Galapagos *news*

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- **THE SECRET LIFE OF THE SEA LION**
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© Susanna Kubernus

A lone sea lion rests on Cerro Brujo beach on the Westerly coast of San Cristobal. This was one of the first places that Charles Darwin visited in 1835, where he made several important geological observations. Writing about Kicker Rock, the jagged outcrop seen on the horizon in this photo, he suggested that the central, cylindrical mass of rock "once filled up the central hollow of a crater, and that its flanks, or sloping walls, have since been worn quite away by the sea." This rock is now more commonly known as Leon Dormido, literally "Sleeping Lion". This seems particularly apt, says GCT supporter Susanna Kubernus, who took the photograph. "My real sea lion sleeps in the same position in front of it," she says.

This photograph features in the Galapagos Conservation Trust's 2012 calendar along with 11 other stunning Galapagos images. To purchase yours, please visit www.savegalapagos.org.

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Friends of Galapagos
Saving Darwin's treasured islands

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The value of data

The human history of Galapagos is full of adventure and discovery, but it also contains plenty of stories of exploitation of these precious Islands that, by today's standards, are pretty hard to take. It's well known that the whaling industry took a massive toll on the Islands, not just in the marine realm but also on land. In an analysis that was way ahead of its time, Director of the New York Aquarium Charles Haskins Townsend sat down in the 1920s to pore over the logbooks of American whaling vessels that had sailed through Galapagos waters between 1831 and 1868. He wanted to know just how serious the impact of the whalers had been on Galapagos Giant Tortoises. Without hard evidence, this was anyone's guess, but with data from the logbooks, Townsend could say that 79 American whaling vessels had made 189 tortoise-collecting trips over the course of 37 years and obtained at least 13,013 giant tortoises to eat. As he had only sampled a fraction of the logbooks from the American fleet and none from those in the British fleet, this was only a minute extent of the extraction that had gone on but it was an invaluable benchmark.

Towards the end of the 19th century, with the collapse of the whaling industry, scientists came in to assess the damage, rushing to collect examples of giant tortoises (and other species) before they disappeared completely. One of the last collecting expeditions, for example, the California Academy of Sciences (CAS)'s Academy Expedition of 1905-1906, took 266 tortoises back to San Francisco, including several males from Pinta and the only individual ever recorded on Fernandina.

More than a century later, it is understandable that we look back on this episode with shame and wish it never happened. But to do so ignores the simple truth that this took place decades before anyone, anywhere really began to think about conservation in any concrete way. It also ignores something rather more important: the absolutely colossal value of collections like these for today's conservation science. The CAS Galapagos collection, for example, is constantly being used as a reference point for current research: without it, nobody would have known of the existence of the endemic Galapagos Rice Rat; DNA drawn from its long-dead Pinta tortoises have also helped confirm that Lonesome George is really a genuine Pinta animal (a concern that some had raised); and only this year, a study of thousands of finch and mockingbird specimens collected on the Academy Expedition has pinpointed exactly when the avian pox virus was introduced to the Archipelago, a finding that is vital for efforts to tackle the disease today (see p. 4).

© Frank Bungartz

Plant specimens in the CDF herbarium.

So historical collections of natural history, however awkward, are of immense – and largely untapped – value. In a visual treat on pp. 10-12, Frank Bungartz, theme leader of Biodiversity Assessment at the Charles Darwin Foundation (CDF), tells of a huge initiative to produce a complete inventory of Galapagos life and extract as much information as possible from the wealth of data in CDF's rich natural history collection and library. Whilst there is still so much to learn about Galapagos, "this relatively simple, yet well-studied microcosm could act as a model for how to organise the data and demonstrate conservation benefits that doing so will undoubtedly yield," says Bungartz.

We have several other fascinating articles for you to enjoy. On pp. 6-7, conservationist Scott Henderson reveals the dark past of Galapagos coffee and takes us on a more upbeat tour of his plantation of "conservation coffee" in the highlands of Santa Cruz. On the centre spread, zoologist Fritz Trillmich brings us up to date with the latest research on the Galapagos Sea Lion, revealing the secret world of this endemic species as never before. In this issue's Global Galapagos article, we hear about the latest assessment of the situation facing the world's sharks, with a dedicated reflection on how things look in Ecuador (p. 13).

There is plenty of exciting news from the Islands (pp. 4-5) and reviews of books that should be of interest to members (p. 14). It is also a great pleasure to bring you an interview with Victor Carrion of the Galapagos National Park (p. 16).

Henry Nicholls
Editor

NEWS *from Galapagos*


© GNP

Tsunami impact

The tsunami triggered by the Japanese earthquake on 11 March has caused damage to low-lying areas in Galapagos. The waves struck at high tide on 14 March, resulting in seawater reaching 1.7m above the normal high-water mark, flooding the Charles Darwin Foundation (CDF)'s marine biology laboratory amongst several other buildings. "The waves completely destroyed a concrete pump house and broke massive wooden doors, flooding laboratories, workshops, and storage facilities, scattering furniture and equipment," says CDF executive director Dr J. Gabriel Lopez. Before the tsunami arrived, the Galapagos National Park (GNP) had closed all visitor sites and both Galapagos residents and tortoises housed at the Charles Darwin Research Station were evacuated to higher ground as a precaution.

Rat eradication

The effort to eradicate rodents from several Galapagos islands is now under way, the first initiative of its kind in South America.

In 2008, a pilot project, in which poisoned bait was dispersed by hand, succeeded in eliminating rodents from North Seymour, a small island of less than 2km². Phase 1 of the ambitious plan will now see bait dispersed from a helicopter over several small- and medium-sized islands, including Rabida, Bartolome, the Beagle Islets and the Bainbridge Rocks.

GNP, with the support from international NGOs, academia and industry, will deliver two doses of poisoned bait at seven-day intervals to increase the likelihood that all rodents consume some. Since there's a chance that Galapagos Hawks, which may feed on rodents, could be inadvertently harmed, twenty individuals have been captured from two of the target islands on which they are present and will be held in captivity until it's safe to return them.


© GNP

There are three types of introduced rodent in Galapagos: Black Rats, Norway Rats and House Mice. These species can have an adverse effect on the reproduction of tortoises, iguanas, and land and sea birds, especially the Galapagos Petrel, which nests in the higher humid zones of the larger islands. If the effort goes to plan, it will take GNP one significant step closer to the complete ecological restoration of these sites.

New company for old male

There has been a dramatic turn of events for Lonesome George, the sole-surviving giant tortoise from Pinta who has been in captivity at the Charles Darwin Research Station (CDRS) since 1972. The Galapagos National Park, which is responsible for what happens to this emblematic tortoise, has decided it's time to introduce a new pair of females into his enclosure. Back in the early 1990s, after almost 20 years in solitary confinement, George was joined by two females from Isabela's Wolf volcano whose tortoises were then assumed to be his closest living relatives. But research carried out by geneticists at Yale University revealed that this is not the case: George is, in fact, most closely related to the tortoises from Espanola. The two Espanola tortoises that have now taken up residence with George have been part of the Espanola captive breeding programme at the CDRS since the 1970s. Park officials are "hopeful" that this switch will result in hatchlings as the breeding season gets into full swing, although a genetic analysis published in 2004 indicated that the chosen females are amongst the least productive of twelve females in the Espanola breeding programme.

© PLoS ONE

Avian pox arrival

It's official. The avian pox virus reached Galapagos in 1898, say researchers from the US and Ecuador. This estimate is vital to understanding avian diseases that affect today's Galapagos birds, says Patricia Parker, a geneticist at the University of Missouri-St Louis in the US. She and her colleagues inspected the skins of several thousand finches and mockingbirds collected in Galapagos between 1891 and 1906 (above). All of those specimens with skin lesions typical of infection date from 1898 or later, they report in the scientific journal *PLoS ONE*. In addition, it appears as though the virus was much more likely to be found on human-inhabited islands, suggesting that humans inadvertently helped it to spread.

Tagging marlin

CDF is to launch an exciting new project to tag and track large pelagic fish in the Galapagos Marine Reserve and the wider Pacific Ocean. The study will begin by concentrating on Striped Marlin (*Tetrapturus audax*) (below left) and Wahoo (*Acanthocybium solandri*), with the aim of working out the proportion of their life cycle they spend in the protected waters around Galapagos and identifying the location of their feeding and breeding grounds. This project will complement existing work on tagging and tracking sharks. "All these species are top predators in the marine ecosystem," says CDF marine scientist Anna Schuhbauer. "Their feeding patterns are crucial to maintaining balance among the different layers of the marine food chain," she says.


© CDF

Condo construction

Some 120 new homes have been built along the pristine coastline of three Galapagos islands, though the intended inhabitants are not humans but penguins. "Our whole goal is to increase the population of Galapagos Penguins, and the way to do that is to make sure that when conditions are good, when they're not food challenged, that all of them will be able to breed," says Dee Boersma, a researcher at the University of Washington in the US.

Ringing the albatross

Park wardens and scientists have fitted Waved Albatrosses with geolocation devices, which should help solve a long-standing mystery. This species breeds at Punta Cevallos on Espanola Island between April and December, but their movements during the non-breeding season are not so clear. The devices, fitted to almost twenty individuals before they left Galapagos, will be removed in May when the birds return and scientists will be able to analyse their movements in detail.


© GNP

Alien plant survey

Botanists at CDF have put together the most comprehensive inventory to date of alien vascular plants in the inhabited areas of Galapagos. Between 2002 and 2007, they surveyed more than 6,000 properties on the inhabited islands of Floreana, Isabela, San Cristobal and Santa Cruz and recorded 754 alien vascular plant species, a substantial increase on the last count. A repeat of the survey in the future will act as an effective early detection tool to help avoid further invasion of the Galapagos National Park, suggest the scientists in a paper in *PLoS ONE*.

Reviving the highlands with conservation coffee

© Scott Henderson

The view of Puerto Ayora from the highlands.

Scott Henderson

Scott is a conservation and marine management practitioner, supervising technical and financial aspects of marine projects in Galapagos and further afield in Costa Rica, Panama, Colombia and mainland Ecuador. He lives in the Galapagos Islands with his Ecuadorian wife and son.

For many of us, whether at home in the kitchen or standing in line at your local café, coffee plays a satisfying part in our daily lives. But for me and my family, growing, processing and roasting coffee in Galapagos is what we do. For us, coffee is about much more than a small, homespun business and fascinating hobby. It is a chance to provide a working model for how sustainable agriculture can help rebuild the heavily degraded Galapagos highlands.

I first came to the Galapagos Islands in 1983 as a 20-year-old biology student at Washington and Lee University in Virginia. Like my fellow trip-mates, I sought the thrill of adventure, looking forward to diving in virtually undived waters and walking through the stark, uninhabited lowlands surrounded by the strange, fearless creatures for which Galapagos is so famous. But as our dilapidated truck-cum-bus crossed the highlands en route to Puerto Ayora, we forded streams swollen with intense El Nino rains and ploughed through deep mud wallows that divided deep green pastures from lush, thick forests. I had no idea that such a wet and fertile other side existed in Galapagos, much less an inkling that more than two decades later I would be living and growing coffee here.

Coffee has had a dark history over the past five centuries, including driving the slave trade, fueling massive deforestation of native ecosystems and tipping the balance of power in favour of land barons, oligarchies and dictators. The introduction of coffee to Galapagos is no exception. Although some coffee may have been present when Charles Darwin visited the Islands in 1835, the first reliable record of cultivation is on San Cristobal in the 1870s. This plantation and other later coffee enterprises on Isabela exploited convicts sent out from the Ecuadorian mainland, many supposedly exiled simply for being on the wrong side of the political fence. This forced labour first eliminated native forests and then grew and processed the coffee. Conditions were so bad on San Cristobal that workers revolted and killed the plantation owner in 1904 and on Isabela, in addition to growing coffee, prisoners were made to build a pointless structure that became known as the "Wall of Tears". As more people began to settle in Galapagos from the 1950s onwards, so coffee cultivation became relegated to ever-smaller plots, mostly for personal consumption and local trading.

© Scott Henderson

Coffee production, from the freshly picked coffee berries (left) to the roasted coffee seeds or "beans" (right).

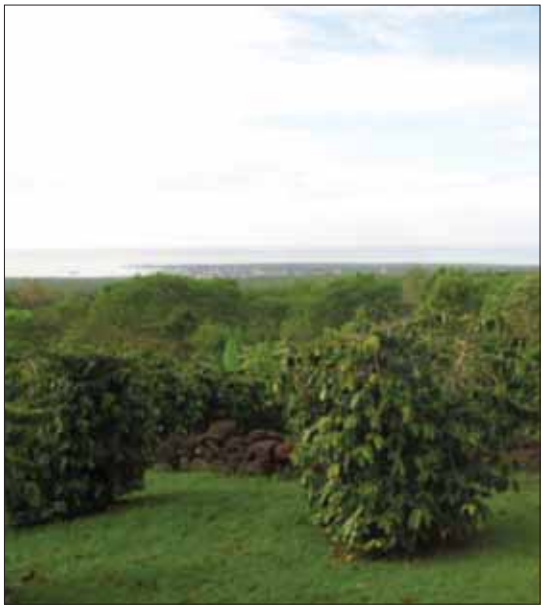
It was not until the 1990s, as the market for "speciality coffee" began to take off, that the Galapagos coffee industry made something of a resurgence. With all varieties grown in Galapagos being high quality 'arabicas' and given the rich, volcanic soils and peculiar climate that make for ideal growing conditions, it made good sense to revive this lost practice. In direct contrast to its dark past, Galapagos coffee is now providing social benefits. It can also be grown alongside native species, providing a means to improve the integrity of the highland ecosystem.

"The good prices that gourmet coffee can fetch means it's possible to afford the costs of relatively expensive labour, the removal of harmful invasive species and gradual restoration of this important habitat."

Although more than 100km^2 of Santa Cruz highlands are reserved for cultivation (as are similar areas of Floreana, San Cristobal and Isabela), agriculture simply cannot compete with the incomes generated by the lucrative tourism sector. Cattle ranching can still turn a profit, but it requires eliminating almost all the natural forest cover and native ground species, so comes at a considerable cost to the highland ecosystem. Coffee, by contrast, grows exceptionally well under native tree cover, alongside Galapagos bushes and surrounded by low-lying native vegetation. With plenty of native pollinators like moths and bees and few insect pests, organic cultivation is easily achievable, bringing benefits to the environment, farmers and consumers alike. Most encouragingly, the good prices that gourmet coffee can fetch means it's possible to afford the costs of relatively expensive labour, the removal of harmful invasive species and gradual restoration of this important habitat.

Thus was born our little enterprise now known as "Lava Java". With the money we have made from our organic "conservation coffee" production we have reforested 100,000m^2 and now employ three full-time workers. Most importantly, we have helped put Galapagos coffee on the international speciality coffee map and provided a working example of how growing it can be both profitable and environmentally beneficial. As members of the local coffee growers' association, we see other producers as allies, members of a swelling group of responsible land stewards that appreciates the importance of the natural environment to Galapagos.

So, as we have that first cup in the morning looking off our balcony over our forested coffee, beyond Puerto Ayora and over the broad, glistening Pacific, we savour far more than the taste of exceptional, fresh coffee: we savour the vision of a Galapagos where people and the environment can exist in harmony.



Henderson's coffee plantation (left) and his Lava Java end-product (right).

*Galapagos coffee (*Coffea arabica*) in bloom.*

The secrets of the sea lion

Fritz Trillmich

Fritz is a professor of animal behaviour at the University of Bielefeld in Germany and has been studying Galapagos Sea Lions and Fur Seals (amongst much else) for more than 30 years.

If you've ever been fortunate to snorkel or dive in Galapagos, the chances are that you have come face-to-face with a sea lion. When its whiskers first pop up in front of your mask, it can be a startling experience. But you soon marvel as the animal gracefully dives away under you, turning and twisting so elegantly that you feel an awkward intruder in its underwater world.

Although the Galapagos Sea Lion (*Zalophus wollebaeki*) is endemic to the Islands, it is very commonly encountered by residents and tourists alike. Yet in spite of its abundance (the population fluctuates between 20,000 and 30,000 individuals) there is still a lot to find out about this delightful creature. Since 2002, I have been involved with a study of sea lions on Caamano, a tiny islet not far out of Puerto Ayora and home to one of the largest sea lion colonies in Galapagos with around 1,000 animals. It is here on a rock about 300m across that we have begun to understand some of the sea lion's enduring secrets.

One of the most striking features of such a dense colony is the noise, particularly during the cold season between September and January when most pups are born. For new mothers must go on frequent foraging trips and when they return to the islet they and their pups use calls (and also smells) to identify each other. Since it takes between two and three years for a youngster to become completely weaned these barking calls are a near-constant feature of life on Caamano.

During this extended period of nurture, juvenile Galapagos Sea Lions will often sneak up to other females and attempt to steal their milk. Most mothers guard their milk supplies closely but by displaying

overtly submissive behaviour some juveniles are able to convince them to give up some of their valuable supplies. Although this obviously benefits the youngster, it may actually benefit the female as well, if the two are related. To explore this possibility, we studied the community structure of Galapagos Sea Lions on Caamano and found that in any given area females are more closely related to each other than would be expected by chance. We also found that those females that interacted most regularly were most closely related to each other. This strongly suggests that females will usually breed at the same site, perhaps selecting the beach on which they themselves were born.

© Fritz Trillmich

© Fritz Trillmich

Sea lion youngsters attempting to suckle from a lactating female (top) and a colony of sea lions on Caamano (bottom).

Strangely, given their dominant presence, we know much less about male Galapagos Sea Lions. When the animal you met snorkelling was a male, it may have startled you by barking under water, expelling bubbles as it did so. Intrigued, we decided to find out more about the very conspicuous territorial behaviour of the male Galapagos Sea Lion and by taking small skin samples from the Caamano population, we were able to work out which males sired which pups.

In most seal species, males guard their territory because it increases the chance of mating with females in the area. This is also the case for the Galapagos Sea Lion, but only to a limited degree. Although dominant males fathered more offspring than other males, territoriality is a costly business. Territorial males have to spend so much of their time in the water defending their territory that they cannot prevent smaller males from sneaking the occasional mating. Furthermore, during the peak of breeding they are so busy defending their patch they may not feed for several weeks at a time.

In an El Nino year, when the abundance of fish declines, the strain on territorial males is much greater; if they have been fasting for a long period and have become quite lean they may even die. If these events were to coincide with an outbreak of disease or active persecution by humans, it could prove disastrous. So, as attractive as the Galapagos Sea Lion might be, we must keep a respectful distance to ensure that we do not introduce diseases from the mainland as a result of previous contact with domestic or wild animals. Thankfully, this should not detract from our enjoyment of this wonderful creature.

A small, fragile fungus (Marasmius cladophyllus) *in the humid highlands of Santa Cruz.*

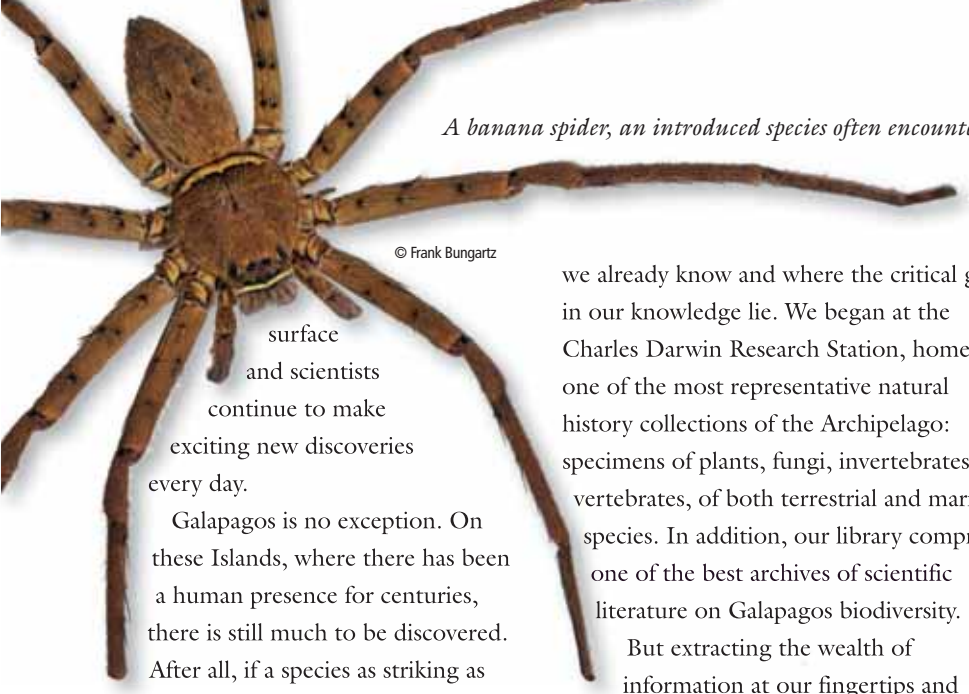
Towards a census of Galapagos life

Frank Bungartz

Frank is an expert in the taxonomy and ecology of lichens. As the theme leader of Biodiversity Assessment at the Charles Darwin Foundation (CDF), he is responsible for establishing the Galapagos Species Checklist, the first online biodiversity information system for all known Galapagos species.

Biodiversity is life, the variety of species inhabiting our earth. From microscopically tiny bacteria to giant whales, food crops as well as their diseases, and slime moulds every bit as much as butterflies, we are all part of this intricate web of life, part of a community of species that together inhabit this planet. Yet when we talk about biodiversity how much do we actually know?

One might assume that today, centuries after the first explorers set out on their voyages of discovery, we have identified a good proportion of the species that inhabit our planet. But this is far from the case, with most estimates suggesting we may only have accounted for a fraction of all species. Our grasp on the extent of biodiversity is particularly poor in the tropics, where we have barely scratched the



A banana spider, an introduced species often encountered inside houses.

© Frank Bungartz

surface and scientists continue to make exciting new discoveries every day.

Galapagos is no exception. On these Islands, where there has been a human presence for centuries, there is still much to be discovered. After all, if a species as striking as the pink iguana on Isabela's Wolf Volcano can go without official recognition until as recently as 2009, how many of the less conspicuous invertebrates, fungi and marine organisms have yet to be described?

But in spite of these vast gaps in our knowledge, the intense scientific interest in Galapagos over the last 50 years still makes it one of the best-studied tropical archipelagos in the world. This fact, in concert with the relatively simple system that is typical of a remote, isolated island chain, makes Galapagos particularly valuable. Here, it should be possible to get to grips with this small ecological framework, to study complex ways in which different species interact and to develop sound conservation strategies that will help to preserve entire ecosystems rather than just single species.

"If we fail to raise awareness and disseminate scientific knowledge about this ecosystem, Galapagos will sadly serve as yet another failed case study in conservation."

In 2007, CDF therefore decided to embark on an ambitious task: to produce the first complete inventory of all known Galapagos species to allow us to assess what we already know and where the critical gaps in our knowledge lie. We began at the Charles Darwin Research Station, home to one of the most representative natural history collections of the Archipelago: specimens of plants, fungi, invertebrates, vertebrates, of both terrestrial and marine species. In addition, our library comprises one of the best archives of scientific literature on Galapagos biodiversity.

But extracting the wealth of information at our fingertips and compiling it into a sophisticated database has been highly time-consuming. It has taken several years to build and refine the technical infrastructure and produce a list of almost 14,000 species reported in Galapagos. Of these, we found that often a single species went under more than one name, so at the latest count the total number of accepted Galapagos species is around 7,500. Already it is clear that many large species groups, such as fungi and invertebrates, have long been neglected and continue to be very poorly known. Anyone interested in exploring this inventory can do so through the CDF website (http://www.darwinfoundation.org/datazone/checklists).

Biodiversity, however, is more than just the sum total of all species. With our checklist in place as a "backbone", we will

Below left: Herbarium specimen of Jasminocereus thouarsii *at CDF. Below right: An as yet unidentified fungus in the humid highlands. Bottom: A Brown Pelican resting up in Tortuga Bay.*

© Frank Bungartz

© Xavier Arturo

© Frank Bungartz

soon be able to "flesh out" and add more detailed information on the ecology of each different species, whether it is native or introduced, and the interactions between them. Where are they distributed? Are they rare, common, unique, threatened or abundant? What is their ecological niche, their role, their function? What do they indicate? Are the ecosystems that they inhabit still intact?

Of course, for many species this is an almost impossible challenge: some, often those that have only recently been discovered and described, are barely known; and even for many of the more established species, we still have very little information. But owing to the enduring fascination for Galapagos, there is still a vast wealth of research to be extracted from the rich literature piled up on dusty shelves. The information system currently in development should make it possible for CDF and its global network of collaborating scientists to enrich the species checklist with this valuable information.

If we are to halt the loss of biodiversity, we need a profound understanding of what species are there and in what ways they depend on each other for survival. It is only with this detailed information that we will be able to develop effective, evidence-based conservation strategies. The rapid extinction of species currently taking place on a global scale makes it all the more urgent that we assemble and organise what we do know.

We have a great opportunity in Galapagos. This relatively simple, yet well-studied microcosm, could act as a model for how to organise the data and demonstrate conservation benefits that doing so will undoubtedly yield. If we fail to raise awareness and disseminate scientific knowledge about this ecosystem, Galapagos will sadly serve as yet another failed case study in conservation. And it is CDF's vision that an ecologically enriched information system will be crucial for the long-term conservation of this unique tropical wonder.


© Frank Bungartz

Galapagos Flycatcher on Isabela's Darwin Volcano.

© Frank Bungartz


© Frank Bungartz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Clockwise: Bottled specimens at CDF; The striking Gossypium darwinii *in the dry zone of San Cristobal; Galapagos Green Hawk Moths in CDF's reference collection.*


© Frank Bungartz

Starfish in the CDF marine collection.

In the light of a recent publication by the Pew Environmental Group and the Trade Records Analysis of Flora and Fauna in Commerce (TRAFFIC), Henry Nicholls looks at the crisis facing the world's sharks.

The demand for shark fins, meat, liver oil and other products has driven numerous shark populations to the brink of extinction. The growing demand for shark fin soup, particularly in Asia, has led to the slaughter of up to 73 million sharks a year and is impacting shark populations worldwide.

Sharks have roamed the world's oceans for more than 400 million years. Though they have survived several mass extinction events, they are not equipped to withstand the threats now posed by humans. Sharks caught in high-seas fisheries are among the oceans' most vulnerable animals. Their low reproductive rates make them particularly susceptible to overfishing in the face of increased demand for shark products. More than half of the shark species taken in high-seas fisheries are classified by the International Union for Conservation of Nature's (IUCN) Red List as Threatened or Near Threatened.

Over a decade ago, the Committee on Fisheries of the Food and Agriculture Organization of the United Nations (FAO) adopted the so-called International Plan of Action for Sharks. This urges individual countries and the more wide-ranging regional fisheries management organisations (RFMOs) to develop, implement and monitor plans to manage and conserve sharks. Unfortunately, this voluntary agreement has not been widely applied, with only about 40 of the 134 known shark-fishing nations adopting a national plan of action and with the first RFMO yet to do so.

In a recent report on *The Future of Sharks: A Review of Action and Inaction* by the Pew Environment Group and TRAFFIC, they used FAO fisheries data to identify the top 20 major shark-catching countries. Between 2000 and 2008, these countries reported extracting a staggering 6.5 million tons of sharks from the world's oceans, accounting for approximately 80% of the total recorded catch.

The top ten, in order, are Indonesia; India; Spain; Taiwan, mainland China; Argentina; Mexico; Pakistan; the United States; Japan; and Malaysia. The top four alone are responsible for over 35% of the annual shark catch. In addition, seven of the countries in the top 20 are currently without a national plan for sharks and where a plan is in place there is no guarantee that the shark fishery is being well managed. At a meeting in Rome in February, the Committee on Fisheries (COFI) adopted the report's recommendation to conduct "a comprehensive review into the actions being undertaken to manage fisheries in which sharks are taken."

"Ecuador has a national plan of action for sharks," says Matt Rand, director of Global Shark Conservation for the Pew Environment Group. "It has not, however, updated this since 2005 and our analysis recommends that governments assess their national plans at least every four years to make sure it still meets the principles set out in COFI's international plan. The protection afforded by the Galapagos Marine Reserve is extremely valuable, but of course sharks are highly migratory and can easily stray beyond its boundaries."

We need sharks. Not only are they vital top predators, helping to maintain balance in the marine ecosystem by removing unhealthy fish, they can also bring significant economic engines for communities – as is certainly the case in Galapagos – that cater to divers. There is little doubt that many of the 400 or so shark species left on earth are facing commercial extinction due to unsustainable fishing practices and the clock is ticking. Yet it's not too late. "Shark-catching countries everywhere must stand by their commitments and act now to protect these amazing marine predators from extinction," says Rand.

© Shawn Heinrichs

Reviews

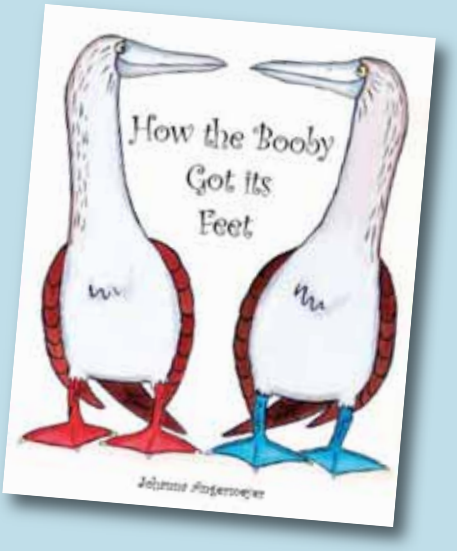
FUN WITH FEET

How the Booby Got Its Feet
by Johanna Angermeyer,
Pelican Press (2010), £6.95,
ISBN 9780954485122
Available from www.savegalapagos.org

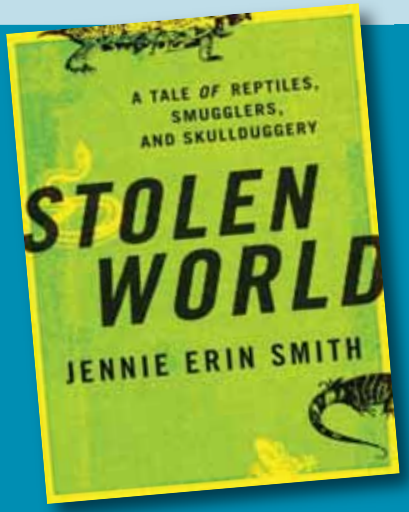
Following on from "Is Your Mama an Iguana?" published in 2009, this is the author's second book for young children featuring some of the unique and colourful animals of Galapagos.

The brightly coloured feet, the comical name and antics of this unforgettable bird are all captured in the compelling storyline of how Basil the Booby ingeniously gets the other Boobies to colour their feet. The enchanting and colour-rich illustrations, so beautifully and imaginatively crafted by the author herself, complement the text perfectly.

This story will appeal to readers of three years and upwards. My own grandson of two-and-a-half was captivated. Some readers will enjoy the back page of "Booby Facts", like the one that male Boobies whistle whereas the females honk. Older children will hopefully be influenced by the conservation message of respect for Galapagos wildlife which is so amusingly, but thoughtfully, woven into the storyline of this delightful book.



Reviewed by Jenny Day



SNAKEHEADS

Stolen World: A Tale of Reptiles, Smugglers and Skulduggery
by Jennie Erin Smith,
Crown Publishing Group (2011),
£15.44, ISBN 9780307381477

When love turns to obsession, things quickly go sour. In this gripping book, the objects of desire are rare snakes, iguanas and tortoises – stolen from the wild by an unsavoury band of collectors and dealers whose youthful fascination led to a life of wildlife crime.

Jennie Erin Smith spent ten years following the fortunes and misfortunes of a band of reptile smugglers. The result is an unputdownable tale of jungle adventure, snakes on planes and dodgy deals in shady places. The characters are undeniably colourful but though they profess a love of reptiles, they have no qualms about abandoning them to a gruesome death when the law gets too close. There's a sting in the tail of this story too: some of the smugglers' best customers were reptile curators at zoos with a reputation for conservation.

Reviewed by Stephanie Pain

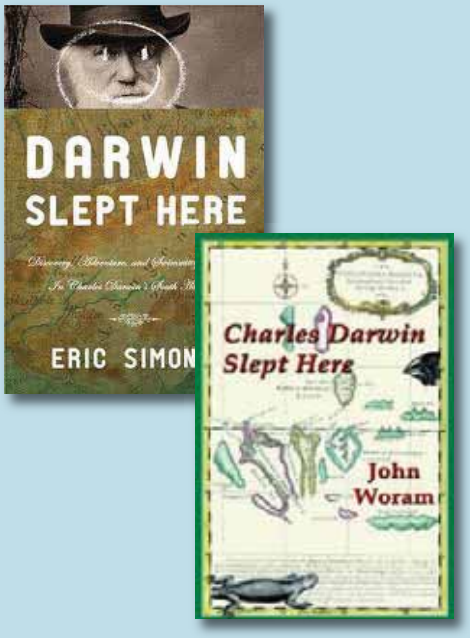
IN BED WITH DARWIN

Charles Darwin Slept Here
by John Woram, Rockville Press, Inc. (2005), £16, ISBN 9780976933601

Darwin Slept Here: A Journey Into South America In The Footsteps of Charles Darwin
by Eric Simons, Duckworth Overlook (2010), £8.99, ISBN 9780715640685

Ahead of the Darwin anniversaries in 2009, historian John Woram used the natty title *Charles Darwin Slept Here* to deliver what must be the definitive human history of Galapagos. This brilliant book covers every major event from the mooted discovery of the Islands by the Incas up until the explosion of Galapagos tourism in the 1960s. Woram's light touch and thorough illustration make this an extremely accessible book.

More recently, journalist Eric Simons has given us *Darwin Slept Here*, an engaging backpacker's journey that traces Darwin's footsteps through South America. He opens the book with Darwin hurling Marine Iguanas into the sea in Galapagos, but the best bit is easily his dissection of "The Adventure of the Beagle", a musical he sat through in Tierra del Fuego. Extraordinary.



Reviewed by Henry Nicholls

Not Another Booby ...

The Blue Glaucus (*Glaucus atlanticus*) is found in the Atlantic, Indian and Pacific Oceans, which means there's a chance you might run into one in Galapagos. It can grow to around 3cm and has dozens of so-called "cerata", outgrowths that give the creature a nasty sting. It will feed on jellyfish, the Portuguese Man-O-War and even other members of its own species, recycling their venomous cells, deploying them to the tips of its cerata for its own defense. Aided by a little air stored in its stomach, the Blue Glaucus floats upside down, drifting wherever the winds and currents take it with its slug-like "foot" on the sea's surface. Its blue underside (which is directed towards the sky) may help camouflage it from sea birds and its silvery grey back (which faces downwards) may disguise it from predatory fish beneath. This strange species was first formally described in 1777 by naturalists on board HMS *Resolution*, Captain James Cook's second voyage to the Pacific.

Islandes

Victor Carrion ...

... has worked his way up through the ranks of the Galapagos National Park (GNP) over almost two decades and has witnessed extraordinary change in the Archipelago. He has held many posts within the organisation, including Director, and is currently Technical Coordinator with responsibility for the eradication of invasive species.

What is the GNP?

It is the organisation responsible for 97% of the 8,007 km² land area that comprises the Galapagos National Park. With four ocean-going patrol-ships, ten smaller vessels and one amphibious aeroplane, the GNP is also responsible for controlling the 133,000 km² that constitute the Galapagos Marine Reserve.

GNP operates under the auspices of Ecuador's Department of Environment. It consists of a central office on the island of Santa Cruz and three laboratories on Isabela, Floreana and San Cristobal. It currently employs 278 park rangers, who work both in administration and out in the field. Some of our projects operate as local government schemes, financed by the state. Other projects are financed by non-governmental organisations.

How did you come to work for the GNP?

I have a degree in Education in Ecology and Environmental Science and in 1994 I began working for the GNP as Conservation Officer in the Technical Office on Isabela. In 1998, I moved to the central office on Santa Cruz to work on the control of hunting. A few years later, I took over the responsibility for the eradication of invasive species and was heavily involved in Project Isabela, notably the removal of goats and donkeys from Santiago and Isabela.

The organisation has been through some difficult times, notably in the early 2000s.

Yes. The position of Director was particularly unstable in 2003 and 2004, with frequent changes in national and local government causing frequent changes in the leadership of the GNP. In 2004, when I was appointed Director for a period of two months, I had a chance to see first-hand how the interests of the national park were being dealt with.

How have things improved since then?

We now have a government that believes the administration and management of the Galapagos Islands is important. There is greater stability in local government posts, and environmental issues are now taken more seriously. A new Legal Regime for Galapagos, which is currently being drawn up, will make important changes to the administration and management of Galapagos that should help safeguard the GNP. But the situation could change if another government were to come into power with less influence on local decisions.

© GNP

What do you consider to be the GNP's most important achievements over the last few years?

One of our most important achievements has been the introduction of a new form of itinerary within which authorised vessels can organise their tours. Cruises will now operate on a 15-day itinerary, which makes it possible to avoid over-crowding by restricting visits to certain sites.

We are also currently conducting a pilot project to eradicate rodents from several small- and medium-sized islands.

Helicopters were used for the first time to disperse the bait in the forms of solids. The experiment will be repeated in the larger islands in future years. The challenge will be to ensure we have enough funding to follow this through on all the islands.