



Global Re-introduction Perspectives: 2016

Case-studies from around the globe

Edited by Pritpal S. Soorae



IUCN/SSC Re-introduction Specialist Group (RSG)



TURNER
ENDANGERED
SPECIES
FUND





The designation of geographical entities in this book, and the presentation of the material, do not imply the expression of any opinion whatsoever on the part of IUCN or any of the funding organizations concerning the legal status of any country, territory, or area, or of its authorities, or concerning the delimitation of its frontiers or boundaries.

The views expressed in this publication do not necessarily reflect those of IUCN.

Published by: IUCN/SSC Re-introduction Specialist Group & Environment Agency-ABU DHABI

Copyright: © 2016 International Union for the Conservation of Nature and Natural Resources

Reproduction of this publication for educational or other non-commercial purposes is authorized without prior written permission from the copyright holder provided the source is fully acknowledged.

Reproduction of this publication for resale or other commercial purposes is prohibited without prior written permission of the copyright holder.

Citation: Soorae, P. S. (ed.) (2016). *Global Re-introduction Perspectives: 2016. Case-studies from around the globe*. Gland, Switzerland: IUCN/SSC Re-introduction Specialist Group and Abu Dhabi, UAE: Environment Agency-Abu Dhabi. xiv + 276 pp.

ISBN: 978-2-8317-1761-6

Cover photo: Clockwise starting from top-left:
i. Bolson's tortoise, USA @ Turner Endangered Species Fund
ii. Wetapunga, New Zealand @ Richard Gibson
iii. Morelos minnow, Mexico @ Topiltzin Contreras-MacBeath
iv. *Silene cambessedesii*, Spain @ Emilio Laguna
v. Tasmanian Devil, Maria Island, Tasmania @Simon DeSalis
vi. Agile frog, Jersey @ States of Jersey Department of the Environment

Cover design & layout by: Pritpal S. Soorae, IUCN/SSC Re-introduction Specialist Group

Produced by: IUCN/SSC Re-introduction Specialist Group & Environment Agency-ABU DHABI

Download at: www.iucnsscrg.org

Re-introduction of tuatara to a mainland sanctuary within the species historic range in Hawkes Bay, New Zealand

Stephanie Price¹, Kristine Grayson², Tamsin Ward-Smith³ & Nicola Nelson⁴

¹ - PhD candidate, Allan Wilson Centre, School of Biological Sciences, Victoria University of Wellington, PO Box 600, Wellington, 6140, New Zealand

steph.price@vuw.ac.nz

² - Assistant Professor, Department of Biology, University of Richmond, Richmond, VA, USA

³ - Sanctuary Manager, Cape Sanctuary, 499 Coventry Road, Hastings, 4156, New Zealand

⁴ - Associate Professor, Allan Wilson Centre, School of Biological Sciences, Victoria University of Wellington, PO Box 600, Wellington, 6140, New Zealand

Introduction

Tuatara (*Sphenodon punctatus*) are medium-sized reptiles and the sole extant representatives of the order Rhynchocephalia, which arose ~250 million years ago in the late Triassic. Endemic to New Zealand, tuatara were widespread until human colonization and introduced mammalian predators resulted in extirpation from the mainland and their restriction to isolated, predator-free offshore islands (Gaze, 2001). Although listed as Least Concern by the IUCN Red List based on robust population sizes on a few islands, the New Zealand Department of Conservation's current Threat Classification System describes tuatara as Range-Restricted, conservation dependent and relict, having undergone a decline within the last 1,000 years and now occupying <10% of their former range.

Translocations to extend the range of tuatara have been essential to species conservation. In October 2012, as part of several unprecedented large-scale translocations within New Zealand, 40 adults and 20 juveniles were re-introduced to Cape Sanctuary, 2,500 ha of private land enclosed by a 10.6 km pest-proof fence on the Cape Kidnapper's Peninsula. We report on the re-introduction and acknowledge the collaborative efforts of the Lowe, Robertson, and Hansen families (landowners and funding



Tuatara (*Sphenodon punctatus*)

parties), Ngati Koata, Ngati Mihiroa, the New Zealand Department of Conservation, and the Victoria University of Wellington Reptile Conservation Research Group to facilitate this translocation.

Goals

- Goal 1: Secure the population viability and genetic diversity of tuatara by restoring a self-sustaining population to an area within their pre-human range (Gaze, 2001).
- Goal 2: Restore a coastal farmland landscape to its pre-human state through weed and pest control, as well as the re-introduction of native fauna and flora.
- Goal 3: Use a re-introduction and ecological restoration project to build collaborative relationships and transfer skills between researchers, Maori iwi, sanctuary staff and volunteers.

Success Indicators

- Indicator 1: Survival and growth of founders within 5 years of release.
- Indicator 2: Evidence of reproduction and recruitment of young in to the population within 10 years.
- Indicator 3: Evidence of a self-sustaining population within 100 years.

Project Summary

Feasibility: Cape Sanctuary is a privately owned, 2,500 ha sanctuary which contains a “seabird cell”, a smaller 1.5 ha enclosure surrounded by a 610 m predator-proof fence designed to provide the utmost protection for nesting seabirds. It is within this smaller site where tuatara were re-introduced in 2012. Prior to the founding of Cape Sanctuary, the Cape Kidnappers Peninsula was largely devoted to production, with land use centered on farming, forestry and tourism. Livestock grazing and invasive pests saw much of the native flora and fauna destroyed (McLennan, 2012). The isolated mainland location of the sanctuary, restricted access (Cape Sanctuary is not open to the public), pest and predator-proof fences, and ongoing pest control means that it is reasonably well-protected against reinvasions and has high potential for establishment of a viable tuatara population.

The presence of tuatara on the peninsula prior to human settlement supports this expectation (Miller *et al.*, 2012). Planting work within the seabird cell has begun to restore much of the native flora, however much of the peninsula is still grassland and it will be decades before a forest canopy regenerates.

Implementation: Tuatara are treasured in Maori culture, therefore the re-introduction to Cape Sanctuary involved collaboration between Ngati Koata (Maori tribe and guardians of the Stephens Island tuatara) and Ngati Mihiroa (guardians of the Cape flora and fauna), as well as the Lowe, Robertson, and Hansen families, the NZ Department of Conservation, and the Victoria University of Wellington Reptile Conservation Research Group. In October 2012, 220 adult tuatara were sourced from Stephens Island in the Cook Strait for re-introduction to sanctuaries across New Zealand. From this group, 40 (20 males:20 females) were re-introduced to Cape Sanctuary. Twenty juvenile tuatara were also re-

introduced. These juveniles were hatched from eggs collected from Stephens Island and head-started in captivity until ~5 years of age. These conservation translocations were the first of their kind to re-introduce tuatara to sites outside of their current ecological range.

Stephens Island is home to the largest population of tuatara, with an estimated 30,000 - 50,000 individuals occupying only



Release site

150 ha of land. Removal of animals from this population therefore carries the benefits of relieving some overpopulation pressure and safeguarding the species against natural disaster and disease outbreaks, as well as providing animals for re-introduction to sites within the historic range of tuatara. Prior to translocation tuatara were weighed, measured, and had samples taken for health screening purposes. These included cloacal swabs for *Salmonella* and *Campylobacter* analysis, blood smears for haemoparasite and white blood cell counts, and faecal matter for intestinal parasite screening. Tuatara were also checked for ectoparasites (ticks and mites) and fitted with uniquely coded passive integrated transponder (PIT) tags inserted beneath the skin for identification. Each animal was then individually packaged in an aerated postal tube and transported from Stephens Island by helicopter and car for re-introduction to their respective sites. As Cape Sanctuary is a mainland site and still vulnerable to introduced predators, tuatara were released in to the seabird cell. Artificial burrows (log piles, pipes, bore holes and wooden boxes) were installed to improve habitat.

Post-release monitoring: A permanent team of landowner-appointed staff currently manages Cape Sanctuary with assistance from volunteers and part-time staff and contractors. Since the 2012 release, Cape Sanctuary has been visited three times by the VUW Reptile Conservation Research Group for tuatara monitoring (Spring 2013 and Spring and Autumn 2014). Three to five people spent up to seven nights searching the seabird cell for adult tuatara each visit. A total of 85% of the founding tuatara were re-located. There was no measurable change in snout-vent length but mean percent mass increase in males was 11.59% and in females was 6.11%. This is a positive indication of habitat quality and prey availability at the introduction site. No evidence of recruitment has been observed. One fatality was observed in a male tuatara as a result of significant trauma to one eye, possibly caused by a seabird or collision with vegetation. A fourth monitoring trip will be conducted in Autumn 2015. It is accepted practice that a population must be monitored for at least the time needed for an individual

to reach sexual maturity before the success of a translocation can be determined. As tuatara may live for over 100 years, reach sexual maturity in their early teens, and females only breed every 4 years on average, monitoring is expected to continue for decades before the establishment of a self-sustaining population can be assessed.

Major difficulties faced

- Recapturing founders is challenging due to the cryptic and nocturnal nature of tuatara, the steepness of the cliff-side site, and the presence of numerous hides and burrows where animals can shelter. The limited ability to monitor survival and growth of all founders during a single trip means that repeat monitoring is required.
- Early stages of revegetation and little closed canopy can limit the range of tuatara from the safety of their burrows and reduce activity on bright nights (e.g. full moon, cloudless), making detection difficult, particularly of re-introduced juveniles and new recruits.
- Access to the site is via dirt and gravel tracks through farmland, so visits are only possible when the weather allows. If the weather is especially adverse and the track hazardous then monitoring visits have the potential to be cut short or extended by several days.

Major lessons learned

- Consistent with previous tuatara translocations and monitoring visits at other re-introduction sites, recapturing founders is difficult. Non-detection does not necessarily imply mortality and subsequent visits can uncover founders not seen since translocation. The inability to recapture 100% of founders after multiple visits is likely due to surveying limitations (e.g. terrain, small team covering a large area, cryptic species, and weather). Therefore, the number recaptured should be interpreted as minimum number alive and not representative of survivorship or translocation success (Nelson *et al.*, 2008)
- Limitations to detectability that should be considered for the timing of future monitoring visits include appropriate weather conditions for accessing the site and moon phase. Tuatara were observed to remain in burrows on bright nights, likely due to increased visibility from a lack of canopy, and thus the increased risk of predation by nocturnal birds of prey.
- Cooperation with stakeholders is invaluable in running effective monitoring visits. Assistance was provided regarding numerous aspects, from accommodation and voluntary assistance to information on notable tuatara sightings between visits. It is in the interest of the translocations success that there is communication and cooperation between stakeholders.

Success of project

Highly Successful	Successful	Partially Successful	Failure
	√		

Reason(s) for success/failure:

- Founders have survived, are in good condition, and there has been a mean population weight gain, indicating that tuatara can survive and there are sufficient resources at Cape Sanctuary.
- Survivorship is probably higher than indicated by the 2013 - 2014 monitoring visits. It is likely that more founders will be recaptured in future visits.
- It is too early to detect recruitment to the population (females breed every 4 years on average, nests are cryptic, and hatchlings very difficult to locate) so success can only be defined on a short-term basis. Long-term monitoring (decades) is required to determine whether the population has become self-sustaining.
- Cooperation with stakeholders ensured that the organization and running of monitoring visits, recruitment of volunteers and sharing of information was efficient and effective.

References

Gaze, P. (2001) Tuatara recovery plan 2001 - 2011. Threatened species recovery plan 47. Biodiversity Recovery Unit, Department of Conservation, Wellington, New Zealand.

McLennan, J. (2013) Cape Sanctuary. Te Matau a Maui. Unpublished.

Miller, K.A., Miller, H.C., Moore, J.A., Mitchell, N.J., Cree, A., Allendorf, F.W., Sarre, S.D., Keall, S.N. & Nelson, N.J. (2012) Securing the demographic and genetic future of tuatara through assisted colonization. *Conservation Biology* 26: 790-798

Nelson, N., Keall, S., Gaze, P. & Daugherty, C. (2008) Re-introduction of tuatara as part of an ecological restoration project on Wakatere-papanui Island, Marlborough Sounds, New Zealand. *In*: Soorae, P.S. (ed.) 2008. Global re-introduction perspectives: re-introduction case-studies from around the globe. IUCN/SSC Re-introduction Specialist Group, Abu Dhabi, UAE. viii +284pp.



INTERNATIONAL UNION
FOR CONSERVATION OF NATURE

WORLD HEADQUARTERS
Rue Mauverney 28
1196 Gland, Switzerland
Tel +41 22 999 0000
Fax +41 22 999 0002
www.iucn.org

