



Conservation genetics of rock wren (*Xenicus gilviventris*)

Project summary:

The rock wren (*Xenicus gilviventris*) is a small, threatened endemic bird, only found in patches of suitable alpine habitat over c.900m a.s.l along the length of the South Island of New Zealand. This research will use a variety of genetic tools to investigate the ecology of the rock wren and aid in the conservation of this unique alpine passerine. Our objectives include gaining reliable estimates of effective rock wren population size combined with detailed data population structuring and dispersal patterns. This knowledge is vital to identify the most vulnerable and robust populations for management and will assist managers in prioritizing resource investment and minimizing the loss of genetic variability in order to reduce the risk of extinction.

Project Need:

The rock wren belong to an ancient endemic family of New Zealand wrens which are now thought to comprise the sister group to all other passerines (Barker et al. 2002; Edwards & Boles 2002; Ericson et al. 2002).

Unfortunately, the rock wren is one of the only two surviving members of the family, the other being the rifleman (*Acanthisitta chloris*). At least six other New Zealand wren species have gone extinct, almost certainly due to destruction of indigenous forest habitat and the introduction of mammalian predators (Michelsen-Heath 1998; Worthy et al. 2010). Anecdotal observations suggest rock wren numbers have been diminishing over the past 20-30 years and results from recent population studies show that both the abundance and range of rock wren have contracted (Michelsen-Heath & Gaze 2007). Both the IUCN and the Department of Conservation have acknowledged the threatened status of the rock wren, classifying the species as Vulnerable (Miskelly et al. 2008; IUCN 2010). This listing recognizes the decline in the population, but also notes that there is insufficient data on the species for confirmation of its status. This is reflected in the fact that published studies on rock wren are extremely limited, probably largely due to the inaccessible nature of their habitat. Current population estimates range somewhere between 2500-9,999 individuals (Birdlife International, 2010). We aim to use genetic data from current and historic rock wren populations to provide reliable estimates of effective rock wren population size and assess whether genetic variation has been lost since human settlement, the signature of a population bottleneck. Conservation management of the species is currently underway, including the translocation of rock wren to offshore islands (Willans & Weston 2005; Weston 2006). However, genetic considerations are not currently a part of these management practices. A thorough understanding of gene flow and population structure would serve to guide these processes and investigate the importance or relevance of genetics to current management. For example, it is not known to what extent rock wren subpopulations (for example Fiordland, versus Canterbury/Westland and Kahurangi) are connected by dispersal and if dispersal has been limited since the arrival of humans. Without dispersal, natural gene flow between populations will not occur, which may lead to loss of genetic variation within populations and negatively impact the fitness of rock wren and their ability to adapt in response to environmental change. We will be assessing genetic variation both within and between rock wren populations.

Project Location:

Permission has been granted to sample rock wren throughout the South Island encompassing their entire range. We aim to sample approximately 30 rock wren from each area (see map attached for specific sampling sites and rock wren sampled to date).

Laboratory work is carried out within the Department of Zoology, University of Otago

Overall objective of the Project:

1. Develop rock wren – specific genetic markers
2. Clarify phylogeny of the rock wren and investigate whether any genetically distinct subspecies exist.
3. Gain a thorough knowledge of rock wren population structuring, dispersal and gene flow throughout their range and on a local scale.
4. Estimate effective population size and assess whether genetic variation has been lost since human settlement using ancient DNA.
5. Identify potential rock wren management units and future management options.

Project Leader: Kerry Anne Weston

The project will be carried out between 2010 - 2013.

Timeline:		Status	Comments
	June 2010 - October 2010		
	Formulating research proposal,		
	permit and funding applications	completed	
	October 2010 - March 2011		
	First field sampling season	completed	70 rock wren caught and sampled
	April 2011 - October 2011		
	Laboratory work and analysis	completed	5 rock wren microsatellite markers working well on samples collected to date
	October 2011 - March 2012		
	Second field sampling season	completed	143 additional rock wren samples collected
	April 2012 - December 2012		
	Laboratory work and analysis		
	January 2012 - June 2013		
	Write up results		

Expected Results:

1. Produce a PhD thesis on 'Conservation genetics of rock wren'
2. Provide scientific advice on rock wren management to conservation managers.
3. Publish scientific publications on rock wren in peer-reviewed journals.
4. Raise the public profile of rock wren, particularly amongst the scientific and conservation communities.