GALAPAGOS MATTERS

AUTUMN | WINTER 2015

Cactus mystery solved

Flamingo origins

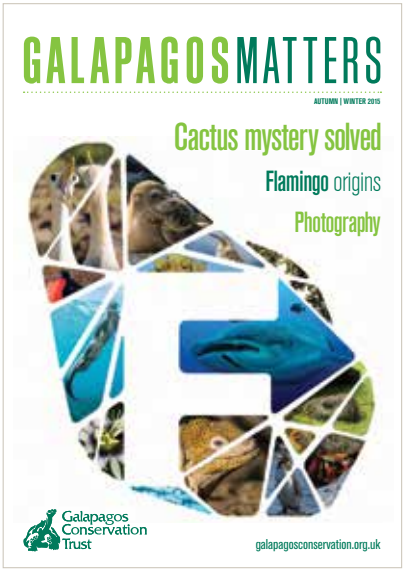
Photography

Galapagos Conservation Trust

galapagosconservation.org.uk

GALAPAGOSMATTERS

CONTENTS



Cover
The Galapagos Future Fund launched in June 2015 with the aim of creating a coordinated and inclusive platform for supporting conservation projects to safeguard the future of the Galapagos Islands. Logo designed by TGDH, images from GCT library,

CONTRIBUTORS


© ERIC RORER

Frank J. Sulloway is an evolutionary psychologist at the University of California, Berkeley and studies the effects of birth order and family dynamics on human behaviour, examined from a Darwinian perspective. He also has a long-standing interest in Charles Darwin and Galapagos.

Robert Tindle is emeritus professor of immunology and virology at the University of Queensland in Australia. In the 1970s, he and his wife Elizabeth spent several years in Galapagos studying flamingos.


© TUI DE ROY

Pete Oxford is a British professional wildlife photographer and has lived in Ecuador since 1985. He has worked as a Galapagos guide, is a co-founder of the Galapagos Guides Association (AGIPA), has worked on many projects with the Galapagos National Park and Charles Darwin Foundation and published three books on the Islands.


© LINDA LAMBERT

Claire Wallerstein is the founder of Rame Peninsula Beach Care, a small local charity in Cornwall in the United Kingdom that has harnessed the power of social media to break out of the isolation imposed by geography.

FROM THE

CHIEF EXECUTIVE

by **Sharon Johnson**

Welcome to the Autumn/Winter 2015 edition of *Galapagos Matters*. I am thrilled to be joining the Galapagos Conservation Trust as the new chief executive at such an exciting time in the charity's history. What's been achieved over the last 20 years has been

I join you after an amazing 14 years at the international environmental charity Trees for Cities, where I started as development director, before being appointed as chief executive. My experience in fundraising, marketing and the many years I spent working on conservation projects globally will stand me in good stead. I am very excited to lead GCT as we embark on the next 20 years, continuing to strive for the protection of the beautiful Islands of Galapagos.

2015 has been a successful year for GCT and the abundance of opportunities makes this a particularly exciting time to be joining the charity. The Archipelago's future rests on decisions that will be made over the coming years, highlighting the importance of the recently launched Galapagos Future Fund. This strategic and holistic approach to conservation will ensure that the unique habitats and wildlife of Galapagos are protected for future generations.

In this issue of *Galapagos Matters*, we delve into the mysteries of *Opuntia* recruitment, as Frank J. Sulloway sheds light on the past 50 years of ecological changes on the Islands (p.8). Renowned wildlife photographer Pete Oxford describes an adventure to Alcedo Volcano on Isabela as well as sharing some of his trade secrets (p.16).

In October, we will be celebrating the unique marine diversity of Galapagos at this year's Galapagos Day and we would love you to join us (p.21). Our president Monty Halls and BBC filmmaker James Brickell will guide us through the underwater world of the Galapagos Marine Reserve, with opportunities for you to learn more about global marine issues, as well as getting updates on our latest projects supported by the Galapagos Future Fund.

I hope you enjoy this issue of *Galapagos Matters*. I would love to receive your feedback on this edition at **sharon@gct.org** and on any other Galapagos-related matters. Thank you for your ongoing support, and I am delighted to be sharing the charity's next stage with you.

Galapagos Conservation Trust

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The information in this issue was obtained from various sources, all of which have extensive knowledge of Galapagos, but neither GCT nor the contributors are responsible for the accuracy of the contents or the opinions expressed herein.

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WILD GALAPAGOS

Rick Barongi, director of Houston Zoo and vice-president of the International Rhino Foundation, snapped this action shot of a blue-footed booby coming in to land whilst on the annual GCT Supporter Cruise. The name 'booby' comes from the Spanish word bobo meaning 'foolish' or 'clown', referring to the bird's clumsy movements on land. If you would like to join our 2016 Supporter Cruise and take your own incredible Galapagos photos, visit our website to download our brochure

GALAPAGOS NEWS

TORTOISE RETURNS

After an absence of over 150 years, giant tortoises have been returned to the small island of Santa Fe. In June, the Galapagos National Park transported 201 young tortoises from the captive breeding facilities on Santa Cruz to be released into the wild on Santa Fe around 20km to the southeast. The island's original tortoise population went extinct in the 19th century following exploitation by buccaneers and whalers. Genetic analysis of museum specimens identified the Espanola tortoise as the most appropriate species to take the place of the Santa Fe tortoise. "More than 25 park rangers transported the tortoises from the coast to the central zone of the island," says Danny Rueda, director of ecosystems at the GNP.

A few days later, GNP staff on Isabela carried out a similar exercise, using a helicopter to transport 351 captive-bred tortoises to several relatively inaccessible sites on Sierra Negra Volcano (right). These are just the latest in a series of bold ecological restoration initiatives

SNIFFER DOGS

Specially trained dogs are being used to sniff out giant African snails, an invasive species that could pose a threat to native plants, animals and agricultural production. The US charity Dogs for Conservation provided the canines, a golden Labrador called Darwin and black Labrador named Neville. In collaboration with the Galapagos Biosecurity Agency and Island Conservation, they have trained the dogs to locate the giant African snails, a species first detected on Santa Cruz in 2010 and currently limited to less than 20 hectares of the Island. With Darwin and Neville's efficient tracking skills, it may be possible to eradicate this potential threat before it spreads more widely.

LAW REFORM

Over the course of the summer, many Galapagos residents have taken to the streets to express their dissatisfaction at proposed changes to the Special Law for Galapagos. Since 1998, Galapagos has been governed according to a legal framework that acknowledges the special status of these Islands and is designed to "preserve the Galapagos Archipelago for present and future generations." In April this year, the Ecuadorian National Assembly drew up a long overdue set of reforms to the law. But the intervention of President Rafael Correa, who insisted on a further 18 changes, triggered widespread unrest. One of the President's amendments – which would see the salaries of Galapagos residents tracking the cost of living in the Archipelago rather than being pegged to those on mainland – proved particularly unpopular as it could result in a substantial drop in income for both public and private sector employees. The consequences of the proposed reforms on other areas of Galapagos life remain unclear. Tensions in the Islands remain high.

WOLF ERUPTION

On 25 May, lava began to pour down the slopes of Wolf Volcano, the first eruption of Isabela's northernmost volcano in more than 30 years. The spectacular event lasted a week. Thankfully, the eruption does not appear to have affected the unique population of pink iguanas that live on the volcano.

CUCUMBER FISHING

There has been no legal fishing for sea cucumbers for the last four years. This changed in August, following pressure to reopen the lucrative fishery. An agreement reached between the GNP, Ecuador's Ministry of Agriculture, Livestock and Fisheries and the Governing Council of Galapagos gave permission for the collection of up to 500,000 sea cucumbers over a 45-day period, after which there would be a further five-year moratorium. Given that the sea cucumbers are already at such low densities – on average just six specimens per $100m^2$ – this could cause the population to collapse completely. In June, before the period permitted for fishing, police seized more than 10,000 illegally sourced sea cucumbers at the airport on San Cristobal.

LEADERSHIP CHANGE

In April, Ecuador's Ministry of the Environment announced that Alejandra Ordonez would be replacing Arturo Izurieta as director of the GNP. In May, Izurieta became executive director of CDF, taking over from Swen Lorenz.

EXTREME WEATHER

There are strong signs that this year could see a return of the phenomenon known as El Nino. "There is a high percentage (90%) of occurrence of El Nino, according to prediction models and forecasting," says Eduardo Espinoza, technical manager of ecosystems at the GNP. The elevated ocean temperatures during an El Nino year have a devastating effect upon the marine ecosystem and on those species, like marine iguanas, seabirds and sea lions, that depend on its productivity for their survival.

MAKING CONNECTIONS

Galapagos aficionados from all round the world gathered in San Francisco in June to attend a three-day symposium entitled "Galapagos 2015: Science, Conservation and History in the 180 years since Darwin". The meeting was organised by Matthew James as part of the 96th meeting of the American Association for the Advancement of Science Pacific Division at San Francisco State University and the California Academy of Sciences. "It was a unique chance for representatives from a wealth of institutions to share progress, make connections and explore ideas for the future," says Jen Jones, who attended the symposium on behalf of GCT.

PLASTIC BAN

As of 10 August the sale and distribution of disposable plastic products in Galapagos has been prohibited. Towards the end of last year, the Galapagos Governing Council issued a new resolution to phase out the use of plastic bags, cups and other items made from extruded polystyrene foam. In the run-up to the implementation of the ban, the GNP has been distributing reusable cloth bags to residents and pursuing a programme of education. It is hoped that the use of such products will have been phased out by 2017.

EXOTIC TASTE

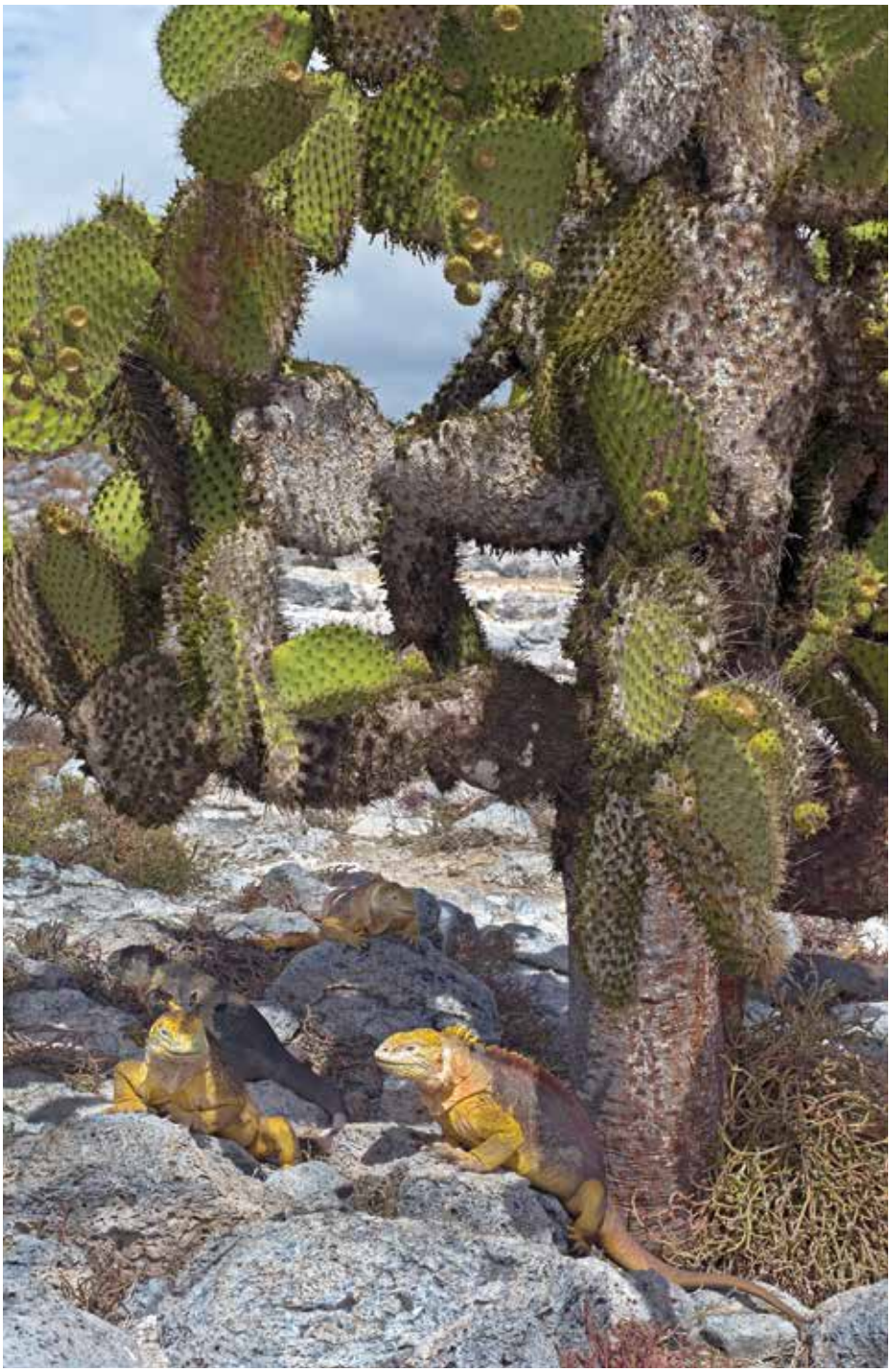
Giant tortoises have a clear preference for eating introduced over native plants, according to a new study in the journal *Biotropica*. By tracking tortoises on the slopes of Santa Cruz, Stephen Blake and his colleagues have found that tortoises consumed at least 64 different plant species. Some 44% of these were introduced but the tortoises spent almost 60% of their dedicated feeding bouts focused on non-native species.

TOURISM UP

The number of tourists visiting Galapagos continues to increase, with 215,691 recorded during 2014, up by 6% on the previous year. Around 30% of these visitors were from Ecuador and the rest from elsewhere.

THE MYSTERY OF THE DISAPPEARING OPUNTIA

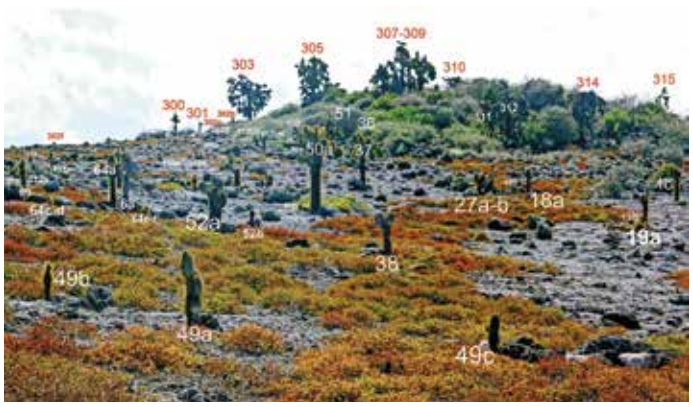
by **Frank J. Sulloway**



I have spent an inordinate amount of time poring over thousands of old photographs from Galapagos. In some of them there are giant tortoises, others show Darwin's famous finches, and land iguanas also make the occasional appearance. But it's not the animal life I am principally examining. It's the giant tree *Opuntia* or prickly pear cacti, whose life histories have drawn

I made my first visit to Galapagos in 1968 as part of an expedition to film the sites visited by Charles Darwin during the *Beagle* voyage. I returned in 1970 with three fellow students to explore unresolved questions about Darwin's conversion to the theory of evolution. In the process, I and my fellow expedition members accumulated more than 5,000 photographs documenting our work on 11 different islands.

Over the next 30 years, I looked at these images only occasionally. But around ten years ago it occurred to me that this collection of photos, along with others taken in 1982, could form the basis of a "repeat photography" project. With enough images, perhaps they could act like a visual "time



machine", providing a powerful way to reveal ecological changes that, although imperceptible from one year to the next, might be substantial over the longer run. I began to augment the collection, searching through archives and writing to dozens of scientists who might have similar photographs taken during the last 50 years.

The giant *Opuntia* trees are one of the Galapagos' most striking features. Botanists recognise six different species of these spine-laden plants, all of them confined to just one or a few islands. I decided to use the photographs to track the extensive loss of *Opuntia* in recent decades, and I began on the small and beautiful island of South Plaza just off the east coast of Santa Cruz.

By analysing the photographs, I have been able to identify and follow the fates of more than 1,000 individual cacti on South Plaza. In order to develop such a comprehensive database, my research associates and I have had to find the precise spots from which hundreds of old photos were taken. In the field, our efforts resemble a treasure hunt. In some cases, it has taken several years of arduous searching to locate these photographic sites. With numerous recent images captured from precisely the same places, and using image-processing software to line up the old and the new, we have successfully created a detailed record of the comings and goings of *Opuntia* on South Plaza.

This decade-long toil has revealed some surprises. Over the last 50 years, roughly 70% of the *Opuntia* on South Plaza (and on some other islands as well) have perished. It is known that the extreme rainfall during an El Nino year can cause older and larger *Opuntia* to collapse. In addition, some cacti inevitably die from old age and other causes, such as desiccation.

A steady stream of young cacti would normally compensate for such losses. Our photos, however, show that recruitment into the population virtually ceased in the 1950s. Indeed, we cannot find evidence of even a single new recruit that has survived past the juvenile stage. Using the height of each cactus as an indication of its age, we have determined that the age structure of the surviving *Opuntia* is dramatically skewed.

What is going on? By comparing cactus populations on South Plaza and elsewhere in the Archipelago, we think we may have the answer: an "ecological cascade" involving the demise of the Galapagos hawk on nearby Santa Cruz. By the 1950s, settlers had all but driven the hawks on Santa Cruz to extinction. In the absence of hawks – the main predator of land iguanas – the land iguanas on South Plaza had a field day, eagerly consuming all the fallen cactus pads and fruits, as well as seedlings, which are the three means by which these giant tree cacti reproduce. On other islands where there are both hawks and land iguanas, there has been no reduction in the recruitment rates of *Opuntia*.

This ecological cascade explains an otherwise puzzling fact about South Plaza. Although there is no evidence of new recruits in any of our old photographs, we have identified half a dozen cacti that have survived long enough to reach adulthood. All these specimens are growing in unusual places, typically on steep cliff faces, where land iguanas cannot reach them.

Now that the full extent of cactus loss on South Plaza has become clear, the Galapagos National Park and Charles Darwin Foundation, funded by a generous grant from the COmON Foundation in the Netherlands (**comonstichting.org**), have initiated an extensive reforestation program, with newly planted cacti being placed inside wire cages to protect them from hungry land iguanas.

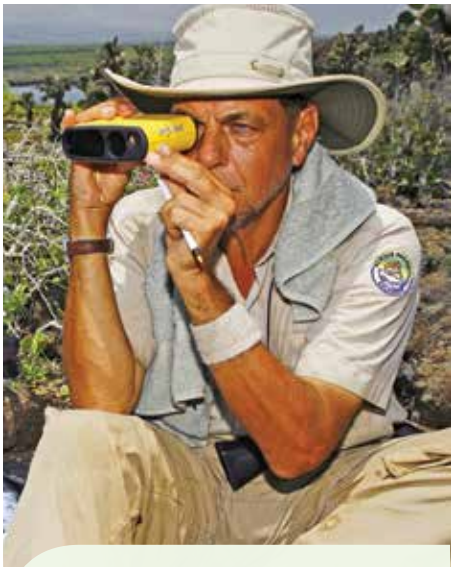
These old Galapagos photographs have revealed far more than I ever could have imagined. Sometimes even the most ordinary images turn out to contain meaningful details of potential scientific value. I cannot help feeling that the study of such images – in Galapagos and elsewhere – has a whole lot more to tell us about the natural world and the impact we are having on it.

Left, closeup: Hungry land iguanas converging on a fallen *Opuntia* pad. Despite the numerous spines, a single land iguana can consume a large pad in less than 10 minutes. © Frank J. Sulloway.

Right: Frank J. Sulloway uses a laser-guided hypsometer to measure the distance of cacti from where a photograph was taken in 1967. © Eric Rorer.

Top: This 1970 photograph (left) from South Plaza shows 57 cacti. By 2006, when Sulloway returned to set up his tripod on the same spot, only 18 of these remained. There

> In some cases, it has taken several years of arduous searching to locate these photographic sites



GET INVOLVED

If you have any photographs from South Plaza or Santa Fe, especially those taken before the year 2000, please do send them to Frank J. Sulloway (**sulloway@berkeley.edu**).

IN THE PINK

by **Robert Tindle**

Paddling a makeshift balsa-wood raft across Isabela's isolated Cementerio lagoon on a still, moon-lit night is an eerie experience.

For three years in the late 1970s, Elizabeth Tindle and I spent as much time in the company of Galapagos flamingos as we did in human society. The Cementerio flamingos, which live in the middle of the lagoon, were one of several breeding colonies we studied. Camped among the thick mangroves that fringed the lagoon, we conducted 20 hours of observations every day, alternating shifts every four hours, each involving a paddle to and from the colony. To really learn what goes on in a flamingo colony, you have to 'live' with the flamingos as they go about their daily rituals of feeding, building nests, incubating eggs and raising young, and we soon found most of the activity at the colony occurred during the night.

Flamingos frequent about 40 lagoons in Galapagos, and have bred at nine of these on five islands. We worked out that the flamingos move freely between these sites, their distribution strongly associated with the abundance of two important food items, the brine shrimp (*Artemia salina*) and the water boatman (*Trichocorixa reticulata*). In other parts of the world, flamingos will not breed until there are hundreds of birds displaying to each other. In Galapagos, things are different, with breeding seemingly triggered by much smaller

Circle: Elizabeth Tindle paddles her way to the flamingo colony aboard the balsa wood raft *Beagle III*. © Robert Tindle.

Below left: Chicks remain in the nest until they are at least 7 days old. © Robert Tindle.

Below Right: Locations of lagoons in Galapagos where

group displays involving fewer than 20 individuals.

Galapagos flamingos breed when the conditions are right, with laying mainly occurring during the coastal 'dry' season from August to January when the water levels in the lagoons are at their lowest and suitable nest sites become exposed. We found that around one in three adults incubates clutches every year, contributing enough chicks to maintain the population. These and other observations, made almost 40 years ago, seemed to suggest that the flamingos in Galapagos might be different from their ancestral stock, the American flamingo (*Phoenicopterus ruber*) from the Caribbean. But in the 1970s, DNA fingerprinting and gene sequencing had yet to be invented and, after several years in Galapagos, Elizabeth and I boxed up our notebooks on flamingos and I resumed my career in medical research and Elizabeth turned to clinical psychology.

Then, in around 2010, two scientists – Roberto Frias-Soler from the University of Havana in Cuba and Michael Wink at the University of Heidelberg in Germany – got in touch to propose a possible collaboration. They were collecting DNA from flamingos in the Caribbean and Galapagos to look for genetic differences and help answer some long-standing questions: what is the relationship between the two populations, when did flamingos first reach Galapagos and have there been repeated colonisations?

This study, which Elizabeth and I contributed to, suggests that in spite of the fact that the Caribbean and Galapagos are some 1,500km apart, most of which is open ocean, flamingos from the Caribbean must have reached Galapagos just once, at least 70,000 years ago. The isolation that Galapagos provided for flamingos helps explain how they could have come to be significantly smaller birds with significantly smaller eggs than those in the Caribbean.

It remains to be seen whether the genetic, morphological and behavioural peculiarities of the Galapagos flamingos means that they qualify as a distinct subspecies. In the meantime, these findings contribute to our understanding of the process of divergence and the origin of new species and underscore the need for continued management of this unique population. Although there are no major threats to the persistence of flamingos in Galapagos, their habitat – the lagoons – do need protection to accommodate local fluctuations in food availability and nesting conditions.

I think back to the time Elizabeth and I spent with flamingos all those years ago. It is exciting to know that our work has played a part in enriching our understanding of this

Top: Greater flamingos © Claire Waring.

Bottom: A flamingo family on Bainbridge

UK NEWS

2015 GALAPAGOS PHOTOGRAPHY COMPETITION

Congratulations to Luis Piovani who is the overall winner of our 2015 Galapagos Photography Competition. Judge Pete Oxford said "The image is well composed with anthropomorphic qualities and a sense of tenderness between mother and young". Thank you to all those who submitted entries to the competition. The winning image and a selection of other entries appear in our 2016 Galapagos calendar.

GALAPAGOS GARDEN PARTY

On 18 June we celebrated GCT's 20th anniversary with a Garden Party at the incredible Bridgewater House. Longstanding members mingled with new in Bridgewater's fine reception rooms to discuss the successes we have achieved as a conservation community so far, and to look forward at the challenges to come.

The event was also the official launch of the Galapagos Future Fund (see below and overleaf) and the appeal set off to a fantastic start, raising money through a silent auction after a suite of talks about the five key areas that the fund will support.

On behalf of all trustees and staff at GCT, thank you to the generous supporters that came to help us celebrate, and we hope to

PHD STUDENTS IN GALAPAGOS

Thanks to the Evolution Education Trust, GCT staff were joined by three PhD students from the University of Bath on a recent trip to Galapagos. Elisabeth Grey, Becky Mead and Dana Buchan are all undertaking research in evolution education and will be supporting the further development of an evolution module for GCT's Discovering Galapagos programme. During the trip, the students visited GCT-funded education projects, including a workshop for teachers in collaboration with

GALAPAGOS FUTURE FUND

GCT is committed to conserving the incredible biodiversity of the Galapagos Archipelago, but this is no easy task. To achieve lasting change, we need your support to enable a combined and structured effort across a wide range of work. This includes pioneering projects to understand whale sharks, a species about which we still know so little, through to ensuring the survival of mangrove finches by protecting them literally one egg at a time. Every penny makes a difference, so if you haven't yet donated and would like to be a part of the conservation action, please donate using the form on the fold out flap at the back of the magazine, visit the Galapagos Future Fund website **galapagosfuturefund.org.uk** or contact the GCT office on **020 7399 7440**.

PROJECT UPDATES

GALAPAGOS FUTURE FUND

The recently launched Galapagos Future Fund provides a platform for supporting projects that are essential for safeguarding the Galapagos Islands for future generations. By developing a coordinated, holistic approach to conserving the Islands, we can ensure our efforts prevent catastrophes like species extinctions, habitat degradation and unsustainable development. The Galapagos Future Fund is focusing on 5 main areas:

CONSERVING ENDEMIC

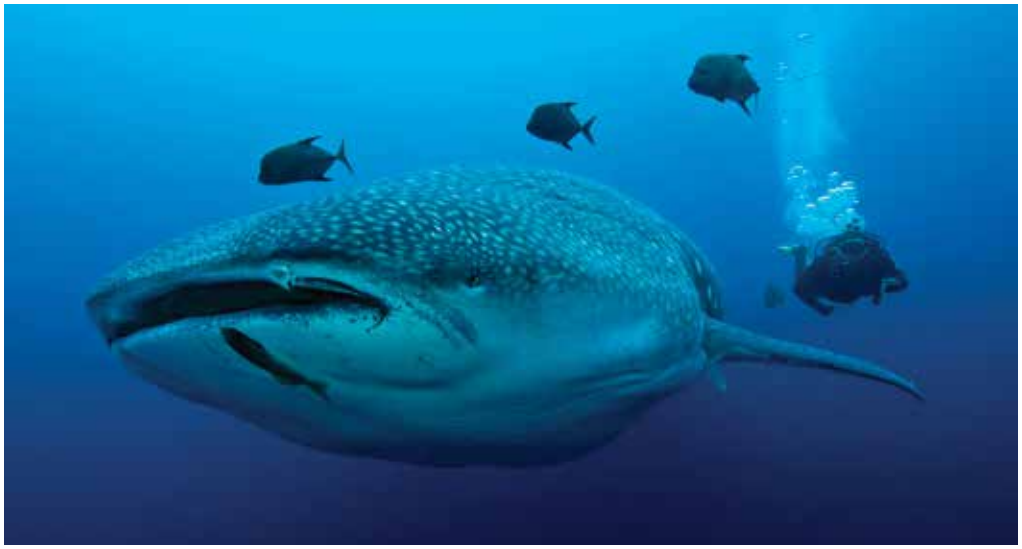
MARINE

CONTROLLING INVASIVE

CONSERVATION THROUGH

SUSTAINABLE

While each of these five areas is of great importance, it is by tackling them simultaneously that we will achieve long-term conservation success. The Galapagos Future Fund will help provide continued funding for our research and conservation projects such as the Mangrove Finch, Marine Iguana and Lost Years projects.



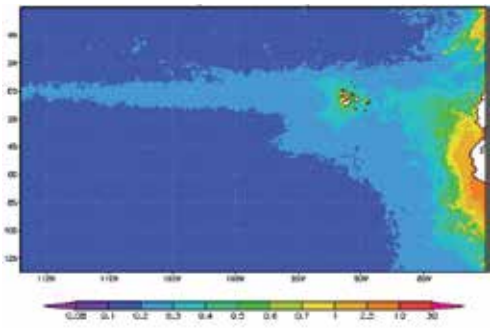
TRACKING THE OCEAN GIANTS

The Galapagos Whale Shark Project (GWSP) is going from strength to strength as the team led by Jonathan Green and Alex Hearn enter their fourth research season in an effort to increase our knowledge about these mysterious ocean giants. In 2015, we have been able to support three research expeditions that are using the latest technology – submarines, satellite tags and genetic analysis – to find out about the life history and behaviour of whale sharks.

We are collaborating with the University of Essex in an effort to account for the observation that many whale sharks around Galapagos appear to be pregnant females. Masters student Rory Graham is analysing the relationship between the whale shark tracking data and satellite data from NASA on ocean temperature and productivity. The shark tracks stay clearly in the most productive waters, only rarely straying into the comparatively desert-like surrounding waters. "The movements of pregnant sharks appear to be strongly connected to the availability of food," says Graham. "This is surprising as nobody has ever witnessed whale sharks actively feeding around the Islands. But they may be feeding passively, in a similar manner to that of the basking shark found in UK waters. If this is the case, Galapagos may act like a 'service station' for pregnant sharks as they navigate to their pupping grounds, wherever they may be."

We need to find out more about this amazing creature urgently. Exploitation continues at an unsustainable rate, with whale shark fins being sold around the world for upwards of $15,000 each despite the fact the species has been classified as 'Vulnerable' since 2000.

This study will also provide clear evidence of whale shark movements across the eastern Pacific. This is crucial for the creation of the most effective protected areas and 'wildlife corridors' from one



Productivity levels where the whale sharks were tracked

© Caron Steele

PROTECTING THE PUNTA PITT MARINE IGUANAS

Genetic profiling of marine iguana populations around the Archipelago has identified that the marine iguanas living in the Punta Pitt area of San Cristobal are a conservation priority.

The greatest threat is believed to be feral cats that prey upon young iguanas and we are currently supporting a study to find out more about the magnitude of this threat. Amy MacLeod is a PhD student at the Technical University of Braunschweig in Germany and is studying the data from GPS collars put on feral cats around the area.

This analysis should shed light on the cats' habitat use, including their daily activities and size of their home range. Finding out where they hunt, how long they hunt for and what species they target will inform management recommendations to ensure that appropriate measures are in place to protect this vulnerable population and other species like the Galapagos penguin that are affected by cats.

MANGROVE FINCH PROJECT

The Mangrove Finch Project team has now successfully raised chicks in captivity for the second year running and returned fledglings to the mangrove forests on Isabela's west coast.

Back in February, the team collected eggs from mangrove finch nests in the knowledge that these early-season eggs have less than a 5% chance of survival in the wild. The primary cause of death of the chicks is the larvae of the invasive parasitic fly, *Philornis downsi*, which feed on the hatchlings with devastating consequences. By collecting the eggs and hand-rearing chicks in a controlled and *Philornis*-free environment, the chances of survival are far greater than they would have been without intervention.

Thanks to the generosity of GCT supporters, we were the major funders for this season and would like to congratulate the team on the success achieved to date.

The Mangrove Finch Project is a bi-institutional project carried out by the Charles Darwin Foundation and Galapagos National Park in collaboration with San Diego Zoo Global and Durrell Wildlife Conservation Trust. The project is supported by the Galapagos Conservation Trust, The Mohamed bin Zayed Species Conservation Fund, Durrell Wildlife Conservation Trust, The Leona M. and Harry B. Helmsley Charitable Trust, Galapagos Conservancy and The British Embassy in Ecuador.

DISCOVERING THE LOST YEARS

In the last issue of *Galapagos Matters*, we introduced you to Moz, a tiny Galapagos giant tortoise hatchling. The project team, led by Steve Blake, has continued to follow his movements along with 19 other hatchlings and is making real progress in understanding the challenges giant tortoises face in their first months and years.

During this study, 29 tortoise nests have been monitored at different altitudes on Santa Cruz. Findings appear to suggest that hatching success decreases with altitude, possibly due to lower nest temperatures and the risk of waterlogging.

The project aims to increase the survival of giant tortoise hatchlings on Santa Cruz via a close collaboration with the GNP. Progress is being made in collaborating on data collection and an in-depth evaluation of invasive species management.

A significant part of the project is local outreach and this is supported via GCT's Discovering Galapagos educational programme. Our Projects Manager Jen Jones visited a workshop in May jointly run by the Galapagos Tortoise Movement Ecology Programme and Ecology Project International. Teachers from three islands tried their hand at being a 'tortoise tracker' and were given tips from environmental educators on how to use the project as a case study in the eco clubs of local schools.

We are very proud to continue our involvement with this programme, a fantastic example of holistic conservation integrating elements of scientific research,

VIEW FROM THE CRATER'S RIM

by **Pete Oxford**

With a heavy backpack, extra water and special permission from the Galapagos National Park, I waded through the shallow, gin-clear waters onto Isabela and looked towards the summit of Alcedo, one of my favourite places on the planet. I had climbed this remarkable volcano on several occasions, but this was to be the first time I would camp inside it, setting up tent in the very heart of this

Alcedo has been off-limits to tourism since the start of Project Isabela almost 20 years ago, the Herculean initiative that saw the successful eradication of goats from northern Isabela and several other Galapagos islands. Stepping ashore with three friends in 2008, I figured we were the first visitors for some time. With recent rains and an absence of herbivorous goats, the vegetation was more than a match for our single machete and we failed to make the summit before nightfall. We slept rough, cold and damp beneath some trees, pushing on at first light towards the crater's rim.

At more than 1,000m above sea level, the view from the lip of Alcedo into the vast 6km-wide caldera was simply breathtaking. Hundreds of giant tortoises lumbered, like gigantic ticks, deliberately over the terrain, while many concentrated in wallows, like animated boulders. Others grazed the tortoise lawns, whilst some wandered over the soft, sulphury muds of nearby fumaroles, presumably benefitting from the intake of minerals. Beside me, quietly enjoying the same view, sat a huge 300kg reptile. I looked into the sparkling eyes of this Galapagos giant tortoise and I was enveloped by a true sense of wilderness, an incredibly rare and indefinable quality, one that I hoped to capture through photography.

On the crater floor we set up tents near an active wallow and I began a marathon of photography. Our time was extremely limited so I worked every angle I could think of and just kept shooting. At night, I hardly slept as tortoises, like bulldozers, cruised close by our flimsy tents, their audible flatulence and rhythmic thumping of coupling shells adding to the thrill. As with much about Galapagos, it was primordial, privileged, wild, unique.

Left: A giant tortoise wanders across fumaroles near the rim of Alcedo Volcano.

Above: At a distance, the tortoises resemble animated boulders or

THE KIT

There are no camera shops in Galapagos, so I take as much photographic equipment as possible, around 25kg including spares. Before each landing, I select what to take ashore based on what I am likely to see (your guide can help with this). I am always careful to transport the kit to the shore in a waterproof case.

THE BODY

I like to take two fairly high-end camera bodies to Galapagos, each fitted with a different lens. This avoids having to expose the sensors to the injurious influence of volcanic dust.

THE LENSES

I carry four principal zoom lenses, ranging from a wide-angle 12-24mm f2.8 to a 200-400mm f4.0 telephoto. The 12-24mm lens is perfect for photographing animals up close in their environment. I use the longer lens to blur backgrounds, for details, flight shots of birds and longer shots in general. By fitting a 1.4x converter between the body and the big zoom, I can realise a focal length of 560mm. It's widely assumed that because the animals have no fear of humans, a big lens is not necessary. But I beg to differ and I use a telephoto often. I also like to pack a dedicated macro lens, invaluable on some islands for photographing flowers, for instance.

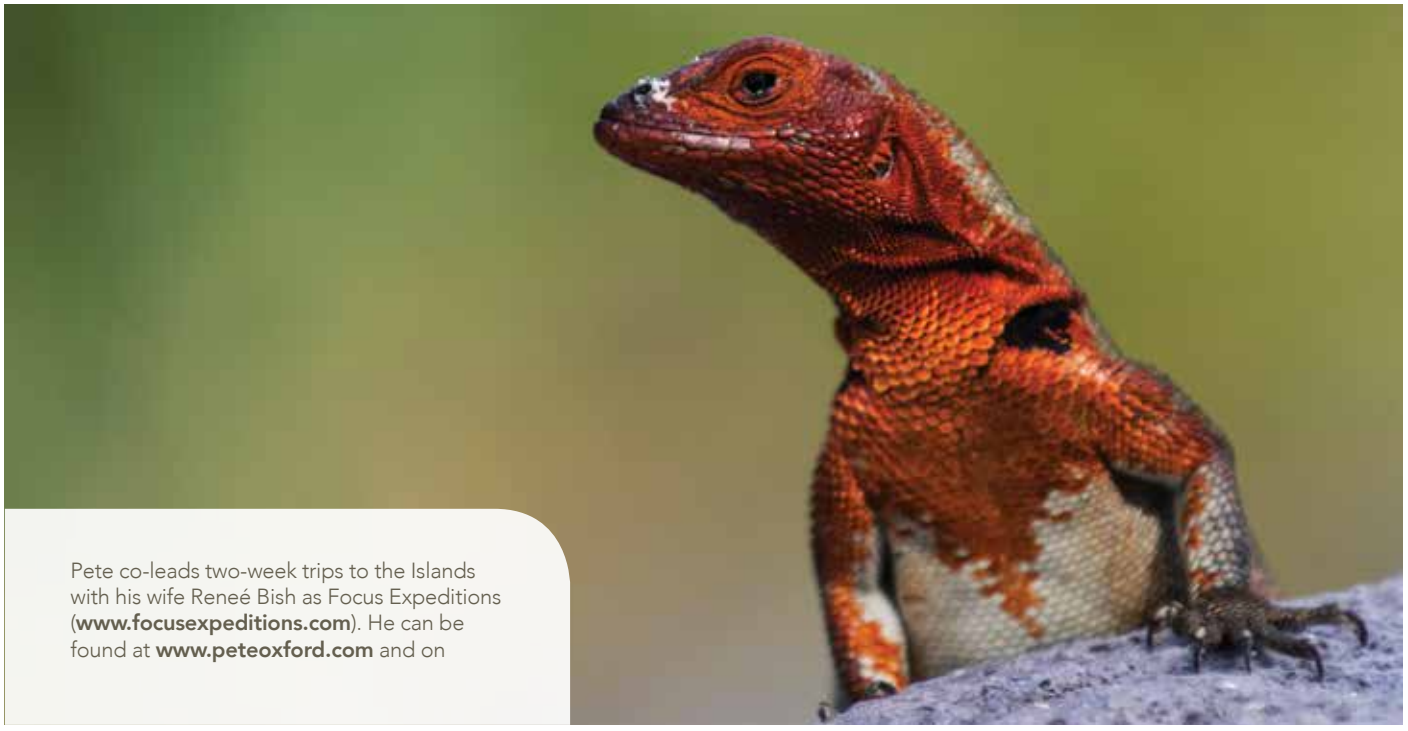
FLASH

The use of flash is prohibited in Galapagos. Usually this is not a problem. But where shadows cast by the harsh equatorial light would benefit from a fill-in flash, I often use a small collapsible reflector to bring in more light.

Top left: This close-up of a lava gull was only possible using a telephoto lens.

Top right: A dedicated macro lens is needed to capture detail.

Below: A female lava lizard at Punta Suarez on Espanola. With a long lens, the lizard is picked out



Pete co-leads two-week trips to the Islands with his wife Reneé Bish as Focus Expeditions (**www.focusexpeditions.com**). He can be found at **www.peteoxford.com** and on

TOP TEN TIPS

1 The sun casts its most dramatic light at dawn and dusk, so don't miss an opportunity to shoot at the beginning and end of the day.

2 Take time to observe your subject. With careful observation you will begin to be able to predict behaviour that will open up new and exciting photographic possibilities.

3 Be careful of distracting backgrounds, such as a very 'twiggy' backdrop or overly bright areas. Moving the camera slightly can often eliminate such distractions. Keep the edges of your frame as clean as possible.

4 Get level with your subject. A low position can transform an image by giving the viewer a perspective as seen by the animal rather than the familiar human perspective from a few feet above. This can also increase the sense of drama.

5 Knee pads and elbow pads may not look cool but they are invaluable protection against the sharp lava when lining up a low-down shot.

6 You may think you have a steady hand, but a tripod will always give a sharper photograph.

7 A circular polarizing filter can be useful, particularly to make the clouds 'pop' or when shooting over water. The effect works best when you shoot at 90 degrees to the angle of the sun.

8 Don't forget to include people – or a human element – in some of your photographs. These act as a reminder that you were actually there.

9 Take an underwater camera of some sort. Galapagos is as stunning underwater as it is on land.

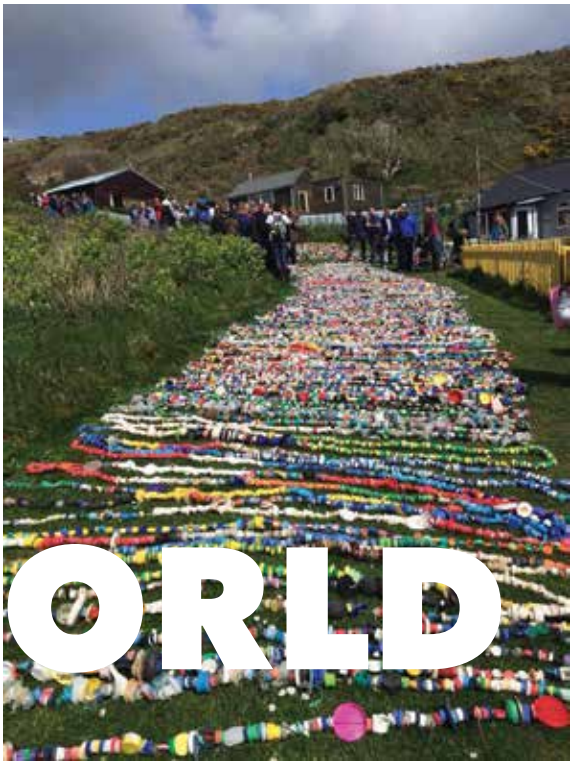
10 The longer the trip the better. Trips of a few days or even a week are frustratingly short. By the second week, however, visitors tend to shed their western stress mantle and begin to see the Galapagos landscape in new and creative ways.

TIP 1 Left: A lava cactus at dusk on Santiago.

TIP 4 Top: Getting level with your subject can increase the sense of drama.

TIP 8 Middle: A tortoise amongst tents is a powerful, personal image.

TIP 9 Above: A diamond stingray settles into a depression it has made, whilst bullseye pufferfish and sergeant majors seek out invertebrates that have been disturbed in the process.



SMALL WORLD

by **Claire Wallerstein**

Cornwall is stuck right at the outer edges of the UK, and the Rame Peninsula is known as "Cornwall's forgotten corner". The isolation is something that is cherished in our small community, but we can also feel insignificant at times, without

In 2010, I returned to Cornwall after decades away and was shocked to see children playing with plastic on the wild beaches where I had once found only shells and sea glass. I set up the beach-cleaning group Rame Peninsula Beach Care in 2013 and expected to face a disheartening struggle. But our group has gone from strength to strength, with volunteers removing around 700 sacks of plastic waste from our small stretch of coastline each year.

In spite of our best efforts, however, it was obvious from the outset that cleaning beaches could never be the answer to the marine plastic crisis. Rather than treating the symptoms of this environmental disaster, we need to get to its cause. But in our forgotten corner of the world, how could we do anything to stop the stuff getting into the sea in the first place?

The answer is social media. Almost entirely through its power, our little group has managed to have an impact far greater than I could ever have imagined. We have quickly become part of a very democratic and inspirational online community of like-minded individuals and groups determined to protect our oceans, including scientists studying the sources and impacts of marine litter to oceanographers, campaigners, policymakers, fishermen and artists.

This large and growing cyber coalition interacts in real time, often to great effect, launching immediate letter-writing campaigns to organisations planning harmful mass balloon releases, for example, or sharing data and experiences to help others push for change. This networked community also works to identify and track objects washing up on beaches, especially useful after a cargo spill or a pollution incident.

People we will never meet in real life have helped us to trace the lobster marker buoys and tags we find on our beaches back to the individual fishermen that lost them in places like Newfoundland, Rhode Island and Labrador, demonstrating both the durability of plastic in the sea and the truly international scope of this problem.

By using Facebook to link with many other local and national groups, we recently coordinated volunteers to collect plastic bottle tops from beaches across Cornwall over a three-month period. We then strung some 65,000 of them into a chain more than 1km long. This has proved to be a powerful visual tool, presented to Prince Charles and EU Commissioner Karmenu Vella and widely used to campaign for the introduction of a bottle deposit scheme in the UK.

Online films about our projects enable us to reach a wide and diverse audience all around the world. Last year, we decided to collect, count and categorise all the plastic debris from a single 25m-wide cove. In just three hours, we recovered almost 600,000 individual items. *The Big Pick* has been viewed thousands of times.

When confronted by a global issue as vast as marine litter, it is easy for individual actors to feel isolated and powerless. The internet has changed all that, the collaboration it facilitates making each of us far more influential than we could ever have been a decade ago. Whether we are in Cornwall, New York or Galapagos, we can all access information, expertise and – perhaps most importantly – the encouragement and support of others, combining our individual voices into a crescendo for change.

For more information about Rame Peninsula Beach Care, see **www.ramepbc.org**.

RAME PENINSULA BEACH CARE

We can all access information, expertise and – perhaps most importantly – the encouragement and

EVENTS

For more information about events and to book your tickets, simply visit galapagosconservation.org.uk/events or call us on 020 7399 7440

GALAPAGOS DAY

01 OCTOBER 2015
1 KENSINGTON GORE, LONDON 6:30PM - 10PM

Join us this October for our annual Galapagos Day at the Royal Geographical Society in London.

This year's event will take you to the underwater world of the Galapagos Marine Reserve to discover the mysterious and enigmatic wonders of the ocean. From giant whale sharks to endemic marine iguanas, we will be celebrating the incredible diversity of the Galapagos Islands, and would love you to join us.

With talks from TV presenter, explorer and marine biologist Monty Halls and BAFTA award-winning BBC filmmaker James Brickell, you will have the opportunity to relive their wildlife adventures, then put your questions to the experts themselves. Throughout the evening, you can learn more about our latest conservation projects and appeals, as well as our award-winning education programme Discovering Galapagos. There will also be the chance to find out about the latest global marine issues, such as water pollution and marine plastics.

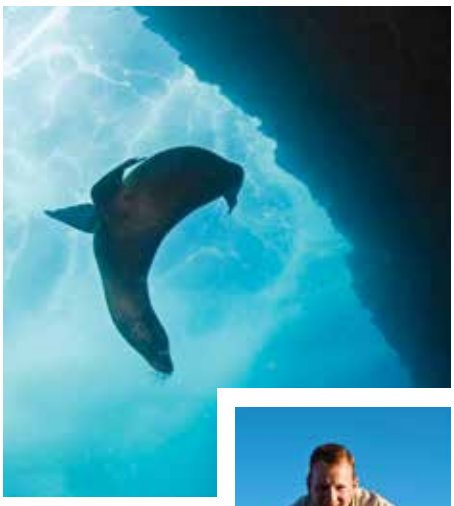
From Galapagos-themed art to an exhibit of artefacts from Darwin's HMS *Beagle* voyage, we have got it all covered. To round off the evening, we will be giving away a fantastic selection of prizes in our Galapagos Day raffle.

Whether you are reviving past Galapagos memories or planning a future trip, Galapagos Day is the perfect evening to celebrate the wonders of the Archipelago with like-minded people.

Tickets (includes 1 drink voucher) are priced at **£30** for adults and **£15** for students.

Tickets are available via our website or by calling the Galapagos Conservation Trust office on **020 7399 7440**.

Additional drinks and snacks will be available at the bar. It is recommended that guests eat before the event.



Monty Halls

James Brickell

2016 CRUISES

SUPPORTER CRUISE

25 APRIL – 02 MAY 2016

Join our President Monty Halls and GCT Chairman Dr Mark Collins on an incredible adventure around the Galapagos Islands in 2016.

This unique opportunity begins in the Ecuadorian capital of Quito and includes an eight-day cruise around the Archipelago's western islands where you will be able to witness first-hand the amazing wildlife and landscapes of Galapagos.

Your cruise will take place on board the stunning *Majestic* yacht, which will transport you from island to island. Daily excursions include snorkelling with penguins near Isabela, hiking to the summit of Bartolome's volcano, swimming with sea lions around Lobos island and admiring the pristine landscape of Fernandina.

For bookings or enquiries contact the office on **020 7399 7440** or email **gct@gct.org**.

DIVE CRUISE

28 AUGUST – 05 SEPTEMBER 2016

This unique dive cruise, developed in partnership with Dive Worldwide, gives you the opportunity to visit one of the foremost diving destinations in the world during prime whale shark season. Not only this, you will be accompanied by professional photographer and whale shark scientist Jonathan Green.

Your itinerary includes two of the best dive locations in the world: Wolf and Darwin islands, host to incredible underwater spectacles such as schooling hammerheads and encounters with enormous whale sharks. Under the expert guidance of Jonathan, you will not only have the opportunity to dive in these amazing locations, but also to learn about these enigmatic species.

For more information contact Dive Worldwide on **01962 302 087** or email **reservations@diveworldwide.com**.

MEMBERSHIP

by **Leah Jones**

MEMBERSHIP FEEDBACK

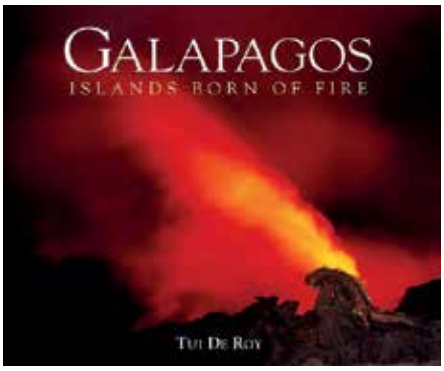
In 2012 we conducted our first ever GCT Membership survey, and thanks to your fantastic feedback we were able to gain a real insight into what is important to you, our supporters.

The survey revealed that the majority of our members joined GCT to stay up to date with conservation projects taking place in Galapagos. We have a variety of communication channels – *Galapagos Matters*, our website, exclusive e-bulletins and regular mailings – through which we hope to keep you abreast of the latest developments, especially initiatives like the Mangrove Finch Project and Lost Years Project that benefit directly from your support (p.15).

The survey showed that you were happy with the contents of *Galapagos Matters*, but felt that the GCT website needed updating. In 2014 we launched our brand new website, **galapagosconservation.org.uk**, which is more user-friendly and packed with project information, advice for visiting the Islands and a variety of ways to support Galapagos.

Finally, you told us you would be interested in hearing about the experiences of like-minded Galapagos enthusiasts. Therefore, we aim to feature the experiences of our supporters throughout our communications. We also continue to develop events that bring the Galapagos conservation community together to discuss a variety of exciting themes.

We are conducting another quick survey, which can be found on the foldout form at the back of this magazine. The feedback we get should help us continue to improve what we can do for you and for Galapagos. You can remain anonymous if you wish, though all members who provide their details will be entered into a prize draw to win a signed edition of Tui De Roy's beautiful book



DR BRYAN NELSON

14 March 1932 to 29 June 2015

We are saddened to announce the recent death of Dr Bryan Nelson, FRSE, MBE. Dr Nelson was a wildlife activist, ornithologist and an Honorary Ambassador for GCT since 2007. He was best known as the world's leading expert on gannets, having spent three years studying the birds at Bass Rock. In 1963, Dr Nelson and his wife and fellow-researcher, June, visited the Galapagos Islands. Here they studied the frigatebirds and boobies, whilst living in a tent on the beach. Having heard of this intrepid British couple on the Islands, the Duke of Edinburgh ordered the royal yacht Britannia to drop anchor off the Galapagos, where he invited the Nelsons on board for sundowners. Dr Nelson passed away at his home in Kirkcudbright, Scotland at the age of 83. He is survived by June, their son Simon and daughter Becky, both of whom are following their parents' adventurous tradition, and two grandchildren. Dr Nelson's "green burial" took place at Roucan Loch outside Dumfries on 20 July 2015.

OUTREACH

GCT Members have always been incredible advocates for conservation education; providing talks and activities for groups and schools in your area is a fantastic way to contribute to a sustainable future.

GCT supporter Sarah Langford is a primary school teacher from Staffordshire with a passion for marine life and the wonders of Galapagos. Sarah has helped to develop many activities and lesson plans for Discovering Galapagos, and has visited schools and organisations around the country finding entertaining ways for children to learn about the Archipelago's wildlife and the importance of conservation. Recently Sarah provided a fun-filled day of activities for young visitors to Erasmus Darwin House (home of Charles Darwin's grandfather), during which children learnt about the tortoises and turtles of Galapagos, and had a chance to create their own moving tortoises and GPS trackers.

If you would like further information about how you can get involved with GCT outreach, or any other variety of volunteering, please

Erasmus Darwin House in Lichfield played a key role in the development of the theory of evolution and will feature in the upcoming Darwin and Evolution module of Discovering Galapagos. We look forward to bringing you more information on this exciting development in a future

THANK YOU, PETER!

GCT Volunteer Peter Robinson celebrated his 10th anniversary as a GCT volunteer in July this year, and on behalf of all GCT staff who have worked with Peter, we would like to say a huge thank you. Without Peter's keen attention to detail and super-speedy admin skills, life in the GCT office would be much harder. Thank you, Peter. Here's to the next ten years!

REVIEWS

DARWINIAN ESSENCE
DARWIN-INSPIRED LEARNING

by Carolyn J. Boulter, Michael J Reiss and Dawn L. Sanders (eds), Sense Publishers, 2014, £28

Darwin's observations in Galapagos have become some of the most famous scientific observations in history; however, there is often more emphasis on the results of those interpretations, rather than the methods by which they have been deduced. *Darwin-Inspired Learning* is a compilation of essays that explores educational practices using the nature of Charles Darwin's own experiences as their source.

With a focus on first-hand observation and inquiry, *Darwin-Inspired Learning* is an essential volume for anyone wishing to extend their scientific lessons beyond the traditional classroom resources. The essence of the book will also feature heavily in the upcoming Evolution module of GCT's Discovering Galapagos.

INVASIVE SALVATION
THE NEW WILD: WHY INVASIVE SPECIES WILL BE NATURE'S SALVATION

by Fred Pearce, Icon Books, 2015, £16.99

In The New Wild, veteran environmental journalist Fred Pearce challenges our widespread assumptions about invasive species. Are they really to blame for the damage they do to the habitats they invade? Very often, Pearce points out, an ecosystem is already severely damaged before an invasive species can take hold. He brings significant insight into the economic and societal impact of invasive species across the globe with sound examples of the recovery of urban and blighted areas. He winds up with a well thought-out exposition on the benefits invasive species bring.

Our response to invasive species, he suggests, needs to be far more nuanced than it has been to date. Implicit in Pearce's thesis is the idea that we should just let things be, that we should let nature fight it out. There is some merit in this argument, though in the case of Galapagos, I cannot agree. We humans introduced these invasive species, either wittingly or unwittingly, and I believe we have an equal responsibility to remove them. That said, *The New Wild* is certainly a well-executed, thought-provoking and compelling read.

Reviewed by Ian Dunn

Please note these books are not available to buy from the Galapagos Conservation Trust.

GALAPAGOS GIFTS

Purchasing one of our Galapagos gifts is a fantastic way to help support GCT. Not only do the profits go directly towards supporting conservation in the Islands, but you can also help share our important messages with

Give the gift of membership

Looking for a Christmas present for a nature lover? A membership to the Galapagos Conservation Trust is the perfect gift. The recipient will receive all the benefits of a regular membership, including a subscription to *Galapagos Matters*, invitations to GCT events and an exclusive GCT pin badge. For more information visit **galapagosconservation.org.uk** or call us on **020 7399 7440**.

Mangrove Finch Christmas Cards *£4.95 (pack of 10)*

This year's Christmas card features a stunning image of a mangrove finch, taken by Francesca Cunninghame, leader of the Mangrove Finch Project team. This individual was released earlier in 2015, having been hand-reared at the Charles Darwin Research Station. The card reads: "Season's Greetings | Felices Fiestas" and comes in a pack of 10

2016 Galapagos Calendar *£10.00*

Our 2016 calendar is filled with eye-catching images of Galapagos' finest wildlife. From the ghost crab to the Galapagos fur seal, this year's calendar features stunning photography from the winners of our 2015 Galapagos Photography Competition.

PAYMENT FORM

There are several easy ways to place an order or donate in support of our work.

1. Via our website **galapagosconservation.org.uk**
2. By telephone on **020 7399 7440**
3. By completing the details on this form and returning with your preferred payment method to:
   Galapagos Conservation Trust,
   Charles Darwin Suite,

Galapagos Future Fund	Total Price £
Make a donation to the Galapagos Future Fund	

Events	Price £	Qty	Total Price £
Galapagos Day - Full price	30		
Galapagos Day - Student price	15		
	TOTAL		

Gifts	Price £	Qty	Total Price £
Christmas Cards	4.95		
2016 Galapagos Calendar	10		
	TOTAL		

Postage & Packaging Charges	UK £	Europe	ROW	
	2.50	7.50	10.00	
I enclose a donation*				
TOTAL				

METHOD OF PAYMENT

Please tick one:

☐ Cheque (payable to Galapagos Conservation Trust)

☐ Credit card ☐ Debit card ☐ CAF voucher ☐ CAF card

NB: We do not accept American Express.

Name on card: .....

Card no: .....

Expiry date: .....

Issue no / Start date: .....

Security code: .....

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☐ Yes! I am a tax payer. Please reclaim tax on all my donations and subscriptions made in the past four years and all future donations.

☐ No, I am not a taxpayer.

MEMBERSHIP SURVEY

1. Please rate from 1 -5, how interested you are in hearing about the following issues.

Wildlife Facts and Information	1	2	3	4	5
Responsible Tourism	1	2	3	4	5
Marine Conservation	1	2	3	4	5
Endangered Species	1	2	3	4	5
Education	1	2	3	4	5
History of the Islands	1	2	3	4	5
Cutting Edge Science	1	2	3	4	5

2. Please rate from 1-5, how well you think GCT performs in each of the following areas.

Membership Communication	1	2	3	4	5
Project Updates	1	2	3	4	5
Appeal Content	1	2	3	4	5
Cost of Events	1	2	3	4	5
Format of Events	1	2	3	4	5
GCT Website Content	1	2	3	4	5
Galapagos Matters Content	1	2	3	4	5

3. Please rate 1-5, how likely you would be to use the following features of a member's only area on the GCT website.

Online Renewals	1	2	3	4	5
Updating Personal Details	1	2	3	4	5
Download Galapagos Matters	1	2	3	4	5
Speak to Other Members via a Forum	1	2	3	4	5
Exclusive Content	1	2	3	4	5

Please provide any further feedback about any of the above questions, or your GCT Membership.

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Thank you very much for your feedback, and don't forget to fill out your personal details below if you would like to be entered into a prize draw to be in with a chance of winning a signed copy of Tui De Roy's stunning book, *Galapagos: Islands Born of Fire.*

CONTACT DETAILS

Please fill in your details below:

Name: .....

Address: .....

.....

.....

Post code: .....

Telephone: .....

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