals caught in 2019 was not determined, a quantitative estimate of the increase is not possible.

4) Can the results of the 2020 as compared to the 2019 trapping effort (both with 100 cage traps over 4 four nights at the same time of year) indicate in relative or absolute terms what the population of BT Possum a in the Sanctuary is ?

It is likely that the BT Possum population has increased from 2019 to 2020 inside the Balijup Sancutary, but not possible to put a quantitative relative estimate of this.

5) Given that quite a few Quenda in Jan 2019 were caught and not microchipped, how many of these are likely to have been re caught in Jan 2020? Any implications of this ?

It is not known how many quenda caught in Jan 2019 were re caught in Jan 2010, but the failure to electronically tag all the captured animals of Jan 2019 has meant effectively that a year of capture/recapture data has been lost.

6) Can trap/re-trap data be used for Balijup to estimate absolute numbers of Quenda in the Sanctuary yet ?

It appears if considerably more capture/recapture data needs to be obtained before a reliable estimate of Quenda population size at the Balijup Sanctuary can be obtained.

7) In the next trapping event, should some BT Possums be moved to outside the fence in Balijup bushland, which is now being baited ? If so how many?

Yes. It would a valuable exercise during the January 2021 Balijup Citizen Science Eco monitoring camp to move 10 Brush Tailed Possums (5 females/5 males) to bushland on Balijup outside the fence.

8) Is the Quenda population in Balijup now of sufficient size to allow application to DBCA for movement of a small number of Balijup's quenda, to other Sanctuaries, such as at Yongergnow in Ongerup ? (Especially given as adjoining landowners to the Balijup Sanctuary have again reported in Dec 2019 seeing young Bandicoot in paddocks outside the fenced area, probably getting through the fence

Yes. It would a valuable exercise in 2021 to move approximately move up to 8 Quenda (up to 4 females/4 males) to another Sanctuary/baited area. Ideally to maintain genetic

variability, an equivalent number of Quenda from other lcoations (ie Metropolitan area) were also re located to that new location at the same time.

9) Should we keep up the same 4 day trapping event every January into the foreseeable future to monitor Quenda and possums etc ? Given limited resources, is any more quenda or possum surveying needed each year (or should the 4 day event be extended)

Yes, standardising the fauna trapping effort each year appears to be a very sound way of providing comparisons between years and allowing assessments of how fauna populations are changing at Balijup Sanctuary.

10) Does analysis of the 2020 and 2019 results indicated any potential need to extend the trapping time to more than 4 nights (which would require further resources and volunteers) ?

No

11) Any other trends or points that can be gleaned from the 2020 data ?

Not at this stage

7.2 Looking to the Future

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 and build on the findings of monitoring as reported in the January 2017 Balijup report and June 2018 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 longer period of surveying before trends can be ascertained.

7.2.1 Quenda

The surveys indicate that a population southern brown bandicoots *(Isoodon obesulus)* have survived in the Sanctuary, since being introduced in August 2015 The the January 2020 monitoring result indicated a significant increase in population size compared to the results of the Feb 2019 monitoring event. This is the secpmd time that we can confidently predict that the current population is larger than the founder population, meeting an important milestone for successful establishment. Further, the population is for the first time dominated by young animals. Maximum life expectancy for Quenda is about 4 years and the last known surviving founder is about that age. So the current generations have been produced entirely from within the exclosure, a second milestone for establishment. The reasons for the increase in productivity within the exclosure are not known but may also be a reflection of the great trap effort in the February monitoring 4 night event than previous events.

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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.

In February 2019 Dr Nic Dunlop of the Conservatoin Council of WA' Citizen Science program provided the following statement

Now the Quenda population has established the next set of questions might include:
What population density is sustainable within the enclosure (ie. what is the carrying capacity)?
Will the Quenda population be self-regulating or will periodic intervention be required? Alternatively could it survive a severe drought or fire?
What effect will an established population of digging marsupials have on vegetation and other ecosystem components?

Mark / release/recapture investigations aimed at estimating population size are extremely time consuming. This is especially true of short-lived species that are capable of rapid reproduction under favourable seasonal conditions, particularly in the absence of predators. Keeping up with demographic changes in such animals requires intensive effort. Estimating the size of the Quenda population in the exclosure would require considerably more sampling effort in the short term and would be very difficult to resource in the long-term. It may therefore be more efficient to measure the impact of the Quenda population.

The following is a suggested approach now that there is an established population.

1. Conduct an intensive 'snapshot' mark/release/recapture program (continuously over about 3 weeks with 1200 -1500 trap nights). Use this to get an instantaneous population estimate. If possible repeat this every 3 years.
2. Measure the level of soil disturbance (include the original vegetation photo-monitoring points) and scats inside and outside the exclosure (and camera-trap rates) correlated with the estimated population

At this stage the relvative value of undertaking an intensive 3 week trapping excersise has not been confirmed. It would howeer be valuable to address these and other questions with the resources and technical assistance of tertiary instituations. Green Skills will continue to seek University research students to address this and other research topics at Balijup.

7.2.2 Possums

It can also be reported that Brush Tailed Possums *(Trichosurus vulpecula)* have established themselves successfully 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. It is recommended that he option of relocating some possums to bushland outside the Sanctury on Balijup should be followed up. . Camera monitoring indicates that now seventeen kangaroos are currently resident within the Sanctuary. It is recommended that they be culled, in part to prevent them increasing their numbers, and in particular to prevent damage to the Sanctuary fence.

7.2.3 Rosenberg's Monitor

The January 2017 citizen science survey results indicated 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 predating on bandicoots in the Sanctuary. The numbers of Southern Heath Monitori 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 (ongoing permission for this has been obtained, but no Rosenberg's monitor have been captured in cage traps either in Jan/Feb 2019 or Jan 2020).

7.2.4 Camera Monitoring

There are reguarlly up to7 Green Skills' wildlife monitoring motion triggered cameras installed within the Sanctuary on an ongoing basis. This is 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 cats, foxes, rabbits and black rats 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 species 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)

7.2.5 Mardo

It could also involve actively monitoring for Mardo (Yellow footed antechinus or *Antechinus flavipes leucogaster*) within the Balijup Sancutary and installing suitable nesting boxes for that species. It is recommended that Green Skills continue to investigate collaborative partnerships between the Balijup Sanctuary project and other fenced sanctuaries.

7.2.6 Concusion

It is proposed thus that the priority projects that should be planned and funding soutght would include the following: 1) Ongoing camera monitoring within the Sanctuary 2) Further cage trapping program events focussing in the Santuary 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) Onoging monitoring and maintenance of the phascogale boxes installed within the Sanctuary and development of further research projects of Brush-Tailed Phascogales at Balijup7) Ongong monitoring of the phascogale nesting boxes on the three properties they have been installed next to the Stirling Range National Park and one property near Youngs Siding on the Nullaki. 8) Other vegetation, bird and wetland monitoring both within the Sanctuary and Balijup property as per the Balijup monitoring framework. 9) Continued development and roll out of a fox (and ideally cat) baiting program for the whole of Balijup property and the implementation of this from 2019 onwards.

8 Photos

8.1 Jan 2020 -Balijup Citizen Science Monitoring - 4 Day Event

		Repair to gate at Balijup Sanctguary- from Jan 2019
		Cage Traps for Balijup Sanctuary 16-20 Jan 2020
		Seting Cage Traps for Balijup Sanctuary 16-20 Jan 2020

		Setting Cage Traps for Balijup Sanctuary 16-20 Jan 2020
		Monitoring Cage Traps for Balijup Sanctuary 16-20 Jan 2020
		Proecessing Balijup Sanctuary 16-20 Jan 2020
		Proecessing Balijup Sanctuary 16-20 Jan 2020

		Proecessing Balijup Sanctuary 16-20 Jan 2020
		Releasing Quenda at Balijup Sanctuary 16-20 Jan 2020
		Released Quenda at Balijup Sanctuary 16-20 Jan 2020
		Checking log with released Quenda at Balijup Sanctuary 16-20 Jan 2020

	Quenda diggings at Balijup Sanctuary 16-20 Jan 2020
	Possum in bag ready for release 16-20 Jan 2020
	One Brush tailed Phascogale was caught in the cage trarps. Photo by Susan Foster
	Spotlighting Excerise nar Lake Nunijup 16-20 Jan 2020

		Visit to Eco Restoration sites on Sandiland Farm, Kendenup 16-20 Jan 2020
		Bird Surveying at Balijup 17 Jan 2020
		Bird Surveying at Balijup 17 Jan 2020
		Processing Data from Balijup at Lake Nunijup Hall 20 Jan 2020

		Introduction to Tree Hollow Survey 17 Jan 2020 at Balijup Sanctuary
		Tree Hollow Survey 17 Jan 2020 at Balijup Sanctuary
		Balijup Fence Sanctuary Maintenance 18 Jan 2020
		Balijup Fence Sanctuary Maintenance 18 Jan 2020

		Carol Pettersen, Minang Elder, talking about Sandalwood and other Noongar Bushtucker foods, 18 Jan 2020
		
		Camera Monitoring. Balijup 19 Jan 2020
		Alisia Lampropoulos at the Lake Nunijup Hall base camp 19 Jan 2020

		Visit to Eco Restoration sites on Sandiland Farm, Kendenup 19 Jan 2020
		Visit to Eco Restoration sites – Lake Matilda birdhide 19 Jan 2020

Appendix 1 – 2019 Quenda (Southern Brown Bandicoot) data including Morphometrics.

Date:	Trap #	Species	N=new R=Retrap RE=recap	Individual	sex (M/F)	Total wt (g)	Bag wt (g)	Body wt (g)	Microchip no.	Head length (mm)	Right Pes (long) (mm)	Tail length (mm)	No. of PY	PY size (mm)	PY fur (pink/fur)	Enlarged teets	Males: scrotum width (mm)	Fate R=released D=died E=escaped)	Comments
1/02/2019	15	Quenda	R	1	F	1005	120	885	982000365592897	91.7	52.8	98.5	1	70	Fur	-		R	
1/02/2019	13	Quenda	R	2	M	1610	75	1535	982000365479043	82.3	57.2	150					31.3	R	
1/02/2019	26	Quenda	N	3	M	1600	120	1480	982000365475116	95.5	57.8	170					28.2	R	
1/02/2019	50	Quenda	N	4	M	1595	110	1485	982000365479324	89	57.5	143					29.5	R	
1/02/2019	84	Quenda	N	5	F	840	110	730	-	72.7	48.9	137	0			3		R	
2/02/2019	15	Quenda	RE	2	M	1625	115	1510	982000365479043	90.6	60.9	155					33.1	R	Left hind leg outer nail missing
2/02/2019	71	Quenda	RE	5	F	825	125	700	-	77.8	51.3	135	0			3		R	recap from un-microchipped quenda
2/02/2019	60	Quenda	RE	3	M	1600	120	1480	982000365475116	89.2	58	140					21.1	R	
3/02/2019	20	Quenda	RE	2	M	1635	125	1510	982000365479043	94.7	60.3	140					32	R	left hind limb outer toenail missing
3/02/2019	42	Quenda	N	6	M	1465	200	1265		87.7	61	150					25.5	R	kink in tail approx 2cm from end
3/02/2019	71	Quenda	N	7	F	1135	200	935		86.9	53.9	140	0			2 lge		R	full tail, 2 very enlarged teets, large sack og milk
3/02/2019	76	Quenda	N	8	F	-	-	#VALUE!			52.8	130	2	50	pink			R	full tail, soft release, ejected young
3/02/2019	23	Quenda	N	9	M	1060	120	940		80.8	56	21.2					25.8	R	stumpy tail
3/02/2019	27	Quenda	R	16	F	1050	120	930	982000365590897	81.9	50.3	101.8	1	50	furred			R	

3/02/2019	48	Quenda	RE	4	M	1540	120	1420	982000365479324	90.2	56.4	130					28.5	R	
3/02/2019	74	Quenda	RE	5	F	840	120	720		77.5	54.6	125	0					R	teats range from 2-8 mm, diff teat stages, no markings
3/02/2019	80	Quenda	N	10	F	1070	120	950			52.1	110	1	40	pink			R	no markings
3/02/2019	94	Quenda	N	11	F	750	120	630		77.6	49.9	112				3		R	2-5mm enlarged teets, no markings
4/02/2019	9	Quenda	RE	2	M	1680	120	1560	982000356479043									R	caught day before
4/02/2019	82	Quenda	N	12	M	800	200	600		73.1	51.1	125					13.5	R	full tail
4/02/2019	104	Quenda	RE	7	F	1105	200	905		84.1	53.8	125	0			4		R	
4/02/2019	11	Quenda	RE	8	F	1170	125	1045		83.9	53.1	125	1	60	pink			R	
4/02/2019	16	Quenda	RE	16	F	1050	120	930	982000365590897									R	
4/02/2019	45	Quenda	RE	4	M	1520	130	1390	982000365479324									R	
4/02/2019	71	Quenda	R	13	M	1130	120	1010	982000365475062	91.5	57.2	165					27.1	R	
4/02/2019	72	Quenda	RE	11	F	795	120	675	-	75.7	49.9	110	0			8		R	3 large, 5 mod enlarged teets
4/02/2019	94	Quenda	N	14	F	885	60	825	-	74.5	52.3	123	0			3		R	no markings
4/02/2019	95	Quenda	N	15	F	1015	120	895	-	76.7	50.5	33.6	0			3		R	stumpy tail
4/02/2019	96	Quenda	RE	3	M	1560	120	1440	982000365475116	91.3	58	146.7					32	R	

Jan Fe 2019
Quenda capture summary

Column1	males	females	total
chipped	**4**	**2**	**6**
unchipped	**3**	**7**	**10**
Total	**7**	**9**	**16**

Appendix 2 February 2019 Brush-tailed Possum captures in Balijup predator exclosure.

Date:	Trap #	Species Q= Quenda Bl=Balck Rat, BP= Brushtail Phascogale Write other sp.	N= new R= Retrap RE= recap	sex (M/F)	Total wt (g)	Bag wt (g)	Body wt (g)	Microchip no.	Head length (mm)	Right Pes (long) (mm)	Tail length (mm)	No. of PY	PY size (mm)	PY fur (pink/fur)	Enlarged teets	Males: scrotum width (mm)	Fate R=released D=died E=escaped)	Comments
1/02/2019	6	Brush-tailed Possum	N	F	1600	120		-	90	45.7	245	0			0		R	
1/02/2019	15	Quenda	R	F	1005	120	885	982 0003655 92897	91.7	52.8	98.5	1	70	Fur	-		R	
1/02/2019	13	Quenda	R	M	1610	75	1535	982 0003654 79043	82.3	57.2	150					31.3	R	
1/02/2019	11	Brush-tailed Possum	N	F	1550	70						0					R	Virgin pouch
1/02/2019	55	Brush-tailed Possum	N	F	2190	70						2		No Fur			R	
1/02/2019	59	Brush-tailed Possum	N	F	1560	70						0					R	Virgin pouch
1/02/2019	68	Brush-tailed Possum	N	F	1620	70						0			1		R	ET 5mm
1/02/2019	67	Brush-tailed Possum	N	F	1845	75						0			2		R	ET 7mm
1/02/2019	99	Brush-tailed Possum	N	F	1320	70						0					R	Virgin pouch?
1/02/2019	25	Brush-tailed Possum	N	F	1800	120				54.1		0			?		R	Enlarged teets
1/02/2019	26	Quenda	N	M	1600	120		982 0003654 75116	95.5	57.8	170					28.2	R	
1/02/2019	27	Brush-tailed Possum	N	F	1920	100			79.9	56.7		0			?		R	Enlarged teets
1/02/2019	36	Brush-tailed Possum	N	F	1800	110			88.3	61.3		0			?		R	Enlarged teets
1/02/2019	50	Quenda	N	M	1595	110		982 0003654 79324	89	57.5	143					29.5	R	
1/02/2019	80	Brush-tailed Possum	N	F	1570	110			83.3	55.1		0			0		R	
1/02/2019	90	Brush-tailed Possum	N	F	1950	110			86.3	50					1		R	
1/02/2019	86	Brush-tailed Possum	N	F	1850	110				57.4		0			1		R	
1/02/2019	84	Quenda	N	F	840	110			72.7	48.9	137	0			3		R	
2/02/2019	6	Brush-tailed Possum		F	1370	125			80.9	50	280	0					R	White tip on tail end
2/02/2019	10	Brush-tailed Possum		M	895	115			68.3	56.3	240					17.7	R	tail small white tip

2/02/2019	18	Brush-tailed Possum		M	18:55	120			86.2	53.2	275					38.2	R	black tail, rufous on flanks
2/02/2019	15	Quenda	RE	M	16:25	115		982 0003654 79043	90.6	60.9	155					33.1	R	Left hind leg outer nail missing
2/02/2019	11	Brush-tailed Possum		F	15:80	115					260	0					R	half tail white, 120mm black
2/02/2019	80	Brush-tailed Possum		F	15:75	120	14:55			58.3	255	0					R	1/4 tail white - 100mm
2/02/2019	78	Brush-tailed Possum		F	15:55	120			82.8	50.6	255	0					R	black tail
2/02/2019	71	Quenda	RE	F	82:5	125				51.3	135	0			3		R	recap from un-microchipped quenda
2/02/2019	102	Black Rat	N	M													D	Euthanised
2/02/2019	103	Brush-tailed Possum		F	20:50	205						0			1		R	tail tiny white tip
2/02/2019	23	Brush-tailed Possum		F	15:15	120			82.1	50.7		0			0		R	
2/02/2019	26	Brush-tailed Possum		F	17:20	120			82.5	52.1		0			0		R	
2/02/2019	28	Brush-tailed Possum		F	18:50	120			82.4	51.1		0			0		R	
2/02/2019	50	Brush-tailed Possum		F	16:10	120						0			1		R	
2/02/2019	31	Brush-tailed Possum		F	21:90	120						1	80	furred			R	
2/02/2019	35	Brush-tailed Possum		F	17:30	120				52.9		0			1		R	
2/02/2019	60	Quenda	RE	M	16:00	120		982 0003654 75116	89.2	58	140					21.1	R	
2/02/2019	82	Brush-tailed Possum		M	20:40	140			73.4	50.2							R	possible growth on testes
2/02/2019	86	Brush-tailed Possum		F	13:10	120			75.9	48.7		0					R	virgin pouch
3/02/2019	2	Brush-tailed Possum	RE	M	18:00	115			91.8	54.3	295					35.9	R	rufous neck, full black tail, caught 2/2
3/02/2019	9	Brush-tailed Possum	RE	M	92:5	115			63.4	50	245					16.5	R	black tail, white tip, caught 2/2
3/02/2019	20	Quenda	RE	M	16:35	125		982 0003654 79043	94.7	60.3	140					32	R	left hind limb outer toenail missing
3/02/2019	13	Brush-tailed Possum		F	14:95	115			76	49.2	263	0					R	half tail white 120mm, 2 non active teets
3/02/2019	42	Quenda	N	M	14:65	200			87.7	61	150					25.5	R	kink in tail approx 2cm from end
3/02/2019	33	Brush-tailed Possum		F	22:25	190					295	1	150				R	black tail with white tip 7cm
3/02/2019	34	Brush-tailed Possum		F	17:45	185						0			2 mod		R	black tail
3/02/2019	35	Brush-tailed Possum		M	20:95	190										38.2	R	black tail, red spots on scrotum
3/02/2019	38	Brush-tailed Possum		M	18:35	65											R	black tail, growth on scrotum

3/02/2019	40	Quenda	RE	M	1510	75		982 0003654 75116	94.9	59.7	145					31.1	R	full tail, wound half way under tail
3/02/2019	60	Brush-tailed Possum		F	1580	185						0					R	black tail, virgin pouch
3/02/2019	71	Quenda	N	F	1135	200			86.9	53.9	140	0			2 lge		R	full tail, 2 very enlarged teets, large sack og milk
3/02/2019	76	Quenda	N	F	-	-				52.8	130	2	50	pink			R	full tail, soft release, ejected young
3/02/2019	86	Brush-tailed Possum		F	1900	190						0					R	black tail
3/02/2019	88	Brush-tailed Possum		M	2040	190											R	tail with white tip
3/02/2019	90	Brush-tailed Possum		F	1815	200											R	black tail
3/02/2019	21	Brush-tailed Possum		F	1500	120			81.6	57.6	260	0					R	black tail, virgin pouch
3/02/2019	23	Quenda	N	M	1060	120			80.8	56	212					25.8	R	stumpy tail
3/02/2019	27	Quenda	R	F	1050	120		982 0003655 90897	81.9	50.3	101.8	1	50	furred			R	
3/02/2019	26	Brush-tailed Possum		F	1625	120				59.8	260	0			1		R	scabies/mites on right foot (orange), all black tail
3/02/2019	50	Brush-tailed Possum		F	1640	120				53	28	0			1		R	black tail
3/02/2019	49	Brush-tailed Possum															E	5cm white tip on tail
3/02/2019	48	Quenda	RE	M	1540	120		982 0003654 79324	90.2	56.4	130					28.5	R	
3/02/2019	46	Brush-tailed Possum		F	1810	120				48.2	250	0			1		R	black tail
3/02/2019	63	Brush-tailed Possum		F	1790	120						0			4		R	2 very large, 1 large and 1 mod enlarged teats
3/02/2019	77	Brush-tailed Possum		F	1460	120			84.4	48.9	300	0			1		R	
3/02/2019	74	Quenda	N	F	840	120			77.5	54.6	125	0					R	teats range from 2-8 mm, diff teat stages, no markings
3/02/2019	80	Quenda	N	F	1070	120				52.1	110	1	40	pink			R	no markings
3/02/2019	94	Quenda	N	F	750	120			77.6	49.9	112				3		R	2-5mm enlarged teets, no markings
3/02/2019	103	Black Rat	N														D	euthanised
4/02/2019	9	Quenda	RE	M	1680	120		982 0003564 79043									R	caught day before
4/02/2019	21	Brush-tailed Possum		F	1480	120						0					R	virgin pouch, black tail
4/02/2019	24	Brush-tailed Possum		F	1615	125						0					R	black tail
4/02/2019	27	Brush-tailed Possum		M	1160	120											R	black tail, small testes
4/02/2019	65	Brush-tailed Possum		F	1805	130						0			1		R	black tail

4/02/2019	82	Quenda	N	M	800	200			73.1	51.1	125					13.5	R	full tail
4/02/2019	89	Brush-tailed Possum		M	1975	195											R	black tail with very small white tip
4/02/2019	104	Quenda	N	F	1105	200			84.1	53.8	125	0			4		R	
4/02/2019	11	Quenda	N	F	1170	125			83.9	53.1	125	1	60	pink			R	
4/02/2019	14	Brush-tailed Possum		F	1350	130						0					R	white tip on tail 11cm
4/02/2019	16	Quenda	RE	F	1050	120		982 0003655 90897									R	
4/02/2019	45	Quenda	RE	M	1520	130		982 0003654 79324									R	
4/02/2019	48	Brush-tailed Possum		F	1740	120						0			1		R	black tail
4/02/2019	49	Brush-tailed Possum		M	1830	130											R	black tail, srotum markings
4/02/2019	71	Quenda	R	M	1130	120		982 0003654 75062	91.5	57.2	165					27.1	R	
4/02/2019	72	Quenda	N	F	795	120			75.7	49.9	110	0			8		R	3 large, 5 mod enlarged teets
4/02/2019	77	Brush-tailed Possum		F	1780	120						0			2		R	tail- base half grey, end half black
4/02/2019	79	Brush-tailed Possum		F	1410	120						0			1		R	tail 1/3 grey, 2/3 black, hairy pouch
4/02/2019	94	Quenda	N	F	885	60			74.5	52.3	123	0			3		R	no markings
4/02/2019	95	Quenda	N	F	1015	120			76.7	50.5	33.6	0			3		R	stumpy tail
4/02/2019	96	Quenda	RE	M	1560	120		982 0003654 75116	91.3	58	146.7					32	R	
4/02/2019	100	Brush-tailed Possum		F	1640	120						0			2		R	tail 2/3 black, 1/3 grey

Appendix 3 Bird Survey Raw Data Sheets

BirdLife Western Australia
167 Perry Lakes Drive, Floreat 6014
Phone : (08) 9383 7749
Email : wa@birdlife.org.au
Website : birdlife.org.au/wa

birdlife
WESTERN AUSTRALIA

Western Australian Database Card

Location		# of Species Recorded	
Latitude (South)	° ' "	Longitude (East)	° ' "
Name		Date	
Address			
Telephone		Email	

Instructions: Fill in the check box for each species recorded. Please include a **B** if you observe the species breeding. We encourage you to put the **count** for waterbirds and waders after the species name. Return the completed form to the office. You can print replacement forms from the website, or ask the office to mail you new forms. The database is designed to record data for BWA excursions, parks, reserves, wetlands, islands and country shires for periods from a few hours to a week, although in special cases data is recorded per calendar month. If the survey is over a long period, or for many sites in an area then please consider also completing forms for the Ongoing Atlas of Australian Birds. If you cannot be 100% certain of the species of gallinago snipe, white-tailed black-cockatoo, corella, chestnut-shouldered fairy-wren, raven or crow then please use the corresponding general number.

EMU
☐ 001 Emu

MOUND BUILDERS
☐ 007 Malleefowl
☐ 006 Orange-footed Scrubfowl

QUAILS, PHEASANTS etc
☐ 009 Stubble Quail
☐ 011 Brown Quail
☐ 012 King Quail
☐ 903 Indian Peafowl
☐ 950 Common Pheasant

WATERFOWL
☐ 838 ***Domestic Goose***
☐ 199 Magpie Goose
☐ 205 Plumed Whistling-Duck
☐ 204 Wandering Whistling-Duck
☐ 217 Musk Duck
☐ 214 Freckled Duck
☐ 198 Cape Barren Goose
☐ 203 Black Swan
☐ 906 Mute Swan
☐ 206 Radjah Shelduck
☐ 207 Australian Shelduck
☐ 202 Australian Wood Duck
☐ 213 Pink-eared Duck
☐ 201 Green Pygmy-goose
☐ 212 Australasian Shoveler
☐ 211 Grey Teal
☐ 210 Chestnut Teal

☐ 2507 ***Domestic Duck***
☐ 208 Pacific Black Duck
☐ 215 Hardhead
☐ 216 Blue-billed Duck

TROPICBIRDS
☐ 107 Red-tailed Tropicbird
☐ 108 White-tailed Tropicbird

GREBES
☐ 061 Australasian Grebe
☐ 062 Hoary-headed Grebe
☐ 060 Great Crested Grebe

PIGEONS, DOVES
☐ 957 Rock Dove (Feral Pigeon)
☐ 988 Laughing Dove
☐ 989 Spotted Dove
☐ 033 Emerald Dove
☐ 034 Common Bronzewing
☐ 035 Brush Bronzewing
☐ 036 Flock Bronzewing
☐ 043 Crested Pigeon
☐ 042 Spinifex Pigeon
☐ 040 Partridge Pigeon
☐ 037 White-quilled Rock-Pigeon
☐ 031 Diamond Dove
☐ 030 Peaceful Dove
☐ 032 Bar-shouldered Dove

☐ 021 Rose-crowned Fruit-Dove
☐ 026 Pied Imperial-Pigeon

FROGMOUTHS
☐ 313 Tawny Frogmouth

NIGHTJARS
☐ 331 Spotted Nightjar
☐ 317 Australian Owlet-nightjar

SWIFTS
☐ 335 Fork-tailed Swift

SEABIRDS
☐ 063 Wilson's Storm-Petrel
☐ 065 White-faced Storm-Petrel
☐ 086 Wandering Albatross
☐ 088 Black-browed Albatross
☐ 091 Shy Albatross
☐ 089 Yellow-nosed Albatross
☐ 929 Southern Giant-Petrel
☐ 937 Northern Giant-Petrel
☐ 080 Cape Petrel
☐ 942 Slender-billed Prion
☐ 069 Wedge-tailed Shearwater
☐ 072 Flesh-footed Shearwater
☐ 071 Short-tailed Shearwater
☐ 913 Hutton's Shearwater
☐ 067 Little Shearwater
☐ 935 Kerguelen Petrel
☐ 076 Soft-plumaged Petrel
☐ 077 White-headed Petrel

☐ 075 Great-winged Petrel
☐ 005 Little Penguin

FRIGATEBIRDS
☐ 095 Lesser Frigatebird
☐ 094 Great Frigatebird

GANNETS, BOOBYS
☐ 104 Australasian Gannet
☐ 105 Masked Booby
☐ 102 Brown Booby

CORMORANTS, PELICANS
☐ 101 Australasian Darter
☐ 100 Little Pied Cormorant
☐ 096 Great Cormorant
☐ 097 Little Black Cormorant
☐ 099 Pied Cormorant
☐ 098 Black-faced Cormorant

HERONS, IBIS, ALLIES
☐ 106 Australian Pelican
☐ 183 Black-necked Stork
☐ 197 Australasian Bittern
☐ 195 Australian Little Bittern
☐ 196 Black Bittern
☐ 189 White-necked Heron
☐ 187 Eastern Great Egret
☐ 186 Intermediate Egret

☐ 184 Great-billed Heron
☐ 977 Cattle Egret
☐ 193 Striated Heron
☐ 190 Pied Heron
☐ 188 White-faced Heron
☐ 185 Little Egret
☐ 191 Eastern Reef Egret
☐ 192 Nankeen Night-Heron
☐ 178 Glossy Ibis
☐ 179 Australian White Ibis
☐ 180 Straw-necked Ibis
☐ 181 Royal Spoonbill
☐ 182 Yellow-billed Spoonbill

RAPTORS
☐ 241 Eastern Osprey
☐ 232 Black-shouldered Kite
☐ 233 Letter-winged Kite
☐ 230 Square-tailed Kite
☐ 231 Black-breasted Buzzard
☐ 234 Pacific Baza
☐ 226 White-bellied Sea-Eagle
☐ 228 Whistling Kite
☐ 227 Brahminy Kite
☐ 229 Black Kite
☐ 221 Brown Goshawk
☐ 222 Collared Sparrowhawk
☐ 220 Grey Goshawk
☐ 218 Spotted Harrier
☐ 219 Swamp Harrier
☐ 223 Red Goshawk
☐ 224 Wedge-tailed Eagle

☐ 225 Little Eagle
☐ 240 Nankeen Kestrel
☐ 239 Brown Falcon
☐ 235 Australian Hobby
☐ 236 Grey Falcon
☐ 238 Black Falcon
☐ 237 Peregrine Falcon

CRANES
☐ 177 Brolga

CRAKES, RAILS, ALLIES
☐ 058 Purple Swamphen
☐ 047 Chestnut Rail
☐ 046 Buff-banded Rail
☐ 050 Baillon's Crake
☐ 049 Australian Spotted Crake
☐ 051 Spotless Crake
☐ 052 White-browed Crake
☐ 053 Pale-vented Bush-hen
☐ 055 Black-tailed Native-hen
☐ 056 Dusky Moorhen
☐ 059 Eurasian Coot

BUSTARDS
☐ 176 Australian Bustard

SHOREBIRDS
☐ 174 Bush Stone-curlew

☐ 175 Beach Stone-curlew
☐ 130 Australian Pied Oystercatcher
☐ 131 Sooty Oystercatcher
☐ 146 Black-winged Stilt
☐ 147 Banded Stilt
☐ 148 Red-necked Avocet
☐ 137 Pacific Golden Plover
☐ 136 Grey Plover
☐ 851 Little Ringed Plover
☐ 143 Red-capped Plover
☐ 140 Double-banded Plover
☐ 139 Lesser Sand Plover
☐ 141 Greater Sand Plover
☐ 142 Oriental Plover
☐ 145 Inland Dotterel
☐ 144 Black-fronted Dotterel
☐ 138 Hooded Plover
☐ 132 Red-kneed Dotterel
☐ 135 Banded Lapwing
☐ 133 Masked Lapwing
☐ 171 Comb-crested Jacana
☐ 170 Australian Painted Snipe
☐ 852 Pin-tailed Snipe
☐ 169 Swinhoe's Snipe
☐ 839 ***gallinago snipe species***
☐ 152 Black-tailed Godwit
☐ 153 Bar-tailed Godwit
☐ 151 Little Curlew
☐ 150 Whimbrel
☐ 149 Eastern Curlew
☐ 160 Terek Sandpiper
☐ 157 Common Sandpiper

☐ 155 Grey-tailed Tattler
☐ 158 Common Greenshank
☐ 159 Marsh Sandpiper
☐ 891 Common Redshank
☐ 154 Wood Sandpiper
☐ 129 Ruddy Turnstone
☐ 939 Asian Dowitcher
☐ 165 Great Knot
☐ 164 Red Knot
☐ 166 Sanderling
☐ 162 Red-necked Stint
☐ 966 Long-toed Stint
☐ 978 Pectoral Sandpiper
☐ 163 Sharp-tailed Sandpiper
☐ 161 Curlew Sandpiper
☐ 167 Broad-billed Sandpiper
☐ 934 Ruff
☐ 932 Red-necked Phalarope

BUTTON-QUAILS
☐ 013 Red-backed Button-quail
☐ 015 Chestnut-backed Button-quail
☐ 014 Painted Button-quail
☐ 019 Red-chested Button-quail
☐ 018 Little Button-quail

PRATINCOLES
☐ 172 Oriental Pratincole
☐ 173 Australian Pratincole

SKUAS, JAEGERS
☐ 960 Brown Skua
☐ 945 Pomarine Jaeger
☐ 128 Arctic Jaeger
☐ 933 Long-tailed Jaeger

TERNS, GULLS
☐ 122 Common Noddy
☐ 124 Black Noddy
☐ 123 Lesser Noddy
☐ 121 Bridled Tern
☐ 120 Sooty Tern
☐ 117 Little Tern
☐ 118 Fairy Tern
☐ 111 Gull-billed Tern
☐ 112 Caspian Tern
☐ 110 Whiskered Tern
☐ 109 White-winged Black Tern
☐ 113 Roseate Tern
☐ 953 Common Tern
☐ 116 Lesser Crested Tern
☐ 115 Crested Tern
☐ 126 Pacific Gull
☐ 125 Silver Gull

COCKATOOS, PARROTS
☐ 264 Red-tailed Black-Cockatoo
☒ 794 Carnaby's Black-Cockatoo
☐ 266 Baudin's Black-Cockatoo
☐ 841 ***white-tailed black-cockatoo sp.***

☐ 323 Blue-winged Kookaburra
☐ 325 Red-backed Kingfisher
☐ 326 Sacred Kingfisher
☐ 327 Collared Kingfisher

BEE-EATERS, ROLLERS, PITTAS
☐ 329 Rainbow Bee-eater
☐ 318 Dollarbird
☐ 354 Rainbow Pitta

SCRUB-BIRDS
☐ 356 Noisy Scrub-bird

TREECREEPERS
☐ 561 White-browed Treecreeper
☐ 562 Black-tailed Treecreeper
☒ 556 Rufous Treecreeper

BOWERBIRDS
☐ 681 Western Bowerbird
☐ 683 Great Bowerbird

FAIRY-WRENS, GRASSWRENS
☒ 532 Splendid Fairy-wren
☐ 542 Purple-crowned Fairy-wren
☐ 541 Red-backed Fairy-wren
☐ 535 White-winged Fairy-wren
☐ 536 Variegated Fairy-wren
☐ 540 Blue-breasted Fairy-wren
☐ 538 Red-winged Fairy-wren

☐ 635 Yellow-throated Miner
☐ 640 Spiny-cheeked Honeyeater
☐ 710 Western Wattlebird
☒ 638 Red Wattlebird
☐ 596 Bar-breasted Honeyeater
☐ 601 Rufous-throated Honeyeater
☐ 599 Grey Honeyeater
☐ 449 Crimson Chat
☐ 450 Orange Chat
☐ 451 Yellow Chat
☐ 448 White-fronted Chat
☐ 589 Black Honeyeater
☐ 587 Red-headed Honeyeater
☐ 593 Tawny-crowned Honeyeater
☐ 588 Banded Honeyeater
☐ 597 Brown Honeyeater
☒ 631 New Holland Honeyeater
☐ 632 White-cheeked Honeyeater
☐ 580 Black-chinned Honeyeater
☐ 583 Brown-headed Honeyeater
☐ 579 White-throated Honeyeater
☒ 578 White-naped Honeyeater
☐ 641 Blue-faced Honeyeater
☐ 644 Silver-crowned Friarbird
☐ 646 Little Friarbird

BABBLERS
☐ 443 Grey-crowned Babbler
☐ 445 White-browed Babbler

☒ 361 Grey Fantail
☐ 826 Mangrove Grey Fantail
☐ 363 Northern Fantail
☒ 364 Willie Wagtail

RAVENS, CROWS
☒ 930 Australian Raven
☐ 691 Little Crow
☐ 692 Torresian Crow
☐ 837 ***raven / crow species***

FLYCATCHERS, MAGPIE-LARK
☐ 367 Broad-billed Flycatcher
☐ 365 Leaden Flycatcher
☐ 372 Shining Flycatcher
☐ 728 Restless Flycatcher
☒ 415 Magpie-lark

ROBINS, SCRUB-ROBINS
☐ 377 Jacky Winter
☐ 379 Lemon-bellied Flycatcher
☒ 380 Scarlet Robin
☐ 381 Red-capped Robin
☐ 385 Hooded Robin
☒ 394 Western Yellow Robin
☐ 387 White-breasted Robin
☐ 388 Mangrove Robin
☐ 391 Buff-sided Robin
☐ 441 Southern Scrub-robin

☐ 270 Major Mitchell's Cockatoo
☐ 273 Galah
☐ 272 Long-billed Corella
☐ 795 Western Corella
☐ 271 Little Corella
☐ 818 ***corella species***
☐ 269 Sulphur-crested Cockatoo
☐ 274 Cockatiel
☐ 254 Rainbow Lorikeet
☐ 257 Varied Lorikeet
☒ 259 Purple-crowned Lorikeet
☐ 280 Red-winged Parrot
☐ 278 Regent Parrot
☐ 279 Princess Parrot
☐ 287 Northern Rosella
☒ 289 Western Rosella
☒ 294 Australian Ringneck
☒ 290 Red-capped Parrot
☐ 297 Blue Bonnet
☐ 296 Mulga Parrot
☐ 310 Budgerigar
☐ 304 Bourke's Parrot
☐ 307 Elegant Parrot
☐ 308 Rock Parrot
☐ 303 Scarlet-chested Parrot
☐ 311 Ground Parrot

CUCKOOS
☐ 349 Pheasant Coucal
☐ 347 Eastern Koel
☐ 348 Channel-billed Cuckoo
☐ 342 Horsfield's Bronze-Cuckoo

☐ 749 ***chestnut-shouldered f-w sp.***
☐ 526 Southern Emu-wren
☐ 528 Rufous-crowned Emu-wren
☐ 513 Striated Grasswren
☐ 512 Thick-billed Grasswren
☐ 511 Dusky Grasswren
☐ 518 Black Grasswren

BRISTLEBIRDS
☐ 520 Western Bristlebird

SCRUBWRENS, ALLIES
☒ 488 White-browed Scrubwren
☐ 499 Shy Heathwren
☐ 502 Rufous Fieldwren
☐ 497 Redthroat
☒ 465 Weebill
☐ 460 Mangrove Gerygone
☒ 463 Western Gerygone
☐ 461 Dusky Gerygone
☐ 457 Large-billed Gerygone
☐ 458 Green-backed Gerygone
☐ 453 White-throated Gerygone
☐ 480 Slaty-backed Thornbill
☒ 486 Yellow-rumped Thornbill
☐ 481 Chestnut-rumped Thornbill
☐ 472 Western Thornbill
☐ 482 Slender-billed Thornbill
☒ 476 Inland Thornbill
☐ 466 Southern Whiteface
☐ 469 Banded Whiteface

QUAIL-THRUSH, ALLIES
☐ 437 Chestnut Quail-thrush
☐ 439 Cinnamon Quail-thrush
☐ 438 Chestnut-breasted Quail-thrush
☐ 422 Western Whipbird
☐ 865 Chiming Wedgebill
☒ 549 Varied Sittella

CUCKOO-SHRIKES, TRILLERS
☐ 423 Ground Cuckoo-shrike
☐ 424 Black-faced Cuckoo-shrike
☐ 425 White-bellied Cuckoo-shrike
☐ 429 Cicadabird
☐ 430 White-winged Triller
☐ 431 Varied Triller

WHISTLERS, SHRIKE-THRUSH
☐ 416 Crested Shrike-tit
☐ 403 Gilbert's Whistler
☒ 398 Golden Whistler
☐ 400 Mangrove Golden Whistler
☐ 401 Rufous Whistler
☐ 404 White-breasted Whistler
☐ 413 Little Shrike-thrush
☐ 411 Sandstone Shrike-thrush
☒ 408 Grey Shrike-thrush
☐ 419 Crested Bellbird

FIGBIRDS, ORIOLES
☐ 432 Australasian Figbird
☐ 672 Yellow Oriole
☐ 671 Olive-backed Oriole

LARKS
☐ 648 Horsfield's Bushlark

OLD WORLD WARBLERS
☐ 969 Zitting Cisticola
☐ 525 Golden-headed Cisticola
☐ 524 Australian Reed-Warbler
☐ 523 Tawny Grassbird
☐ 522 Little Grassbird
☐ 509 Rufous Songlark
☐ 508 Brown Songlark
☐ 507 Spinifexbird

WHITE-EYES
☐ 576 Yellow White-eye
☒ 574 Silvereye

SWALLOWS, MARTINS
☐ 358 White-backed Swallow
☐ 879 Barn Swallow
☐ 357 Welcome Swallow
☐ 360 Fairy Martin
☒ 359 Tree Martin

FLOWERPECKERS
☐ 564 Mistletoebird

FINCHES
☐ 653 Zebra Finch
☐ 655 Double-barred Finch
☐ 666 Long-tailed Finch
☐ 669 Masked Finch

☐ 341 Black-eared Cuckoo
☐ 344 Shining Bronze-Cuckoo
☐ 345 Little Bronze-Cuckoo
☐ 337 Pallid Cuckoo
☐ 338 Fan-tailed Cuckoo
☐ 339 Brush Cuckoo
☐ 336 Oriental Cuckoo

OWLS
☐ 247 Rufous Owl
☐ 246 Barking Owl
☐ 242 Southern Boobook
☐ 250 Masked Owl
☐ 249 Eastern Barn Owl
☐ 253 Eastern Grass Owl

KINGFISHERS
☐ 319 Azure Kingfisher
☐ 322 Laughing Kookaburra

PARDALOTES
☐ 565 Spotted Pardalote
☐ 570 Red-browed Pardalote
☒ 576 Striated Pardalote

HONEYEATERS, CHATS
☒ 592 Western Spinebill
☐ 602 Pied Honeyeater
☐ 8293 Kimberley Honeyeater
☐ 608 Singing Honeyeater
☐ 628 White-gaped Honeyeater
☐ 617 White-eared Honeyeater
☐ 620 Purple-gaped Honeyeater
☐ 621 Grey-headed Honeyeater
☐ 622 Yellow-plumed Honeyeater
☐ 623 Grey-fronted Honeyeater
☐ 624 Yellow-tinted Honeyeater
☐ 625 White-plumed Honeyeater
☐ 594 White-fronted Honeyeater

WOODSWALLOWS
☐ 543 White-breasted Woodswallow
☐ 544 Masked Woodswallow
☐ 545 White-browed Woodswallow
☐ 546 Black-faced Woodswallow
☐ 547 Dusky Woodswallow
☐ 548 Little Woodswallow

BUTCHERBIRDS, CURRAWONGS
☐ 701 Black Butcherbird
☒ 702 Grey Butcherbird
☐ 700 Pied Butcherbird
☒ 705 Australian Magpie
☐ 697 Grey Currawong
☐ 673 Spangled Drongo

FANTAILS
☐ 718 Arafura Fantail

☐ 664 Crimson Finch
☐ 663 Star Finch
☐ 662 Red-browed Finch
☐ 651 Red-eared Firetail
☐ 654 Painted Finch
☐ 670 Gouldian Finch
☐ 658 Yellow-rumped Mannikin
☐ 657 Chestnut-breasted Mannikin
☐ 659 Pictorella Mannikin

PIPITS, WAGTAILS
☐ 647 Australasian Pipit
☐ 9806 Eastern Yellow Wagtail

OLD WORLD FINCHES
☐ 996 European Goldfinch

Comments (other species, breeding, etc)

birds are in our nature

BAUUP

HYBRID STANDARD SEARCH SURVEY: 20 MIN x 2 HA AREA SEARCH + 50% BREAKOUT

DATE: 17.01.2020 SITE: NE of sanctuary

START TIME: 9.30 OBSERVERS:

1.	2. SPECIES	3. TIME 1ST CONTACT	4. TIME 2ND CONTACT	5. Count 20 mins	6. Count post 20 mins
1	Weebill	9.30		2	
2	Aust Ringneck	9.32	9.38	1,1,2	
3	Western Gerygone	9.33	9.40	1,1,1	
4	Silvereye	9.34	9.34	2,2,2	
5	Grey Fantail	9.37	9.42	1,1	
6	Yellow Rumped TB	9.37		3	
7	Western Spinebill	9.45		1	
8	Grey Butcherbird	9.48		1	
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FINISH TIME: 9.50

BALIJUP

HYBRID STANDARD SEARCH SURVEY: 20 MIN x 2 HA AREA SEARCH + 50% BREAKOUT

DATE: 17-01-2020 SITE: Sanctuary - Watercourse to salt patch

START TIME: 8.50 OBSERVERS: Sarah, Basil, Andrew

1.	2. SPECIES	3. TIME 1ST CONTACT	4. TIME 2ND CONTACT	5. Count 20 mins	6. Count post 20 mins
1	Weebil	8.51	8.59	1, 3, 1, 2	
2	Western Gerygone	8.53	9.00	1, 1	
3	Western Spinebill	8.59	9.06	1, 1	
4	White naped honeyeater	8.59		1	
5	Grey fantail	9.00	9.01	1, 1, 1	
6	Yellow western robin	9.06		1	
7	New Holland Honeyeater	9.07		1	
8	Spotted Pardalote	9.09		1	
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Splendid Wrens heard in Leptospermum 7 FINISH TIME: 9.10

White browed SW flew from outside fence - inside

BALIJUP

HYBRID STANDARD SEARCH SURVEY: 20 MIN x 2 HA AREA SEARCH + 50% BREAKOUT

DATE: 17-1-20 SITE: Sanctuary Watercourse to salt patch

START TIME: 8.25 OBSERVERS: Sarah, Basil, Andrew

1.	2. SPECIES	3. TIME 1ST CONTACT	4. TIME 2ND CONTACT	5. Count 20 mins	6. Count post 20 mins
1	Weebill	8.26	8.34	2,1,2,2	
2	Western Spinebill	8.28	8.38	1,1	
3	Aust Ringneck	8.28	8.36	2,1	
4	Western Gerygone	8.40	8.43	1,1,	
5	Grey Fantail	8.41		1,	
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FINISH TIME: 8.45

BALIJUP

HYBRID STANDARD SEARCH SURVEY: 20 MIN x 2 HA AREA SEARCH + 50% BREAKOUT

DATE: 17-1-20 SITE: Outside Sanctuary SW corner

START TIME: 6:50 OBSERVERS: Sarah, Basil, Andrew

1.	2. SPECIES	3. TIME 1ST CONTACT	4. TIME 2ND CONTACT	5. Count 20 mins	6. Count post 20 mins
1	Grey Fantail	6:51		1,	
2	Aust Ringneck	6:52	6:55	3, 3, 2, 3	
3	Western Rosellas	6:54	7.05	3, 2	
4	Yellow rump Thornbill	6:55		2,	
5	Tree Martins	6:59		4,	
6	Weebil	7:02	7.08	3, 2, 2	
7	Western Yellow Robin	7.04	7.06	1, 2	
8	Silvereyes	7.07	7.24	2,	1
9	New Holland HE	7.07		3,	
10	Purple-crowned Lorikeet	7.09		2	
11	Western Spinebill	7.14	7.21		2, 1
12	Whitenaped HE	7.18			1,
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Inland Thornbill seen after survey

GST heard after survey 5

FINISH TIME: 7.24

BALIJUP

HYBRID STANDARD SEARCH SURVEY: 20 MIN x 2 HA AREA SEARCH + 50% BREAKOUT

6.37 DATE: 17-1-20 SITE: Outside Sanct near gate

START TIME: 6.17 OBSERVERS: Basil, sarah, Andrew

1.	2. SPECIES	3. TIME 1ST CONTACT	4. TIME 2ND CONTACT	5. Count 20 mins	6. Count post 20 mins
1	Aust Ringneck	6.17	6.20	4, 2, 3	
2	Aust Raven	6.18	6.35	1, 1	
3	Weebill	6.24	6.27	1, 2	
4	Common Bronzewing	6.28		1,	
5	Grey Fantail	6.32	6.36	1, 1	
6	Inland Thornbill	6.34		1,	
7	Silvereyes	6.36		1,	
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Heard outside survey area - 4 Purple crowned Lorikeet, Carnabys Cockatoo Striated Pardalote, Magpie

FINISH TIME: 6-37

BALIJUP

HYBRID STANDARD SEARCH SURVEY: 20 MIN x 2 HA AREA SEARCH + 50% BREAKOUT

DATE: 16/1/2020 SITE: Balijup Sanctuary near gate

START TIME: 4.52 OBSERVERS: Andy, Kieran, Andrew

1.	2. SPECIES	3. TIME 1ST CONTACT	4. TIME 2ND CONTACT	5. Count 20 mins	6. Count post 20 mins
1	Ringneck Parrot	4:55	5:10	3,3	
2	Western Gerygone	4:56	5:03	1,1	
3	Grey Fantail	4:59	5:00	1,1	
4	Western Yellow Robin	5:00	5:06	1,1	
5	Scarlet Robin	5:00		1,	
6	~~Gold~~ Western Whistler	501		2,	
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5 sittellas moving through 3

FINISH TIME: 5:12

BALIJUP

HYBRID STANDARD SEARCH SURVEY: 20 MIN x 2 HA AREA SEARCH + 50% BREAKOUT

DATE: 16-1-20 SITE: BS near gate e

4:50 START TIME: 4:38 OBSERVERS: Kieran, Andy, Andrew

1.	2. SPECIES	3. TIME 1ST CONTACT	4. TIME 2ND CONTACT	5. Count 20 mins	6. Count post 20 mins
1	Ring Necks	4:31	4:50	2, 1	
2	Weebill	4:34	4:41, ~~4:45~~	3, 2, 1,	
3	Purple crown lorikeet	4:36		1,	
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2 FINISH TIME: 4.50

~~BASE~~ BALIJUP

HYBRID STANDARD SEARCH SURVEY: 20 MIN x 2 HA AREA SEARCH + 50% BREAKOUT

DATE: 16-1-20 SITE: ~~Balijup~~ Sanctuary Near Gate

4.27 START TIME: 4.07 OBSERVERS: Andy, Kieran, Andrew

1.	2. SPECIES	3. TIME 1ST CONTACT	4. TIME 2ND CONTACT	5. Count 20 mins	6. Count post 20 mins
1	Aust Ringneck	4.09	4.13	2, 1	
2	Western Gerygone	4.09		1	
3	Grey Fantail	4.12	4.17	1, 1, 1	
4	Western Whistler	4.23		2	
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FINISH TIME: 4.27