

Memorandum to Main Roads Western Australia: **Defining habitat categories for Western Ringtail Possum in the South Coast population**

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Introduction

Current Environment Protection and Biodiversity Conservation (EPBC) Significant Impact Guidelines for the Western Ringtail Possum pertain only to the population occurring on the southern Swan Coastal Plain (DEWHA 2009). No guidelines have yet been developed for the South Coast population, which can be defined as a significant population under these guidelines (DEWHA, 2009). Recently a significant amount of work has been carried out on the South Coast population.

These recent data indicate that the South Coast population is quite different to the Swan Coastal Plain population in some aspects of its ecology. For example, the presence of Peppermint (*Agonis flexuosa*) is not necessary for the presence of the species; habitats with high densities are largely confined to Marri/Jarrah/Sheoak communities within 20 km of the coast; diet can be quite broad and a small percentage of individuals use refugia on the ground (Van Helden et al. 2018; Van Helden unpub. data; Van Helden and Close pers. com.; Mathieson et al. in review; Gilfillan 2008 and S.Gilfillan pers. obs.). The EPBC Significant Impact Guidelines for the Swan Coastal Plain may therefore have limited application to the South Coast population.

The EPBC Significant Impact Guidelines identified three areas as important for the Western Ringtail Possums within the southern Swan Coastal Plain: *Core habitat*, *Primary corridors* and *Supporting habitat*. As the definitions in themselves are not Swan Coastal Plain specific they can be used interchangeably to some degree. Using these habitat categories as a guide, plus current available data on Western Ringtail Possum ecology, habitat categories can be defined for the South Coast population and then identified within the Albany Ring Road project area. NB: the defined categories should be considered DRAFT and should be presented to the WRP Recovery Team for discussion and review.

Methods

Habitat category definitions were defined for the South Coast population by:

1. correlating available data on densities and home ranges of WRP with vegetation type (outlined in Table 1) and;
2. gathering expert opinion of what constitutes habitat categories.

Once habitat categories were defined the occurrence of these categories within the Albany Ring Road project area was mapped. In addition, the habitat categories were mapped (desktop assessment only) within a 5km buffer of the project area to give a regional context. This mapping is presented and summarised in a separate memo to Main Roads Western Australia. Details of methods will be provided in a final Biological Survey report for the Albany Ring Road Project (Southern Ecology December 2019).

Results

1. Core Habitats

Definition

- native vegetation with high canopy continuity (>3 canopy connections per tree) between trees >2 m high (Jones *et al.* 1994b; Van Helden *et al.* 2018)
- gardens with high cover of native and/or exotic plants/trees
- large enough to contain multiple home ranges
- long unburnt (if native vegetation)
- high densities (> 1/ha) OR high abundance >50
- breeding by a high % of individuals (if known)
- high recruitment (if known)
- can be connected OR isolated or largely isolated. However, poorly connected areas should be targeted for restoration work to restore connectivity, considering that the Effective Population Size for South Coast populations is not known.

Core Habitats within the South Coast population

Core Habitats occur within 20km of the coast in an area approximately from West Cape Howe NP in the west to Two Peoples Bay NR in the east (Van Helden, B. and Close, P. (*pers com.*)). At this point in time the east and west extent of this area is not as clear and requires further survey.

Habitats that should be considered Core Habitats, based on the above definition are:

- Any remnant with an established density of > 1/ha;
- OR
- Any remnant with an established abundance of >50.
- As a precautionary principal, any Jarrah, Marri or Sheoak forest or woodland, or Peppermint Low Forest remnant that is >50 ha in size until densities are established.

supporting information:

- Surveyed remnants that are largely comprised of these vegetation types and with these other characteristics have densities ranging from 0.36 – 17/ha (Table 1). Remnants with measured densities at the lower end of this range (Bakers Junction and Down Rd. NR's) are however large and contain estimated abundances of 306 +/-75 and 251 +/-45, respectively.
 - Average home range in Albany bushland (marri / jarrah communities is 0.88 (Van Helden *et al.* 2018); A population of 50 individuals is generally seen as large enough to avoid inbreeding (Franklin 20018) and with a estimate of 0.88ha home range 50 individuals would conservatively require 50ha to maintain viability, thus Core Habitats are defined as >50ha in size.
- Urban areas (core)
supporting information: Urban areas with gardens generally having a high % of plant cover and higher densities (Van Helden, *pers com.*). Average home range in garden areas of Albany are 0.51ha (Van Helden unpub data) with evidence of overlapping HR. Average density within gardens of Albany (averaged across seasons) is 3.4 possums/ha (Van Helden unpub data).

2. Supporting Habitats

Definition

- any area with an established density of <1/ha;
- OR
- any area with an established abundance of <50.
 - may be breeding occurring or not
 - can be native or non-native vegetation, including urban gardens.

Supporting habitats within the South Coast Population

- Jarrah, Marri or Sheoak or Peppermint woodlands or forests that is < 50ha, or has an established density of <50.
- any remnant that has possums present.
- urban areas with gardens generally having a low % of plant cover and lower densities (Van Helden, pers com.)

3. Linkages

Definition

- any structure that allows movement of individuals at a small to medium scale (eg. street-scape/road-side non-native plantings, wind-breaks, plantations, fencelines)
- no resident individuals, movement of animals only
- do not need to be continuous, but can contain small gaps, as Western Ringtail Possums can come to the ground to move short distances.

Linkages within the South Coast Population

As linkages function on a local scale, they have not been identified at the scale of the population as a whole.

4. Primary Corridors

Definition

- provide major connectivity between areas of occupation,
- regional scale,
- containing multiple home ranges,
- breeding occurs,
- provides movements and habitat (residents)

Linkages within the South Coast Population

There are three primary corridors within the South Coast Population:

- King River
- Kalgan River
- Coastal Corridor (from West Cape Howe NP to Cheynes Beach – this may extend either east or west with new records).

Table 1: Densities determined by systematic methods of surveying WRP in various remnants and associated vegetation types.

Remnant/reserve and vegetation association (ARVS # in brackets)	Density	Source and method
Bakers Junction NR Jarrah/Marri Sheoak laterite forest (12) and Jarrah/Sheoak/Eucalyptus staeri Sandy Woodland (13)	0.483/ha, se = 1.182	Biota (in prep) Distance Sampling
Down Rd NR Jarrah/Marri Sheoak laterite forest (12) and Jarrah/Sheoak/Eucalyptus staeri Sandy Woodland (13)	0.795/ha, se = 1.145	Biota (in prep) Distance Sampling
Gull Rock	0.786/ha, se = 0.373	Biota (in prep) Distance Sampling
King River	0.115/ha, se = 0.213	Biota (in prep) Distance Sampling
Marbellup NR	0.106/ha, se = 0.223	Biota (in prep) Distance Sampling
Millbrook NR	0.142/ha, se = 0.451	Biota (in prep) Distance Sampling
Redmond West	0.000	Biota (in prep) Distance Sampling
Simpson Rd	0.400/ha, se = 0.700	Biota (in prep) Distance Sampling
Walmsley East	0.223/ha, se = 0.356	Biota (in prep) Distance Sampling
Walmsley South	0.175/ha, se = 0.339	Biota (in prep) Distance Sampling
Walmsley West	0.395/ha, se = 0.480	Biota (in prep) Distance Sampling
Mt Clarence and Adelaide 3 different vegetation types pooled; Marri/Jarrah Coastal Hills Forest (17), Jarrah Woodland Marri/Jarrah Forest/Peppermint Woodland (10) Coastal <i>Banksia ilicifolia</i> Peppermint Low Woodland (4)	1.60/ha - 2.25/ha (depending on season)	Gilfillan and Comer (2018) Distance Sampling
Mt Melville 3 different vegetation types pooled; Marri/Jarrah Coastal Hills Forest, (17) Jarrah/Sheoak/ <i>E. staeri</i> Sandy Woodland (13), Marri/Jarrah Forest/Peppermint Woodland (10)	2.90/ha - 3.16/ha (depending on season)	Gilfillan and Comer (2018) Distance Sampling

Remnant/reserve and vegetation association (ARVS # in brackets)	Density	Source and method
Mt Clarence and Adelaide Marri/Jarrah Coastal Hills Forest (17), Marri/Jarrah Forest/Peppermint Woodland (10) Jarrah Woodland (11)	4.13/ha (average density) – up to 5.5/ha in these vegetation types	Biota (2019) Distance Sampling
Remnant bushland in urban areas of Albany Marri, jarrah or Sheoak vegetation communities	4.5/ha (averaged across seasons):	Van Helden (unpub data) Based on Home Range size
Urban gardens of Albany Various (exotic and native)	3.4/ha (averaged across seasons)	(Van Helden unpub data) Based on Home Range size
Albany Ring Road Survey Area - CSBP site mix of exotics/Marri/ Jarrah/and Peppermint	0.36/ha	(Biota 2018) Distance Sampling
Albany Ring Road Survey Area - George st. tip site Jarrah/Marri Sheoak laterite forest (12)	0.14/ha	(Biota 2018) Distance Sampling
Albany Ring Road Survey Area - roadside vegetation all vegetation types combined	< 1/km (14 individuals in 19 km	Biota (2018) Strip transects
Albany remnants Peppermint (<i>Agonis flexuosa</i>) Woodland	1.6/ha (av); 8/ha (max)	(Mathiesen et al. in review) Systematic, exhaustive spotlight searches in multiple 20 m x 20 m quadrats over 20 days
Albany remnants Sheoak (<i>Allocasuarina fraseriana</i>) Woodland	7.0/ha(av); 12/ha (max)	(Mathiesen et al. in review) Systematic, exhaustive spotlight searches in multiple 20 m x 20 m quadrats over 20 days
Albany remnants Marri-eucalypt (<i>Corymbia calophylla</i> , <i>Eucalyptus marginanta</i> and <i>Eucalyptus staerii</i>) woodlands	6.5/ha (av); 17/ha (max)	(Mathiesen et al. in review) Systematic, exhaustive spotlight searches in multiple 20 m x 20 m quadrats over 20 days

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