



Global Re-introduction Perspectives: 2010

Additional case-studies from around the globe
Edited by Pritpal S. Soorae



IUCN/SSC Re-introduction Specialist Group (RSG)





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Re-introduction of shore skinks to offshore islands in the Auckland region, New Zealand

Marleen Baling^{1,3}, Chris Wedding², Manuela Barry¹, Weihong Ji¹
& Dianne H. Brunton¹

¹ - Ecology and Conservation Group, Institute of Natural Sciences, Massey University, Private Bag 102-904, North Shore City, Auckland 0745, New Zealand (m.barry@massey.ac.nz; j.j.weihong@massey.ac.nz; d.h.brunton@massey.ac.nz)

² - Bioresearches Group Ltd., P.O. Box 2828, Auckland 1140, New Zealand (chris.wedding@bioresearches.co.nz)

³ - Current address: Pacific Invasives Initiative (IUCN Invasive Species Specialist Group), The University of Auckland, Private Bag 92019, Auckland, New Zealand (m.baling@gmail.com)

Introduction

The shore skink (*Oligosoma smithi*; Gray, 1845) is one of two native lizard species that are restricted to the northern coastline of New Zealand (Hare *et al.*, 2008; Chapple *et al.*, 2009). Despite having a wide distribution on the mainland and on offshore islands in the northern part of North Island (Townes *et al.*, 2002; Hare *et al.*, 2008), this species is significantly impacted by introduced mammalian predators. In particular, several shore skink populations have shown marked increases in recruitment following pest eradications (Townes, 1991; Townes, 1996 G. Ussher, unpublished data), therefore they could be considered ideal indicator species for pest eradication projects. Shore skinks were selected as a target species for captive breeding for future translocations, as part of an ecosystem restoration approach for islands in the Auckland region. This endemic species is ideal for re-introductions due to their generalist foraging strategy, coupled with their relatively fast maturation period (M. Baling, unpublished data). Their visually active and diurnal behavior also serve as a good reptile conservation advocate to

public visitors at island reserves. In 2006, the first translocation of this species was conducted to two offshore islands in the Hauraki Gulf, Auckland, and into captivity as a trial for breeding program that aims for future wild releases.

Goals

- Goal 1: Promote a functional, self-sustaining ecosystem on offshore islands in the Hauraki Gulf, Auckland, by establishing new lizard species



Shore skink release © D. Jenkins

populations that are currently absent in habitats within the species historic range.

- **Goal 2:** Create founder populations from captive-bred shore skinks for re-introduction projects as a means of reducing pressure on wild sources.
- **Goal 3:** Determine at source population recovery following removal of skinks for re-introduction.

Success Indicators

- **Indicator 1: *Re-introduction sites*** - Short-term: The survival, establishment and breeding of founders and their offspring at islands. Long-term: Self-sustaining populations that consist of island-born breeders on islands.
- **Indicator 2: *Captive population*** - Short-term: The survival, establishment and breeding of the founder population. Long-term: Yearly production and survival of offspring in captivity to the point of suitable re-introduction size, condition and health.
- **Indicator 3: *Source population*** - The continual increase in juvenile recruitment at all cohort stages, two years following removal of skinks.

Project Summary

Feasibility: The species re-introduction was initiated through discussions between Massey University (Albany Campus) and the New Zealand Department of Conservation (DOC), for the identification of reptile research and conservation management priorities in the Auckland region. These discussions and the identification of source and release locations later expanded to involve local councils, local herpetologists, captive breeders and veterinarians to develop best practice protocols. The selection of the source population was highly dependent on a large population size that was geographically closest to re-introduction locations. The two islands selected were surveyed for best release sites based on habitat type of the source population, to increase chances of survivorship. The enclosures at the captive facility are held outdoors and have naturalistic environment settings, to promote normal intra-specific interactions and breeding. The support from Massey University, Supporters of Tiritiri Matangi Inc. (SoTM), Motuora Restoration Society Inc. (MRS), Auckland Regional Council (ARC), DOC and local iwi tribes contributed to the translocation of 120 individual shore skinks from Tawharanui Regional Park (Tawharanui) to Tiritiri Matangi Island (n=30), Motuora Island (n=30) and the Massey University Captive Reptile Breeding Facility (n=40).

Implementation: The species re-introduction underwent several stages; initial survey and disease-screening of reptiles at release sites (Tiritiri Matangi and Motuora Islands), capture and quarantine of shore skinks from source site (Tawharanui), and the release of the animals to each site. Initial reptile surveys were conducted on both islands to confirm non-presence of the shore skink, in accordance with DOC protocols. Funding for disease-screening was limited, therefore only reptile-associated parasites of health concern were targeted; i.e. *Salmonella* and *Cryptosporidia*. A sample of reptiles from the release site islands and all of the captured shore skinks were tested for true positives. In November 2006, shore skinks were sourced at a female-biased sex ratio of 1:2, with a focus

on capturing gravid females to provide immediate island-born individuals (due in January/ February 2007) and to increase genetic diversity of the founder population (through non-related founder neonates). All shore skinks were quarantined at the Massey University captive facility, and wildlife veterinarian advice was sought when some individuals tested positive for *Salmonella*. The translocation was deemed fit to continue, after results showed the presence of an uncommon strain of *Salmonella* at the release sites, and that all shore skinks were tested negative (except for one). The releases at both island reserves were public events, promoting public advocacy of reptile conservation and restoration by re-introduction.

Post-release monitoring: For each founder population was conducted intensively for the first four months, and then at three-monthly intervals until the end of 2008. Live-trap grids were used to monitor survivorship and distribution of each founder population. The distributions of two other resident skink species were also recorded to investigate niche displacement. Evidence of island-born individuals from translocated gravid females was first detected in early 2007, signaling initial founder survival and successful birthing. The following New Zealand summer season (2007-2008), young or sub-adults, including several gravid females in the trapping grid were caught at Tiritiri Matangi Island (confirming successful establishment). The second release site at Motuora Island was exposed to large winter storms and the population remained undetected (with the exception of one or two adults) during the summer of 2007-2008. This was possibly due to insufficient refuges from storms and unusually high tides during the winter months at the release site. Monitoring continues bi-annually and will be conducted by the volunteers of each NGO (SoTM and MRS), with guidance from the current researcher. Volunteers are trained to set the traps, identify species and data recording for monitoring long-term trends of the populations. The possibility of supplementation (to further increase genetic diversity) is likely for founder populations that are stable or have established and is part of the original translocation proposal.

Post-removal monitoring of the source population: This was conducted as part of a postgraduate student project that was examining the effects of mouse predation on the population recovery. The source population was monitored for one year, using live-traps within pest-controlled and non-pest-controlled grids from which the skinks were sourced. The study showed that the skinks remained abundant within both grids but particularly so within the pest-controlled site. Additionally, population recovery would likely be much greater within the pest-controlled site where the population comprised of a significantly greater proportion of juvenile skinks, despite both sites having similar proportions of neonates. The study suggested that a higher predation pressure on neonate skinks by mice in non-controlled sites is likely to suppress skink recovery rates. Because ongoing pest management occurs at Tawharanui, the population is capable of recovering post-translocation. The captive founder population was established and has been successfully breeding since 2007. All animals' conditions are monitored and their morphometrics recorded monthly. There is a high survival rate for captive-born young, and they are seen to be sexually mature by two years of age. In early

2009, 30 captive sub-adult (born season 2006-2007) and 50 wild-caught shore skinks were disease-screened and released to Motuihe Island, Auckland, as part of the island's restoration plan. This marked the first translocation from the captive breeding facility. The next cohort, born 2007-2008, is planned for release to Crusoe Island, Auckland, in early 2010 as part of the Auckland Regional Council's initiative.



Ocean Dunes TRP © C. J. Wedding

Major difficulties faced

- Unpredictable weather, especially heavy storms and high tides during winter that destroyed trap grids. Therefore trap maintenance can be very high.
- The difficulty in detecting this species at low densities, especially to capture newborn individuals. This facilitated the need for multiple capture/ tracking techniques (i.e. live pitfall traps, artificial refuges, funnel traps, tracking tunnels, and hand-capture) to increase detection rates.
- Due to the high cost and limited funding for disease-screenings, a comprehensive testing of both translocated individuals and release site populations were not able to be done. Priorities for potential diseases of concern had to be selected instead.
- Developing best practice husbandry techniques and data recording, while attempting to provide for and maintain natural behaviors (e.g. intra-specific competition, foraging) in the captive population without significant detriment to the survivorship of individuals.
- Conflict of interest in shore skink experiment on pest monitoring manipulations and other wildlife management. The pest-controlled grid at source population area is also the breeding ground for the endangered New Zealand dotterel (*Charadrius obscurus*), and some volunteers of Tawharanui raised concerns about the effect of rodent bait stations and skink trap placements on the chicks.

Major lessons learned

- Selection of suitable release sites particularly within dynamic habitat types such as beaches or close to the coastline that may change according to seasonal weather should be taken into account. Sufficient stable refuges should be identified, or added if there is little choice in release sites.
- Importance in communication (before, during and after the translocation) between DOC, ARC, local councils, NGO's, iwi tribes, and researchers is very high. Good communication is needed to maintain relationships, share local knowledge and aid in funding for research and monitoring. Teaching, training and educating volunteers in monitoring techniques is advisable to maintain

Reptiles

reliable long-term data collection that will assist the increase in local knowledge of the species and location.

- Defining disease-screening methods and understanding of *Salmonella* prevalence in New Zealand reptiles. There was a lack of standardized protocol in disease-screening New Zealand reptiles in the Auckland region.
- Setting the standard in quarantine procedures in reptile translocation in the Auckland region. This translocation procedure preceded the next few lizard re-introductions in the Auckland region, where advice and services were sought from researcher by other NGO's organizing other lizard translocations.

Success of project

Highly Successful	Successful	Partially Successful	Failure
	√		

Reason(s) for success/failure:

- One of the two wild-release populations has fulfilled the short-term goal of the re-introduction. The long-term goal will be assessed at five and 10 years post-translocation. This first lizard re-introduction to Tiritiri Matangi Island may be used as an example for future re-introduction of more endangered New Zealand lizard species to this public scientific reserve.
- The outcome for the shore skink re-introduction to Motuora Island is currently inconclusive due to low re-capture rates and will be re-assessed in the next two years.
- The captive population has satisfied the short and long-term goals, as young are born annually and high proportions are surviving to adulthood. These young are fit to be translocated to the wild, therefore will aid in restoring the historical geographic distribution of the species, and also complete island ecosystem restorations.
- The project confirmed the capability of a high-density source population to recover after removal of 120 individuals from the site.

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