CHAPTER 4 POPULATION COMPARISON STUDY

4.1. Overview

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4.1.1. Introduction

The quickest and surest means to identifying the agent(s) of decline is to use a hypothetico-deductive approach (Caughley, 1994, Caughley and Gunn, 1996). The declining-population paradigm provides a framework by which this approach can be used. Comparisons between populations at different stages of decline provide strong associative evidence that can identify putative agent(s) of decline among the countless conceivable possibilities. The 'shortlist' of putative agents that result from this exercise can then be experimentally tested to robustly determine their role in a species decline.

The Population Comparison Study (PCS) component of the Woylie Conservation Research Project (WCRP), is therefore, the principal tool in the diagnosis of woylie decline. The section provides a brief overview of the design and details of the PCS common to its various components.

4.1.2. PCS investigative components

The five investigative components of the PCS, examined differences between the woylie populations and the three major categories of putative agents of decline;

Woylie components

1. Woylie demographics
2. Woylie survival and mortality

Putative agents of decline

3. Predators
4. Resources
5. Disease

Together, these components provide an extensive and integrated enquiry into some of the mechanics possibly causing the woylie declines and the possible factors that may be associated.

4.1.3. PCS sites

This is a more detailed and focused study designed to complement data collected from the broad-scale regional (Upper Warren) fauna monitoring program (Chapter 2). This study focused on the Upper Warren region where moderate woylie densities still existed and where declines were current. The five PCS sites in the Upper Warren region were associated with a subset of the 11 key monitoring transects (Figure 4.1.1) and provided replicated representation of contemporary population states across the region;

- Declined populations now at low densities: Boyicup and Winnejup
- The last remnant moderate-density populations: Keninup, Warrup and Balban (i.e. sites seemingly not yet affected and which have the potential to decline)

Karakamia Wildlife Sanctuary supports the last remaining high density woylie population. Managed and owned by the Australian Wildlife Conservancy and isolated from other woylie populations, the woylies at Karakamia are contained within 275 ha of jarrah/marri forest, bounded by a predator-proof fence (i.e. cat and fox free). Having been reintroduced to Karakamia in 1996, the woylie numbers rapidly expanded and have remained at relatively stable, high densities for about the last five years (Trish Gardner, pers. comm.). Located approximately 50 km east of Perth, Karakamia provides a particularly powerful comparative site to the Upper Warren PCS sites.

4.1.3.1. Site descriptions

The five Upper Warren PCS sites were located adjacent to some of the key fauna monitoring transects. The PCS site at Karakamia was approximately central to the property. In contrast to the transects used for regional fauna monitoring, the PCS research was site-based, using the trapping grids associated with the demographics component as the central points of reference. The predator and resources components necessitated studying sites outside these grids but remained closely associated with the trapping grids wherever possible.

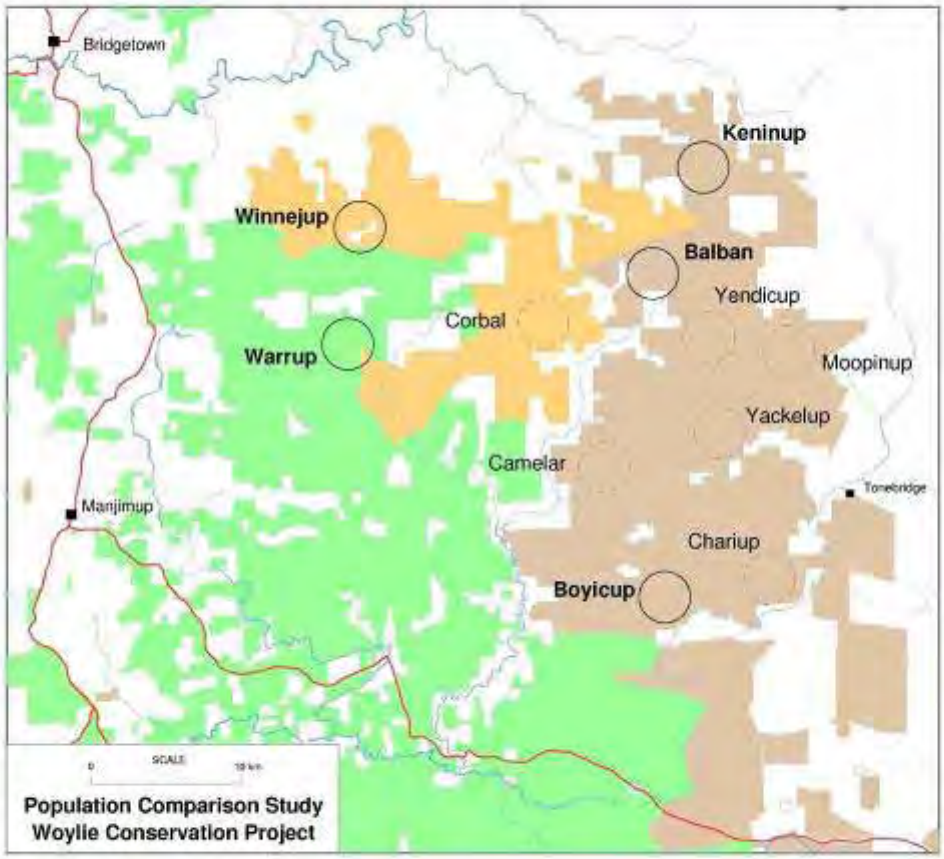

Figure 4.1.1. The five principal Upper Warren areas (in bold) associated with the Population Comparison Study in relation to the other sites associated with the Upper Warren Fauna Monitoring program (plain text and dashed circles). The Karakamia PCS site is 50 km east of Perth, Western Australia.