

# GALAPAGOS NEWS

Spring-Summer 2014

## FINCH in PERIL

## Fish-eating Snakes

The Charles Darwin  
Research Station Turns 50!

GC BATTLES INVASIVES



**GOT GALAPAGOS PHOTOS?**



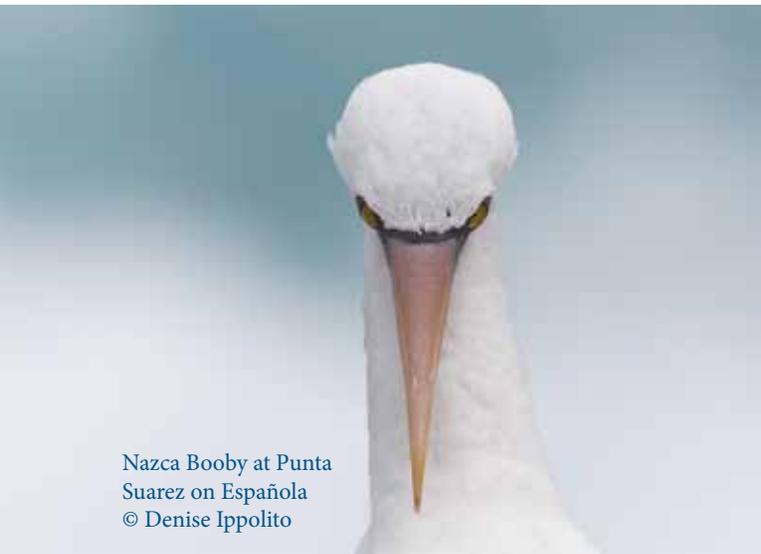
**GC 2015 PHOTO CONTEST**  
See back cover for details.



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Nazca Booby at Punta Suarez on Española © Denise Ippolito

# FROM THE PRESIDENT Johannah Barry

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2015



### Cover Image

A Male Frigatebird shows off for its mate and the camera. This image was submitted to a previous photo contest by GC member, Michael Lambie.

**This issue of Galapagos News celebrates the 50th anniversary** of the founding of the Charles Darwin Research Station, an important, far-reaching and collaborative effort of the Government of Ecuador, UNESCO, and the World Conservation Union. The CDRS continues to play a leadership role in science and management in Galapagos and the hundreds of visiting scientists, resident scientists, and volunteers who have come through its doors bear witness to the importance of long term and focused collaboration.

While Galapagos remains the best preserved tropical archipelago in the world, and has been much in the news recently as the premier tourism site to visit, it still has challenges that, while not immediately visible to visitors, have serious and detrimental effects on endemic wildlife. We write briefly on some of the critical work being undertaken to combat the parasitic fly, *Philornis downsi*, as well as work on introduced plant and ant species that threaten both the human and animal populations in the islands. This sober and very important work is lightened somewhat by the good news about the growing pink iguana population on Isabela Island, with numbers estimated as high as 500, and the curious fish-eating behavior observed in some snakes on Fernandina Island — yet more evidence that evolution is happening in real time.

We celebrate the extraordinary news of the successful hatching of mangrove finches, arguably the world’s most endangered bird. Collaboration among institutions was key to this conservation milestone, and we await the news of a successful release on Isabela Island.

And for our members and friends who once “camera-clicked” their way through the Galapagos Islands, we invite you to submit your best photos to one or both of two photo endeavors we are proud to be a part of: The Annual Galapagos Conservancy Photo Contest is underway (details on back cover) and the Darwin Sign Project (see page 5).

As always, this work would not be possible without the support and guidance from our donors and friends. Thank you for all you do for Galapagos.



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**Galapagos News** is a twice-yearly publication that is produced for Galapagos Conservancy supporters and friends. The information in this issue was obtained from various sources, all of which have extensive knowledge of Galapagos. The opinions expressed are those of the authors, and not necessarily of Galapagos Conservancy.  
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# GALAPAGOS NEWS

## VIRTUAL GALAPAGOS



Daniel Orellana of the Charles Darwin Foundation collects images with "The Trekker" © Google

THE THRILLS OF GALAPAGOS can now be experienced from the comfort of your own home, courtesy of a pioneering collaboration between the Charles Darwin Foundation (CDF), Galapagos National Park (GNP), Catlin Seaview Survey, and Google Maps.

**Images collected last year** by Google's Trekker platform and the Catlin Seaview Survey SVII camera system have been used to create a series of 360° panoramas at several sites across the Archipelago, both above and below the waves. These can now be explored on the Street View feature of Google Maps. The same technology has also been used to create several virtual behind-the-scenes tours of the Charles Darwin Research Station.

"This imagery will not only be of utmost importance for research and management, but also an exceptional platform to raise environmental awareness about the importance of conserving this world heritage site," says Pelayo Salinas de León, CDF's former head of fisheries and sharks research and coordinator of the marine surveys on the project.

## WIDESPREAD ERUPTION

**The hotspot responsible for Galapagos** may not be located beneath the youngest island of Fernandina, as is generally assumed. Images of volcanic activity to a depth of some 300 km below sea level suggest that the source of Galapagos eruptions is located approximately 150 km to the southeast, report geologists from the University of Oregon and other institutions in the US in the journal *Nature Geoscience*. Their images also show the volcanic activity is far more complex and widespread than models have predicted, a finding that helps to explain why so many volcanoes in Galapagos — around a dozen — still show signs of activity.

## PHILORNIS GRANT

**CDF's research into the invasive botfly *Philornis downsi*** has been given a significant boost, with a \$600,000 grant from the Leona M. and Harry B. Helmsley Charitable Trust. More than half of the 20 endemic passerine species in Galapagos are at risk from this nest parasite, with the mangrove finch (pg. 6-7) and several other species on the brink of extinction. The grant will help CDF and collaborating institutions continue urgent research into the ecology of this invasive insect and to develop novel methods of control.

## ECUADORIAN MILK SNAKE FOUND

**Some Galapagos residents were surprised** in February, when their car ran over a colorful snake in the highlands of Santa Cruz, the first case of an introduced snake in the Archipelago. The GNP was quick to coordinate a search for further individuals near the small settlement of Santa Rosa on the Santa Cruz Highway that crosses the island. "Monitoring included forming a circle of a mile around the area in which it was found to determine the possible presence of more specimens in the field and to prevent movement into protected areas," said Danny Rueda, director of ecosystem management at the Galapagos National Park. Herpetologists at CDF and at the University of San Francisco in Quito identified the specimen as an Ecuadorian milk snake. All available evidence suggests this was a one-time incident.

## PINK IGUANA INSIGHTS

**A** thorough survey of Wolf Volcano has revealed new and intriguing insights about the enigmatic pink iguana. Earlier this year, a team of personnel from the GNP and researchers from the University of Tor Vergata in Italy spent ten days on Wolf, the northernmost volcano on Isabela and the highest in the Archipelago. Among many findings, the team discovered a nesting zone near the summit and estimated that there could be as many as 500 pink iguanas. Although this is more than expected, the population is still small, says Washington Tapia, the GNP's former head of research. "Therefore, we should begin a captive breeding program soon to help increase the numbers and contribute to the overall conservation of the pink iguana," he says.



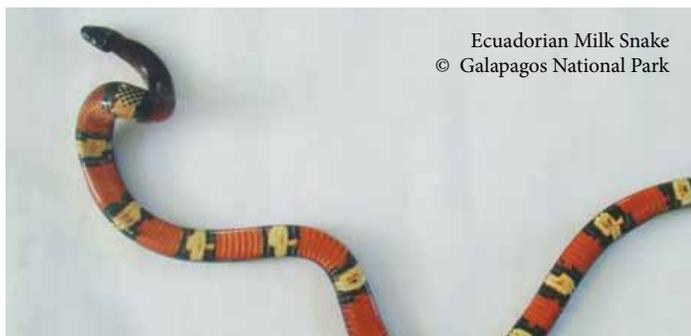
© Galapagos National Park

## BLUE-FOOTED BOOBY CENSUS

**A** recent census of blue-footed boobies in Galapagos which was co-funded by Galapagos Conservancy, the Galapagos Conservation Trust (UK), and the Swiss Friends of Galapagos, has revealed that the size of the current population is only one-third that of the 1960s. Researchers have linked this to a chronic lack of breeding within the population. Over the past three years, breeding activity has been absent from some colonies and birds with juvenile plumage account for only 1.2% of the population. The most likely cause is a reduction in food availability, as previous studies have linked the abundance of sardines and herring to successful breeding. A dramatic decrease in sardine abundance in the eastern Pacific has been recorded over the past 15 years as part of a natural cycle. This has meant that while adults can still survive, relatively few chicks have been successfully raised since 1997.



Blue-footed Boobies dance in sync  
© Margaret Belska



Ecuadorian Milk Snake  
© Galapagos National Park

## YOU CAN MAKE GALAPAGOS HISTORY!

**T**hose who have visited Galapagos will know that the sign outside the entrance to the Charles Darwin Research Station is a popular spot to be photographed. In recognition of the 50th anniversary of the research station, CDF and the Friends of Galapagos Organizations are asking you to send in your photos beside the sign to contribute to a giant collage that will go on display at the new visitor center. It is a great opportunity to become a part of Galapagos history! A voluntary donation of \$5 per photo will be put towards building repairs that are desperately needed (see *Renovating the Library* on p. 9) and help keep the CDF at the forefront of Galapagos conservation science for years to come. For more information and to submit your photo, please visit:

[www.darwinsignproject.com](http://www.darwinsignproject.com)



CDRS Executive Director, Swen Lorenz, long-time Galapagos resident and naturalist Godfrey Merlen, and GCT's Chief Executive Ian Dunn pose with the famed CDRS welcome sign.



© Michael Dvorak

# MANGROVE FINCH: SAVING A SPECIES

by Francesca Cunninghame, CDF ornithologist

**// Can you see something now?"** Swaying near the top of a mangrove tree, I shout down hopefully to my companion far below. I am holding a four-meter-long pole fitted with a camera, trying to direct it into the entrance of a mangrove finch nest that's perched on the end of a distant branch. The lens needs to be close enough to get footage but not so close it disturbs the nest and its contents. My arm is tiring fast.

We arrived at this tree more than two hours earlier and began to set up the climbing rig, using a sling shot to fire nylon ropes into the canopy. The mangrove finch pair is fairly accepting of me as I climb upwards, the female initially perching curiously on the camera pole. She's now moved off to a nearby branch to watch the drama unfold.

"To the right," comes the reply from Romy Russek, my assistant during this field trip who is stationed in front of the monitor more than 17 meters beneath me. "Further up. Down a bit." This goes on for what feels like an age, my stamina draining as a gentle wind moves the branch to and fro. "There," shouts Romy. "I can see them. There are chicks. They're alive!" It is April 2013 and we have got it: the first few fleeting seconds of footage, the first time anyone has filmed mangrove finch chicks in the nest. It is with a mixture of relief and anticipation that I gently head to the ground to join her. Back in camp, we sit in the shade to replay the footage. What we have captured seems so brief and so blurred, but we are able to confirm that there are two live and apparently healthy chicks in this nest. For the future of the mangrove finch, by far the rarest of Darwin's finches and one of the most range-restricted birds in the world, every breeding attempt matters. We are so elated that we break into fits of laughter.

Current estimates put the population at somewhere between 60 and 80 individuals, all of them found within

two tiny patches of mangrove forest on the west coast of Isabela. In the past, the mangrove finch has been recorded on Fernandina and, until 2009, at another site on the east of Isabela. But since all efforts to locate these birds have failed, we must assume that the entire range of this species is split between Playa Tortuga Negra and the slightly smaller site at Caleta Black about 5 km to the north. In 2013, these two sites held just 14 pairs that attempted to breed.

The most immediate and serious threats to the survival of the mangrove finch come from two invasive species: black rats and the parasitic fly *Philornis downsi*. Permanent bait stations installed throughout the mangrove forest (as part of the Galapagos National Park and Charles Darwin Foundation's Mangrove Finch Project) have significantly reduced rat predation and resulted in an increase in the number of nests from which one or more offspring fledge. But the parasitic fly *Philornis*, first recorded in Galapagos in the 1960s, is still a huge problem. It is now known to affect at least 17 bird species endemic to Galapagos, female flies laying their eggs in nests and the larvae feeding on the blood of nestlings. In the case of the mangrove finch, *Philornis* infestations in 2013 resulted in the death of more than one third of all nestlings.

What can be done? CDF and its international collaborators are currently developing methods of controlling *Philornis* that do not harm the birds, but this is likely to take several years to perfect. In the meantime, one of the key goals of the Mangrove Finch Project is to establish populations at other suitable sites within the species' historical range, an achievement that would reduce the risk of extinction dramatically.

This is far from easy. In 2010, we carried out a trial translocation, moving nine birds from Playa Tortuga Negra to a stand of suitable forest some 25 km to the south, but found that none of the individuals stayed at the release site for more

than six months and several returned to their native territory. We obviously need a different approach. Thankfully, our data on nesting success have suggested what this might be.

The mangrove finch breeds between January and May, but clutches laid in the first few months of the season have a very high failure rate. In 2013, for instance, 95% of early nests did not succeed in producing a single fledgling. It's a dismal statistic, but one that presents an opportunity. In February this year, in collaboration with the San Diego Zoo, we collected eggs from nests with a plan to incubate them artificially and rear the chicks by hand in a specially adapted quarantine room at the Charles Darwin Research Station in Puerto Ayora. Once at the fledgling stage, we will take them to aviaries stationed within the mangrove forest at Playa Tortuga Negra, where they can acclimatize to the habitat before being released.

The mangrove finch typically lays a clutch of two eggs, and we are hoping that through this intervention we will double the number of fledglings in 2014, with humans rearing the early clutches and the birds rearing chicks later in the season. If we succeed, it will be possible to think again about further translocations, either moving some of these recruits to a new site or, in future seasons, carrying out the hand-rearing step within the new territory, which may make them more likely to stay.

If these seem like extraordinary measures, it is because the mangrove finch finds itself in such an extraordinarily perilous position. It is only with this kind of intensive conservation action that this species — one of the most specialized of Darwin's finches — stands any chance of survival. ■

### The last stand of the mangrove finch.

Playa Tortuga Negra is the green area in the foreground and the smaller site of Caleta Black is in the distance.

© Francesca Cunninghame

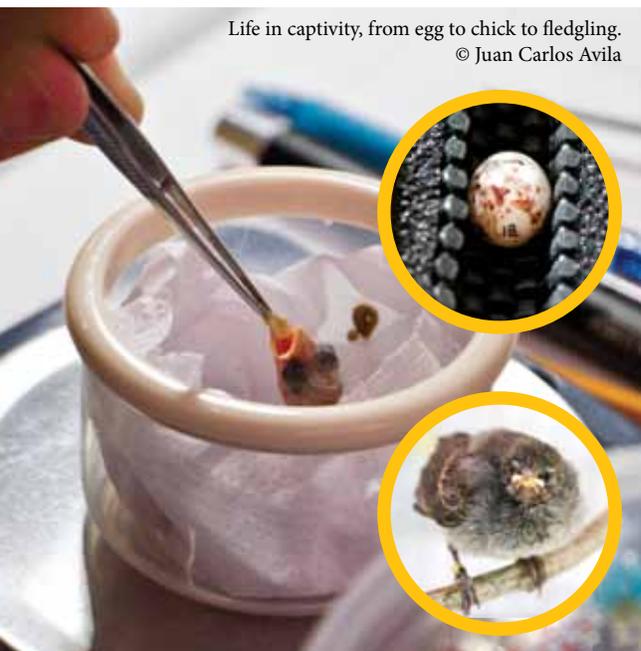


“The mangrove finch is by far the rarest of Darwin's finches and one of the most range-restricted birds in the world.”

### REARING FINCHES - by Richard Switzer, San Diego Zoo

Upon reaching Galapagos in January, one of my first tasks was to work with CDF to establish an artificial propagation facility at the research station in Puerto Ayora on Santa Cruz. San Diego Zoo's Avian Propagation Center is one of the world leaders in the incubation and hand-rearing of a range of bird species — from hummingbirds to harpy eagles. Our Hawaii Endangered Bird Conservation Program also specializes in the rearing of small songbirds. Our collaboration on the Mangrove Finch Project is an exciting opportunity to assist with the conservation of this critically endangered species. We were able to provide much of the specialist equipment, like incubators and brooders, and to advise on what food items to feed the chicks. In addition, as many of the passerines around Puerto Ayora are infected with avian pox, it was vital to establish quarantine conditions in which to rear the chicks, minimizing the risk that they carry the disease with them back to Playa Tortuga Negra when they are eventually released. Our egg and chick room is installed with an “air lock” vestibule, which includes a fly-zapper to prevent the entry of mosquitoes, the most common vector of the pox virus.

Among a complex web of challenging logistics, the eggs rescued from early nests are transported to Puerto Ayora in portable incubators via helicopter or boat. At the time of writing, the first eggs and nestlings are installed in their incubators and brooders at the research station and we are busy monitoring the development of embryos and nurturing the tiny chicks. This first year of activities is considered a pilot. We nervously wait to see whether all our efforts will be successful...



Life in captivity, from egg to chick to fledgling.  
© Juan Carlos Avila

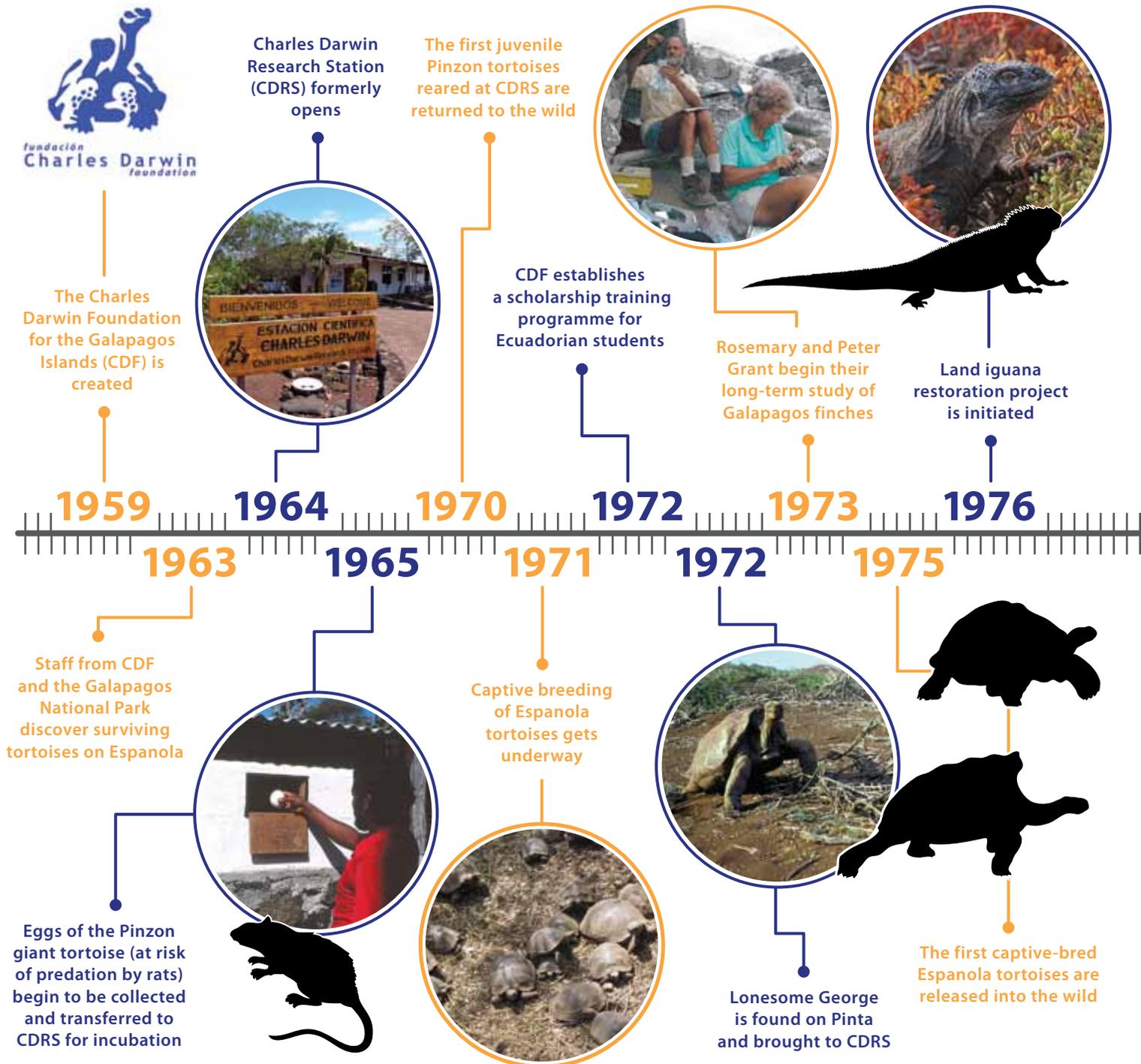




# FIFTY YEARS of CDRS

**F**ifty years ago, on January 20, 1964, a small group of scientists, Ecuadorian authorities, and ambassadors from several countries gathered at the eastern limits of Puerto Ayora on the central island of Santa Cruz to celebrate the official opening of the Charles Darwin Research Station (CDRS). For the first time since its foundation five years earlier, the Charles Darwin Foundation (CDF) had an operative base in Galapagos: offices, laboratory space, and a library that would

further its mission "to provide knowledge and assistance through scientific research and complementary action to ensure the conservation of the environment and biodiversity in the Galapagos Archipelago." Over the years, the CDRS has welcomed hundreds of visiting scientists to Galapagos and, in collaboration with the government of Ecuador, has made some major contributions to the conservation of these islands.

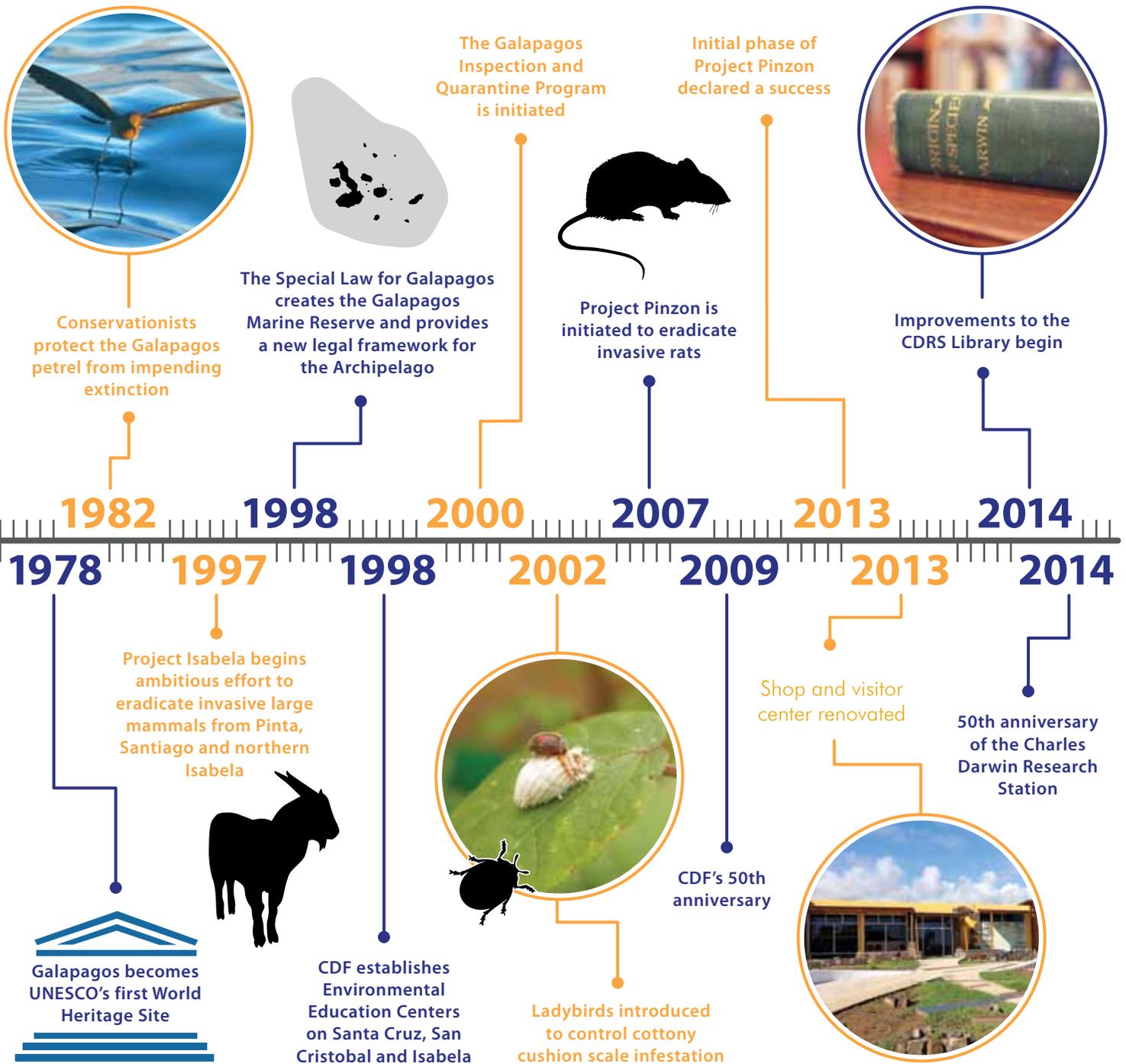


## RENOVATING THE LIBRARY

In January, two highly skilled engineers traveled to Galapagos as part of a project to rejuvenate several of the CDRS buildings. Jon Waite and Amie Shuttleworth, who have been working as engineers in London for more than five and eight years respectively, took a three-month sabbatical during which they volunteered their time and skills towards making improvements to the CDRS buildings, as well as helping with the design of a best-practice family house with the Princes Foundation for Building Community.

The library has been a primary focus of their work — a building that houses a vast collection of books, publications,

and scientific journals and has been central to the CDRS since its inception 50 years ago. With careful consideration given to minimizing access to insects and control of humidity, they designed and oversaw the renovations, giving the library a new lease of life. “The research station is so important to the continued conservation of Galapagos and knowing that we have helped to make the library more accessible at the same time as preserving the impressive collection in a low-energy manner is a great feeling,” says Amie. To read more about their time spent in Galapagos, visit the project website [sustainablegalapagos.org](http://sustainablegalapagos.org). ■





# THE FISH-EATING SNAKES OF FERNANDINA

by Godfrey Merlen, Galapagos Naturalist

**T**he low hilltop of Cape Douglas on the northwest corner of Fernandina slopes down to the sea. It is a rough place of jumbled lava with a flat wave-washed ledge about 40 meters wide that eventually falls precipitously, a drop of just over one meter, into some of the most productive waters in Galapagos.

The rich waters explain why this harsh volcanic haul-out is adorned with several dozen flightless cormorants, hundreds of fur seals and even more marine iguanas, all endemic species intent on exploiting the abundant resources just off shore. But beyond these very visible residents, there is a far less conspicuous creature that shows a truly remarkable behavioral adaptation to this special environment.

For most visitors to Galapagos, snakes are unlikely to feature high on their wish list of must-see species. They are encountered only rarely, so are difficult to study and as a consequence receive little attention in the guidebooks. The four endemic species are reported to be “mildly poisonous” constrictors, eating lava lizards, marine iguana hatchlings, grasshoppers, and (on islands where they still exist) endemic rice rats. But, in August 1995, I discovered that the Galapagos racers at Cape Douglas have added another food source to their diet: fish.

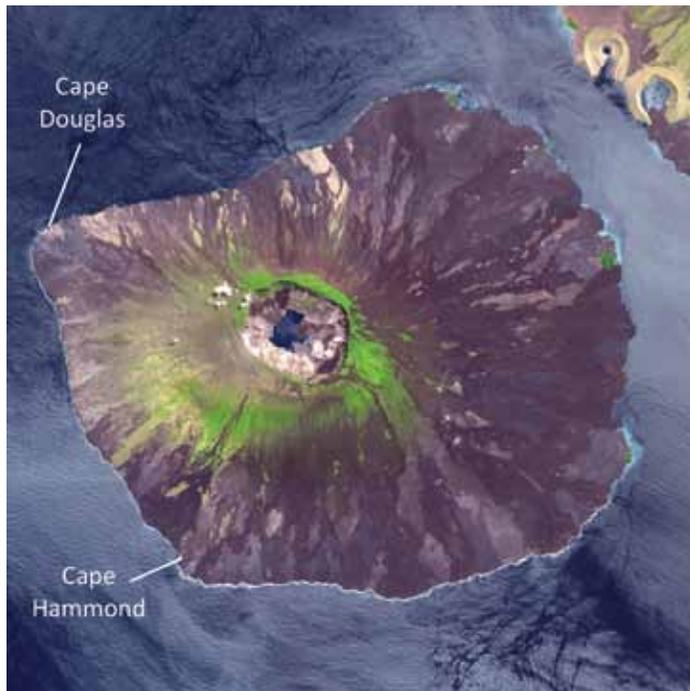
While ambling across the wave-washed ledge, I noticed a snake entering a narrow crack in the lava that led to the sea. It seemed strangely purposeful, which made me curious about what it was up to. At some risk from the waves, I moved quickly into a position where I might catch another glimpse of the snake. I was fortunate, for as I peered along the edge of the sheer lava face, its head and a significant part of its body slowly projected from the crack and hung out over the sea. Suddenly it struck sideways and then quickly retreated. I did so too, to find the creature emerging onto the lava ledge with a four-eyed blenny in its mouth. As far as I know, I was the first person to witness and record this behavior in Galapagos snakes.

The snake seemed strangely purposeful, which made me curious about what it was up to. ”

In subsequent years, I have made further sightings of fish-eating snakes at Cape Douglas and once also at Cape Hammond to the south. Here, at low-tide, I observed 15 snakes patrolling the sandy, rocky floor of the lagoon, investigating holes and slithering between lava boulders in search of prey. I found one individual attempting to swallow a 13-cm-long fish.

Most recently, in November last year, I spent six days at Cape Douglas with the BBC to record this remarkable behavior, footage due to be broadcast later this year. One individual I named “Mr. Light” due to his obvious light-colored stripes, occupied a defined fishing “patch”, on one day consuming an incredible eight blennies in 47 minutes.

The three fish-eating snakes I observed on this occasion were dedicated fishermen, not going after other prey, and they seemed to stick to a daily pattern. When the tide was falling, they slithered downhill, often over the backs of iguanas, to feed among the wet boulders, sea anemones, and algae. Once full and with the tide on the turn, they would retreat to higher ground where it is dry and warm.



### THE SNAKES OF GALAPAGOS

There are four terrestrial snakes known to occur in Galapagos. Two of these species are found on Fernandina: the Galapagos banded snake (*Antillophis slevini*) and the Galapagos racer (*Pseudalsophis biserialis occidentalis*). The fish-eating behavior has only been observed for the Galapagos racer.

Top, left: A Galapagos racer strikes at Cape Douglas on Fernandina. © Godfrey Merlen.

Above: Fernandina viewed from space, showing Cape Douglas to the northwest and Cape Hammond at the southwest of the island. Tagus Cove on Isabela is visible across the Bolivar Channel in the top right of the image. © NASA.

Charles Darwin would have been fascinated by these observations. At this moment it is not possible to say if this extraordinary habit occurs more widely on Fernandina. The available evidence suggests it is unique to the west coast, perhaps because the abundance of terrestrial prey along this stretch of the island is relatively low and the waters just off shore are particularly rich. In this setting, snakes have found an open niche but have had to make a radical change in their behavior to exploit it.

In time, it is just this kind of process that could result in the origin of a new species. ■



### THE FOUR-EYED BLENNY

Of all the fish that inhabit the shores of Galapagos, few are more curious than the endemic four-eyed blenny, one of the most important prey items of the fish-eating snakes of Fernandina. Its name is misleading as it has two eyes, though each lens is divided into two distinct flat surfaces that allow the fish to see both in and out of the water. This remarkable arrangement, in concert with a strong tail for flipping it about in the air from rock to rock and cryptic coloring, allows the blenny to inhabit the inter-tidal zone where it hunts small crustaceans.

Above: The rocky shore of Cape Douglas and a four-eyed blenny. © Godfrey Merlen.



## GC MEMBERS FUND **THE BATTLE AGAINST INVASIVES**

Some of the largest threats to Galapagos biodiversity are the invasive species that directly harm or simply outcompete native and endemic species for resources. Through the support and generosity of our members, Galapagos Conservancy is funding a number of initiatives to control the invaders. We highlight a few projects below.

### INVASIVE PARASITIC FLIES

A 2012 workshop co-funded by Galapagos Conservancy resulted in a plan outlining strategic and groundbreaking research on the invasive nest-parasite fly *Philornis downsi*. Scientists from Ecuador, USA, Argentina, Australia, and Austria are now working together to understand the ecology of the fly and develop innovative techniques to mitigate its impacts on Darwin's finches and other threatened song birds in Galapagos. This research effort is being led by CDF senior science advisor and invasive species expert Dr. Charlotte Causton, who for the past two years has been funded by GC. Over the coming two years, \$245,000 in funding from GC will provide ongoing support for Dr. Causton, a new junior scientist position for research on *P. downsi* in Galapagos, and a portion of the work conducted by US-based collaborators.



### INVASIVE ANTS

Galapagos Conservancy, at the request of the Galapagos National Park Directorate, funded an in-depth analysis of invasive ant prevention and control programs in Galapagos. The end result was a five-year strategic plan that identified activities required to prevent new introductions of invasive ants and to reduce the impact of those that have already reached the Galapagos Islands. The highest priority among ants is the tropical fire ant (*Solenopsis geminata*) because of its capacity to disperse naturally between islands and its high impact



on humans and biodiversity, and the big-headed ant (*Pheidole megacephala*) because it is a recent (2007) introduction. Galapagos Conservancy will continue to fund this critical work which will positively impact both the human and animal populations in the islands.

### BATTLING INVASIVE PLANTS

During the 3 million years or so that the Galapagos Islands have existed, new plant species arrived and successfully established themselves at a rate of about one species every 10,000 years. In recent decades, the increase in immigration and transport of fruits and vegetables to the islands to meet the demands of a growing tourism industry have also meant a huge increase in the arrival and introduction of non-native plants. Of the 866 recognized introduced species present in Galapagos, at least 564 (65%) were deliberately brought to the islands for the purpose of agricultural or domestic use. Galapagos Conservancy will provide nearly \$200,000 in 2014 to help the Charles Darwin Foundation and its partners examine, and hopefully deploy, biological control methods to remove two of the most invasive plants in Galapagos.

**Quinine (*Cinchona pubescens*)** is one of the most invasive woody species in the Galapagos Islands, and it has now spread into all of the highland vegetation zones of Santa Cruz, covering more than 12,000 hectares. Quinine is considered a "transformer," changing the overall plant species composition and community structure of the highlands of Santa Cruz. **Blackberry (*Rubus niveus*)** was introduced to Galapagos in the 1970s on San Cristóbal and Santa Cruz. It is now also found on Isabela, Floreana, and Santiago, and covers about 30,000 hectares, with the potential to cover 90,000 hectares — approximately 12% of the entire archipelago. Traditional control methods, such as herbicides or machete, work only in the short term because of the plant's massive seed bank and prolific growth rate.



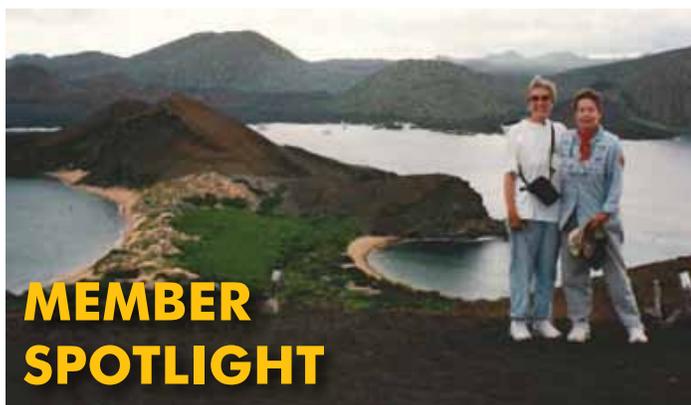
Blackberry, taking over a native Galapagos scalesia forest. © CDF

Scientists will experiment with vegetation suppression and introductions of diseases targeted to specific invasive plants, doing everything possible to ensure that there is no negative effect on non-target species and endemic wildlife. ■



For the past year, the body of Lonesome George, the last known Pinta Island Tortoise who passed away in June of 2012, has been undergoing the process of taxidermy in the capable hands of George Dante at Wildlife Preservations in West Paterson, New Jersey. Funded entirely by Galapagos Conservancy supporters, Dante has been working painstakingly to ensure that Lonesome George will be preserved forever in a natural pose, representative of how the tortoise is remembered at his last home. He spent the last four decades of his life at the Fausto Llerena Tortoise Breeding Center in Puerto Ayora, Galapagos.

Beginning in September 2014, Lonesome George will be on display at the American Museum of Natural History in New York for three months. A grand unveiling is tentatively planned for **September 18th**, and we will certainly keep our members informed as the work moves forward and dates are finalized. ■



**IN MEMORIAM: DALE A. ELLIOTT**

Galapagos conservation lost a great friend and passionate advocate when Ms. Dale A. Elliott (pictured, right) passed away on January 8, 2014. Originally from the small town of Lake Mills, Wisconsin, Dale loved being outdoors and had a lifelong interest in biology. After earning a Biology degree in 1964, she worked as a graduate student with San Francisco State University’s Dr. Robert Bowman researching Galapagos finches — the birds that helped to shape Charles Darwin’s evolutionary theory. Dale became a regular supporter of Galapagos conservation efforts, and first visited Galapagos in May of 1997 with her partner Kate Blickhahn (pictured, left) after many years of hoping to make the trip. She was an enthusiastic conservationist during her lifetime, serving as member and officer of the Marin Conservation League in Marin County, CA and regularly giving to more than a dozen conservation organizations — including Galapagos Conservancy, to which she made a donation every year since 1997. Dale also helped design and direct a comprehensive training program to help local K-8 teachers enrich their science curriculum with hands-on outdoor experiences. Over the years, Dale’s informal and formal research projects included studies of the western fence lizard, marshes and wetlands, and egret and blue heron nesting behavior in Marin County, as well as nest monitoring and chick banding of Laysan Albatross on Midway Island as an Elderhostel volunteer. Her passing is a loss to the conservation world, and her dedication to Galapagos will be deeply missed. ■



**GALAPAGOS CONSERVANCY MEMBERSHIP**

**GALAPAGOS CONSERVANCY STANDARD MEMBERSHIP**

Thanks to all of our members who make our work possible. We could not preserve, protect, and restore the Galapagos Islands without your generosity and commitment to conservation. Our annual membership levels are as follows:

<b>Friend:</b>	<b>\$25</b>	<b>Advocate:</b>	<b>\$250</b>
<b>Family:</b>	<b>\$50</b>	<b>Protector:</b>	<b>\$500</b>
<b>Supporter:</b>	<b>\$100</b>		

**GALAPAGOS AMBASSADOR SOCIETY**

With your gift of \$1,000 or more (or cumulative annual giving of \$1,000), we will welcome you to the Galapagos Ambassador Society. Many of our Galapagos Ambassadors are often willing to become closely and regularly involved in our programs. Ambassadors receive special updates and briefings; invitations to attend special member events; recognition in the GC Annual Report; and a special Ambassador welcome gift.

<b>Española Society:</b>	<b>\$1,000 to \$4,999</b>
<b>Santiago Society:</b>	<b>\$5,000 to \$9,999</b>
<b>Fernandina Society:</b>	<b>\$10,000 to \$24,999</b>
<b>Isabela Society:</b>	<b>\$25,000 and up</b>

**GALAPAGOS GUARDIAN SOCIETY**

Galapagos Guardian Society members give recurring monthly contributions that are charged automatically to a credit card. These members help us reduce our fundraising costs because we do not send them annual membership renewal notices for the duration of their support. This is an easy and secure way to provide GC with ongoing funds that we can use to address the most critical conservation challenges in Galapagos.

To join, please see page 3 for a mail-in form or join online at [www.galapagos.org](http://www.galapagos.org) or call **703-383-0077**.

BLOG [EXCERPT]



Adult tortoises look on as Sean Burnett and Fredy Cabrera prepare to install a camera in a shelter made of lava blocks to protect it from their 400+ lb. weight. © James Gibbs

**In** the summer of 2013, four webcams were installed in the tortoise pens at the Fausto Llerena Tortoise Center at the Galapagos National Park Directorate (GNPD) campus on Santa Cruz. In addition to support from the GNPD and a generous Galapagos Conservancy donor, two people in particular were instrumental in bringing the webcams to life: Sean Burnett of Wildlife Intel, which uses technology to help advance wildlife conservation efforts like poaching detection in remote areas, and Dr. James Gibbs of the State University of New York's College of Environmental Science and Forestry (SUNY-ESF).

Galapagos Conservancy recently chatted with James and Sean to find out how this technology inspired the "tortoise cams," and what it entailed to install the first-ever wildlife webcams in the Galapagos Islands.

**GC: How did you become involved in the Galapagos Tortoise Cam project?**

**James:** For several years, Sean and I have been discussing the value of video in remote places around the world to help protect and observe endangered species. We realized that the same technology could be used to share images of animals that people wouldn't otherwise get a chance to see — Giant tortoises seemed an iconic species to start with, and the captive breeding center a good place to try it out.

**GC: How did the tortoises respond to the installation process?**

**James:** I was surprised by how much interest the tortoises took in this project. They were fascinated with the spherical camera lenses, and inspected them at length early in the installation process.

**Sean:** Even now, almost a year later, the ever-curious tortoises seem to want to get really close to the cameras, knock them around, and look into the lens.

**GC: What were some of the challenges you faced in setting up the cameras?**

**Sean:** We have run into one minor issue since installing the cameras: the 475-lb. adult tortoises occasionally like to knock the camera out of alignment. We thought we had built quite a fortress for the camera in the adult pen, but it wasn't strong enough, I guess!

**Read the full interview on our blog:**  
<http://www.galapagos.org/blog-listing/>

**Watch the tortoises!**  
<http://www.galapagos.org/gallery/tortoise-cam/>



Above: This close call illustrates why all cables were elevated as much as possible: to avoid tortoise (and rat) bites. Fortunately, the famous bite strength of Galapagos giant tortoises is not well developed in the young!

Right: A young tortoise catches his close-up.

© James Gibbs



# GALAPAGOS GIFTS

Proceeds from all gifts purchased in the Galapagos Gift Shop benefit Galapagos conservation.

<http://www.galapagos.org/shop/>

## NEW "SIGNED-by-the-AUTHOR" BOOKS in the GALAPAGOS GIFT SHOP!

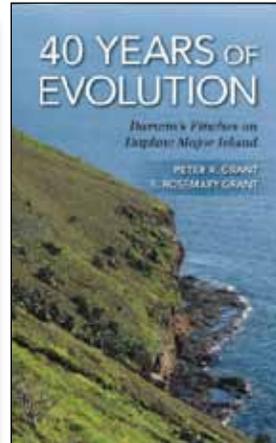
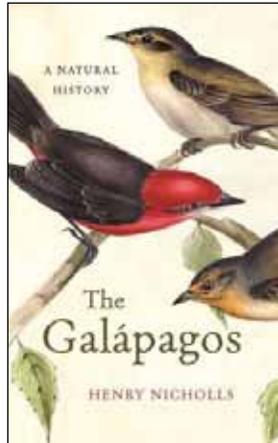
### The Making of Galapagos

THE GALAPAGOS:  
A NATURAL HISTORY

by Henry Nicholls,  
Profile Books, 2014

**I**nformative and succinct, fascinating and easy to read, *The Galapagos: A Natural History* is an absolute 'must read' whether you are a first time visitor or an 'old hand' with an on-going interest in the Archipelago. With a logical evolution in its structure, you first visit Galapagos from a geological perspective, then delve into its unique marine environment before engaging with the major taxa of the terrestrial habitats and finally, the arrival and impact of humans. There is something for everyone in *The Galapagos: A Natural History* — a book that does exactly what it says on the cover.

(Reviewed by Ian Dunn of Galapagos Conservation Trust)



### The Finches of Daphne Major

40 YEARS OF EVOLUTION:  
DARWIN'S FINCHES ON  
DAPHNE MAJOR ISLAND

by Peter R. Grant and B.  
Rosemary Grant,  
Princeton University Press, 2014

**I**n this meticulous new book, evolutionary biologists Peter and Rosemary Grant set out their lifetime's work studying the finches

of Daphne Major. This is a major contribution to Galapagos and scientific literature, a richly illustrated book that ties together the many different lines of their scientific enquiry, including botany, morphology, behavior, genetics, and much more. The number of profound insights that the Grants have managed to glean from an island as small as Daphne Major is truly remarkable, their evidence for evolution by natural selection as sparkling clear as the waters that surround it.

(Reviewed by Henry Nicholls)

## HELP US REACH 10,000 FACEBOOK FANS



Stay up to date on all things Galapagos by "liking" our Facebook page at [www.facebook.com/GalapagosConservancy](http://www.facebook.com/GalapagosConservancy). Already a fan? Invite your friends to like us and help us reach 10,000! Don't use Facebook? Sign up for email updates instead: <http://bit.ly/GC-email>.

## OTHER NEW ITEMS IN THE GIFT SHOP!



Stemless wine glasses, t-shirts for everyone, and recycled totebags!





# GALAPAGOS CONSERVANCY

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Fairfax, VA 22030 USA



## GC PHOTO CONTEST for **2015 CALENDAR** ENTER BY **7.31.2014**

Please email no more than 5 photos, one per email, to [photo@galapagos.org](mailto:photo@galapagos.org). Include your name, subject of photo, and location (if known) in the email subject line. Include your full contact information in the body of the email, with any other descriptive details about the photo.

Visit [www.galapagos.org](http://www.galapagos.org) for rules, permissions, and to view last year's winners.

*Sunset on Isabela © GC Member, Kiyoko Gotanda  
Nazca Boobies with Sally Lightfoot Crab © GC Member, Adam Mentis*