

Monitoring changes in the abundance of Western Ringtail Possums (*Pseudocheirus occidentalis*) after construction of the Albany Heritage Park Demonstration Trail

August /September 2018 Monitoring Session -

20 months Post Trail Construction

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Survey dates: 27th, 29th, 30th August and 3rd September 2018



Report prepared by Sandra Gilfillan for the City of Albany

November 2018

1. Background

After adoption by Council in 2015 of the *City of Albany Trails Hub Strategy 2015-2025* the City has been working extensively with the community, stakeholders and staff to create a concept plan for recreational trails in Albany Heritage Park as the highest priority project identified in the Strategy.

Construction of a Demonstration Trail was completed on the 23rd December 2016.

Mount Clarence and Adelaide Reserves are thought to be core habitats for the Albany population of the State and Commonwealth listed Western Ringtail Possum, where it occurs in high densities (Oyster Harbour Catchment Group Albany Project preliminary monitoring results).

A decision was therefore made by the City of Albany to carry out monitoring of the Western Ringtail Possum abundance along the Demonstration Trail in an attempt to identify impacts on this species with the view to providing an evidence based approach to an evaluation of impacts of the rest of the trails proposal.

Previous monitoring occurred on the following dates:

1. Immediately pre construction (6th to the 9th November 2016)
2. Immediately post construction (29 and 30th December 2016 and 1st and 2nd January 2017)
3. Three months post construction (9th to 12th April 2017)
4. Five months post construction (19th, 21st, 22nd and 24th June 2017)
5. Ten months post construction (20th-23rd November 2017)

The results for these monitoring sessions are presented and discussed in Gilfillan (2017).

This report outlines the results for the August /September 2018 (*20 months* post construction) monitoring session carried out on the 27th, 29th, 30th August and 3rd September. It also includes a summary and discussion of overall results for the previous monitoring sessions in the context of the latest results.

2. Methods

2.1 Monitoring Sites

Three sites were surveyed in August 2018, comprising two situated along the Demonstration Trail (Site 1 and 2) (placed in vegetation types that are known to support Western Ringtail Possums (*Marri/Jarrah Coastal Hills Forest* and *Jarrah Woodland*, ARVS Vegetation Units) and the Control Site

(a monitoring site used for the Oyster Harbour Catchment Group Western Ringtail Possum Albany Project (Gilfillan and Comer 2018)). It is approximately 500m from the Demonstration Trail sites and also comprises the above two vegetation types) (Figure 1).

2.2 Spotlighting

Spotlighting at all sites was carried out using the *distance sampling method*. Distance sampling involves the counting of individuals or groups of individuals, along a line transect by sighting the animal and then measuring an accurate perpendicular distance from the line-transect.

Further details on spotlighting methods are outlined in Gilfillan (2017).

Spotlight leaders: Carl Beck (City of Albany) (Site 1); Sandra Maciejewski (City of Albany) (Site 2); Sandra Gilfillan (Control Site); Kristy Vogel (Field Assistant).

2.3 Data analysis

2.3.1 Measurement of numbers of Ringtail Possums

As for previous sessions, the sample sizes for each site were too small to produce a meaningful results using *Distance Analysis*. Results are therefore presented for the unadjusted counts which do not take into account the detection probability of the species at these sites. This means that the counts presented may not accurately reflect the actual number of individuals present due to differences in detectability between nights within a monitoring session and between monitoring sessions.

The **highest count** over the four nights at a site, which represents the ***number of individuals known to be alive (KTBA)*** on the site within the period of sampling, was used to compare monitoring sessions. This value is a reasonable measure for which to make comparisons between monitoring sessions as it most likely represents the count when detectability was the ***highest***.

2.3.1 Small-scale spatial distribution of Western Ringtail Possum spotlighting observations.

In previous reports the analysis of the percentage of observations within the 5 m Trail buffer was calculated using GPS coordinates of the observation. However the actual location of the animal is a perpendicular distance from this point. In this report therefore the percentage of observations within the 5 m buffer was calculated for this monitoring session, and recalculated for all previous monitoring sessions, using the perpendicular distance of the observation from the Trail. The Trail has

a 5 m buffer on either side of it, and therefore any observation within 5 m of either side of the Trail was recorded as being inside the 5 m buffer. Observations from all nights per session were summed for a site and presented as a percentage of the total number of the observations per session (pairs and triplets included).

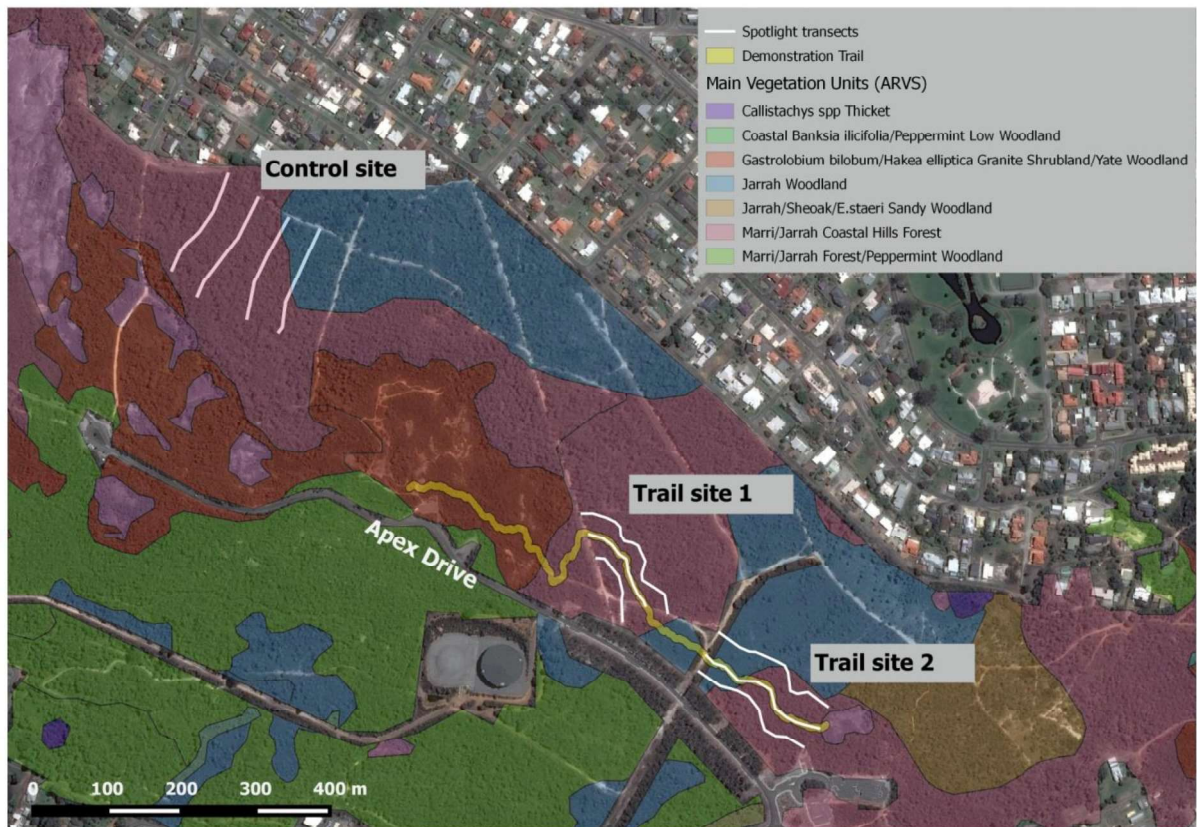


Figure 1: Location of Western Ringtail Possum monitoring sites for the Albany Heritage Park Demonstration Bike Trail (Control site and Trails sites (Site 1 and 2), and the main ARVS Vegetation Units present. Location Map (right)



3. Results and Discussion

3.1 August 2018 (20 months post construction) monitoring session

Results of spotlighting for the August 2018 (20 month post construction) monitoring session are shown in Table 1 and Figures 2 and 3. These numbers represent the raw data (numbers of animals seen, with pairs and triplets included in the count).

Counts between nights within a site were quite variable for Site 2 and the Control Site, but fairly consistent on Site 1 (Table 1). At all sites Ringtail Possum observations were scattered throughout the site, with records on all transects (Figure 2 and 3). Brushtail Possums were only observed at the Control site.

Table 1: August 2018 (20 months post construction) spotlighting. Number of Western Ringtail Possums spotted at each site (on transects only) for each night. BTP = Brushtail Possum. Pairs and triplets included in count.

Site	Date	Number seen by spotter	Number seen by other	Total	Other species observed
1	27/08/2018	6	0	6	
1	29/08/2018	7	0	7	
1	30/08/2018	7	0	7	
1	3/09/2018	7	0	7	
2	27/08/2018	5	2	7	
2	29/08/2018	4	0	4	
2	30/08/2018	5	0	5	
2	3/09/2018	6	1	7	
Control	27/08/2018	1	0	1	BTP
Control	29/08/2018	4	0	4	
Control	30/08/2018	1	0	1	BTP
Control	3/09/2018	1	0	1	BTP

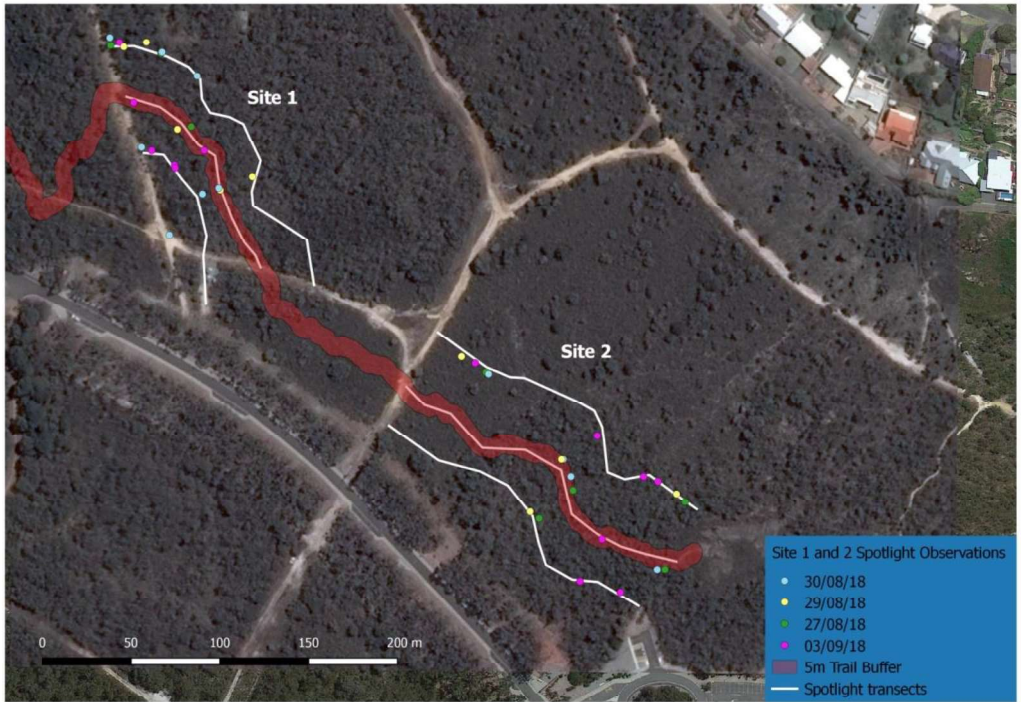


Figure 2: Distribution of observations of Ringtail Possums on Site 1 and Site 2 (all nights).

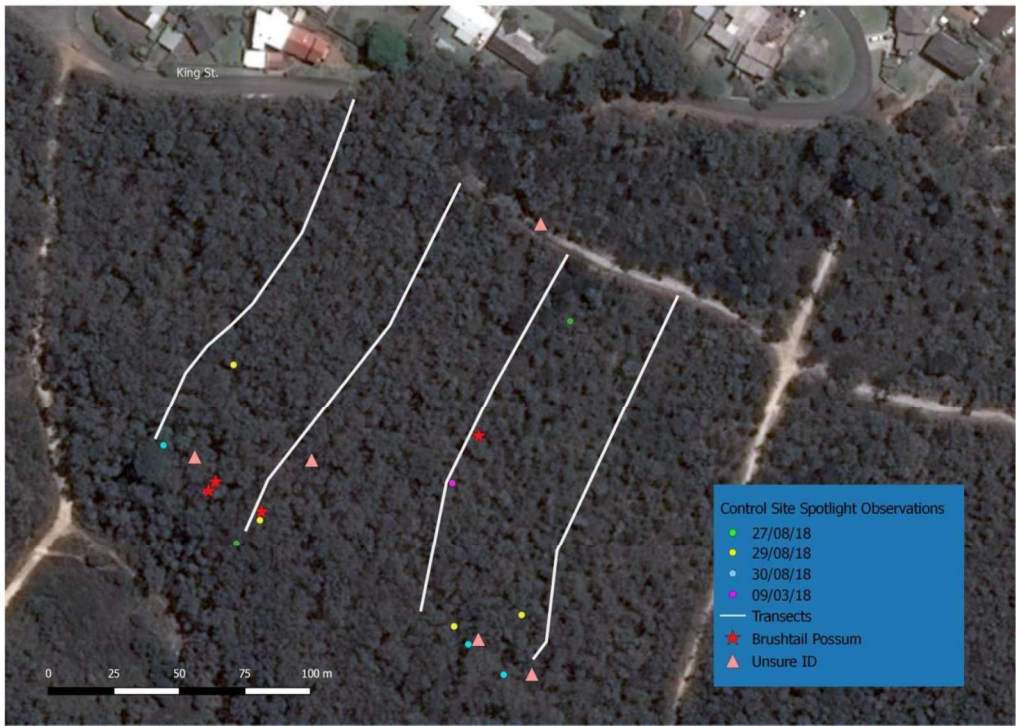


Figure 3: Distribution of observations of Ringtail Possums (and Brushtail Possums) on the Control site (all nights).

A summary and comparison of counts for the seven construction monitoring phase sessions is shown in Table 2 and Figure 4. The highest count of the sampling period represents the number of individuals known to be alive (KTBA) on the site, within the period of sampling.

KTBA values (including pairs and triplets) varied over the monitoring sessions for all sites (Table 2, Figure 4). The Trail sites differed in their *post* construction KTBA values. Trail site 1 showed an apparent trend of a sustained decrease up to *10 months post* Trail construction, with a lower count in the *10 months post* monitoring session than in the *pre* monitoring session (both in November). Trail site 2 showed variable counts with no sustained decrease and showed a similar count in the *pre* monitoring session to the *post 10 months post* monitoring session (both in November). By the *20 month post* construction session, KTBA values for Site 1 were similar to the *pre* session, however at Site 2, KTBA values were half that seen in the *pre* session.

The Control site KTBA values also showed a substantial decrease between the *pre* and *20 month post* sessions.

Table 2: Summary of spotlight counts and KTBA values in seven construction phase monitoring sessions. Range of counts over 4 nights for each session (NB: one night only for *During*). KTBA values in bold. Pairs and triplets included in count. Number of pairs relates to the highest count. * Probable repeat counts included here (value is more likely 13).

	Pre	During	Immediate post	3 months post	5 months post	10 months post	20 months post
Site 1	5-6 (1 pair)	11 (2 pairs)	8- 12 (5 pairs)	0-7 (1 pair)	0-4 (0 pairs)	2-4 (2 pairs)	6-7 (2-3 pairs)
Site 2	11- 18* (or 13) (3 pairs and 2 triplets)	12 (3 pairs)	5- 13 (4 pairs)	5-7 (2 pairs)	3- 11 (2 pairs and 1 triplet)	6- 10 (1 pair and 1 triplet)	4-7 (0-2 pairs)
Control	7-17 (7 pairs)	NS	7- 10 (1 pair and 1 triplet ; 2 pairs)	2- 12 (0 pairs)	5- 8 (1 triplet)	3-7 (1 pair)	1-4 (1 pair)

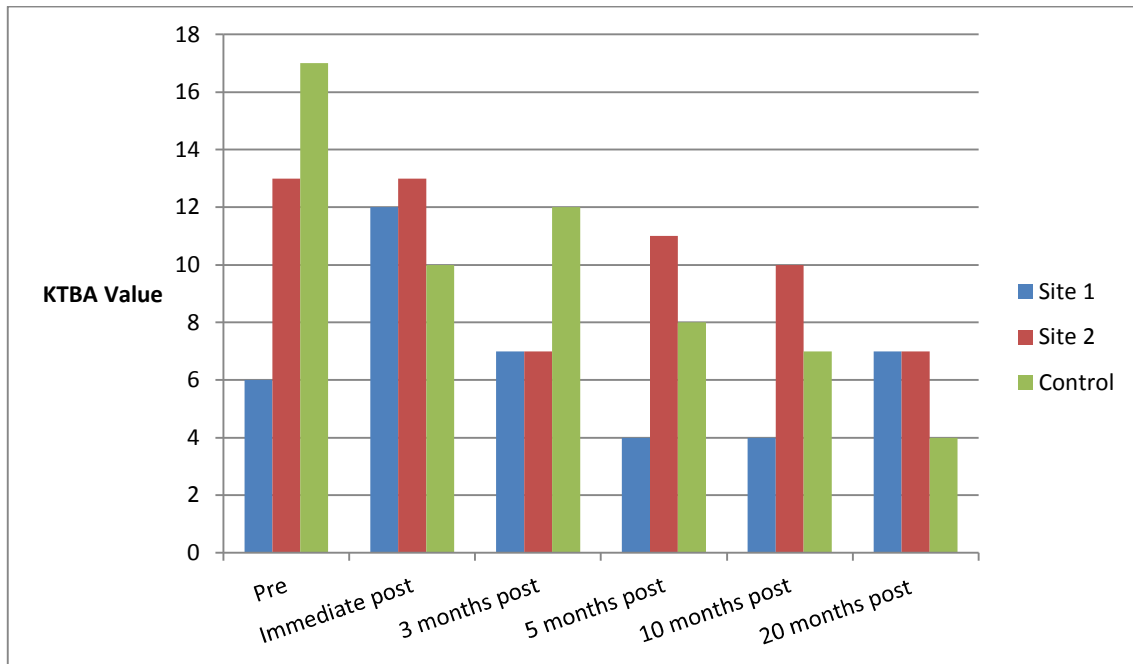


Figure 4: Spotlight counts (KTBA values) in six construction phase monitoring sessions.

3.2 Small-scale spatial distribution of Western Ringtail Possum spotlighting observations.

In addition to counts, the small-scale spatial distribution of Ringtail Possum spotlight observations on sites can be compared between monitoring sessions. Changes in these small-scale distributions may indicate a change in use of certain areas of the survey area, or of the home range of an individual. Due to the high variability in the spotlight counts, this measure is possibly a more robust indicator of any impact of the Trail on individual possums.

Note: the new method applied to calculating the percentage of observations within the 5 m Trail buffer did not significantly change results from the previous method.

For Site 1, the *immediate post* session saw a reduction in observations within the 5 m Trail buffer in comparison to the *pre* session, with the *3 months post* and the *5 months post and 10 month* monitoring session failing to detect any Ringtail Possums within the 5 m Trail buffer. By the 20 months post session values were close to the *pre* session values. At Site 2, in comparison, there was no clear trend in the percentage of observations within the 5 m Trail buffer and no apparent shift away from the Trail transect over the period of monitoring (Figure 5).

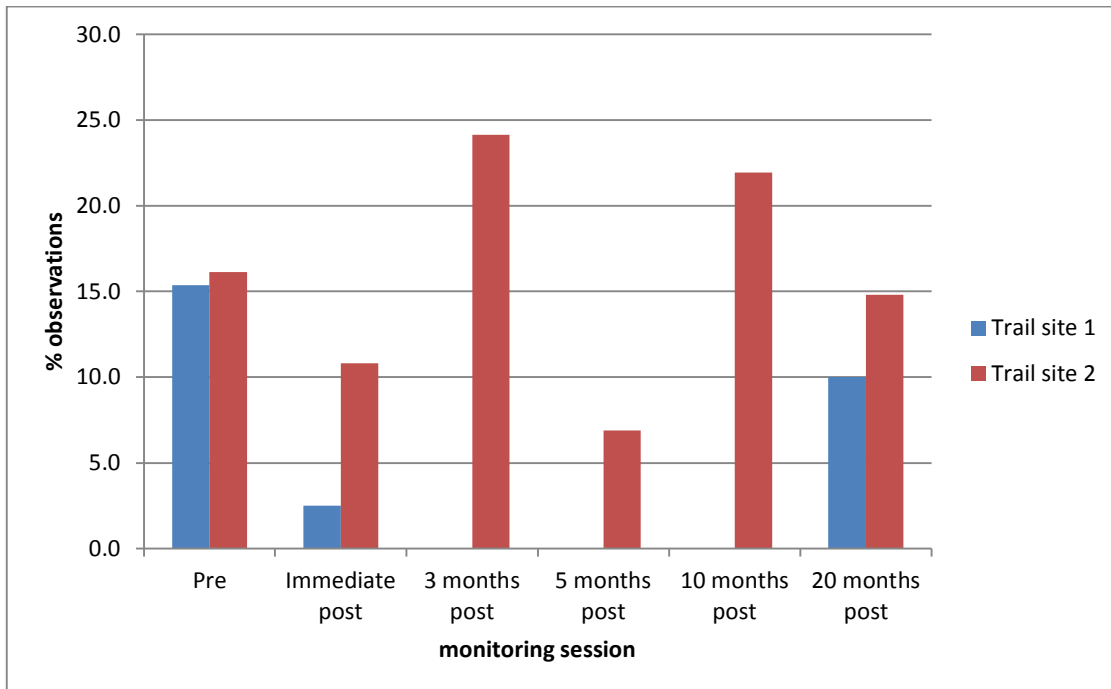


Figure 5: Percentage of Ringtail Possum observations within the 5m Trail buffer over six monitoring sessions for Trail Site 1 and 2.

4. Discussion

Spotlight counts of Western Ringtail Possums in all monitoring sessions, at all sites to date have been very variable. Using the maximum number seen over the monitoring session (KTBA) allows a comparison to be made between sessions of the minimum number of individuals using the site at the time of sampling. The KTBA values over the 6 monitoring sessions (1 Pre and 5 Post Trail construction), indicate that, at this point in time (at 20 months post construction) the Trail construction and use has had no negative impact (reduction) on the number of Ringtail Possums *observed* using the sites.

However, high variability in the spotlight counts within and between monitoring sessions at all sites, including the Control, suggests that the numbers (and KTBA values) *observed* do not accurately reflect the numbers of individuals using the area around the Trails, possibly due to factors such as the movement of individuals throughout their home range during a night, and the differences in detectability due to differing habitat types and differing observers. Robust estimates of abundance and density can only be obtained by applying distance sampling analysis to the data (and thereby estimating detection rates) which, unfortunately could not be applied in this situation due to the low sample numbers. A recently completed Oyster Harbour Catchment Group Western Ringtail Possum Project found similar high variability in spotlight counts, but when distance sampling analysis was applied the results showed consistency in abundance and densities over for seasons (Gilfillan and Comer 2018).

Difficulties with the correct identification of Ringtail Possums on the Control Site between Ringtails and Brushtail Possums in certain situations (when animals high up a tree) may under or over record the numbers of Ringtail Possums counted on a particular night.

In terms of small-scale space use around the Trails, the *20 months* monitoring session saw a return in the percentage of observations within the 5 m Trail buffer to values similar to *pre* session at Site 1. The small scale use of space by individuals, and hence detection of shifts in distribution, however can best be elucidated by the radio-tracking of individuals whose home ranges intersect the Trail area.

5. Conclusion and Recommendations

The limitations of the study discussed make it difficult to draw any definite conclusions at this stage about the impacts of Demonstration Trail construction and use on Western Ringtail Possums. The following recommendations will lead to a better understanding of this issue:

1. As outlined in Gilfillan (2017), that in the longer term a more comprehensive monitoring of the whole of the Mt Clarence /Adelaide Reserves Ringtail population would enable the application of distance sampling analysis, and likely give a more accurate assessment of any changes in population numbers.

Baseline density estimates using distance sampling analysis is now available for the Mt Clarence/Mt Adelaide Reserves as a whole (Gilfillan and Comer 2018). The continued monitoring of the OHCG Project transects can be used to monitor any long-term changes that may results from escalation of the Trails from the small area of the Demonstration Trail to a larger Trail system covering a wider area of the Reserves.

2. Due to the high variability in overall counts, if monitoring is continued at the Trail sites emphasis of results should be placed on the percentage of sightings within the 5m trail buffer rather than counts. The monitoring could be extended to the whole of the Trail in order to increase sample size. In order to properly elucidate the impacts of trail use on small scale distribution of individuals around the trail, radio-tracking of individuals should be considered.

References

Gilfillan, S. (2017). Monitoring changes in the abundance of Western Ringtail Possum (Ngwayir) (*Pseudocheirus occidentalis*) after construction and use of the Albany Heritage Park Mountain Bike Demonstration Trail, Mt Clarence, Albany, WA. Final Report. Report Prepared for the City of Albany.

Gilfillan, S. and Comer, S. (2018). Western Ringtail Possums in Albany: Core Habitat, Abundance, and Distribution. Oyster Harbour Catchment Group Project. Final Report of findings.