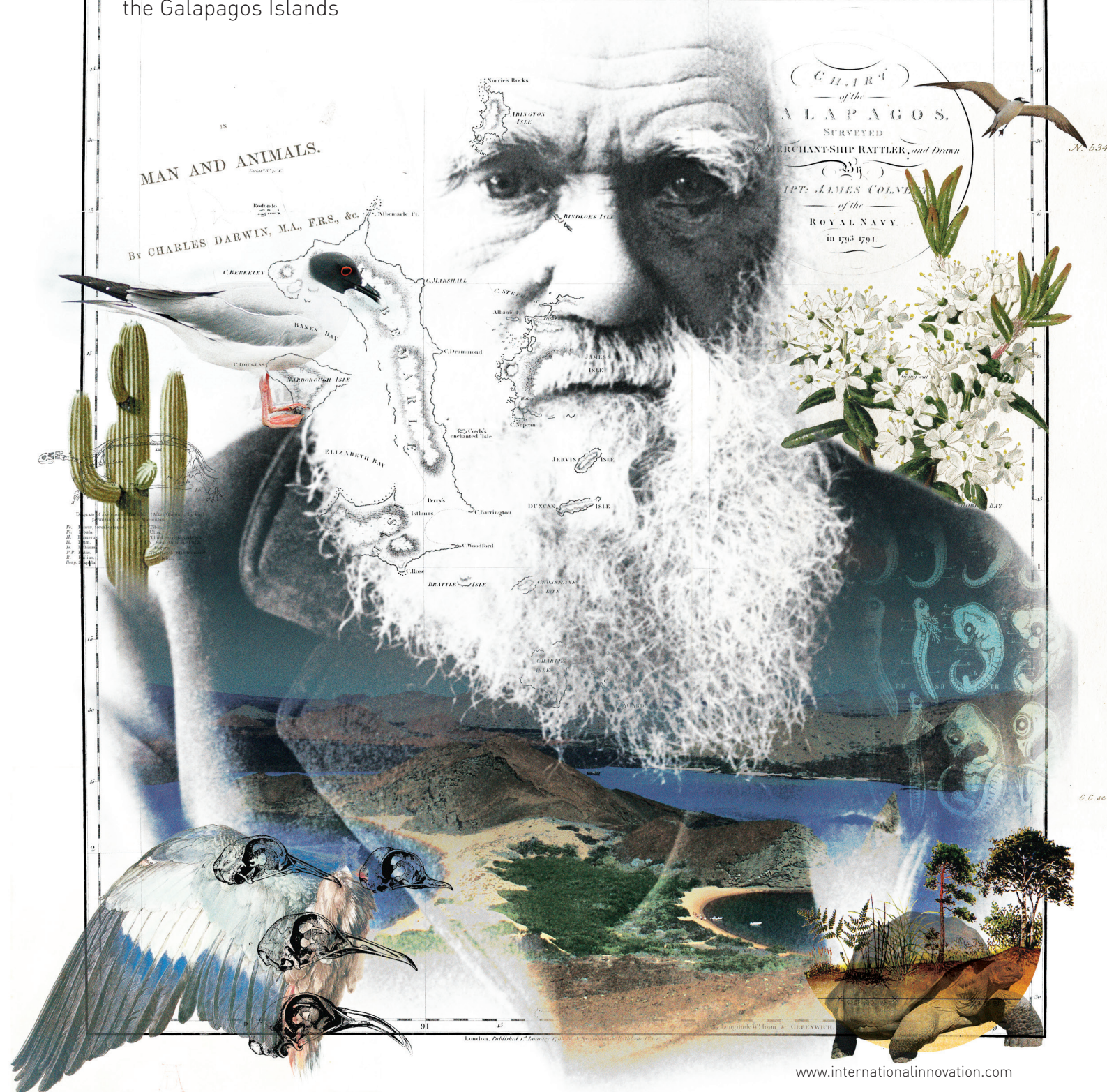


 CULPEPERS I

WEXAMS 1



THE GALAPAGOS ISLANDS are one of the best preserved island ecosystems in the world. The observations Charles Darwin made when he visited the Islands in 1835 can still be seen and have been studied further by hundreds of scientists around the world. Gaining an understanding of the biological and ecological processes in place has helped Ecuador to implement environmental conservation strategies and policies for the future of the Galapagos.

The Charles Darwin Foundation (CDF) embodies the work and magnificence of Charles Darwin through the generation and sharing of knowledge with the Ecuadorian authorities, local community and institutions around the world.

WILDLIFE ADAPTATION

In the past 50 years, the Galapagos wildlife has had to adapt to changing conditions – the two main drivers of which are natural and anthropogenic. Natural phenomena such as El Niño and La Niña events and, more recently, tsunamis, solar incidences and the natural arrival of species, play a key role in selecting the most adaptable species or individuals on the Islands.

Even though we still have pristine places where natural processes can be studied, enabling us to understand how nature works, the anthropogenic effects on the wildlife are the ones taking up most of our attention nowadays. Human activities since the discovery of the Galapagos in 1535 have increased in various ways, particularly in the past century, when formal colonisation took place.

The introduction of species by man has been the most damaging factor to the fragile and unique Galapagos ecosystems. Competition of invasive species with native and endemic species (plants and animals) has created serious alterations in ecosystem and species composition. These changes have affected the populations and habitat of giant tortoises, land iguanas, Galapagos petrels, endemic *Miconia* (brown tree), and *Scalesia* forests (lechoso or giant sunflower tree). The involuntary introduction of plagues such as the fly *Philornis downsi*, are generating serious threats to the survival of various iconic land birds such as the Darwin finches as the larvae feed on the blood of the recently hatched birds, causing 100 per cent mortality.

NEW AND EXPANDING SPECIES

At CDF, we consider the expansion of existing and the arrival of newly introduced species as the greatest threat to the Galapagos ecosystems, both terrestrial and marine. We are continuously monitoring new arrivals of foreign species and studying those that have managed to establish themselves in order to advise the authorities on how to control them and implement management actions. Our goal is to assure the survival of those endemic species and contribute to the stability of Galapagos natural ecosystems.

The arrival of these alien species is directly connected with human activities that sustain a current population of around 28,000 inhabitants, with tourism being the main indirect culprit. Although the Ecuadorian Government has improved its quarantine and biosecurity mechanisms, there are serious limitations, both technical and institutional, for the prevention of such introductions – putting Galapagos at risk on a daily basis.

GALAPAGOS AND BEYOND

Our concerns, however, extend beyond the Galapagos, which is why we work internationally. The Charles Darwin Research Station has hosted scientists from all over the world. This means that CDF is connected with one of the greatest scientific networks, contributing to the global understanding about how nature works and how conservation management can be applied or adapted to other parts of the world.

We are part of international efforts to protect and sustainably manage island systems around the planet. We hosted the International Workshop on Island Sustainability in 2010, which provided us (and international experts), with insights on the difficulties and actions needed to maintain natural and human associations in a sustainable way, and in the context of an increasingly globalised economy and technology. CDF has already inserted in its mission the aspect of contributing internationally by generating alliances with regional conservation initiatives such as the Tropical Eastern Pacific Marine Corridor where four Natural World Heritage Sites are present (Cocos, Malpelo, Coiba and the Galapagos).



(Reservado a la Fundación Charles Darwin)

Location

VOLUNTEERING AND SCHOLARSHIPS

The volunteer programme offers the opportunity for individuals to be involved in a variety of projects and experience how our scientists work in extreme and difficult conditions for a great cause. They get what they came for and more! Being in the field or working in our labs or facilities contribute to their professional and personal growth.

The Foundation has provided scholarships and has formed more than 2,000 Ecuadorian professionals, some of whom are now in high-level positions in the Government or environmental and conservation organisations. I am one of them, and I am thankful to CDF for having provided me with such an opportunity. It never crossed my mind that I was going to be directing such an amazing organisation 25 years later!

To know more about CDF and contribute to its work please visit:
www.darwinfoundation.org/en/get-involved/donate

BIENVENIDOS — WELCOME
**ESTACION CIENTIFICA
CHARLES DARWIN**
Charles Darwin Research Station

INTERNATIONAL INNOVATION



CDF HIGHLIGHTS

PLANTS

The Galapagos Verde 2050 project has managed to restore the growth of endemic and native plants in islands severely affected by man, such as the Island of Baltra, as well as by rats such as the Island of South Plaza, where an important population of endemic land iguanas live.

Another important innovative study shows that quinine (*Cinchona pubescens*), an invasive plant for the Galapagos but in danger of extinction in the mainland, is enriching the Galapagos soils with phosphorus. This is the first example worldwide of an invasive species enriching the soil with this nutrient.

WORKSHOPS

Working with the Ecuadorian Ministry of Environment and the Galapagos Government Council, CDF was key to the organisation of three important international workshops: 1) searching solutions to control the parasitic fly, *Philornis downsi* in the Galapagos; 2) development of the Action Plan 2016-2020 for the Conservation of Critically Endangered Mangrove Finch; and 3) development of the Action Plan for Wildlife Health Contributions to Conservation in the Galapagos.

MARINE BIOLOGY

The CDF marine biology team has worked on the research ship *Nautilus* investigating the unexplored deep waters of the Galapagos. During these studies, they discovered a cat shark that had not been documented before. Together with our collaborators, we recently presented results of their research on the commercially exploited Galapagos sailfin grouper (*Mycteroperca olfax*), which has given us better information about this species' life history, adding new valuable data towards a first ever management plan for this species.

TECHNOLOGY

There have also been some technological gains this year that are proving valuable for research in the Galapagos. The land bird team at CDF helped to launch the application BirdEye Galapagos, which has information about the different birds on the Islands. We expect this will help people record their bird sightings in the 'e-bird', which in turn will increase the data that can be analysed for the protection of the Galapagos birds.

Through our scientific and academic networks we have been able to advance in other technological areas, such as through the donation of high-resolution satellite images of all the inhabited islands. This will be used to better understand the distribution of invasive species.



INSECTS

A recent study shows the dominance of invasive ant species compared to native and endemic species, which can help us understand and better manage areas within the agricultural zones of inhabited islands affected by introduced ants.



INVASIVE SPECIES, SUSTAINABILITY AND CONSERVATION MANAGEMENT

Concerning invasive species, we have three different project areas that will continue in 2016 and beyond. The priorities found in a recent 2015 workshop on the introduced fly *Philornis downsi* will be used to find ways of controlling it. Similarly, in early 2015, CDF hosted the International Workshop on Marine Invasive Species. As a result, in 2016, in collaboration with local authorities and stakeholders, the Foundation will make an action plan to prevent the arrival of non-native marine species. Next year, we expect that our scientists at CDF will have the ability to use high-resolution satellite images to understand the distribution of invasive species plants better.

With regard to sustainability, we have three projects that will continue in 2016 to address this complex system: 1) research on the management and sustainability of commercial fisheries such as the Galapagos grouper; 2) a study of submarine seamounts focusing on species dynamics and local and regional connectivity; and 3) the ecosystem restoration Galapagos Verde 2050 project looking into efficient ways to restore degraded terrestrial areas both inside and outside the protected areas space. Hundreds of hectares where native and endemic species are repopulating have benefited from our project, allowing for various associated native species of fauna and flora to regenerate as viable ecosystems.

In the conservation area, CDF has been leading research and advice on the conservation and management of the already fragile and reduced population of the mangrove finch (*Camarhynchus heliobates*), including the generation of the Mangrove Finch Management Plans 2011-2015 and 2016-2020. By the end of 2016, we will have an estimate of the populations of other small land bird groups living in the highlands of inhabited

islands, such as yellow warblers, vermillion flycatchers, Galapagos flycatchers and other species of Darwin finches.

Monitoring of the Galapagos penguin (*Spheniscus mendiculus*), flightless cormorant (*Phalacrocorax harrisi*) and the waved albatross (*Phoebastria irrorata*) will continue in 2016 to understand how the species can be better protected. Long-term research on the populations and use of habitats by sharks and rays will be important to determine their distribution and connectivity along the East Tropical Pacific Marine Corridor (CMAR) and improve the regional conservation efforts between Ecuador, Colombia, Panama and Costa Rica.

PRESERVING THE ISLANDS

The Galapagos must be preserved as one of the most pristine natural laboratories on Earth. It will depend on how the individuals that live on the islands find the balance between conservation of the natural capital and the sustainability of their ways of living. The international commitment of the Ecuadorian Government as signatory of the UN's World Heritage Convention offers hope for a better future for the Galapagos in this globalised world. We certainly need the international community to help us achieve this goal.

www.darwinfoundation.org

