



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

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Citation: Soorae, P. S. (ed.) (2010) GLOBAL RE-INTRODUCTION PERSPECTIVES: Additional case-studies from around the globe. IUCN/SSC Re-introduction Specialist Group, Abu Dhabi, UAE, xii + 352 pp.

ISBN: 978-2-8317-1320-5

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

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Re-introduction of the Antiguan racer to offshore islands of Antigua, West Indies

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Introduction

The Critically Endangered Antiguan racer (*Alsophis antiguae*: Colubridae) was historically distributed throughout Antigua (280 km²) and probably Barbuda (161 km²). Henry W. Parker first described this snake in 1933, but declared it extinct three years later, purportedly due to the introduction of Asian mongooses (*Herpestes javanicus*). In 1989, Antiguan racers were rediscovered on Great Bird Island, a mongoose-free 8 ha islet, 2.4 km from Antigua's Northeast coast. A study by the first author found only 50 individuals remaining, half of which had injuries consistent with bites by alien rats (*Rattus rattus*). This finding prompted the formation of the Antiguan Racer Conservation Project by local and international organisations, which eradicated the rats from Great Bird Island. Within two years, the racer population had more than doubled in size (Varnham *et al.*, 1998). To enable the world population to increase further, a re-introduction program was launched in 1999 (ARCP, 1999), using wild stock from Great Bird to repopulate islands cleared of rats and mongoose. By 2010, more than 500 Antiguan racers inhabited four islands totalling 63 ha. While the islands are within a marine protected area, the racer lacks adequate legal protection and remains seriously threatened by alien species and human pressures (Daltry, 2007).



Antiguan racer © Matthew Morton, DWCT

Goals

- Goal 1: Suitable re-introduction sites within the Antiguan racer's historic range identified and alien invasive predators (rats and mongooses) eradicated.
- Goal 2: The support of local stakeholders and policy-makers secured through education, awareness-raising and consultations.

- Goal 3: Breeding colonies of Antiguan racers established on predator-free islands and form a viable meta-population.
- Goal 4: All Antiguan racer colonies adequately protected from threats and routinely monitored.

Success Indicators

- Indicator 1: Individual racers translocated from Great Bird Island to re-introduction sites exhibit higher rates of growth and survival.
- Indicator 2: Antiguan racers confirmed to be reproducing on all re-introduction islands within three years of release.
- Indicator 3: All islands inhabited by Antiguan racers protected and kept free of alien invasive predators.
- Indicator 4: Local stakeholders demonstrate positive commitment to conserving Antiguan racers and their habitat.

Project Summary

Feasibility Stage: Studies of the racer's population status and behavioural ecology began in 1995, using radiotelemetry, mark-recapture and direct observations (Daltry *et al.*, 2001). This medium-sized (snout-vent length to 105 cm) diurnal colubrid was found to prey almost exclusively on lizards (*Anolis wattsi* and the endemic *A. leachi*, *Ameiva griswoldi*, and *Sphaerodactylus elegantulus*). Antiguan racers are capable of reproducing from two years of age, and can live more than 15 years, but population turnover is high, with an annual age-independent mortality rate of 44%. Antiguan racers can achieve densities of up to 20 individuals per ha in the absence of alien mammals. Antigua has approximately 30 low-lying offshore islands ranging from less than 1 ha to 200 ha. Most, including Great Bird Island, are naturally vegetated with xeric woodlands, with white sand beaches and extensive areas of exposed limestone pavement. The only native mammals are bats, and the most conspicuous vertebrates are lizards and birds, including globally significant seabird colonies. All but the smallest islands had been invaded by alien black rats (*Rattus rattus*), which attack small snakes and degrade their habitat. The members of the Antiguan Racer Conservation Project (Forestry Unit, Environmental Awareness Group, Durrell Wildlife Conservation Trust, Fauna & Flora International, Island Resources Foundation and Black Hills State University) therefore concluded the rats should be eliminated from all prospective racer re-introduction sites (ARCP, 1999).

Antigua's offshore islands include both crown land and private islands, some of which have been developed for luxury housing. Tens of thousands of people visit the uninhabited islands on private vessels and tourist catamarans, with Great Bird Island and Green Island being the most popular for recreation. In 2006, seven years after the re-introduction program began, every island mentioned in this article was gazetted as part of the North East Marine Management Area, a multiple-use marine protected area. At the time of writing, however, this area still lacks regulations or staff on the ground. In the mid-1990s, few Antiguans knew of the racer's existence and most expressed a negative attitude towards snakes. To give the re-introduction program a chance of success, it was important to popularise the racer, especially among the private land owners, tour operators

Reptiles



Donald Anthonyson, Jenny Daltry and friends releasing racers on York © Tom Aveling, FFI

and other regular users of the islands. The Environmental Awareness Group (national NGO) and the Forestry Unit (Ministry of Agriculture, Lands, Housing and Environment) led the education efforts and dialogue with the many stakeholders. In addition to organising numerous public talks and field trips to Great Bird Island, project personnel visited schools throughout Antigua to display live racers and developed several documentaries about the project, articles in newspapers and magazines,

postings on the Internet, radio interviews, and tour operator training workshops. Public knowledge and opinion of the racers improved significantly, and the project team gained permission to re-introduce the species even to private islands (notably Green and York, owned by the Mill Reef Club). In 1999, the IUCN/SSC Re-introduction Specialist Group formally endorsed a plan from the Antigua Racer Conservation Project, which presented these issues in more detail (ARCP, 1999).

Implementation Stage: Between 1995 and 2008, rats and, where present, small Asian mongooses were eradicated from 12 islands using brodifacoum bait (Varnham *et al.*, 1998). Islands were selected based on their potential suitability for snake re-introductions or to reduce the risk of re-introduction sites being reinvaded. The first re-introduction of Antiguan racers took place on Rabbit Island (2 ha) in 1999, followed by Green Island (45 ha) in 2002 and York Island (7 ha) in 2008. In all cases, young racers were observed within two or three years of the first release, confirming that the snakes had bred. To combat inbreeding, additional stock are periodically taken from Great Bird to the re-introduction sites. All source animals were translocated from Great Bird Island, where the population had attained its carrying capacity of between 100 and 160 adults and subadults. No more than 10% of the source population was removed in any one year, and the closely-monitored source population has remained consistently high. All translocated individuals were tagged and a sliver of tissue removed from the tail for genetic analysis. The snakes were transported by boat from Great Bird to the re-introduction sites, typically within less than 24 hours of capture. Only adult and subadult snakes in peak physical condition were translocated.

Post-release monitoring: This was done using radiotelemetry and direct observations which have revealed that the translocated racers adapted easily to the new islands and exhibit growth spurts when released from the competitive

environment on Great Bird Island. Almost every year, a census lasting approximately 40 days is conducted by project staff using a standardized mark-recapture method (Daltry *et al.*, 2001). All captured racers are marked with a unique PIT tag. The total population exceeded 500 adults and subadults in 2010, a ten-fold increase since the project began. Populations of the racer's main prey species – *Anolis wattsi* and *Ameiva griseivoldi* – have also been the subject of intensive field-based investigations (e.g., Smith & Colbert, 2002). As the racer populations have increased on each island, the lizard populations have appeared to dip slightly, but not significantly. Threats to the racers are being monitored, especially the presence of alien invasive species and the number and impacts of human visitors to the offshore islands. Since 2002, a network of rat-bait stations has been maintained and monitored on each re-introduction site to provide an early warning of any re-invasions by rats. Contingency supplies of rodenticide are maintained in Antigua to allow a rapid response in the event of a reinvasion. The project partners meet annually to evaluate progress and decide upon future goals.



Green Island - the largest re-introduction site

© Jenny Daltry, FFI

Major difficulties faced

- Initially, most people who own or use the offshore islands regarded snakes as vermin. The project had to invest heavily in nationwide education and awareness programmes to ensure local stakeholders would not kill the snakes or oppose the re-introduction.
- The source population on Great Bird Island, which was probably isolated for hundreds of years, exhibits many signs of inbreeding. This raises questions over whether any of the re-introduced populations will be genetically viable over the long term.
- Alien invasive species - notably the black rat (*Rattus rattus*) and fire ants (tentatively identified as *Wasmannia auropunctata*) remain a significant threat to all islands occupied by racers, and are difficult to control.
- The ever-increasing numbers of visitors and vessels increase the risk of alien invasions as well as increased human-snake encounters, habitat degradation and increased fire risk. The annual number of visitors to the 8 ha Great Bird Island, for example, has increased from 17,000 (mid-1990s) to well over 40,000.
- Securing sufficient funding to maintain the project remains a perpetual challenge. There may be potential to charge fees to recreational visitors who

Reptiles

use the marine protected area to help support essential protection and conservation activities.

Major lessons learned

- The Antiguan racer re-introduction program was grounded in a sound scientific understanding of the behaviour and population dynamics of the target species and its prey.
- The fact the program was operated by a consortium of organisations, rather than one body, gave it resilience. Wherever a partner was unable to contribute sufficient human or financial resources, the other partners worked harder to keep the program going.
- The re-introduction program benefited from being embedded in a wider, holistic landscape conservation program (the Offshore Islands Conservation Program) that addresses the management and sustainable use of the offshore islands.
- The use of relatively small offshore islands makes the eradication of introduced predators feasible. Preventing the reinvasion of re-introduction sites by rats is a perpetual challenge, and requires dedicated personnel and continuous funding streams to be sustained.
- The use of multiple re-introduction sites (islands) to establish a meta-population has made the target species more secure from stochastic impacts on individual sites.

Success of project

Highly Successful	Successful	Partially Successful	Failure
	√		

Reason(s) for success/failure:

- Breeding colonies have been successfully established on all three islands to which the Antiguan racers have been re-introduced. and there has been at least a ten-fold increase in the global Antiguan racer population.
- Introduced predators were successfully eradicated and prevented from reinvading multiple sites.
- The Antiguan racer, and the re-introduction program, has met with strong support from key stakeholders, and local capacity to sustain the program has been significantly increased.
- The current sum of four populated islands is still short of our original target of five islands, however, and there is a lack of additional islands that appear suitable for re-introduction.
- None of the four islands can by themselves support a genetically viable population (numbering in the thousands). The future survival of this meta-population is therefore dependent on concerted protection and the assisted transfer of individuals between islands.

Acknowledgments

The Antigua Racer Conservation Project forms part of the Offshore Islands Conservation Program co-managed by the Forestry Unit (Ministry of Agriculture, Lands, Housing and Environment), Environmental Awareness Group, Durrell Wildlife Conservation Trust, Island Resources Foundation, Fauna & Flora International and Black Hills State University. The authors thank everyone who have contributed their valuable time to planning, implementing and monitoring the Antigua racer re-introduction program over the years, including Chrissundra Abdool, Mike Appleton, Steve Ashton, Tom Aveling, Calvin Balagne, Jahmilla Baptiste, Quentin Bloxam, Sophia Browne, Kevin Buley, Mykl Clovis, Dr Brian Cooper, Gillian Cooper, Lena Dempewolf, Kim Derrick, Winston Downes, Kevin Drew, Calvin Fenton, Joanne Ford, the Fuller family, Dr. Stephen Funk, Dr Gerardo Garcia, Carole-Faye George, Collie Gardner, Richard Gibson, Algernon Grant, Jervaine Greenaway, Harmony Hall, John Hartley, Leslie Henry, McRonnie Henry, Milly Iturra, Dr Karron James, Philmore James, Victor Joseph, Florida Kentish, Ian Kisson, Dr Jason Kolbe, Ato Lewis, Kevel Lindsay, Trisha Lovell, Cortright Marshall, Carole McCauley, Sarah McIntyre, Sean Mendonca, Lucia Mings, the Mill Reef Club, Dr Reg Murphy, Aldrick Nicholas, Lia Nicholson, Anantha O'Dean, Agnieszka Ogradowczyk, Andrea Otto, Sean Peters, Polly Phillpot, Kohylah Piper, Junior Prosper, Kumarie Ram, Toby Ross, Dr Brian Smith, Nate Stephen, Ingrid Sylvester, Adriel Thibou, Kim Walter, Everette Williams, Dr Kevin Wright and Karen Varnham. Fieldwork and the preparation of this manuscript were supported by British Airways Assisting Conservation, Balcombe Trust, Disney Worldwide Conservation Fund, Durrell Wildlife Conservation Trust, Fauna & Flora International, Curtis and Edith Munson Foundation, Organization of American States, US Fish and Wildlife Service (grant 96200-9-G292), and Whitley Award Scheme. The rat eradication work described in this paper was made possible with the kind support of Syngenta Agrochemicals.

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