

Project Plan SP 2013-021

Monitoring of threatened birds on Dirk Hartog Island

Animal Science

Project Core Team

Supervising Scientist	Allan Burbidge
Data Custodian	Allan Burbidge
Site Custodian	

Project status as of July 18, 2018, 8:01 a.m.

Pending project plan approval

Document endorsements and approvals as of July 18, 2018, 8:01 a.m.

Project Team	required
Program Leader	required
Directorate	required
Biometrician	granted
Herbarium Curator	not required
Animal Ethics Committee	required

Monitoring of threatened birds on Dirk Hartog Island

Biodiversity and Conservation Science Program

Animal Science

Departmental Service

Service 5: Conserving Habitats, Species and Ecological Communities

Project Staff

Role	Person	Time allocation (FTE)
Supervising Scientist	Allan Burbidge	0.1

Related Science Projects

This project is part of the Dirk Hartog ecological restoration and fauna reconstruction plan (Gillen *et al.* 2011; Morris *et al.* 2016).

Proposed period of the project

June 1, 2013 – None

Relevance and Outcomes

Background

Dirk Hartog Island was established as a national park on 29 October 2009 and this provided the opportunity to restore the island's natural environment and reconstruct its native vertebrate fauna. The island formerly supported at least 13 species of mammal of which only three still persisted following introduction of feral cats, mice and goats and over 100 years of pastoral use (Gillen *et al.* 2011; Morris *et al.* 2016).

The island also supports three threatened bird subspecies (Dirk Hartog Island Southern Emu-wren, Dirk Hartog Island White-winged Fairy-wren and Dirk Hartog Island Rufous Fieldwren), while another, the Dirk Hartog Island Western Grasswren, became extinct during the last century (Burbidge *et al.* 2013). However, despite the fact that the three threatened bird taxa were known to be endemic to Dirk Hartog Island, virtually nothing was known of their distribution on the island, habitat preferences, or abundance. In addition, the taxonomic status of the fieldwren was unclear - while some authors considered the island population to be an endemic subspecies (e.g. Schodde and Mason 1999), others (e.g. Johnstone and Storr 2004) hypothesised that variation in this species in Western Australia was clinal, and no subspecies should be recognised.

There has therefore been a clear need to clarify the taxonomic and conservation status of the fieldwren, to characterise the ecological requirements of the endemic taxa, and to determine their population sizes, in order to provide baseline data against which outcomes of future management actions can be evaluated.

Aims

- (a) clarification of the taxonomic status of the Dirk Hartog Island Fieldwren
- (b) species distribution modeling for each of the threatened bird taxa
- (c) assessment of population levels and density surface modeling for each of the threatened taxa.

Expected outcome

1. Base line data against which to evaluate management actions in the future
2. Recommendations regarding the conservation status of the fieldwren, and the level of sensitivity of each of the threatened bird taxa to potential management actions such as prescribed fire
3. Scientific publications

- (a) clarifying the taxonomic status of the Dirk Hartog Island Fieldwren
- (b) describing species distribution models for each of the threatened bird taxa
- (c) describing population levels and density surface models for each of the threatened taxa.
- 4. Conference presentations.
- 5. Popular articles and presentations, e.g for Landscape.

Knowledge transfer

Users will include other participants in the Dirk Hartog Island Fauna Reconstruction project, including scientific and management staff. Transfer of knowledge will be via ongoing personal contact with management and scientific staff, together with provision of reports, etc.

Tasks and Milestones

Finalise genetic and morphological analyses and submit for publication
 Finalise SDMs and DSMs and submit for publication

References

Buckland, S. T., Anderson, D. R., Burnham, K. P., Laake, J. L., Borchers, D. L., and Thomas, L. (2001). 'Introduction to Distance Sampling. Estimating Abundance of Biological Populations'. (Oxford University Press: Oxford, UK.)

Burbidge, A. H., Blythman, M., and van Dongen, R. (2013). Threatened birds on Dirk Hartog Island: preliminary report on October 2013 survey. Unpublished report, Department of Parks and Wildlife, Perth.

Burbidge, A. H., Dolman, G., Johnstone, R., and Burbidge, M. (2018a). Morphological and genetic relationships of the Dirk Hartog Island fieldwrens. Department of Biodiversity, Conservation and Attractions, Perth, W.A.

Burbidge, A. H., Ford, S., King, J., Blythman, M., and van Dongen, R. (2018b). Threatened birds on Dirk Hartog Island, 2017-18 report: population estimates. Department of Biodiversity, Conservation and Attractions, Perth, W.A.

Gillen, K., Rose, D., Morris, K., Sims, C., McCluskey, P., Desmond, A., and Fitzgerald, B. (2011). Dirk Hartog Island National Park Ecological Restoration Strategic Plan. Department of Environment and Conservation, Perth.

Johnstone, R. E., and Storr, G. M. (2004). 'Handbook of Western Australian Birds. Volume II. Passerines (Blue-winged Pitta to Goldfinch)'. (Western Australian Museum: Perth.)

Morris, K., Page, M., Thomas, N., and Ottewell, K. (2016). A Strategic Framework for the Reconstruction and Conservation of the Vertebrate Fauna of Dirk Hartog Island 2016 – 2030 [DRAFT]. Dept of Parks and Wildlife, Perth, W.A.

Schodde, R., and Mason, I. J. (1999). 'The Directory of Australian Birds: Passerines'. (CSIRO: Collingwood, Victoria.)

Thomas, L., Buckland, S. T., Rexstad, E. A., Laake, J. L., Strindberg, S., Hedley, S. L., Bishop, J. R. B., Marques, T., and Burnham, K. P. (2010). Distance software: design and analysis of distance sampling surveys for estimating population size. *Journal of Applied Ecology* **47**, 5–14.

Study design

Methodology

Genetics: Genomic and mitochondrial DNA extracted from museum specimens. Using the ND2 locus, apply Rapid Maximum likelihood methods (RaxML) to generate a phylogeny. Cluster analysis on the matrix of genome-wide identity by state pairwise distances, with groups determined by a permutation score (using SNPRelate, an R/Bioconductor Package). For details, see Burbidge *et al.* (2018a).

Occurrence data: Presence in unbounded quadrats (see Burbidge *et al.* 2013).

Abundance data: Line transects surveyed using distance sampling (Buckland *et al.* 2001; Burbidge *et al.* 2015, 2018b);

Surface density modelling: Model based methods to model the density of each species as a function of spatially indexed environmental covariates (Thomas *et al.* 2010); analysis in **R** using the **mrds** and **dsm** packages (for details see Burbidge *et al.* 2018b).

Biometrician's Endorsement

granted

Data management

No. specimens

Herbarium Curator's Endorsement

not required

Animal Ethics Committee's Endorsement

required

Data management

Currently maintained in an Access database (occurrence data) and in csv files (abundance data).

Budget

Consolidated Funds

Source	Year 1	Year 2	Year 3
FTE Scientist			
FTE Technical			
Equipment			
Vehicle			
Travel			
Other			
Total			

External Funds

Source	Year 1	Year 2	Year 3
Salaries, Wages, Overtime			
Overheads			
Equipment			
Vehicle			
Travel			
Other			
Total			