

GALÁPAGOS POST

Spring-Summer 2021



NOT EXTINCT!

"Fernanda" confirmed to be a true Fernandina tortoise, a species thought extinct for 112 years!

PROJECT UPDATES:

Land Iguanas on Santiago

Giant Tortoises Thrive on Alcedo Volcano

NASA Partnership

Virtual Education in Galápagos

MARINE RESERVE PROTECTION



**Plus, a history of
Galápagos Conservancy**
from President Emeritus
Johannah Barry



**Galápagos
Conservancy**
galapagos.org



FROM THE
PRESIDENT
Dr. Paul Salaman

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Cover Image:
The Galápagos Marine Reserve is under siege. Please see pages 8-10 for the full story.

Black-tipped Reef Shark at Darwin Island
© Greg Asner

Dear Friends of Galápagos,

It is with delight that I write to you for the first time in the newly renamed **Galápagos Post**. I joined Galápagos Conservancy in October of last year and have been amazed at what we have accomplished in just eight months through your support.

Our most exciting recent news is that Fernanda — the female Giant Tortoise found in 2019 on Fernandina Island by Galápagos National Park rangers with Galápagos Conservancy staff and an Animal Planet film crew — has been genetically confirmed as a Fernandina Giant Tortoise, a species believed extinct since 1906! This is both a great scientific discovery and an urgent call to action (page 3 and 6). We have launched an urgent appeal so we can conduct an expedition to Fernandina in the next couple months to search for a mate for Fernanda and save the species. So, we very much hope to have further exciting news on this unique tortoise soon.

In this issue, you will also learn about our new partnership with NASA for Rewilding Galápagos (page 19), experience the magic of Alcedo Volcano (page 12), and review the progress of marine conservation initiatives across the Islands (page 8). I’m also delighted that our esteemed President Emeritus — Johannah Barry — describes in her own words the evolution of Galápagos Conservancy since the 1980s (page 14).

This publication’s new name was inspired by the world’s most unusual mail delivery system, Post Office Bay on Floreana Island. Mariners first placed a barrel on the northern coast in the 18th century, leaving addressed letters inside for distant loved ones in the hopes that other homeward-bound sailors passing through the Islands would hand-deliver them. Hundreds of years later, their system is still in use and continues to charm visitors to Galápagos. We hope you will be similarly charmed with the *Galápagos Post*, twice a year in your mailboxes. It is your support that makes our work possible. Thank you.

For Galápagos,

Paul Salaman



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

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GALÁPAGOS CONSERVANCY
MEMBERSHIP

GALÁPAGOS CONSERVANCY STANDARD MEMBERSHIP

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

Friend: \$30 Supporter: \$100 Protector: \$500
Family: \$50 Advocate: \$250

GALÁPAGOS AMBASSADOR SOCIETY

With your gift of \$1,000 or more (or cumulative annual giving of \$1,000), we will welcome you to the Galápagos Ambassador Society. Many of our Galápagos 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 our Annual Report; and a special Ambassador welcome gift.

Española Society: \$1,000 to \$2,499
Pinta Society: \$2,500 to \$4,999
Santiago Society: \$5,000 to \$9,999
Fernandina Society: \$10,000 to \$24,999
Isabela Society: \$25,000 and up

GALÁPAGOS GUARDIANS SOCIETY - Monthly Giving

Galápagos Guardians 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 Galápagos Conservancy with ongoing funds that we can use to address the most critical conservation challenges in Galápagos. To join, please complete the mail-in form to the right or join online at:

give.galapagos.org/a/monthly.

If your employer matches charitable contributions, you could double your impact on Galápagos Conservancy’s efforts. **Galápagos Conservancy’s EIN # is 13-3281486.**



Save the Fernandina Tortoise
EMERGENCY ACTION FUND

◇ GOAL = \$327,000 ◇

Our geneticist partners at Yale University just confirmed that the living female Giant Tortoise found in 2019 is a member of the long-lost Fernandina Giant Tortoise species, last reported 112 years ago. We are seeking urgent funding for a series of expeditions with the Galápagos National Park to return to Fernandina Island to search for additional tortoises in the hopes of finding a mate for “Fernanda” and, ultimately, saving the species. (See [page 6](#) for more details.)

☐ **YES!** I'd like to help save the Fernandina Tortoise species and bring it back from the brink of extinction!

Member Name(s): _____

Address: _____

City, State, Zip: _____

Email: _____

☐ My check is enclosed.

Or, please charge my:

☐ Visa ☐ AMEX ☐ Mastercard ☐ Discover

Name on Card: _____

Card Number: _____

Expiration Date: _____ CVV #: _____

Signature: _____

Donation Amount: \$ _____

☐ I'd like to make this gift a monthly gift and become a member of the Galápagos Guardians Society. By checking this box, I agree to have my credit card charged once a month for the amount indicated above (\$10 minimum).

Questions?

Email: member@galapagos.org

Cut out, use centerfold envelope, or mail this form to:

Galápagos Conservancy - Member Services
11150 Fairfax Blvd. Suite 408
Fairfax, VA 22030 USA

To make your gift online, visit:

galapagos.org/fernandinatortoise

(B21F)

GALÁPAGOS NEWS



LAND IGUANA REINTRODUCTION SUCCESS

Back in January 2019, Galápagos Conservancy supported the reintroduction of 2,150 Galápagos Land Iguanas, listed as *Vulnerable* by the IUCN, onto Santiago Island. A recent survey has found that the population is estimated to have doubled, and there are positive signs of ecological restoration. Until 2019, Galápagos Land Iguanas had not been recorded on Santiago Island since Charles Darwin visited in 1835. He described the lowlands of Santiago as saturated with “infinite numbers of a large herbivorous lizard.” However, by the time the California Academy of Sciences visited in 1903, they found only skeletal remains. It is thought that they became locally extinct because of food competition and predation by species introduced by humans, such as feral pigs and goats, which have now been removed from the island. Beyond the ongoing conservation of this endemic species, the reintroduction of Land Iguanas is also helping restore Santiago’s ecological health by promoting vegetation restoration on the island through seed dispersal.

These Land Iguanas were moved from North Seymour Island, where there were more than 5,000 individuals — far too many for the island’s food supply to support. The captured iguanas were a mix of adults and juveniles, with 60% of them female and 40% male to promote rapid growth in the new population.

In August 2019, when the team returned to measure any changes in body mass since release, they found the iguanas had a 9–12% increase in body weight, likely due to the increase in food availability compared to North Seymour.

The most recent survey in December 2020 estimated the population on Santiago had reached more than 4,500 individuals, highlighting the enormous success of this project and resulting in a thriving Land Iguana population which will help to conserve this unique species for generations to come.



A very rare Galápagos Penguin with all white plumage © Jimmy Patiño

COVID-19 IN GALÁPAGOS

Global travel restrictions to slow the COVID-19 pandemic cut a vital economic lifeline to the Galápagos Islands; the highly tourism-dependent economy employs nearly 80% of its population. Since March 2020, the community and authorities have worked tirelessly to find ways to safely reactivate the local economy while protecting residents and ensuring Galápagos as a secure travel destination. By the end of May 2021, the majority of Galápagos residents had been vaccinated, including all Galápagos Conservancy staff. The first vaccination campaigns reached people over age 65, teachers, medical staff, medically vulnerable people, and essential workers. Vaccines were then offered to everyone over age 16.

Simple protocols remain in place, such as the use of masks, social distancing, and PCR testing prior to entering the Islands. Smaller tourism companies began operating in August 2020. As vaccinations globally become more available, the cruise ship companies are readying to set sail again from June 2021. Parallel to the vaccination campaigns has been a massive effort toward reactivating the economy. One such effort involves providing seed funding for local, sustainable tourism initiatives that strengthen Galápagos as a resilient destination while ensuring the ecological protection of the Archipelago.



RARE WHITE PENGUIN SPOTTED

A rare white Galápagos Penguin was found on the north end of Isabela Island by a local naturalist guide. The unique bird has a condition similar to albinism called *leucism*, in which a genetic mutation causes an animal to appear mostly white, but some pigment can still be produced. In this case, the penguin’s plumage lacks color because the cells responsible for melanin production are absent.

RISE IN PENGUIN & CORMORANT NUMBERS

A recent study by the Charles Darwin Foundation and Galápagos National Park has found that the number of Galápagos Penguins and Flightless Cormorants in the Islands is increasing. The Galápagos Penguin population increased from 1,451 in 2019 to 1,940 in 2020, the highest it has been since 2006.

Flightless Cormorant numbers increased from 1,914 to 2,220 over the same period, reaching a record number according to historical data dating back to 1977. Scientists think this could be due to La Niña and the pause in tourism during the COVID-19 pandemic.

COOL WATER SECRETS UNCOVERED

New research from Dr. Alex Hearn, a Galápagos Conservancy partner scientist, has revealed the secret of Galápagos’ rich marine ecosystem. For decades, scientists have known that upwelling of cool, nutrient-rich waters are responsible for the abundance of phytoplankton at the bottom of the food chain, but no one knew what was behind this upwelling.

Using an ocean circulation model, scientists have now shown that the intensity of upwelling in the Archipelago is driven by local northward winds, which generate vigorous turbulence in the ocean, bringing nutrients up to the surface from deeper waters. This knowledge will help to protect the Galápagos Marine Reserve against climate change. The full paper is available online: go.galapagos.org/xpEbMe

GALÁPAGOS SCIENTIST CHANGING THE MARINE WORLD

Dr. Inti Keith, a Senior Marine Biologist at the Charles Darwin Foundation, has been selected for the iconic *Explorers Club EC 50* program, recognizing 50 remarkable people who are changing the world. Dr. Keith (at right) leads the Marine Invasive Species program in Galápagos. Her research funded by Galápagos Conservancy currently seeks to understand the status of macroalgae (seaweeds) across the Galápagos Marine Reserve.

185 BABY GALÁPAGOS TORTOISES SEIZED FROM ILLEGAL TRAFFICKERS

On the afternoon of Sunday, March 28, Galápagos National Park staff discovered 185 *Critically Endangered* tortoise hatchlings inside a suitcase bound for mainland Ecuador during a routine luggage inspection at Seymour Airport on Baltra Island. The tortoises were individually wrapped in plastic to limit their movement and subsequent detection. Most of the young tortoises were estimated to be between one and six months of age, with some appearing to be newly hatched. As of this printing, 32 of the tortoises had died (10 while in the suitcase), and 153 survived.

Galápagos Conservancy’s Director of Conservation, Washington Tapia, believes that the tortoises were removed from tortoise nests on Santa Cruz Island. “The young tortoises were found in terrible condition and appeared to be extremely underweight. We’ve collected important data, including size and weight, for each tortoise to better assess its health condition,” said Tapia in a statement.

The surviving hatchlings were transferred to secure pens at the Giant Tortoise Center on Santa Cruz Island that is managed by the Galápagos National Park Directorate (GNPD) and Galápagos Conservancy, where they will be cared for under the close supervision of Park veterinarians and guards.

Dr. James Gibbs, Vice President of Science and Conservation at Galápagos Conservancy, noted that the Galápagos National Park and Ecuadorian authorities have been working diligently to prevent the illegal trafficking of *Critically Endangered* Giant Tortoises. Galápagos Conservancy, which has been supporting the Park for more than three decades, is working closely with authorities to increase security and monitoring efforts around the natural tortoise nesting sites across Galápagos to prevent further trafficking attempts.

On May 19, the perpetrator was sentenced to three years in prison, a \$639,100 fine, and will be required to issue a public apology through national media. An investigation is ongoing to search for potential accomplices.



Many species of Galápagos Giant Tortoises are highly endangered due to past exploitation, with a current population size of only 10–15% of its historical number. A total of 15 Galápagos Giant Tortoise species are endemic to the archipelago, of which six are *Critically Endangered* (including the Santa Cruz tortoise species), and three are *Extinct*.

"EXTINCT" for 112 YEARS!

BREAKING NEWS & URGENT APPEAL

Scientists at Yale University have confirmed genetic similarity between a lone female Giant Tortoise discovered in 2019 on Fernandina Island and the Fernandina Giant Tortoise (*Chelonoidis phantasticus*), last reported 112 years ago and long considered lost forever.

The female Giant Tortoise was found during a 2019 joint expedition of the Galápagos National Park Directorate (GNPD), Galápagos Conservancy, and Animal Planet. To avoid the same tragic fate as Lonesome George — the last Pinta Giant Tortoise who died in 2012 — an urgent expedition to Fernandina Island will be undertaken to find a mate and save the species. At the time of discovery, the GNPD and Galápagos Conservancy teams were confident that the female Giant Tortoise was a member of the lost Fernandina Giant Tortoise species. However, to verify their assumption, a blood sample was sent to geneticists at Yale, where a team led by Dr. Gisella Caccone sought to uncover the genetic origin of the female tortoise and determine how closely it matched the only other tortoise ever found on Fernandina Island, a large male collected in 1906.

Nicknamed "Fernanda" by her discoverers, genetic analysis has now confirmed that she is a *Chelonoidis phantasticus* tortoise and native to the island, verifying what researchers at Galápagos Conservancy and GNPD had long hoped for.

"One of the greatest mysteries in Galápagos has been the Fernandina Island Giant Tortoise. Rediscovering this lost species may have occurred just in the nick of time to save it. We now urgently need to complete the search of the island to find other tortoises," said Dr. James Gibbs, Vice President of Science and



Back in 2019, using a surprisingly simple device made of rope and sticks, two Galápagos National Park Rangers carry Fernanda back down to the boat that will take her to the Giant Tortoise Center on Santa Cruz Island, where she has been kept safely in captivity for the last two years.

© Washington Tapia for Galápagos Conservancy



"Rediscovering this lost species may have occurred just in the nick of time to save it."

- Dr. James Gibbs, Galápagos Conservancy
Vice President of Science and Conservation

Conservation for Galápagos Conservancy, tortoise expert, and biology professor at the State University of New York.

Fernandina Island's landscape is dominated by an active volcano that makes expeditions very challenging. If a male tortoise is located on the volcanic terrain, he will be united with Fernanda at the Galápagos National Park's Giant Tortoise Center in Santa Cruz. Scientists would then oversee breeding efforts, rear any young safely in captivity, and eventually return them to safe habitats on their native island of Fernandina.

Prior to the 2019 discovery, only one specimen of the Fernandina Giant Tortoise had ever been found — a male collected during a California Academy of Sciences expedition in 1905-06. While populations of Giant Tortoises were decimated throughout the Galápagos Islands in the 19th century due to exploitation by whalers and buccaneers, the Fernandina Giant Tortoise species was believed to be extinct due to volcanic eruptions in past centuries. The current population of Giant Tortoises throughout all the Islands is only 10-15% of its historical numbers, estimated to have once been 200,000-300,000 individuals.

But there is hope. Park rangers found signs (tracks and scat) of at least two other tortoises on Fernandina Island during the searches that resulted in the discovery of the lone female. Galápagos Conservancy has launched an urgent appeal (See sidebar or page 3 for details.) to raise funds to undertake the expedition(s) to find these and perhaps other tortoises to save this species from the brink of extinction. ■



Above, left: Fernanda explores her corral at the Giant Tortoise Center on Santa Cruz Island. © Galápagos Conservancy/GTRI

Above: Galápagos Conservancy's Washington Tapia (left) docks the panga boat carrying Fernanda and the expedition team at Santa Cruz Island back in 2019. © Galápagos Conservancy/GTRI

We are asking for urgent support to fund a series of expeditions, beginning in late 2021, to return to Fernandina Island to search for additional tortoises in the hopes of finding a mate for Fernanda and saving her species.

Dr. James Gibbs, Vice President of Science and Conservation at Galápagos Conservancy, has requested **\$327,000** to fund the following efforts:

- Conduct three expeditions with our staff and park rangers to lead multiple, intensive searches across Fernandina Island
- Relocate any surviving tortoises by helicopter
- Build a special secure pen inside the Giant Tortoise Center on Santa Cruz Island with constant supervision and reproductive assistance to recover the species

We are thrilled that genetic analysis has confirmed that this species is not extinct, but the expeditions to find a mate for Fernanda won't be possible without your support.

To help, see page 3 or visit:
galapagos.org/fernandinatortoise

LEADERSHIP ON THE HIGH SEAS

SINK or SWIM?

The impact of industrial fishing could be devastating for the environmental and economic security of Galápagos. © Jonathan Green

by Sharon Johnson, Chief Executive of the UK's Galapagos Conservation Trust

In July 2020, the news of international fishing vessels anchored along the edge of the Exclusive Economic Zone around the Galápagos Islands hit the headlines.

These fleets, comprised largely of Chinese fishing vessels, come every year and have been doing so for decades, but the scale of last year's operation was unprecedented. There were nearly 300 vessels, some outfitted for fishing, others acting as refrigeration containers and still more serving as refueling stations. This floating, self-sufficient city-at-sea was just one of many fleets harvesting the marine resources in these rich waters, for much-prized squid and tuna but which also end up ensnaring endangered sharks and other threatened species in the process.

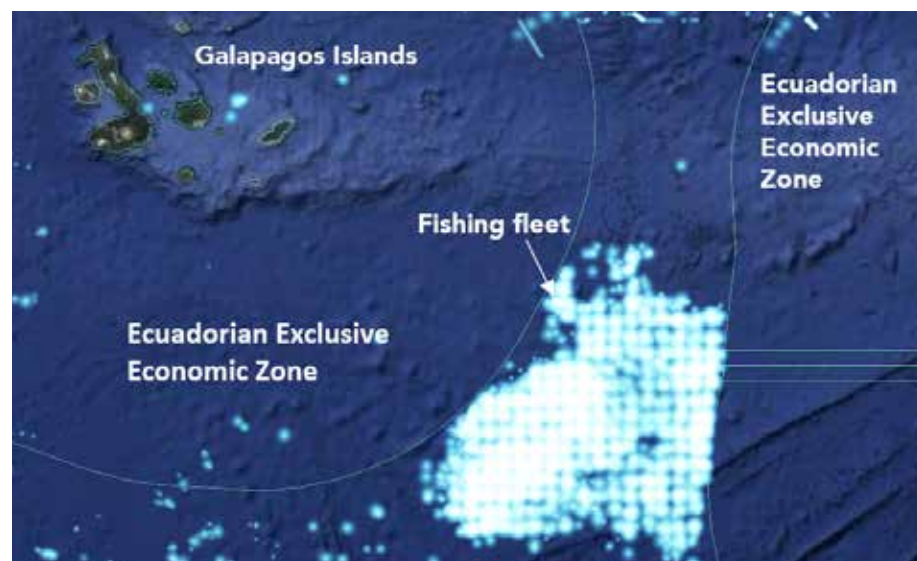
Concerned over the loss of biodiversity and food security, in July 2020 Ecuadorian President Lenín Moreno appointed a Commission to design a strategy for the protection of Galápagos and its marine resources. Its remit — to review the marine management of Galápagos — is urgent. But Ecuador's efforts to protect Galápagos and its marine biodiversity would have a much greater chance of success if there was real and effective support from the international community. It is time to step up our game.

The threat that international fishing poses to both marine biodiversity and international relations is not new. From 1963 to 1975, the United States and Ecuador were embroiled in the so-called "tuna war." The conflict began when Ecuador seized and fined a US

fishing vessel that failed to recognize the region up to 200 miles off the coast over which Ecuador felt it had sovereign rights. The tensions abated in 1975, with the creation of a Pacific "regional association" that acknowledged each country's sovereign right to resource conservation in this offshore zone, an "exclusive economic zone" (EEZ) that most countries around the world eventually agreed to in 1982 as part of the United Nations Convention on the Law of the Sea.

Yet this was not enough. In 1998, mounting concerns about decreasing fish populations and the impacts of long-line fishing, Ecuador created the Galápagos Marine Reserve (GMR) to protect an ocean area of 133,000 km², at the time the second largest marine protected area in the world. The creation of the GMR created a "spillover" effect into the EEZ, which still benefits industrial-scale fisheries today.

However, we have yet to factor in another looming threat



Satellite image of the international fishing fleet in June 2020 © Global Fishing Watch

— climate change. It may be surprising to learn that the greatest impact of climate change is not likely to come from the warming waters around Galápagos impacting marine life directly, but as waters warm faster in other areas, fish populations elsewhere are likely to collapse more rapidly, attracting even more intense fishing activity surrounding the relative sanctuary the GMR.

The Ecuadorian Navy, of course, monitors the annual muster to prevent vessels straying into either Ecuador's EEZ or the protected waters of the GMR. But is a small Ecuadorian navy a fair match for a global giant like China? Much was made of the fact that the Chinese government agreed to implement a moratorium on some of its fishing activities in the Pacific for a few months in autumn 2020. However, their fishing activities are limited in those months in any case, so it is increasingly clear that existing protection measures are simply not sufficient to protect this irreplaceable biodiversity, including the catastrophic number of endangered sharks caught as by-catch.

Although catching sharks deliberately is illegal, if caught as by-catch and landed, it is then legal to keep and sell them. One study found that 85% of shark fins for sale in China and Hong Kong originated from the Eastern Pacific — including Ecuador. There has been a dramatic increase in the use of artificial floating objects to attract fish in recent years, too. These so-called fish aggregating devices (FADs) released outside the GMR will often drift into it and are notorious for hooking sharks. It is thought that more than 250,000 sharks are caught as by-catch in these waters each year, although this figure is likely to be a gross underestimate.

Of course, the impact of industrial-scale fishing is not limited to sharks. The intensity of this extraction threatens many other species. A routine census showed that since the creation of the GMR more than 20 years ago, the populations of 13 out of 28 marine species that were surveyed have all declined,

China has the world's largest distant-water fishing (DWF) fleet, with a recent report putting the figure at almost 17,000 vessels, some 5-8 times larger than previous estimates. In 2016, China's DWF fleet captured around two million tons of fish, around one-quarter of the global DWF catch. Almost 1,000 of these vessels are registered in other countries, 'flags of convenience' that can act as a way to circumvent regulations.

Galápagos Conservancy supports improvements in marine protection around Galápagos. One key proposal is the creation of the **Galápagos-Cocos Swimway**, a protected area of 120,000 km² between Galápagos and Cocos Island off the coast of Costa Rica. The ability to migrate between these two World Heritage Sites is critical to at least five *Endangered* species — Whale Sharks, Leatherback Turtles, Green Turtles, Silky Sharks, and Scalloped Hammerhead Sharks.

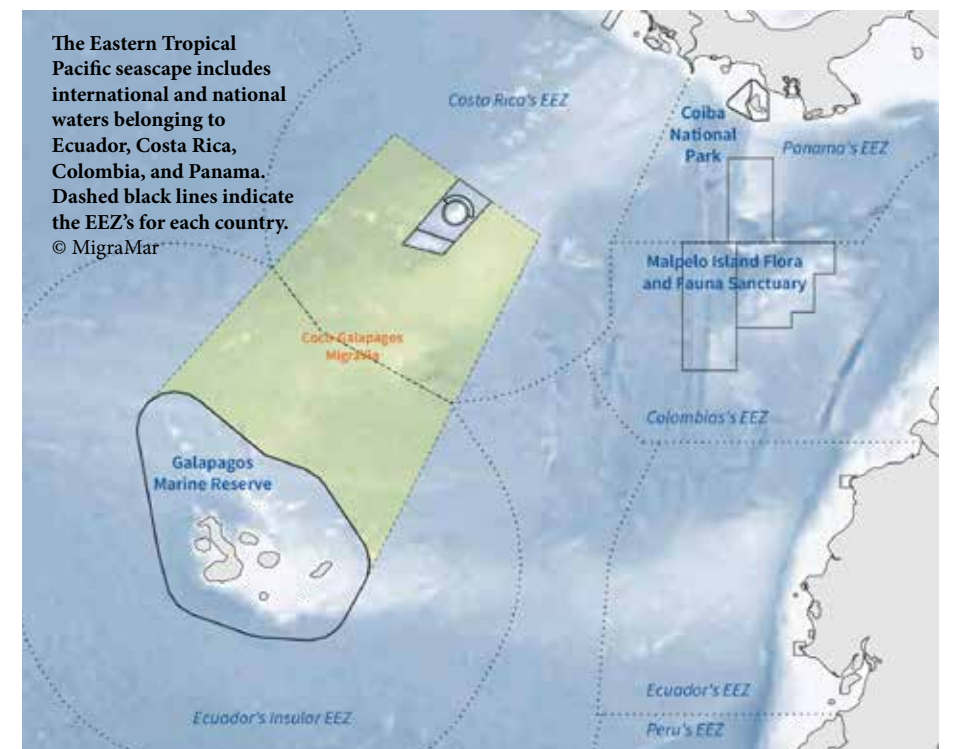


Scalloped Hammerhead Sharks near Darwin Island in the northern end of the Galápagos Marine Reserve. © Cibele Sanches

with the conservation status of just one species — the Olive Ridley Turtle — showing an improvement. The pressure on the GMR has also had knock-on consequences for the livelihoods of artisanal fisheries in Galápagos, not to mention the alarming mass of plastic from FADs and other waste from these floating cities that wash up on the Islands' beaches.

Among many other measures, Ecuador's new Commission is considering the creation of a new marine protected area between Galápagos and Cocos Island in Costa Rica. But such proposals are fraught with local and national tensions between conservation groups, government agencies, and fishers. The Galápagos population and the number of registered fishers has continued to increase since 1998, yet there has been no commensurate increase in the access to new fisheries. The COVID-19 crisis has only made matters worse and there is strong opposition to the expansion of Ecuador's marine protected areas. Longlining experiments are also taking place

The Eastern Tropical Pacific seascape includes international and national waters belonging to Ecuador, Costa Rica, Colombia, and Panama. Dashed black lines indicate the EEZ's for each country. © MigraMar



in the GMR, and the government is beginning to stall on the implementation of the Commission's recommendations.

While Ecuador attempts to find solutions that satisfy political, economic, and environmental concerns, the international community must work harder and faster to offer its support. In 2017, the UN General Assembly began a process to negotiate a new, international and legally binding treaty for the conservation and sustainable development of marine biodiversity in areas beyond national jurisdiction. The fourth and final negotiating session had been due to take place last year but was postponed by the pandemic. Sticking points remain, yet it is vital that when the participants reconvene, as is expected in August this year, that the draft treaty is not watered down. Ratification of an ambitious and robust High Seas Biodiversity Treaty is long overdue and a vital legislative step if we are really serious about the protection of marine biodiversity in places like Galápagos. This could be a massive help to Ecuador in strengthening its hand. But will this address the threat of illegal, unreported and unregulated fishing? Are international tensions likely to increase?

Ecuadorian conservationist Yolanda Kakabadse, and former president of both IUCN and WWF, who was appointed by the President of Ecuador to the Commission, believes international tensions may increase, but above all she feels "China cares about its reputation and there is opportunity for dialogue, particularly on the international stage."

China is due to host the fifteenth meeting of the Conference of the Parties (COP15) to the Convention on Biological Diversity in October. Delegates will agree on a post-2020 global biodiversity framework, with one of its key targets to ensure that the harvesting, trade and use of wild species will be legal and at sustainable levels by 2030. The COP15 platform presents a big opportunity for China to take the lead on the environment in general and marine protection in particular, to repeat the commitments it made last year regarding its distant-water fishing fleet in the Pacific, act on them, and go still further.

Ecuador has often led the way in changing the way the world sees the natural world. In spite of its small size, Ecuador is a biodiversity hotspot, estimated to be home to an astonishing 10% of all species on Earth. In 1978, Galápagos became the world's first ever UNESCO World Heritage Site. When Ecuador created the Galápagos Marine Reserve in 1998, it was one of the largest marine protected areas in the world, second-only to Australia's Great Barrier Reef. In 2008, Ecuador became the first country to recognize rights for nature in its constitution. It is certainly in Ecuador's interests to avoid a repeat of the 20th-century tuna wars with the US, this time with China. It is in all of our interests to help them achieve this: for the protection of Galápagos, for the emergence of truly sustainable fisheries, and for treating the natural world with the respect it deserves and so desperately needs.

AUTHOR

Sharon Johnson

is the CEO of Galapagos Conservation Trust (GCT), Galápagos Conservancy's sister organization in the United Kingdom. Prior to joining GCT in 2015, Sharon had already worked in the non-profit sector for more than 15 years, both in the UK and abroad in places like Borneo, the Seychelles, and Australia.



Without intervention, the impact of industrial fishing is likely to have serious consequences for the environmental and economic security of Galápagos. Galápagos Conservancy is working to support:

- Increased dialogue at the provincial and national level between all stakeholders, including all elements of the fishing industry, to find solutions that protect the survival of all marine life.
- Adoption of more sustainable fishing practices within the Galápagos Marine Reserve. We oppose the experimental longlining currently taking place.
- Support for local and national livelihoods by improving international market access for responsible catch.

and expanded Galápagos Marine Reserve and for the designation of the critically important Galápagos-Cocos Swimway.

- Increased awareness beyond Ecuador of the impacts of industrial fishing around Galápagos.
- Reduction in plastic and other pollution generated by national and international fishing fleets.



At least 250,000 sharks are legally landed as 'by-catch' in Ecuador each year.
© Tracey Jennings

GALÁPAGOS CONSERVANCY
PROJECT UPDATE

RISE TO THE OCCASION
The First Virtual Teacher Institute

by Richard Knab, Galápagos Conservancy's Leader of the Education for Sustainability in Galápagos Program

Slow and unreliable internet connectivity and limited student access to technology posed a daunting challenge for Galápagos educators when COVID-19 required them to teach at a distance.

Fortunately, teachers rose to the occasion and developed creative ways to continue promoting education for sustainability while schools were closed, and teachers and students worked from home. But given the connectivity challenges in the Islands, how could Galápagos Conservancy continue to provide its 50-hour Teacher Institutes without mobilizing its international team of training facilitators for these traditionally in-person events?

This is the question we asked ourselves when Ecuador's Ministry of Education requested that we resume our week-long teacher professional development workshops in January 2021. The answer was to be found in some of the same creative applications of technology and combination of real-time and self-paced strategies employed by Galápagos teachers during the pandemic.

Our first virtual Teacher Institute took place from January 11–15 and involved 419 Galápagos preK-12 educators. The week was designed to strengthen teacher skills related to Project Based Learning (PBL) — a teaching strategy that fosters learning as students carry out real-world projects that are engaging and personally meaningful. The integrating theme for the week was *Climate Change Impacts in Galápagos*. Activities included a combination of real-time instruction (via Zoom and WhatsApp), self-paced learning, and facilitated group planning. We overcame much of the need to connect to the Internet by packaging all training materials (more than 700 files, including videos, PDF documents, PowerPoint presentations, curriculum documents, etc.) on USB memory sticks that were distributed to all teachers prior to the event. Interactive schedules guided teachers through each day. Training facilitators connected with

teachers in real-time by Zoom or WhatsApp every morning for instructions and a quick review of the previous day, and after lunch for facilitated reflections on the morning's activities and group planning sessions. During the week, each teacher developed a multi-week lesson plan focusing on climate change. They began implementing them on the Monday after the Institute.

Teacher surveys and pre- and post-knowledge tests revealed a high level of satisfaction with the format (96%) and content (98%) of the event, as well as an increased understanding of climate change and sustainability concepts. More than 90% of participants reported feeling better prepared to integrate these concepts into their teaching with students.

The Institute demonstrated that it is possible to provide effective teacher training at a distance, despite significant internet issues in Galápagos. In fact, our new "virtual approach" has several advantages over in-person events, since it allows for a significant reduction in the number of trainers and travel required, reducing our costs and ecological footprint.

"Global environmental challenges are impacting communities and populations around the world and require a special level of awareness and responsibility among those living in special protected places like Galápagos. Through the **Education for Sustainability Program**, most Galápagos teachers have come to understand that we represent important voices of nature and sustainability, and we are learning strategies that will ensure generations of young people who understand their unique home and live and act sustainably. Beyond developing new skills, we have also formed a strong community of practice. The professional relationships and friendships formed during the first four years of the program enable us to work with a shared sense of purpose — even when faced with great challenges, such as COVID-19."



Carmen Vivar, High School Language Arts Teacher at Unidad Educativa Miguel Ángel Cazares



GALÁPAGOS CONSERVANCY
♦ PROJECT UPDATE ♦

Magic and Tortoises on ALCEDO VOLCANO

by Washington Tapia, *Director of the Giant Tortoise Restoration Initiative*

Alcedo Volcano is located in the center of Isabela Island, the largest island in the Galápagos Archipelago. It has one of the most spectacular landscapes on the planet, where one can witness both the volcanic activity that gave rise to the islands as well as the ecological and evolutionary processes in full action — such as the opening of pathways created by Giant Tortoises.

Alcedo was once home to a wide variety of species of plants, shrubs, and trees — all of them native or endemic. But this volcano is currently in the process of ecological restoration after introduced feral goats almost brought its ecosystems to collapse. The goats' voracious appetites had led to the destruction of many plant species over several decades, negatively impacting the endemic giant tortoise populations there. Tortoises are herbivorous but do not have the same capacity for movement and reproduction as goats. I personally witnessed how the presence of more than 100,000 goats led to terrible soil erosion and habitat destruction, relegating the once dense and beautiful forests of Alcedo to a kind of semi-desert.

Fortunately, the long-term goals of past steadfast conservation efforts led by the Galápagos National Park Directorate, with the support of Galápagos Conservancy and other organizations and individuals, are now coming to fruition. In 2006, the eradication of goats was achieved, not only on Alcedo Volcano, but on all volcanoes of northern

Isabela Island. This historic conservation effort — known as Project Isabela — was probably the best developed and also the most ambitious ecological restoration project on the planet at the time.

I have a special connection with Alcedo Volcano: in addition to being one of the most beautiful places I know, it is where exactly 24 years ago, in February of 1997, I ascended the 11 miles of the volcano's intricate path to the summit with a 130-pound backpack and dreams of leaving a positive footprint, to start my first day of paid work as a biologist and park ranger. It was also on this volcano that my wife and I learned some of the happiest news of our lives: that our first daughter (now a biologist, too) was on the way.

In January of 2021, with more than two decades of experience and the same desire to do the best job possible, I had the opportunity to return to the volcano — this time with an incredible team of park rangers and volunteers. Our primary goal was to assess the state of the ecosystems and, particularly, of its key species — the iconic Giant Tortoises.

It was a little more than a week of extreme effort, with some days of intense rain and others of strong tropical sun, walking an average of 18 miles a day. But it gives me immense satisfaction to report that Alcedo is recovering its evergreen forests at the summit, the magic of its endemic *Guayabillo* forests at mid-altitude, the mystical dry forests in the lower areas, and the monospecific stands of ferns on the slopes near the summit. We were also able to confirm that the Tree Fern (*Cyathea weatherbyana*) endemic to the humid highlands of Galápagos, and believed to have been extinct at the volcano, is slowly returning. We recorded eight individual Tree Ferns, the majority of them inside two fences that were built to save them from goats many years ago. But I am sure that in a few

"Finding such a large number of tortoises on Alcedo Volcano confirms that the management programs have been successful. The eradication of goats and donkeys in 2006 has allowed the Giant Tortoise population here to flourish. Abundant vegetation was found, which guarantees a permanent source of food for this species."

- Danny Rueda,
Director of the Galápagos National Park Directorate



Tapia observes a Giant Tortoise on the rim of Alcedo Volcano.

years the fern will once again dominate the landscape on the southeastern part of the summit, as it was before the goat invasion.

The most gratifying part of this expedition was to be able to verify that, after the rebounding of the plant communities, the Giant Tortoises have perhaps benefited the most from the eradication of the invasive herbivores. By removing the strong competition for food from the goats, and no longer having their nests trampled or destroyed, the tortoise population has grown significantly — from approximately 6,000 to perhaps more than 15,000 individuals, with a large number of juveniles between 12 and 15 years of age. With the vegetation recovering, it makes sense that the survival rate of juveniles would be higher than when the goats were there. Five thousand tortoises were tagged during this expedition — the sidebar to the right offers a glimpse of the data analyses performed upon return by the research team. I am extremely grateful for the efforts of the entire expedition team and the generosity of Galápagos Conservancy's donors, who helped make all of this possible. ■

GIANT TORTOISE POPULATION ON ALCEDO DEEMED HEALTHIEST IN GALÁPAGOS

The results of the January 2021 expedition to Alcedo Volcano in the northern half of Isabela Island to conduct a census of the Giant Tortoise population there (*Chelonoidis vandenburghi*) exceeded all expectations, with **4,723 individual tortoises** located and marked. The areas of the volcano covered during the expedition were concentrated on the summit and eastern and southern slopes, as well as the interior of the caldera where approximately 90% of the tortoise population is located due to the availability of food.

Washington Tapia, Director of the Giant Tortoise Restoration Initiative for Galápagos Conservancy and leader of the expedition, confirmed that crews marked 1,745 females, 1,794 males, and 1,184 juveniles. Data suggest that this is a healthy population: in nature, a population of such a large size, with many older as well as younger individuals, and where there is one male for each female, is considered a completely viable population. "Although we have much data yet to process, I estimate that the population exceeds 12,000 –15,000 tortoises total in this region," Tapia said.

Performing this type of monitoring work requires extreme physical exertion. Johannes Ramírez, a park ranger who participated in the expedition, explained, "In a single working day, from 5:00 am to 6:00 pm, some groups had to travel up to 18 miles to cover their assigned area and effectively meet the sampling objectives." However, the most surprising finding for the whole team was to see such large numbers of tortoises. "In a single quadrant of about 200 meters, one crew located more than 500 tortoises," he added.

As a result of the management actions implemented by the Galápagos National Park Directorate and its collaborators during the last six decades, the Galápagos Islands are likely home to nearly 60,000 Giant Tortoises across the different species — a number that, according to Tapia, is still low considering that more than 200,000 tortoises were removed from the Archipelago in previous centuries by whalers and pirates.



All photos © Joshua Vela / Giant Tortoise Restoration Initiative

From so **SIMPLE A BEGINNING**

A History of **Galapagos Conservancy**

While I can claim to be a witness to the evolution of said institution, I cannot claim, nor would I, that the experiment known as Galapagos Conservancy was solely a product of my imagination.

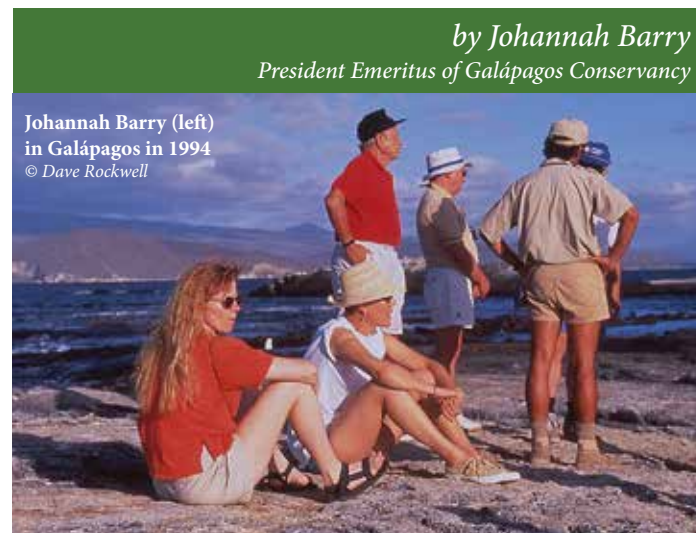
Successful conservation rarely falls within the domain of a single person and Galapagos Conservancy is/was no exception. Timing, luck, tenacity, and a broad array of generous and forgiving friends is the recipe for what became Galapagos Conservancy and I am delighted to have this opportunity to describe the journey. At the same time, I note that the Galapagos world has changed significantly since the days of the early 1990s when I became involved with this extraordinary place. The world discovered these islands during my tenure and, while I believe that visitors to Galapagos are their most ardent supporters, I continue to be concerned that, like our own national parks in the US, Galapagos is being “loved to death.” However, let us start this journey on an optimistic note.

Galapagos conservation has benefited from the engagement of many organizations and individuals who share the common belief that this biodiversity treasure is deserving of the international community’s respect and concern. Certainly, the fact that it was the first natural site to be inscribed on UNESCO’s World Heritage roster in 1978 recognizes its global importance. The language of its inscription describes the Islands as “demonstrating a unique natural spectacle that preserves a remarkable record of wildlife and stages of Earth’s history that cannot be found anywhere else in the world. Likewise, the property also contains outstanding examples of ecological and biological processes in the evolution of ecosystems and habitats for *in-situ* conservation of biological diversity.”

From CDF, Inc. to Galapagos Conservancy

In 1991, I was a development officer with IUCN-US and was hired as a consultant to examine the success of the Smithsonian Institution’s “Friends of Galapagos” grassroots campaign in the US (see *timeline at right*) and the costs of turning it into its own organization outside of the Smithsonian. At the conclusion of my consultancy, I filed an application in April 1992 to form an independent institution in the US authorized to solicit and receive donations on behalf of conservation in the Galapagos Islands. The Charles Darwin Foundation, Inc. (CDF, Inc.) was approved in September, and its first office was established in my own garage in Falls Church, Virginia.

Over the years, however, it proved difficult to share a similar name with the Belgian-based, Charles Darwin Foundation (CDF) for the Galapagos Islands — the organization that oversees the Charles Darwin Research Station in Galapagos.



Instances where the staff or Board of CDF, Inc. would be interviewed by the press, or where the in-house newsletter would carry an article about developments in the Islands, were attributed to the Charles Darwin Foundation in Ecuador.

Further, the very name of Charles Darwin and his association with Galapagos were not well understood by a US audience and CDF, Inc. was often assumed to be a historical society and was the frequent target of evolution skeptics. It was thought that a clean break from the historical name and a name which more easily described the CDF, Inc.’s work was warranted. In 2006, the Board of Directors of CDF, Inc. changed the name of the organization to Galapagos Conservancy and recommitted to the bylaws which reflected the organization’s mission to support science and conservation in the Islands.

Since then, Galapagos Conservancy has continued to support the Charles Darwin Foundation in Ecuador, as well as critical programs carried out by the Galapagos National Park Directorate, the Galapagos Biosecurity Agency, the Ministry of Education, local organizations, and community groups, as well as individual scientists and academic institutions working for the benefit of Galapagos conservation.

In 2012, Galapagos Conservancy initiated two of its own multi-year and multi-institutional programs in the Islands — the Giant Tortoise Restoration Initiative, and the Education for Sustainability program. Each program works collaboratively with the Ecuadorian government. Galapagos Conservancy also launched a third program in 2019 called Vital Signs, which seeks to curate existing data on natural systems (precipitation, water temperature, marine life density, vegetation cover) to make readily available to natural resource users in the Islands.

Since 1986, beginning with its founding years as the Darwin Scientific Foundation (see *timeline*), Galapagos Conservancy has provided more than \$31 million in direct funds to key Galapagos organizations, local Galapagos organizations and civic groups, individual scientists, and academic institutions

carrying out work in the Islands. We have provided core funding to the Galapagos Invasive Species Fund (FIAS) to support an endowed fund which underwrites invasive species mitigation, control, and eradication in the islands.

Galapagos Then and Now

It would indeed be presumptuous to declare that I have the “final word” on the landscape that is Galapagos in the 21st century. I certainly do remember the 1990s when we had “lights out” at 10 pm until 6 am the next morning. Like many Galapagos hands, I can remember Puerto Ayora before there was an actual traffic light and paved roads. Nor can I forget walking home in the dark with nothing but the moon to guide my way (and a flashlight ... I wasn’t quite the Girl Scout). The pandemic reminded me of the strong community and sense of island culture that now exists in Galapagos, certainly not the case decades ago. In the 80s and 90s, Galapagos was a destination where entrepreneurial folks could do well. There wasn’t a sense of community insofar as few people had roots in the Islands. Now, that is not the case. There are generations resident in the Islands, and those generations banded together when the Islands were shut down in 2020. I am humbled by the community spirit that looked out for each other, and the strong and wise intervention by the Ecuadorian government to look after its citizens.

But having said that, and understanding that tourism has opened up again, I am hoping that the sense of awe, which I honestly experience every time I travel to the Islands, is still extant. That despite the fact that one can travel easily to the Islands, one does not forget the extraordinary experience that is Galapagos. This fragile Archipelago, with its other worldly landscapes and creatures found nowhere else, must remain magical and special.

In his pivotal work, *On the Origin of Species by Natural Selection*, Charles Darwin wrote, “There is grandeur in this view of life ... and that, whilst this planet has gone cycling on according to the fixed law of gravity, from so simple a beginning endless forms most beautiful and most wonderful have been and are being evolved.” There is something to be said for the power of a group of people, connected only by their love for a special place, to come together and create meaningful and lasting good. Lasting conservation requires our undivided attention and respect, and I am grateful that so many have joined us to ensure its success. ■



The Evolution of Galapagos Conservancy

1984-87: The Charles Darwin Foundation (CDF) enters into an agreement with the Nature Conservancy (TNC) and the Smithsonian Institution (SI) to raise funds from TNC donors to be held in an endowment. A separate organization was created to hold these funds called the Darwin Scientific Foundation, Inc. (DSF).

1986-1991: The Smithsonian Institution carries out a “Friends of Galapagos” grassroots fundraising campaign for Galapagos conservation.

1991: CDF agrees to duplicate the successful “grassroots” campaign in the US and expand it to Europe to create a coordinated, international program of constituency building, public education, and fundraising called the “Friends of Galapagos” organizations or FOGOs. By 2001, there are ten FOGOs established around the globe, including one in the United States.

1992: The Charles Darwin Foundation, Inc. (CDF, Inc., known as Galapagos Conservancy today) is created as an independent institution in the United States and is authorized to solicit and receive gifts on behalf of conservation in Galapagos. Johannah Barry is hired to lead the organization.

2001: DSF merges into CDF, Inc. to create a single U.S.-based organization with both a robust donor engagement mission and an endowment.

2006: The Board of CDF, Inc. votes to change the name to Galapagos Conservancy to better reflect the mission and work of the organization.

2020: Johannah Barry retires as President of Galapagos Conservancy, having grown the organization from a one-woman shop to a membership organization with more than 12,000 members, two offices, and 11+ staff members. Dr. Paul Salaman takes over the lead as President.

Left: In her last year as President of Galapagos Conservancy, Johannah Barry was honored by the Galapagos National Park by being named an honorary park ranger, in recognition of her decades-long personal commitment to Galapagos conservation. Pictured here with the Park’s Director, Danny Rueda, she was also asked to name the tortoise hatchling in this photo, which she aptly named Hope.



JOHANNAH BARRY was founder and President of

Galapagos Conservancy and advanced the organization’s mission to preserve and protect the Galapagos Islands from 1992 to 2020. Her background includes more than 40 years of institutional advancement and organizational development. In her retirement, she remains forever connected to Galapagos Conservancy as President Emeritus.

AUTHOR

OF RAILS AND DAISIES

Galápagos Rail on
Santiago Island
© Michael Dvorak

by Jaime Chaves, Assistant Professor at the Dept. of Biology, San Francisco State University

I am wearing personal protective equipment from head to toe, like an outfit worn by a scientist working in a radioactive laboratory. But I'm not trying to protect myself so much as to protect the sample I am holding from contamination. The small plastic vial in my gloved hands contains a sample of tissue removed from the toe of a bird collected during the California Academy of Sciences expedition to Galápagos in 1905.

The tiny fragment of dried skin belongs to one of the most elusive land birds in the Archipelago, the endemic Galápagos Rail. The DNA it contains may help unravel the origins of this secretive rarity.

During Charles Darwin's visit to Galápagos in 1835, his first encounter with a rail was in the highlands of Floreana, observing that "this small Water Hen" appeared to be "confined to the damp region." On Santiago, where he had more time to explore, he found these elusive birds "uttering loud & peculiar Crys" from the undergrowth. The captain of HMS Beagle, Robert Fitzroy, collected some specimens from Floreana, which ornithologist John Gould used to work up his formal scientific description of the species in 1841. Yet the rail's secretive behavior, living in some of the most inaccessible parts of the Archipelago, means that its evolutionary origins have remained shrouded in mystery.

The DNA extracted from the clip of dry skin from the California Academy specimen reveals that the ancestors of the Galápagos Rail probably reached the Islands about 1.2

million years ago, at the time when the Archipelago looked very different and Santa Cruz, San Cristóbal, Española, and Floreana were probably the only islands above water. In contrast to Darwin's iconic finches, whose ancestors are thought to have colonized Galápagos at roughly the same time and subsequently evolved into more than a dozen different species, the Galápagos Rails that came to occupy seven different islands appear to have remained as a single species. The reasons why this is the case are not fully understood, but one possibility is that the highland habitats on different islands are relatively similar and the selective pressures on the different rail populations are not too intense.

Although the Galápagos Rail is a species that is out of sight from most residents and visitors, human activity in the Islands has had an indirect impact on these birds. The ground-dwelling, largely flightless lifestyle of the rail means that rats and goats, introduced by humans in the 19th century, posed a significant challenge to rail populations. On many



Ornithologist John Gould's illustration of the Galápagos Rail collected by Captain Robert Fitzroy in 1835.



The largest species in the *Scalesia* radiation, *S. pedunculata*
© Jennifer Linton



The illustration of the *S. incisa* specimen collected by Charles Darwin in 1835.

islands, goats stripped away the dense, moist vegetation and bracken associated with rail habitat, resulting in the extinction of these birds from Pinta in the 1970s and probably also Floreana in the 1980s, and causing rail numbers to plummet on other islands, like Santiago. Fortunately, the successful eradication of goats from several islands means that rail numbers have bounced back. DNA samples taken from the five surviving island populations, however, reveal that they are characterized by a low genetic diversity so could be vulnerable to inbreeding or disease. We are working on sampling more museum specimens, including the ones collected by Fitzroy in 1835, which will give us a better idea of the genetic diversity back then and therefore how much of this has been lost.

Alongside our work on the Galápagos Rail, we are using similar genetic techniques to get to the bottom of yet another puzzle linked to specimens collected by Darwin from Galápagos: the dramatic radiation of the *Scalesia*, the giant daisy trees that are the botanical equivalent of Darwin's Finches. Within the endemic *Scalesia* genus, these plants come in a wide range of shapes and sizes, from small bushes attached to arid cliffs to 20-meter-tall tree-like forms thriving in the wet highlands. But exactly when these species originated and how such diversity came about are questions that have been raised time and again.

In an effort to come up with answers, my colleagues and I have used DNA from all 15 *Scalesia* species known to science to reconstruct the evolutionary history of these plants. This so-called molecular phylogeny leads us to conclude that the ancestors of *Scalesia* first reached the Archipelago about 3 million years ago, but that most of the subsequent speciation occurred relatively recently, within the last 1 million years. In geological terms, this is a rapid radiation, with similar adaptations emerging repeatedly on different islands.

This process, known as convergent evolution, suggests that similar ecological opportunities on different islands helped select for similar characteristics, such as shrub-like forms on the arid lowlands and tree-like forms in the dripping highlands. This is a little like being given a math problem and finding several different solutions that all arrive at the same answer. We hope that this new *Scalesia* phylogeny will allow the exploration of unanswered questions — old and new — about the evolution of this remarkable genus.

In these and countless other projects taking place around the world, genetics continue to advance our understanding of the evolution by natural selection as proposed by Darwin in *On the Origin of Species*. Genetic information is also useful for guiding us towards conservation measures that will improve the management of unique and rare species. Our rail research, for example, will identify which populations are more susceptible to extinction and individuals that could be

"*Scalesia* ... are the botanical equivalent of Darwin's Finches."

used to reintroduce rails to Floreana. In the case of *Scalesia*, some species are threatened with extinction, with very few plants surviving in very remote areas. It is crucial that we find ways to maximize the genetic diversity that we still have, protecting these unique species that were brought to light for the first time by Darwin himself.

You can read the full Galápagos Rail research article here: go.galapagos.org/Bnyr9d and the *Scalesia* research article here: go.galapagos.org/hdqVUK ■

AUTHOR

Jaime A. Chaves was born in Ecuador and is Assistant Professor at the Department of Biology at San Francisco State University. Most of his work explores the evolution and adaption of species on the Galápagos Islands by using a combination of fieldwork, genetic techniques, and bioinformatic analyses.



Galápagos Rail on Santa Cruz Island
© Michael Dvorak



RESTORING FLOREANA

Floreana Island used to be home to some of the most iconic species in the Archipelago, such as the Galápagos Giant Tortoise and the Floreana Mockingbird. Around 150 years ago, however, the first human settlers arrived on the island bringing with them invasive species such as rats and cats. Since then, its magnificent wildlife has come under threat, with 12 species now locally extinct — including the Galápagos Rail — and 55 species under threat, including some *Scalesia* species such as the *Vulnerable Scalesia villosa* which is found only on this island and nearby islets.

Galápagos Conservancy partners with Island Conservation and the Galápagos National Park in their efforts to restore Floreana back to its former ecological glory, by eradicating invasive mammals, which will benefit native flora and fauna. The long-term goal is to reintroduce locally

extinct species such as the Galápagos Rail and Giant Tortoises.

The eradication phase of the Floreana Restoration Project, involving baiting to remove rodents, was due to occur in 2021, but COVID-19 led to the suspension of fieldwork in 2020. It was also necessary to divert some of the project's funding to cover pandemic-related issues, so the eradication event has now been postponed until 2023. The revised timeframe should allow the team to deploy emerging drone technology to deliver bait more accurately and cheaply than existing methods using helicopters. While delays like this are frustrating, they do allow us to take advantage of emerging research, such as that by Jaime Chaves and his colleagues, which allow us to better understand the species that we are protecting from extinction.



Galápagos Conservancy
galapagos.org

NEWS & VIEWS

NASA & Galápagos Conservancy Partner on Rewilding Galápagos

The Galápagos Islands have been the focus of perhaps the largest-scale “rewilding” program ever attempted on Earth. Largely thanks to the work of the Galápagos National Park Directorate and Galápagos Conservancy, more than 10,000 captive-bred Galápagos Giant Tortoises of multiple species have been released to the wild, helping to reverse the decimation of populations caused by centuries of exploitation. Still, current populations are just 10% of their original size and occupy only 35% of available habitats.

NASA’s Applied Science Ecological Forecasting program will be providing \$750,000 in funding to Galápagos Conservancy and the State University of New York College of Environmental Science and Forestry (SUNY-ESF) to develop integrated technological tools to guide future decision-making by the Galápagos National Park Directorate in its efforts to inform the “when and where” of rewilding Giant Tortoises throughout the Archipelago. Decision-making tools will be based on factors including expected future climatic conditions, probability of population establishment, ecosystem status, biodiversity enhancement, economic outcomes, and operational costs.

Forecasts for temperature and precipitation in the coming century fall outside the ranges ever observed in the Islands, so the effects of climate change will have significant consequences for Giant Tortoises. To account for those changes, the tools developed will integrate satellite-derived data on land vegetation cover, land surface temperature, and precipitation, in addition to more than 2 million field observations on tortoise distribution, data from camera traps, photography from tourists on social media, and economic forecasts on rewilding costs and income from tourists. Data from these tools will promote efficient decision-making that incorporates both ecological and social dimensions, facilitate communication between key stakeholders and the public about tortoise restoration, and provide a framework for transparency and consensus decision-making, a key component of Ecuador’s National Biodiversity Strategy and Action Plan.

Efforts to rewild Galápagos are accelerating with the NASA-Galápagos Conservancy-SUNY-ESF partnership, the recently announced \$43 million investment led by Leonardo DiCaprio, and the ongoing work of the Giant Tortoise Restoration Initiative. Galápagos Conservancy is thrilled to be a leader in these efforts, and we are grateful to NASA and SUNY-ESF for joining us at this pivotal moment. ■

GIVE & ADOPT!

Symbolic Animal Adoption Kits

We offer symbolic adoptions for \$50 and \$100 for Giant Tortoises, Blue-footed Boobies, Sea Lions, and Marine Iguanas. A great gift for a budding conservationist!

Gift Memberships and Honor & Remembrance Gifts

Honor your loved ones by supporting important conservation efforts in Galápagos! Gift levels start at \$30. Recipients will receive a beautiful card informing them of your gift, which you can personalize with a special message.



galapagos.org/shop

Galápagos Conservancy Awarded 4-Star Rating!

In April, the largest and most-utilized evaluator of charities, **Charity Navigator**, awarded



Galápagos Conservancy their top 4-star rating. “This is our highest possible rating and indicates that your organization adheres to sector best practices and executes its mission in a financially efficient way,” said Michael Thatcher, Charity Navigator’s President and CEO. “Attaining a 4-star rating verifies that Galápagos Conservancy exceeds industry standards and outperforms most charities in their area of work. This exceptional designation from Charity Navigator sets Galápagos Conservancy apart from its peers and demonstrates to the public its trustworthiness.”

Sponge-naming raises \$20,000+

We would like to celebrate Ken and Diane Saladin, our long term supporters, who not only participated in our first ever charity auction to name three new-to-science sea sponge species discovered in Galápagos, but won the rights to name all three. Ken and Diane chose to name two in honor of Galápagos Conservancy founder and President Emeritus Johannah Barry and Galápagos Conservancy Liaison Roslyn Cameron, and the third will bear their own family name. The \$20,250 raised from the auction will go directly towards conservation efforts to protect the Galápagos Marine Reserve in which these rare sponges can be found. We are grateful to Dr. Cleve Hickman, Professor Emeritus of Biology at Washington & Lee University, for providing this opportunity to leave a lasting legacy for a great cause in the Islands!



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*THANK YOU for helping us preserve, protect,
and restore the Galápagos Islands!*



The expedition team just before heading to Española Island in June 2021.
© GTRI/Galápagos Conservancy

GOOD LUCK to this intrepid team of rangers and scientists! As this issue goes to print, they are headed to Española Island to conduct comprehensive surveys of the albatross and tortoise populations there. **Results of the expedition will appear in our next *Galápagos Post* issue!**