

Canopy Crossings and Kin Connections

Using relatedness to infer Western Ringtail Possum (*Pseudocheirus occidentalis*) dispersal through a fragmented road corridor

Biota Environmental Sciences



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Helix Molecular Solutions

The Possum's Problem



- **Habitat fragmentation** is putting **arboreal** species at increasing risk of **genetic isolation** due to **reduced dispersal** opportunities.
- **Genetic relatedness** is a means to **infer contemporary dispersal** by identifying highly related individuals at disparate locations.

Habitat fragmentation is a key **threatening process** to the critically endangered **Western Ringtail Possum** (*Pseudocheirus occidentalis*; 'WRP'; ngwayir), an **arboreal folivore** from south-west Western Australia. Knowledge on dispersal dynamics is limited; the prevailing belief being that **males disperse while females are philopatric** (remain close to birthplace). WRP are considered to **require canopy continuity** and spend little time on the ground, thereby making them **vulnerable to genetic isolation** by fragmentation.

The Objective

To study the **first-order genetic relatedness** (parent-offspring, full-sibling) of 99 possums with abutting home ranges along a peri-urban road corridor in Bunbury, to investigate two primary hypotheses:

H1: Close relatives do not occur over large canopy gaps.

H2: Females do not disperse far and are more related to close neighbours.

The Process

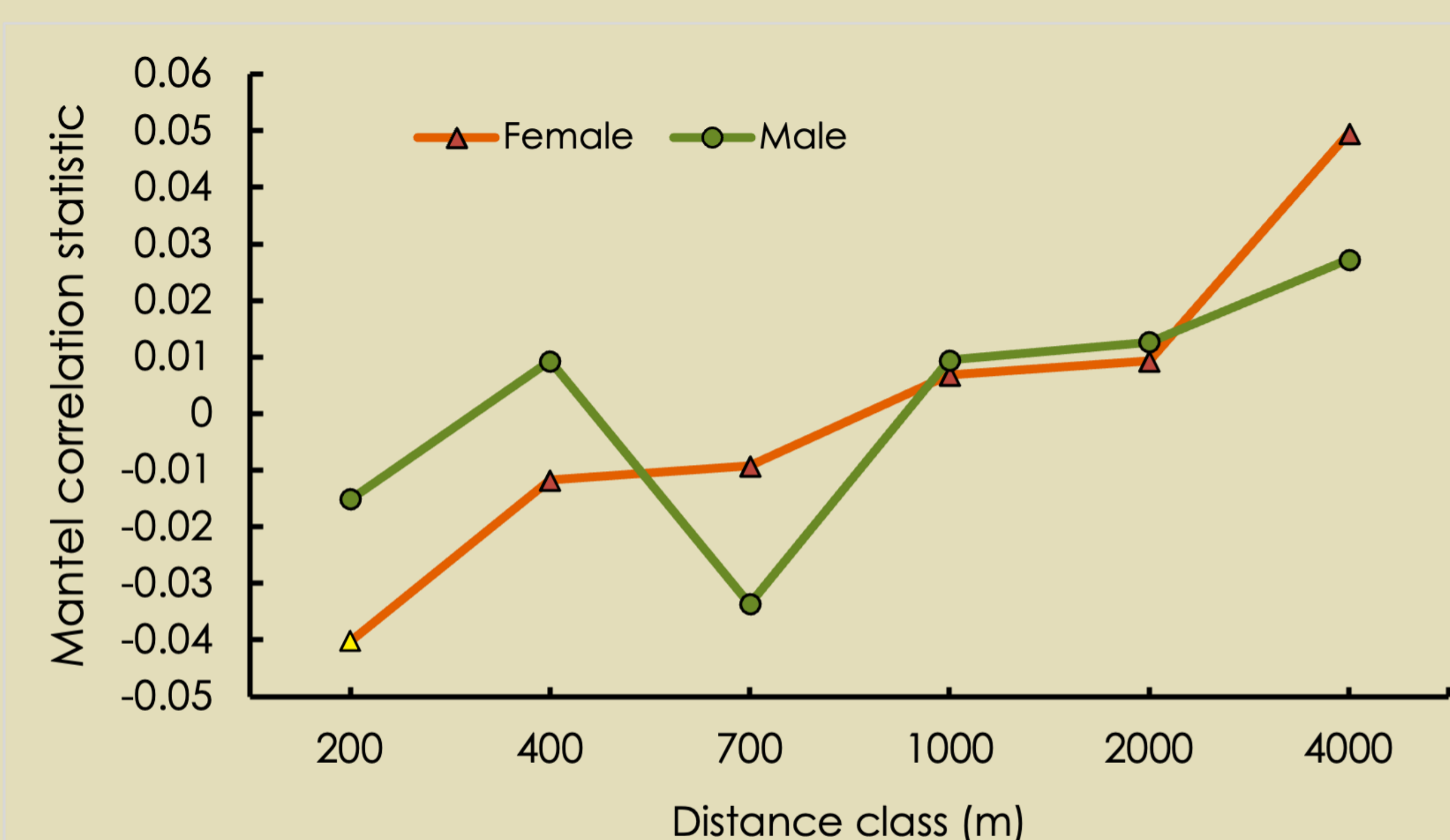
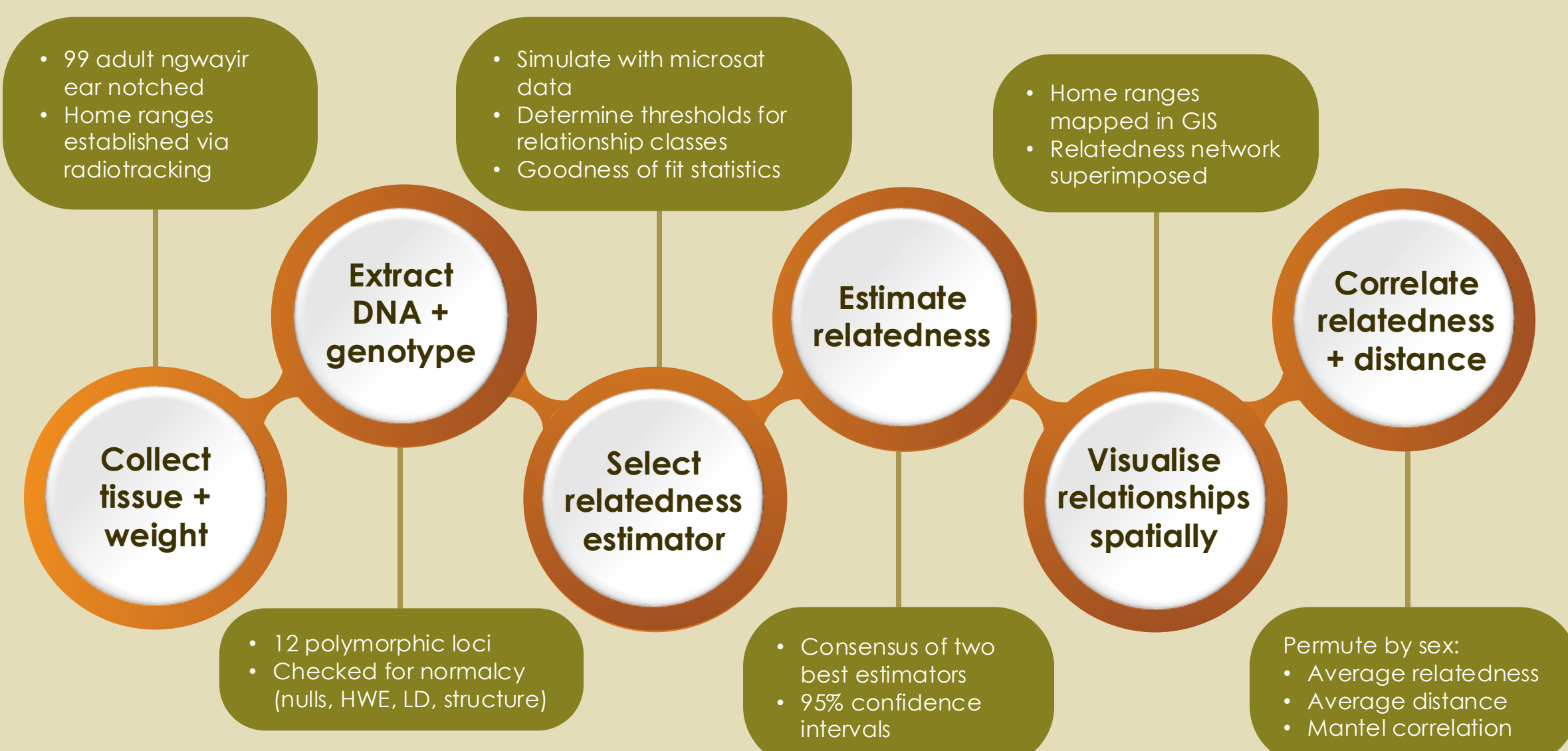


Figure 1 Mantel test linking relatedness and distance for same-sex first-order pairs of male and female Western Ringtail Possums
Yellow fill illustrates significance at $\alpha = 0.05$

Findings

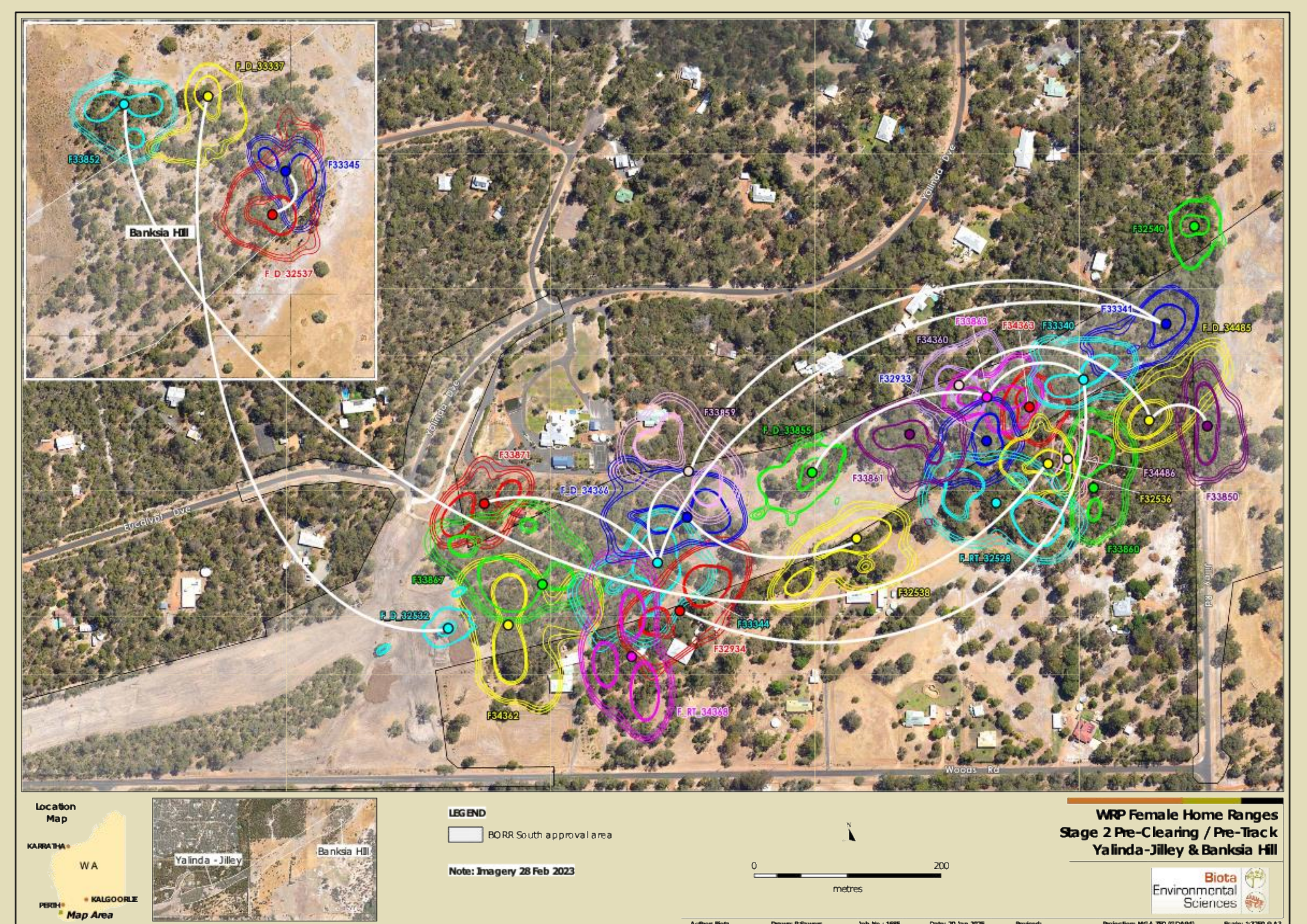


Figure 2 Home ranges and first-order relationships among female Western Ringtail Possums
Coloured isopleths indicate home ranges, solid circles depict individuals, white lines signify relationships

The Outcome

Close relations on either side of roads and over cleared paddocks suggests ability to **overcome large canopy gaps** during dispersal.

Relationships between possums in well-connected bushland and small, isolated fragments indicates **stepping stone movement** and highlights the **value of retaining habitat patches**.

Moderate support for **philopatry in both sexes** - both males and females disperse similarly short distances from their natal home,

