

**Busselton Health Campus
Western Ringtail Possum Monitoring
Annual Report
2019**

Prepared for
WA Country Health Service



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WA Country Health Service



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Abbreviations

Abbreviation	Definition
BHC	Busselton Health Campus
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999</i>
WACHS	WA Country Health Service
BC Act	<i>Biodiversity Conservation Act 2016</i>

Executive Summary

Astron Environmental Services conducted the 2019 western ringtail possum monitoring survey to satisfy the relevant environmental conditions of the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* approval (EPBC 2011/6011) for the Busselton Health Campus redevelopment. The survey was undertaken from 5 to 6 November 2019. Over two consecutive nights, 64 and 59 western ringtail possums were recorded, respectively. This equates to a mean count of 62 individuals for the 2019 monitoring period.

The recording of 62 western ringtail possums during the 2019 monitoring survey is above the 20% population reduction trigger value (54 individuals). However, the western ringtail possum number is the lowest recorded from all surveys undertaken during the post-breeding season, except for 61 individuals recorded in November 2009 during baseline surveys. The population does not appear to have increased from 2018, when they were predated upon by a resident red fox. Although there was no evidence of foxes in 2019, the population may still be subject to predation pressure from cats recorded during the 2019 survey.

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1 Introduction

Astron Environmental Services (Astron) was engaged by the WA Country Health Service (WACHS) to conduct an annual monitoring program for western ringtail possums (*Pseudocheirus occidentalis*) within the grounds of the Busselton Health Campus (BHC), located approximately 2.5 km to the west of the Busselton town centre. The annual monitoring is to be undertaken in the years 2018, 2019, 2020 and 2025, consistent to the methods and details specified in the Western Ringtail Possum Management Plan (Coffey Environments Australia Pty Ltd 2013) specific to the BHC site. The western ringtail possum monitoring program is a regulatory requirement under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC) approval conditions (EPBC 2011/6011) (Table 1).

The BHC has undergone a redevelopment project that included the removal of western ringtail possum habitat; peppermint trees (*Agonis flexuosa*) and the translocation of 20 western ringtail possum individuals. The western ringtail possum monitoring program has been conducted on a biannual basis from 2009 – 2016 and annually from 2017 - 2019. Under the Western Ringtail Possum Management Plan (Coffey Environments Australia Pty Ltd 2013) a reduction of more than 20% of the baseline population (threshold value of 54 individuals or less) would trigger a management response.

The objective of the 2019 monitoring program was to obtain a western ringtail possum abundance count for the BHC and compare the survey results with the baseline data and previous year's survey data.

Table 1: Relevant regulatory conditions under the EPBC approval (EPBC2011/6011).

Regulatory document	Condition no.	Requirement	Evidence
Development of the Busselton Health Campus (EPBC 2011/6011)	Condition 9 (c)	Details of a western ringtail possum monitoring program for the project area	This report.

2 Background Information

2.1 Ecology

The western ringtail possum is a folivorous (leaf eating herbivore) marsupial endemic to south-western Australia. The current distribution of this species is restricted to patchy occurrence along the south coast (from east of Albany to west of Walpole), the west coast (from Bunbury to Augusta), and inland populations in Harvey, Perup and Manjimup. The peppermint woodland around the Busselton area is classified as habitat critical to survival of this species (Department of Parks and Wildlife 2017).

The diet of the western ringtail possum almost exclusively comprises the dominant or co-dominant upper and midstorey myrtaceous plants. In urban areas the western ringtail possum may also feed on introduced garden species (Department of Parks and Wildlife 2017).

In some coastal populations, western ringtail possums breed year round with breeding peaks in late autumn and winter and a lull in late summer (Van Dyck and Strahan 2008). During the day western ringtail possums shelter in dreys (nests made of vegetated matter), tree platforms, tree hollows, hollow logs, *Xanthorrhoea* spp. skirts, under sedges, forest debris and disused rabbit warrens.

2.2 Conservation Status and Threats

The western ringtail possum is classified as Vulnerable under the Commonwealth EPBC Act and has recently been upgraded to Critically Endangered under the Western Australian *Biodiversity Conservation Act 2016* (BC Act).

Since colonial settlement the western ringtail possum has undergone a substantial range contraction, up to 90% of the predicted original range. The Ludlow-Busselton area has long been known as the last substantial stronghold for western ringtail possums left on the Swan Coastal Plain. This Swan Coastal Plain population has been contracting since the early 1990s, mostly due to habitat loss and fragmentation from urban development and mining (Woinarski, Burbidge, and Harrison 2014). The effect of the south-west's drying climate on the peppermint stands and canopy in this area is also considered a contributing factor of the decline (Jones and Francesconi 2007). Most of the populations within the Busselton area that have had sufficient monitoring to detect a decline over the last 5 to 12 years have shown declines of 20 to 80% (Woinarski, Burbidge, and Harrison 2014). From existing survey data, the population in the Bunbury to Dunsborough region is possibly between 2,000 and 5,000 animals (Department of Parks and Wildlife 2017). The major threats to this species survival include:

- habitat loss and fragmentation
- introduced predators (red foxes and cats)
- climate change
- timber harvesting
- altered fire regimes.

3 Methods

3.1 Monitoring

The 2019 monitoring program was conducted by Principal Zoologist Jessica Johnston, from 5 to 6 November 2019. The methods used are consistent with those previously used for the BHC site (Coffey Environments Australia Pty Ltd 2013). The weather conditions during both survey nights were cool and calm on 5 November 2019 and cool and moderately windy on 6 November 2019. Western ringtail possum activity did not appear to be impacted by the weather conditions.

Nocturnal spotlighting was conducted between 1930 and 2200 hours on both nights consisting of transects approximately 50 m apart around the areas of BHC with intact vegetation (survey effort shown in Figure 1). Western ringtail possums have distinctive eye shine that is easily detectable using this technique (Department of Parks and Wildlife 2017).

A drey census was conducted during the daylight hours of 5 November 2019 through areas containing intact vegetation (survey effort shown in Figure 1). Dreys were categorised into one of the following four categories based on Thompson and Thompson (2009):

- Category 1 - Flat bed of vegetative material.
- Category 2 - Slightly concave nest of vegetative material.
- Category 3 - Dome shape nest with an open top.
- Category 4 - Completely conical nest that is fully-enclosed.

All western ringtail possum and drey locations were marked using a handheld GPS.

3.2 Limitations

No limitations to the survey scope were encountered.

4 Results and Discussion

A total of 64 western ringtail possum individuals were recorded on the night of the 5 November 2019 and 59 individuals on the night of the 6 November 2019 (Table A.1, Appendix A). This equates to a mean count of 62 individuals for the 2019 monitoring period. As the 2019 survey was undertaken during the post breeding period, the records were generally from lone adults or adult/s accompanied by a sub-adult or juvenile (Plate 1) The density of western ringtail possums within BHC is approximately 18.5 individuals per ha of canopy, based on an estimated remaining canopy area of 3.35 ha (Coffey Environments Australia Pty Ltd 2013). A summary of the western ringtail possum monitoring results from 2009 to 2019 is displayed in Table 2.



Plate 1: Adult and sub-adult western ringtail possum.



Plate 2: Example of a rabbit warren.

Table 2: Western ringtail possum abundance and density.

Survey timing	Abundance	Density (individuals/hectare of canopy)
February 2009	58	13.1
November 2009	61	13.8
February 2010	44	10.0
December 2010	77	17.4
March 2011	57	12.9
November 2011	77	17.4
March 2012	82	18.6
October 2012	68	20.3
March 2013	61	18.1
October 2013	70	20.9
March 2014	64	19.1
October 2014	68	20.3

Survey timing	Abundance	Density (individuals/hectare of canopy)
March 2015	68	20.3
October 2015	108	32.2
March 2016	79	23.6
October 2016	104	31.0
March 2017	78	23.3
October 2018	64	19.1
November 2019	62	18.5

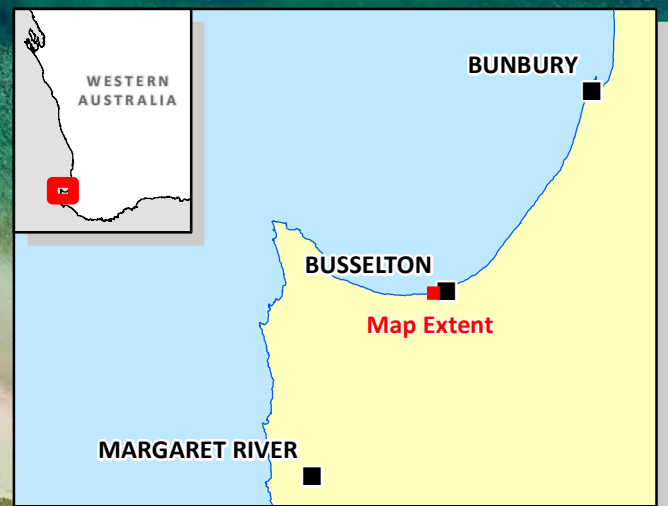
A total of 30 dreys were recorded across the BHC, these constitute one drey classified as category 1, 11 dreys classified as category 2, 12 dreys classified as category 3 and six dreys classified as category 4 (Table A.2, Appendix A). Four western ringtail possums (two lone adults, and one adult and juvenile) were identified as inhabiting the dreys at the time of the survey. The location of the western ringtail possums and the dreys recorded are displayed in Figure 1.

There was no evidence of the red fox den or associated western ringtail possum remains recorded in 2018. However, one cat (*Felis catus*) with no collar was flushed from vegetation within the foreshore area during the day and at least two cats were observed within the site on the night of 6 November 2019. The conservation area has been heavily impacted by rabbit (*Oryctolagus cuniculus*) grazing, with a large resident population occurring across the BHC (see Plate 2). Although not in direct competition with the western ringtail possum for food or shelter, the continued presence of rabbits at the BHC will impact the long-term health of the vegetation, in addition to providing a food source for cats.

344000

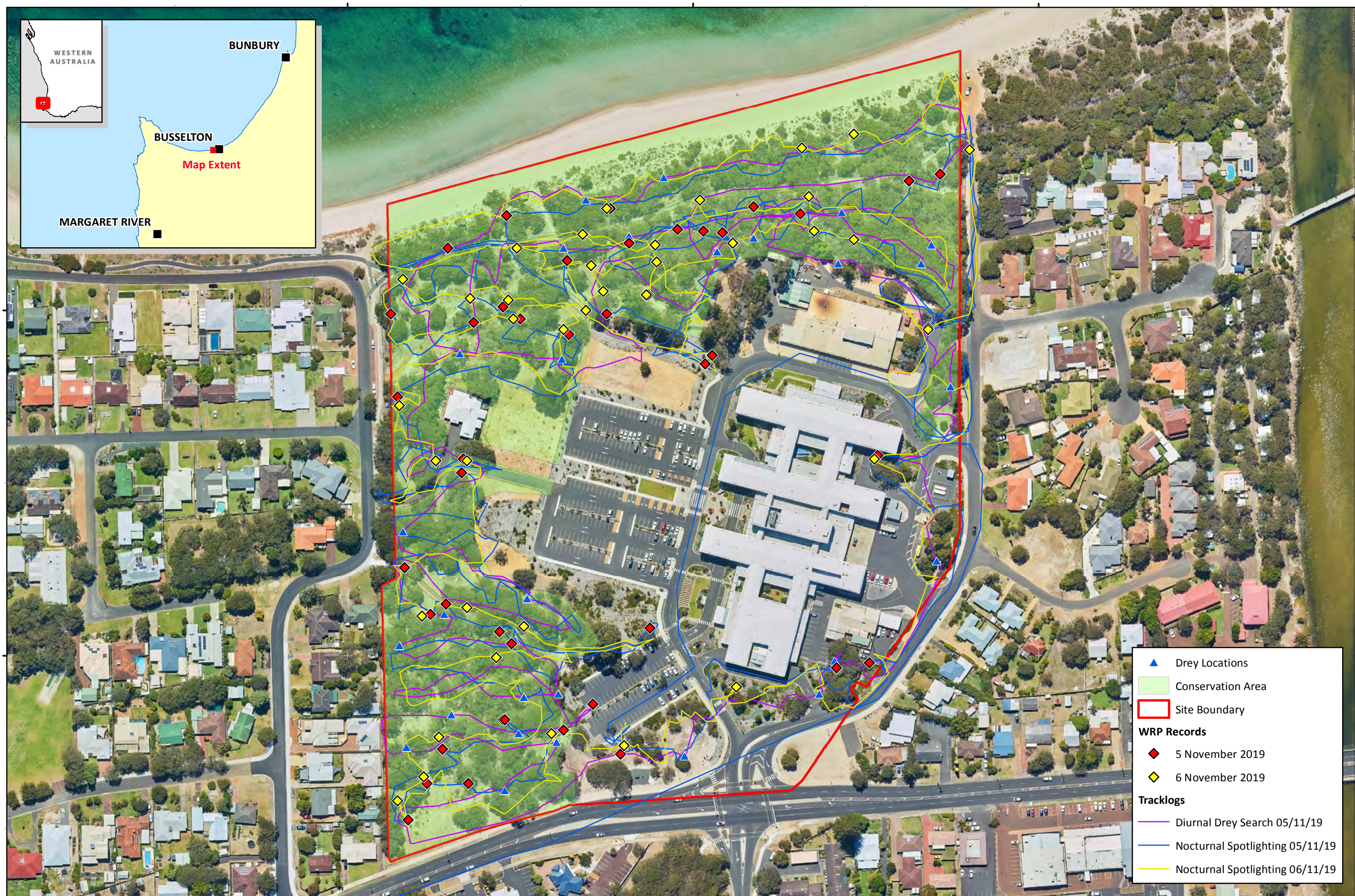
344200

344400



6275000

6274800



- ▲ Drey Locations
- Conservation Area
- Site Boundary
- WRP Records**
- ◆ 5 November 2019
- ◆ 6 November 2019
- Tracklogs**
- Diurnal Drey Search 05/11/19
- Nocturnal Spotlighting 05/11/19
- Nocturnal Spotlighting 06/11/19

WA Country Health Service
 Busselton Health Campus Western Ringtail Possum Monitoring, Annual Report 2019

Figure 1: Survey effort and location of Western Ringtail Possums and dreys

Author: J. Johnston

Drawn: L. Robinson

Date: 03-12-2019

Coordinate System: GDA 1994 MGA Zone 50

0 25 50 75 100 Metres



Figure Ref: 21249-19-ENVDR-1RevA_191127_WRP_Drey_Loc

The long-term data for the western ringtail possum abundance at the BHC follows a trend of higher numbers in October/November following the seasonal breeding over winter, followed by a decrease in February/March coinciding with sub-adult dispersal and mortalities (Figure 2).

The recording of 62 western ringtail possums during the 2019 monitoring survey is above the 20% population reduction trigger value (54 individuals) and is just below the mean abundance recorded during the baseline surveys (65 individuals). However, the western ringtail possum number is the lowest recorded from all surveys undertaken during the post-breeding season, except for 61 individuals recorded in November 2009 during baseline surveys (Figure 2). The population does not appear to have increased from 2018, when there was predation pressure from a resident red fox. The population may still be subject to predation pressure in 2019, but possibly from a different predator, the feral cat.

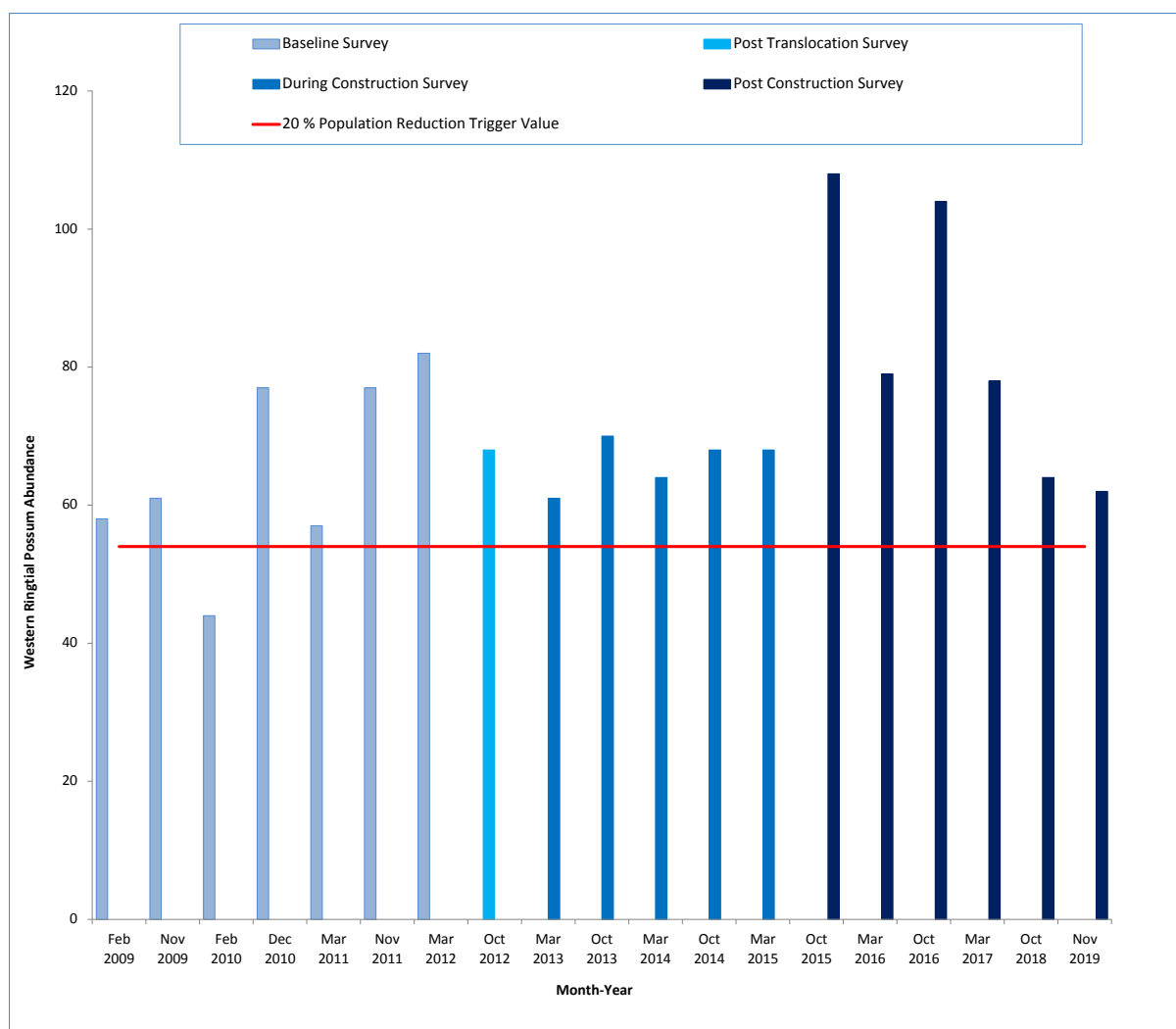


Figure 2: Western ringtail possum abundance at BHC from 2009 to 2019.

5 Conclusions

As the western ringtail possum population remains above the 20% trigger value a management response involving an increase in monitoring frequency, further population investigation or consultation with the Department of Water and Environmental Regulation and the Department of the Environment and Energy is not required at this stage (Coffey Environments Australia Pty Ltd 2013).

6 References

Coffey Environments Australia Pty Ltd 2013, *Western Ringtail Possum Management Plan - Busselton Hospital Health Campus Redevelopment*, Unpublished report for Department of Health, Perth.

Department of Parks and Wildlife 2017, *Western Ringtail Possum (Pseudocheirus occidentalis) Recovery Plan. Wildlife Management Program No. 58.*

Jones, BA & Francesconi, M 2007, *An important local population of the Western Ringtail Possum, Pseudocheirus occidentalis: a 2006 survey study of the population and habitat in the Busselton localities of Siesta Park and Kealy*, unpublished report prepared for Geocatch.

Thompson, SA & Thompson, GG 2009, 'A case for *in situ* management of Western Ringtail Possums, *Pseudocheirus occidentalis*, in development areas', *Journal of the Royal Society of Western Australia*, vol. 92, no. 3, pp. 269-76.

Van Dyck, S & Strahan, R 2008, *The Mammals of Australia*, 3 edn., New Holland Publishers, Sydney.

Woinarski, JCZ, Burbidge, AA & Harrison, PL 2014, *The Action Plan for Australian Mammals 2012*, CSIRO Publishing, Collingwood.

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Appendix A: Western Ringtail Possum and Drey Locations

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Table A.1: Location of dreys recorded in 2019 at the Busselton Health Campus.

Waypoint number	Easting (mE)	Northing (mN)	Tree species	Tree height (m)	Drey category rating	Height of drey in tree (m)	Comments
37	344099	6274755	Peppermint	6	2	5	
38	344060	6274766	Peppermint	6	2	5	
39	344034	6274747	Peppermint	5	2	4	
40	344121	6274750	Peppermint	7	3	5	
41	344091	6274722	Peppermint	8	2	6	
47	344195	6274742	Peppermint	4	3	2	
48	344273	6274778	Peppermint	3	4	2.5	
49	344282	6274797	Peppermint	3	1	3	
50	344341	6274855	Peppermint	4	4	4	
51	344349	6274956	Peppermint	5	3	4	
52	344284	6275027	Peppermint	7	2	6	
53	344332	6275027	Peppermint	10	3	9	
54	344338	6275038	Peppermint	8	3	7	
55	344286	6275057	Melaleuca sp.	8	4	7	
57	344183	6275077	Peppermint	3	3	3	
59	344138	6275064	Peppermint	5	3	4	
60	344065	6274975	Peppermint	5	2	5	
61	344125	6275036	Peppermint	8	2	7	
62	344163	6275043	Peppermint	6	3	6	Adult and juvenile in drey
63	344235	6275042	Peppermint	4	2	2	
64	344214	6275034	Peppermint	6	3	5	Adult in drey (tail)
65	344124	6274972	Peppermint	8	4	8	

Waypoint number	Easting (mE)	Northing (mN)	Tree species	Tree height (m)	Drey category rating	Height of drey in tree (m)	Comments
66	344032	6274872	Peppermint	10	4	9	
67	344104	6274833	Peppermint	8	3	8	Adult in drey
68	344056	6274824	Peppermint	8	4	7	
69	344030	6274806	Peppermint	8	3	7	
69	344030	6274806	Peppermint	8	2	8	
70	344097	6274809	Peppermint	6	3	6	
71	344122	6274778	Peppermint	8	2	6	
72	344102	6274776	Peppermint	6	2	3	

Table A.2: Location of western ringtail possums recorded in 2019 at the Busselton Health Campus.

Waypoint number	Easting (mE)	Northing (mN)	Date	Species	Tree species	Number of possums	Comments
73	344142	6274772	5/11/2019	WRP	Peppermint	1	
74	344125	6274757	5/11/2019	WRP	Peppermint	1	
75	344070	6274726	5/11/2019	WRP	Peppermint	1	
76	344046	6274726	5/11/2019	WRP	Peppermint	1	
77	344035	6274705	5/11/2019	WRP	Peppermint	1	
78	344055	6274746	5/11/2019	WRP	Peppermint	1	
79	344090	6274763	5/11/2019	WRP	Peppermint	2	Adult + juvenile
80	344091	6274763	5/11/2019	WRP	Peppermint	1	
81	344175	6274816	5/11/2019	WRP	Peppermint	2	Adult + juvenile
82	344095	6274807	5/11/2019	WRP	Peppermint	2	Adult + subadult
83	344088	6274814	5/11/2019	WRP	Peppermint	2	Adult + subadult
84	344057	6274830	5/11/2019	WRP	Peppermint	2	Adult + subadult
85	344048	6274824	5/11/2019	WRP	Peppermint	1	
86	344033	6274851	5/11/2019	WRP	Peppermint	1	
87	344066	6274906	5/11/2019	WRP	Peppermint	1	
88	344067	6274914	5/11/2019	WRP	Peppermint	1	
89	344029	6274950	5/11/2019	WRP	Peppermint	2	Adult + subadult
90	344128	6274986	5/11/2019	WRP	Peppermint	1	
91	344100	6274995	5/11/2019	WRP	Peppermint	1	
92	344090	6275002	5/11/2019	WRP	Peppermint	2	Adult + subadult
93	344073	6274993	5/11/2019	WRP	Peppermint	1	
94	344025	6274998	5/11/2019	WRP	Peppermint	2	Adult + subadult

Waypoint number	Easting (mE)	Northing (mN)	Date	Species	Tree species	Number of possums	Comments
95	344058	6275036	5/11/2019	WRP	Peppermint	1	
96	344127	6275029	5/11/2019	WRP	Peppermint	1	
97	344150	6274998	5/11/2019	WRP	Peppermint	2	Adult + subadult
98	344211	6274974	5/11/2019	WRP	Peppermint	3	2 adults + juvenile
99	344207	6274969	5/11/2019	WRP	Peppermint	2	Adult + juvenile
100	344217	6275045	5/11/2019	WRP	Peppermint	4	2 adults + 2 subadults
101	344262	6275056	5/11/2019	WRP	Peppermint	2	Adult + subadult
102	344336	6274990	5/11/2019	WRP	Peppermint	2	Adult + subadult
103	344343	6275079	5/11/2019	WRP	Peppermint	1	
104	344325	6275075	5/11/2019	WRP	Peppermint	1	
105	344235	6275060	5/11/2019	WRP	Peppermint	1	
106	344206	6275046	5/11/2019	WRP	Peppermint	1	
107	344191	6275047	5/11/2019	WRP	Peppermint	1	
108	344163	6275039	5/11/2019	WRP	Peppermint	1	
109	344092	6275055	5/11/2019	WRP	Peppermint	3	2 adults + juvenile
110	344152	6275059	5/11/2019	WRP	Peppermint	2	Adult + subadult
111	344307	6274916	5/11/2019	WRP	Peppermint	1	
112	344302	6274796	5/11/2019	WRP	Peppermint	3	2 adults + juvenile
113	344283	6274793	5/11/2019	WRP	Peppermint	1	
114	344158	6274743	5/11/2019	WRP	Peppermint	1	
115	344160	6274748	6/11/2019	WRP	Peppermint	1	
116	344118	6274755	6/11/2019	WRP	Peppermint	1	
117	344029	6274716	6/11/2019	WRP	Peppermint	1	

Waypoint number	Easting (mE)	Northing (mN)	Date	Species	Tree species	Number of possums	Comments
118	344044	6274730	6/11/2019	WRP	Peppermint	1	
119	344053	6274753	6/11/2019	WRP	Peppermint	1	
120	344086	6274799	6/11/2019	WRP	Peppermint	2	Adult + subadult
121	344102	6274817	6/11/2019	WRP	Peppermint	3	
122	344069	6274828	6/11/2019	WRP	Peppermint	2	2 adults + subadult
123	344043	6274823	6/11/2019	WRP	Peppermint	2	Adult + subadult
124	344069	6274913	6/11/2019	WRP	Peppermint	1	
125	344051	6274913	6/11/2019	WRP	Peppermint	1	
126	344030	6274945	6/11/2019	WRP	Peppermint	2	Adult + subadult
127	344125	6274989	6/11/2019	WRP	Peppermint	3	2 adults + juvenile
128	344096	6274995	6/11/2019	WRP	Peppermint	1	
129	344032	6275018	6/11/2019	WRP	Peppermint	1	
130	344071	6275007	6/11/2019	WRP	Peppermint	1	
131	344093	6275006	6/11/2019	WRP	Peppermint	3	2 adults + juvenile
132	344141	6275026	6/11/2019	WRP	Peppermint	2	Adult + subadult
133	344148	6275011	6/11/2019	WRP	Peppermint	2	Adult + subadult
134	344138	6275000	6/11/2019	WRP	Peppermint	2	Adult + subadult
135	344098	6275036	6/11/2019	WRP	Peppermint	1	
136	344136	6275044	6/11/2019	WRP	Peppermint	3	2 adults + juvenile
137	344179	6275028	6/11/2019	WRP	Peppermint	1	
138	344174	6275009	6/11/2019	WRP	Peppermint	1	
139	344173	6275009	6/11/2019	WRP	Eucalyptus sp.	1	
140	344223	6275039	6/11/2019	WRP	Peppermint	1	

Waypoint number	Easting (mE)	Northing (mN)	Date	Species	Tree species	Number of possums	Comments
141	344270	6275046	6/11/2019	WRP	Peppermint	3	2 adults + juvenile
142	344293	6275041	6/11/2019	WRP	Peppermint	1	
143	344267	6275066	6/11/2019	WRP	Peppermint	2	Adult + subadult
144	344204	6275064	6/11/2019	WRP	Peppermint	1	
145	344178	6275038	6/11/2019	WRP	Peppermint	1	
146	344150	6275059	6/11/2019	WRP	Peppermint	1	
147	344263	6275094	6/11/2019	WRP	Peppermint	2	Adult + subadult
148	344293	6275102	6/11/2019	WRP	Peppermint	2	Adult + subadult
149	344360	6275093	6/11/2019	WRP	Peppermint	1	
150	344336	6274989	6/11/2019	WRP	Peppermint	2	Adult + juvenile
151	344305	6274914	6/11/2019	WRP	Peppermint	1	
152	344225	6274782	6/11/2019	WRP	Yate	1	