

REF2021 Impact case study: Empowering effective conservation translocations for saving species

Although a widely used conservation management action for over 1,300 species worldwide, conservation translocations (moving endangered species from one site to another for conservation) have a poor success record. To address this, researchers at ZSL's Institute of Zoology (IOZ) developed a programme of work to identify best practice methods for the management of conservation translocation programmes. These methods were implemented via review of International Union for Conservation of Nature (IUCN) conservation translocation guidelines, development of IUCN conservation translocation practitioner training and through policy and management initiatives adopted by conservation NGOs and governments globally. As a result, there have been demonstrable improvements for focal species (critically important Endangered species) across the world, including IOZ playing a critical role in leading the recovery of four bird species: New Zealand's hihi *Notiomystis cincta* (adding >200 to a global population of 1000–3000), Australian Regent honeyeaters *Anthochaera phrygia*, Mauritius parakeets *Psittacula eques* and olive white-eyes *Zosterops chloronothos*.

Underpinning research

Conservation translocations are an increasingly necessary conservation tool. However, despite a few well-publicised success stories, most conservation translocations fail. If global biodiversity recovery is to be achieved, improving conservation translocation success is imperative. IOZ research found that, despite 20 years of the applied science of reintroduction biology, the discipline has largely failed to support conservation translocations because of a mismatch between species management needs and scientific interests, leading to the production of interesting, yet not always useful, science. In response to this, IOZ developed a research programme aimed at delivering evidence-based solutions to management issues identified by practitioners and associated with animal translocations. This approach ensured that IOZ research met end users' expectations, including governments and NGOs, and directly informed management decisions. Some specific examples from IOZ research include:

New Zealand hihi translocations

The hihi is an endangered forest bird which had become restricted to a single offshore island; since 1980 an ongoing recovery programme has aimed to increase its range and numbers, through reintroduction. Often conservation translocations involve supporting the animals after their release, for example supplementary feeding – but this is often carried out without critical evaluation of how much benefit these measures provide. IOZ researchers used monitoring data from 1991 to 2010 to quantify population demographic benefits of supplementary feeding and projected these into the future under different feeding regimes. Furthermore, using population monitoring data from 1995 to 2015, IOZ Senior Research Fellow Dr Ewen built a model to evaluate three management alternatives. The fundamental objectives were to maximize the number and persistence of female hihi in the new location, minimize the impact on the source population, and minimize costs. Their analysis, carried out between 2016 and 2018, showed that no further translocation was the rational choice for an establishing population.

Mauritius (Echo) parakeet disease management

An outbreak of beak and feather disease virus in Mauritius parakeets in 2005 has led to major changes in how this reinforced wild population has been managed ever since. Using an experimental approach spanning three breeding seasons (2013 to 2014 and 2015 to 2016) IOZ researchers quantified the efficacy of chemical hygiene protocols of nest sites that had been in place since the outbreak. IOZ researchers

showed that while management reduced prevalence of beak and feather disease virus it also unintentionally reduced breeding success, leading to an evidence-based change in nest site management.

Mauritius olive white-eye supplementary feeding

Post-release population growth of the critically endangered Mauritius olive white-eye had been aided by supplementary feeding. However, the success of feeding resulted in demand for food that overtook management capacity. In turn, managers feared that changing to a less intense feeding regime would cause population declines. IOZ research combined a field experiment with decision support analysis to quantify the risks and assist in rational decision making, resulting in an evidence-based change to a less intensive, less costly feeding regime that did not cause population declines. In 2020, four years after the experiment, the population was continuing to grow and costs had been contained, matching predictions almost exactly.

Australian Regent honeyeater nest predator management

Regent honeyeaters are critically endangered, with an estimated population of less than 400 mature birds. An ongoing reinforcement program is in place using captive reared birds. IOZ research found that the reproductive success of released birds was very low due to predation. IOZ researchers led a decision process for identifying and selecting a perceived best way to manage predator pressure. This research showed how risk aversion and uncertainty makes decisions difficult, but structured thinking helps compare and select management options, subsequently adopted by the recovery group.

Conservation impacts

IOZ works to promote best practice conservation translocations, with impact falling into three main areas: the recovery of endangered focal species (animal species that provide an essential ecological function); capacity building through IUCN training; and influencing the adoption of IUCN guidelines into policy.

Focal species recovery

IOZ research has led to population recovery of multiple endangered species globally:

Hihi: IOZ played a critical role in the recovery of NZ's endemic hihi alongside collaborators at Massey University. Hihi had become restricted to a single small offshore island for more than a century before early success in reintroduction to Kapiti Island in 1991. Based on the findings that population vital rates can be improved via supplementary feeding all reintroduction sites are fed but closely monitored to refine feeding management decisions. IOZ research set methods for assessing monitoring data for making decisions on releasing birds. These approaches were used to establish three new populations between August 2013 and December 2020, growing the number of populations to seven and spreading hihi into two new mainland regions within their historic range after an absence of more than a century. IOZ research has been used to define national management protocols requested by the NZ government; our methods of modelling projections of both source and destination populations have been used to give permission for or against translocation.

Mauritius parakeet: Once the world's rarest parrot, with 8 to 12 individuals in 1987, the Mauritius parakeet now numbers about 400–450 mature individuals. The work of IOZ researchers, alongside collaborators at the University of Kent, showing that chemical treatment of nest boxes reduced breeding success, resulted in the Mauritius Wildlife Foundation (MWF) discontinuing chemical treatment of nest boxes in 2017, a process that had been in place for over a decade. This improved parakeet breeding success by 5%, as well as removing a resource intensive component of population management. Similarly, IOZ work with MWF predicting cheaper management with equal population growth in the Critically Endangered Mauritius olive white-eye resulted in the MWF reducing management effort involving supplementary feeding in 2015.

Regent honeyeater: In Australia, IOZ and Monash University research on the critically endangered Regent honeyeater (350 to 400 mature individuals remaining) quantified the predicted outcome of alternative nest protection actions. This research was used by the species recovery team to select and apply new nest protection measures using tree collars in 2019.

Capacity building through IUCN training

Capacity building can allow faster uptake of best practice. In 2016, the Chair of the IUCN Conservation Translocation Specialist Group (CTSG) engaged IOZ to lead on developing an IUCN CTSG practitioner training course. This four-day course has been running annually since 2016 and as at 2020, has trained 110 practitioners from 27 countries to date (including 26 practitioners from developing countries).

Ongoing contact with course alumni has also demonstrated the enduring impact of the training, which has enabled release planning for the extinct-in-the-wild Guam kingfisher (sihek), and New Zealand's rarest breeding bird, the tara-iti, with both projects following methodologies taught in the course materials.

Influencing the adoption of IUCN guidelines into policy

The success of IOZ research has attracted wider sector interest from NGOs and policymakers via their exposure in IUCN training. This led Dr John Ewen to be invited to the British and Irish Association of Zoos and Aquariums (BIAZA) Reintroduction Advisory Group, where he drafted the BIAZA Policy on Conservation Translocations. This policy was signed off by the BIAZA council in March 2019, providing best practice of translocation to all BIAZA zoos and aquariums in Britain and Ireland. In addition, John Ewen was invited as a sounding board member for Natural England's 'Code and Good Practice Guidance for Reintroductions and Conservation Translocations'.



The New Zealand hihi (*Notiomystis cincta*), a focal species for IOZ's research on small population recovery