GALAPAGOS news

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a biannual English-language publication for members of the international network of Friends of Galapagos organizations

Socio-Economic Issue

Social Science in Galapagos

CDF Supports Galapagos in Danger Decision

Plus:
Galapagos Guides
Floreana Mockingbird
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GALAPAGOS CONSERVANCY
Saving one of the world's great treasures

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The front cover: A local supporter pictured at one of CDF's annual "DarwinDays"© Cristina Loayza, CDF

CDF Supports Galapagos in Danger Decision

On June 26 of this year, the Charles Darwin Foundation (CDF) announced its support for UNESCO's decision to register Galapagos as a World Heritage Site in danger. Placing Galapagos on the list emphasizes and reinforces the decision of the Government of Ecuador in April to declare Galapagos at risk and as a national priority for conservation.

These two declarations are critical steps in moving forward a shared local, national, and international agenda to ensure the long-term conservation and sustainable development of the islands.

Economic development in Galapagos is growing at an unprecedented rate with tourism as the driving force. The resulting immigration and increased demand for fuel, goods, water, and public services has caused the number of flights to more than double in the last five years. The decreased isolation of the islands increases the potential for the introduction and spread of invasive species—the greatest threat to the biodiversity of Galapagos.

"The problems in Galapagos cannot be simplified to the finning of sharks, or the over-harvesting of sea cucumbers; the problems are underlain by an unsustainable socio-economic model that brings more investment, more immigrants, more cargo, more invasive species, and does not sufficiently link the local community to conservation," said Graham Watkins, Executive Director of the CDF.

There are now 1,321 registered introduced species in Galapagos whereas there were only 112 registered in 1990. These include 748 species of introduced plants, compared to 500 species of native plants, and at least 490 species of introduced insects. The risk of the arrival of pathogens such as West Nile Virus, insect pests, and new predators is now high. Mosquitoes carrying dengue and some avian diseases are recent arrivals to the islands.

Added to this, the greater energy requirements for tourism and the local population increases the risks of repeating the oil spill disaster of 2001. Diesel and petrol consumption have increased by 20% and 45% respectively in the last five years alone and the number of clients for electricity in Santa Cruz has increased by 35% since 2001.

Despite the fragility and rapidly diminishing isolation of the Galapagos Islands, there is some good news. The Galapagos National Park Service, with support from the Charles Darwin Foundation, has shown they are world leaders in the management of invasive species and restoration of endangered species and habitats.

Within the local communities can also be found proof of what can be achieved: for example, Pescado Azul, a small sustainable enterprise run by a women's cooperative on Isabela Island, produces value-added tuna products. The new cooking school at the Galapagos National College is training local culinary professionals for employment in the tourism sector. And the Municipalities are working with the tourism private sector to ensure effective recycling in the main towns in the islands.

"These successes and examples need to be multiplied to ensure sustainability, local benefits, and the conservation of this unique archipelago," commented Watkins.

More than ever, Galapagos needs effective leadership and strong support to achieve the vision of a sustainable and equitable society living in harmony with nature. It is clear that the development model for the islands requires a change in direction—the declarations by the President of Ecuador and UNESCO are critical initial steps in this process of change.

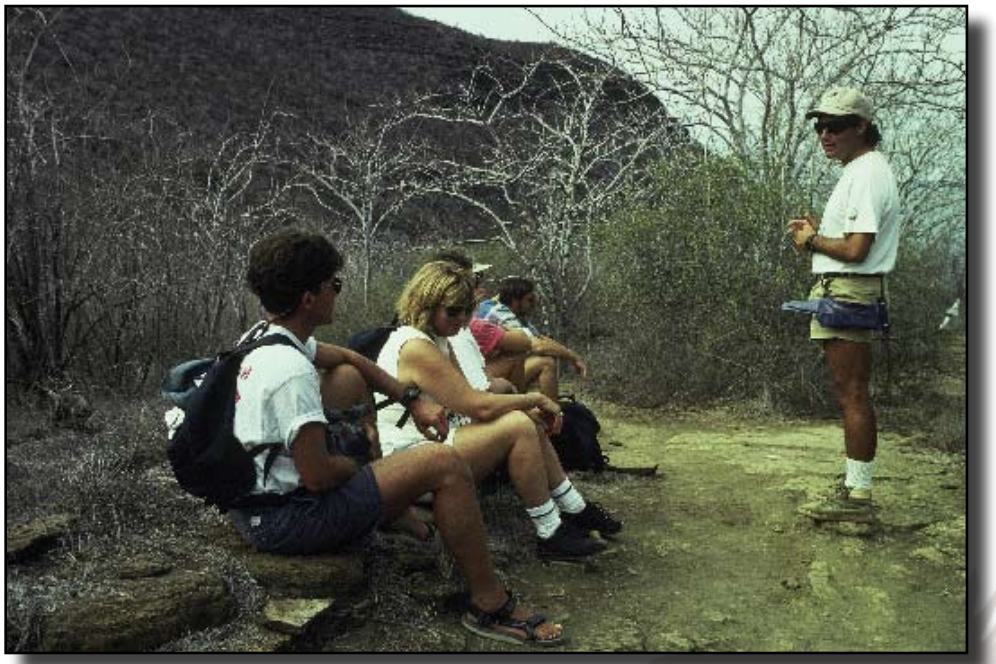
–Article based on a CDF press release.

Who's Who in Galapagos

Galapagos Guides

by Rachel Dex

The Galapagos naturalist guides are arguably the single most important factor in bringing alive the archipelago and its amazing wildlife for the thousands of visitors that arrive on its shores each year. But their role is much more than guiding visitors, for they are also in the front line of the Galapagos National Park's efforts to ensure that the growing number of tourists who visit the archipelago each year do not damage the fragile ecosystems and unique wildlife.



Naturalist guide briefing visitors at Tagus Cove. (Photo by Nigel Sitwell)

No visitors can enter the Galapagos National Park unless they are accompanied by a licensed guide. Each guide is responsible for a maximum of sixteen passengers which means that some of the larger vessels can have up to six guides on board, while smaller yachts with up to sixteen passengers have just a single guide.

As well as being responsible for the well-being of tourists under their care, a key role of the guides is to ensure that visitors follow the Galapagos National Park rules at all times while on the islands. They are also the eyes and ears of the Galapagos National Park Service, reporting any unusual sightings or animal behavior and any illegal activities.

There are currently 333 licensed guides in Galapagos, either working on fixed contracts for the larger tourism operators or on a freelance basis. The National Park has a system of grading the guides who work on their behalf. Level One is for those who have just completed their first year of work, Level Two is attained after four years, and Level Three for those with a university degree and multiple language skills.

All guides are required to be members of one of the two guides' unions—the Associacion de Guias Interpretes del Parque Nacional Galapagos (AGIPA), or the Associacion de Guias de Galapagos (AGPG). These organizations not only look after the guides' interests but also try to improve public education in Galapagos. Crucially, they have a voice on the Junta de Manejo Participativo (the Participatory Management Board) which decides key issues regarding conservation within the marine reserve.

So how do people become Galapagos guides? Individuals must first be accepted for a training course controlled by the Galapagos National Park and taught in conjunction with the Charles Darwin Research Station. The course typically lasts around six weeks and includes a final exam which they must pass before qualifying.

In the past, the guides course was open to international applicants and residents on the Ecuadorian mainland, usually people with a keen interest in nature and with appropriate university qualifications. However, since the Special Law for Galapagos was introduced in 1998 in a bid to control migration to the islands (among other things), only those born or resident in the archipelago can now apply for the course or work as licensed naturalists.

While it is crucially important to control migration to the islands, and also to offer a variety of employment opportunities for Galapagueños, the decision not to allow qualified university-educated people from the mainland to train as guides in Galapagos has sparked fears that the quality of guides in the archipelago could start to decline when the present generation of naturalist guides retire.

Rachel Dex is married to Santiago Bejarano, one of the most experienced Galapagos guides, who is Ecuadorian and started guiding in Galapagos in 1992. In 2004 they moved with their family to England where they run Think Galapagos, a small specialist travel company.

News From Galapagos

Provided by the Charles Darwin Foundation

People in the news

In May this year **Peter Grant** was elected as a Foreign Associate of the National Academy of Sciences of the United States. In the same month his wife, **Rosemary Grant**, was elected a Fellow of Britain's Royal Society (Peter was already a Fellow). Though British by birth, both Grants have been working in North America for many years, most recently at Princeton University. These prestigious honors celebrate their scientific studies in Galapagos, and underline the significant role of the Charles Darwin Foundation.

Peter Grant pointed out that "CDF has given us strong and unwavering support over the past 35 years, so it is only fitting for CDF to share the benefits of public recognition. I hope that these two elections will also be seen as a recognition of what Ecuador, and specifically Galapagos, has to offer its citizens in scientific exploration and discovery, both in inspiration and material value."

He went on to say that the potential for future discoveries in Galapagos is enormous. "This is one important reason why we are united in our commitment to preserve Galapagos in as natural a state as possible. It is the responsibility of our generation to do this for the benefit of future generations."

On August 8th, Rafael Correa, the President of Ecuador, appointed **Eliecer Cruz** as Governor of Galapagos. This event is a high honor for Eliecer, but also very good news for the archipelago, and for all of us who are interested in conservation. Eliecer has a background in natural sciences, and is well respected in Galapagos, having served as Director of the Galapagos National Park for seven years. Most recently he has worked as the Galapagos representative for WWF, an international wildlife conservation body.

First steps to eradicate rodents

Heidi Snell

Black rat

This spring the CDF and the GNPS hosted a 10-day international workshop concentrating on the problem of introduced rats and mice. Participants included experts with experience in the eradication of rodents on other islands around the world.

Building on the recent success of Project Isabela, which achieved the eradication of goats, pigs, and donkeys from some of the larger islands in Galapagos, the next challenge will be the elimination of introduced rodents such as the black rat and the common house mouse, two of the most invasive and destructive species that have arrived in Galapagos since the discovery of the islands in 1535.

Linda Cayot, the workshop coordinator and long-term CDF researcher said, "The workshop has already created an exciting plan for Pinzon and Rabida Islands which will provide a testing ground for the eradication of rodents from the entire archipelago."

While representing a huge challenge for both scientists and managers, Project Pinzon is designed to look to the future, when the knowledge and technology exists to eradicate introduced rodents from the larger, more complex islands. "I was thrilled to be a part of the start of another exciting program, much like Project Isabela", said Cayot, "and I look forward to the day when Galapagos is both goat-free and [introduced] rat-free."

Bryan Milstead, CDF's Head of Vertebrates, said introduced rodents are having strong detrimental effects on biodiversity in Galapagos, as they have done elsewhere. "We look forward to working with the Galapagos National Park to develop a state of the art rodent eradication program that will serve as a model for other island ecosystems worldwide."

The Galapagos Conservation Trust (UK) and Lindblad Expeditions (USA) provided financial support for the workshop. Catering was provided by the Colegio Galapagos cooking school, a landmark program that is training local high school students.

Report based on CDF's e-newsletter.

Major haul of shark fins

Early in August the National Environmental Police in the port city of Manta seized some two tons of shark fins and arrested 15 people, although a public official later ordered them released

CDF

and the fins returned, according to the Associated Press in Ecuador, and quoted in the *International Herald Tribune* and other newspapers.

The story hit the headlines in Ecuador and elsewhere, not only because of the size of the haul but because the Environmental Police were accompanied by Sean O'Hearn

of the environmental group Sea Shepherd, which has an agreement to assist these police, and also assists the Galapagos National Park Service in policing the Galapagos Marine Reserve.

Shortly after the raid, immigration police took O'Hearn into custody, revoked his visa, and threatened to deport him for allegedly infringing Ecuadorian sovereignty. This action was later rescinded and he was allowed to remain in the country (where he has an Ecuadorian wife and a daughter).

"He has committed no crime," said Mariana Almeida, president of the Ecuadorian organization Fundacion Selva Vida, "He has had the courage to defend sharks." Two tons of fins represent a total of about 20,000 fins, each worth around US$80–100 (£40–£50) in Asia. And how many sharks died to provide the fishermen with this bonanza? Whatever the number, it's surely too many.

End of an era

A milestone in the history of Galapagos was reached on September 4th with the death of Fritz Angermeyer at the age of 90. Fritz was the last survivor of the four Angermeyer brothers—the others being Gus, Hans and Carl—who left Nazi Germany in 1935 to settle on Santa Cruz Island. The family's exploits are chronicled in a captivating book by Hans Angermeyer's daughter Johanna, entitled *My Father's Island*. Fritz's departure severs the last link with an era when the Encantadas, or Enchanted Isles, were inhabited by a mere handful of hardy and adventurous souls.

Galapagos at Risk

Now available online, in both English and Spanish: *Galapagos at Risk*. This document summarizes studies of Galapagos from the last 15 years on biodiversity, conflict, tourism, economics, and migration. It hopes to create a new paradigm of understanding about what is happening in Galapagos and underscores the declaration of President Correa and UNESCO's decision to add Galapagos to its List of World Heritage Sites in Danger.

Visit www.galapagos.org/conservation/publications1.html to view or download this document.

Three coral species on IUCN Red List

A recent study by CDF, sponsored by Conservation International (CI) and implemented jointly with IUCN (the World Conservation Union), has concluded that three species of corals unique to Galapagos could soon disappear forever. Two of the species—the Floreana coral (*Tubastraea floreana*) and Wellington's solitary coral (*Rhizopsammia wellingtoni*) are listed as Critically Endangered, while a third—the Galapagos coral (*Polycyathus isabela*)—is designated as Vulnerable. The Red List also includes 74 Galapagos seaweeds, or algae, of which ten are Critically Endangered.

Floreana coral, endemic to Galapagos
Status Critically Endangered
Photo © Paul Humann / www.fishid.com

Why are these particular species threatened with extinction? Scientists believe that climate change and over-fishing—two of the biggest threats to marine life—are the most likely causes. Climate change is blamed for increasingly severe El Niño events that have caused dramatic rises in water temperatures in recent years in Galapagos waters. This warmer water harms coral reefs that are habitats for fish and other marine life, and also harms algae.

Galapagos kelp – Status Vulnerable
Photo © Sean Connell,
University of Adelaide

Unfortunately, the recovery of algae species following strong El Niño events is impaired by over-fishing of the natural predators of sea urchins, which feed on the algae. These include lobsters, wrasses, and trigger fish. The result is mushrooming urchin populations that scour rocks clean of algae, thus depleting a major food source for other species such as the marine iguana.

NASA Aids Climate Change Research

There is also interesting work taking place to learn more about the possible effects of climate change on Galapagos.

An ongoing study carried out by the Charles Darwin Foundation with funding from NASA is using a combination of new satellite technology, a network of submerged buoys, special oceanographic instruments, and seasonal research cruises to monitor the flow, temperature, salinity, and productivity of the cool, salty and nutrient-rich Ecuadorian Undercurrent (EUC) as it arrives at Galapagos.

Part of the project is aimed at understanding how NASA sensors in orbit can be used to follow changes in ocean productivity, and how that can directly help the people who manage sensitive and unique marine protected areas such as the Galapagos Marine Reserve.

The data collected through this project will help to predict the impact that changes in EUC and El Niño could have on marine species in Galapagos, and will help better manage ecological resources in the Galapagos National Park—especially fisheries and dive tourism.

It can also add to our understanding of the potential of Galapagos as a "thermometer for other parts of the world," since the unique confluence of currents in Galapagos provides the opportunity to monitor a number of currents that travel to and impact other regions.

ENSURING THE FUTURE FOR A LANDMARK SPECIES

by Paquita Hoeck

Floreana Island, the original home of the Floreana mockingbird

The animals that most people associate with Charles Darwin and his discoveries are probably the celebrated Darwin's finches, or perhaps the giant tortoises. However, it was a quite different group of birds that first aroused Darwin's curiosity, and greatly influenced his thinking about natural selection.

These were the endemic mockingbirds, of which he saw three of the four species during his six-week visit to Galapagos in 1835. Darwin collected specimens of the San Cristobal mockingbird, the Floreana mockingbird, and the Galapagos mockingbird. There is a fourth species living on Espanola Island, but that was not discovered until later.

These birds have been studied recently by Paquita Hoeck, who is working on her Ph.D. in Zurich, Switzerland. She wrote the following informal report while in Galapagos earlier this year:

I am investigating the genetic structure of mockingbird populations on different islands with the aim of determining inbreeding levels and the ability of their immune systems to respond to various threats. This is of interest because one of the Galapagos species, the Floreana mockingbird, is highly endangered with a total of only about 100 individuals living on two tiny islands close to the larger island of Floreana. We are trying to find out more about the genetic and health status of this bird in order to devise a recovery plan for the species. In line with the habitat restoration project being carried out on Floreana, we hope to reintroduce mockingbirds to the large island where they once occurred, and increase their numbers to a level that will ensure the species' survival.

I arrived in Galapagos at the beginning of November 2006 to start working on Champion and Gardner, the two little islets where the Floreana mockingbird still occurs. I was joined by an experienced German ornithologist, Herbert Biebach, who helped me catch the birds and band them for individual identification.

Our task was to catch and band as many individuals as possible to form a basis for future monitoring. We also took blood samples for later genetic analysis, because we are interested in how similar or distinct the two populations are, as well as how inbred they are. The population on Champion currently consists of only 20 individuals and has been isolated for the last 120 years!

Based on a fishing boat

During our trips to Champion and Gardner we were based on a fishing boat together with a group of hunters who were working on the Floreana restoration project. Every morning we were taken by boat to either Champion or Gardner to catch birds, while the hunters were taken to Floreana to hunt feral goats and donkeys.

It was a unique experience to live on a small fishing boat together with 16 men and sometimes 20 dogs, especially for me as I was the only woman. Every hunter was assigned two dogs for their work, dogs that are highly trained to run over sharp lava rocks and detect and corral goats; they were really vivacious and hard-working animals.

We were glad, however, that most of the time the dogs could stay overnight on shore because there was really not that much space on the boat, especially when 17 people were trying to have supper on a windy and shaky deck. The sea was really rough and it was sometimes hard for us to disembark with our backpacks and boots while the waves were smashing the little dinghy towards the rocks that we wanted to jump onto.

Gardner is a tough island to work on because it is very steep and difficult to land there. It is much larger than Champion and it became clear very soon that we would never be able to catch all the mockingbirds on Gardner, simply because we didn't have enough time and because some parts of the island were inaccessible. However, we did manage to catch and band a good number of birds on the flatter part of the island. Champion was very different in this respect. It is a tiny island of about 9 hectares (22 acres), and is much easier to walk on and place food traps for the mockers. At the end of one week on Champion we had caught 19 of the 20 individuals we had seen, which was a really satisfactory result.

When we had finished our work on these small islets for the time being, Herbert headed back to Europe. I remained in Galapagos for some weeks more, traveling to several different islands to catch mockingbirds, and discussing with other experts the plans for a Floreana mockingbird recovery project.

Photos: Paquita Hoeck

Floreana mockingbird with bands on its legs. The bird opposite is on an Opuntia cactus.

Paquita Hoeck's interest in the Galapagos Islands no doubt stems from the fact that she lived at the Charles Darwin Research Station as a small child when her father, Hendrik Hoeck, was the Director. Peter and Rosemary Grant have provided funds from their Balzan Prize to support Paquita's field work.

Broadening the Conservation Agenda: Social Science in Galapagos

by Johannah Barry

Over the last several months, the international community has focused significant attention on the threats to the biological integrity of Galapagos. This heightened interest was sparked by conflicts between Galapagos National Park Service and Ecuadorian Air Force personnel, a UNESCO visit to consider placing Galapagos on the World Heritage Sites in Danger List—and their subsequent decision to do so—and a declaration by Ecuador's President Rafael Correa recognizing that Galapagos is at risk and requires an urgent and radical change in the direction of development.

The statistics are overwhelming. Tourism visitation in Galapagos has grown from 40,000 in 1991 to more than 120,000 in 2006; over this same period the contribution of tourism to the local economy grew at a yearly rate of 14%. This rapid economic growth has been coupled with a parallel rise in legal and illegal immigration which has outpaced the capacity of the management authorities of Galapagos, including local municipalities, the National Institute of Galapagos (INGALA), the Galapagos National Park, the Galapagos Inspection and Quarantine System, and other local and national agencies.

At the heart of the challenges now facing Galapagos is a disconnection between one of the world's most precious wilderness areas and its resident population. The unchecked growth in tourism and migration are symptoms of a human population, whether resident or temporary, which has yet to reconcile the responsibilities inherent with living in and around a premier national park with the understandable need to earn a living. This dichotomy is now squarely before the local and international conservation community. The long-term conservation of Galapagos will ultimately depend on how these human issues are managed.

Critical data

Social science in Galapagos is not new. Landmark publications such as Indicadores Regionales (Jose Rodriguez, 1992) and the important series of Galapagos Reports, published by the World Wildlife Fund (WWF) and Fundacion Natura (1998–2002), have provided critical data for policy makers over the years. But the speed at which both tourism and migration are growing, and the increasing conflicts among sectors in Galapagos, signal a system dangerously close to the tipping point. The Charles Darwin Foundation (CDF) and its US partner, Galapagos Conservancy (GC), are among the institutions which have collaborated to produce Galapagos Report 2006-07, a compilation of economic, environmental, and social data and analyses which seek to quantify and illuminate a range of socio-economic factors now affecting the Islands.

Many flights arrive every day at airports in Galapagos.

The conservation actors in Galapagos, along with the international community of scientists and managers and policy makers, have made a bold move by incorporating social science into the fabric of the conservation work now at play in the archipelago. The traditional role of the CDF and the Galapagos National Park as science advisors and managers, respectively, must be broadened if the core issues of conservation in Galapagos are to be addressed effectively. Both institutions have signaled the importance of integrating local residents into conservation planning and both institutions are supporting a hard look at the economic drivers which are threatening to overwhelm the limited governance capacity now present in Galapagos.

Many supporters of GC and the CDF have asked if it is necessary and appropriate for a scientific institution to take on, or at the very least, to catalyze social science research. The answer is an overwhelming Yes. Does this work stretch the already limited capacity of the Foundation, the Galapagos National Park Service, INGALA, and other organizations in Galapagos? Again, the answer is Yes. The central role of these institutions is to conserve Galapagos as a World Heritage Site and a biological treasure. To tackle the fundamental biological threats that are now affecting Galapagos (exploitation of fragile plant and animal populations, and the introduction of alien species, including disease), the key institutions in Galapagos must turn their attention to the single factor which is at the heart of these challenges—people.

Many questions must be answered. New business models have been proposed for residents, but do we fully understand markets, the complexion of the labor force in Galapagos, and the social and environmental impacts of these models? What sort of investments should be encouraged? What sorts of incentives and regulations are needed? How can current tourism models and concession systems be adjusted in ways that ensure local benefits,

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Herbarium Happenings

by Patricia Jaramillo and Frank Bungartz

A Brief History of "CDS"

Systematic botanical exploration of the Galapagos Islands dates back to the Galapagos International Scientific Project in 1964. Before this expedition, botanical research in Galapagos benefited from a long history of visiting scientists, but 1964 marks a turning point. A permanent research facility was finally established on the islands. Under the auspices of the UNESCO and the World Conservation Union, the Charles Darwin Research Station (CDRS) was established. Here, resident scientists now lived and worked.

Facilities on the islands in these early years were limited. Therefore, before 1963, all plant collections were generally deposited in herbaria outside the archipelago, typically at research institutes where international visitors were based.

Scientific research by scientists living on the islands required direct access to reference collections, and the first botanists at the CDRS therefore decided to establish a herbarium at the research station. The first collections accessioned to the new herbarium were made in 1963–64 by David Snow, then Director of the CDRS. One of the most important contributions during these pioneer years was the collection by Ira L. Wiggins in 1966, who left duplicates that were collected for his preparation of the first modern, comprehensive vascular plant flora of the islands. In 1975, the status of the CDRS herbarium was internationally recognized with its inclusion in *Index Herbariorum* and its being assigned the institutional identifier **CDS**.

The following years saw a continuous increase of the collection, from 7,000 specimens in 1996 to 14,000 in 2003, to more than 30,000 specimens today. During these years, considerable improvements to secure adequate preservation of specimens were also introduced. For the first time, protocols of collection, curation, maintenance, and storage were meticulously followed and a regular monitoring and pest control regime was introduced.

Visiting scientist Conley K. McMullen (James Madison University) checking CDS Herbarium specimens inside the new herbarium building.

The Current Situation

The CDS herbarium is the largest collection in the world that specializes in plants and plant-like organisms from Galapagos. More than 85% of all native and endemic vascular plant species are today represented in the herbarium. With the recent completion of an introduced plant inventory, CDS holds the most complete collection of plants that were brought to the islands by man, accidentally or on purpose.

Currently, the herbarium includes more than 20,000 vascular plant specimens. The great majority of this material is dried, pressed plants; mounted on herbarium sheets, stored in traditional metallic, galvanized specimen cabinets. Large, dried specimens of fruit, wood, bark, roots, tubers, and other oversize collections are stored separately. Additional collections of succulents, plant parts such as soft fruits or flowers, and marine algae (which comprise the majority of these collections) are stored as wet collections in Copenhagen Mixture (70% ethanol, 29% water, 1% glycerol). Lichens and bryophytes are stored in folded herbarium envelopes, upright within drawers. If necessary, fragile specimens are mounted for support on cardboard. Fungi, the organisms that are generally most susceptible to pests and mold, are kept in cardboard boxes or herbarium envelopes, which are placed with silica gel in Ziploc® bags. The specimens are regularly checked and the silica is replaced according to the silica gel color indicator.

Future Projects

Since 2005, the CDRS has been planning to build up a seed collection of native and endemic endangered plants. Viable seeds will be collected from native and endemic Galapagos plants, and stored with silica gel inside sealed glass tubes. These tubes will then be stored with silica in hermetic storage jars inside a cold cabinet (-5° C). Periodically, seeds will be tested for germination. This method is well established and has been tested, and in comparison with many other storage regimes has yielded excellent long term results.

The seedbank will focus first on critically endangered, native, and endemic Galapagos species. Of course, we hope that this drastic backup measure will never be necessary as the ultimate resource to re-introduce species that become extinct in the wild. It is anticipated that the seedbank will regularly act as a resource to boost natural populations that are in decline.

Financial Support

The CDS Herbarium's primary problem has always been lack of funding. Estimates of annual collection maintenance, costs

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a high quality visitor experience, and less growth? Local governance is being tested and challenged. How can that governance be strengthened to clarify leadership and reduce complexity?

Attracting the funding and expertise necessary to undertake this work will not be easy. Despite President Correa's call for an immediate invasive species control plan and parallel migration and education reforms, there is an unsettling delay in the ability of government and multilateral donors to step up and provide necessary resources. Galapagos Conservancy is at the forefront of raising funds to undertake this work. We are looking for partners worldwide to support these investigations, while at the same time continuing to fund the core conservation programs that are so critical to the biological health and integrity of the archipelago.

An aerial view of Puerto Ayora on Santa Cruz Island. (Heidi Snell)

The human footprint

Galapagos has attracted the imagination of artists, writers, scientists, and conservationists for more than two hundred years. That these islands are now receiving international recognition for their ecological fragility is deeply disturbing. To save Galapagos will require not only an acknowledgement that people are firmly a part of the archipelago's landscape, but that people will ultimately provide the solutions. This may seem counter-intuitive while speaking about wilderness. But there are few places on the planet where there are no human footprints, and Galapagos is one of those places where the footprint is still faint.

Johannah Barry is the President of Galapagos Conservancy. Formerly known as the Charles Darwin Foundation, Inc., it is based in Falls Church, VA, just outside Washington, DC. It was the first Friends of Galapagos organization to be established in the world.

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for curation materials, equipment replacement, and the salary of the herbarium curator are approximately $45,000. Without the herbarium as a general resource, most plant research would not be possible.

Nevertheless, it is very difficult to secure ongoing funding. For more information on how you can support CDS, please contact Galapagos Conservancy.

Authors: Patricia Jaramillo and Frank Bungartz of the Botany Department at the Charles Darwin Research Station, Santa Cruz, Galapagos

This article is excerpted from a longer article from the July 2007 issue of The Vasculum, the biannual newsletter of The Society of Herbarium Curators, an umbrella organization aiming to unite herbaria across the nation and around the world. The purpose of the society is to promote and expand the role of herbaria in botanical research, teaching, and service to the community at large, to provide a forum for discussion and action on all issues confronting herbaria, and to extend its efforts and interject its influence toward the protection and preservation of endangered herbaria. Website: http://www.societyofherbariumcurators.org/

Darwin's Cotton and Opuntia Cactus with Carpenter bee. (Photos: Gerald Corsi and Carol Hemminger)

Canine Distemper Outbreak in Galapagos

By Monika Hilbean and Felix Ehrensperger

In March of this year, the two of us together with 13 friends from Switzerland and Germany, had the chance to make a two-week visit to the Galapagos Islands under the leadership of Dr. Hendrik Hoeck of the Swiss Friends of Galapagos. While we were there, we heard that canine distemper had been found on the island of Isabela. Four of us in the group were veterinarians and we were keen to know more about this event. Thanks to Hendrik, we were able to meet staff at the Galapagos National Park and talk with the Park vet, Dr. Marylin Cruz, about the outbreak and the measures that should be taken.

Canine distemper is a contagious viral disease, which mostly affects dogs, but can also infect some other mammals, including occasionally seals. The disease is much rarer in wild cats but in the Serengeti in Tanzania, it has infected and killed lions. Animal to animal transfer is by secretions such as saliva and tears. Mostly young dogs between eight weeks and six months are infected and become ill about four days afterwards. The infection spreads and if insufficient antibodies are produced during the first nine days, the dogs develop one or several of the following symptoms: high fever, anorexia, apathy, vomiting, sneezing, coughing, conjunctivitis, and breathing difficulties or pneumonia. If the brain is affected, there is little likelihood of recovery.

The canine distemper virus closely resembles the measles virus in man and phocine distemper virus in seals. In 1988, more than 17,000 seals died in the North Sea and during the year 2000 more than 10,000 Caspian seals died of this disease. It is thought that ecological factors and overpopulation contributed to the appearance of this disease among seals. The origin of the events has not been identified, but it is assumed that the virus passed from a dog or dogs to the seal population. Not much is known about the sensitivity of sea lions to this virus and there seem to be few documented cases among them.

We learned from Marylin Cruz that all possible measures had immediately been put in place by the Galapagos National Park to prevent the spread of the disease between dogs and sea lions. For example, dog owners had to keep their animals inside temporarily, and disinfectant baths had been installed for visitors and locals at the ports.

Once in contact with sick animals, strict hygiene measures are essential to stop the virus from spreading. The most important preventive measure is vaccination. However, the problem in Galapagos is that dog vaccination is banned by law—a government decision which runs counter to the advice of Marylin Cruz and many other scientists. A big risk is surely posed by any dogs that may be brought in illegally from the continent, and which might have had contact with the virus and arrive in the islands during the incubation phase of the disease.

The unvaccinated dog population in Galapagos is likely to be very susceptible to the virus because they have had rare or no contact with it in the past. This is why canine distemper is a time bomb that can at any time enter the region and infect other animals.

The danger of passing the virus to the local sea lion population is a real possibility, and it is for this reason that every measure should be taken to reduce the danger to a minimum or indeed eliminate it. Prophylactic vaccination of dogs is clearly needed.

The endemic Galapagos sea lion could be at risk from canine distemper. (Photos from top to bottom: Jill Lee, Carl Foreman, Wayne Hartschuh)

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