Fundación
Charles Darwin
Foundation
GALAPAGOS

Annual Report 2017
2018 Preview

"The love for all living creatures
is the most noble attribute of man."

Charles Darwin.

CONTENT

This annual report was produced by the Communications team at the Charles Darwin Foundation.

We would like to thank the entire staff of the Charles Darwin Foundation for providing us with information and suggestions.

General Direction:
Paola Díaz Freire

Editorial Committee:
María José Barragán Paladines
Edgardo Civallero
Paola Díaz Freire
Isabel Grijalva Arroyo
Arturo Izurieta Valery
Diego Núñez Flores
Julio Rodríguez Stimson
Daniel Unda García

Editing, Production and Coordination of Contents:
Isabel Grijalva Arroyo

English Translation:
Sam DuBois
Daniel Tompkins

Editing:
María José Barragán Paladines
Paola Díaz Freire
Isabel Grijalva Arroyo

Art Direction:
Daniel Unda García

Graphic Design / Layout:
Daniel Unda García

Ilustrations:
Daniel Tompkins
DUNDA

Cover Photograph:
Joshua Vela Fonseca

Back Cover Photograph:
Sofía Green

© Carrie Bristow / Falmouth University

Our thanks to the Ecuadorian Government, to Ecuador's Ministry of Environment, to the Galapagos National Park Directorate, the Galapagos Bio-security Agency, the Governing Council of the Special Regime for Galapagos, all individual and institutional collaborators, our staff, our volunteers and our generous donors for supporting our work in Galapagos over these 59 years.

© Joshua Vela / CDF

MISSION

The mission of the Charles Darwin Foundation and its Research Station is to provide knowledge and assistance through scientific research and complementary action to ensure the conservation of the environment and biodiversity in the Galapagos Archipelago.

VISION

The vision of the Charles Darwin Foundation and its Research Station is to contribute to a sustainable Galapagos by providing breakthrough research which informs conservation actions and inspires humanity to conserve this extraordinary Archipelago and our planet as a whole.


© Joshua Vela / CDF

EXECUTIVE SUMMARY

This annual report provides an overview of all projects implemented by the Charles Darwin Foundation in Galapagos during 2017 and offers a preview of our activities through mid-2018. Our work carries on thanks to the support of our staff and volunteers, the Galapagos National Park Directorate, other foundations, other civil-society organizations and generous donors, who believe in our work. In 2017, we enhanced our capacity for fundraising, scientific production, and our worldwide communication channels by launching our new website. The Board of Directors continues to play a proactive role, hugely supporting the fundraising efforts, and following up on the implementation of our CDF 2016-2019 strategy. Our deepest thanks for the backing and political commitment of all governmental institutions for our work.

This document summarizes, clearly and dynamically, information generated by research projects in Galapagos. All of these projects are implemented with the backing and authorization of our most important partner, the Galapagos National Park Directorate. We also collaborate with other national and international research, conservation and academic organizations. This report also includes summaries of the work by our administrative, financial, fundraising, operations, human resources, and information technology areas. Our donors, staff and collaborators are recognized in each section. Our research efforts are organized into three main categories: marine and land environments and ecosystem restoration. The annual report also has sections on: promotion, communications and extension activities, knowledge management, infrastructure, inspiring stories, a visit to the Research Station, financial reporting, our donors, inter-institutional alliances, agreements, publications, scientific lectures, organizational chart, members of our General Assembly, members of our team, collaborating scientists, volunteers and scholarship grant students. Each project and section specifies the persons participating, starting with the Principal Investigator (PI) or Coordinator and then their team members and volunteers in alphabetical order.

During 2017 and up to mid-2018, we have studied marine ecosystems, including green turtles, and the threats they face, analyzed samples taken from seamounts to study this ecosystem's biodiversity, and continued studying the status of the flamingo population. We have also marked four new hammerhead sharks and seven tiger sharks, using satellite and acoustic transmitters, to understand their migration patterns and the degree to which they are protected in the Marine Reserve. We have developed a monitoring program to assess the threat posed by plastic marine debris for species in Galapagos. We have continued with the project to restore the Los Gemelos ecosystem and the Scalesia forests on Santa Cruz Island. Using Google Earth, as a low-cost alternative, we have delimited mangrove ecosystems and beaches.

In early 2018, we have continued studying the causes of the vermilion flycatcher's population decline, and worked to recover the small mangrove finch populations on Isabela Island. Our efforts have continued to study the Philornis downsi fly and find solutions to lessen its impact on the landbird population. The Giant Tortoise Movement Program, which is part of a collaboration between several institutions, and works with the Darwin Foundation, conducted a pilot study on Santa Cruz Island, sampling a total of 30 tortoises in agricultural zones, peri-urban areas and the National Park.

We published, jointly with WWF-Ecuador, the first Atlas of Galapagos, native and invasive species, after two years of compiling information. We are working on publishing the first inventory of deep-water invertebrates by Phylum. We have opened the new "Marine World" display at the Van Straelen Interpretation Center and in early 2018 we launched our new website. Our work continues to implement our new DataZone. We face many challenges and execute many projects in Galapagos. If you want more details, after reviewing this document, we would be pleased to hear from you, by email: cdrs@fcdarwin.org.ec

LETTER FROM OUR PRESIDENT

Dear Friends of the Charles Darwin Foundation,

Im honored to introduce the annual report of the Charles Darwin Foundation (CDF) before the 60th year anniversary of this remarkable institution coming up in 2019. Out of coincidence, it is also my own 60th anniversary, which made me aware of the startling fact that most of the stakeholders in preserving Galapagos do not know Galapagos without a Charles Darwin Foundation. To most of us, it is incomprehensible to imagine the Galapagos absent a CDF, the organization that has taken the lead in scientific research in support of conserving those remarkable islands and the sea that surrounds them. Just as the islands themselves are fragile, we cannot think of the CDF as a permanent entity, but one that had an origin by the foresight of visionaries, and one that needs to change and adapt due to pressures beyond its control.

As you will see from this annual report, the research of the CDF continues to evolve. One thing that does not change is the tireless work of the scientists and the rest of the staff toward preserving Galapagos. They do the hard work that is making the difference in saving the native ecosystems, restoring ecosystems that have been historically upset by humans, and doing all of this while working for the interests of the human population in the islands. The main challenge has been, and is always likely to be, minimizing the impact of introduced organisms. Although the Galapagos is in constant change due to humans, we cannot lose sight of the fact that it is the best-preserved tropical archipelago in the world.

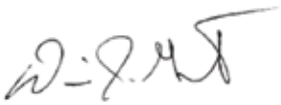
The Charles Darwin Foundation, and the entire Galapagos community, lost one of its greatest champions in 2018, Felipe Cruz, who was also a personal friend. I ask that everyone who is devoted to Galapagos conservation think of Felipe, how hard he worked for his home, and use that to guide your own efforts.

The Board membership was constant this year, a rarity. We achieved one of the main goals of the Strategic Plan the Board developed two years ago: to achieve a dedicated in-house fundraising team.

The second priority of the strategic plan was to strengthen the science program at the Station, and we worked with staff to help form a vision for upcoming scientific challenges and to prioritize them. One of the outcomes was the publication of an important paper that includes several of CDF's partners: "A collaboratively derived environmental research agenda for Galápagos", published in Pacific Conservation Biology.

In contrast to the stability the Board has maintained in 2018, there will be changes coming soon. After 10 years on the board and 7 years as President, I will be retiring after the annual meeting in November. Serving as a volunteer for the Darwin Foundation has been one of the most richly rewarding experiences of my life, and I will continue to devote myself to the organization in different ways. The amount I have learned from my colleagues on the Board and the staff of the Darwin Station is immeasurable, and I will value this experience for the rest of my life.

Cordially,



Dennis Geist
President

LETTER FROM THE EXECUTIVE DIRECTOR

Dear friends,

I am pleased to bring you our report on the actions and work for 2017 and the preview of 2018. Undoubtedly, with the efforts of all those who comprise the Charles Darwin Foundation, its members, the Board of Directors, and those of us who implement the field actions with which we are entrusted, what we have achieved has been largely thanks to our generous donors.

2017 has laid the institutional groundwork for accomplishing the commitment made with the Ecuadorian Government through 2041. The three axes identified in the 2015-2018 strategic capacity-building plan – science, infrastructure (physical and human capital), and financial sustainability – have made considerable headway, and I am satisfied that we have achieved what we proposed. However, there is always more we can do and improve, and that is the direction we are headed.

The science axes has acquired strong leadership and renewed energy by adding Dr. María José Barragán-P. as our Science Director at the Charles Darwin Research Station since early 2018. Scientific operational infrastructure and support have grown efficiently and decidedly, raising the quality, safety, and complementary interaction among the services required by such demanding, multi-disciplinary, multicultural activity. Financial sustainability is increasing by clearly identifying priorities for investment and a strategic fundraising approach, which we reinforced in 2017 and are reaping the benefits of in 2018, particularly in preparation of the end of support from one of our greatest donors, The Leona M. and Harry B. Helmsley Charitable Trust.

Threats to the Galapagos continue to grow faster than the actions we execute on various fronts at CDF, in collaboration with strategic national and international partners. Science, despite its contributions to conservation and sustainability in Galapagos, still faces difficulties in being identified as an investment in conserving the natural heritage underpinning all productive activity in the islands. The change in the National Government has significantly refreshed channels of communication with the State entities we work with, but much remains to be achieved so science can receive not only funding, but backing for the actions to pursue research with the required vigor.

I must share, with deep sadness, the passing of our first Galapagos native who reached the highest role in conserving the islands where he was born. Felipe Cruz-Bedón deserves our undying recognition for everything he taught us, and left for us to care for the Galapagos Islands. From wherever you are, we commit ourselves to continue with your exemplary force and passion for the future of the island's biodiversity and those of us who live in this paradise.

I am sure that, as 2018 draws to a close and we look toward completing 60 years of institutional life in 2019, we will continue consolidating efforts to enable Ecuador to make the best decisions for the future of this jewel of the world, so fragile, iconic, and exceptional.

As always, with optimism and profound gratitude to you all,

Dr. Arturo Izurieta-Valery
Executive Director

NATIONAL ASSEMBLY OF ECUADOR AND CDF

On August 22nd 2017, the Ecuadorian National Assembly approved the Agreement with CDF. The Ecuadorian National Assembly representatives approved our work, and agreed that we provide support to the islands´s conservation and the development of science.

From 120 Assembly members:

- 113 Assembly members voted yes
- 5 abstained
- 2 voted no

This vote is extremely valuable to the continuity of our work in Galapagos and relevant to the operation of the Charles Darwin Research Station.

IMPLEMENTATION OF THE AGREEMENT AS NGO IN ECUADOR

Throughout 2017 and the first semester of 2018, two meetings of the Activities Coordination Board of CDRS were held. Here, significant progress regarding the implementation of the Agreement was reported: the presentation of initial drafts of a Research Policy for the CDRS, the approval of the Annual Research Operational Plans, and the continued registration of researchers in SENESCYT. In October 2018, the first meeting of the Scientific Advisory Committee is expected to convene.

One of the main commitments of the Agreement with the Ecuadorian Government was the signing of the Basic Operating Agreement as a Non-Governmental Organization in the country, which was signed in March 2017 and sent to the Ministry of Foreign Affairs. Despite the predisposition of government entities linked to the Agreement with the Ecuadorian State and the Basic Operating Agreement, we hope to strengthen the support of Government institutions for a streamlined operation of the Charles Darwin Research Station in Galapagos.

Felipe Cruz-Bedón's Legacy for the Galapagos

We will always remember our fellow co-worker and friend of so many years, Felipe Cruz-Bedón. He was born on Floreana Island (22 April 1958) and died in Chile this August 9th.

Felipe worked for our institution for 32 years, and contributed considerably to numerous conservation efforts in the Galapagos Islands through other institutions such as the Galapagos National Park Directorate. Unquestionably, his leadership and passion for the islands will never fade, for this reason, we have decided to create the Felipe Cruz Bedón Training Fund for Galapagos National Park Rangers and Biosecurity Agency technicians, part of the Education component of the Ecoventura and CDF Fund-Galapagos Biodiversity and Education for Sustainability Fund (GBESF).

Among Felipe's long list of contributions to science, we have his study of the dark-rumped petrel *(Pterodroma phaeopygia)* on Floreana, the eradication of goats from Galapagos with the Isabela Project, which completely removed pigs and goats from San Salvador Island, and reduced the goat population on Isabela from 100,000 to under 60.

Felipe Cruz was Assistant Executive Director of the Charles Darwin Research Station. During his administration, jointly with the Galapagos National Park Directorate, he managed the program to breed mangrove finches in captivity, a species of which fewer than 100 individuals remain.

Felipe's passion and professionalism are examples to live by for us at the Charles Darwin Foundation, and we will always remember him as our brilliant ambassador.

SCIENCE IN THE 21ST CENTURY

For 59 years, the Charles Darwin Foundation has been conducting research in and for Galapagos, posing questions, and finding answers to numerous issues that have driven scientific development. Nevertheless, some questions remain unanswered. When the first Europeans reached this Archipelago in 1535, this marked a starting-point in the Islands' history and, consequently, in the images created and re-created about Galapagos.

Many of those images and the meanings associated with them, especially those regarding science in Galapagos, remain to this day. Although varied, diverse changes have occurred in the Archipelago. After Charles Darwin's visit in 1856, in the late 19th and early 20th centuries, Western science, inspired by its positivist tradition, which has prevailed until recently, pursued that direction and a specific geopolitical agenda.

During these early explorations of Galapagos, both discovery and curiosity paved the way for developing science interested in natural objects. Then, in the 1960s and 1970s, after the devastation caused by World War II, western-world society and scientists, eager to go beyond a season of constraints and scarcity, were motivated to resume their research agendas. So, explorers and scientists came to Galapagos with interest in discovering the unknown, 'conquering' wildness, and collecting and cataloging everything new in these remote islands. In the 1980s and 1990s, scientific interest focused mainly on the so-called 'hot-spots' of biological diversity, and on priority zones for conservation. During this period, protected areas were created to restrict use and limit user access. During those years, the paradigm of 'sustainability' prevailed and research began to focus on conservation 'without communities' as an action strategy.

Finally, in the 2000s-2010s, research formats integrated, for the first time, a holistic direction, including Galapagos' natural and social dimensions, and granting them an equitable value, to better grasp problems affecting the Archipelago. Since then, science has been integrating multiple traditional disciplines and methodologies, all as a more coherent mechanism to understand and mitigate the challenges that the Archipelago is facing.

In 2015, the Sustainable Development Goals (SDGs) invited world leaders to reformulate the notion of sustainability, as the 'pathway' to follow and not precisely the 'destination' to reach. These last few years have perceived the need to change and adapt research paradigms toward sustainability, in their shifts and evolution since the outset, moving toward a comprehensive approach of 'conservation and sustainability', integrating human communities into the equation.

The dimension of 'sustainable development' came in strongly, along with the urgent need to "change or perish".

In 2018, we have challenges to face, urgencies to address and priorities to achieve. We are at a crossroads, which obliges us to choose which development model we want for Galapagos. Do we want the model of endless accumulation and growth? Or could it be a better-balanced format of adapting to limiting conditions and sustainable practices that minimize the human footprint in the Archipelago? These questions are pending, and can predict that finding answers will not be easy.

However, we are certain that the research conceived, planned and conducted by the Charles Darwin Research Station must necessarily consider – with the same intense interest – both natural and societal systems in Galapagos' socio-ecosystem. Only by weighing equally these two factors of the equation will we achieve the sustainability we long for in Galapagos, and the wellbeing of its human population.

Dr. María José Barragán
Science Director

In 2015, Resolution 70/1 issued by the General Assembly of the United Nations established the “Agenda 2030”. Within this framework, seventeen strategic objectives (i.e., Sustainable Development Goals, SDGs) were negotiated and adopted as a global initiative to achieve the sustainability of the planet. All this, inspired by the slogan “Transforming our worl d: The Sustainable Development Agenda 2030”.

As a result of the adoption of the SDGs, each of the signatory states of the United Nations has committed to accept and make viable the fulfillment of these objectives, until the year 2030. For this reason, the political agendas at world level, the civil society discourses and market practices, in many nations, tend to promote integration and make visible their alignment with the SDGs.

In this context, since its inception in 1959, the Charles Darwin Foundation for the Galapagos Islands (CDF) has played an important role in generating knowledge about the natural attributes of the Galapagos. However, the complexity and urgency of the challenges that we currently face in the archipelago and on a global scale, need a holistic approach, to understand the limitations that limit our work, and to identify the alternatives that bring us closer to sustainable development. In this manner, and aligned with the two regulatory frameworks within which the CDF develops its scientific work (i.e., the Agreement with the Ecuadorian State and the Management Plan for the Galapagos Protected Areas), CDF’s research projects, they are conceived, developed and managed, totally or partially aligned with these mandates, and with one or more of the SDGs.

This shows that the research and science generated within the CDF projects have high relevance and great involvement at the local, national and global levels. The knowledge generated in our research is undoubtedly a way to better understand and guide our policies and our practices, to achieve the long-awaited sustainability, before 2030.

INSTITUTIONAL ACHIEVEMENTS

1959

The Charles Darwin Foundation for the Galapagos Islands (CDF) was created, and the Galapagos National Park (GNP) was established.

1964

The Charles Darwin Research Station (CDRS) was inaugurated in Puerto Ayora, Santa Cruz Island.
25 year Agreement with the Govenment of Ecuador is signed.

1965

The Program to Breed in Captivity and Repatriate Giant Tortoises began on Santa Cruz Island.

1966

The first Education for Conservation of the Galapagos Islands Program began.

1971

Along with the GNPD, the CDF discovered Lonesome George, the last known survivor of the giant tortoises from Pinta *(Chelonoidis abingdonii).*

1986

Galapagos Marine Resources Reserve (GMRR) was established and the First Operational Plan of the CDRS was produced.

1989

Multiple Use Building of the CDRS is opened in San Cristobal.
Renewal of 25 year Agreement with the Government of Ecuador.

1992

The Management Plan of the GMRR was approved and the CDRS Master Plan was launched.

1995

The CDF rediscovered the Margarita tree *(Scalesia atractyloides)* and the Floreana Lino *(Linum cratericola),* believed to be extinct, in collaboration with the GNPD.

1997

The Isabela Project began – The world's largest eradication and restoration project – focusing on eliminating goats and pigs from northern Isabela and on Santiago and Pinta Islands.

2010

Knowledge Management information repository project starts.

2012

The CDF launched the DataZone virtual platform. That same year, efforts began to discover and evaluate mechanisms to control the *Philornis downsi* invasive fly.

2014

The first Mangrove Finch was born in the CDRS as part of the "Early Raising in Captivity" Program for endangered species.

2016

CDF scientific research supported the declaration of the Darwin and Wolf Marine Sanctuary. The Charles Darwin Exhibition Hall was inaugurated.

2017

Ecuador's National Assembly approved the cooperation agreement between the CDF and the Ecuadorian Government.

1972

The CDF Scholarships and Volunteers Program began for Ecuadorian students.

1973

Galapagos National Park Management Plan with technical advice from CDF

1976

Along with the GNPD, the CDF undertook the Land Iguanas Breeding and Repatriation Program.

1978

First annual report launched and opening of Van Straelen building.

1982

Conservation Program in Floreana for the Pata Pegada (*Pterodroma phaeopygia) starts.*

1998

With the approval of the Special Law for Galapagos (LOREG) the Galapagos Marine Reserve (GMR) was created.

2000

The data base for the natural history collections and the Land Invertebrates Collection was created. The Galapagos Quarantine and Inspection Program (SICGAL) began, to prevent the introduction of invasive species into the Archipelago.

2002

After several years of studies about potential biological controls, the Australian ladybug (*Rodolia cardinalis)* was released to control invasive aphids *(Icerya purchasi).*

2007

The Charles Darwin Foundation issued the report, 'Galapagos at Risk'.

2009

50th anniversary CDF.

2018

"Marine World" was inaugurated at the Van Straelen Interpretation Center. We launched the first Atlas of Galapagos, co-authored by CDF and WWF.

fundación
Charles Darwin
foundation

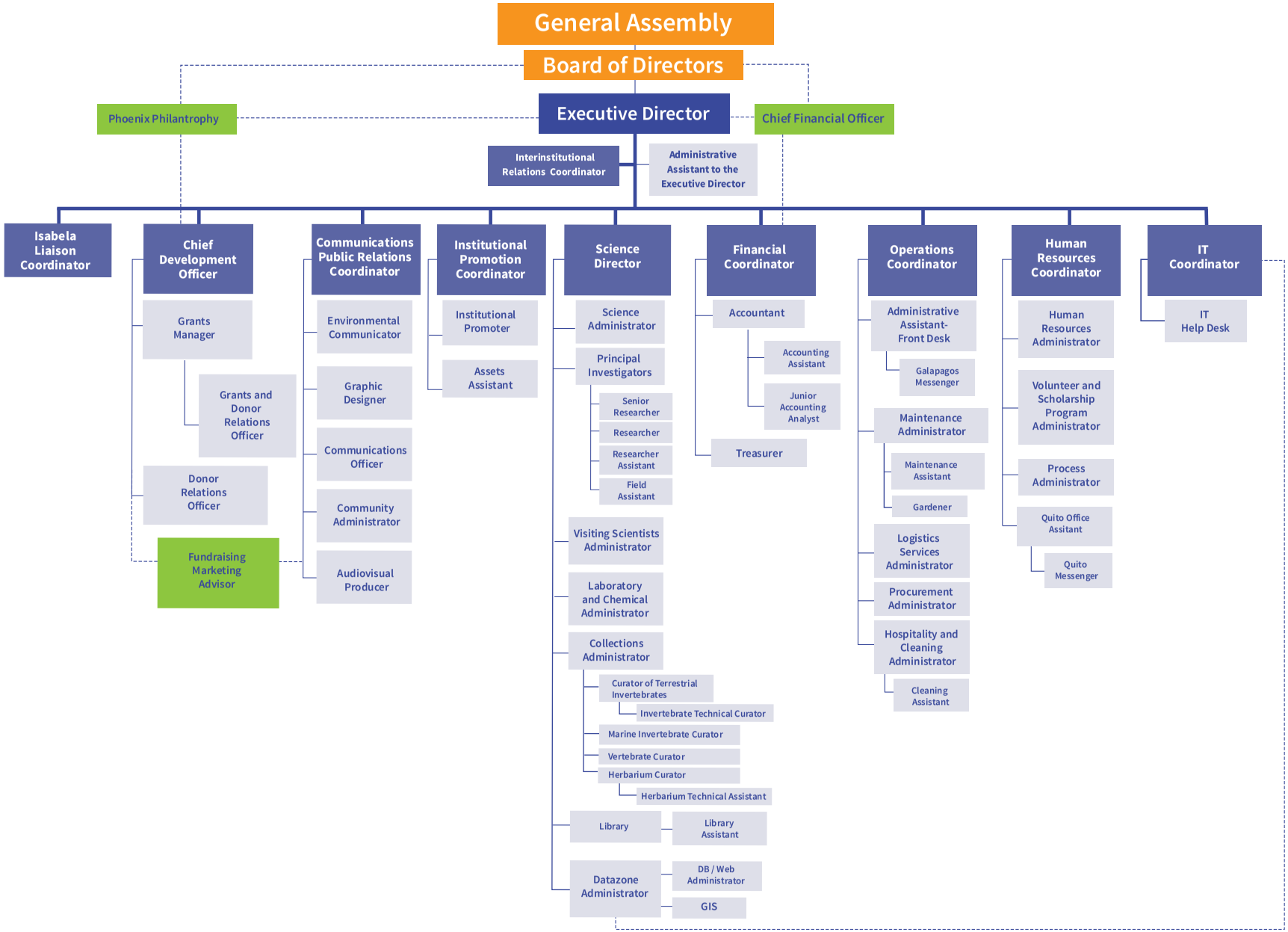
GALÁPAGOS – ECUADOR

2019

60th Anniversary of the Charles Darwin Foundation's creation in 1959.

Fundación Charles Darwin Foundation GALAPAGOS

ORGANIZATIONAL CHART 2017 to june 2018



GENERAL ASSEMBLY

The General Assembly is the governing body of the Charles Darwin Foundation and participates in electing the Board of Directors, establishing policies, issuing norms and final approval of the Foundation's Operating Plan and budget.

Board of Directors

The Board is the CDF's administrative body. Board members are elected for a 6-year term and may be reelected once. Except for the Ecuadorian Government's representative, Board members will be elected on a staggered basis, to renew the Board while ensuring continuity. The Board of Directors meets at least four times a year; two of these regular meetings are physical gatherings, and additional special meetings can be summoned when deemed necessary.

- Dennis Geist - **President**
- Hans van Poelvoorde - **Vice President**

- Paul Baker
- Alfredo Carrasco V.
- Mireya Muñoz
- Darrel Schoeling
- Ronnie Stewart
- William Sutherland

Chief Financial Officer: Phil van Haarlem

Institutional Governing Members

Jorge Carrión Tacuri	Galapagos National Park Directorate
Jorge Ellis	UNESCO
Tarsicio Granizo	Ministry of the Environment
Sharon Johnson	Galapagos Conservation Trust
Presidente Lenín Moreno	Presidency of the Republic of Ecuador
Lorena Tapia	Government Council of the Galápagos Special Regime
José Valencia	Ministry of Foreign Affairs and Human Mobility

Individual Governing Members

Naeem Ahmad
Rodrigo Bustamante
Monica Calvopiña
Juan Manuel Carrión
Desiree Cruz Reyna
Lynn Fowler
Herbert Frei
Oscar Gordillo
Paquita Hoeck
Macarena Iturralde
Michael Jackson
Matthew James
Andrew Laurie
Ivan Kruger Loor
John Loudon
Luis Maldonado Robles
Cynthia Manning
Inés Manzano
Conley Mc Mullen
Godfrey Merlen
Marc Patry
Paula Tagle
Robert Tindle
Ma. Verónica Toral Granda
Alan Tye
Barbara West

Honorary Members

Rodrigo Borja Cevallos
Irenaeus Eibl-Eibesfeldt
Juan Flaim
Peter Grant
Rosemary Grant
Henri The Grand Duke of Luxembourg
Cleveland Hickman Jr.
Hendrik Hoeck
Oswaldo Hurtado Larrea
Syuzo Itow
Randal Keynes
Peter Kramer
Katherine Coolidge Lastavica
Sven-Olof Lindblad
Craig MacFarland
Ans Thurkow-Hartmans
Tjitte de Vries

Individual Active Members

David Anderson
Laura Arcos
Alfredo Arévalo Tello
Ma. Eulalia Arízaga del Balfour
Carlos Andrés Baca
Leon Baert
Oswaldo Báez
David Balfour
Bernardo Beate
Robert Bensted-Smith
Luis Calvopiña
Susana Cárdenas Díaz
Linda Cayot
Keith Christian
Segundo Coello
Guy Coppois
Eliecer Cruz
Felipe Cruz
Sarah Darwin
Judy Diamond
Samuel DuBois
Tui de Roy
Eugenia del Pino
Fernando Espinoza
Joseph P. Flanagan
Emma Flor de Tejada
Tom Fritts
Dolores Gangotena de Diez
James Gibbs
Jack Stein Grove
Elena Gualancañay Pacheco
Patricia Guerra
Gaston Guex
Minard (Pete) Hall
Ole Hamann
Sylvia Harcourt-Carrasco
Burr Heneman
Freddy Herrera
Juan Holguin
Marinus S. Hoogmoed
Pablo Iturralde
Lukas Keller
Friedemann Köster
Bernard Landry
Octavio Latorre
María López
Soledad Luna Zárate
Katzumi Matsuoka
Patricia Parker
Duncan Porter
Guenther Reck
Rodolfo Rendón
Mark A. Richards
Raymond F. Rifenburg
José Rodríguez Rojas
Juan Schiess
Heidi Snell
Howard Snell
Jennifer Stone
Luis Suárez
Fritz Trillmich
Edmund Truell
Carlos Valle
Hernán Vargas
Sigrid Vásconez
José L. Villa
Pádraig Whelan
Martin Wikelski

Institutional Active Members

William Aragón
Augusto Barrera
Johannah Barry
Jaime Calderón
Oliver Dangles
Rubén Flores
Humberto Gómez
Diego Inclán
Scott Miller
Arturo Mora
Enrique Ponce de León
Christof Schenck
Roque Sevilla
Lauren Spurrier
Catalina Vélez
María Alejandra Vicuña
Military Geographical Institute
SENESCYT
Galapagos Conservancy
Assembly, Ecuador Higher Education System
Institut de Recherche pour le Développement
Ministry of Agriculture
Naval Oceanographic Institute (INOCAR)
Ecuadorian Museum of Natural Sciences / INABIO
Smithsonian Institution
World Conservation Union (IUCN)
Ministry of Tourism
Frankfurt Zoological Society
Metropolitan Touring
WWF - Intl Headquarters
Council of Higher Education
Vice Presidency of Ecuador

OUR TEAM

Scientific research and conservation of biodiversity in the Galapagos Islands are our passion and commitment. We are a multi-disciplinary team oriented toward pursuing our mission and thereby ensuring a sustainable future for the Galapagos Islands. We believe in what we do, day by day, and in the results we deliver; we trust people, their development and everything they can contribute to make the Charles Darwin Foundation a great leading research organization. The contribution of those of us who make up the CDF, both national and international, makes it possible to attain our institutional goals, and contributes to conserving this Heritage of Humankind.

- Galapagos Permanent Residents **58%**
- National Temporary Residents **26%**
- International Temporary Residents **16%**

Last Name	Name	Nationality
Acurio Armas	Andrea	Ecuadorian
Alonso	Dolma	Italyn
Alvarez Zamora	Fabiola	Ecuadorian
Anchundia González	David	Ecuadorian
Andrade Vera	Solange	Ecuadorian
Auz Cerón	David	Ecuadorian
Barragán Paladines	María José	Ecuadorian/German
Barreno Ocaña	Daniel	Ecuadorian
Barreno Oñate	Juan	Ecuadorian
Betancourt Cargua	Lenyn	Ecuadorian
Bradley	Kelsey	Canadian
Buglass	Salomé	British/Trinidad & Tobago
Cabrera Freire	Freddy	Ecuadorian
Cabrera Perugachi	Javier	Ecuadorian
Cahuana Criollo	Andrea	Ecuadorian
Caiza Pilataxi	Viviana	Ecuadorian
Calderón Barrera	Rosita	Ecuadorian
Camuendo Amaguaña	Cristina	Ecuadorian
Carrión Bravo	Angie	Ecuadorian
Carrión Cabrera	Wilson	Ecuadorian
Carrión Klier	Carolina	Ecuadorian/German
Carrión López	Johanna	Ecuadorian
Castro Jaramillo	Israel	Ecuadorian
Causton	Charlotte	British
Celi Vivanco	Ángel	Ecuadorian
Cerutti Pereyra	Florencia	Italyn/Mexican
Chango Chango	Rosa	Ecuadorian
Civallero Rodríguez	Edgardo	Argentinean/Spanish
Cruz Valle	Luis	Ecuadorian
Cunalata Guamán	Lilia	Ecuadorian
Cunninghame	Francesca	New Zealander
Del Hierro Villalba	Galo	Ecuadorian
Delgado Jaime	Julio	Ecuadorian
Delgado Maldonado	Byron	Ecuadorian
Díaz Freire	Paola	Ecuadorian/Australian
Díaz Holguín	Pilar	Ecuadorian
Echeverría Zambrano	Fernando	Ecuadorian
Ellecosta	Ursula	Italyn
Enright	Sarah	Irish
Espín Reinoso	Andrea	Ecuadorian
Fernández López	Luis	Ecuadorian
Fessl	Birgit	Austrian
Flores Tabango	Diana	Ecuadorian
Freire Cando	Renato	Ecuadorian
Gallegos Sun	Julio	Ecuadorian
Graham	Louis	South African
Haro Hidalgo	José	Ecuadorian
Herrera Ortíz	Paola	Ecuadorian
Herrera Román	Jorge	Ecuadorian
Hobbs	Claire	British
Iñiguez Ordoñez	Wilson	Ecuadorian
Izurieta Valery	Arturo	Ecuadorian/Australian
Jäger	Heinke	German
Jaramillo Díaz	Patricia	Ecuadorian

Last Name	Name	Nacionality
Jiménez Caisabanda	Jorge	Ecuadorian
Jiménez Uzcátegui	Gustavo	Ecuadorian
Keith Kennedy	Inti	Ecuadorian/ Scottish
Lahuatte Vera	Paola	Ecuadorian
Lara Valverde	Omar	Ecuadorian
Lehar	Patricia	American
Loor Cedeño	Lady	Ecuadorian
Loor Orozco	Erika	Ecuadorian
Loosveld	Stefan	Belgian
López Andrade	Mariuxi	Ecuadorian
Macías Pacha	Johanna	Ecuadorian
Marín Jarrín	José	Ecuadorian
Marti Puig	Patricia	Spanish
Martínez López	Francisco	Ecuadorian
Masaquiza Chiliquinga	Agustina	Ecuadorian
Masaquiza Chiliquinga	Margarita	Ecuadorian
Mayorga Mayorga	Paúl	Ecuadorian
Merino Dávila	Javier	Ecuadorian/American
Moity Martín	Nicolás	Spanish
Monroe	Renee	American
Morejón Jaramillo	Gustavo	Ecuadorian
Nagode	Liza	Slovenia
Negoita	Luka	American
Newman	Carly	Australian
Nieto Claudín	Ainoa	Spanish
Núñez Flores	Diego	Ecuadorian
Padilla Bolyears	Mariela	Ecuadorian
Parra Díaz	Macarena	Chilean
Pike	Courtney	American
Pincay Rodríguez	Mercedes	Ecuadorian
Ramírez Salazar	Erika	Ecuadorian
Rea Ponce	Solanda	Ecuadorian
Rentería Báez	Bolivia	Ecuadorian
Rentería Bustamante	Jorge	Ecuadorian
Rodríguez Pérez	Jacqueline	Ecuadorian
Rodríguez Stimson	Julio	Ecuadorian/American
Romero Martínez	Lorena	Ecuadorian
Romoleroux Paredes	Marta	Ecuadorian
Sagubay Valencia	Ángel	Ecuadorian
Salinas De León	Pelayo	Spanish
Santos Cevallos	Mauricio	Ecuadorian
Serrano Cisneros	Gaby	Ecuadorian
Smith	Franz Paúl	New Zealander
Solís Coello	Micaela	Ecuadorian
Táez Salinas	Andrea	Ecuadorian
Tanner Palacios	Michael	Ecuadorian
Tigse Vega	Mónica	Ecuadorian
Unda García	Daniel	Ecuadorian
Vásquez Macías	Jandry	Ecuadorian
Venegas Guzmán	Lorena	Chilean
Verdesoto Haro	Gabriela	Ecuadorian
Vilema Moreno	Daniela	Ecuadorian
Williams	Edward	American

VISITING SCIENTISTS AND/OR COLLABORATORS

A large number of international and national visiting scientists and collaborators have conducted their scientific projects through the CDF and its Research Station for over 30 years. This research and these discoveries over the years have made valuable contributions to science and to Galapagos conservation programs. Every year we welcome scores of participants in the different scientific projects conducted under research permits issued by the GNPD under the auspices of CDF.
International visiting scientists have the obligation to include Ecuadorian students in their projects, which gives local youth a chance to acquire magnificent experience, practice techniques, and learn from renowned scientists in Galapagos, a natural laboratory.

This Program's purpose is to facilitate requirements and procedures so visiting scientists and collaborators who come through the CDF can access research permits from the Galapagos National Park (GNPD) authorizing them to implement their projects.

The Program also assists with and follows up on logistical arrangements, ensuring that the requirements and regulations established by the GNPD on behalf of Ecuador's environmental authority, the General Law on the Special Regime of the Province of Galapagos and the biosecurity standards set by the ABG are all met.

Collaborators:
Galapagos National Park Directorate, ABG, Consejo de Gobierno.

Team:
Marta Romoleroux, David Chillagana, Fernando Echeverría and Solanda Rea.

VISITING SCIENTISTS

Research Project	Participants	Country	Institutional Affiliation	Project Objectives
Genetic basis of the development of the beak of Darwin´s finches	Abzhanov, Arkhat Investigador principal	United States	Imperial College of London, United Kingdom	Study the genetic variation expressed during the growth and development that is the key to understand the evolution of Darwin´s finches. Understand the main mechanisms that generate new species in Galapagos. Find the genes that enable to explain diverse and adaptive shape of the beak as a model to research evolution biology.
	Dobreva, Mariya Lider de proyecto	Bulgary		
	Tokita, Masayoshi	Japan	Harvard University, United States	
Interspecific competition between tortoises and cattle and the impact of agricultural species on the Santa Cruz food web	Howlett, Sonia	United States United States United States	Princeton University, United States	Determine the effects of agriculture on native biodiversity and interspecific interactions to compare the herbivory of cattle and tortoises.
Morphology and vocal evolution of Darwin´s finches	Jeffrey Podos Investigador principal	United States	University of Massachussetts, United States	The general objective of the project is to understand the evolutionary and ecological processes determining the morphology and vocalization fo Darwin´s finches.
	Gotanda, Kiyoko	Canada	McGill, University, Canada	
Protection of Galapagos Owls: census, eating habits and hunting grounds; their influence over the population of mammals and endemic and introduced birds	Wagner, Hermann - Investigador principal	Germany	Aachen University, Germany	Determine how the hunting territories depend on ecological niches, how territory coincides with prey distribution and the influence that owls have on endemic and introduced species of birds and mammals, specially on those in danger of extinction.
	Marquez, Lady	Ecuador	Escuela Superior Politécnica del Litoral, Ecuador	
	Piedrahita, Paolo - Lider de proyecto	Ecuador		
What triggers the eruption of Galapagos volcanoes?	Stock, Michael -Investigador principal	United Kingdom	University of Cambridge, United Kingdom	Sampling lavas from eruptions of Galapagos volcanoes and using high-resolution geochemical techniques to identify the eruption-triggering mechanisms. This geochemical data can be compared with monitored signals at the Earth's surface to identify and understand precursory 'warning' signs.
	Gibson, Sally	United Kingdom		
	Gleeson, Matthew	United Kingdom		
	Bernard, Benjamin	France	Instituto Geofísico, Ecuador	
	Proaño, Antonio	Ecuador		
Population biology and health of the Galápagos Sea Lion (*Zalophus wollebaeki*	Krüger, Oliver -Investigador principal	Germany	Princeton University, United States	Determine the state of the sealion population on Caamaño islet as an example of the population and health of the species in the archipelago thru behavior observations and data collection.
	Kalberer, Stephanie - Lider de proyecto	Switzerland		
	Tuppen, Sophie	United Kingdom		
	De Rango, Eugene	United States		
	Palacios, Orly	Ecuador		
Monitoring of Galapagos Marine Birds	Anderson, David -Investigador principal	United States	Wake Forest University, United States	Long-term project to continue monitoring the survival of Nazca boobies through data gathering on distribution and feeding characteristics during incubation, monitoring reproduction success, study the variation of adult behaviour in relation to reproduction performance.
	Edwards, Theresa	United States		
	Gruber, Eva	United States		
	Howard, Jennifer - - Lider de proyecto	United States		
	Rebol, Erynn	United States		
	Reyes, David	Ecuador	Universidad Central del Ecuador	
	Andino, Juan Francisco	Ecuador		
	Rodriguez, Enzo	Ecuador		

VISITING SCIENTISTS

Research Project	Participants	Country	Institutional Affiliation	Project Objectives
Census of Blue-Footed Boobies	Anderson, David -Investigador principal	United States	Wake Forest University, United States	Counting of individuals to determine the size of the population, evaluate reproduction and understand the prevailing diet
	Huyvaert, Kathryn	United States	Colorado State University, United States	
Are the eastern Pacific tropical reefs more resistant to ENSO?	Fong, Peggy -Investigador principal	United States	University of California en Los Angeles	Measure physical parameters of coral and reef community characteristics prior ENSOs to establish a baseline by deploying long-term temperature loggers, conduct CTD casts and collect water samples, install long-term pH sensor, measure benthic metabolism, assess the health of major coral species, benthic community condition, simple coral-algal simbiosis, adn measure rates of key ecological processes the promote reef resilience.
	Bittick, Sarah Joy	United States		
	Brandtneris, Viktor	United States	University of the Virgin Islands	
	Smith, Tyler	United States		
	Enochs, Ian	United States		
	Baker, Andrew	United States	University of Miami	
	Palacio, Ana	Colombia		
	Manzello, Derek	United States	National Oceanic and Atmospheric Administration	

COLLABORATING SCIENTISTS (own projects)

Proyecto de investigación	Participantes	País	Afiliación institucional	Objetivos de los proyectos
The influence of parasitism and environmental factors on breeding success and population development of Darwin's tree finches.	Tebbich, Sabine - Investigador principal	Austria	University of Vienna, Austria	Philornis downsi contributes to the decline of some species Darwin´s finches. However, project data suggests that the effect is increased by environmental factors; extreme weather conditions -heavy rains, droughts and control of invasive plants with herbicides. The project studies the interaction between land birds, parasitism of *P. downsi* and environmental factors -climate and food availability.
	Cimadom, Arno - Lider de proyecto	Italy		
	Heyer, Eileen	Austria		
	Wappl, Christian	Austria		
	Iñiguez, Wilson	Ecuador		
	Bonifacio, Luke	Australia	Monash University, Autralia	
Faunistic recognition of the Hymenoptera (bees and wasps) of the Galapagos Islands	Herrera, Henri Investigador principal	Ecuador	Universidad Técnica de Chimborazo, Ecuador	Not much is known about the Hymenptera (wasps and bees) of Galapagos. The project studies the taxonomy and diversity, a generic list, the distribution and possibly the biological aspects will be produced. The information will contribute to consolidate a scientific collection.
	Campaña, Yesenia	Ecuador		
	Amarillo, Angela	Colombia	Pontificia Universidad Javeriana, Colombia	
	Fernandez, Fernando	Colombia	Universidad Nacional de Colombia	
	Sarmiento, Carlos	Colombia		
Population dynamics of the Galapagos Hawk on Santa Fe island	Tjitte De Vries - Lider de proyecto	Holland	Universidad Católica de Quito, Ecuador	This project determines the effects of climante and habitat structure on the survival, reproduction and formation of polyandric groups of the Galapagos hawks on Santa Fe Island.
	Jarrín, Rubén Darío	Ecuador		
	Poveda, Cristian	Ecuador		
	Tobar, Sebastian	Ecuador		
	Toscano, Gabriela	Ecuador		
	Proaño, Antonio	Ecuador		
Management of underwater long-term community, and investigation on its trophic links	Witman, Jonathan - Investigador principal	United States	Brown University, United States	Determine oceanographic and biological factors in patterns and dynamics of the Galapagos marine communities, particularly in relation to ENSO. Describe the spatial and temporal variability on the structure of benthic invertebrate communities -abundance, regeneration and biodiveristy- and their resiliance on the rocky submarine community of the Galapagos Marine Reserve.
	Beltram, Fiona	United States		
	Lamb, Robert	United States		
	Lupi, Camila	United States		
	Smith, Franz	New Zealand		

COLLABORATING SCIENTISTS in our Projects

Research Project	Participants	Country	Institutional Affiliation	Project Objectives
Analysis of satellite and drone images to map the dominant plant species.	Daniela Ballari Jim Kellner Daniel Orellana Adam Soule Catherine Fahey Luke Flory	Ecuador United States Ecuador United States United States United States	Univ. de Cuenca, Ecuador Univ. de Brown. Univ. de Cuenca, Ecuador Woods Hole OI. Univ. Florida. Univ. Florida..	Recommendations for a management of the dominant plant species of the upper part, based on their distribution in the islands and focusing on invasive species.
Reducing the threat of vessel strike for the green turtle *(Chelonia mydas)* in the Galapagos.	Marco Boeri Chris Harrod Jonathan Houghton Hansjoerg Kunc Neild Reid	United Kingdom Chile United Kingdom United Kingdom United Kingdom	Univ. de Brown. Univ. de Cuenca, Ecuador Woods Hole OI. Univ. Florida. Univ. Florida.	Develop an economically sustainable solution to reduce threats to sea turtles related to marine transit, through community participation, scientific research and improvement of tourism practices, combining the economic expectations of the community with conservation priorities.
Conservation of threatened populations of small landbirds.	Arno Cimadom Diego Cisneros Sophia Cooke Rachel Dudaniec Michael Dvorak James Gibbs Neil Gostling George Heimpel Sonia Kleindorfer Lucinda Lawson Denis Mosquera Jakob Müller Erwin Nemeth Katharina Peters Martin Quiroga Gonzalo Rivas Sabine Tebbich Hernan Vargas Beate Wendelin David Anderson Patricia Parker Fernando Esperón Wacho Tapia Margaret Voss	Austria Ecuador United Kingdom Australia Austria United States United Kingdom United States Australia United States Austria Germany Austria Australia Argentina Ecuador Austria United States Austria United States United States Spain Ecuador United States	U. Viena, Austria USFQ, Ecuador Cambridge University, UK Macquarie Univ, Australia BirdLife Austria State University of New York Universidad South Hampton U. Minnesota. Flinders U., Australia U. Cincinnati. U. Viena, Austria Max Planck, Germany BirdLife Austria Flinders U., Australia LECEN-FCV-UNL USFQ, Ecuador U. Viena, Austria Fondo Peregrino BirdLife Austria U. Wake Forest U of Missouri, St Louis, United States CISA_INIA Galapagos Coservancy Syracuse University	Provide strategies for GNPD to reverse the decline of populations of small Galapagos landbirds based on a scientific understanding of the factors causing this decline.
Control techniques for *Polistes Versicolor*	Henri Herrera Fernando Romero Richard Toft Mariana Bulgarella Phil Lester	Ecuador Ecuador New Zealand New Zealand New Zealand	ESPOCH ESPOCH ENTECOL U. Victoria of Wellington U. Victoria of Wellington	Control techniques for Polistes Versicolor

COLLABORATING SCIENTISTS in our Projects

Research Project	Participants	Country	Institutional Affiliation	Project Objectives
Research on marine invasive species for prevention, detection and management in the GMR.	Stuart Banks	UK	Conservation International	Minimize the negative impacts of invasive species on marine biodiversity, ecosystem services and health status of the Galapagos Marine Reserve.
	Margarita Brandt	Ecuador	Universidad San Francisco de Quito	
	Dale Calder	Canada	Royal Ontario Museum	
	Marnie Campbell	New Zealand	University of Waikato	
	Deborah Carlton	United States	Williams College / Maritime Studies Program, Mystic, Connecticut USA	
	Jim Carlton	United States	Williams College, USA	
	Ken Collins	United Kingdom	Southampton U., UK	
	Terry Dawson	United Kingdom	U. Dundee, UK	
	Nicole de Voogd	Netherlands	Naturalis Biodiversity Center, Leiden, The Netherlands	
	Jonathan Geller	United States	Moss Landing Marine Laboratories	
	Neil Gostling	United Kingdom	Southampton U., UK	
	Chad Hewitt	New Zealand	University of Waikato	
	Antony Jensen	United Kingdom	Southampton U., UK	
	Gretchen Lambert	United States	University of Washington, Seattle, Washington USA	
	Kristen Larson	United States	Smithsonian Institution / Smithsonian Environmental Research Center (SERC)	
	Jennifer Mallison	United Kingdom	Southampton U., UK	
	Priscilla Martínez	Ecuador	NAZCA	
	Linda Mccann	United States	SERC, USA	
	Kathleen Reardon	United States	Williams College / Maritime Studies Program	
	Bernhard Riegl	United States	Nova Southeastern University	
	Fernando Rivera	Ecuador	NAZCA	
	Robbie Robinson	United Kingdom	University of Southampton	
	Greg Ruiz	United States	SERC, USA	
	Carmen Schloeder	Panama	Smithsonian Tropical Research Institute, Panama.	
	Mark Torchin	Panama	STRI, Panama.	
	Mariana Vera	Ecuador	Conservacion Internacional	
	Luis Vinueza	Ecuador	USFQ, Ecuador	
	Jorg Wiedenmann	United Kingdom	University of Southampton	
State of birds biodiversity in the marine coastal zone.	Carlos Valle	Ecuador	USFQ,	Generate information to know the biodiversity of the birds that are observed in the marine-coastal zone on the following islands: Isabela (Punta Essex to Canal Elizabeth), Marielas and Fernandina (Punta Mangle to Punta Espinoza). With this information, the objective is to determine trends and spatio-temporal changes, and to identify threats (introduced species), which will serve to improve the long-term management plan.
	Hernán Vargas	United States	PF, USA	
Study of the distribution and trophic impact of the introduced frog *Scinax quinquefasciatus* in Galapagos	Rafael Bermúdez	Ecuador	ESPOL	Better knowledge of the ecology, distribution and trophic impact of the introduced frog *Scinax quinquefasciatus* in Santa Cruz, Isabela and San Cristóbal.
	Raffael Ernst	Germany	Museo Senckenberg de Dresden	
	María del Mar Moretta	Ecuador	ESPOL	
	José Pontón	Ecuador	ESPOL	
	Andrés Merino-Viteri	Ecuador	U Católica	
	Juan Guayasamin	Ecuador	USFQ	
	Luis Coloma	Ecuador	Fundación Otonga	

COLLABORATING SCIENTISTS in our Projects

Research Project	Participants	Country	Institutional Affiliation	Project Objectives
Study of lagoon bird populations: Galápagos Flamingo.	Catherine Soos Carlos Valle Hernán Vargas Lenin Vinueza	Canada Ecuador United States Ecuador	Environment Canada & Technology Branch, Ecotoxicology and Wildlilfe Healt Division USFQ, ECU PF, USA USFQ, ECU	Generate information to know the population trend of Galápagos flamingos, determine spatio-temporal changes, identify their threats (introduced species, heavy metals) and know the current condition of the main lagoons, which will serve to improve the long-term management plan .
Study of seabird populations: Galapagos penguin, flightless cormorant and Galápagos albatross.	Kyler Abernathy Paul Doherty Edison Encalada Jacob González Katheryn Huyvaert Marina Jimenez Karine Laroucau Greg Marshall Diego Paez Patricia Parker Enzo Reyes Richar Rodriguez Catherine Soos Antje Steinfurth Leandro Vaca Hernán Vargas Lenin Vinueza Gina Zanella	United States United States Ecuador Spain United States United Kingdom France United States Ecuador United States Ecuador Ecuador Canada Sudáfrica Ecuador United States Ecuador France	Remote Imanging CSU UCE UB CSU Kent University Agence Nationale de Securite Sanitaire, France NatGeo Society USFQ UM Museo de Ballenas UCE Environment Canada & Technology Branch, Ecotoxicology and Wildlilfe Healt Division UCT, SA USFQ PF USFQ Agence Nationale de Securite Sanitaire,	Generate information to know the population status (survival, reproduction) and determine spatio-temporal changes, identify threats (introduced species and pathogens, contaminants) and know the impact of climatic and oceanographic variability on the breeding colonies. This information will be used to improve the long-term species management plan.
Long-term evaluation of control of quinine *(Cinchona pubescens)* and the possibility of biological control.	Christine Edwards Paulo Herrera Catherine Fahey Luke Flory Carol Ellison Harold Evans	United States Ecuador United States United States United Kingdom United Kingdom	MBG UTPL Univ. Florida, Univ. Florida. CABi UK CABI	Holistic restoration of the upper part of Santa Cruz for improved quinine control.
Galápagos Verde 2050	José Benedicto James Gibbs Ole Hamann Frank Sulloway Wacho Tapia María del Mar Trigo Pablo Vargas	Spain United States Denmark United States Ecuador Spain Spain	Universidad de Valencia State University of New York University of Copenhagen /Denmark) Universidad de Berckley Galapagos Coservancy Universidad de Málaga Consejo Superior de Investigaciones Científicas	Restoration of the population of *Opuntia echios var. echios* in Plaza Sur, and soil analysis in the study sites.

COLLABORATING SCIENTISTS in our Projects

Research Project	Participants	Country	Institutional Affiliation	Project Objectives
Seamounts in the GMR: Characterization of their ecology and of the ecosystem services they provide.	Euan Harvey	United States	Curtin U., USA	Characterize the communities of the seamounts in the GMR as well as the main ecosystem services that they provide to the local community, especially the services that provide supplies, regulations and culture.
	Renato Bebop	United States	University of Delaware	
	James Bell	New Zealand	Victoria U. of Wellington, NZ	
	Rafael Bermudez	Ecuador	ESPOL, Ecuador	
	Dan Fornari	United States	Woods Hole OI, USA	
	Alan Friedlander	United States	University of Hawaii	
	Tom Glebas	United States	Video Ray	
	Meghan Jones	United States	Woods Hole Oceanographic Institution	
	Leigh Marsh	United Kingdom	Southampton University	
	Nicolas Pascal	France	Perpignan U., France	
	Brennan Phillips	United States	University of Rhode Island	
	Serge Planes	France	Perpignan U., France	
	James Reimer	Japan	U. Ryukyus, Japan	
	Nicole Reinault	United States	Ocean Exploration Trust	
	Luiz Rocha	United States	California Academy of Sciences	
	Juan Armando Sanchéz	Colombia	Universidad de Los Andes	
	Dorsey Wanless	United States	Universidad Boise State	
	Shane Ahyong	Australia	Australian Museum Research Institute	
	Keiji Baba	Japan	Kumamoto University	
	Liliana Baums	United States	The Pennsylvania State University	
	Michael Berumen	Arabia Saudita	King Abdullah University of Science and Technology	
	Stephen Cairns	United States	Smithsonian Institution	
	Chong Chen	Japan	Japan Agency for Marine-Earth Science and Technology	
	Federica Costantini	Italy	University of Bologna	
	Jean-François Flot	Belgium	Université Libre de Bruxelles	
	Zac Forsman	United States	Hawaii Institute of Marine Biology	
	Michel Hendrickx	Mexico	Universidad Nacional Autonoma de Mexico	
	Stephane Hourdez	France	Station Biologique de Roscoff	
	Nicole Joy de Voogd	Netherlands	Naturalis Biodiversity Center	
	Andreas Kroh	Austria	Natural History Museum	
	Douglas Long	United States	St Mary's College	
	Christopher Mah	United States	Smithsonian Institution	
	Charles Messing	United States	Nova Southeastern University	
	Timothy O'Hara	Australia	Museum Victoria	
	Karen Osborn	United States	Smithsonian Natural Museum	
	Bruce Ott	Canada	Khoyatan Marine Laboratory	
	Gustav Paulay	United States	University of Florida	
	David Paz	United States	Louisiana State University	
	Richard Preziosi	United Kingdom	University of Manchester	
	Andrea Quatrinni	United States	Harvey Mudd College	
	Geoff Read	New Zealand	National Institute of Water and Atmospheric Research	
	Henry Reiswig	United States	University of Victoria	
	Laura Robinson	United Kingdom	University of Bristol	
	Greg Rouse	United States	Scripps Institution of Oceanography	
	Sonia Rowly	United States	University of Hawaii	
	Tim Shank	United States	Woods Hole Oceanographic Institution	
	Prashant Sharma	United States	University of Wisconsin-Madison	
	Mahmood Shivji	United States	Nova Southeastern University	
	Julia Sigwart	United States	University of California, Berkeley	
	Ole Tendal	Denmark	Zoologisk Museum,	
	Janet Voight	United States	The Field Museum of Natural History Chicago	
	Les Watling	United States	University of Hawaii	
	Mary Wicksten	United States	Texas A&M University	
	Gary Williams	United States	California Academy of Science	
	Craig Young	United States	Oregon Institute of Marine Biology	

COLLABORATING SCIENTISTS in our Projects

Research Project	Participants	Country	Institutional Affiliation	Project Objectives
Ecology, evaluation and management of fisheries: steps towards sustainability.	Paul Barber	United States	UCLA, USA	Increase knowledge of the ecology, life history and fishing dynamics of the main fishing resources of the Galapagos and the habitats they occupy, in order to provide updated information to improve fisheriy management.
	Jose Cota	United States	SCRIPPS, USA	
	Marleen DeTroch	Belgium	Universidad de Gante	
	Luis Domínguez-Granda	Ecuador	ESPOL, Ecuador	
	Tyler Eddy	Canada	Dalhousie U.	
	Luis Flores	United States	ESPOL, Ecuador	
	Alan Friedlander	United States	U. Hawaii, USA	
	Isabel Haro	Australia	U. Queensland, Australia	
	Heleen Leirsebelik	Belgium	Universidad de Gante	
	Ismael Mascareñas	United States	SCRIPPS, USA	
	Jessica Miller	United States	OSU	
	José Pontón	Belgium-Ecuador	Gante-ESPOL	
	Mireya Pozo	Ecuador	ESPOL, Ecuador	
	Etienne Rastoin	Australia	Curtin University	
	Octavio Aburto	United States	SCRIPPS, USA	
Philornis downsi	Edward Holmes	Australia	Sydney University	Develop effective tools for the management of *Philornis downsi*
	Charles Lehnen	United States	University of Minnesota	
	Michael Ben-Yosef	Israel	U.Hebrea, Israel	
	Rebecca Boulton	United Kingdom	Cambridge University, UK	
	Mariana Bulgarella	New Zealand	University Victoria, Wellington	
	Paola Carrion	Ecuador	Galapgos Science Center	
	Guillermo Fadul	Panama	COPEG, Panama	
	Rachel Dudaniec	Australia	Macquarie Univ, Australia	
	Jemma Geoghegan	Australia	Macquarie Univ, Australia	
	George Heimpel	United States	U. Minnesota, USA	
	Diego Inclan	Ecuador	Initituto de Biodiversidad	
	Edouard Jurkevitch	Israel	U.Hebrea, Israel	
	Einat Jurkevitch	Israel	U.Hebrea, Israel	
	Gwen Keller	Panama	USDA-ARS, Panama	
	Sonia Kleindorfer	Australia	Flinders U., Australia	
	Jen Koop	United States	U. Massachussets, Dartmouth, USA	
	Piedad Lincango	Ecuador	UC, Ecuador	
	Sabrina McNew	United States	U. Utah, USA	
	Alejandro Mieles	United States	SUNY-ESF, USA	
	Oscar Molla	Spain	Consultor independiente, Spain	
	Roger Moon	United States	U. Minnesota, USA	
	Alejandro Percara	Argentina	LECEN-FCV-UNL	
	Martin Quiroga	Argentina	LECEN-FCV-UNL	
	Ismael Ramirez	United States	U. Minnesota	
	Roxanne Sage	Canada	University of Quebec, Canada	
	Adrianne Taube	United States	Syracuse University	
	Bradley Sinclair	Canada	NCNI, Canada	
	Stephen Teale	United States	SUNY-ESF, USA	
	Sabine Tebbich	Austria	U. Viena, Austria	
	Margaret Voss	United States	Syracuse University	
	Boaz Yuval	Israel	U. Hebrea, Israel	

COLLABORATING SCIENTISTS in our Projects

Research Project	Participants	Country	Institutional Affiliation	Project Objectives
Protection and recovery of the Mangrove Finch, a bird in danger of extinction.	Deena Breener	United States	San Diego Zoo, United States	Increase in the population of mangrove finches in the wild.
	Karl Campbell	Ecuador	Island Conservation, Ecuador	
	Michael Dvorak	Austria	BirdLife Austria	
	Nicole LaGreco	United States	San Diego Zoo, United States	
	Lucinda Lawson	United States	University of Cincinnati, United States	
	Patricia McGill	United States	Dallas Zoo, United States	
	Erwin Nemeth	Austria	BirdLife Austria	
	Patricia Parker	United States	University of Missouri, St Louis,USA	
	Bruce Rideout	United States	San Diego Zoo, United States	
	Hernan Vargas	United States	Fondo Peregrino	
	Beate Wendelin	Austria	BirdLife Austria	
	Glyn Young	Jersey	Durrell, Jersey	
Restoration of the Los Gemelos ecosystem in response to current impacts. Evaluation of the possibility of biological control of blackberry plants.	Rachel Atkinson	United States	IDB, United States.	Guide for efficient management of introduced species with less impact on native species.
	Maria Belén Bentet	Ecuador	Univ. Agraria del Ecuador	
	Mareike Breuer	Germany	Technical University Berlin	
	Sascha Buchholz	Germany	Technical University Berlin	
	Arno Cimadom	Austria	Univ. de Viena, Austria	
	Henri Herrera	Ecuador	ESPOCH	
	Rachael Smith	Australia	Gob. de Queensland, Australia	
	Sabine Tebbich	Austria	Univ. de Viena, Austria	
	Anna Walentowitz	Germany	Univ. de Greifswald, Germany	
	Franz Zehetner	Austria	BOKU, Austria	
	Carol Ellison	United Kingdom	CABI, UK	
	Harold Evans	United Kingdom	CABI, United Kingdom	
	Peter Madison	New Zealand	Landcare Research, New Zealand	
Sharks in the GMR (Galapagos Marine Reserve).	Euan Harvey	United States	Curtin U., USA	Determine the impact of the El Niño phenomenon on the abundance and distribution of sharks in the GMR.
	Octavio Aburto	United States	SCRIPPS, USA	
	Rafael Bermudez	Ecuador	ESPOL	
	Euan Harvey	New Zealand	Curtin U., USA	
	David Acuña	New Zealand	Massey U., New Zealand	
	Marti Anderson	New Zealand	Massey U., New Zealand	
	Neil Hammerschlag	United States	Miami U., USA	
	Mauricio Hoyos	Mexico	Pelagios Kakunja	
	Diego Paez	Ecuador	USFQ	
	Mahmood Shivji	United States	SOSF Shark Research Center	
	Adam Smith	New Zealand	Massey U., New Zealand	
Galapagos Turtle Movement Ecology Program.	James Gibbs	United States	State University of New York	Establish the movement patterns of the tortoises in Santa Cruz, Española and Alcedo Volcano (Isabela). Establish correlations between the reproductive physiology of the tortoises and their movement patterns.
	Sharon Deem	United States	Saint Louis Zoo, USA	
Estudio de los moluscos gasterópodos terrestres de Galápagos	Sergio Miquel	Argentina	Argentina	Study of the terrestrial gastropod mollusks of the Galapagos and comparison with those in the continent, including description of potential new species.

COLLABORATING SCIENTISTS in our Projects

Research Project	Participants	Country	Institutional Affiliation	Project Objectives
Baseline study of ants *(Hymenoptera: Formicidae)* introduced in the Galapagos Islands and search for biological controllers of the invasive ant Solenopsis geminata in Ecuador.	Henri Herrera Rob Plowes Sanford Porter Robert Van der Mer Henri Herrera Andreas Nord Juan Bouzat Patricia Parker Guojie Zhang	Ecuador United States United States United States Ecuador Norway United States United States Denmark	ESPOCH, Ecuador University of Texas USDA-ARS, USA USDA-ARS, USA ESPOCH University of Tromsø Bowling Green State University University of Missouri, St Louis, USA University of Copenhagen	To know the fauna of introduced ants and their impact on the archipelago
Submareal ecological monitoring: continuity of subtidal ecological monitoring in the Galapagos Marine Reserve.	Priscilla Martínez Fernando Rivera Soledad Luna Bernhard Riegl Graham Edgar Greg Ruiz	Ecuador Ecuador Alemania United States Australia United States	NAZCA NAZCA Dresden University Nova Southeastern University University of Tasmania Smithsonian Environmental Research Center	Evaluate the effectiveness of the management within the RMG in the different areas of use taking into account the climatic variability of the region.

Number of SCIENTISTS per country

Spain	1
Germany	5
Arabia Saudita	1
Argentina	4
Australia	12
Austria	14
Belgium	3
Belgium-Ecuador	1
Canada	7
Chile	1
Colombia	1
Denmark	3
Ecuador	42
United States	101
Spain	5
France	5
Netherlands	2
Israel	4
Italy	1
Japan	3
Jersey	1
Mexico	2
Norway	1
New Zealand	13
Panama	4
United Kingdom	22
Sudáfrica	1

Researchers interested in conducting a research project through CDF may visit our website for further information or contact us at:
cientificos@CDFarwin.org.ec

VOLUNTEERS AND SCHOLARSHIP STUDENTS

The Volunteers and Scholarship Students Program began in 1971, with the main goal of supporting science and providing opportunities for students and professionals.
Our Volunteers Program offers professional experience in the different scientific projects, administrative and operational areas of the CDF. Most of these positions are based at the Charles Darwin Research Station in Puerto Ayora, Santa Cruz Island. Volunteers can be local, national and international; students or professionals.

Further, our scholarships help train talented students from Galapagos to pursue their tertiary (University) studies in fields involving ecosystem conservation, sustainability, and other specialties that can leverage the development of Galapagos and their community.

Please visit our website for details on how to apply to the Program:
www.darwinfoundation.org

- International Transitory Visitors **39 %**
- Permanent Residents of Galapagos **26 %**
- National Temporary Residents **16 %**
- National Transitory Visitors **11 %**
- Interational Temporary Residents **7 %**
- CDF Quito Office **1 %**

VOLUNTEERS

Last Name	Name	Nationality / Origin
Aguilar Ullauri	Juan	Ecuadorian
Alvarado Arichabala	Paola	Ecuadorian
Arnés Urgelles	Camila	Ecuadorian
Atiencia Garzón	Jonathan	Ecuadorian
Bailón Lopez	Jean	Ecuadorian
Barrera Díaz	Salomé	Ecuadorian
Barrera Moncada	Anaceth	Ecuadorian
Bensted Smith	William	British
Bouriat	Alizé	French
Brito González	Carla	Ecuadorian
Bucheli Crespo	Frenchsca	Ecuadorian
Buchholz	Sascha	German
Budd	Kayla	American
Bustamante Velarde	Ernesto	Peruvian
Caicedo Morales	Sugey	Ecuadorian
Cantero Flores	David	Spanish
Carrión Cortez	Carolina Alejandra	Ecuadorian
Castillo Ayala	Andrés	Ecuadorian
Castillo Bermudez	Joe	Ecuadorian
Castillo Moreira	Surya	Ecuadorian
Cedillo Caiminagua	Yazmín	Ecuadorian
Chillagana Caza	David	Ecuadorian
Coloma Villacrés	Andrea	Ecuadorian
Coronel Oliveira	Ana Paula	Ecuadorian
Creemers	Marie	Belgian
De la Hoz Schilling	Carolina	Spanish
De Pagter	Justin	Dutch
Deonarine	Isaac	American
Desiderio Canales	Tony	Ecuadorian
Espina Meco	Yaiza	Spanish
Espinosa Treiber	María	Ecuadorian
Estrada Enriquez	Camila	Ecuadorian
Fusari	Margaret	American
García Paez	Juan Manuel	Ecuadorian
Garzón Suárez	Henry	Ecuadorian
Gavin	Todd	American
Gómez Acosta	Keila	Ecuadorian
Goñi Molestina	Mikel	Ecuadorian
Granizo Pazmiño	José	Ecuadorian
Green Iturralde	Sofia	Ecuadorian
Guerrero Campos	María	Spanish
Gutierrez Borbor	George	Ecuadorian
Hamdan	Farah	Lebanese
Heimpel	Simon	American
Hernández García	Sara	Spanish
Heyer	Eileen	Austrian
Ison	Theo	Canadian
Kaval	Pamela	American
Laglaguano Morocho	Juan	Ecuadorian
Lavalley	Sara	American
Lehnen	Charles	American
Leuba	Célina	Swiss
Liberoff Bañados	Luciana	Peruvian
Luzuriaga Taday	Yomayra	Ecuadorian
Madejska	Valentina	British
Martínez Berrezueta	Julio	Ecuadorian
Mejía Restrepo	Alejandra	Colombian
Mieles Catucuago	Vicky	Ecuadorian
Miller	Joshua	American

Last Name	Name	Nationality / Origin
Moina Quimi	Emy	Ecuadorian
Monaghan	Elizabeth	American
Morales Ponce	Adrián	Ecuadorian
Morán Alvarez	Andreinna	Ecuadorian
Mosquera Muñoz	Denis	Ecuadorian
Moya Olvera	Yemina	Ecuadorian
Moya Serrano	Ana	Ecuadorian
Mullikin	Ashley	American
Nieto Lucero	Diego	Ecuadorian
O'Flynn	Aoibheann	Irish
Patry Blenkiron	Emile	Ecuadorian/Canadian
Pluchon	Nicolas	French
Polzin	Brandon	American
Poveda Pazmiño	Cristian	Ecuadorian
Pulido Leria	Cristina	Spanish
Ramón Gomez	Gessica	Ecuadorian
Renda	Samantha	South African
Ricaurte Vinueza	Paola	American
Rideout	Keeley	American
Rodas April	Marcela	Ecuadorian
Rojas Allieri	María Lorena	Ecuadorian
Rosas Guerrero	Jesús	Spanish
Ruales Moncayo	Jenny	Ecuadorian
Salas Moya	Carolina	Costa Rican
Savage	Jodie	Australian
Schmidt	Josefin	Spanish
Schuiteman	Michelle	American
Scoggin	Joshua	Ecuadorian/American
Scoggin	Raji	Ecuadorian/American
Segovia Amador	Edgar	Ecuadorian
Sellés Ríos	Bárbara	Spanish
Skehel	Alice	British
Steiner	Quinn	American
Sueldo	Alexandra	Peruvian / American
Tapia Silva	Laura	Ecuadorian
Taylor	Sally	Canadian
Terán Suárez	Franklin	Ecuadorian
Tomalá Gaibor	Celeste	Ecuadorian
Urguilés Rodríguez	María Gabriela	Ecuadorian
Urresta Salgado	Daniela	Ecuadorian
Vargas Nicola	Isabela	Ecuadorian
Vásconez Robalino	Jennifer	Ecuadorian
Vela Fonseca	Joshua	Ecuadorian
Velásquez Ramos	Aymed	Ecuadorian
Walentowitz	Anna	German
Wielding	Tomas	New Zealander
Wilke	Hayden	American
Wilson	Joel	American
Witt	Emily	American
Yépez Ruíz	Janaí	Ecuadorian
Zamora Zurita	Sergio	Ecuadorian

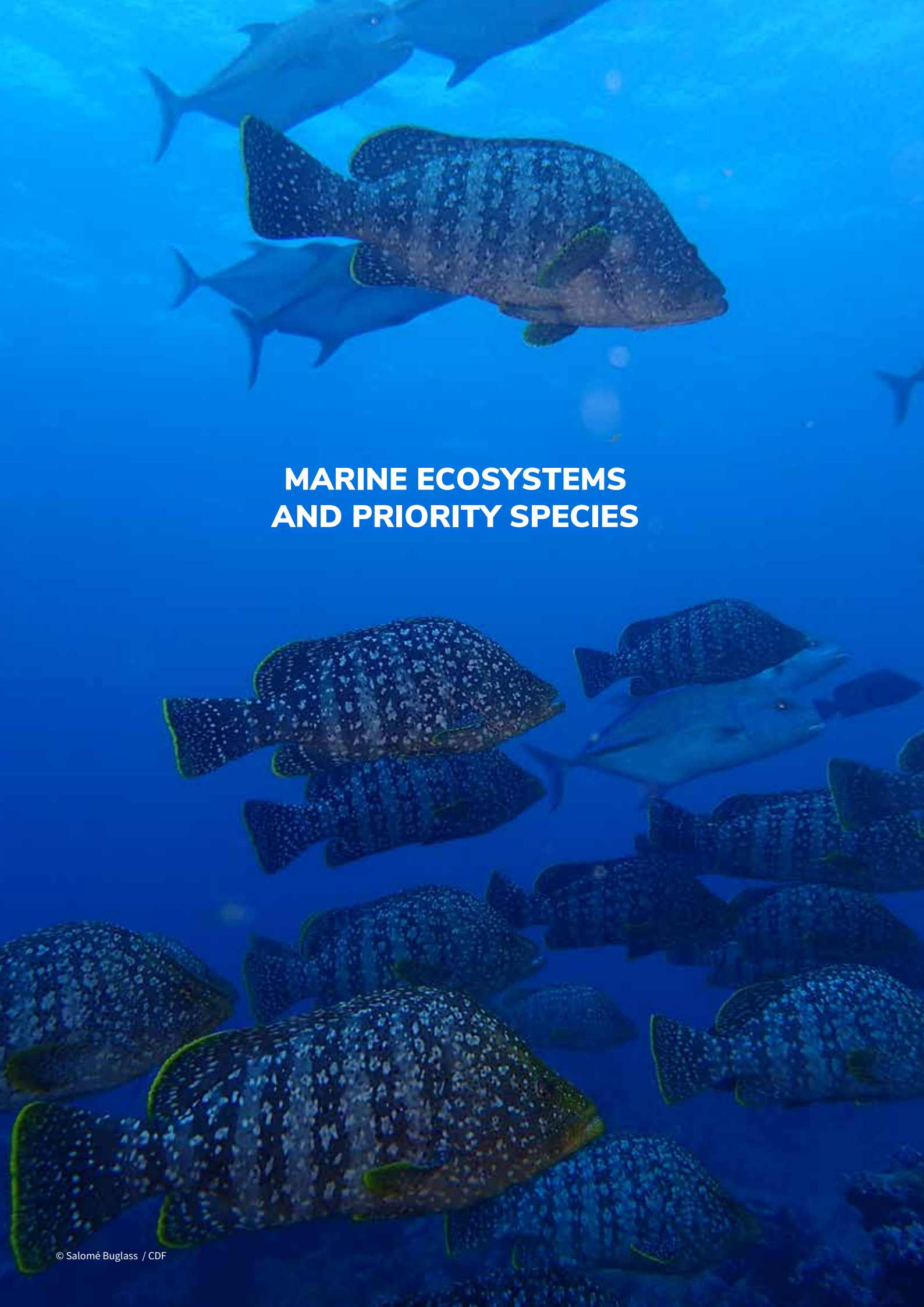
SCHOLARSHIP AND THESIS STUDENTS

Last Name	Name	Study Field	Nationality
Bonilla Valencia	Abraham	Tourism	Ecuadorian
Cortez Morán	Oskar	Electronics and automation	Ecuadorian
Espín Vargas	Priscilla	Veterinary Medicine and Zootechnics	Ecuadorian
Loyola Jara	Diana	Biology with mention in Ecology / Management	Ecuadorian
Santos Farías	Gabriela	Agronomic Engineering	Ecuadorian
Tapia Jaramillo	Patricia	Biology	Ecuadorian
Tutivén Ramón	Yanella	Biology	Ecuadorian

Last Name	Name	Nacionality
Cedillo	Yazmin	Ecuatorian
Coloma	Andrea	Ecuatorian
Gutiérrez	George	Ecuatorian
Piedrahita	Paolo	Ecuatorian
Morán	Andrea	Ecuatorian
Bentet	Maria Belén	Ecuatorian
Walentowitz	Anna	German
Terán	Franklin	Ecuatorian
Flores	Diana	Ecuatorian
Fierro	Denisse	Ecuatorian

MARINE AND TERRESTRIAL ENVIRONMENTS

MARINE ECOSYSTEMS AND PRIORITY SPECIES




© Juan Manuel García / CDF


© Nicolás Moity / CDF

Reducing Threats for Marine Turtles in Galapagos

Donors:
The Leona M. and Harry B. Helmsley Charitable Trust.

Collaborators:
Galapagos National Park Directorate

Team:
Macarena Parra, Byron Delgado, Rosita Calderón, Surya Castillo, Sofia Green, Jonathan Houghton, Wilson Iñiguez, Hansjoerg Kunc, Adrián Morales and Karina Ramón.

The Galapagos Islands are a key site for the diverse migratory species of the Eastern Tropical Pacific (ETP). This is also a site of great importance for conserving green turtles *(Chelonia mydas),* hosting the region's second largest nesting colony. There are also numerous foraging sites for this species throughout the Archipelago.

Internationally, collisions with vessels has been recognized as a threat for a broad range of marine fauna including cetaceans, sharks, mantas and especially marine turtles. In Galapagos, there have already been cases of marine turtles harmed by boats in their nesting and feeding sites. For this reason, and thinking about early actions to evaluate this problem, the CDF, in alliance with Queen's University Belfast (QUB) in Ireland, has conducted research to assist efforts by the GNPD to reduce the number of marine turtles hit by maritime transport vessels.

In 2017-2018, a study began of the navigation behavior of green turtles, during their breeding season. It identified the activities that make them more vulnerable to being hit by ships. For example, these included resting, swimming or breeding on the surface, which puts them at a greater risk of collision. Sites where these behaviors occur, and where there are the most collisions, were also located. The study also sought to understand turtles' reaction mechanisms when boats approach. These data will be essential to design conservation strategies, and to prevent marine shipping from negatively impacting the species in the GMR.

Researchers are also working with authorities and the local community to assess and take into consideration the socio-economic implications of any management measure that is proposed. They will attempt to generate a holistic plan to facilitate conservation actions by the GNPD, without affecting the local community's economic growth aspirations.


© Daniel Unda García/ CDF

Population Studies of Marine Birds

Research on the survival of populations of the Galapagos penguin *(Spheniscus mendiculus)*, flightless cormorant *(Phalacrocorax harrisi)* and Galapagos albatross *(Phoebastria irrorata),* now threatened by climate change, introduced species and pathogens, human interactions and non-infectious diseases, is important for long-term conservation of these species. The CDF-GNPD team, with the collaboration of Ecuadorian and international universities, is working on ecological monitoring in these marine bird nesting zones on Fernandina, Isabela and Española islands.

To better understand the conservation status of these unique, fragile species, three population census monitoring efforts were made in 2017 and 2018. Gustavo Jiménez and his team found that the penguin population made a comeback since 2016.

Meanwhile, the flightless cormorant population hit the second population record since this research began in 1977. Albatross population monitoring had the highest capture/recapture rate for individuals since 2010. Findings showed 60% nesting in study quadrants. Our studies showed that reproduction in natural nests, control of introduced species, knowledge of the species' ecology and health were fundamental to understand these populations' dynamics. New cases of penguins were found by catching with drift nets, which are dragged into the GMR by marine currents.

At this time, the presence of heavy metals is being analyzed, by sex, in all three species of marine birds. We will also distinguish Galapagos penguins by the spots on their chests, using photographic identification. We will validate ecological differences among feeding zones of Galapagos penguins, flightless cormorants and Galapagos albatrosses, using analysis of stable isotopes.

Donors:
The Leona M. and Harry B. Helmsley Charitable Trust, Penguin Fund Japan, Sr. Seishi Sakamoto, Galapagos Conservation Trust, The Truell Charitable Foundation, Lindblad – National Geographic, International Watch Company Schaffhausen, Friends of Galapagos Netherlands, Primitive Entertainment, Blue Planet film and CBS.

Collaborators:
Directorate of the Galapagos National Park (ECU), San Francisco of Quito University (ECU), Colorado State University (USA), University of Missouri (USA), National Geographic Society, and the Agence Nationale de Sécurité Sanitaire (FRA).

Team:
CDF: Gustavo Jiménez, José Granizo, Diana Loyola, Valentina Madejska, Diego Núñez, Julio Rodríguez, Josefin Schmitd, Daniel Unda and Lorena Venegas.
GNPD: Jean Piere Cadena, Walter Chimborazo, Marcelo Gavilanes, Andrea Loyola, Johannes Ramírez, Marlon Ramón and Wilson Villafuerte.
University of Missouri: Maricruz Jaramillo, Jane Merkel and Sage Roher.
USFQ: Lenin Vinueza.

Shark Population Status and Ecology

Worldwide, shark populations have declined by 90%, mainly due to overfishing. Over 100 million sharks, globally, are caught for their fins, but the Galapagos Islands are still a paradise for sharks thanks to the protection granted by the Marine Reserve Galapagos (GMR). Darwin and Wolf islands, to the north of the Archipelago, are considered to have the largest biomass of sharks in the world!

The Charles Darwin Foundation is researching the ecology of the commonest species of sharks to determine to what degree the GMR actually protects these highly mobile and globally threatened species. We are also studying the effects of El Niño/La Niña cycles on shark populations in the context of climate change and analyzing connectivity among the different marine populations of sharks. Our goal is to better manage and conserve shark populations in Galapagos.

During 2017 and 2018, we have continued our efforts to quantify the effect of El Niño/La Niña cycles on sharks and the effectiveness of the GMR in protecting them. We have also marked four other hammerhead sharks *(Sphyrna lewini)* and seven tiger sharks *(Galeocerdo cuvier)*, using satellite and acoustic transmitters, to understand their migration patterns and the degree to which they are protected in the Marine Reserve.

We have published four scientific articles, including the first reference to sharks' abundance and diversity in the Galapagos Archipelago and the first descriptive report on the marine environment hosting a ray using active hydrothermal vents as incubators in natural display cases, at 1,600 mt. depth.

In the future, we expect that Galapagos will be a worldwide model for sustainable coexistence between human beings and sharks.

Donors:
The Leona M. and Harry B. Helmsley Charitable Trust, the Save Our Seas Foundation, National Geographic Pristine Seas, IWC Schaffhausen, Focused On Nature, Qi Ming Wang, Karen Lo and Miguel Bosé.

Collaborators:
The Galapagos National Park Directorate, National Geographic Pristine Seas (US), Massey University (New Zealand), Curtin University (Australia), the Save Our Seas Shark Research Center (US), San Francisco of Quito University (Ecuador), David Acuña, Dr. Euan Harvey, Dr. Diego Páez, Dr. Mahmood Shivji, Dr. Dave Ebert, and Etienne Rastoin.

Team:
Pelayo Salinas-de-León, Florencia Cerutti, Megan Cundy, Carolina de la Hoz, Ana Moya, Keeley Rideout, Yanella Tutiven and Daniela Vilema.

Exploring Seamounts and Ecosystem Services

Seamounts are underwater volcanic mountains standing on the sea floor, which never reach the surface. Many are known as hotspots of biodiversity and often include cold-water corals and sponge gardens. They may be surrounded by productive waters that attract abundant sea life. The marine floor of the GMR is full of hundreds of seamounts, originating from the Archipelago's historical volcanic activity. Due to technological challenges of accessing these depths, very little is known about them, the life, and physical environments in these places.

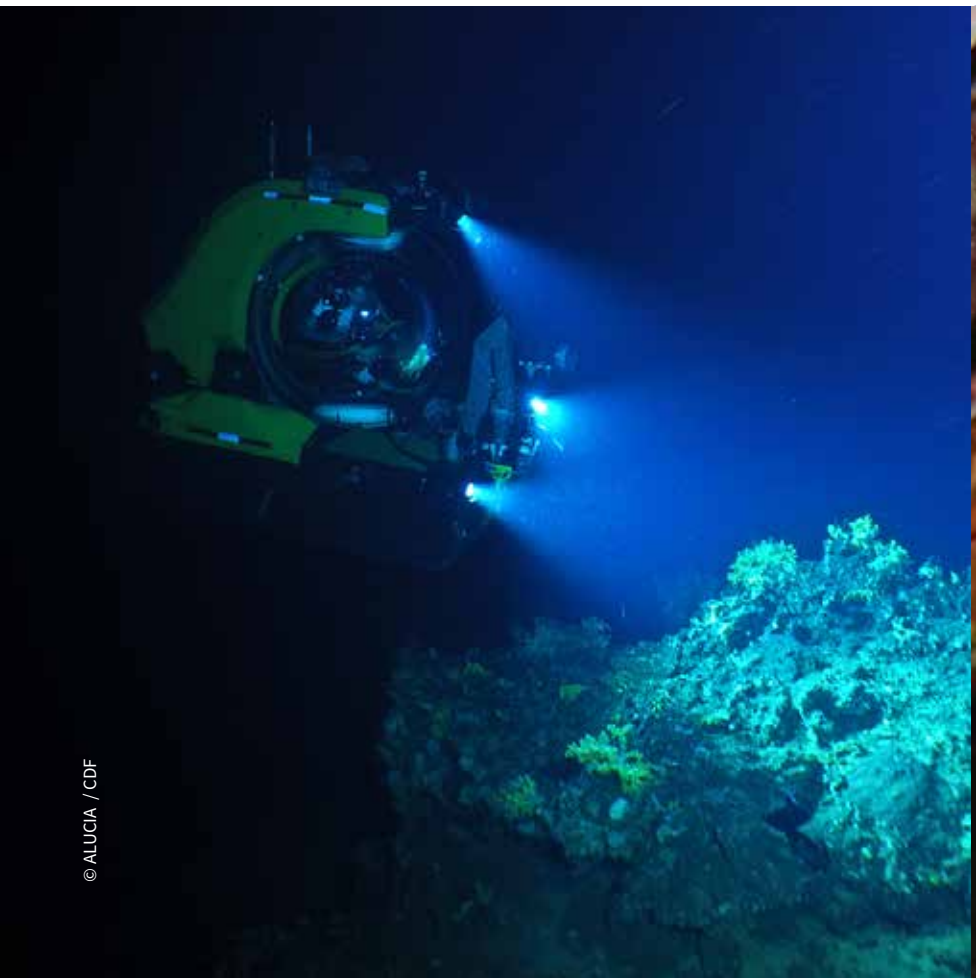
To learn more about these biomes, in 2015, the CDF and the GNPD established the program to study GMR seamounts. This was possible thanks to the support of the Ocean Exploration Trust, Woods Hole Oceanographic Institute and National Geographic's Pristine Seas, who brought three specialized ships for this type of marine explorations, in 2015 and 2016. During these cruises, remote operation vehicles (ROVs) and submarines were used to explore several seamounts and lava flows at depths of 100 to 3500 meters, in localities in the GMR. To study the biodiversity in this ecosystem, photographs and transects were taken. Over 300 specimens were collected. These ships also made bathymetric mapping over an area of 7,065 km2.

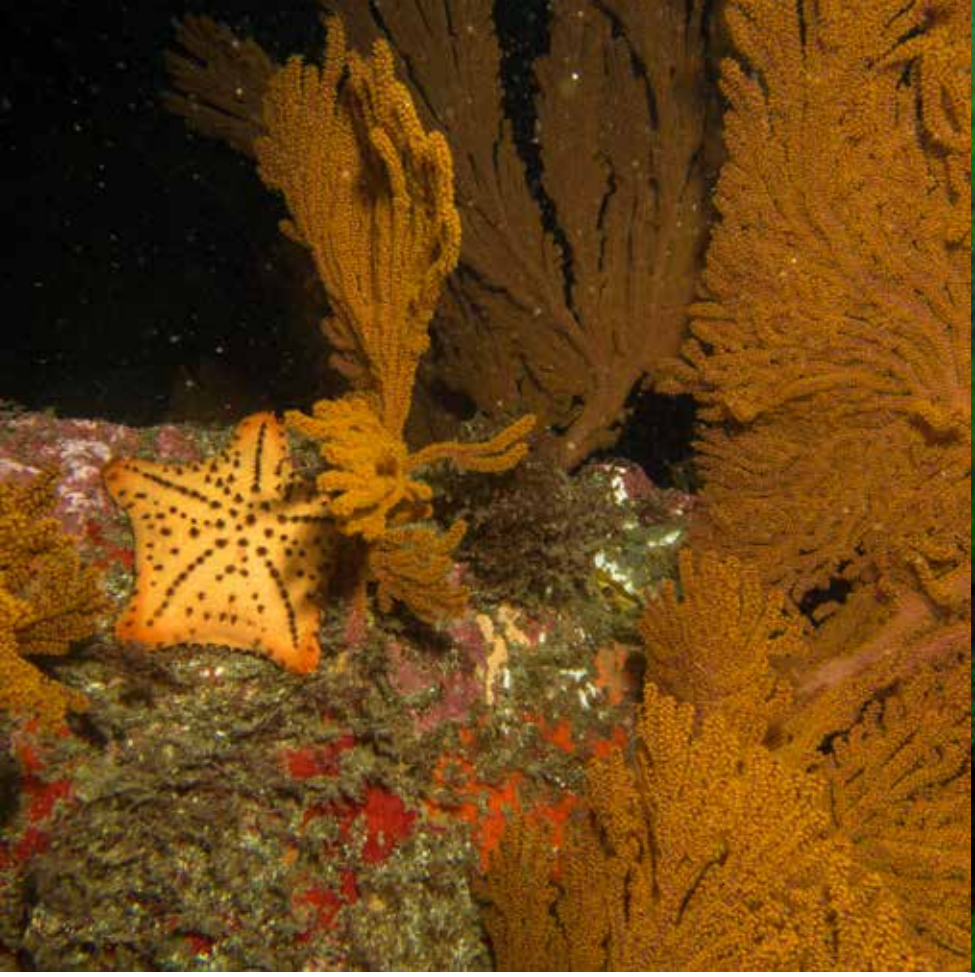
We have identified over 50% of the specimens collected. We have found more or less 30 species of organisms that are potentially new for science. We are going to publish the first inventory of invertebrates in the depths of the GMR, by Phylum. Our next challenge is to characterize the seamount communities and habitats, knowing the significance of these biomes for production sectors (e.g., artisanal fishing and tourism) in Galapagos, and to promote adequate management of marine resources and conservation in the GMR.

Donors:
National Geographic Society, Alucia Productions and Atlantic Productions.

Collaborators:
The Galapagos National Park Directorate, Woods Hole Oceanographic Institution, Ocean Exploration Trust, National Geographic Pristine Seas, VideoRay, University of Southampton, Smithsonian Institution, Louisiana State University, Boise State University, St. Mary's College, University of Victoria, Université Libre de Bruxelles, University of the Andes, Smithsonian Museum of Natural History, University of Kumamoto, University of Bristol, University of Southampton, University of Hawaii, Texas A&M University and National Autonomous University of Mexico.

Team:
María José Barragán-P., José Marín Jarrín, Patricia Martí-Puig, Salome Buglass, Leigh Marsh, Nicolás Moity, Pelayo Salinas-de-León and Etienne Rastoin.
Volunteers and students:
Camila Arnés, Marie Creemers, Isaac Deonarine, Theo Ison, Sara Lavalley and Belén Yánez.





© Nicolás Moity / CDF

Subtidal Ecological Monitoring in the Galapagos Marine Reserve

The rocky subtidal habitats in the Galapagos Islands are full of emblematic fauna such as sharks, mantas, tortoises, penguins, groupers, corals, sea stars, etc. The Subtidal Ecological Monitoring Program began in 2000, and was designed to provide the GNPD with a complete description of this community. It will also attempt to provide information about the dynamics and magnitude of fluctuations in this biota over space and time, incorporating natural and human effects such as climate change.

This long-term monitoring of the marine ecosystem provides us an opportunity to observe and react to new changes in these ecosystems, such as changes in communities, depletion of fish populations, invasion by non-native species, and decreasing species-of-interest tourism. It will also assess possible threats posed by El Niño events and by climate change, and provide us with a valuable tool to suggest management measures.

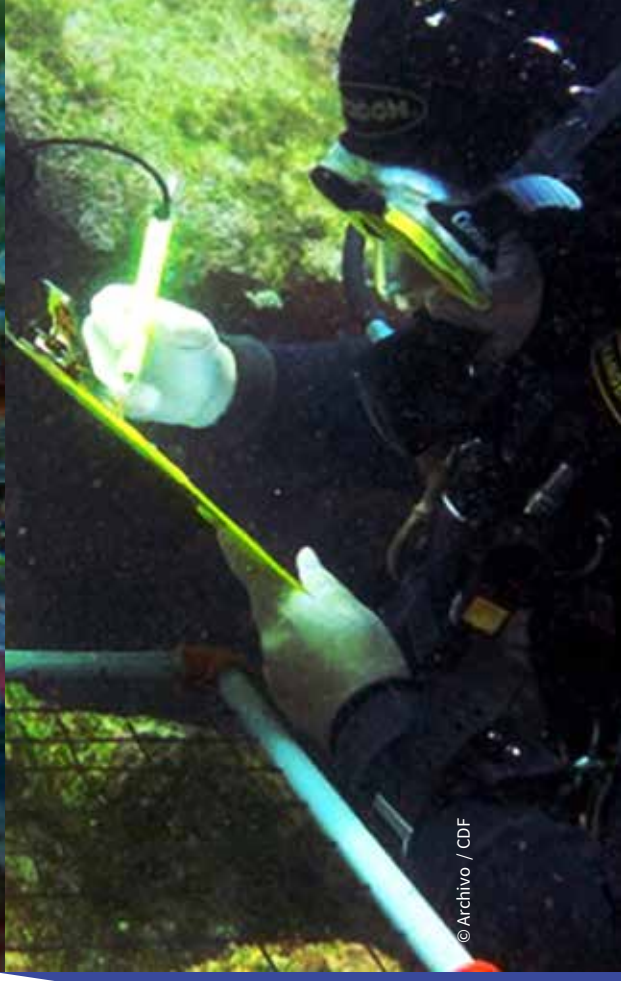
Scientists from the CDF, the GNPD and Conservation International (CI) take monitoring trips annually to the Archipelago's different bioregions to register diversity, abundance and size of the species present in three major groups of macro fauna: fish, macro-invertebrates and sessile organisms. The diving team moves along a 50-meter transect parallel to the Coast making visual censuses of these three taxonomic groups, at a depth of 15m and 6m. In addition to this, the team also records data to gauge the current status of the coral reefs at Darwin and Wolf. The CDF uses a methodology for long-term evaluation of subtidal communities that is also applied in other Marine Protected Areas (AMP) in the Eastern Tropical Pacific (ETP). The team is now working to standardize these methods throughout the ETP, enabling direct comparison between MPAs, conservation of marine ecosystems in the Archipelago and in the region.

Donors:
Amy Blackwell and Jerry Wellington Climate Change Fund.

Collaborators:
The Galapagos National Park Directorate and Conservation International.

Team:
CDF: nti Keith, Salome Buglass, Nicolás Moity, Wilson Iñiguez, Sofia Green and Franklin Teran
CI: Stuart Banks, Mariana Vera.
GNPD: Jules Paredes, Alberto Proaño and Jenifer Suarez.


© Salomé Buglass / CDF


© Archivo / CDF

Invasive Marine Species

Invasive Marine Species Program

The marine ecosystems of the Galapagos Islands harbor unique biological communities with a high incidence of endemic species. Galapagos is a UNESCO world heritage site, renowned for its high biodiversity and extraordinary oceanographic features. Marine biological invasions have increased due to global trade and tourism. The Galapagos Islands are under continuing threat from marine non-native arrivals, given the connectivity and increase in marine traffic that exists across the Eastern Tropical Pacific (ETP), as well as the effect of extreme climatic events such as the El Niño. The management strategies to tackle marine invasive species in Marine Protected Areas (MPAs) in the Pacific region have to be addressed in order to protect marine biodiversity.

The Charles Darwin Foundation and the Smithsonian Environmental Research Center have joined forces to create the CDF/SERC Marine Invasive Species Program. The international team has the taxonomic expertise in the identification of marine non-native species and along with regional cooperation through the Eastern Tropical Pacific Marine Corridor Initiative (CMAR), numerous monitoring trips were conducted, and settlement plates were deployed to determine what non-native species could possibly be transferred from one region to another on boat hulls. The team have started to quantify the risks present in the ETP region by documenting the introduced marine species that have been found in the Galapagos Islands (Ecuador) and Cocos Island (Costa Rica), as well as in mainland Ecuador. All collaborating institutions in this program share the same common goal of conserving the marine ecosystems of the region.

Donors:
Amy Blackwell and Jerry Wellington Climate Change Fund.

Collaborators:
Galapagos Conservancy, Lindblad Expedition/National Geographic Fund, The Leona M. and Harry B. Hemsley Charitable Trust and Ken Collins and Jennifer Mallison.

Team:
Inti Keith, Rosita Calderon, Wilson Iñiguez, Sofia Green, Franklin Terán, Jessica Howard, Tomas Hannam-Penfold, Carolina Salas

Monitoring Plastics and Invasive Marine Species

Marine ecosystems in Galapagos are especially vulnerable to non-native invasive species, because they have evolved in such an isolated setting. This means that, although these ecosystems are perfectly suited to life in Galapagos, they have no natural defenses to withstand competition or predation by other outside species.

In recent years, marine bio-invasions have increased due to increasing commerce reaching the islands, increasing human population numbers, and the growing number of tourists entering the Galapagos. This has brought serious, unpredictable consequences for native marine ecosystems throughout the Archipelago. Every year, around 8 million tons of plastic get into the ocean, providing a new habitat, ideal for transporting introduced (potentially invasive) marine species to places that have historically remained 'remote and isolated', such as Galapagos.

The Charles Darwin Foundation is developing a monitoring program to assess the threat posed by marine plastic, as potential transport for introduced species with capacity to become invasive, harmful species in Galapagos. This will attempt to detect early the presence of non-native species, to reduce the probability of secondary dispersal by plastic debris.

The research team is monitoring all species found living on plastic debris (including an astonishing amount of sandals!) collected on various beaches and coastlines throughout the Archipelago. We have found the species Dosima fascicularis, not previously recorded in Galapagos, and although it has not been invasive historically, this exemplifies the major role played by plastic in dispersing non-native species.

Unfortunately, there has been little study of plastic's role in the sea, as a means of transporting invasive species. When more funds are raised, we look forward to identifying the routes plastic takes to reach Galapagos and the invasive species from those other regions that might have the greatest invasive potential to become established in the islands.

Donors:
Galapagos Conservancy, Lindblad Expeditions/National Geographic Fund, the Leona M. and Harry B. Helmsley Charitable Trust, Ken Collins and Jennifer Mallinson.

Collaborators:
Galapagos National Park Directorate, Agency for Regulation and Control of Bio-security and Quarantine for Galapagos (ABG), Ecuadorian Navy, Naval Oceanographic Institute, Conservation International, the Smithsonian Environmental Research Center and Williams College.

Team:
Inti Keith, Tomas Hannam-Penfold and Jessica Howard.

Toward Sustainable Fishing in the Galapagos Marine Reserve

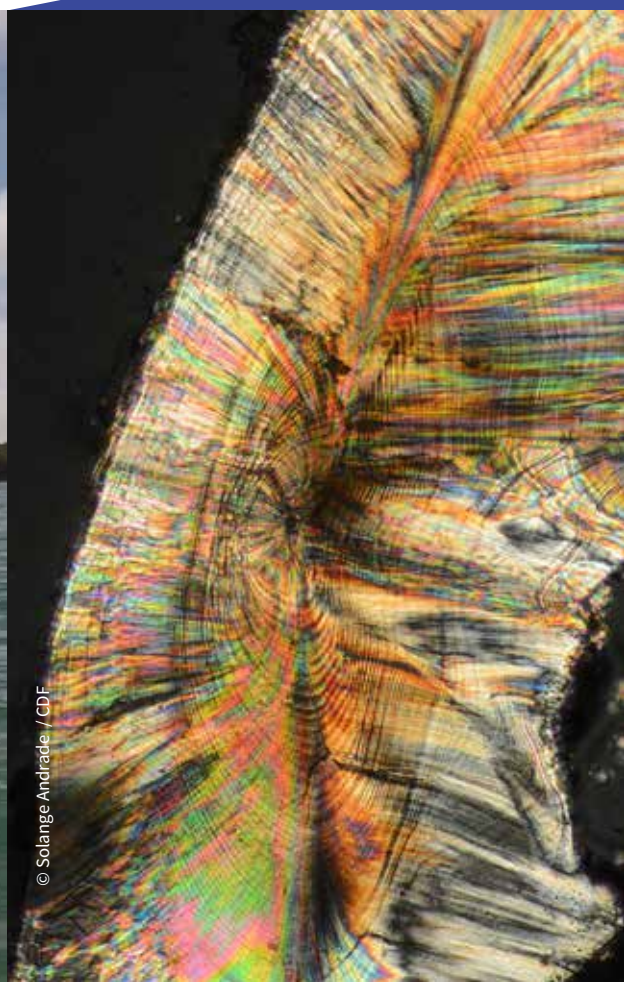
Although “Galapagos cod” is the second-most-profitable fishery in Galapagos, it currently does not have any management regulations, in view of the lack of biological information about its early and adult stages of life, as well as other coastal demersal or bottom-feeding fish species (groupers and snappers). This project is building knowledge about initial stages of development for commercial fish species which is important for the Galapagos artisanal fishing sector, and is essential to understanding their population status and distribution. Using lighted traps, we have collected many larvae and juveniles of fish and invertebrates, in mangrove zones near sandy beaches in Galapagos, which are their refuge and/or nursery during early life stages. Additionally, we are using their morphology and genetic studies with DNA barcodes to ascertain whether Galapagos’ most important fish species are present in these habitats. We are also studying the life history of fish species that are endemic to the Eastern Pacific and economically important (e.g., scorpionfish *(Pontinus clemensi),* yellow snapper *(Lutjanus argentiventris),* whitefish *(Caulolatilus princeps),* “Galapagos cod” *(Mycteroperca olfax),* and camotillo *(Paralabrax albomaculatus*), an endemic species to Galapagos, categorized as ‘endangered’ by the World Conservation Union (IUCN)).

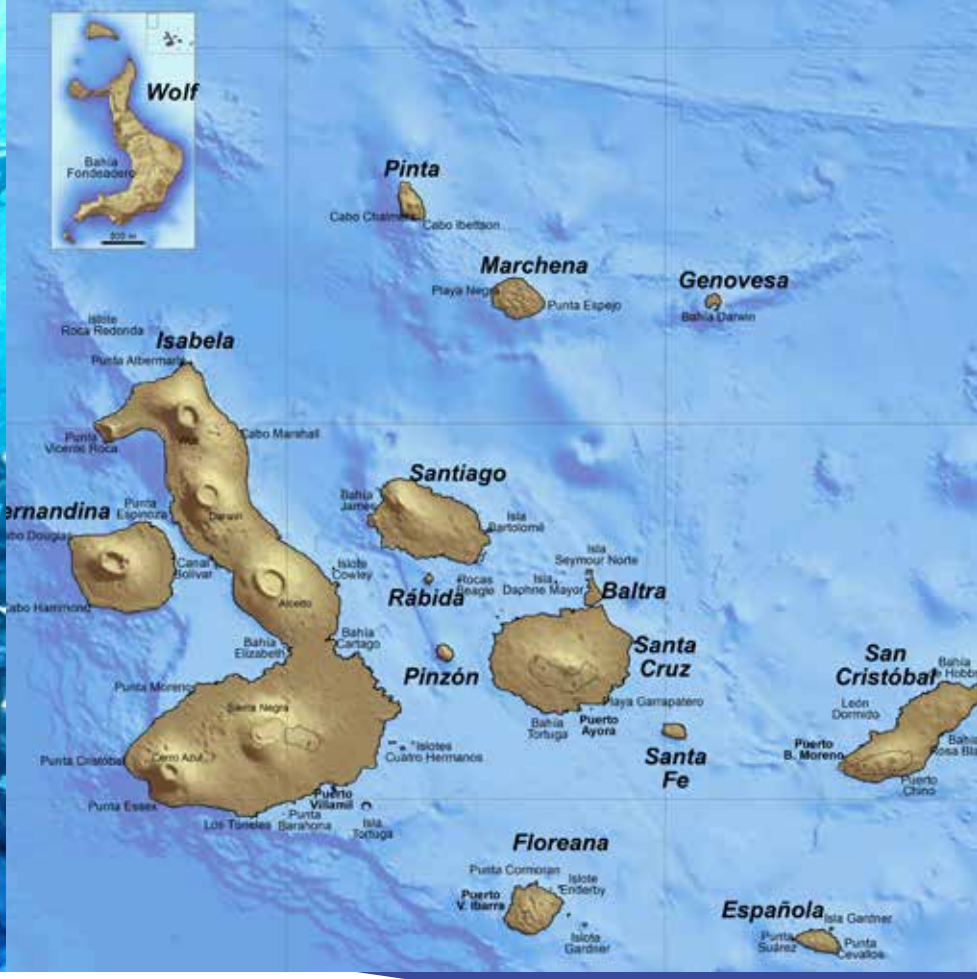
To learn about the ages, growth and movement patterns of commercial species, we are using otoliths (bony fish internal ear bones). They are analyzed chemically, and their growth rings (daily for young fish and annual for adults). The seasonal variability of food and environmental conditions affect the amount of bone growth in otoliths. Additionally, reproductive biological studies and estimates of size and age of maturity of a species have determined that commercial fish grow slowly and mature sexually quite late in life. One example is the scorpionfish: it begins breeding at 12-14 years of age (approx. 34-44 cm). Further, Marín-Jarrín et al. (2018) state that at least one third of the scorpionfish marketed have never bred. Therefore, describing these species’ life history is essential to fishing sustainably.

Donors:
The Leona M. and Harry B. Helmsley Charitable Trust.

Collaborators:
Galapagos National Park Directorate

Team:
CDF: María José Barragán P, José R. Marín Jarrín, Solange Andrade Vera, Jean Carlos Bailón, Carla Brito, Joe Castillo, Nicolás Moity, Pelayo Salinas de León, Michelle Schuiteman, Raji Scoggin, Teresa Villavicencio and Emily Witt.
Association of Artisanal Fishers of Galapagos: Leopoldo Ayala, Carlos Bailón, Marcos Bailón, Nelson Ibarra y Faustino Villarroel.
Oregon State University: Jessica Miller.
University of California at San Diego: Leticia Cavole.
Free University of Brussels: Quentin Jossart y Marc Kochzius.
University of Stockholm: Stefan Eiler.
GMaRE-ESPOL: Rafael Bermúdez.





Spatial Studies of Fisheries in the Galapagos Marine Reserve

Interactions among ecosystems, their species, and human beings determine the most important conservation zones in the GMR. This project focuses on the spatial dimension of fishing resources in the protected area, delimiting mangrove ecosystems and beaches around them. For this purpose, we are using Google Earth®, considered a low-cost technological alternative that yields more accurate results, using mid-resolution satellite imagery (Landsat, Sentinel). The baseline for mangrove distribution in Galapagos shows that, in the GMR, there is a total of approximately 3,700 ha of mangroves and around 4,000 beaches, which shows that most mangrove patches are under 0.5 ha, and most (90%) are within 500 m of the coastline. This baseline has made it possible to spatially analyze the ecosystem services that mangroves provide, regarding tourism, fishing and sequestering carbon underground. This has also identified key areas to conserve biodiversity in the GMR, using databases, historical collections, and recent data on endangered biodiversity. This analysis makes it possible to estimate the likelihood of species' distribution, subject to restrictions from the available environmental information. 'Machine learning techniques (Maxent)' and 'combined expert knowledge methods' are used.

Data from fishing (e.g., catch zones, species unloaded) can be used to identify zones where deep-sea fishing species concentrate in the GMR. This makes it possible to give the artisanal fishing sector useful information, to make their fishing more profitable and sustainable, focusing on pelagic species rather than demersal fish.

Finally, spatial analysis applies a series of logical rules regarding No-Catch Zones (NCZs) as defined by the GMR Zoning in 2000. The baseline for fish distribution in NCZs, informs an assessment of the 2000 zoning, and to compare it with a new zoning proposal. Practical application of spatial tools is highly varied and relevant to biological and social spatial analysis of GMR systems and resource governance.

Donors:
The Leona M. and Harry B. Helmsley Charitable Trust.

Collaborators:
Dirección del Parque Nacional Galápagos, Scripps Institution of Oceanography.

Team:
CDF: María José Barragán P., José Marín Jarrín, Cristina Aguaiza, Joe Castillo, Byron Delgado, Denisse Fierro Arcos, Gustavo Jiménez Uzcategui, Inti Keith, Sara Lavalley, Nicolás Moity, Pelayo Salinas-de-León, Jodie Savage, Michael Tanner and Lisseth Vega.
ESPOL: Mónica Irene López Moncada and Sophia Nativí.
Brown University: Jon Witman.
WWF: Jorge Ramírez.
Stony Brook University: Paul Tompkins.
Massey University: David Acuña-Marrero.
Scripps Institution of Oceanography: Octavio Aburto and Matt Costa.
LAFF, UCSB: Gonzalo Banda-Cruz.
Max Planck Institute for Ornithology: Carolina Proaño.

© David Jiménez/ FCD


© Sam Rowley / CDF

Study of the Population Status of the Galapagos Flamingo and Lagoon Birds

On the basis of preliminary bird monitoring findings in Galapagos, and analysis and interpretation of the data gathered, we know that the Galapagos flamingo *(Phoenicopterus ruber glyphorhynchus)* is an endemic subspecies for Ecuador, which is currently in the 'Endangered (EN)' category on the Red List of Endangered Species in Ecuador accordingly, because the number of individuals counted in this last decade has declined. The project has given flamingoes priority and has been reactivated in 2018 by the CDF, with a bi-institutional collaboration arrangement (CDF-GNPD).

This analysis integrates aspects of why this species' geographical range is limited, and its population figures are low. It also analyzes the role played by the El Niño phenomenon, introduced species, anthropogenic impacts, pathogens, and contaminants, as threats and possible impacts affecting this species. Further, natural phenomena (e.g., tsunamis and volcanic eruptions) that happened during this past decade are analyzed, including how they may affect this species in the future.

To examine the population status of the Galapagos flamingo versus threats such as climate change, introduced species, human interaction, impact of pathogens and non-infectious diseases, in 2018 CDF-GNPD monitored lagoons in the Archipelago. They also took samples, which are being analyzed in the USFQ's laboratories.

Donors:
The Leona M. and Harry B. Helmsley Charitable Trust.

Collaborators:
The Galapagos National Park Directorate, San Francisco of Quito University.

Team:
CDF: Gustavo Jiménez.
GNPD: Klever Aguilar, Aníbal Altamirano, Roberto Ballesteros, Wilson Cabrera, Milton Calva, Edinson Cárdenas, Javier Castillo, Milton Chugcho, Carlos Gaona, Fidelino Gaona, Marcelo Gavilanes, Diana Gil, Bolívar Guerrero, Estalin Jiménez, Freddy Jiménez, Henry Mora, Francisco Moreno, Freddy Mosquera, Edison Pomboza, Efrén Pomboza, Ángel Ramón, Marlon Ramón, Paola Rivadeneira, Edie Rosero, Christian Sevilla, Joan Solorzano,Alonso Tenelema,Oscar Tricallotis, Wilman Valle, Wilson Villafuerte and Wilson Villamar.

TERRESTRIAL ECOSYSTEMS

Small Landbird Population Conservation and Ecology

Recent findings by the CDF and GNPD monitoring program show over 40 populations of landbirds in the Islands are declining (19), rare or potentially extinct (14), or extinct (10). It is also known that birds living on inhabited islands are under more difficult conditions, because of introduced predators (e.g., cats and rats), introduced diseases, habitat destruction, and pesticides. A special risk is posed by the introduced parasitic fly, *Philornis downsi*, currently the main threat to conservation of small landbirds, known to affect almost every species present in Galapagos.

The CDF has been working with a number of partner and collaborating institutions to develop a method to control this parasitic fly. Tests and experiments are injecting insecticides in nests that are at risk, to protect chicks from attack by *Philornis downsi.* The mechanism covers the base of nests where the highest concentration of fly larvae have been found, to minimize their contact with eggs or chicks. This project is quite challenging because nests are usually out of researchers' reach, requiring expert tree climbers and long pipes to inject nests. Results so far indicate that this technique must still be improved. However, we have significantly reduced the amount of parasites in nests and increased breeding of Mangrove Finches (*Camarhynchus heliobates)* and Vermilion Flycatchers *(Pyrocehpalus nanus)*. Additional efforts will research alternative mechanisms to apply repellants to nests that are too difficult to inject.

This year we have worked on understanding the causes for declining Vermilion Flycatcher populations, to develop a protection plan. The greatest success has been in experimenting and then reducing *Philornis downsi* in nests. This has shown that the fly is part of the problem, especially when habitats are degraded. Curiously, at Alcedo volcano, where the Vermilion Flycatcher's habitat remains intact, successful nesting has been recorded in nests infected with parasites. This shows the importance of habitat quality and food availability to create resilience in small landbird populations.

Donors:
BirdLife Austria, Galapagos Conservancy, The Leona M. and Harry B. Helmsley Charitable Trust, Lindblad Expeditions - National Geographic Fund and Friends of Galapagos in Switzerland.

Collaborators:
Directorate of the Galapagos National Park, Ministry of Agriculture and Livestock, University of Vienna, Polytechnic School of the Coast, San Francisco of Quito University, Peregrine Fund, University of Missouri, University of Syracuse.

Team:
Birgit Fessl, Juan Aguilar, David Anchundia, Andrea Coloma, George Gutiérrez, Eileen Heyers, Celina Leuba, Andreinna Moran, Denis Mosquera, Courtney Pike, Nicolás Pluchon, Cristian Poveda, Lorena Rojas, Tui de Roy, Gabriela Urgilés, Isabela Vargas and Janai Yépez.

© Sam Rowley/ CDF

Galapagos Tortoise Movement Ecology Program

This program is a multi-institutional collaboration among the CDF, the Max Planck Institute of Ornithology, GNPD, Saint Louis Zoo Institute for Conservation Medicine, the Houston Zoo and the Galapagos Conservation Trust.

2017 was quite a productive year for the Galapagos Tortoise Movement Ecology Program. This program has pursued new lines of research to better understand the threats confronting these giants and how we can contribute to their conservation. Our colleagues, Freddy and José, have continued their immense field work, conducting meteorological censuses, surveying local farmers about impacts that tortoises may have on their farms, or walking for hours, come sun or rain, to follow tortoises around in the field or devoting long hours to marking newborn tortoises.

This year, we must also highlight the work of Dr. Samuel Rivera and Dr. Sharon Deem. Thanks to them, we were able to camp for several days in the El Chato nesting zone (Santa Cruz Island) to perform laparoscopies to sex newborn tortoises. This information is crucial because the incubation temperature determines the sex of our little tortoises. Did you know that increasing the temperature of Galapagos by one degree could seriously affect the rate of males to females in the populations of free-living giant tortoises that are born every year? In-depth knowledge of these species' reproductive ecology provides us with fundamental information to help conserve this emblematic species.

To educate the public, we have spoken with several local and visiting groups, including the Second Symposium on Research and Conservation in Galapagos. Over 500 young people, ages 5 to 18, participated in experiential education activities in classrooms and elsewhere, in collaboration with EPl, the GNPD, the Municipality of Santa Cruz, primary schools and the secondary section of the Tomás de Berlanga Unit School.

Donors:
Saint Louis Zoo Institute for Conservation Medicine, Houston Zoo, Galapagos Conservation Trust, Woodspring Trust, the United States National Science Foundation (US-NSF), Friends of Galapagos, Switzerland, International Watch Company Schaffhausen, International Community Fund and Karen Lo.

Collaborators:
irectorate of the Galapagos National Park and Max Planck Institute of Ornithology.

Team:
Stephen Blake, Sharon L. Deem, Kathleen Apakupakul, Guillaume Bastille-Rousseau, Francisco Benítez, Freddy Cabrera, Diego Ellis, Evan Emmel, Anne Guezou, José Haro, Alejandra Mejía, Ainoa Nieto, Jamie Palmer, Karina Ramón, Samuel Rivera and Charles Yackulic.

© Joshua Vela/ CDF

Assessing the Health Status of Land Tortoises

This program is a multi-institutional collaboration among the CDF, the Max Planck Institute of Ornithology, GNPD, Conservation Medicine Institute of the Saint Louis Zoo, the Houston Zoo and the Galapagos Conservation Trust.

Under the leadership of Dr. Sharon Deem, Director of the Saint Louis Zoo Institute for Conservation Medicine, we have started a new research component this year under the Galapagos Tortoise Movement Ecology Program: ascertaining the health status of land tortoises and determining how living close to human beings and domestic animals may affect their well-being.

This year, we conducted a pilot study on Santa Cruz Island, sampling a total of 30 tortoises in agricultural zones, peri-urban areas, and in the Galapagos National Park. Long days of sampling in the rain, followed by intense laboratory work, have yielded some preliminary findings. There is evidence that Galapagos' giant tortoises have antibiotic-resistant bacteria, which is common in other species of wild animals (e.g., vultures or storks), that live near inhabited zones.

Use and abuse of medicines to improve human and animal health is causing antibiotic resistance worldwide, which may be transmitted to wild animals through contaminated water and soil. It is indispensable to understand Galapagos wildlife's health, to ensure conservation of these unique species and to maintain the whole ecosystem's balance, including the health of those human beings who are privileged to live in this natural paradise.

Donors:
Saint Louis Zoo Institute for Conservation Medicine, Houston Zoo, Galapagos Conservation Trust, Cleveland Metroparks Zoo, Saint Louis Zoo, Schaffhausen International Watch Company, International Community Fund and Karen Lo.

Collaborators:
Directorate of the Galapagos National Park and Max Planck Institute of Ornithology.

Team:
Stephen Blake, Sharon L. Deem, Kathleen Apakupakul, Freddy Cabrera, Paulo Colchao, Fernando Esperón, José Haro, Laura Kleinschmidt, Ainoa Nieto, Jamie Palmer and Karina Ramón.

Researching Bird Mortality on Santa Cruz Island Highway

Donors:
The Leona M. and Harry B. Helmsley Charitable Trust.

Collaborators:
Galapagos National Park Directorate.

Team:
CDF: Gustavo Jiménez, José Granizo, Luciana Liberoff and Valentina Madejska.
GNPD: Karina Bedoya, Viviana Carrera, Fidelino Gaona, Andrea Guerrero, Roberto Jiménez, Andrea Loyola, Galo Quezada and Evelyn Vera.
Future Leaders: Josué Baque andSofía Lucas.

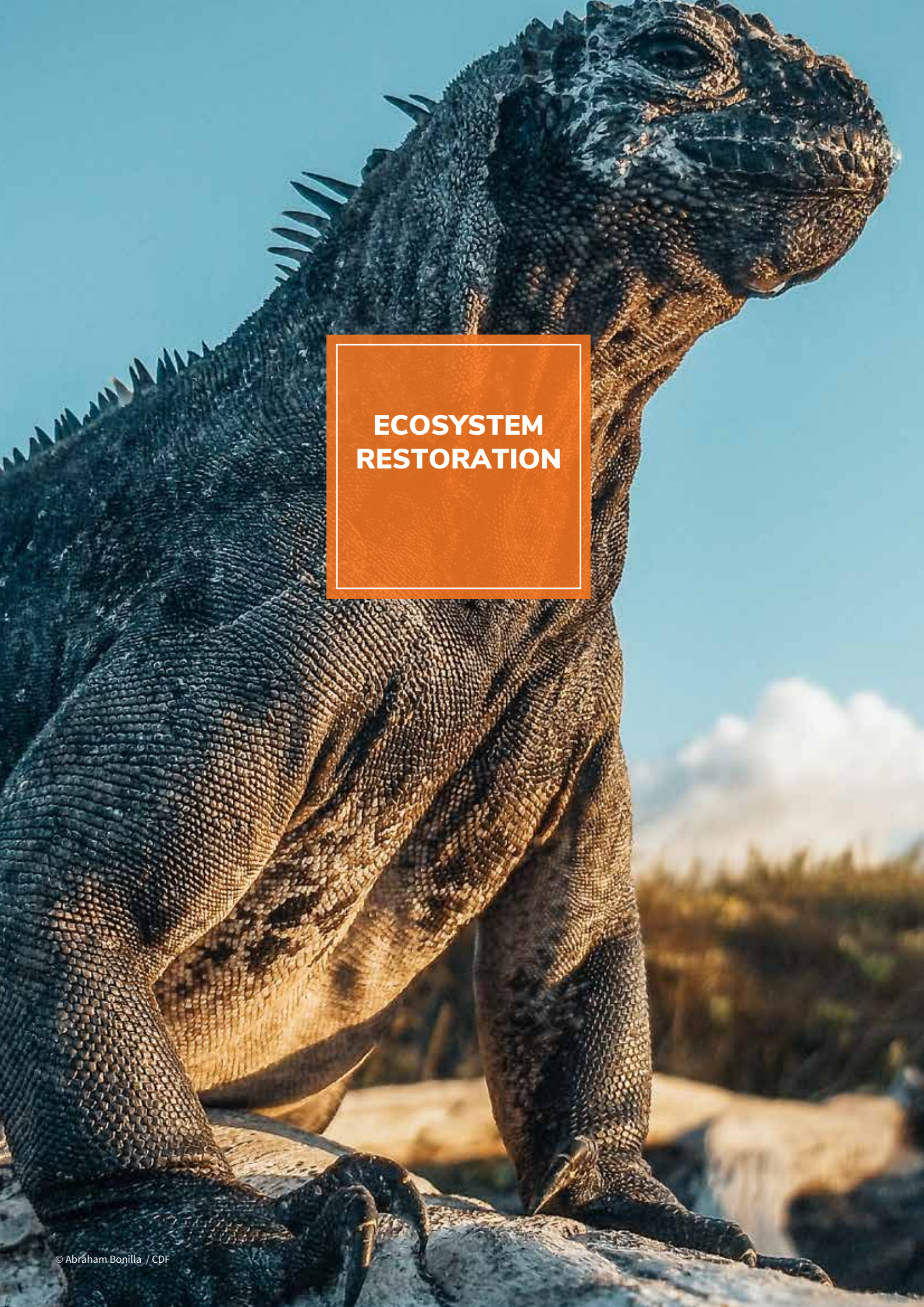
Highways are part of human communities' socio-economic development. However, they can have negative effects on natural zones, such as fragmenting habitats, decreasing wildlife populations, polluting the environment, and trampling animals, such as landbirds. Despite this critical influence, highways also provide birds with food, water and resting zones. The highway on Santa Cruz, which began operating in 1974, crosses the island from south to north (Puerto Ayora - Itabaca Canal). The number of automotive vehicles circulating on the island has increased significantly in recent years: from approximately 28 in the 1980s to over 1100 at present. Studies of automotive impact on the wild birds of Santa Cruz have been conducted in 1980, 2001, 2003 and 2004-2006. After twelve years, and with evidence on hand to show the significance of this issue, the CDF is replicating this study in 2018, following the methodology used in 2006. This project is examining automotive impact on wild birds of the Puerto Ayora – Itabaca Canal highway at present, especially now that the roadway's usage dynamics have changed.

This is a bi-institutional project (CDF-GNPD). During this research, eight monitorings took place monthly (January- September) of automotive-landbird collision incidents in the Puerto Ayora – Itabaca Canal route. During the monthly monitoring more than 268 landbirds collected were killed by car collisions. The number may be higher, but has not been documented, because there are many 'carrion-eating' species (e.g., cats, rats, storks, owls) that feed on road kill, removing the evidence of incidents. Informational lectures about the preliminary findings have been given at the GNPD Science Congress and at the Tomás de Berlanga Unit School.


© Joshua Vela / CDF


© Archive / CDF

ECOSYSTEM RESTORATION



RECOVERING ENDANGERED SPECIES


© Liza Díaz Lalova/ CDF

Contributing to the Recovering of the Mangrove Finch in Galapagos

The Mangrove Finch *(Camarhynchus heliobates)* is considered the rarest bird species in Galapagos. Its population of approximately just 100 individuals has only 12 breeding pairs recorded in 2018. This small population is located in two small, remote areas of mangrove forests on Isabela Island. These finches currently face constant threats by introduced species and climate change. For this reason, the CDF's Mangrove Finch project is a highly significant initiative to conserve this species and prevent it from disappearing.

After four seasons of successful breeding in captivity, to promote reproduction of the remnant Mangrove Finch population, 39 chicks have been released in their natural habitat. In 2018, exciting results have been obtained in conserving mangrove forests and the finches living in them. In 2018, researchers camped at a remote site of Isabela Island for two months, to protect chicks from the *Philornis downsi* fly. This research was done without removing eggs from nests, and without raising chicks in captivity, as had been done in previous breeding seasons. In 2017, Mangrove Finch nests were fumigated with a natural, plant-based insecticide. This killed the parasites and enabled chicks to remain with their parents. One of the greatest challenges to date is to access the delicate nests, located in mangrove trees as high as 20 m. The research team uses ropes and improvised scaffolding to reach these lofty nests. To date, 21 Mangrove Finch chicks have been protected from the danger of introduced species by using this method.

The birds raised in captivity that have started breeding in Nature were recorded, another successful result, including one female with three chicks. Despite the encouraging results so far, we can not lower our guard and leave the breeding pairs without intensive care during the breeding season. Otherwise, the Mangrove Finch population will continue dwindling, making their extinction likelier.

The Mangrove Finch project is a bi-institutional effort by the Charles Darwin Foundation and the Directorate of the Galapagos National Park.

Donors:
The Leona M. and Harry B. Helmsley Charitable Trust, Marguerite Griffith-Jones, GESS Charitable Trust, Decoroom Limited, Holbeck Charitable Trust, Galapagos Conservation Trust, Friends of the Galapagos Switzerland, Foundation Ensemble and Prince Bernhard Nature Fund.

Collaborators:
San Diego Global Zoo, Auckland Zoo and Durrell Wildlife Conservation Trust and Galapagos National Park Directorate

Team:
Francesca Cunninghame, David Auz, Birgit Fessl and Jorge Jiménez.

Donors:
Galapagos Conservancy, The Leona M. and Harry B. Helmsley Charitable Trust and the Lindblad Expeditions - National Geographic Foundation.

Collaborators:
The Directorate of the Galapagos National Park, The Agency for Regulation and Control of Bio-security and Quarantine for Galapagos (ABG), the Canadian National Collection of Insects, Arachnids and Nematodes (CNC) of Agriculture and Agri-Food, Flinders University, Galapagos Science Center, Hebrew University of Jerusalem (Israel), National Biodiversity Institute, LECEN - ICIVET LITORAL (Argentina),University of Macquarie, Saint Louis Zoo in Missouri, SUNY-ESF, University of Syracuse, Central University of Ecuador, University of Connecticut, University of Guayaquil, University of Massachusetts – Dartmouth, University of Minnesota, University of Utah, University of Vienna, University of the West Indies, Victoria University of Wellington, and USDA-ARS/COPEG.

Team:
Charlotte Causton, Andrea Cahuana, Sugey Caicedo, Yazmín Cedillo, Simon Heimpel, Paola Lahuatte, Charles Lehnen, Andrea Merchan, Courtney Pike, Erika Ramírez, Samantha Renda, Quinn Steiner, Isabela Vargas and Hayden Wilkes.

Finding Alternatives to Control the Invasive fly *Philornis downsi*

In late 2017 and early 2018, two more landbird species in Galapagos were found to be hosts for the introduced parasitic fly, *Philornis downsi:* One is the Galapagos martin (*Progne modesta)*, and the other is the Gray Warbler Finch (*Certhidea fusca)*, identified by Sarah Knutie. This makes a total of 20 bird species whose conservation status is seriously affected by this invasive fly. These species also include 12 species of Darwin Finches. So, *Philornis downsi* is seriously affecting the survival of numerous species of landbirds, including the Mangrove Finch, which is critically endangered.

These invasive flies are experts at locating birds' nests to lay their own eggs. Once the maggots hatch, they feed off the blood of baby chicks, which sometimes kills the nest's entire clutch. To reduce the impact of *Philornis downsi* on landbirds, the CDF and GNPD are making a multi-institutional collaboration effort (currently including 22 institutions from 10 countries) to research this little-known fly's biology and ecology. At the same time, researchers are seeking effective, environmentally-friendly control methods.

To identify methods to control this land-bird parasite, it is fundamental to maintain laboratory colonies of it. This has never been achieved before by researchers working with this species. Now CDF scientists have developed a method to raise these flies' maggots, by devising a diet to replace the live bird hosts. They are working arduously to discover how to successfully raise adult flies of this species. Ironically, although the flies can survive harsh environmental and ecological conditions in Galapagos, their reproductive success in the laboratory is low, which suggests that they need certain special elements, which researchers are now working on. The most interesting preliminary findings include the discovery that birds' odors stimulate flies to lay eggs. Researchers suspect that these odors may also play a key role in helping flies locate nests and maybe even breeding pairs. During the remaining months of 2018, the research team will be expanded to discover which odors are most appealing to these flies. Once this is known, some of these odors might potentially be used to trap flies in endangered land-bird nesting areas.


© Liza Díaz Lalova / CDF


© Tui de Roy / CDF

Invasive Wasps: Using Lures to Attract Them

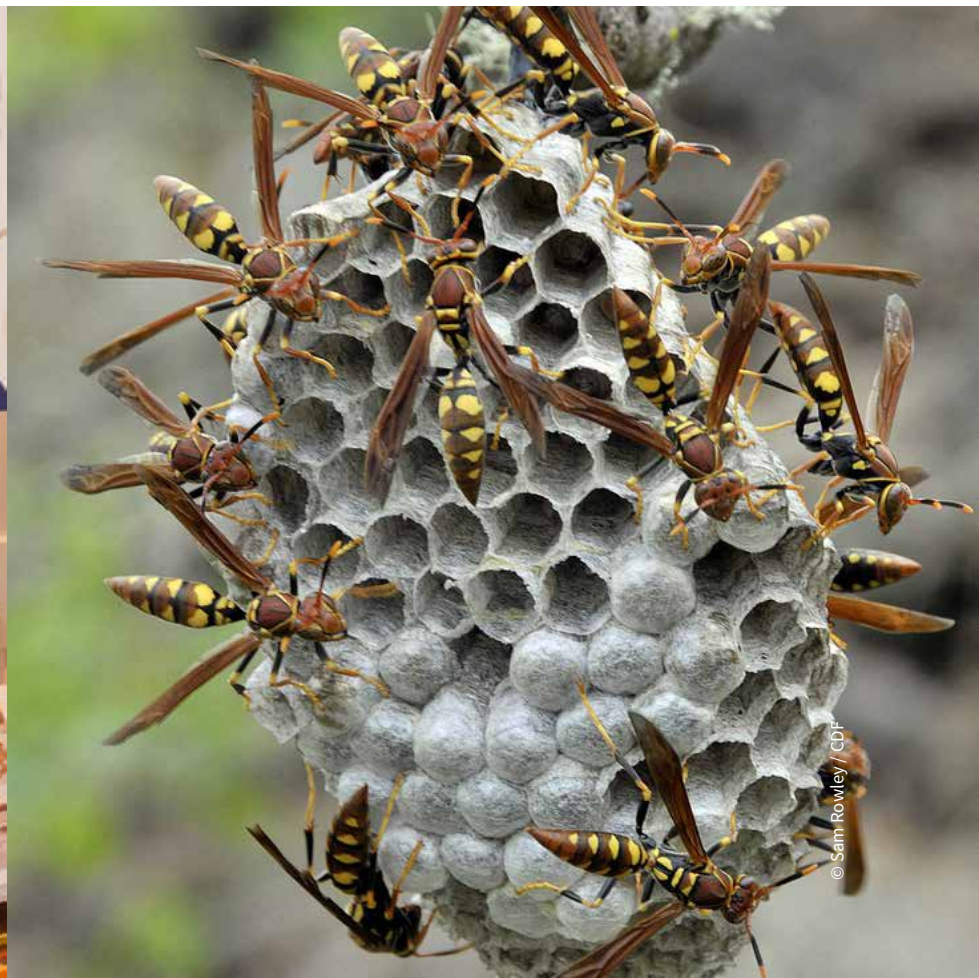
Donors:
Galapagos Conservancy.

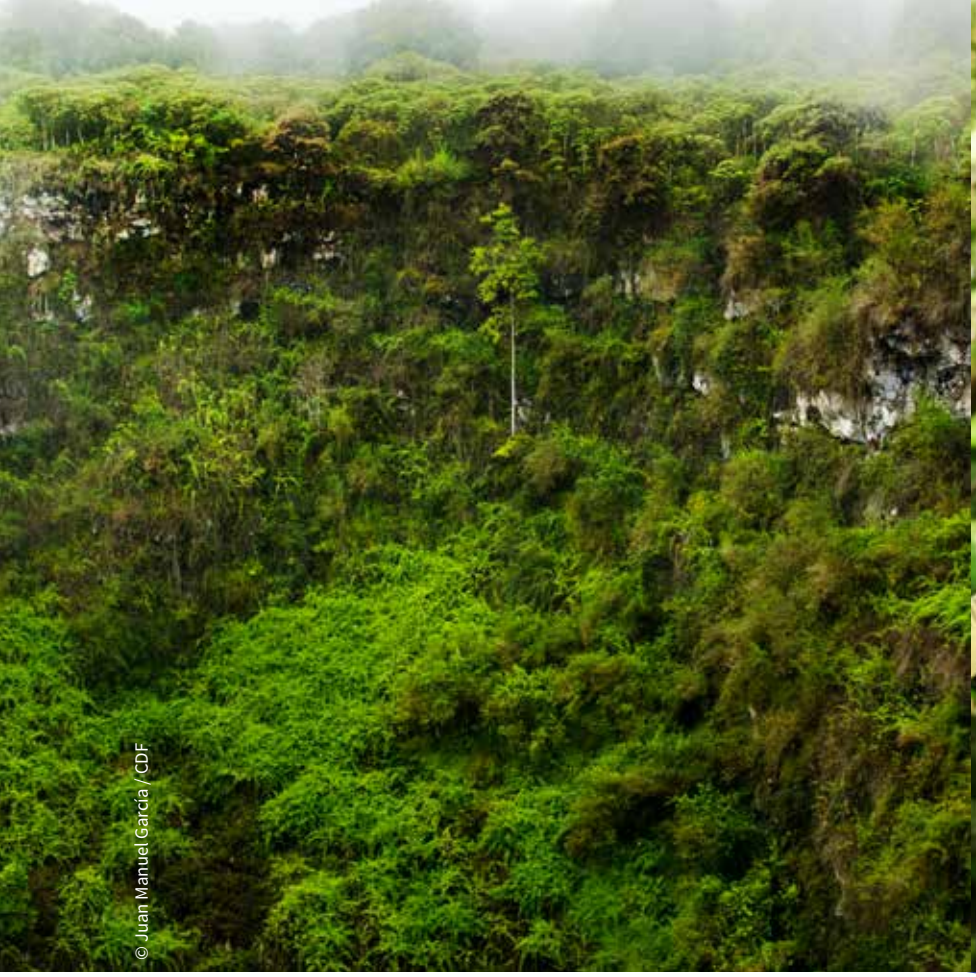
Collaborators:
Directorate of the Galapagos National Park, Victoria University at Wellington and the Polytechnic Institute of Chimborazo.

Team:
Charlotte Causton, Heinke Jäger and Jacqueline Rodríguez.

The paper wasp, *Polistes versicolor*, was reported for the first time in the Galapagos Islands in 1988. It is believed now to have spread to most islands in the Galapagos Archipelago. The GNPD and the CDF have identified the need to manage this wasp species as a high priority. The argument for this proposal is due to the possible negative impact that this wasp species could have on biodiversity in Galapagos. Additionally, this wasp is a nuisance for both residents and visitors to the islands, and is known to be an introduced species. The wasp prefers to eat native invertebrates, particularly larvae of Galapagos moths and butterflies, which makes it especially threatening for the islands' insects (entomo-fauna).

This situation has a diverse range of implications, not only for these species' well-being, but also for the insectivore species that feed on them, such as birds and lizards. The Polistes wasp also eats nectar from flowers and frequently visits Galapagos' plants. Studies are being conducted to understand the consequences of these interactions for Galapagos ecosystems. *Polistes versicolor* is commonly found in areas inhabited by humans (e.g., visitor sites, markets, farms) and its sting can cause allergic reactions in some people. Scientists have discovered that this wasp is strongly attracted by fermented fruits and yeasts. For this reason, yeast and other potential attractants will be assessed to find a possible lure to effectively attract wasps. However, it is hoped that this compound of appealing substances will be less attractive to native species from Galapagos. The purpose of this research is to develop a bait with insecticide, that will appeal to wasps, which will eat it and then take part of the bait back to their nest. Growing wasps and the queen will then feed on the bait, destroying the nest and successfully control this introduced pest.




© Juan Manuel García / CDF


© Liza Díaz Lalova / CDF

Restoring the Ecosystem of Los Gemelos

Native Galapagos plant species have been seriously affected by changing land use over the last few decades. More recently, these changes have been seriously influenced by invasive species. One of the habitats most seriously impacted is the Scalesia forest, on Santa Cruz Island. This woodland zone is dominated by the Daisy Tree *(Scalesia pedunculata)*, a species whose coverage is currently estimated at less than 1% of its original distribution. The best remaining relict of this population, on Santa Cruz Island, is in Los Gemelos. At this site, this species spreads over 100 hectares and this is where the GNPD is focusing all its restoration efforts for this native, endemic species.

Over the last 20 years, large areas of Los Gemelos have been invaded by a very aggressive terrestrial invasive species: blackberry *(Rubus niveus)*. This species thrives so strongly because it produces numerous seeds, grows vigorously and prevents native species from growing. The GNPD is taking successful actions to control blackberry and to reforest with young *Scalesia* seedlings grown in tree nurseries for the last 10 years. However, there is concern that this intensive management, using herbicides to control blackberry, has changed the forest's structure and composition, affecting other species living in this zone (e.g., invertebrates, birds).

Therefore, this long-term study will provide scientific information on the effects of restoration measures on the *Scalesia* forests of Santa Cruz Island, in addition to contributing valuable knowledge about the dynamics of this unique but little-studied ecosystem.

The CDF, in collaboration with the International Agriculture and Bioscience Center (CABI), is studying the use of biological control agents for blackberry, as an alternative to the techniques currently used to control this highly invasive species. The findings of this research will provide knowledge about effective techniques which are, at the same time, environmentally respectful. This will restore Galapagos ecosystems through an integrated scientific approach.

Donors:
Galapagos Conservancy, Keidanren Nature Conservation Fund, and Lindblad Expeditions-National Geographic Fund.

Collaborators:
Directorate of the Galapagos National Park, University of Vienna and International Agriculture and Bioscience Center.

Team:
Heinke Jäger, María Belén Bentet, Carolina Carrión, Marcelo Loyola, Diego Nieto, Samantha Renda and Jacqueline Rodriguez.


© Joshua Vela/ CDF


© Heinke Jäger / CDF

Invasion and Control of the Quinine Tree

More than 800 plant species have been introduced to the Galapagos Islands. Most are not problematic or even beneficial, like agricultural and ornamental plants. However, some have become invasive and negatively affect other plant and animal species. The best-known examples are blackberry *(Rubus niveus),* guava *(Psidium guajava),* Cuban cedar *(Cedrela odorata)* and the red quinine tree (*Cinchona pubescens).* Characteristics that make quinine such a successful invader includes the production of numerous, windborne seeds and a vigorous vegetative reproduction by resprouting from underground stems and fallen trees. It is currently successfully being manually and chemically controlled by the Galapagos National Park Directorate in priority conservation areas. Methods include uprooting of the trees and applying herbicides to cuts in the bark. However, over the last 10 years, a dramatic die-off of this species has been observed is currently unknown what causes it.

The Charles Darwin Foundation, alongside the Galapagos National Park Directorate, is studying the impacts of quinine and seeks to improve the control actions currently carried out. This includes evaluating possible alternative control options. Studies carried out showed that quinine shades out and reduces the cover of native and endemic plant species. In addition, it changes the microclimate and the nutrient cycling in the soil, particularly that of phosphorus. Studies on the impacts of control measures revealed that the native vegetation recovers over the years after an initial decrease in cover. However, they also caused severe disturbance to the surrounding vegetation and soil, which probably facilitated the establishment of other introduced, like blackberry *Rubus niveus*. In addition, continuous hand pulling of emerging seedlings over a long period would be necessary to guarantee a lasting control success. Due to these challenges, research by CDF is also looking into using biological control agents as an alternative to current control techniques.

Donors:
Galapagos Conservancy, Keidanren Nature Conservation Fund and Lindblad Expeditions-National Geographic Fund.

Collaborators:
Galapagos National Park Directorate, International Center for Agriculture and Biosciences (CABI) University of Florida and Technical University of Berlin
Team:
Heinke Jäger, Carolina Carrión, Surya Castillo, Marcelo Loyola and Jacqueline Rodríguez.

Analysis of Satellite Imagery to Map the Expansion of Invasive Species

Donors:
The Leona M. and Harry B. Helmsley Charitable Trust, Galapagos Conservancy, and the Lindblad Expeditions-National Geographic Fund.

Collaborators:
Galapagos National Park Directorate, DigitalGlobe Foundation and Brown University.

Team:
Heinke Jäger, Carolina Carrión, and Jorge Rentería.

Invasive plants or weeds can have a negative impact on native communities of flora and fauna and on agriculture. They can also alter the services provided by natural ecosystems, especially in highly sensitive places such as the Galapagos Islands. Knowledge about the distribution and abundance of invasive plants and visualizing them with vegetation maps can help determine areas of possible impact and guide management actions.

Obtaining data to prepare vegetation maps, using traditional methods (hiking around), may prove difficult and very costly, especially to map large areas with difficult access. Therefore, the Charles Darwin Foundation is identifying the locations of invasive species using an innovative methodology, with drone photographs and analyzing high-resolution satellite imagery. This information is used to prepare maps showing the distribution and the abundance of the humid zone's most dominant invasive species in the Galapagos Islands.

Part of the preliminary outputs are distribution maps of invasive species in the humid zone of Santa Cruz Island. Species such as blackberry *(Rubus niveus),* guava *(Psidium guajava)* and cedrela (*Cedrela odorata)* have been identified as the most dominant invasive species in this locality. Additionally, distribution maps of invasive species are being created for Floreana and Santiago islands, using this same methodology. We expect this information to help the Galapagos National Park Directorate to efficiently plan measures and actions to control invasive plants, to help conserve the Archipelago's unique species.


© Sam Rowley / CDF


© Joshua Vela / CDF


© Hugues Mouret/ CDF


© Heinke Jäger/ CDF

Study of the Distribution of Introduced Tree Frog *Scinax quinquefasciatus*

The Fowler's Snouted treefrog *Scinax quinquefasciatus,* native to western mainland Ecuador, was probably introduced to the Galapagos Islands by means of cargo transfer in the year 1997 or 1998 during the El Niño. The unusual wet conditions during that period were thought to have facilitated the establishment of the species in the archipelago.

Presently, the treefrog has been reported from the islands of Santa Cruz and Isabela, and in the past, from San Cristóbal. While an attempt was made to assess the distribution of the species on Isabela, no up to date information exists for the distribution on Santa Cruz. In addition, the population size, invasion potential and impact on native species need to be establish for the islands to be able to formulate recommendations for management and quarantine decisions. This project aims at closing this knowledge gap in an integrative approach, combining field-based assessments, lab-based dietary analyses with ecological models and, in the long run, population genetic analyses.

During the pilot phase, we acquired several new records of well-established populations of the treefrog on Santa Cruz. The search within the agricultural zone on Santa Cruz Island revealed a large distribution. So far, the records outside of the agricultural zone are located in the urban areas of Puerto Ayora and in transitional habitats between the National Park area and the agricultural zone. The few records within the National Park area come from popular tourist sites, like Los Gemelos and Media Luna. Specimen obtained from the farm 'Rancho Manzanillo' were used for dietary analysis by means of gut content assessments. Results will be used to inform quarantine efforts about the dispersal risk and the Galapagos National Park Directorate about management recommendations.

Donors:
Galapagos Conservancy, Lindblad Expeditions-National Geographic Fund y Basler Stiftung.

Collaborators:
Galapagos National Park Directorate, Rancho Manzanillo, Natural History Collections Senckenberg Dresden, and Escuela Superior Politécnica del Litoral.

Team:
Heinke Jäger, Marcelo Loyola, Samantha Renda.

Galapagos Verde 2050

"Galapagos Verde 2050" is a long-term project implemented by the CDF with the GNPD's support. This project is contributing to conserving Galapagos' natural capital and its human population's well-being. This initiative uses water-saving technologies as tools to develop a successful model, to achieve this project's two goals: the ecological restoration of affected vegetation zones, and development of sustainable agricultural practices.

Collaborators:
Galapagos National Park Directorate, Agency for Regulation and Control of Biosecurity and Quarantine for Galapagos (ABG), Ministry of Agriculture (MAG), Government of Floreana, Government of Santa Cruz, Baltra Ecological Airport (ECOGAL)
Ecuadorian Air Force, Ecuadorian Navy Santa Cruz, Floreana and San Cristóbal educational institutions.

Team:
Patricia Jaramillo, Luka Negoita, Lorena Romero, Paúl Mayorga, Jandry Vásquez and María Guerrero.

Ecological Restoration

This component of the project includes 37 study sites, distributed among several islands: Española, Floreana, Northern Isabela, Plaza South, Baltra and Santa Cruz. This component's goal is ecological restoration on these islands to recover and/or maintain ecosystems' capacity to generate services, and recover populations of endangered endemic species.

On Baltra, an experimental model has been developed and implemented to restore degraded arid ecosystems. This component proposes the use of three different water-saving technologies (i.e., Groasis, Hidrogel, and Cocoon) in different areas. Work has included three hectares located in areas chosen on the basis of their level of degradation. This experiment included 12 species of native and endemic plants from the island to restore native ecosystems to the desired status. Localities for study included Plaza South, Española, Santa Cruz and Northern Isabela. On these islands, restoration began for the populations of *Opuntia echios* var. *echios, Opuntia megasperma* var. *orientalis, Scalesia affinis* and *Galvezia leucantha* var. *leucantha*, all of which are species with seriously affected populations and compromised conservation statuses. Additionally, on Santa Cruz, ecological restoration actions have been taken on the bicycle path and in urban areas, implementing ecological gardens in homes distributed among different gradients of the island's vegetation zones.

An important achievement of this restoration phase has been to obtain and plant 400 individuals of *S. affinis,* a species of which only 65 remain. This species had difficulty, for many years, in obtaining viable seeds and seedlings. However, analyses of the first phase have shown that the Groasis and Hidrogel technologies have yielded promising results in all ecological restoration experiments so far. However, the third technology, Cocoon, has had unsatisfactory results, especially on Baltra.

Galapagos Verde 2050

"Galapagos Verde 2050" is a long-term project implemented by the CDF with the GNPD's support. This project is contributing to conserving Galapagos' natural capital and its human population's well-being. This initiative uses water-saving technologies as tools to develop a successful model, to achieve this project's two goals: the ecological restoration of affected vegetation zones, and development of sustainable agricultural practices.

Donors:
COmON Foundation, The Leona M. and Harry B. Helmsley Charitable Trust and BESS Forest Club.

Collaborators:
Galapagos National Park Directorate, Agency for Regulation and Control of Biosecurity and Quarantine for Galapagos (ABG), Ministry of Agriculture (MAG), Government of Floreana, Government of Santa Cruz, Baltra Ecological Airport (ECOGAL) Ecuadorian Air Force, Ecuadorian Navy Santa Cruz, Floreana and San Cristóbal educational institutions.

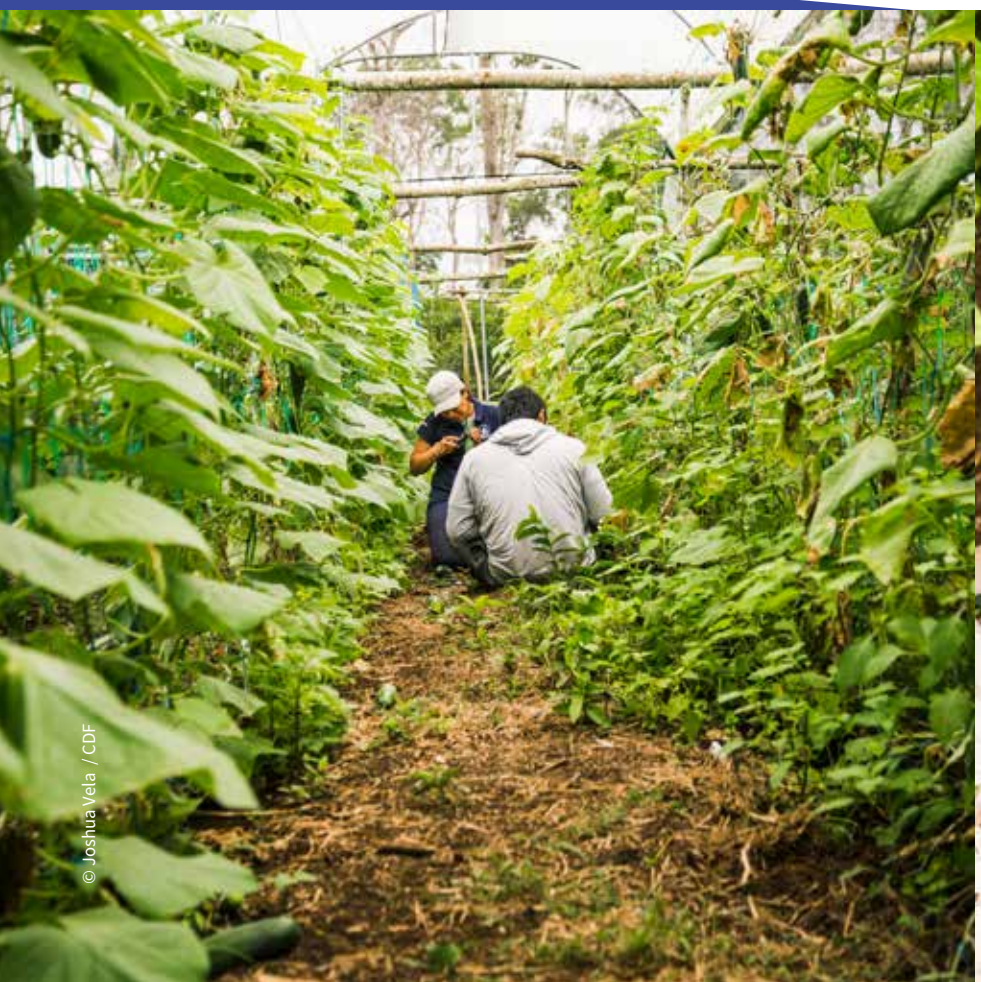
Team:
Patricia Jaramillo, Luka Negoita, Micaela Solís, Lorena Romero, Paúl Mayorga, Jandry Vásquez and María Guerrero.

Sustainable Agricultural Practices

This component attempts to understand how using technologies can help improve productivity on Santa Cruz and Floreana farms. This research includes 36 study sites on Floreana and Santa Cruz. Experiments are currently under way on six producing farms, using the Groasis and Hidrogel technologies. Study sites are located both among open field crops and in greenhouses, to assess the effectiveness of using water-saving technologies on annual and perennial crops; and analyze the cost/benefit ratio of using water-saving technologies in agriculture. The annual crops assessed included: broccoli, tomato, bell pepper, watermelon and cantaloupe, which are important cash crops for local farmers because of their high demand. This is especially important for tomatoes and peppers, grown year-round to meet demand. Results so far show that, in a five-year projection, several crops will be profitable, with a cost-benefit ratio of $1.52 per product.

Preliminary results from the GV2050 project suggest that ecological restoration efforts and the implementation of sustainable agricultural practices can effectively contribute to sustainability in the Galapagos.

In 2018, the GV2050 project was selected as a finalist in the Latin America Verde Prizes.



OUTREACH AND EXTENSION WORK

© Daniela Vilema/ CDF


© Joshua Vela / CDF


© Daniela Vilema/ CDF

Sharks and the Local community

The CDF has traditionally been involved in environmental education activities. Our Marine Environmental Education Project "Shark-Ambassadors" started in 2017. This project teaches secondary-school students in the community of Puerto Ayora about conserving marine environments and ocean, with special interest in sharks. It teaches through science, experience, exploration and fun. The "Shark-Ambassadors" 2017 group participated in coastal cleanups, discussion workshops with scientists, a camp at our Research Station, a field trip to snorkel with sharks at Punta Carrión and its members' participation in the CDF Open House to tell community members visiting the Station about their experience.

In early 2018, renovation of the Environmental Interpretation Center began, to re-inaugurate it after 18 years, in June 2018. This Van Straelen Interpretation Center is currently hosting the "Marine World" displays. This exhibit is devoted to and inspired by sharks, although it has components related to various marine dimensions, of which sharks are an essential part. This exhibit answers questions asked by students during the campaign to "Put on your shark fin and take care of the planet" in 2016. The information exhibited includes representations of prehistoric sharks, and up-to-date information on mangroves (known as shark nurseries), threats to sharks, their anatomy and senses, the science behind their conservation, the consequences of marine pollution and some suggestions to try to resolve these problems. To reopen this exhibit, local volunteers contributed their goodwill, talent and commitment to achieve this project of great value, usefulness and beauty, reusing materials and recycling materials found in the dump or even in the coastal cleanup campaigns. The furnishings were made with recycled materials (pallets) painted to colorfully decorate the Center.

Thanks to the GNPD's support, we re-used furnishings from another Interpretation Center to set up new information panels for instructional activities. The building's wiring was also changed out, and new lighting installed. The "Marine World" is being used for educational activities with groups of local students and to inform our visitors about the importance of science for conservation. This year, 2018, we are continuing with these activities through the Shark-Ambassadors Club. This initiative is open to students aged 12 to 17, with whom we will also be working on a new project to change attitudes toward marine pollution. Under the new component "Marine Mornings", we will also visit the rest of the populated islands to do activities with students and the community at large.

Donors:
Save Our Seas Foundation, The Leona M. and Harry B. Helmsley Charitable Trust, Inti Raymi Foundation and the COmON Foundation.

Collaborators:
Galapagos National Park Directorate, Ministry of Education and Culture, National Navy, Tomás de Berlanga Unit School, Galapagos National High School, Miguel Ángel Cázares High School and San Francisco de Asís Unit School.

Team:
Daniela Vilema, Solange Andrade, Jonathan Atiencia, Florencia Cerutti, Luis Cevallos, Paola Díaz-Freire, Ana Moya, Pelayo Salinas.
Volunteers: Luis Changobalin, Félix Hidalgo, Camila León, Katherine León, Elena Quiroz, Ibrahí Rodríguez, Fernanda Romero, Susan Romero, Fiorella Ruiz and José Santos.

The Charles Darwin Foundation, Working on Isabela Island

Donors:
Scalesia Foundation and the Lindblad Expeditions Fundation- National Geographic.

Collaborators:
Galapagos National Park Directorate

Team:
Ernesto Bustamante Velarde. Isla Santa Cruz: Johanna Carrión, Paola Díaz, Arturo Izurieta, María José Barragán and Diego Núñez.

In 2016, our institutional presence on Isabela resumed. This reactivation was made possible thanks to the activities and institutional presence, technical and scientific assistance provided by the CDF, since January 2017, facilitated by a liaison coordinator in Puerto Villamil. This liaison is the primary contact between the Charles Darwin Foundation in Santa Cruz, with different local institutions, community and tourists from Isabela Island who need to discuss with the Foundation.

The results from 2017 and early 2018 have been quite satisfactory. 64 meetings have been held with local institutions; we participated in and supported nine community events. Additionally, since September 2017 four talks have been given ("Monthly Talks") about CDF projects, presented by CDF Puerto Ayora researchers to Park rangers, guides and community members, during visits to Isabela Island. As part of the most important activities in 2017, a Bag Launching event was held for the "Mangrove Finch Project".

This event publicized project results and distributed reusable cloth tote bags to 163 students on Isabela. Activities were coordinated, and three CDF research projects on Isabela were backstopped. Diverse scientists and donors visited.

In 2018, we continued and reinforced activities from the previous year, and also worked to raise funds to implement research and/or development projects. The first project that the Charles Darwin Foundation - Isabela will lead in 2018 is a local undertaking funded by "LIDEC" from the Scalesia Foundation. The "Sustainable Community" project on environmental education aims to sensitize youth of Puerto Villamil about environmental problems in the world and Galapagos, as well as the role of human beings and the community in solving them; and to motivate them to become change agents for sustainability in Isabela and the Archipelago.

© Ernesto Bustamante/ CDF

© Archivo / CDF


©Paola Díaz / CDF

The Charles Darwin Foundation, Working on San Cristobal Island

In October 2017, CDF re-opened on San Cristobal, with the name of Jacinto Gordillo Environmental Education Center, in honor of our colleague and friend who passed away on October 25th, 2016. The CDF signed a Cooperation Agreement with the San Cristobal Public High School, on San Cristobal Island. This agreement promotes secondary students' participation in research projects and other specific activities. One of the activities kicking off this collaboration formally, is to design, implement and care for the native garden in the CDF's facilities on San Cristobal. The San Cristobal Public School has also expressed interest in setting up a model native garden of their own, with backing from the Galapagos Verde 2050 project.

Another Cooperation Agreement was signed with the University of Pennsylvania, to establish joint collaboration in environmental education activities and research actions on San Cristobal Island. Students from that University are currently using CDF's infrastructure on San Cristóbal and working with the San Cristobal Public School, to study community perception about sea lions.

We look forward, by late 2018, to having a CDF representative on San Cristobal, who will be CDF's contact person between CDF Puerto Ayora and the Cristobal community. This will bring community relations closer, so activities on San Cristobal will be more efficient, and collaboration can be established with more institutions.

Collaborators:
Galapagos National Park Directorate and San Cristobal Public School.

Team:
Johanna Carrión, Julio Delgado, Arturo Izurieta, Patricia Jaramillo and Mauricio Santos.

KNOWLEDGE MANAGEMENT




Natural History Collections

For decades now, the CDF and the GNPD, by the Ecuadorian Government's mandate, have custody of Galapagos' Natural History Collections. This invaluable heritage is housed in the Charles Darwin Research Station (CDRS) facilities in Puerto Ayora. These collections have four sections, divided according to the main taxonomic groups of Galapagos flora and fauna: Herbarium (CDS), Land Invertebrates Collection (ICCDRS), Marine Invertebrates Collection (MCCDRS) and Vertebrates Collection (VCCDRS).

The main function of the Galapagos Natural History Collections at CDF, is to preserve specimens of Galapagos flora and fauna for scientific purposes, that have been collected during research activities and have great scientific value because they are the first records of a species in Galapagos, or even holotypes of new species. Specimens are also included in these collections that have direct implications for the conservation of the Archipelago's natural systems, such as some invasive species, crucial for decision-making and management actions.

These collections are highly important to scientific work in Galapagos. For this reason, their conservation, maintenance and administration are considered top priority in the CDF Operating Plan. In fact, the CDF annually allocates significant staffing and funding to adequately preserve and ensure these specimens' integrity. These resources are largely allocated for keeping stable temperature and humidity conditions, 365 days a year, and the operational costs and personnel this activity demands.

With over 70,000 specimens, the Galapagos Natural History Collections are one of the greatest repositories of biological diversity from the Galapagos Archipelago in the world, after the Galapagos collection at the California Academy of Science in the United States. In fact, a number of the specimens in these collections, were gathered during the first scientific expeditions to the Galapagos Islands, over 60 years ago. These early collections document current patterns of species extinction, anthropogenic impacts, migrations and environmental changes on each island of the Archipelago, and even the arrival of invasive species such as *Philornis*. Comparing morphological, ecological and geographic records in the databases associated with the CDF collections makes it possible to analyze, model and predict future conditions that may affect biodiversity conservation in the Galapagos Islands. This knowledge is fundamental to propose and carry out coherent, effective management plans in priority zones.

The specimens we keep, such as the skeleton of 'Lonesome George', are objects of great scientific value and global heritage. These collections are, therefore, highly valuable because they involve concepts of cultural identity and heritage, a legacy that Ecuador is preserving for the world.

Donors:
The Leona M. and Harry B. Helmsley Charitable Trust and Lindblad National Geographic Fund.

Team:
Patricia Jaramillo, Andrea Acurio, Lenyn Betancourt, Diana Flores, Gustavo Jiménez, Tony Desiderio, Jennifer Vásconez, María José Ramirez and Henri Garzón.

Donors:
The Leona M. and Harry B. Helmsley Charitable Trust y Lindblad National Geographic Fund.

Team:
Patricia Jaramillo, Francisco Martínez, Dolma Alonso, Byron Delgado, Gustavo Morejón, Andrea Acurio, Lenyn Betancourt, Diana Flores and Gustavo Morejón.

Collections' DataBases and dataBoard

The databases at the Charles Darwin Foundation are among the institution's most valuable assets. Much of the research conducted since the outset is kept within them. In 2018, the dataBoard was implemented, which is very important for our collections. This new application is an interface to access the information. The current structure meets international standards for databases on biodiversity such as the Darwin Core (DwC). These databases are kept safe with copies in our datacenter in Galapagos and with backups at external sites.

With dataBoard, our scientists and other organizations can access information with a friendly interface. DataBoard enables taxonomy searches, searching through samples, images in the digitization system, collaborators and searches in meteorological data. The portal can consult the number of species known in Galapagos, disaggregated by taxonomic levels; we can examine collections' physical status, make precise taxononomic reports, and much more.

We are developing innovative tools to enter new information on samples, make changes in species' taxonomy, additional components for cataloguing the Galapagos Report, integrating our systems with the library and other databases.

© Lenyn Betancourt / CDF

Digital Biodiversity

The “Biodiversity Digital” pilot project aims to use modern technologies to generate high-resolution digital imagery of the specimens in our collections and to make them accessible through a digital platform. These images will provide supporting material for taxonomic identifications and instructional use.

These images are processed to turn them into an array of smaller pieces, which are joined to form the complete image for each possible level of magnification. This technique is called pyramid image construction, similar to the technologies used for Web-based mapping services by “tiles” such as Google Maps, Open Street Maps, and others.

A second part of the project is labeling collections’ specimens with microchips using NFC (Near Field Communication) technology. These labels can be read with any mobile telephone or tablet with that feature. Reading a microchip provides us with a link to relevant information about the specimen. The CDF is pioneering the use of this technology in natural history collections.

Donors:
The Leona M. and Harry B. Helmsley Charitable Trust and Lindblad National Geographic Fund.

Team:
Patricia Jaramillo, Fabiola Alvarez, Lorena Venegas, Diana Flores, Andrea Acurio, Lenyn Betancourt, Francisco Martínez and Gustavo Morejón.

Library and Historical Memory in Galapagos

The Charles Darwin Foundation library manages the academic knowledge necessary to keep the institution's scientific projects operating and is also the main knowledge repository in the Galapagos. Its two archives (institutional and audiovisual) organize and manage the graphic, sound, and documentary memory of the Charles Darwin Research Station.

In our Knowledge Society in which information moves through virtual channels and spaces, the Foundation's library and archives are currently working to digitize their varied collections and, at the same time, on the urgent physical preservation of a valuable documentary heritage that is threatened by adverse environmental conditions. Further, although the library continues to support research and knowledge production on a day-to-day basis in the CDF, it is also one of the few active, functioning libraries in the Archipelago and therefore never neglects its connection with the local community and providing socially responsible service. The library and archives team is aware that information is one of the basic elements of people's social, cultural and economic development, and to make solid policies in moving toward the future, especially concerning biosphere conservation. Therefore, the team strives for responsible, sustainable, deeply committed management of documents and strategic knowledge, improving their work day by day.

Donors:
Galapagos Conservancy, the Leona M. and Harry B. Helmsley Charitable Trust.

Team:
Edgardo Civallero, Erika Loor, Lady Loor, Patricia Lehar, Edward Williams, Margaret Fusari and Sally Taylor.

Geoportal

The Knowledge Management Area includes the Geographical Information (GI) Management area. This area concentrates on assisting scientific production from a spatial perspective, which highlights and strengthens the work of our scientists. This approach enhances the quality of the information and knowledge that our institution generates.

Studies show that approximately 80% of the information used and required by authorities for decision-making has a spatial component. GI helps to interpret scientific results in the form of knowledge about the territory. This also helps prioritize management measures, and informs user sensitization and learning. These geographical data enable spatial comparisons between historical knowledge and the present, making this an interesting tool for multi-time monitoring. To assist with this type of information, the 'Knowledge Management' area has generated the following tools:

GI Storage

Geoespatial data, especially in raster layers, due to the large amount of information stored, require considerable storage space on the local network.

Internal Geoportal

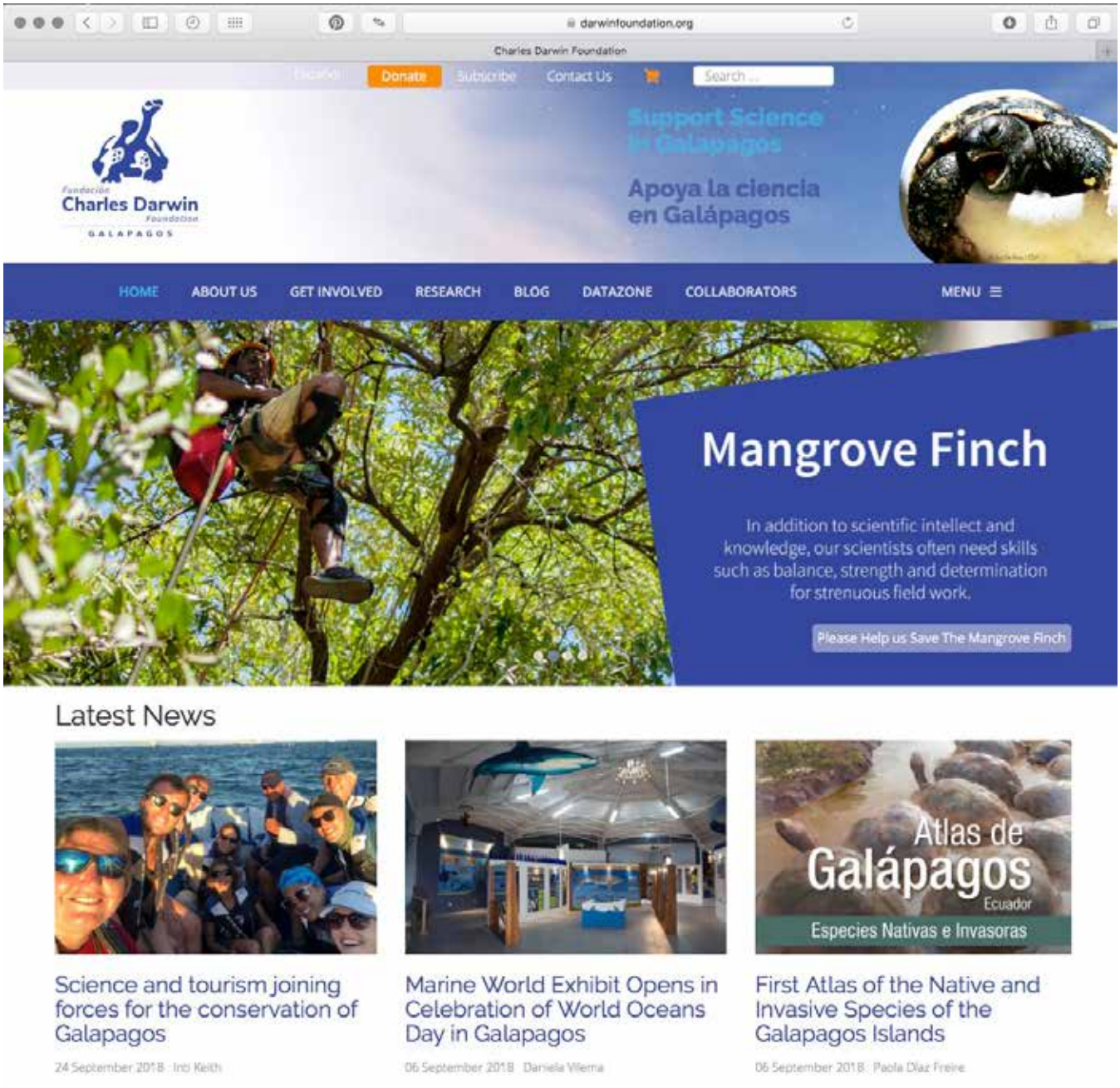
Catalog or inventory of internal geographical information, all the GI that the CDF has, and according to the use limits defined for projects. Characteristics are described by metadata (which ensures authorship), complementary information, and using symbology legends on the type of information and labels that will facilitate subsequent use. All GI processed and reviewed will enter the internal Geoportal, with any exceptions on material that has limits on usage. This geoportal is implemented in the local institutional network.

External Geoportal

The Geoportal presents geographical information that may be of greater interest to be published on Internet, offering CDF's spatial information about topics that are relevant and high-priority for Galapagos. This guarantees external access to maps, searching, displaying and downloading information. This service also offers Storymaps, which are scientific productions combining geographical information, narrative text, images and multimedia contents, advance publications of scientific studies with multimedia material and a geographical perspective.

Donors:
The Helmsley Charitable Trust.

Team:
Byron Delgado, Francisco Martínez, Gustavo Morejón and Joel Wilson.



Institutional Website

www.darwinfoundation.org

The Charles Darwin Foundation Website is the institution's main display case for the world. Its pages and contents convey knowledge, progress, and scientific findings to users anywhere and any time they require it.

In 2018, we uploaded a totally renewed version of our Website. At this time, we are working to provide multi-language contents for our diverse users and target audience. It has also been restructured to improve navigation, making the simple page convenient and intuitive.

Another key feature is managing self-manageable contents, which makes CDF staff self-reliant and allows them to publish, renew or update their contents quickly and easily. All this is possible thanks to working together with the Communications Area. Undoubtedly, we will continue to constantly improve and develop new features to benefit our users with valuable scientific information.

Donors:
The Helmsley Charitable Trust.

Team:
Dolma Alonso, Byron Delgado, Paola Díaz Freire, Francisco Martínez, Gustavo Morejón, Julio Rodríguez, Michelle Schuiteman, Daniel Unda García and Joshua Vela.

Donors:
Microsoft Windows, Windows Server 2016, Microsoft Offices, Office 360 and COmON Foundation.

Team:
Israel Castro, Oscar Cortéz, Renato Freire, Mikel Goñi, Julio Martínez and Luis Zuñiga.

Information and Communication Technology Area

The ICT team is the foundation and main driver of CDF's operations. The Datacenter hosts all our servers, services, and data to run the Research Station properly. Our Datacenter has improved both the quality and capacity for information storage. In 2017, two Synologys servers were installed to back up all users' and servers' information. At the same time, each computer is also backed up, FTP service is provided, with the videos server and data server. We have improved the Datacenter's infrastructure, with a new floor and ceiling, air conditioning, the HP servers, the Synology hardware, and the structured wiring.

In 2018, we invested in perimeter security equipment, implementing a latest-generation XG firewall, providing better digital security services for the institution. We have also invested in a new ESET SECURITY antivirus platform. This year, our Internet Service Provider changed their technological infrastructure, with latest-generation hardware for data transmission and to facilitate the satellite connection.

Additionally, Internet service bandwidth was improved, enhancing navigation and downloading capacity at the Charles Darwin Research Station.

© Juan Manuel García/ CDF

Conserving Mangroves and Beaches using GIS

Mangroves in Galapagos: distribution, dynamics, Ecosystem Services and their value

Mangroves provide major benefits to coastal communities and to humankind as a whole. We mapped mangroves using freely available Google Earth Very High Resolution images and obtained an area of ~3700 ha of fringing mangrove that covers 35% of the coastline.

We also analysed mangrove change in ten years (2004-2014) and determined that mangroves grew 24% mainly by expansion of existing mangroves patches as opposed to generation of new patches. We determine that mangrove cover and growth are inversely proportional to the geological age of the islands. However, many other factors like nutrients, currents or wave exposure protection might explain this pattern. The precise localization of mangrove cover across the Galapagos islands now enables documenting whether it is changing over time.

The Charles Darwin Foundation carried out the first economic valuation of mangroves' multiple Ecosystem Services (ESs) for Ecuador and for the ETP region. We focused on three high-value and politically significant ESs (carbon storage in mangroves, the mangroves' role for artisanal fisheries, and mangrove-based tourism). We found that Galapagos mangroves store over 778,000 tons of carbon, with average subsoil carbon of 211.03 ± 179.65 Mg C/ha, valued at $ 2,940/ha to $ 27,852/ha.

We have identified the species of fish depending on mangroves that are caught by local whitefin fishers, with net benefits of $ 900,000 a year, which makes this fishery the second most profitable in the Archipelago. The value of mangrove-based tourism is estimated at $ 16,958/ha, contributing over $ 62 million dollars to the Archipelago's economy.

Our findings stress the importance of mangroves for human well-being, and taking into account the stakeholders, users, and existing property rights, this valuation makes it possible to discuss institutionalizing ESs as an option for the Galapagos Islands, particularly under blue carbon initiatives.

Donors:
The Leona M. and Harry B. Helmsley Charitable Trust.

Collaborators: The Galapagos National Park Directorate, Scripps Institution of Oceanography, and Matt Costa, Octavio Aburto, Claire Alex Sueldo and Kayla Budd and LAFF,
UCSB:
Gonzalo Banda-Cruz.

Team:
José Marín Jarrín, Byron Delgado, Sara Lavalley, Nicolás Moity, Pelayo Salinas-de-León and Michael Tanner

© Nicolás Moity / CDF

DiveStat Project

The GMR is one of the largest Marine Protected Areas (MPAs) in the world and hosts special, unique ecosystems. These characteristics are the greatest attraction for SCUBA diving tourism, as shown by the number of divers coming to Galapagos every year.

The DiveStat project monitors divers coming to Galapagos, helps tourism operators, and helps authorities understand who divers are and how they behave underwater. This program aims to improve decision-making to assure conservation of the marine ecosystem while promoting an optimal diving experience for visitors. The Divestat project also promotes responsible diving practices, to minimize the impacts that visiting divers may generate in the Reserve's fragile marine ecosystem.

For this initiative, around 1,200 divers were interviewed, 200 dives were made to monitor divers' behavior underwater, and over 4,000 scientific observations were made of mega-fauna presence at diving sites. The success and benefits of DiveStat in Galapagos have been illustrated regionally in the Eastern Tropical Pacific Marine Corridor (ETPMC), an initiative grouping four countries and five Marine Protected Areas (i.e., Cocos, Malpelo, Gorgona, Galapagos and Coiba).

As a result of this exercise in Galapagos, the methodology designed and used in the DiveStat project is being replicated during the monitoring conducted in the Isla de Cocos National Park, Costa Rica. This methodological approach is the basis for a common tool adopted by CMAR to monitor a series of indicators regarding tourism activity in these marine protected areas. This methodology is currently shared to assess diving tourism activity and its impact on the region.

The findings are expected to make it possible to compare governance models among MPAs, in terms of managing the tourism sector, and the challenges these areas face. Finally, this will be expected to improve policies and practices promoting marine conservation and improving MPA governance.

Donors:
Funds for Marine Biodiversity Galapagos 2015 given by EcoVentura to WWF-Ecuador.

Collaborators:
Galapagos National Park Directorate, WWF-Ecuador, the Galapagos Tourism Observatory.

Team:
CDF: Nicolás Moity, Marta Díaz, Andrea Lema, Elena Pérez, Felipe Wittmer.
Tourism Observatory, MINTUR: Juan Carlos Izurieta, David Flores, Sofía Trujillo.
WWF-Ecuador: Angie Carrión, María Casafont, Rafaela Chiriboga, Gabriela Erazo, Mariuxi Farías.
GNPD: Eddy Araujo, Cristian Cáceres, Keyla Castro, María Virginia Gabela, César Jiménez, Arnaud Lacoste, Lisa Lindsuz and Carla Huete-Stauffer.

Galapagos Atlas
Native and Invasive Species

This is the first Galapagos Atlas, presenting socio-economic aspects and geographical information about the species illustrated in this book, which were selected by applying diverse criteria (i.e., their biological, cultural, ecological and conservation importance for the Archipelago). The publication contains information about the knowledge generated for decades, by research initiatives in Galapagos. 68 national and international authors participated. This collective work provides basic introductory information about geology, climate, diversity, and important notes about naturalist Charles Darwin's visit. This atlas also presents vignettes from the history of human settlements, of introduced species and fishing and tourism activities, both mainstay livelihoods.

The research conducted and knowledge produced are dynamic fields, constantly changing, adapting and adjusting. The information illustrated in this document's technical data sheets reflects the data available up to 2017, on these varied topics. The challenge for scientific activity is to complement gaps in existing information.

This will make it possible to better understand variations in the abundance and status of biodiversity and decide on the best policy and practice for how we will act to preserve it. This first atlas is an individual and institutional motivation to keep generating information and producing knowledge. Its greatest contribution is that, for the first time, Galapagos' most iconic species are presented with the same level of interest and relevance as the problem species that are threatening conservation of the islands' biological diversity.

The Atlas is available for the general public as a PDF on the CDF and WWF-Ecuador Websites.

Donors:
Leona M. and Harry B. Helmsley Charitable Trust, WWF-Ecuador.

Collaborators:
The Galapagos National Park Directorate and all authors, illustrators, photographers of the Galapagos Atlas.

Editorial Committee for the Atlas:
CDF: Byron Delgado, Paola Díaz Freire, Arturo Izurieta, José Marín Jarrín, Gustavo Jiménez, Nicolás Moity, Michelle Schuiteman.
WWF-Ecuador: Hugo Arnal, Pedro Araujo, Rafaela Chiriboga and Jorge Ramírez (WWF-Ecuador).

Meteorological Data

Our Weather Station - 54 Years and Counting

During 1960s, the National Institute of Meteorology and Hydrology (INAMHI) installed several meteorological stations around the Galapagos Archipelago. Initially, these stations were managed by several local institutions. The only station that has remained active to this day is the one managed by the Charles Darwin Research Station, in Puerto Ayora, Santa Cruz Island.

This weather station has been operating since December 1964. It collects meteorological information (i.e., ambient temperature, rainfall, and sunshine) three times a day, according to the established schedule, 365 days a year. This provides long-term time series data, systematically recorded, which can be used on comparative time scales over time. The weather station hosted by the CDRS is a second-order station with a rain gauge, a psychrometer (with thermometers to measure the relative humidity of moist and dry air, top and low temperatures), and a sunshine recorder (i.e., a gauge of the intensity of the sun's rays).

Locally and nationally, the CDRS weather station is considered a valuable source of climatological data on a long timescale for Santa Cruz and Galapagos. These data, quite useful in research involving oceanography and fisheries, in a more specific context, are also invaluably important to study global, long-impact issues, such as climate change. This shows the weather station's great usefulness for research into such significant local and global issues.

Meteorological data are currently stored in CDF's data bases and available for users who require information. These data series are shared with INAMHI every month for their national records, and in the next few months they will be available on our institutional Website, after being updated.

Donors:
INAMHI, Galapagos National Park Directorate.

Team:
Solanda Rea, Fernando Echeverría, David Chillagana and Marta Romoleroux

PUBLICATIONS AND SCIENTIFIC ACTIVITIES

© Thomas Hannam- Penfold / CDF

Articles

1. **Acuña Marrero, D.,** De la Cruz Modino, R., Smith, A.N.H., **Salinas de León, P.**, Pawley, M.D.M., & Anderson, M.J. (2017). Understanding human attitudes towards sharks to promote sustainable coexistence. *Marine Policy*, 91, 122-128. DOI: https://doi.org/10.1016/j.marpol.2018.02.018

2. **Acuña Marrero, D.**, Smith, A.N.H., Hammerschlag, N., Hearn, A., Anderson, M.J., Calich, H., Pawley, M.D.M., Fischer, C., & **Salinas de León, P.** (2017). Residency and movement patterns of an apex predatory shark (*Galeocerdo cuvier*) at the Galapagos Marine Reserve. PLoS One, 12(8), e0183669. DOI: https://doi.org/10.1371/journal.pone.0183669

3. **Acuña Marrero, D.**, Smith, A.N.H., **Salinas de León, P.**, Harvey, E.S., Pawley, M.D.M., & Anderson, M.J. (2017). Spatial patterns of distribution and relative abundance of coastal shark species in the Galapagos Marine Reserve. *Marine Ecology Progress Series*, 593, 73-95. DOI: https://doi.org/10.3354/meps12505

4. Asigau, S., Hartman, D.A., Higashiguchi, J.M., & **Parker, P.G.** (2017). The distribution of mosquitoes across an altitudinal gradient in the Galapagos Islands. *Journal of Vector Ecology*, 42(2), 243-253.

5. **Buglass, S.**, Reyes, H., Ramírez González, J., Eddy, T.D., **Salinas de León, P., & Marín Jarrin, J.** (2017). Evaluating the effectiveness of coastal no-take zones of the Galapagos Marine Reserve for the red spiny lobster, *Panulirus penicillatus.* Marine Policy, 88, 204-212. DOI: https://doi.org/10.1016/j.marpol.2017.11.028

6. **Cairns, S.D.** (2017). Deep-Water Octocorals (Cnidaria, Anthozoa) from the Galápagos and Cocos Islands. Part 1: Suborder Calcaxonia. *ZooKeys,* 729, 1-46. DOI: 10.3897/zookeys.729.21779

7. **Causton, C.E., Jäger, H., Toral Granda, M.V.**, Cruz, M., Mejía, M., Guerrero, E., & Sevilla, C. (2017). Total number and current status of species introduced and intercepted in the Galapagos Islands. *Informe Galápagos 2015-2016* (pp. 181-183). Puerto Ayora, Galápagos: GNPD, GCREG, CDF, GC.

8. **Cerutti Pereyra, F.,** Yánez A.B., Ebert, D.A., **Arnés Urgellés, C. & Salinas de León, P.** (2018). New record and range extension of the Deepsea Skate, *Bathyraja abyssicola* (Chondrichthyes: Arhynchobatidae), in the Galapagos Islands. *Journal of the Ocean Science Foundation*, 30, 85-89. DOI: http://dx.doi.org/10.5281/zenodo.1400829

9. Djukic, I., Kepfer Rojas, S., Kappel Schmidt, I., Steenberg Larsen, K., Beier, C., Berg, B., Verheyen, K. et al. (2018). Early stage litter decomposition across biomes. *Science of the Total Environment,* 628-629, 1369-1394. DOI: https://doi.org/10.1016/j.scitotenv.2018.01.012

10. Fernández, F., Sarmiento, C.E., **& Herrera, H.W.** (2018). First record of the Sclerogibbidae (Hymenoptera) from the Galapagos Islands, Ecuador. *Pan-Pacific Entomologist,* 94(1), 27-31. DOI: https://doi.org/10.3956/2018-94.1.27

11. Filek, N., Cimadom, A., Schulze, C.H., **Jäger, H., & Tebbich, S.** (2017). The impact of invasive plant management on the foraging ecology of the Warbler Finch (*Certhidea olivacea*) and the Small Tree Finch (*Camarhynchus parvulus*) on Galápagos. Journal of Ornithology, 159(1), 129-140. DOI: https://doi.org/10.1007/s10336-017-1481-4

12. Ibáñez, A., Klein, C., Quezada, G., **Krüger, M.**, Brodesser, S., & Steinfartz, S. (2018). Characterization of lipid structures in femoral secretions of Galápagos marine iguanas by shotgun lipidomics. *Chemoecology,* 28(1), 21-28. DOI: https://doi.org/10.1007/s00049-018-0251-y

13. Ibáñez, A., Menke, M., Quezada, G., **Jiménez Uzcátegui, G.,** Schulz, S., & Steinfartz, S. (2017). Diversity of compounds in femoral secretions of Galápagos iguanas (genera: *Amblyrhynchus* and *Conolophus*), and their potential role in sexual communication in lek-mating marine iguanas (*Amblyrhynchus cristatus*). PeerJ. DOI: 10.7717/peerj.3689

14. **Izurieta, A., Delgado, B., Moity, N.** et al. (2018). A collaboratively derived environmental research agenda for Galápagos. *Pacific Conservation Biology.* DOI: https://doi.org/10.1071/PC17053

15. **Jäger, H., Buchholz, S.,** Cimadom, A., Tebbich, S., **Rodríguez, J.,** Barrera, D., Walentowitz, A., Breuer, M., Carrión, A., Sevilla, C., & **Causton, C.** (2017). Restoration of the blackberry-invaded Scalesia forest: Impacts on the vegetation, invertebrates, and birds. *Informe Galápagos 2015-2016* (pp. 142-148). Puerto Ayora, Galápagos: GNPD, GCREG, CDF, GC.

16. **Kalberer, S.**, Meise, K., Trillmich, F., & **Krüger, O.** (2018). Reproductive performance of a tropical apex predator in an unpredictable habitat. *Behavioral Ecology and Sociobiology,* 72(108). DOI: https://doi.org/10.1007/s00265-018-2521-7

17. **Keith, I.** & Martínez, P.C. (2017). El peligro que *Carijoa riisei* invada la Reserva Marina de Galápagos. *Informe Galápagos* 2015-2016 (pp. 120-126). Puerto Ayora, Galápagos: GNPD, GCREG, CDF, GC.

18. Lubetkin, M., Carey, S., Kelley, K.A., Robert, G., Cornell, W., Raineault, N., Balcanoff, J., Ballard, R.D., & **Salinas de León, P.** (2017). Nontronite-Bearing Tubular Hydrothermal Deposits from a Galapagos Seamount. *Deep-Sea Research Part II.* DOI: dx.doi.org/10.1016/j.dsr2.2017.09.017

19. **Marín Jarrin, J.R., Andrade Vera, S.**, Reyes Ojedis, C., & **Salinas de León, P.** (2018). Life history of the Mottled Scorpionfish, *Pontinus clemensi,* in the Galapagos Marine Reserve. *Copeia,* 106(3).

20. **Moity, N.** (2018). Evaluation of no-take zones in the Galapagos Marine Reserve, Zoning Plan 2000. *Frontiers in Marine Science, 5*(244). DOI: 10.3389/fmars.2018.00244

21. Pazmiño, D.A., Maes, G.E., Green, M.E., Simpfendorfer, C.A., Hoyos Padilla, E.M., Duffy, C.D.A., Meyer, C.G., Kerwath, S.E., **Salinas de León, P.** & Van Herwerden, L. (2017). Strong trans-Pacific break and local conservation units in the Galapagos shark (*Carcharhinus galapagensis*) revealed by genome-wide cytonuclear markers. Heredity, 120, 407-421. DOI: https://doi.org/10.1038/s41437-017-0025-2

22. **Salinas de León, P.**, Bertolotti, A., Chong Montenegro, C., Gomes do Régo, M. & Preziosi, R.F. (2017). Reproductive biology of the endangered white-spotted sand-bass *Paralabrax albomaculatus*, endemic to the Galapagos Islands. *Endangered Species Research,* 34, 301-309. DOI: https://doi.org/10.3354/esr00858

23. **Salinas de León, P.**, Hoyos Padilla, E.M., & Pochet, F. (2017). First observation on the mating behaviour of the endangered scalloped hammerhead shark *Sphyrna lewini* in the Tropical Eastern Pacific. *Environmental Biology of Fishes, 100*(12), 1603-1608. DOI: 10.1007/s10641-017-0668-0

24. **Salinas de León, P.**, Philips, B., Ebert, D., Shivji, M., **Cerutti Pereyra, F**., Ruck, C., Fisher, C., & **Marsh, L.** (2018). Deep-sea hydrothermal vents as natural egg-case incubators at the Galapagos Rift. *Nature Scientific Reports,* 8, 1788. DOI: 10.1038/s41598-018-20046-4

25. Seebens, H., Blackburn, T.M., Dyer, E.E., Genovesi, P., Hulme, P.E., Jeschke, J.M., Pagad, S., Pyšek, P., Van Kleunen, M., Winter, M., Arianoutsou, M., Bacher, S., Blasius, B., Brundu, G., Capinha, C., Celesti Grapow, L., **Causton, C.**, Dawson, W., Dullinger, S., Economo, E., Fuentes, N., Guénard, B., **Jäger, H.**, Kartesz, J., Kenis, M., Kühn, I., Lenzner, B., Liebhold, A., Mosena, A., Moser, D., Nentwig, W., Nishino, M., Pearman, D., Pergl, J., Rabitsch, W., Rojas Sandoval, J., Roques, A., Rorke, S., Rossinelli, S., Roy, H.E., Scalera, R., Schindler, S., Štajerová, K., Tokarska Guzik, B., Walker, K., Yamanaka, T., & Essl, F. (2018). Global rise in emerging alien species results from increased accessibility of new source pools. *PNAS*, *115*(10), E2264-E2273. DOI: http://www.pnas.org/cgi/doi/10.1073/pnas.1719429115

26. Tompkins, E.M., **Anderson, D.J.,** Pabilonia, K.L., & Huyvaert, K.P. (2017). Avian Pox Discovered in the Critically Endangered Waved Albatross (Phoebastria irrorata) from the Galápagos Islands, Ecuador. *Journal of Wildlife Diseases, 53*(4), 891-895. DOI: 10.7589/2016-12-264

PUBLICATIONS

27. Toral-Granda, M.V., **Causton, C.E.**, **Jäger, H.,** Trueman, M., Izurieta, J.C., Araujo, E., Cruz, M., Zander, K.K., **Izurieta, A.**, Garnett, S.T. (2017). Alien species pathways to the Galapagos Islands, Ecuador. PLoS ONE, 12(9), e0184379. doi: https://doi.org/10.1371/journal.pone.0184379

Books

1. Atkinson, R., **Guézou, A., & Jaramillo, P.** (2017). *Siémbrame en tu Jardín - Kanpa sisapampapi tarpuway - Plant me in your garden. Jardines nativos para la conservación de Galápagos - Galapagos suyu kuskata kamankapak sisapampakuna - Native gardens for the conservation of Galapagos.* 2.ed. Puerto Ayora: Fundación Charles Darwin.

2. **Jaramillo, P.**, Tapia, W., & Gibbs, J. (2017). *Plan de acción para la restauración ecológica de las islas Baltra y Plaza Sur.* Puerto Ayora: Fundación Charles Darwin, Parque Nacional Galápagos.

3. **Tutivén, Y.** & Yépez, J. (2017). *Guía de otolitos de peces comerciales de la Reserva Marina de Galápagos.* Puerto Ayora: Fundación Charles Darwin.

4. **Tye, A.** (ed.) (2018). *Guidelines for invasive species planning and management on islands.* Cambridge, Gland: IUCN.

5. **Charles Darwin Foundation** (CDF) and **WWF-Ecuador.** (2018) Galapagos Atlas, Native and Invasive Species. Quito, CDF and WWF-Ecuador.

Book Chapters / Volumes Edited

1. **Jäger, H.** (2017). Quinine tree invasion and control in Galapagos: a case study. En M.L. Torres & C.F. Mena (eds.). *Understanding invasive species in the Galapagos Islands* (pp. 69-76). S.l.: Springer. DOI: https://doi.org/10.1007/978-3-319-67177-2_5

2. Silvia Salas, **María José Barragán-Paladines,** Ratana Chuenpagdee (Eds.) (2018) Viability and Sustainability of Small-Scale Fisheries in Latin America and The Caribbean. Series: MARE Publication Series 19. Springer Verlag.

Posters at Scientific Events

1. McCauley, R.A. & **Jaramillo Díaz, P.** (s.f.). Systematics of the endemic species of Litophila *(Amaranthaceae: Gomphrenoidae)* in the Galapagos Islands.

Thesis

1.Creemers, M.F. (2017). First insights into deep-sea sponge diversity patterns: A baseline study for the protection and sustainable management of seamount ecosystems in the Galapagos Marine Reserve (GMR), Ecuador. (Un-published M.Sc. Thesis). University of the Basque Country, Plentzia, Spain.

2.Ison, T. (2017). Socio-cultural and Economic Valuation of Seamount Biodiversity in the Galapagos Marine Reserve. (Un-published M.Sc. Thesis). The University of Edinburgh, Edinburgh, United Kingdom.

3. Muñoz, D.A. (2018). The effect of *Philornis downsi* in the reproductive success of the Little Vermilion Flycatcher on Isabela Island – Galapagos. (Un-published M.Sc. Thesis). Universität Wien, Vienna, Austria.


© Juan Manuel García / FCD

SCIENTIFIC EVENTS

Training in Science

Talks for Guides' course, 2017:
Galapagos Mammals; Marine birds: penguins, cormorants, albatrosses; Coastal and lagoon birds: herons, flamingos, pintails; Fishery management projects; Landbird conservation projects: Project on controlling *Philornis downsi*; Project on introduced plants and restoration of Los Gemelos; Galapagos Verde 2050 project; Seamounts in the GMR; CDF-WWF DiveStat Project, Marine Invasive Species.

Talks for diving guides' course, 2018:
Fisheries management; CDF-WWF DiveStat Project; Galapagos marine birds: penguins, cormorants, and albatrosses, Marine Invasive Species.

Scientific Lectures

Visiting Researchers and Collaborators

- William Durham: "Challenge as never before: Penguin and Cormorant adaptations to Galapagos." And "The Coevolution of tree species? The Giant Daisies and tree Finches of Galapagos"

- Leah R. Gerber: "Linking knowledge to conservation outcomes in the Galapagos Marine Reserve".

- Diego Ellis: "Opportunities and future technologies to investigate the ecology of movement in Galapagos and the world".

- Mark Hixon / Sean Hixon: "Invasion of Atlantic coral reefs by Pacific lionfish" an "Transport and assembly of the stone hats (pukao) on the giant statues (moai)) of Easter Island (Rapa Nui)".

- Charlie Lehnen: "Exploratory Study of the Natural History of Dípthera (flies) in Galapagos".

- Sharon Deem: "One Health".

- Elke Schuttler: "Cape Horn Reserve: Current status, challenges, education, science".

- Emily Witt: "A new procedure to process whitefish otoliths, *Caulolatilus princeps*, in the Galapagos Marine Reserve"

- **Sage Roher:** "Disease ecology and microbiota assessment of the Galapagos Penguin (*Spheniscus mendiculus)"*

- **Jon Witman:** "Aspects of marine ecosystem functioning and El Niño impacts in the Galapagos Marine Reserve: an update".

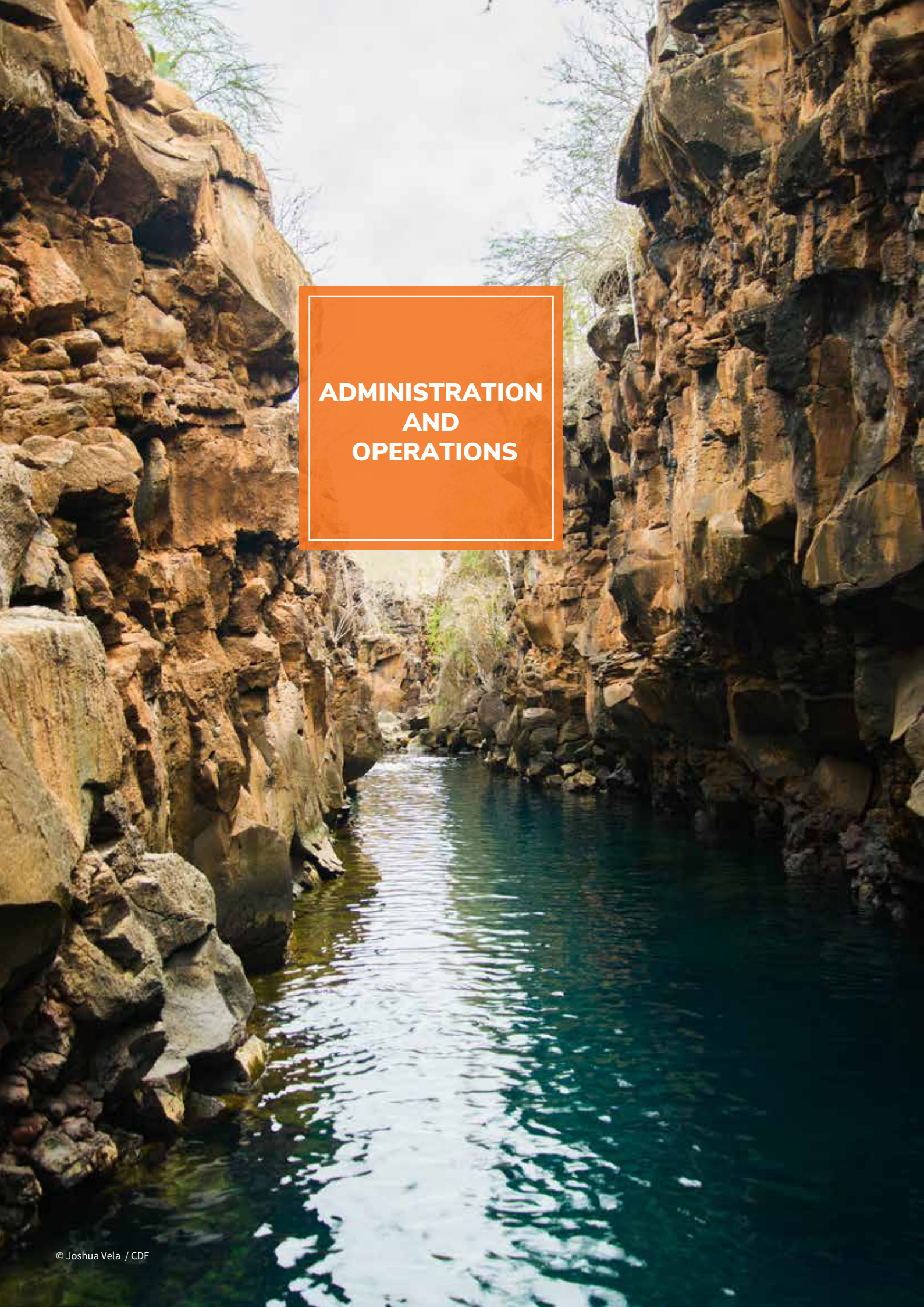
Authors	Subject
Causton, C. E., C. Calderón Alvaréz, C. D. Hoddle, M. S. Hoddle, M. P. Lincango, T. G. A. Poulsom, and R. G. Van Driesche	Improving health of native Galapagos plants by introducing a specialized predator of the invasive cottony cushion scale
Charlotte Causton	Host-specific associations affect the microbiome of Philornis downsi, an introduced parasite to the Galápagos Islands
Gustavo Jiménez-Uzcátegui, Rommel L. Vinueza, Andrés S. Urbina, David A. Egas, Carolina García, Javier Cotín, Christian Sevilla	Lead and cadmium levels in Galapagos penguin (*Spheniscus mendiculus*), flightless cormorant (*Phalacrocorax harrisi)* and waved albatross *(Phoebastria irrorata)*
Alejandro Ibañez, Markus Menke, Galo Quezada, **Gustavo Jiménes Uzcátegui**, Stefan Schulz and Sebastian Steinfartz	Diversity of compounds in femoral secretions of Galápagos iguanas (genera: Amblyrhynchus and Conolophus), and their potential role in sexual communication in lek-mating marine iguanas *(Amblyrhynchus cristatus)*
David Acuña-Marrero, Adam N. H. Smith, Neil Hammerschlag4, Alex Hearn , Marti J. Anderson, Hannah Calich, Matthew D. M. Pawley, Chris Fischer, Pelayo Salinas-de-León	Residency and movement patterns of an apex predatory shark *(Galeocerdo cuvier)* at the Galapagos Marine Reserve
Nikolaus Filek, Arno Cimadom, Christian H. Schulze, **Heinke Jäger, Sabine Tebbich**	The impact of invasive plant management on the foraging ecology of the Warbler Finch *(Certhidea olivacea)* and the Small Tree Finch *(Camarhynchus parvulus)*
Salinas-de-León P, Hoyos-Padilla EM, Pochet F	First observation on the mating behaviour of the endangered scalloped hammerhead shark *(Sphyrna lewini)* in the Tropical Eastern Pacific.
María Verínica Toral-Granda, Charlotte E. Causton, Heinke Jäger, Mandy J. Trueman, Juan Carlos Izurieta, Eddy Araujo, Marilyn Cruz, Kerstin K. Zander, **Arturo Izurieta**, Stephen T. Garnett.	Alien species pathways to the Galapagos Islands, Ecuador
Megan Lubetkin, Steven Carey, Katherine A. Kelley, Geneviève Robert, Winton Cornell, Nicole Raineault, Jacob Balcanoff, Robert D. Ballard, **Pelayo Salinas-de-León**	Nontronite-bearing tubular hydrothermal deposits from a Galapagos seamount
Salinas-de-León P, Bertolotti A, Chong-Montenegro, Gomes-Do-Régo M, Preziosi RF	Reproductive biology of the endangered Galapagos-endemic white-spotted sand-bass *Paralabrax albomaculatus.*
Birgit Fessl, George E. Heimpel, **Charlotte E. Causton**	Invasion of an avian nest parasite, *Philornis downsi,* to the Galapagos Islands: colonization history, adaptations to novel ecosystems, and conservation challenges
George E. Heimpel, Alexandra Hillstrom, Deborah Freund, Sarah A. Knutie, Dale H. Clayton	Invasive parasites and the fate of Darwin's finches in the Galapagos Islands: the case of the Vegetarian Finch
Salomé Buglass, Harry Reyes, Jorge Ramírez-González, Tyler D. Eddy, Pelayo Salinas-de-León, and **José Marín Jarrín**	Evaluating the effectiveness of coastal no-take zones of the Galapagos Marine Reserve for the red spiny lobster, *Panulirus penicillatus*
Peter Grant	Rapid hybrid speciation in Darwin's finches
Salinas-de-León P, Brennan Philips, David Ebert, Mahmood Shivji, **Florencia Cerutti-Pereyra,** Cassandra Ruck, Chuck Fisher, Leigh Marsh	Deep-sea hydrothermal vents as natural egg-case incubators at the Galapagos Rift.

Authors	Subject
Ika Djukic, Sebastian Kepfer-Rojas, Inger Kappel Schmidt, Klaus Steenberg Larsen, Claus Beier, Björn Berg, Kris Verheyen y autores de 190 instituciones en el mundo.	Early stage litter decomposition across biomes
Samoa Asigau and **Patricia. G. Parker**	The influence of ecological factors on mosquito abundance and occurrence in Galapagos
Stephen D. Cairns	Deep-Water Octocorals *(Cnidaria, Anthozoa)* from the Galápagos and Cocos Islands. Part 1: Suborder Calcaxonia
Acuña-Marrero D, de-La-Cruz-Modino R, Smith A, Salinas-de-León P, Pawley M, Anderson MJ	Understanding public attitudes towards sharks to promote a sustainable coexistence
Alejandro Ibáñez; Corinna Klein; Galo Quezada; Marcus Krüger; Susanne Brodesser; Sebastian Steinfartz	Characterization of lipid structures in femoral secretions of Galápagos marine iguanas by shotgun lipidomics
Hanno Seebens, Tim M. Blackburn, Ellie E. Dyer, Piero Genovesi, Philip E. Hulme, Jonathan M. Jeschke, Shyama Pagad, Petr Pyšek, Mark van Kleunen, Marten Winter, Margarita Arianoutsou, Sven Bacher, Bernd Blasius, Giuseppe Brundu, César Capinha, Laura Celesti-Grapow, **Charlotte Causton,** Wayne Dawson, Stefan Dullinger, Evan Economo, Nicol Fuentes, Benoit Guénard, **Heinke Jäger,** John Kartesz, Marc Kenis, Ingolf Kühn, Bernd Lenzner, Andrew Liebhold, Alexander Mosena, Dietmar Moser, Wolfgang Nentwig, Misako Nishino, David Pearman, Jan Pergl, Wolfgang Rabitsch, Julissa Rojas-Sandoval, Alain Roques, Stephanie Rorke, Silvia Rossinelli, Helen E. Roy, Riccardo Scalera, Stefan Schindler, Kateřina Štajerová, Barbara Tokarska-Guzik, Kevin Walker, Takehiko Yamanaka & Franz Essl	Global rise in emerging alien species results from increased accessibility of new source pools
Heinke Jäger	Quinine tree invasion and control in Galapagos: a case study
David Acuña, Pelayo Salinas de León.	Spatial patterns of distribution and relative abundance of coastal shark species in the Galapagos Marine Reserve
Kalberer S., Meise K., Trillmich F., **Krüger O.**	Reproductive performance of a tropical apex predator in an unpredictable habitat
Peter Glynn, **Inti Keith,** Stuart Banks.	State of corals and coral reefs of the Galápagos Island
Nicolás Moity	Evaluation of no-take zones in the Galapagos Marine Reserve, Zoning Plan 2000
Keith, I, Carlton, J. T., Ruiz, G. M.	- A new look at Galapagos fouling communities,
Keith, I, Carlton, J. T., Ruiz, G. M.	- Status and Trends of Bioinvasions in the GMR

- **Talks Guide Course 2017: 30**
- **Ongoing Talks of Divers guides 2018: 9**
- **Talks held at the CDF 2017-June 2018: 30**

Researchers Participation:

- **National Events : 49**
- **International Events : 26**



ADMINISTRATION AND OPERATIONS


© Paola Díaz / CDF

INFRASTRUCTURE

The Inspiration Complex: a new sustainable architecture model

In 2017, CDF worked on its institutional strategic planning, including, among other activities, improving the infrastructure of its Research Station. As planned, in early 2018 the architectural design began, and the construction work is planned to start in mid-2018. The work will begin to construct the new building for the Marine Science Section of the Charles Darwin Foundation (BIOMAR). This construction is called the "Inspiration Complex" project and focuses on a modern, functional place for marine scientists. This new building will incorporate cutting-edge technology, local resources, and a sustainable architecture model for Galapagos into its design and planning.

The "Inspiration Complex" has its origin in the CDF's old dining hall, for many decades a venue for social and scientific interaction for several generations of researchers. This facility was long used by CDF scientists and collaborators to inspire and be inspired with new ideas, by the areas of their research work and innovative, highly relevant topics. Now the Foundation wants to recover this place and open up a new site, including laboratories, Biomar offices and new meeting areas.

This initiative will pioneer Galapagos ecological architecture designs and reduce our carbon footprint. The "Inspiration Complex" will have a low impact on the environment, by optimizing resource use as planned. The project is scheduled for completion in late 2019.

Donors:
COmON Foundation.


© Surya Castillo / CDF

Laboratories

Donors:
COmON Foundation.

Team:
Ainoa Nieto Claudín, Karina Ramón and Ana Paula Coronel.

Laboratories are a fundamental dimension of scientific work in any research center. In 2017, the CDF has emphasized remodeling and improving the existing laboratory and preparation room infrastructure. Modern equipment has been purchased and staff working with laboratories have been suitably trained. Staff has been informed and prepared on topics of interest such as occupational safety and safe handling of equipment and chemicals.

In October 2017, a workshop on basic laboratory principles was held for our entire staff in the hospitality area and donation point. The event provided an opportunity to share experiences and knowledge, ensure development of good practices in using and handling chemicals and equipment, and preventing possible accidents. In many cases, this was the first chance for colleagues from these areas of the CDF to look into a microscope and view a tortoise's blood up close. They also learned to identify different species of insects and seeds using a stereo-microscope. Participants learned to wear individual industrial protection gear properly (goggles, gloves and masks), and how to prevent accidents with chemicals.

Ongoing training with technical staff, and constant, rigorous maintenance of CDF's infrastructure are indispensable to uphold the scientific standards of an institution striving for the top, to become a national and worldwide benchmark in scientific research. This approach will welcome new scientists to work cooperatively toward the goal of Galapagos Islands conservation.

Operational Management

The CDF Operations team comprises of specialists in several areas. A group of technicians, committed to the Institution's mission and vision, perform work that is fundamental for the CDF's proper operation and performance. In 2017 and 2018, the Charles Darwin Research Station was rewired, and possible scenarios of risk were examined regarding energy issues. A new submersible water pump was installed. Additionally, the Information Technology (IT) office infrastructure was improved. Investments in building maintenance included the Science building ('Fisher-Right'), which holds our natural history collection of vertebrates. This section's roofs were waterproofed and the collection site was completely restored. Finally, the roofs of the IT, Communications and Biomar offices were also changed. At the same time, the homes of our collaborators and volunteers, on the CDRS campus, have received ongoing maintenance. We are also working on the Zero Emissions Plan for the Research Station campus.

Donors:
COmON Foundation, Hyundai Corporation.

Collaborators:
GNPD, Cuerpo de Bomberos de Santa Cruz, ABG, Consejo de Gobierno.

Team:
Mauricio Santos, Julio Delgado, Ángel Sagubay, Wilson Carrión, Gaby Serrano, Juan Barreno, Mónica Tigse, Omar Lara and Louis Graham.

© Juan Manuel García / CDF

Collaborator:
P.A. Vinicio Mejía Barrera.

Team:
Phil van Haarlem, Pilar Díaz-Holguín, Anaceth Barrera, Salomé Barrera-Díaz, Viviana Caiza, Liliana Cunalata, Andrea Espín, Jorge Herrera, Johanna Macías and Andrea Táez.

Financial Management

The operation of a Scientific Station also requires administrative support, which is why the Finance Area of the Charles Darwin Foundation works to provide financial information to the different operational areas of the Charles Darwin Research Station and manage the donation funds that make possible our operation. Thanks to the transparent management of finances, we can send reports to the individuals and institutions that support us.


© Daniel Tompkins / CDF

INSPIRING STORIES


© Paola Díaz / CDF


© Liza Díaz Lalova / CDF


© Jesús González / CDF

The Charles Darwin Foundation Communications Area is working on producing moving stories about the research work performed by our researchers and technicians. We want to tell every anecdote about our projects, field trips and our researchers' partnered scientific work.

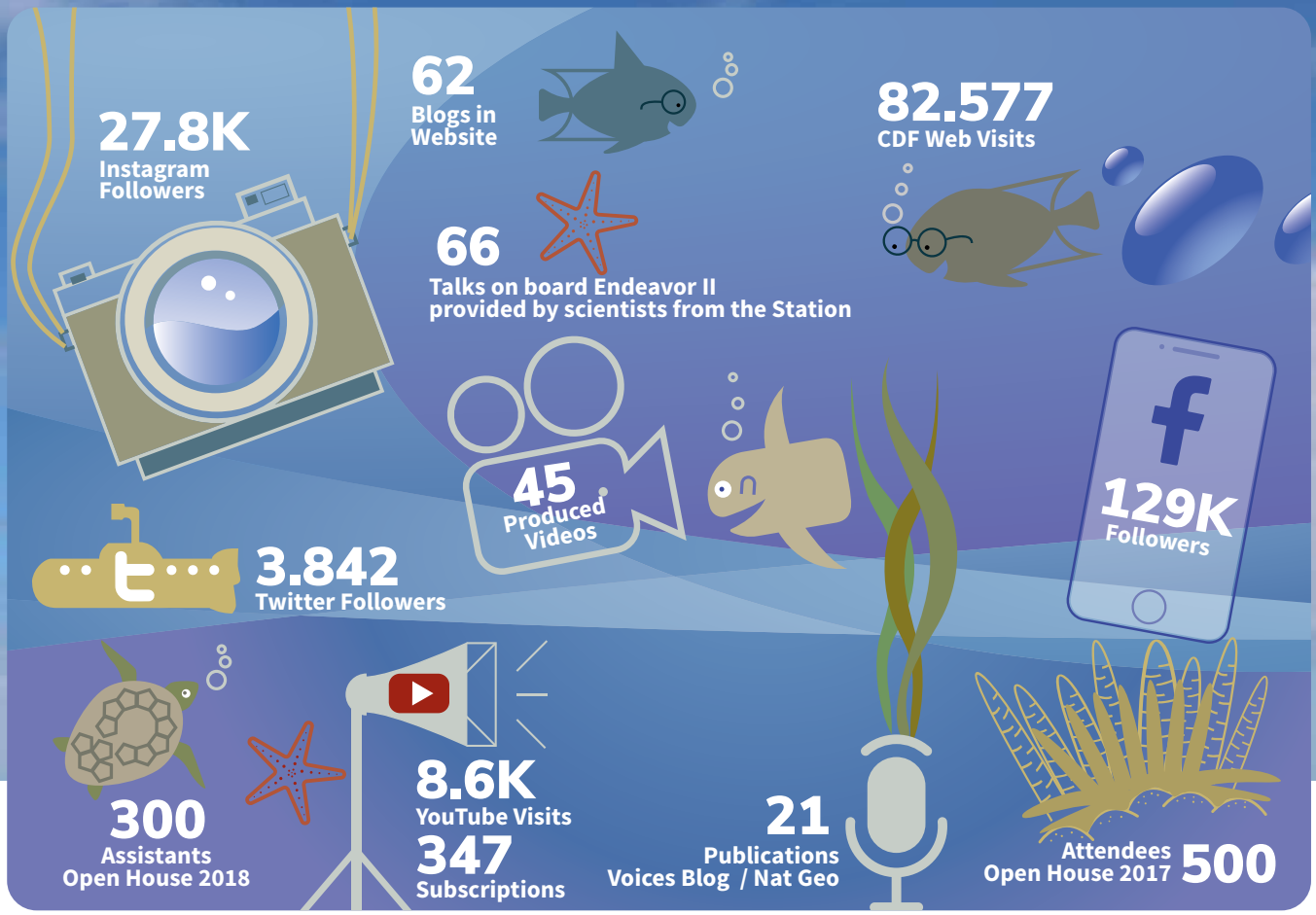
With limited resources, we all get involved in our projects, writing articles, creating graphic designs, helping with multimedia management and audiovisual production by the Research Station and its staff.

We keep our digital channels – website and social networks – up to date. In 2017 and early 2018, we worked with Kizuna Lab to improve our website's positioning, by using SEO/SEM. We also launched CDF's new website, jointly with the Knowledge Management Area.

We manage the photographic and audiovisual archive. We help organize events, lectures, and publicity campaigns. We design educational, promotional and publicity materials, and produce presentations or interviews (e.g., the promotional video for the Galapagos Verde 2050 project, the video for the Mangrove Finch project, the video for Tibu-Ambassadors, the video for the Latin America Verde Prize; and the inter-institutional video with information about Galapagos that will be shown in the Quito and Guayaquil airports).

In 2017 and 2018, we updated our internal policies and protocols on institutional communication. We developed the CDF Corporate Identity Manual. We also gave over 90 special guided visits at the Research Station (reserved in advance; there may be restrictions), offering comprehensive support in communication.

We have produced banners, designed project proposals, interpretive panels, signage, corporate imagery, stationery, stickers, promotional material, ads for print and digital media, digital illustrations, product designs, designing the new Website, designing costumes, creating characters, and other communication products. We have tripled our photographic and audiovisual data bank. Thanks to Lindblad/National Geographic for giving us professional images of the Archipelago for our productions.



Collaborators:
Kizuna Lab, Paula Urueña, Daniela Paz, Jesús González, Pablo Viteri, Tui De Roy and Carlyn Iverson

Team:
Paola Díaz-Freire, Paola Alvarado, Jonathan Atiencia, Luis Cevallos, Andrés Cruz, Liza Díaz-Lalova, Juan Manuel García, Matilda González, María Isabel Grijalva, Pamela Kaval, Aiobheann O. Flynn, Emile Patry, Marcela Rodas, Julio Rodríguez, Joshua Scoggin, Daniel Unda-García, Daniela Urresta, Joshua Vela, Daniela Vilema, Thomas Wilding and Clive Wilkinson.

Among our main activities, in 2017 we held the first Open House, after a lapse of 10 years. This initiative was inspired by the desire to share our research work with the local community. The second Open House was held in mid-2018, and coincided with the celebration of World Ocean Day. Additionally, the CDF's communications team took part in the National Geographic Storytelling Bootcamp. This activity was held to learn the latest trends in producing and editing video, writing blogs, photography, and other communication techniques. This event was attended by 15 members of the CDRS staff. In 2018, our On-Line Product Gallery was inaugurated. We designed the contents for the new 'Marine World' exhibit in the Van Straelen Interpretation Center.

Regarding environmental interpretation, the Communications Department updated the signage for our tourist trails in the CDF/GNPD campus, including the Footprint of the Tortoise trail. We designed the image for the Shade House exhibit for the Galapagos Verde 2050 Project.

One major landmark in early 2018, was renewing our institutional logo. Now, the logo features a simple, modern graphic line, presenting a renewed image of the Foundation and its Research Station. This update emphasizes our identity and differentiates our brand. We led and organized the participatory selection of the new logotype for the 60-year anniversary in 2019. We designed new logos for the Education Fund for Sustainability and Biodiversity in Galapagos (GBESF), and for the Galapagos Marine Research and Exploration Program (GMARE). We refreshed the corporate image with sub-logos for our projects.

Collaborators: Richard Tollefson, Kellie Teskey and Julie Iacobelli (PPG), Carly Newman.

Team: Renee Monroe, Kelsey Bradley, Sarah Enright, Claire Hobbs, Liza Nagode, Daniel Tompkins, Theresa Rhodes, Arturo Izurieta and CDF Board of Directors.

© Juan Manuel García/CDF

FORGING LASTING RELATIONS

The Charles Darwin Foundation's fundraising team builds and maintains relations with foundations, corporations and individuals who, through their generous donations, maintain our research activities, and keep all the operations going that make the research possible.

The Fundraising Area continues finding, building and developing new alliances to support the CDF's work, focusing on generating knowledge to support Galapagos Archipelago conservation decision-making.

Fundraising focuses on thematic areas for which there is currently funding (e.g., biodiversity research, education and sustainable development). In recent months however, various topics have been added for fundraising, especially those involving social aspects of conservation. This is a strategy to diversify the CDF research agenda, and to fulfill our institutional mandate, inspired by the goals of the 25 - year Cooperation Agreement with the Ecuadorian Government, by the goals and priorities of the Galapagos Protected Areas Management Plan, and also motivated by CDF's vision and mission.

The Fundraising Area is strengthening, cultivating and nourishing existing alliances, and also exploring, identifying and forging new relationships. An important part of this work is welcoming and receiving VIP guests, and potential donors, as this is a more personal way of exploring possible future partnerships.

The fundraising team specializes in multiple activities to elicit donations and resources. In 2017 and 2018, we have sought out new foundations to explore possible forms of cooperation. Accordingly, in addition to continuing and strengthening our long-term relations, in 2018 we have begun new collaborations in the marine science area with the UN Environment Program, through an Eastern Tropical Pacific coral research fund, the Paul M. Angell Family Foundation, the Prince Albert II of Monaco Foundation, and Focused on Nature.

Additionally, the fundraising area helps write, edit, submit and negotiate research proposals, focusing on the potential partner's interests. This calls for maintaining close communication with researchers and the science area so research proposals can reach possible donors or research funds in a clear, efficient, attractive format. The fundraising area also communicates directly, continually and openly with donors, regarding projects' financial statements, progress with projects they are funding, and preliminary or final results of their generous contributions. This communication highlights the great contribution to CDF knowledge generation from their generous donations, to contribute to conserving the Galapagos Islands.

The fundraising team's work has global coverage. It covers the entire world to find new possibilities, whether individual or collective, to fund our projects. This quest focuses on people who are passionate about the role that science plays in conservation, convinced that science can make a difference. This team's mission is to share with the world and potential donors the results of research conducted at CDF and their connection with actions to conserve one of the most beautiful places in the world, which UNESCO declared the first Heritage Site of Humankind.

PLEASE DONATE!

You can donate by visiting our Website:
www.darwinfoundation.org

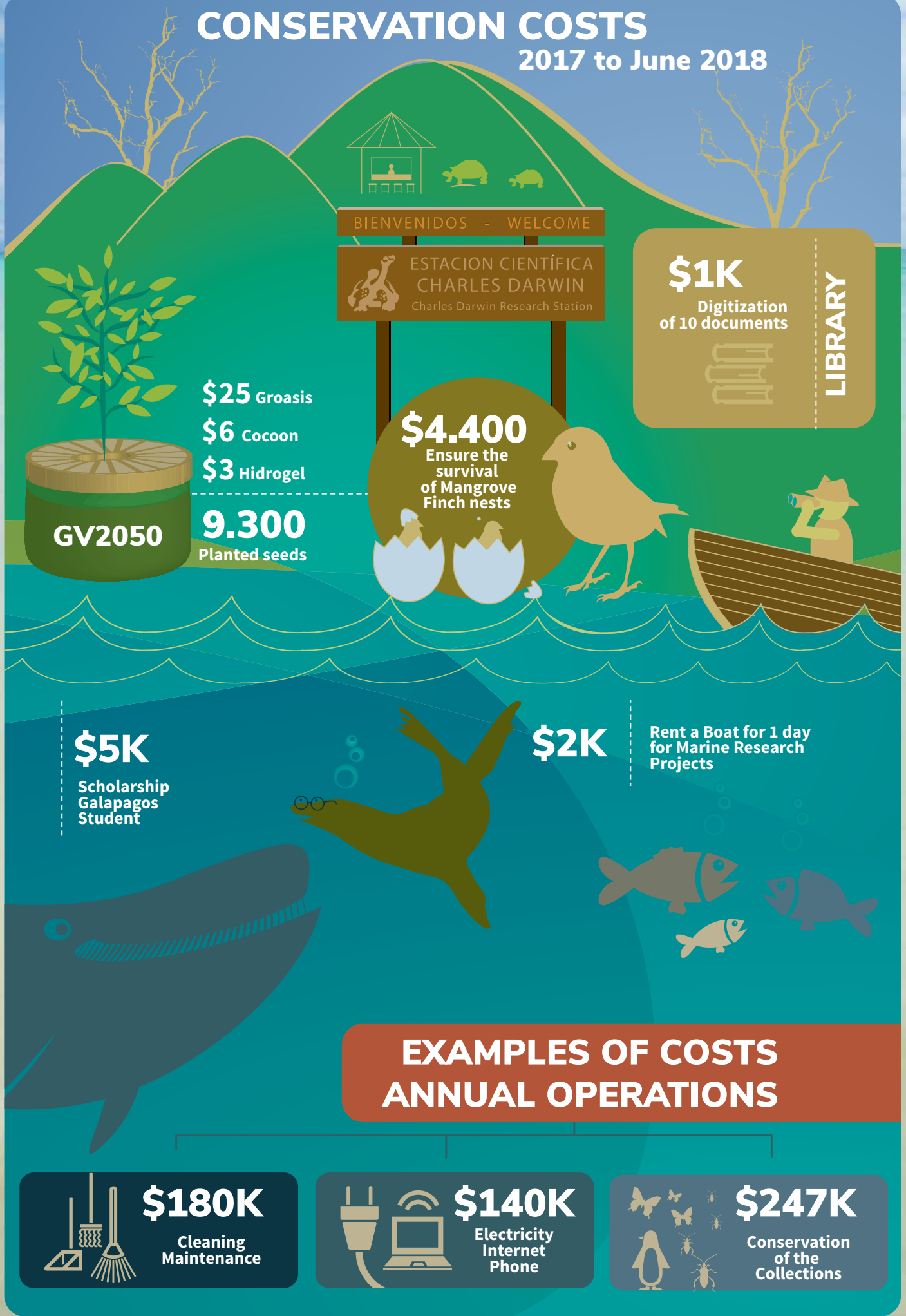
Other Ways to Give to CDF

The Foundation also receives donations by check, direct transfer, planned regular donations, and donations of stocks. If you would like to donate using one of these methods, please contact our Fundraising Area by writing to
cdrs@fcdarwin.org.ec

If you live in the United States, you can make your mark in Galapagos and consider the Charles Darwin Foundation when planning your estate inheritance. For more information about leaving your legacy, please communicate with
cdrs@fcdarwin.org.ec

CONSERVATION COSTS

2017 to June 2018



EXAMPLES OF COSTS ANNUAL OPERATIONS

$180K
Cleaning Maintenance

$140K
Electricity Internet Phone

$247K
Conservation of the Collections


© Julio Rodriguez/ CDF

HUMAN RESOURCE MANAGEMENT

HR management has focused on reviewing, developing and establishing formal tools to ensure that everyone belonging to the CDF can do their jobs. Our starting-point was to review the Strategic Plan to determine action priorities.

In 2017 and 2018, we created the CDF Position Manual, a tool to provide a reference to apply processes such as personnel recruitment and selection, performance evaluation, training, working conditions and risks, etc. We developed and implemented the worker induction program, assuring that people enter with the knowledge that will enable them to understand what CDF does, and what their role is within CDF. We have also updated the regulations, organizational chart, policies and procedures. We have also defined our organizational values and competencies.

We have conducted selection and hiring processes for 20% of the total CDF staff. 19% of the staff have left, 9% by resigning, 8% because of contract non-renewal, and 2% because of retirement.

Staff training has included first aid, fire extinguisher handling, and waste management. We held an integration event focused on building teamwork, a harmonious workplace and communication among the CDF family. We have also stressed the excellent work performed by the CDF staff and the contributions of those who have been with CDF for many years.

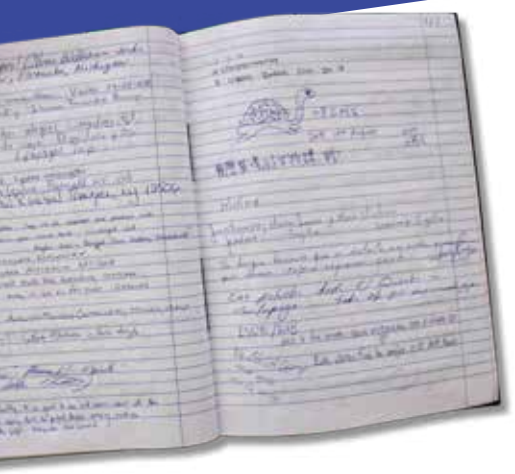
Collaborators:
Firefighters of Santa Cruz Island, Municipality of Santa Cruz Island.

Team:
Galo Del Hierro, Daniel Barreno, Ursula Ellecosta, Julio Gallegos, Paola Herrera, Vicky Mieles and Mariela Padilla.

© Marcela Rodas / CDF

Collaborators:
CDF Science Team, CDF Communication Area, Diego Bermeo and Carlyn Iverson.

Team:
Stefan Loosveld, Mery Arevalo, Frenchsca Bucheli, Luis Fernández, Mercedes Pincay, Bolivia Rentería, Jenny Ruales, Raji Scoggin, Celeste Tomalá, Sergio Zamora and Joel Zavala.



VISITING THE RESEARCH STATION

The Institutional Promotion team works to generate a positive experience for local, national and international visitors who visit our Charles Darwin Research Station every day. The Charles Darwin Exhibition Hall has interpretation areas detailing the scientific work conducted at the Research Station. There is also a donation point and coffee shop, shaded areas and a lookout deck.

In 2017, an electric Eco Shuttle was donated to us, and in late 2018 will transport visiting senior citizens, expecting mothers, families with small children, and persons with reduced mobility, so they can visit the National Park and the Research Station facilities.

We have two new wheelchairs available for our visitors if requested at the Exhibition Hall reception. As part of our contribution to community initiatives, this Hall has an exhibit by the Santa Cruz Youth Photography Club. The club consists of first- and second-year students of the international Baccalaureate at the Galapagos National High School who use photography as a tool to conserve and strengthen their cultural identity and positively influence conservation and empowerment regarding the Natural and Cultural Heritage of protected areas in Galapagos. This exhibit is renewed every six months.

The Charles Darwin Exhibition Hall is open from Monday through Sunday:

8h00 to 12h30
14h30 to 17h30

***Numbers of visitors from July 2017 through June 2018**

82,800

* The numbers of visitors to our Exhibition Hall are recorded daily using a manual count in the Hall.

© Juan Manuel García/ CDF

The new Marine World exhibit in the Van Straelen Building

Open Monday through Friday:

07h30 to 17h00

This display was created for local community students to use, and who participate in our environmental education programs.

Parque Nacional GALÁPAGOS Ecuador

Estación Científica Charles Darwin Research Station
GALAPAGOS - ECUADOR

Leyenda / Legend

Ruta principal	Main Trail
Camino secundario	Secondary Trail
Camino de playa	Beach Trail
Fin del camino	End of Trail

Exhibición tortugas gigantes
Giant Tortoises Exhibition

Solitario George
Lonesome George

FINANCIAL REPORT

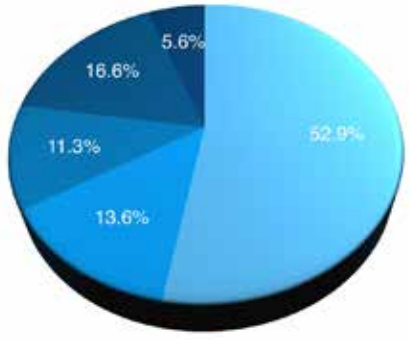
The Finance area of the Charles Darwin Foundation is equipped to provide timely and accurate financial information to the Board, the Executive Management as well as to Science, Operations and Grant administration.

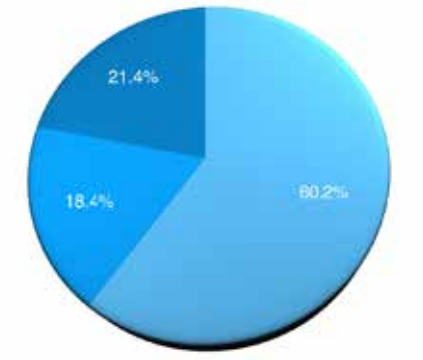
It provides the financial information for grant reporting to individual and institutional donors. The finance area is guided by the Annual Operating plan and budget. The Foundations' 2016 and 2017 accounts have been audited by PricewaterhouseCoopers del Ecuador Cia. Ltda.

Throughout 2017 and the first half of 2018, we have worked intensely to lay the foundations for our future financial sustainability. Since the CDF depends 100% on private donations, ongoing loyal support by our generous donors has been fundamental for our continuing success.

2017 INCOME

Applied restricted income	$ 2,455,902	52.9%
Unrestricted pledged income	$ 630,000	13.6%
Unrestricted other income	$ 523,065	11.3%
Institutional promotion	$ 771,124	16.6%
Services	$ 258,621	5.6%
TOTAL	**$ 4,638,712**	



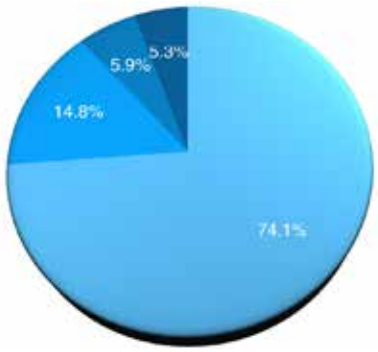


2017 EXPENDITURE

Science, conservation & education*	$ 2,764,859	60.2%
Fundraising	$ 844,534	18.4%
Supporting Services	$ 980,952	21.4%
*** 2017 expenditure**	**TOTAL**	**$ 4,590,345**

*Science, conservation & education

Science project costs	$ 2,047,578	74.1%
Other project costs	$ 408,324	14.8%
Services for scientists	$ 161,903	5.9%
Science, laboratories & collections	$ 147,054	5.3%
TOTAL	**$ 2,764,859**	



2017 Statement of Financial Position

Assets	*31-12-2017*	*31-12-2016*
Cash and cash equivalents	$ 2,667,969	$ 1,803,436
Other current assets	$ 508,928	$ 467,813
	$ 1,228,162	$ 1,234,229
TOTAL	**$4,405,059**	**$3,505,478**
Liabilities and equity		
Deferred income	$ 2,204,988	$ 1,431,868
Other current liabilities	$ 428,440	$ 348,306
Employee benefits	$ 431,291	$ 433,241
Equity	$1,340,340	$1,292,063
TOTAL	**$4,405,059**	**$3,505,478**

© Julio Rodriguez / CDF

OUR DONORS 2017 to June 2018

Major institutional donors such as the COmON Foundation, Leona M. and Harry B. Helmsley Charitable Trust, Galapagos Conservancy, Schaffhausen International Watch Company (IWC) and Lindblad Expeditions - National Geographic Fund have continued supporting us during 2017 and 2018. We are extremely grateful, since our work would not be possible without their constant contributions.

In 2017, we made a new alliance, with the Ecoventura travel company. In July 2017, the Charles Darwin Foundation, Ecoventura, Eliécer Cruz-Bedón and the Galapagos National Park representative, Jorge Carrión as a witness signed an agreement to create the Galapagos Education and Biodiversity Sustainability Fund, to raise funds for conservation in the Galapagos Islands. Specifically, this fund will support marine and terrestrial conservation, and education efforts by the Charles Darwin Foundation, and provide patrolling, surveillance and administrative support for the Galapagos National Park Directorate.

We would especially like to mention the Hyundai Corporation, which in 2017 gave us their generous donation of an Ioniq electric vehicle and a generator which is now an integral part of our Research Station and enables us to work without interruptions during blackouts.

In addition to continuing and strengthening our long-term relations, in 2018 we have begun new collaborations in the marine science area with the UN Environment Program, the Paul M. Angell Family Foundation, the Prince Albert II of Monaco Foundation, and Focused on Nature.

Donations by individuals have also been fundamental to guarantee project operation in 2017. Our thanks to all our individual donors, especially Ms. Karen Lo, Amy E. Blackwell, Sven Lindblad, Walter Scott Jr. and Ken and Jenny Collins. We are grateful for having met new individual donors in 2018, such as Ernest Rady and Bob Rogers, who were inspired after visiting the Galapagos Islands and taking a tour through the Charles Darwin Research Station.

Finally, we are enormously grateful for the in-kind donations that we have received from various sources, including local and international companies and dear friends of the CDF, who have donated their time, experience, hospitality, works of art and more, including Microsoft Ecuador, Tamaki Okuno, Carlyn Iverson, Juan Carlos Manosalvas, María Soledad Lehmann-Restrepo and Naeem Ahmed.

	Calendar year 2017	January 1st - June 30th 2018
	Corporations	**Corporations**
$250,000 - $500,000	IWC Schaffhausen	IWC Schaffhausen
$10,000 - $49,999	BESS Forest Club	BESS Forest Club
	Tropical Aquaculture Products Inc.	Tropical Aquaculture Products Inc.
$1,000 - $9,999	University NAVSTAR Consortium	University NAVSTAR Consortium
	ServiceHouse B.V.	

	Foundations and NGOs	**Foundations and NGOs**
Above $1,000,000	COmON Foundation	COmON Foundation
	The Leona M. and Harry B. Helmsley Charitable Trust	
$500,000 - $1,000,000		Galapagos Conservancy
$250,000 - $500,000	Galapagos Conservancy	

$50,000 -$249,999	Lindblad Expeditions - National Geographic Fund	The Leona M. and Harry B. Helmsley Charitable Trust
		Lindblad Expeditions - National Geographic Fund
		United Nations Environment Programme
$10,000 - $49,999	Anonymous Donor	Galapagos Conservation Trust
	Frankfurt Zoological Society	Japan Association of Galapagos
	Friends of Galapagos Netherlands	Keidanren Nature Conservation Fund
	Friends of Galapagos Switzerland	Paul M. Angell Family Foundation
	Galapagos Conservation Trust	Prince Albert II of Monaco Foundation
	Holbeck Charitable Trust	Rogers Family Charitable Fund
	International Galapagos Tour Operators Assoc.	Save Our Seas Foundation
	Inti Raymi Fund	Schwab Charitable Fund
	Marguerite Griffith-Jones, GESS Charitable Trust, and Decoroom Limited	Vrije University Brussel
	Queen's University Belfast	
	Save Our Seas Foundation	
	Suzanne and Walter Scott Foundation	
	World Wildlife Fund	

	Calendar year 2017	January 1st - June 30th 2018
$1,000 - $9,999	Cameron Foundation	Aerial Conservancy
	Falmouth University	Cameron Foundation
	Fraydun Foundation Inc.	Breuss-Burgess Family Fund
	Ghent University	Falmouth University
	Japan Association for Galapagos	Friends of Galapagos Switzerland
		Focused on Nature
		Michael & Annie Falk Foundation
		Mortimer Charitable Lead Trust
		Rady Family Foundation
Below $1,000	Friends of Galapagos New Zealand	Friends of Galapagos New Zealand
	Stanford University Alumni Association	Keith and Karen Lee Family Fund
		Penguin Fund of Japan
		Stanford University Alumni Association
	Tourism Sector Alliances	**Tourism Sector Alliances**
$50,000-$100,000	Ecoventura	Ecoventura
$500 - $5,000	Geographic Expeditions	Geographic Expeditions
	Galapagos Safari Camp	Ponte Travels
	Senderos Naturales	
	Wilderness Travel	
Below $500	Natural Habitat Adventures	Natural Habitat Adventures

	Names
Above $500,000	Ms. Karen Lo
$50,000 - $150,000	Amy E. Blackwell Ken Collins and Jennifer Mallinson Brian Graham Tennant (legacy) Sven Lindblad Mark Wang
$5,000 - $49,999	Miguel Bosé Keith Decker Dennis Geist Ewout Heersink John Heersink L.M.H. Maas Seishi Sakamoto Ronnie Stewart Barbara West
$1,000 - $4,999	H.R.H. Princess Maha Chakri Sirindhorn Scott Atkinson G.H. Beens Koen Borsje William Chadwick Donald Clark Jeff Corbin and Darrel Schoeling Mr. De Heer A. Dijkinga Dolores Gangotena de Diez Sylvia Harcourt-Carrasco Eric Kettner Linda Koster-Pon Peter Kramer George and Susan Krouse Baird Matthews Frederik Meintz Zijlstra Bernard Pon Mariëtte Pon Catherine Putonti Ellen Ramsay Jens Redmer Ulrich Sauer C.S.L. Schep Darrel Schoeling K.J. Storm Holly Straub W. van de Groep CJ Albert van der Merwe Anel van der Merwe Antoon van den Berg Phil van Haarlem Hans van Poelvoorde Gerard L.M. van Hengstum William Welke

Individuals

Mayor a/greater than $500,000	1
$50,000-$150,000	4
$5,000 - $49,999	9
$1,000 - $4,999	35
Below $1,000	226

Corporations

$250,000 - $500,000	1
$10,000 - $49,999	2
$1,000 - $9,999	2

Foundations/Non-Government Organizations

Above $1,000,000	2
$500,000 - $1,000,000	1
$250,000 - $500,000	1
$50,000 - $249,999	3
$10,000 - $49,999	20
$1,000 - $9,999	11
Below $1,000	4

Tourism Partners

$50,000 - $100,000	1
$500 - $5,000	5
$1 - $499	1

In-Kind Donations

Corporations:	21
Individuals:	39

AGREEMENTS

In 2017 and the first half of 2018, we have established alliances with several national and international institutions such as the Smithsonian Environmental Research Center, Friends of Cocos Island Foundation, National Biodiversity Institute, Polytechnic School of Chimborazo, La Iguana Foundation of Guayaquil and the Municipality of Santa Cruz. These agreements enable us to strengthen and diversify current lines of research at the Charles Darwin Research Station and continue with fundraising efforts, strengthen bonds of cooperation with national and international institutions and resume our presence on other inhabited islands of Galapagos.

Signing the Framework Cooperation Agreement with the Galapagos National Park Directorate and with the Government Council of the Special Regime for Galapagos are two of the most important aspects of CDF's inter-institutional relations and work so far in 2018.

In 2017, 13 agreements were signed, making a total of 34 agreements in effect through the end of that year.

Under the Cooperation Agreement with the Ecuadorian Government, we have fulfilled the requirement of submitting financial and technical reports on progress with research projects carried out by the Research Station with funding from International Cooperation during 2017. In coordination with the CDF Science Sector, we have progressed in preparing adjustments in the Research Station's overall research policy, for validation.

Working connections with our main partner, the Ministry of the Environment, have been strengthened substantially since mid-2017. Work with the Galapagos National Park Directorate and the Galapagos Bio-security Agency have flowed dynamically and smoothly, for the benefit of Galapagos and the institutions themselves.

Institutions	Signature	Current
• Galapagos National Park Directorate	July 2018	5 years
• The Japan Association for Galapagos	March 2018	3 years
• Friends of Cocos Islands Foundation	February 2018	5 years
• Smithsonan Environmental Research Center	January 2018	5 years
• Rancho Manzanillo	December 2017	2 years
• ELECGALAPAGOS	October 2017	1 year
• San Cristóbal Highschool	October 2017	3 years
• Ecoventura	July 2017	
• Fundación la Iguana	June 2017	2 years
• Santa Cruz Municipality	June 2017	4 years
• University of Wisconsin-Eau Claire	June 2017	5 years
• National Biodiversity Institute	May 2017	3 years
• Universdad Internacional del Ecuador	April 2017	5 years
• Escuela Politécnica de Chimborazo	April 2017	2 years
• Pikaia Lodge	January 2017	1 year
• Hotel Casa de Marita	January 2017	3 years
• Dalhousie University	December 2016	1 year
• World Wildlife Fund	November 2016	10 years
• Escuela Politécnica del Litoral (ESPOL)	September 2016	5 years
• YACHAY TECH	July 2016	25 years
• Government of Ecuador	July 2016	5 years
• Pontificia Universidad Católica del Ecuador	July 2016	1 year
• Tropical Herping	June 2016	3 years
• The Queen´s University of Belfast	June 2016	5 years
• Charles Darwin University	June 2016	5 years
• The Leibniz Center for the Tropical Marine Ecology	May 2016	2 years
• Universidad Técnica de Ambato	February 2016	5 years
• Escuela Politécnica del Ejército, Escuela Politécnica del Litoral	February 2016	5 years
• Universidad de Málaga	February 2016	5 years
• YACHAY EP	February 2016	5 years
• Universidad San Francisco de Quito	November 2015	3 years
• Central University of Ecuador	September 2015	5 years
• Baltra Airport (ECOGAL)	September 2014	3 years

Lindblad Expeditions Celebrates its 50th Anniversary

n 1967, Lars-Eric Lindblad landed on South Plaza Island in the Galapagos Islands. Like so many of us who have been fortunate enough to visit this magical place, Lars-Eric did not know what to expect. As he explored the island, he was, ''immediately struck by one powerful observation: Not a single creature displayed even the slightest hint of fear as we walked by. Boobies on nests simply stared at us as we passed within a few feet; land iguanas just kept eating their cactus fruit. The sea lions, particularly the young ones, tried to approach us to investigate the new creatures.''

Today, 50 years later, Lars-Eric's powerful observations still hold true, thanks to the amazing work of Lindblad Expeditions, and its partnership with National Geographic. Since 1997, Lindblad Expeditions and National Geographic travelers have donated more than $8.5 million to important conservation, education, and research priorities in Galapagos, many of which have directly supported the Charles Darwin Foundation. Examples include: invasive species eradication efforts, ecological monitoring of shark populations, migration studies of giant tortoises, scholarship programs, and support for artisans to create a sculpture which will change the perception of plastic use for both travelers and locals.

We congratulate Lindblad Expeditions on its 50th anniversary in Galapagos, and we look forward to collaborating for many more years to protect and conserve these Enchanted Isles for future generations.
Link to quote:

Enlace a una cita:
https://www.expeditions.com/globalassets/pdf/brochures/new/gal-077_2galfue7.pdf

A Story of Over 100 Years' Friendship: Japan and Ecuador

Galapagos and Ogasawara Strengthen their Relations

To commemorate 100 years of diplomatic relations between Ecuador and Japan, in March 2018 two representatives of the CDF participated in two symposiums in Japan, held a number of meetings with current donors, potential donors, researchers and authorities from Tokyo, Ogasawara (or the Bonín Islands) and the Amami Islands.

The Amami Islands had sent UNESCO the request for nomination to be a World Heritage Site and requested recommendations from CDF as a scientific advisor from one of the best-conserved World Heritage Sites in the world, the Galapagos Islands, to prepare for the challenge of being on the UNESCO list.

Moreover, the CDF with the Boninology Institute, Japanese Association for Galapagos (JAGA) and authorities of Japan made it possible to hold a cultural exchange, with four students from the Galapagos Archipelago to visit the Archipelago of Ogasawara, a Natural Heritage of Humankind Site since 2011. Ogasawara is an Archipelago of around 30 islands, the largest of which is about the size of Floreana Island, with a population of approximately 2500 inhabitants. These islands of volcanic origin are 1000 Km south of Tokyo.

During their visit to Japan, the students learned about the community and culture, and the challenges they face to conserve the islands of Ogasawara. At the end of August, a group of students from Ogasawara came to Galapagos to share time and experiences with authorities, local students, and community.

Authorities such as the Minister of Environment from Japan, Mayors of Ogasawara (Chichi Jima) and Amami, Governor of Tokyo, maintain their interest in extending this exchange long-term and strengthening bonds between Ogasawara and Galapagos.

Donors:
Institute of Boninology (IBO), Japanese Association for Galapagos (JAGA), Committee for the Ecuador-Japan 2018 Centennial.

Collaborators and special thanks to:
Authorities of Japan, Representatives of the Keidanren Committee on Nature Conservation (KCNC), National Museum of Nature and Science in Tokyo, representatives of Peace Boat, Nippon TV, NHK TV, singer / songwriter Masashi Sada, BESS Forest Club,the Embassy of Ecuador in Tokyo, High Schools in Ogasawara and High Schools in Galapagos.

Team:
CDF: JJohanna Carrión, Angie Carrión, Paola Díaz, Galo del Hierro, Arturo Izurieta and Mariuxi López.
JAGA: Aki Akama, Akiko Hansaki, Tamaki Okuno, Hiroko Sakura and Kazuki Takagi.
IBO: Sora Horikoshi, Harumi Horikosi, Tetsuro Sasaki, Atsuko Asatani, Naoki Kachi, and Kuu Miyagawa.

Galapagos Biodiversity & Education Sustainability Fund

In August 2017, a Memorandum of Understanding (MOU) was signed among the Ecoventura tourism company, the Charles Darwin Foundation (CDF), and Mr. Eliécer Cruz-Bedón. Launching the "Educational Fund for Galapagos Sustainability and Biodiversity" materializes these united thrusts to drive conservation in Galapagos. The purpose of this initiative is to raise funds from tourism activity to support research, education and public knowledge about the natural and societal systems in the Galapagos Islands, to contribute to conserving the Galapagos Islands. Specifically, this fund will support marine and terrestrial research to support conservation decisions in these zones, in the Galapagos National Park and its Marine Reserve. This initiative will also support scientists who are CDF scholarship students and will also focus on the efforts that CDF makes in environmental education and dissemination. This fund's support will also include activities of patrolling, surveillance and administrative support for the GNPD.

Donor: Ecoventura
Collaborators: Galapagos National Park Directorate, Eliécer Cruz-Bedón
Team: Santiago Dunn (Ecoventura), Melissa Sotomayor (Ecoventura), Amy Lesh (Ecoventura), Dorish Welsh (Ecoventura), Paola Díaz-Freire, Daniel Unda-García, Renee Monroe, Liza Nagode.

The cooperation agreement for 10 years (Nov. 2016 – Nov. 2026) establishes two levels of coordination: the institutional coordinator based on the ESPOL Campus and the local coordinator based on the Islands. For this 2018-2019 period, these coordinator positions will be filled by Dr. Mercy J. Borbor-C. and Dr. Rafael Bermúdez, respectively, with Isabel Timpe as Program Assistant in the islands.
The GMARE Program in 2018 and 2019 wishes to conduct research under joint proposals by the partner institutions and complementary activities, in addition to building their own projects' research capacities.

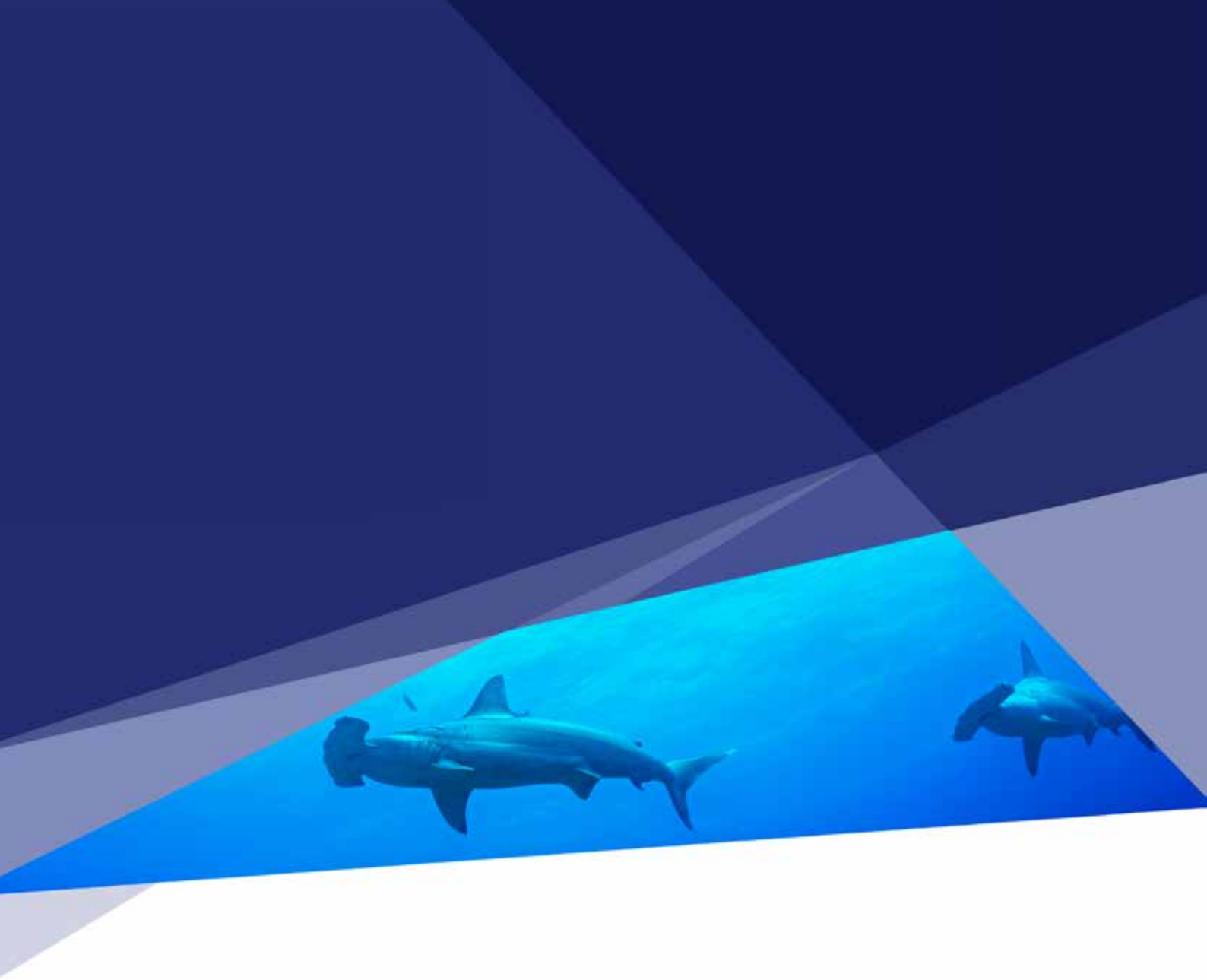
Donors: Polytechnic Institute of the Coast, IAEA (International Atomic Energy Agency for the Summer School on Ocean Acidification). The CDF provides, as its counterpart contribution, the use of infrastructure and logistical support, its staff, and other assistance for the proposed projects in the Program's research plan.
Collaborators: Galapagos National Park Directorate
Team: CDF: María José Barragán-P., José Marín-Jarrín. ESPOL: Rafael Bermúdez, Mercy J. Borbor, Isabel Timpe.

The Charles Darwin Foundation (CDF) has been designated to be the liaison within the technical group coordinating science for the CMAR initiative in coordination with the Pro Tempore Secretariat, represented by the GNPD. Under the initiative, there are five technical working groups, which are the group on tourism, the group on marine protected areas, the group on science, the group on communications and the group on fishing. These groups comprise experts from the public and private sectors in the thematic areas defined by CMAR, providing scientific and technical inputs and proposals for CMAR's actions. They have their action plan according to CMAR's regional plan, and the national commissions of each country.

Collaborators: Galapagos National Park Directorate, National System of Conservation Areas / Cocos Marine Conservation Area, National Natural Parks of Colombia, MiAmbiente.
Team: Inti Keith, María José Barragán-P., Nicolás Moity.

ABG	Bio-security and Quarantine Regulation and Control Agency for Galapagos
MPAs	Marine Protected Areas
CABI	International Center for Agriculture and Biosciences
CI	Conservation International
CMAR	Eastern Tropical Pacific Marine Corridor
CNC	Canadian National Collection of Insects, Arachnids and Nematodes
FCDs	Fish Concentration Devices
GNPD	Galapagos National Park Directorate
CDRS	Charles Darwin Research Station
ESPOCH	Polytechnic Institute of Chimborazo
ESPOL	Polytechnic Institute of the Coast
CDF	Charles Darwin Foundation
GMaRE	Galapagos Marine Research and Exploration
IBO	Institute of Boninology
ICF	International Community Foundation
INAMHI	National Institute of Meteorology and Hydrology - Ecuador
INOCAR	Naval Oceanographic Institute of Ecuador
IWC	International Watch Company Schaffhausen
JAGA	Japanese Association for Galapagos
KNCF	Keidanren Nature Conservation Fund
LOREG	Law of the Special Regime of the Province of Galapagos
MAGAP	Ministry of Agriculture, Livestock, Aquaculture and Fishing
MINTUR	Ministry of Tourism
ETP	Eastern Tropical Pacific
GMR	Galapagos Marine Reserve
GMRR	Galapagos Marine Resources Reserve
GIS	Geographical Information System
UNESCO	United Nations Education, Science and Culture Organization
WWF	World Wildlife Fund

© Pelayo Salinas / CDF



Fundación
Charles Darwin
Foundation
GALAPAGOS

CHARLES DARWIN FOUNDATION FOR THE GALAPAGOS ISLANDS

Puerto Ayora, Santa Cruz, Galápagos, Ecuador. + 593 (5) 2526 146 / www.darwinfoundation.org / cdrs@fcdarwin.org.ec