Global Re-introduction Perspectives: 2016

Case-studies from around the globe

Edited by Pritpal S. Soorae

IUCN/SSC Re-introduction Specialist Group (RSG)

RSG

هيئة البيئة - أبوظبي
Environment Agency - ABU DHABI

calgaryzoo

TURNER ENDANGERED SPECIES FUND

DENVER ZOO

Global Re-introduction Perspectives: 2016

Case-studies from around the globe

Edited by Pritpal S. Soorae

IUCN/SSC Re-introduction Specialist Group (RSG)

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

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.iucnsscrsg.org

IUCN Species Survival Commission (SSC)
The SSC is a science-based network of close to 8,000 volunteer experts from almost every country of the world, all working together towards achieving the vision of, “A world that values and conserves present levels of biodiversity.”

Environment Agency - ABU DHABI (EAD)
The EAD was established in 1996 to preserve Abu Dhabi’s natural heritage, protect our future, and raise awareness about environmental issues. EAD is Abu Dhabi’s environmental regulator and advises the government on environmental policy. It works to create sustainable communities, and protect and conserve wildlife and natural resources. EAD also works to ensure integrated and sustainable water resources management, and to ensure clean air and minimize climate change and its impacts.

Turner Endangered Species Fund (TESF)
The TESF was established in 1997 to conserve biological diversity by ensuring the persistence of imperiled species and their habitats with an emphasis on private land. Our activities range from single species conservation actions to restoration of ecological communities and functional ecosystems. We are unique in our efforts to bring the role of private lands to the forefront of ecological conservation. We aim to use the best science to effectively conserve biodiversity and disseminate reliable scientific and policy information. We are determined to establish a new level of effectiveness for private-public efforts to redress the extinction crisis.

Calgary Zoo (CZ)
The Calgary Zoo’s vision is to be Canada’s leader in wildlife conservation. In close alignment with IUCN, this vision is pursued through a mix of Canadian and global conservation initiatives regarding two strategic pillars: 1) Conservation Translocations, such as re-introductions, to avert species extinction and strengthen ecosystem function; and 2) Community Conservation to bring mutual and sustainable benefits for local livelihoods and biodiversity. The Calgary Zoo engages in collaborative partnerships around the world to develop the innovation and application of science-based solutions to achieve long-term benefits for conservation.

Denver Zoological Foundation (DZF)
The DZF is a non-profit organization whose mission is to “secure a better world for animals through human understanding.” DZF oversees Denver Zoo and conducts conservation education and biological conservation programs at the zoo, in the greater Denver area, and worldwide. Over 3,800 animals representing more than 650 species call Denver Zoo home. A member of the World Association of Zoos and Aquariums (WAZA), Denver Zoo’s accreditation from the Association of Zoos and Aquariums (AZA) assures the highest standards of animal care. A leader in environmental action, Denver Zoo was the first U.S. zoo to receive ISO 14001 sustainability certification for its entire facility and operations and in 2011 was voted the greenest zoo in the country. The ISO 14001 international certification ensures the zoo attains the highest environmental standards. Since 1994, Denver Zoo has participated in well over 550 conservation projects in 55 countries. In 2011 alone, Denver Zoo participated in 70 projects in 20 countries and spent well over US$ 1 million to support of wildlife conservation in the field.

Re-introduction Specialist Group (RSG)
The RSG is a network of specialists whose aim is to combat the ongoing and massive loss of biodiversity by using re-introductions as a responsible tool for the management and restoration of biodiversity. It does this by actively developing and promoting sound inter-disciplinary scientific information, policy, and practice to establish viable wild populations in their natural habitats.

Conservation of the European pond turtle through population reinforcement in Liguria, Northern Italy

Dario Ottonello[1], Sebastiano Salvidio[2], Riccardo Jesu[3], Claudia Gili[4], Paolo Genta[5], Stefano Canessa[6] & Fabrizio Oneto[7]

[1] - ARPAL - 16149 Genova, Italy & DAIS - Cà Foscari University of Venice, 30123, Venezia, Italy dario.ottonello@unive.it
[2] - DISTAV - University of Genova, 16132 Genova, Italy salvidio@dipteris.unige.it
[3] - Costa Edutainment Aquarium of Genova, 16128 Genova, Italy riccardojesu@libero.it
[4] - Costa Edutainment Aquarium of Genova, 16128 Genova, Italy cgili@costaedutainment.it
[5] - Province of Savona, 17100 Savona, Italy p.genta@provincia.savona.it
[6] - School of BioSciences, University of Melbourne, 3010 Victoria, Australia science@canessas.com
[7] - Cesbin srl, 16132 Genova, Italy

Introduction

The European pond turtle (*Emys orbicularis*) is classified as Near Threatened by the IUCN; although globally common, it is classified as Endangered or Declining in several European countries (including Italy: Ficetola *et al.*, 2013). Threats include habitat loss and modification, water uptake, fishing and other human activities (road traffic, nest predation & waste dumping), and competition with invasive species, including American freshwater terrapins, fish, crayfish and coypu. In the north-western Italian region of Liguria, the endemic subspecies *E. orbicularis ingauna* is considered endangered (Jesu *et al.*, 2004). Only one population remains in the Centa river valley consisting of few small and isolated sub-populations inhabiting Mediterranean streams and secondary habitats, such as ponds in abandoned clay quarries (Salvidio *et al.*, 2013). In 2000 a conservation project was undertaken with the involvement of public authorities (Province of Savona, State Forestry Corps, and University of Genova), private entities (Aquarium of Genova) and NGOs (Pro Natura Genova, WWF Liguria). Realized actions include the creation and restoration of sites, monitoring wild *E. orbicularis* and restocking individuals born in a local facility (Centro Emys in Leca di Albenga) and bred

European pond turtle basking © Pino Piccardo

European pond turtle habitat © Pino Piccardo

at the Aquarium of Genova. Since 2013, a European LIFE project (LIFE12 NAT/IT/000395) is assisting these conservation actions.

Goals

- Goal 1: Improve the habitat of *E. orbicularis ingauna* in the Centa river valley, with particular regard to nesting and basking sites.
- Goal 2: *Ex-situ* reproduction of *E. orbicularis ingauna* and release for reinforcement of the extant population in the Centa river valley.
- Goal 3: Eradicate invasive alien terrapins from all wetland areas in which *E. orbicularis* is present.
- Goal 4: Develop a veterinary protocol for assessing disease risks associated with the re-introduction programs.
- Goal 5: Increase public awareness of the need to preserve wetlands and to avoid the release of alien species, particularly turtles.

Success Indicators

- Indicator 1: Double the total population of *Emys orbicularis ingauna* (from about 50 - 60 to >100 individuals) and increase its reproductive rate.
- Indicator 2: Eradicate alien terrapins from sites occupied by *Emys orbicularis ingauna.*
- Indicator 3: Increase the number of sites occupied by *Emys orbicularis ingauna.*
- Indicator 4: Achieve successful breeding of re-introduced individuals.

Project Summary

Feasibility: This project aims to improve the status of the species in the region of Liguria by reinforcing the extant population through the release of captive-bred individuals. The release program will be supported by habitat restoration actions, by the concurrent removal of non-native turtles and by broader activities aimed at increasing public awareness of the threats faced by native turtles and the impacts caused by the release of non-native wildlife. Since sites are located within protected areas (Natura 2000 network), further man-made habitat modification is unlikely to constitute a threat for the extant populations. However, even in

protected areas sites still face threats from natural vegetation succession and silting-up of ponds. These processed are reducing the standing water surface available for *Emys orbicularis* populations: ongoing management of sites is required in order to maintain their suitability. Currently, small numbers and fragmentation leave the population vulnerable to stochastic events. High survival of adults is observed in the wild, but sporadic reproduction and high juvenile mortality hinder the formation of a well-structured and self-maintaining population. Therefore, captive-breeding should bypass the most vulnerable biological phases while habitat management and removal of alien terrapins will increase the reproductive success for *E. orbicularis*. Once a sufficient number of individuals have been released and a well-structured population has been established, the high natural survival of the species and the improvement in habitat are expected to allow its persistence into the future (Canessa *et al.*, 2015).

On the other hand, non-native turtles are widespread in the area, following the release of unwanted pets (Ottonello *et al.*, 2005). The large number of individuals and the effort required for locating and trapping them, particularly in light of the scarce resources available, make the complete eradication of these competitors of *E. orbicularis* a difficult task. Ultimately, the eradication of non-native turtles depends not only on removal of current individuals, but also on the prevention of future releases. In this sense, a broad strategy is required to combine direct conservation actions with education and awareness campaigns. The captive breeding center provides opportunities for engaging the public and interacting with local schools and visitors.

Implementation: Thanks to different financial instruments (Regional, Provincial and EU funds), sponsorship by the European Association of Zoos and Aquaria (EAZA) and the support of volunteers during the years allowed implementation of several actions during the project. In particular, a small natural area was acquired from its previous owners and declared as protected; three ponds were restored; and periodic habitat management is being carried out. Since 2008, more than 200 captive-bred sub-adults terrapins have been released at five locations. In 2014, the eradication program of aliens terrapins from the Centa River plain begun, resulting in the removal of 95 individuals to date. Invasive turtles captured belong to three different species: *Graptemys pseudogeographica, Pseudemys concinna* and *Trachemys scripta*. In particular, *T. s. elegans* represents 80% of

Hatchlings © Pino Piccardo

allochthonous animals found. An examination of data on the size of the individuals and on the consistency of juveniles suggests that *T. s. elegans* is able to reproduce in the area.

Breeding center © Dario Ottonello

Post-release monitoring: The restocked terrapins are seasonally monitored by intensive trapping. All released individuals are marked to facilitate identification. In addition, some of the individuals released are radio-tracked to obtain data about post-release survival and movement. Post-release monitoring suggests a successful establishment of released individuals in the wild, with recapture rates over 80%. However, to date no information is available about the successful reproduction by released individuals.

Major difficulties faced

- In Mediterranean climates, ponds are rapidly invaded by aquatic vegetation and filled up by siltation; therefore periodic management is needed.
- Difficulties in the eradication of *Trachemys scripta elegans* turtles reproducing within the area of occurrence of *Emys*.
- Continuous reduction in public funding for environmental conservation.
- Due to the slow life cycle of the species, there is a time lag between the release of individuals and the possibility to determine their reproductive rates in the wild.
- At the broader scale, the high level of anthropic modification of the Centa River plain makes it difficult to restore a good level of ecological connectivity between sites.

Major lessons learned

- Success depends on the effective collaboration of multiple agencies and stakeholders, particularly where multiple objectives are being targeted.
- Ongoing management of sites and non-native turtles is likely to be required beyond the end of the release program, to maximize the probability that the restocked population persists until a sufficient number of individuals have been established.
- To avoid the risk of spreading diseases in the wild population, a veterinary check-up of individuals prior to release is of fundamental importance.
- When the aim is to preserve a specific subspecies, as is the case for this project, a genetic study of the founding breeders is required to assess the risk

of genetic pollution through the introduction of individuals from other populations/subspecies.

Success of project

Highly Successful	Successful	**Partially Successful**	Failure
		√	

Reason(s) for success/failure:

- The declaration of new protected areas and the restoration of existing ones, together with the release of individuals, have prevented the total extinction of the species after its rediscovery in the 1990s.
- The release of sub-adult individuals ensures high-post release survival, increasing the likelihood of establishment in the wild.
- The strong commitment and successful coordination of participants has allowed good progress towards all objectives.
- Widespread engagement of the public, particularly through activities at the captive breeding centre, has increased the perception of *E. orbicularis ingauna* as a local flagship species, and encouraged support by local communities.
- Evidence of successful breeding by released individuals has not yet been found.

References

Canessa, S., Ottonello, D. & Salvidio, S. (2015). Population modelling to assess supplementation strategies for the European pond terrapin *Emys orbicularis* in Liguria. Atti X Congresso Nazionale Societas Herpetologica Italica, Genova, 2015.

Ficetola, G.F., Salvidio, S., D'Angelo, S., Bonardi, A., Bottoni, L., Canalis, L., Crosetto, S., Di Martino, S., Ferri, V., Filetto, P., Genta, P., Jesu, R., Masin, S., Mazzotti, S., Ottonello, D., Richard, J., Sala, L., Scali, S., Tedaldi, G. & Vinello, F. (2013) Conservation activities for European and Sicilian pond turtles (*Emys orbicularis* and *Emys trinacris*, respectively) in Italy. Herpetology Notes 6: 127-133.

Jesu, R., Piombo, R., Salvidio, S., Lamagni, L., Ortale, S. & Genta, P. (2004) Un nuovo taxon di testuggine palustre endemico della Liguria occidentale, *Emys orbicularis ingauna* n. ssp. Annali Museo Civico di Storia Naturale "G. Doria", Genova 96: 133-192.

Ottonello, D., Salvidio, S., Genta, P. & Jesu, R. (2005) *Trachemys scripta elegans* in Liguria: management in relation to a recently described *Emys orbicularis* subspecies. In: Proceedings of the workshop Biological invasions in inland waters. Universita Degli Studi di Firenze, pp. 53-54

Salvidio S., Ottonello D., Oneto F., Genta P., Lamagni L., Ortale S., Jesu R., Gnone G. & Gili C. (2013). The conservation of the European pond terrapin *Emys orbicularis* in Liguria (NW Italy): status and perspectives. Atti II Congresso "Tartarughe e Testuggini" della Societas Herpetologica Italica Abruzzo-Molise, Ianeri Edizioni, Pescara, pp. 23-25.