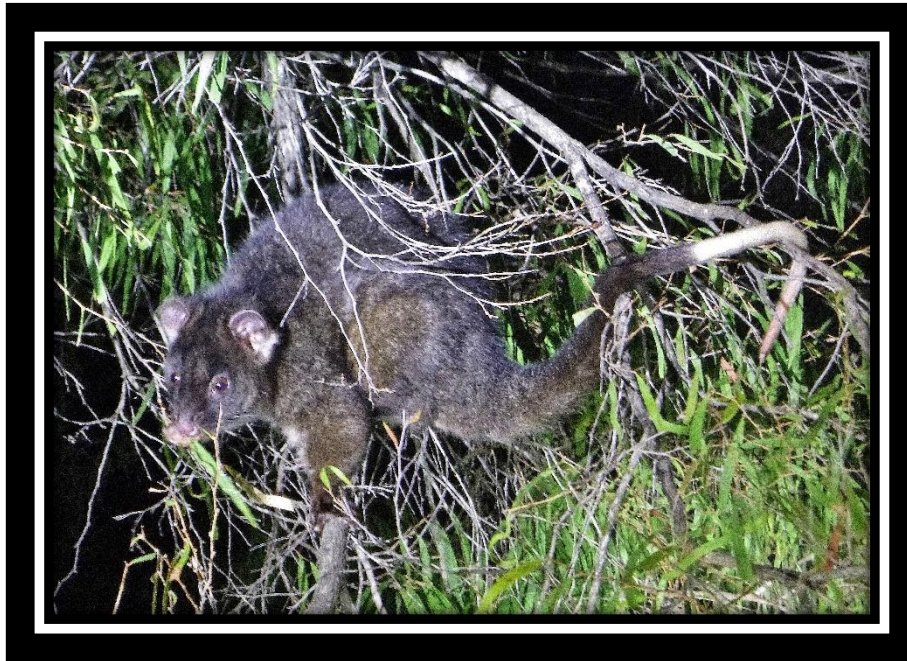


Assessment of the Western Ringtail Possum along the Vasse River for the Busselton Eastern Link Project



Western Ringtail Possum at the Vasse River footbridge, off Peel Terrace (Photo:Tim Gamblin)

Prepared for: Strategen Environmental

Prepared by: Mike Bamford and Tim Gamblin
M.J. & A.R. Bamford Consulting Ecologists
23 Plover Way
Kingsley, WA 6026



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INTRODUCTION

The City of Busselton is proposing to develop the Eastern Link Project (the Project), comprising a new road and bridge over the Vasse River in Busselton, 200m east of the existing Causeway Bridge. The City has engaged Strategen Environmental to coordinate environmental studies and approvals for the Project.

The Eastern Link Project will involve clearing approximately 0.05ha (seven mature trees) of Peppermint (*Agonis flexuosa*) woodland on the northern shore of the Vasse River and approximately 0.16ha of mixed riparian (various sp.) and paperbark (*Melaleuca* sp.) woodland on the southern shore. Surveys by Ecosystem Solutions (2017) and Busselton-Dunsborough Environment Centre (BDEC, 2018) found that the Western Ringtail Possum (WRP, *Pseudocheirus occidentalis*), a listed threatened species (Critically Endangered under both the Federal *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and the *Western Australian Biodiversity Conservation Act 2016*), occurred in vegetation in and adjacent to the Project area. Clearing of the Project area will affect this species' habitat.

The above two surveys were at different times of year (August 2017 for Ecosystem Solutions, December 2018 for BDEC) and recorded different numbers of animals. In addition, the Department of Biodiversity, Conservation and Attractions (DBCA) has indicated concern that the August 2017 survey may have underestimated the number of WRP in the vicinity of the Project area, and that clearing the Project area may result in over-crowding in the surrounding habitat. Accordingly, Strategen have engaged Bamford Consulting Ecologists (BCE) to undertake a verification survey of the Project area and surrounding WRP habitat, to characterize the distribution and abundance of WRP.

METHODS

Description of Project Area

There is some history to WRP surveys for the Project and two study areas have been recognised: the Project area (development envelope – blue polygon on Figure 1) and the survey area (pink polygon on Figure 1). The BCE investigations encompassed both these areas. The Project area consists of approximately 1.25ha of land along the northern and southern shores of the Vasse River, running north/south, approximately from Cammilleri St south towards Causeway Road (blue polygon, Figure 1). Much of the vegetation consists of Peppermint woodland, with varying proportions of Flooded Gum (*Eucalyptus rudis*), *Melaleuca priessiana*, *Melaleuca* sp. and occasional other tree and tall shrub species. There are also areas of seasonally inundated sedgeland. The survey area (pink polygon on figure 1) extends east-west along the Vasse River, and south along Paperbark woodland around a wetland located west of the historic railway embankment. The survey area thus includes a large amount of woodland fringing the river.

Survey methods

The survey area consists of land along the Vasse River from the Causeway Road Bridge to the Old Butter Factory/Museum and the equivalent area on the southern shore, with an extra section due south in the wetland west of the railway embankment (Figure 1). A small northern area of just a few trees along Cammilleri St was also investigated. The survey area represents the areas of WRP habitat expected within and adjacent to the Project area, excluding non-habitat areas such as cleared ground, open water and samphire and sedgeland vegetation. The Project and survey areas were visited by Mike Bamford (B.Sc. Hons. Ph.D. Biol.), Tim Gamblin (B. Sc. Cert. Env. Man.) and Andy McCreery (Bsc. Cons. Biol.) from 27th to 29th March 2019. Mike has many years of experience in surveying for the WRP, and the work was undertaken with reference to Federal survey guidelines (SEWPaC 2011). Tim and Andy have some formal and informal experience searching for the species previously. The latter has lived and worked for the DBCA in Busselton.

Two approaches were used for this survey: drey search and spotlighting.

The Project area (Figure 1 - blue polygon) and some adjacent vegetation was visited on foot in daylight and trees were examined closely for possum dreys. These are clumps of twigs and leaves that are generally quite conspicuous and placed in the mid canopy of trees.

Dreys were not searched for in the entire survey area (pink polygon) along the Vasse River, only in the Project area (blue polygon) and immediately adjacent. A possum may have five to eight dreys across a home range of 0.5 – 1.5ha, and home ranges overlap (Jones 2000). By examining dreys through binoculars, it is sometimes possible to tell if a possum is present, and this was noted if observed. However, all dreys were recorded, even simple platforms and dreys that were falling apart, as the presence of dreys is a good indicator of possum usage. The tree species in which dreys were found were also recorded. Possums will also shelter in tree hollows and thus dreys are not always a reliable indicator of possum presence, but in the Project and survey area there were few trees of sufficient size to provide suitable hollows. Adjacent infrastructure with roofing may offer potential alternate shelter.

Spotlighting was carried out across the nights of 27th to 29th March. On the first night the area surveyed concentrated around the Project area (Figure 1, blue polygon) with an additional 30m surveyed east/west on both north and south foreshores. On the second survey night this area was extended to 130m east towards the Causeway on both sides of the foreshores. On the third night the survey effort was in the more extensive survey area (pink polygon Figure 1) outside the smaller and twice-surveyed Project area (Figure 1, blue polygon).

Spotlighting was carried out by two personnel each with a headlamp and hand-held spotlight, and all trees were scoured thoroughly for possums. Possum eyeshine is very distinct. Survey time was approximately 45 minutes to an hour for the Project area and two hours for the survey area, commencing within an hour after sunset. Locations of possums were recorded and the tree species and where they were seen was noted.

Results

The three-night survey in the Busselton Eastern Link Project area and adjacent areas resulted in 34 records of the WRP. Surveys in the Project area (blue polygon) revealed both dreys and WRPs (Figure 1.) Both adults and juveniles were recorded. The first survey night recorded 4 WRP, the second 13 and the final night 17. All records were along the Vasse River and the majority of WRPs were observed in Peppermint trees, though several were in *Melaleuca* species and a few in eucalypt species (Table 2).

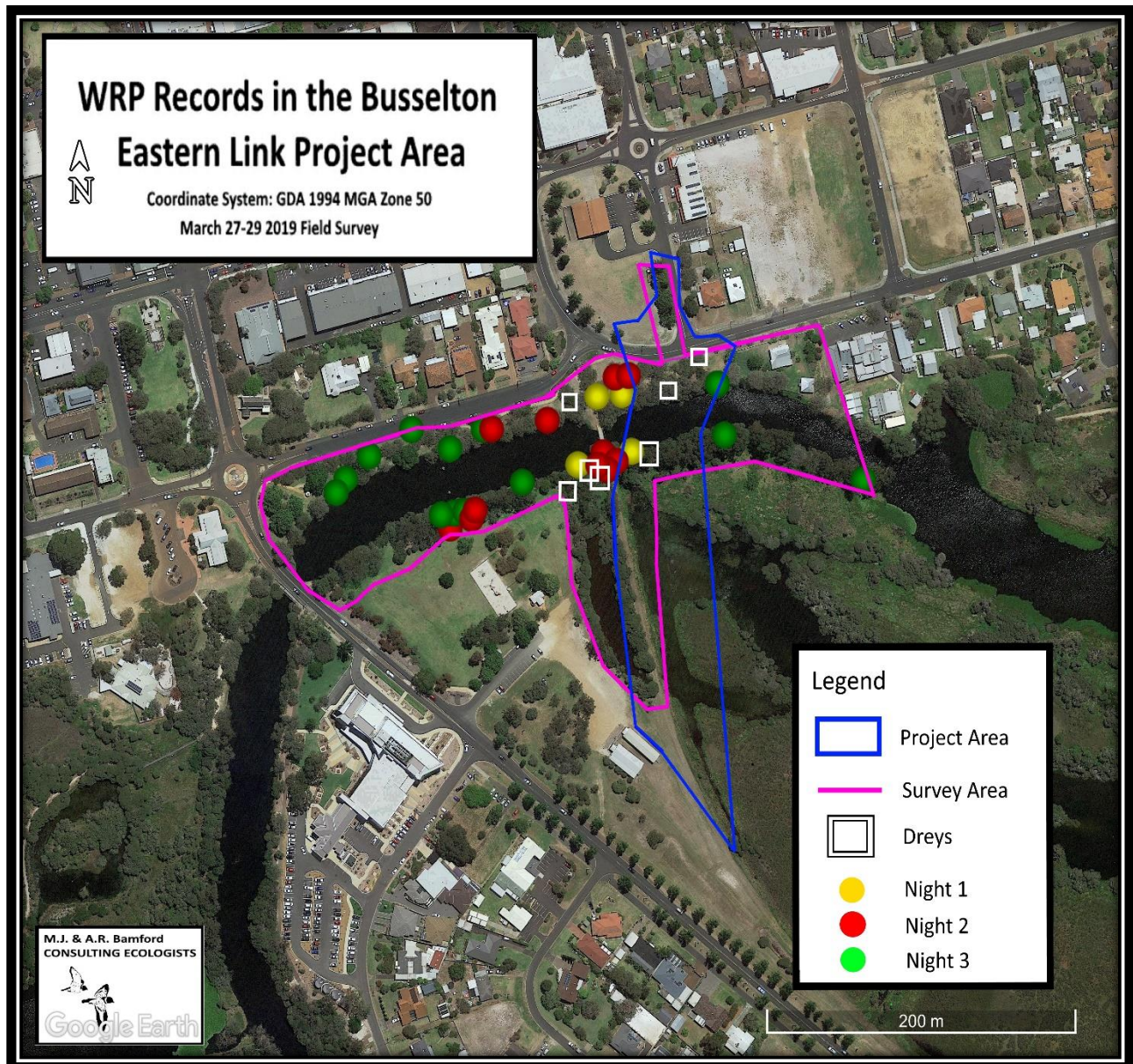


Figure 1. WRP records (spheres) over a three-night survey in the Busselton Eastern Link Project and survey area. Dreys recorded in vicinity of the project area only.

Table 1. Distribution of dreys and WRP sightings by plant species.

Plant species	# Dreys
<i>Agonis flexuosa</i> (Peppermint)	3
<i>Melaleuca</i> species (Paperbark)	4
	# Sightings
<i>Agonis flexuosa</i> (Peppermint)	27
<i>Melaleuca</i> species (Paperbark)	4
<i>Eucalyptus</i> species	3

Table 2. WRPs and the vegetation type they were observed in over three nights along the proposed Busselton Eastern Link over the Vasse River, March 2019.

Date	Age	Easting	Northing	Zone	Habitat Type
27/03/2019	Adult	346803.64	6275081.88	50H	Melaleuca
27/03/2019	Adult	346838.29	6275090.31	50H	Melaleuca
27/03/2019	Adult	346831.54	6275123.70	50H	Peppermint Tree <i>Agonis flexuosa</i>
27/03/2019	Adult	346815.33	6275122.33	50H	Peppermint Tree <i>Agonis flexuosa</i>
28/03/2019	Adult	346721.88	6275043.20	50H	Peppermint Tree <i>Agonis flexuosa</i>
28/03/2019	Juvenile	346730.26	6275053.09	50H	Melaleuca
28/03/2019	Juvenile	346731.26	6275053.09	50H	Melaleuca
28/03/2019	Adult	346822.68	6275085.85	50H	Peppermint Tree <i>Agonis flexuosa</i>
28/03/2019	Adult	346821.68	6275085.85	50H	Peppermint Tree <i>Agonis flexuosa</i>
28/03/2019	Adult	346819.75	6275089.24	50H	Peppermint Tree <i>Agonis flexuosa</i>
28/03/2019	Adult	346822.75	6275090.24	50H	Peppermint Tree <i>Agonis flexuosa</i>
28/03/2019	Adult	346824.75	6275089.24	50H	Peppermint Tree <i>Agonis flexuosa</i>
28/03/2019	Adult	346835.44	6275135.08	50H	Peppermint Tree <i>Agonis flexuosa</i>
28/03/2019	Adult	346826.92	6275133.94	50H	Peppermint Tree <i>Agonis flexuosa</i>
28/03/2019	Adult	346783.56	6275107.74	50H	Peppermint Tree <i>Agonis flexuosa</i>
28/03/2019	Adult	346743.21	6275101.99	50H	Peppermint Tree <i>Agonis flexuosa</i>
28/03/2019	Adult	346742.21	6275101.99	50H	Peppermint Tree <i>Agonis flexuosa</i>
29/03/2019	Adult	346898.00	6275101.00	50H	Eucalypt
29/03/2019	Adult	346988.00	6275076.00	50H	Peppermint Tree <i>Agonis flexuosa</i>
29/03/2019	Adult	346716.00	6275051.00	50H	Peppermint Tree <i>Agonis flexuosa</i>
29/03/2019	Adult	346724.00	6275052.00	50H	Peppermint Tree <i>Agonis flexuosa</i>
29/03/2019	Juvenile	346729.00	6275053.00	50H	Peppermint Tree <i>Agonis flexuosa</i>
29/03/2019	Adult	346768.00	6275071.00	50H	Peppermint Tree <i>Agonis flexuosa</i>
29/03/2019	Adultx2	346893.00	6275131.00	50H	Peppermint Tree <i>Agonis flexuosa</i>
29/03/2019	Adult&Juv	346669.00	6275085.00	50H	Peppermint Tree <i>Agonis flexuosa</i>
29/03/2019	Adult	346648.00	6275063.00	50H	Peppermint Tree <i>Agonis flexuosa</i>
29/03/2019	Adultx2	346654.00	6275071.00	50H	Eucalypt
29/03/2019	Adult	346696.00	6275101.00	50H	Peppermint Tree <i>Agonis flexuosa</i>
29/03/2019	Adultx2	346721.00	6275090.00	50H	Peppermint Tree <i>Agonis flexuosa</i>
29/03/2019	Adult	346743.00	6275104.00	50H	Peppermint Tree <i>Agonis flexuosa</i>

Table 3. Western Ringtail Possum dreys recorded along the proposed Busselton Eastern Link over the Vasse River, in March 2019.

Date	Occupied	Easting	Northing	Zone	Habitat Type
27/3/2019	unconfirmed	346841.92	6275089.48	50H	Melaleuca
27/3/2019	unconfirmed	346863.55	6275134.75	50H	Peppermint Tree <i>Agonis flexuosa</i>
27/3/2019	confirmed	346798.47	6275120.62	50H	Peppermint Tree <i>Agonis flexuosa</i>
27/3/2019	unconfirmed	346877.62	6275147.95	50H	Peppermint Tree <i>Agonis flexuosa</i>
28/3/2019	unconfirmed	346797.99	6275069.37	50H	Melaleuca
28/3/2019	unconfirmed	346813.57	6275081.60	50H	Melaleuca
28/3/2019	unconfirmed	346814.57	6275081.60	50H	Melaleuca

DISCUSSION

The WRP is clearly abundant in the Project area and wider survey area, with a population very likely in excess of 17 animals over a total habitat area of approximately 1.5 ha. The WRP are present in almost every type of existing habitat; however, they are most abundant in areas of Peppermint and dense low Melaleuca thickets. The population is at a high density in a small area, which probably reflects the urban location, with animals possibly feeding in nearby gardens rather than being totally reliant on the vegetation of the survey area.

The Busselton Eastern Link Project will result in the loss of some nesting and foraging habitat (approximately 0.21 ha), which could reduce the carrying capacity of the approximately 1.5 ha of habitat between Causeway Bridge and the Old Butter Factory, and restrict the movement of animals through the area. However, the Project's mitigation proposals of rope bridges to connect the foreshores, shuttered lighting on new infrastructure and revegetation will go some way to reducing problems of overcrowding. BCE also recommends additional mitigation through providing nest-boxes which may offset the increase in population density in the remaining habitat. Construction of nest-boxes could be done in conjunction with local schools. While Peppermint is an important tree for the species, planting Marri (*Corymbia calophylla*), Spearwood (*Kunzea* sp.) and Coojong (*Acacia saligna*) in addition would be very helpful.

While mitigation measures are proposed to allow all possums to remain in the area, DBCA has proposed that relocation be considered if a larger population is present. If relocation is to be undertaken, DBCA (K. Williams 2019, Regional Leader Nature Conservation pers. comm.) has advised that potential relocation sites need to be fenced and have at least the potential for feral predator control, and need to be assessed for their suitability for the WRP.

BCE have undertaken a preliminary assessment of several potential relocation sites (Figure 2) with observations presented below.

Potential WRP Relocation Sites

Reserve 44757, Busselton Bypass, Vasse

Preliminary assessment indicates that this reserve (3.4 ha) is the most suitable candidate for WRP relocation. Further investigation (drey and spotlighting surveys) would be required to confirm how much habitat is currently occupied so that overcrowding issues could be assessed. Access was limited by a kangaroo fence. The habitat comprises Peppermint, Marri, Acacia and Flooded Gum trees. The fence suggests the site may be suitable for Fox baiting. The habitat is not dissimilar to that of the Project site thus minimizing stress to the translocated individuals in adapting to a new environment. The fenced area is relatively small, though being adjacent to Broadwater Nature Reserve / Wetland (see Figure 2) offers significant area for WRP dispersal. Two dreys were found in Acacia in roadside vegetation between the Busselton Bypass and the bike track (see Plate 1, below right).



Plate 1. Reserve 44757

Portion of Reserve 22614, Queen Elizabeth Road, Ambergate

This site (approximately 1.0 ha portion out of 72.0 ha reserve) is composed largely of young Marri and other eucalypt species with possibly some Marri old enough to have suitable hollows. There is very little Peppermint (trees near the road possibly planted). Although this habitat is likely to support WRPs (spotlighting survey required to confirm), the change in habitat from the Project site may result in short term stress during establishment. This site is unfenced but fox baited. An obvious and significant benefit is its large size (Figure. 2) and with potentially lower numbers of established WRTPs, overcrowding is unlikely. This reserve was considered the next most suitable site.



Plate 2. Ambergate Reserve

Reserve 51685, Woodswallow Drive, Vasse

Preliminary assessment of the reserve (5.8 ha) indicates coverage with largely young Jarrah/Marri woodland with very few large hollow bearing trees such as mature Marri and appears to have kangaroo fencing. However, the southern boundary has a suitable area of thickets of Acacia, Melaleuca and Peppermint trees. Large holes were observed in the fence but if properly maintained, potential for baiting exists. Care would need to be taken as the reserve is adjacent residential premises, potentially with pets. A Brushtail Possum skull was found. No evidence of WRP dreys were observed though a formal survey is likely to expose some in the area of thickets.



Plate 3. Reserve 51685

Barnard Park East, Marine Terrace, Busselton

Preliminary assessment of the reserve indicates three dreys with at least two of occupied and the likelihood of more dreys being present. This finding suggests that the small reserve may not be suitable as a relocation site at the present time due to high numbers of resident WRP. Relocation could result in overcrowding. All dreys were recorded in Peppermint trees and suitable hollow bearing trees such as Marri, to provide alternative lodging, were absent. There are a number of mature Peppermint trees scattered at this site but with quite large open spaces between them. The fencing and revegetation program proposed by City of Busselton will likely improve the site's habitat connectivity and enhance the habitat potential for WRPs in the near future (2-5 years).

In addition to dreys, fresh WRP scats were located and a Brushtail Possum skull was found. This site is unfenced, had recent evidence of dogs and can't be fox baited.



Plate 4. Barnyard Park East

Reserve 22884 (Busselton Waste Facility), Rendezvous Road, Vasse

A drey was observed just outside the fence of this reserve in the north-eastern corner. It's probable there are more inside the reserve, though restricted access prevented confirmation of this. A large old Marri in the northern section of this reserve would likely provide hollows and there are also scattered mature Peppermint Trees. The south-western corner potentially has Peppermint trees but access via Edwards Road was blocked. The fencing is useful for potential Fox baiting, however this site needs further investigation and at this stage better reserves are available.



Plate 5. Reserve 22884

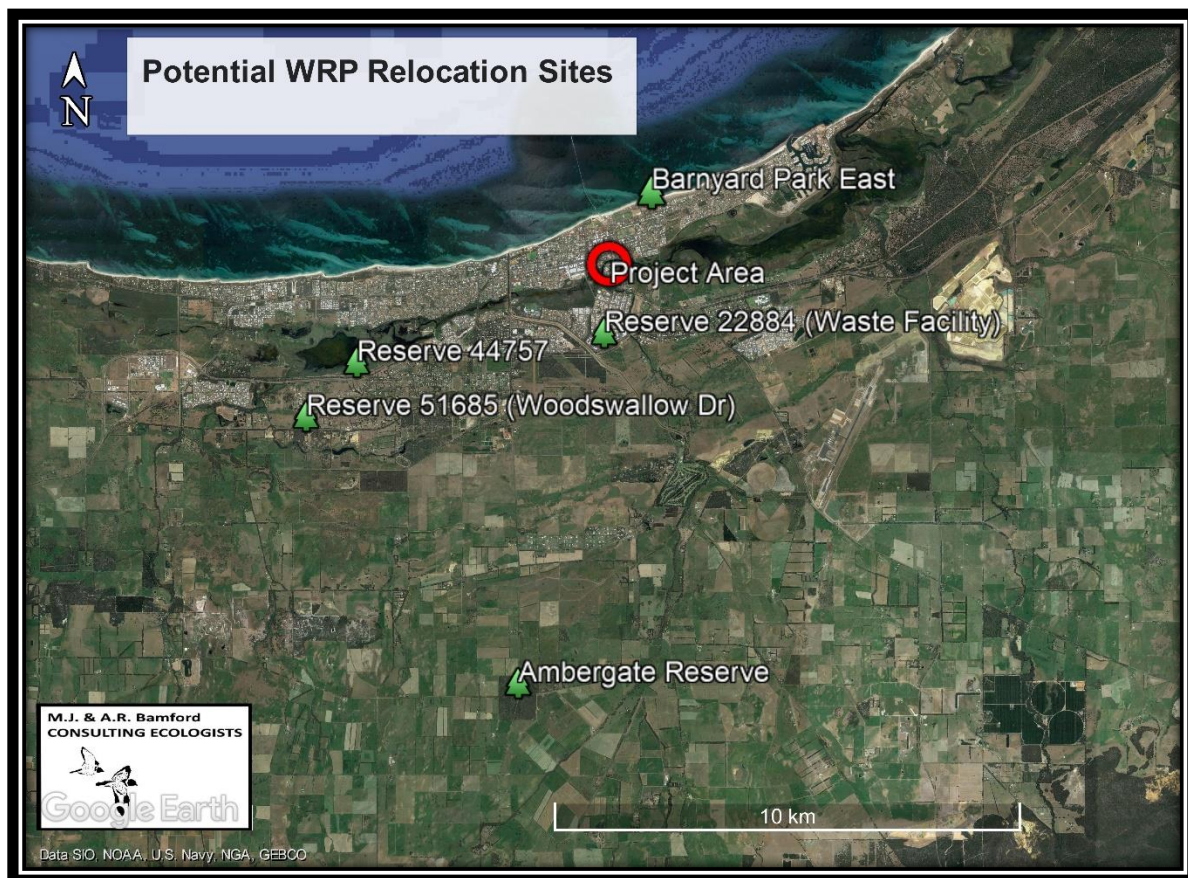


Figure 2. Potential WRP locations in the vicinity of Busselton.

REFERENCES

DEWHA (2009). Significant impact guidelines for the vulnerable Western Ringtail Possum *Pseudocheirus occidentalis* in the southern Swan Coastal Plain, Western Australia. Dept of Environment, Water, Heritage and the Arts, Canberra.