



GALAPAGOS TORTOISE MOVEMENT ECOLOGY PROGRAMME – PROJECT UPDATE 2016

Introduction

So far this year, the Galapagos Tortoise Movement Ecology Programme has overcome challenges, discovered brand new information and even seen a new tortoise species described in Galapagos - yet there is still more work and research to be undertaken. The life stages most critical to the population dynamics of tortoises are from egg to juvenile, when mortality rates peak. These stages are called "the lost years" because little data exist on growth, mortality rate and causes of death. Our continued research is vital in understanding the "lost years" of the Galapagos Giant Tortoise (GGT). This project is the first of its kind with no other studies conducting research on the ecology of GGT hatchlings with a holistic background covering scientific, conservation and educational outcomes.

Key Achievements in 2016

- Integration of the newly described Cerro Fatal giant tortoise into the project.
- A total of 95 nests monitored since 2013, 18 added in 2016 so far.
- A peer reviewed publication entitled "*Losing the lost years of Galapagos tortoises*" submitted to the *Journal PLoS Biology* – with the aim of 5/6 further publications to be submitted before the year end.
- So far in 2016, 180 students have participated in the education programme with Ecology Project International (EPI).
- A feature in the *National Geographic* magazine in early 2017 is planned, covering climate change in Galapagos and the effects on GGTs.
- A BBC documentary is scheduled for 2017 on the GGT with the first ever hatchling footage.
- Workshops have taken place within the Galapagos National Park on invasive species management in nesting sites, working directly with the local farming community to engage them in GGT conservation.

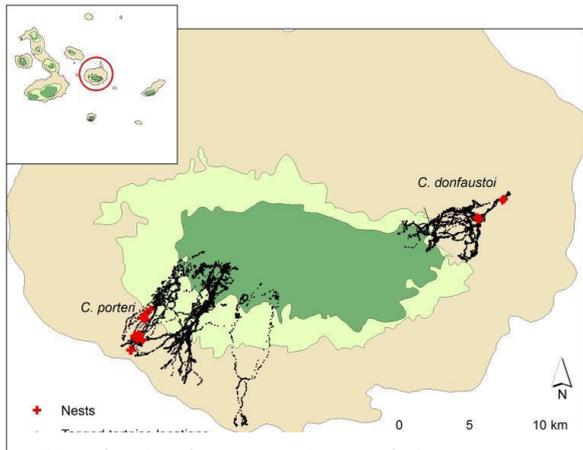
Project Updates

Monitoring of nests and hatchling survival

Since 2013, 95 nests have been monitored throughout Santa Cruz island, 18 of which were added in 2016 with the total due to increase before the year. The Cerro Fatal tortoise (*Chelonoidis donfaustoi*) was officially described in 2016 after being discovered to be a genetically distinct species from the Reserva tortoise species (*Chelonoidis porteri*). There is thought to be only 250 Cerro Fatal tortoises in the wild. Now with two species to research and the monitoring of two sites to be done, our work is more vital than ever. The monitoring of nesting and hatchling survival and



Research is undertaken on GGT hatchlings ©
Galapagos Tortoise Movement Ecology Programme



Map showing the two tortoise population movements on Santa Cruz and nest locations ©Galapagos Tortoise Movement Ecology Programme

growth continues to reveal the importance of nest location as the primary determinant of reproductive success with middle elevation zones showing the greatest chance of survival and highest growth rates. A small sample of wild hatchlings in Cerro Fatal were monitored this year, but unfortunately many of the hatchlings did not survive. Observations suggest that incubation failure was high and that the hatchlings died as they were unable to dig their way out of the nest. Further research in Cerro Fatal will allow us to determine hatchling survival and to ensure that appropriate protective measures are in place to increase the survival likelihood of these rare animals.

The strong El Niño event predicted for 2016 did not fully materialise. 2016 has mostly been a cool dry year

so we have been unable to fully assess the impact of El Niño on the hatchlings. However, on 4 January 2016 in Santa Cruz, severe flash floods occurred which flooded most GGT nests and, despite efforts to save this cohort of hatchlings, many did not survive. This demonstrates how vital this work is and the importance of regular monitoring of tortoise nests sites particularly during unusual weather events, as this is likely to occur more regularly with future climate change. If it was not for the work undertaken by the field staff in Santa Cruz, the nesting season could have ended with the loss of many more hatchlings.

MOZ – THE CASE OF THE MISSING HATCHLING!

Tagging tiny giant tortoises is far from easy and our rangers work tirelessly to monitor and conserve the hatchlings, as demonstrated in this account by Dr Steve Blake. *“As soon as he emerged from the nest, Moz was off and running – in the first couple of weeks he had gone about 150m from the nest where he rested for a couple of weeks, before undertaking what must have been a massively energetic march to a point about 500m from the nest, right beside the ocean. Moz never quite made it to the beach, but he got close. Unfortunately, Moz is a reluctant participant in our scientific research since he has lost his VHF radio tag several times. It is most frustrating to track the beep of the tag only to find the radio laying on the ground, but no Moz! Our staff on Galapagos know the habits of Moz so well that they can usually find him and glue the tag back on, but on the last occasion it happened, Moz decided to shift his home range and to date we have not been able to find him. For such a little hatchling he has a big character. The team continue to look out for him but being a little tortoise they are very difficult to find but we will keep you updated on his whereabouts!”*

The intensification of agriculture is still affecting the GGT. Our ongoing collaboration with the Galapagos National Park (GNP) and the local farming community is developing further with land-use planning workshops taking place, whilst also engaging and educating locals on the importance of the GGT.

Our existing research has demonstrated that significant improvements could be made to current methods protecting GGT nests from the impacts of invasive species such as feral pigs. Progress has been made but there is much more to be done to ensure that this invasive species management is done as efficiently as possible and we will continue to engage the GNP with these activities as we continue to work together for the ongoing conservation of the GGT and the wider Galapagos ecosystem. We aim to also highlight the economic benefits of preserving the native flora and fauna to local communities and the tourism industry.

Linking with Ecology Project International’s Education Programme

In 2016, GCT in partnership with Ecology Project International (EPI), delivered its ecology curriculum to 180 students aged between 15-17 years of age in Galapagos. Our aim is to continue student involvement in the understanding of movement ecology and the ecological role of the GGT. We also plan to expand our

presence in the EPI programme from one to two modules, totalling 40% of EPI's interactive learning curriculum. The new module will involve immersing students in the core aspects of the GTMEP by training them in hatchling radio-tracking data collection and analysis.

The [Discovering Galapagos website](#) has come on leaps and bounds. Since the launch in 2014, the site has received over 100,000 visitors from over 100 countries. Together with GTMEP and ZSL London Zoo, GCT have been producing educational materials including a teacher zone, where curricula, games and outreach project materials are easily accessible for teachers in Galapagos and worldwide. We are replicating the model of producing GGT outreach materials and delivering them in Galapagos for other projects including our work on whale sharks in the Galapagos Marine Reserve. We hope that by the end of next year to have all of our current projects will be featured on Discovering Galapagos.

Publications/Media

So far this year, two papers have been published in the journals *Movement Ecology* and *The Journal of Animal Ecology* but it is predicted that by the end of 2016, 5-6 further papers will have been published. The continued research and written publications assist in improving knowledge about the species globally. There is also a potential documentary film on the *National Geographic* channel in the pipeline featuring footage shot of the GGT from GTMEP Crittercams; this will be confirmed in 2017.

Looking to the Future for Galapagos Hatchlings

GCT aims to continue supporting the GTMEP over the next field season.

Our aims for the coming year include:-

- To collect more data on the GGT across environmental gradients from the recently described species on Santa Cruz.
- To publish at least two more peer reviewed publications in the *Journal PLoS Biology* (or similar journal).
- To deploy at least 30 new VHF tags and 12 ICARUS tags on hatchlings from the two species of Santa Cruz giant tortoise.
- To undertake further research into the link between hatchling survival and environmental conditions with the aim of publishing a research paper on the predicted impacts of climate change on GGT movements and implications for population dynamics.
- To produce a harmonised database between the GTMEP and Galapagos National Park on nesting characteristics of tortoises on Santa Cruz island, and to agree concrete steps towards the better protection of GGT nests to increase reproductive success.



Moz the hatchling takes his first intrepid steps – we hope to locate him again in the next field season! © Galapagos Tortoise Movement Ecology Project

If you are interested in donating to the Galapagos Tortoise Movement Ecology Project, please head to our [‘donate’ page](#) or [‘adopt’ your very own hatchling!](#)