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Translocation of the Eastern Bristlebird and factors associated with a successful program

David Bain
University of Wollongong

Translocation of the Eastern Bristlebird and factors associated with a successful program

A thesis submitted in fulfilment of the requirements for the degree of Doctor of Philosophy from the University of Wollongong

By

David Bain, BSc (Hons)

School of Biological Sciences

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Declaration

This thesis is submitted in accordance with the regulations of the University of Wollongong in fulfilment of the requirements of the degree of Doctor of Philosophy. The research carried out for this thesis was conducted in accordance with the following permits:

University of Wollongong animal ethics: AE02/10

Department of Environment and Conservation scientific permit: S10166

Department of the Environment and Heritage threatened species permit: E2002-35012

Booderee National Park research permit: BDR04/00019

Beecroft Peninsula research permit: 4/02

The work in this thesis has been carried out by me and has not been submitted to any other university or institution.

David Bain

Date 08/05/2007


ENDANGERED
BRISTLEBIRD

Acknowledgements

I first met the Eastern Bristlebird on a field trip as an undergraduate student at the University of Wollongong. I should say heard it, as an excited NSW National Parks and Wildlife Service officer smiled broadly and pointed enthusiastically in the general direction of a bird call. “Pretty birdie”, “Pretty birdie” he kept repeating. Little did I know that this bird and the excited Parks officer pointing at it would form the core of my post-graduate studies three years later.

When the idea of post-graduate study was first raised with me by Rob Whelan and Jack Baker, I was not at all confident. Do I really have it in me? I have always been passionate about the natural world and with some encouragement set about getting my hands and brain dirty with ecology and conservation.

First and foremost the support of my supervisors has been amazing. They are all passionate about ecology and conservation and all provided knowledge, wisdom, support and encouragement throughout my studies. Associate Professor Kris French (University of Wollongong) always had an open door, most often resulting in new doors being opened in my work. Professor Rob Whelan (University of Wollongong) always challenged me, asking questions and providing a platform for me to find my own way to an answer. Dr Jack Baker (NSW Department of Environment and Conservation) provided buckets of advice on all aspects of my work, from investigating ecological questions to how to talk to a television reporter.

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A work-horse of the team, Jodie regularly put in 14 hour days - as long as the food was kept in steady supply! There were numerous other people who volunteered their time and their assistance does not go unrecognised. It is comforting to know there are people willing to give their time to help in the conservation of the natural world.

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Translocation of the Eastern Bristlebird and factors associated with a successful program

Abstract

In the ongoing concern for the conservation of biodiversity around the globe, intensive, hands-on management of threatened species is becoming commonplace. The translocation of organisms to establish, re-establish or augment populations is one of the intensive strategies being used. This thesis explores the contemporary use of translocation in conservation, with a focus on the reintroduction of the Eastern Bristlebird (*Dasyornis brachypterus*) as a case study.

Translocation can be defined as the movement of living organisms from one area to free release in another. It is becoming increasingly common in the conservation of threatened species of a range of taxa around the world. Translocations have generally suffered from high failure rates, which have been mainly attributed to low habitat quality of the release site, a small number of individuals released, ignoring species-specific behaviours, poor management of the original threats to the species and stochastic environmental events. Aspects that have been associated with success include high habitat quality of the release site, reintroduction into part of the former range of the species, large number of individuals released and the use of a wild source population. Recent reviews have identified five key aspects of translocation projects that are required for a well-formed translocation program. These are the completion of a feasibility analysis, the use of criteria by which to assess success, the inclusion of experimental designs, financial accountability, and the effective communication of outcomes.

The bristlebird is an endangered Australian passerine. It is a small cover-dependent, semi-flightless bird that is restricted to a few isolated populations over a large geographic

range. It is threatened by habitat loss and fragmentation, inappropriate fire regimes and introduced predators. Reintroduction was identified by the National Recovery Team as a potential management strategy for the conservation of this bird. This reintroduction program was established with the following aims: Successfully translocate the bristlebird; investigate the post-release dispersal of reintroduced birds; monitor the impact of removing birds from a population.

To critically assess the effectiveness of the reintroduction program, seventeen criteria were established prior to commencement. The criteria were developed to be adaptable to a range of species or projects using a timescale that is measured in generation time rather than a set unit such as years. At the time of writing, the reintroduction was a resounding success. All criteria within the first four years were reached. Overall 13 of the 17 criteria have been achieved, including breeding being recorded in the reintroduced population and complete recovery of the source population following the removals.

The costs of the reintroduction program were analysed against other conservation options for the bristlebird. The analysis revealed that this reintroduction was much cheaper than many other translocation programs. It was also the cheapest option reviewed to potentially expand the area of occupancy of the bristlebird around Jervis Bay.

Two main study areas were established in the Jervis Bay region, NSW; one in the vicinity of the proposed source population at Booderee National Park and NSW Jervis Bay National Park and the other at the proposed release environment at Beecroft Peninsula. Over three years (2003 – 2005), fifty-one bristlebirds were caught using mist nets and 50 were transported to the release location and immediately released. All bristlebirds were banded, measured, had pin feathers collected for DNA analysis and radio transmitter attached before release.

In the release environment, reintroduced birds were radio-tracked for up to 34 days after release, to allow estimation of initial dispersal distances and mortality. Beyond this, transect surveys and targeted call playback were used to monitor the reintroduced

population once a year. In the reintroduced population, male bristlebirds dispersed further and moved more than females. Released bristlebirds did not disperse away from previously released conspecifics and settled quickly in nearby habitat. The translocated bristlebirds moved over much greater areas than bristlebirds in their native habitat; one bird dispersed over 4 km from the release location. During this monitoring, it was shown that bristlebirds can disperse a long way through continuous habitat, although they appear to prefer to settle in proximity to other bristlebirds. This has the potential to exacerbate the effects of habitat fragmentation as bristlebirds may not colonise nearby or tenuously connected habitat if there is a lack of conspecifics to enhance settlement.

Two monitoring sites were established in the source population, one where removals were to take place and another as a control to assess the impact of the removals on the population. The removal of 51 bristlebirds over three years from a single area in the source population had no detectable impact. Individuals that were removed appeared to have been replaced within six months of their removal. The origin of the replacement bristlebirds was unknown but the quick recovery was suggested to be a result of a surplus of non-calling or non-territorial birds within the population, perhaps combined with some juvenile dispersal. Such a surplus may be a mechanism for population persistence in an unpredictable environment or a result of insufficient suitable habitat for population expansion.

During the reintroduction, a wildfire burned a large proportion of bristlebird habitat in the location of the source population at Jervis Bay. The bristlebird has been described as fire-sensitive, with fire implicated in the decline of the species. The frequency of occurrence of bristlebirds was investigated in the second week after the fire in a range of sites varying in fire intensity. Bristlebirds were found in burned habitats but were more common in the less intensively burnt sites than in the more intensely burnt sites. Bristlebirds had been surveyed along transects in this area 2 months prior to this fire and were surveyed again 1, 9 and 13 months post-fire. Bristlebird numbers decreased in burnt areas after the fire and increased in unburnt areas. This pattern was evident for up to 9 months post-fire after which bristlebird numbers returned towards pre-fire levels in both

burnt and unburnt vegetation. This is in contrast to some previous research on bristlebirds and fire. It is suggested that bristlebirds avoided the fire by moving to unburnt areas. By the onset of the next breeding season, displaced bristlebirds were returning to pre-fire home ranges. It is speculated that the apparent lack of impact from this fire on bristlebirds was due to the close proximity of unburnt habitat and other refuges. The dispersal of juveniles and non-territory holding floaters from unburnt habitat combined with feral predator control probably contributed to the observed response, although these were not tested. It is suggested that the response of bristlebirds and presumably other birds to fire is strongly context-dependant and that fire management and bristlebird conservation may not be mutually exclusive.

Over fifty percent of bird species are sexually monomorphic and the bristlebird was previously considered to be part of this majority. I measured morphological characteristics on live and preserved bristlebirds, with sex determined genetically for live individuals using a common molecular technique, to test this suggestion. Males were significantly heavier, had larger heads, longer wings and longer tails than females. Univariate sexing criteria were developed based on the differences between males and females in two of these measures, weight and head-bill length and these measures were used to sex fifteen additional birds for which sex had been determined genetically. A discriminant function was also derived from the two characters. When the discriminant function was used in conjunction with the sexing criteria, 80 % of results agreed with molecular results, 7 % disagreed and 13 % were inconclusive. I speculate that this inaccuracy was due to juvenile males and the time of year of trapping, but the technique can be used to sex an individual in the hand with 80% accuracy, and can therefore provide a relatively quick and inexpensive method to investigate sex ratios in bristlebird populations and aid in the selection of individuals during further translocation projects.

Translocation can be a useful tool in conservation if planned and funded well and the outcomes published for the dissemination of information. This reintroduction has been a success, with bristlebirds surviving and breeding in the release environment. This has expanded the area of occupancy for the bristlebird and helped to reduce threats to the

species from stochastic events such as fire. Using experimental techniques, new aspects of bristlebird behaviour and population dynamics have been described, along with implications for the future management of the species.

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