

## **Progress Report SP 2012-033**

# **Genetic approaches for evaluating the contribution of the reserve system to fauna conservation**

**Animal Science**

### **Project Core Team**

**Supervising Scientist**

Kym Ottewell

**Data Custodian**

**Site Custodian**

### **Project status as of July 5, 2016, 11:38 a.m.**

Approved and active

### **Document endorsements and approvals as of July 5, 2016, 11:38 a.m.**

**Project Team**

granted

**Program Leader**

granted

**Directorate**

granted

# Genetic approaches for evaluating the contribution of the reserve system to fauna conservation

K Ottewell, M Byrne, K Morris, D Coates

## Context

Human-mediated landscape disturbance can affect the amount of genetic diversity present in populations of threatened species and their distribution across the landscape. One challenge facing conservation managers is understanding how management tools can be used to protect and facilitate genetic patterns and processes. For example, reserve design principles (comprehensiveness, adequacy, representativeness; single large or several small) can be just as well applied to conserve genetic diversity as species diversity.

## Aims

- Use genetic approaches to investigate patterns of contemporary and historical diversity in target species to understand how best to conserve the processes that generate these patterns.
- Determine genetic diversity and gene flow amongst quenda (*Isoodon obesulus* ssp. *fusciventer*) populations in fragmented and continuous populations in the Perth region, in reserves of varying size and connectivity.
- Identify habitat features that are associated with high genetic diversity and gene flow in quenda populations using GIS and habitat modelling, and how well these features are captured in the reserve system.
- Assess the genetic diversity and genetic structure of target species in the Pilbara and how this relates to climate and environmental features (soils, landforms, etc.), and is captured in the current reserve system.

## Progress

- DNA extraction and genotyping of quenda tissue samples from the Swan Coastal Plain and Perth Hills has been completed. Landscape (species distribution model) and genetic analyses are currently underway.
- DNA extractions, microsatellite genotyping and mitochondrial sequencing has been completed for three target small mammal species in the Pilbara. Collation of GIS datasets and genetic analyses are currently underway.

## Management implications

This project and its constituent investigations will assess the adequacy of the current reserve system in conserving species genetic diversity and genetic processes such as gene flow. More broadly, the project will provide insight into genetic patterns in Western Australian landscapes and how these patterns have been shaped through species' responses to climate and landscape features. Species-specific recommendations will also be made to guide translocations and help prioritise conservation management activities.

## Future directions

- Analyse genetic diversity and genetic differentiation between quenda populations and correlate this information with habitat data and species distribution models. Assess genetic diversity patterns of quenda populations in continuous versus fragmented habitat.
- Analyse patterns of historical and contemporary population structure and genetic diversity of Pilbara small mammal species and correlate with environmental and landscape features. Investigate development of niche-based species distribution models for each species (past and present) and correlate with genetic data.