Global Re-introduction Perspectives: 2013

Further case-studies from around the globe

Edited by Pritpal S. Soorae

IUCN/SSC Re-introduction Specialist Group (RSG)

RSG

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1980 - 2012: 32 years of re-introduction efforts of the hihi (stitchbird) in New Zealand

John G. Ewen[1], Rory Renwick[2], Lynn Adams[3], Doug P. Armstrong[4] & Kevin A. Parker[5]

[1] - Institute of Zoology, Zoological Society of London, Regents Park NW1 4RY, London, UK john.ewen@ioz.ac.uk
[2] - Department of Conservation, Warkworth Great Barrier Area Office, 28 Baxter Street, Warkworth 0910, New Zealand rrenwick@doc.govt.nz
[3] - Department of Conservation, Wellington Hawkes Bay Conservancy Office, PO Box 5086, Wellington 6145, New Zealand ladams@doc.govt.nz
[4] - Institute of Natural Resources, Massey University, Private Bag 11222, Palmerston North, New Zealand D.P.Armstrong@massey.ac.nz
[5] - Institute of Natural Sciences, Massey University, Private Bag 102904, North Shore Mail Centre, Auckland, New Zealand k.parker@massey.ac.nz

Introduction

The hihi or stitchbird (*Notiomystis cincta*) is a rare New Zealand passerine listed as Vulnerable by the IUCN (2011) and as Nationally Endangered by New Zealand's Department of Conservation (Miskelly *et al.*, 2008). Hihi are the sole representatives of a New Zealand endemic bird family, the Notiomystidae that was historically widespread and common over the main North Island and surrounding offshore islands of the country. Following European colonization of New Zealand the hihi suffered a rapid decline in range and numbers until by about 1890 they had become restricted to a single remnant population on an isolated offshore island, Little Barrier or Hauturu (3,083 ha). The relatively unmodified forest ecosystem on Little Barrier supports a hihi population estimated to be between 600 to 6,000 birds. The rough terrain and isolation make reliable population estimates difficult although there are indications that hihi abundance has fluctuated on the island since the late 1800s. Beginning in 1980, an ongoing national recovery program aims to increase the range and numbers of hihi using re-introduction. Initially a captive population was established with the view it would provide most founders for re-introduction, but later harvesting from wild populations has provided most birds. To date there have been 21 translocations to eight

Male hihi © Eric Wilson

different locations (see: www.hihiconservation.com). Here we review this recovery program and highlight the mixed success but growing optimism surrounding management of this species.

Goals

- Goal 1: Identify sites favorable to the establishment of unmanaged or managed hihi populations and introduce hihi to the most favorable of these.
- Goal 2: Continuing to optimize management required to allow re-introduced hihi populations to persist in otherwise unsuitable habitats.
- Goal 3: Maintaining a captive population of hihi to produce birds for re-introduction.
- Goal 4: Coordinated and ongoing movement of hihi between populations as optimal management indicates (including, assessing suitable translocation sites, sustainable harvest for translocation, genetic management and reduced disease transmission risks).

Success Indicators

- Indicator 1: Coordinating a national approach to monitoring to ensure survival and breeding success is evaluated one year post release, and population growth is estimated from survival and reproduction data.
- Indicator 2: Essential that monitoring is designed such that results can be evaluated and management adjusted to ensure optimal hihi recovery (using an adaptive management model).
- Indicator 3: Existing translocated hihi populations are maintained and produce enough birds to be available as founders for new translocations.
- Indicator 4: That the captive population is a net producer of hihi for translocation and that hihi production costs are competitive until a more cost-effective or successful translocation technique is developed.
- Indicator 5: That global hihi numbers increase and are divided between multiple viable sites to protect against catastrophe in any one site.

Project Summary

Feasibility: Habitat requirements for hihi are difficult to identify and successful establishment at sites with populations of the more dominant bellbird (*Anthornis melanura*) and tui (*Prosthemadera novaeseelandiae*) remains the acid test for New Zealand restoration. However, the identification of key management initiatives that promote population persistence make re-introduction a feasible management approach. The New Zealand Government is committed to hihi conservation under the Wildlife Act and limited funds and extensive staff time from the Department of Conservation (DoC) are allocated to this project. Increasingly community based conservation groups are also becoming involved in hihi management as it shares the responsibility for management of this species and suitable sites. A national Hihi Recovery Group is convened by the DoC and includes DoC staff, community conservation group representatives and researchers. The purpose of the Hihi Recovery Group is to provide advice to hihi managers, including identifying and evaluating re-introduction sites. Currently the Hihi Recovery Group and managers of hihi populations benefits from generous

Little Barrier Island (Hauturu) © John Ewen

corporate sponsorship from Wesfarmers Industrial and Safety NZ Ltd. In all cases Maori iwi (tribal groups) are consulted and their support is obtained from both source and release sites prior to any translocation. Iwi have kaitiaki (traditional guardianship) over all native species and the locations where they are found in New Zealand.

Implementation: The practicalities and logistics of hihi translocations and subsequent monitoring have been refined over multiple translocation events. Early translocations were from the remnant population on Little Barrier whereas more recently hihi have been translocated from established re-introduced populations and the captive breeding facility. Husbandry techniques are well formalized and documented (e.g. Ewen *et al.*, 2011a) and disease risk assessments for translocation and preventative medications are continually revised (Ewen *et al.*, 2011b). The genetic ramifications of translocation have been assessed and recommendations have been made to best manage current genetic diversity and minimizing inbreeding accumulation (Brekke *et al.*, 2011). Another major transition has been from translocation to DoC managed reserves (mostly remote offshore islands) to community driven restoration projects (often mixed private and public lands on the main North Island). In all cases non-native mammalian predators are either controlled, or ideally, eradicated prior to hihi translocation.

Post-release monitoring: In most early re-introduction events translocated hihi were colour ringed but no standardized re-sighting protocol had been developed to accurately track their fates. Early monitoring inconsistently recorded persistence of release individuals, evidence of breeding of these birds and recruitment. Beginning in the early 1990s there was an effort to develop improved monitoring methods of individual survival, and in some cases individual reproductive success, across re-introduced hihi populations. This necessitated ongoing colour ringing of progeny in each re-introduced population and conducting regular and consistent re-sighting of ringed birds. These data are then used to model population growth and demographic responses to management (Armstrong *et al.*, 2002; Armstrong *et al.*, 2007; Chauvenet *et al.*, 2012). Current monitoring methods work well at accessible sites, however where release locations are remote or include difficult terrain the quality of monitoring data is considerably lower and remains a challenge. In addition, sites with mature forest

that include natural nesting cavities for hihi make recording reproductive success more difficult than at sites where artificial nest boxes are used.

Major difficulties faced

- Lack of detailed knowledge of the resilience of the one remnant hihi population on Little Barrier to continual harvesting for translocation or the habitat features that allow the population to persist without supportive management.
- Difficulty in obtaining detailed post release survival data and ongoing survival and reproduction data from some populations. This is due to a mix of site characteristics (size and terrain), low density of hihi (at least initially), and monitoring skills of personnel.
- Poor population persistence without management at release sites and in at least one case uncertain population viability despite supportive management.
- Possible dispersal of hihi outside of protected areas at restoration sites located on the main North Island of New Zealand, and the difficulty in distinguishing the effect of dispersal against the impacts on the population of any predators that remain within an area despite control measures.
- Multiple problems in the captive breeding program including; (i) poor survival in captivity, (ii) low numbers of individuals can be housed in any single aviary due to aggression, (iii) high cost of maintaining the population and rearing young, and (iv) continual need for replacement of breeding birds from wild populations.

Major lessons learned

- Hihi can be easily caught, held and transported for re-introduction. Over time the techniques and husbandry requirements have been continually refined (details available in references or on request). A primary goal is to reduce stress to birds during all stages of translocation and to minimize the time taken for this process.
- Some hihi populations can grow with intensive supportive management. Currently all re-introduced hihi populations require some form of supportive management. Targeted monitoring is designed to evaluate and optimize management. This is important where management is costly and time consuming.
- Post-release monitoring is challenging but provides valuable information. The

Public release of hihi at Maungatautari 2011

Recovery Group is still developing a best approach to post-release monitoring for each site.

- Convening a national Recovery Group that includes DoC staff, community group representatives, iwi and NGOs, plus researchers benefits hihi conservation. The Recovery Group allows cohesive action with maximal input and agreement. It also provides an avenue to direct where research is required and also for generating funding.
- Direct translocations have proven to be a more successful and cost effective translocation technique compared to captive breeding, which has now been discontinued.

Success of project

Highly Successful	Successful	**Partially Successful**	Failure
		√	

Reason(s) for success/failure:

- Positive growth of re-introduced populations at some sites when supportive management provided a varying mix of; (i) provision of sugar water food supplementation, (ii) provision of artificial nest boxes at some sites, (iii) management of nest mite parasites and, (iv) ongoing control or exclusion of introduced mammalian predators.
- Despite supportive management some sites remain unsuitable, perhaps associated with disease (Mokoia Island population) or dispersal outside of protected areas (Ark in the Park project of Waitakere Ranges) or possibly from predation despite predator control attempts.
- All re-introduced populations require supportive management. The success of managed populations is due to the willingness of many determined groups and individuals to work together.
- The success of the project has been enhanced through collaborative information sharing and stakeholder involvement via the Hihi Recovery Group.
- Captive breeding program discontinued due to poor survival in captivity associated with disease and also an inability to hold many adult birds in the same enclosures due to aggression. Excessive cost to produce only few offspring relative to the ability to source large numbers of hihi for translocation from wild populations.

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