

GALAPAGOS NEWS

FALL 2013 – WINTER 2014

Whale Shark Mystery Marine Invasive Species

Now Playing: **Tortoise Webcams!**

Protecting Penguins
The Importance of Mangroves



GALAPAGOS
CONSERVANCY

Saving one of the world's great treasures

**Galapagos
Gift Ideas! (Page 15)**



www.galapagos.org



Galapagos penguins are endangered, but we are helping.
Photo by GC member, Sabine van der Meulen.

FROM THE **PRESIDENT** Johannah Barry

CONTENTS

- 3** Galapagos Calendar
GC Legacy Society
- 4-5** Galapagos News
- 6-8** Whale Shark Mystery
- 9** Hidden Invaders
- 10** Protecting Penguins
- 11** Mangrove Forests
- 12-13** GC Member Update:
Tortoise Webcams
YouTube Channel
GC in San Francisco
Membership Options
Donor Spotlight
- 14** Global Relevance:
Plankton Under Pressure
- 15** Galapagos Gifts
- 16** GC Cruise 2015



Cover Image
A SCUBA diver experiences the wonder of a "fish tunnel"
© Luis Salazar

In this issue of **Galapagos News**, we are thrilled to announce the launch of our **Galapagos Giant Tortoise Webcams**, the first set of streaming cameras installed in the islands under the guidance of the Galapagos National Park. Please come to our website to take a look!

With the support of our generous donor, Dr. Jim Gallagher, and working with Sean Burnett of Wildlife Intel and James Gibbs of SUNY-ESF, we were able to install and operate four cameras in various pens at the Tortoise Breeding Center in Santa Cruz. While admittedly it is just plain fun to watch tortoises go about their daily business, we also believe that these cameras offer a glimpse of Galapagos to the world in an eco-friendly way. While we occasionally bemoan our growing dependence on technology, there is great value in creating these links between wild places and our own back yard.

Low technology interventions also make an appearance in this issue. Dr. Dee Boersma's work on the use of "penguin condos" to help increase reproduction rates of the endangered Galapagos penguin highlights the use of natural materials. Creating new nest sites by stacking lava rocks or excavating small caves seems to have a positive impact on the population, and Dee is reporting some egg laying and fledging to date. Dr. Boersma is also reaching out to Galapagos visitors to provide photos of penguins from their trips to build a robust photographic database of penguin sightings throughout the archipelago. Information on how you can help can be found on page 10.

And finally, we welcome Dr. Arturo Izurieta who has been named the new Director of the Galapagos National Park. Dr. Izurieta, an Ecuadorian citizen, holds a doctorate in Natural and Rural Systems Management from the University of Queensland (AU), and has worked as a consultant with the Government of Ecuador as manager of the Invasive Species Project. I had the pleasure of working with Dr. Izurieta during his first term as Park Director (1991-1995) and look forward to working together again to achieve our many mutual goals.

As always, thank you to our many friends and supporters who make possible our work to preserve, protect, and restore the Galapagos Islands.



GALAPAGOS CONSERVANCY
11150 Fairfax Blvd., Fairfax, VA 22030 USA
Tel: 703.383.0077 Fax: 703.383.1177
comments@galapagos.org www.galapagos.org

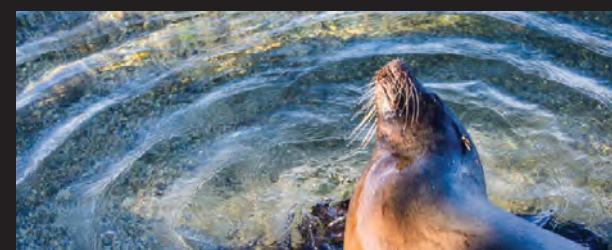
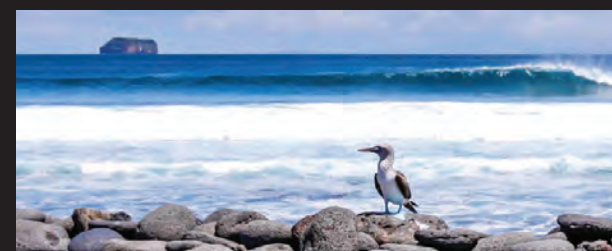


GOING GREEN: Help us help the environment by requesting to receive this newsletter by email instead of by mail. It's simple: email member@galapagos.org. Put "Galapagos News by email" in the subject line, and include your full name and address in the body.

Galapagos News is a twice-yearly publication that is produced for Galapagos Conservancy supporters and friends. The information in this issue was obtained from various sources, all of which have extensive knowledge of Galapagos. The opinions expressed are those of the authors, and not necessarily of Galapagos Conservancy.
Editors: Henry Nichols, Lori Ulrich Designer: Lori Ulrich, based on design by The Graphic Design House, UK
Galapagos News is printed on recycled paper.



2014 Galapagos Calendars ... on sale now at www.galapagos.org



Photos by GC Members: Bill Klipp (cover photo), Kris Lo Presto, Melanie Schade, and John Gersh

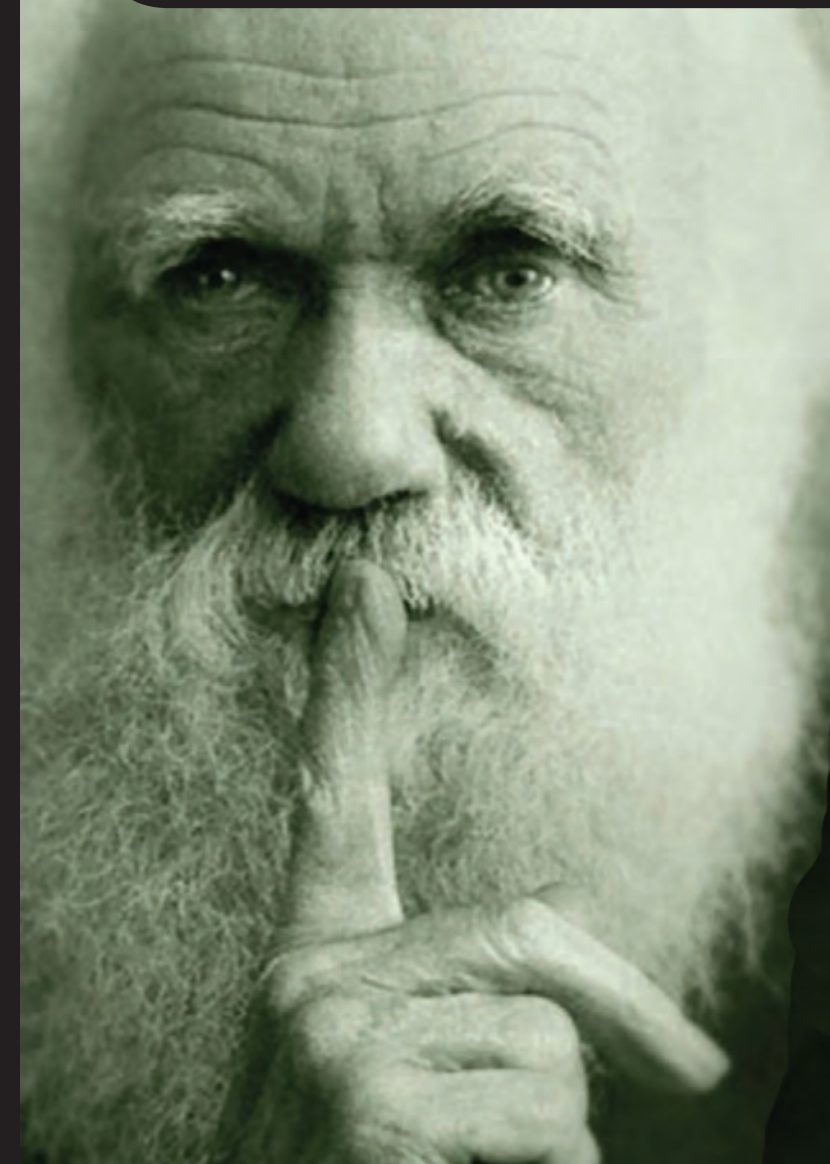
The legacy of one man's visit to Galapagos changed the world ...

What will be *your* legacy?

Remembering Galapagos and the work of Galapagos Conservancy in your will is one of the most valuable ways to show your support.

Leaving a legacy enables GC to commit to protecting the wildlife and habitats of Galapagos well into the future.

Contact legacy@galapagos.org
or visit www.galapagos.org



GALAPAGOS NEWS



© Francesca Cunningham, CDF

“We owe much to our predecessors who had the foresight to preserve this unique species in captivity in anticipation of conservation tool innovations like these.”

Bill Waldman | Island Conservation

TORTOISE RECOVERY

Young giant tortoises are surviving on Pinzón for the first time in more than a century, a direct consequence of a recent campaign to eradicate invasive black rats from the island.

It's likely that rats have been present on Pinzón since the 18th century. In 1965, when conservationists first took stock of the island's unique species of giant tortoise (*Chelonoidis ephippium*), they found a population of aging adults. With non-native rats feeding on eggs and hatchlings and no young tortoises surviving, conservationists came up with a temporary solution: they began removing eggs before the rats found them, hatching the tortoises in captivity and – when old enough to withstand rats – returning them to Pinzón.

But following a bold restoration initiative last year, the Pinzón population might now be able to recover without further intervention. In December 2012, the Galapagos National Park (in collaboration with Island Conservation, the Charles Darwin Foundation, and several other partners) distributed rodenticide on Pinzón. The survival of tortoise hatchlings on Pinzón is a strong indication that the rodent eradication campaign was successful.

“This is a dream come true for conservationists around the world,” said Bill Waldman, chief executive officer of Island Conservation, an international charity that specializes in the eradication of invasive species from islands. “We owe much to our predecessors who had the foresight to preserve this unique species in captivity in anticipation of conservation tool innovations like these.”

Eradication of invasive rodents is now planned for the much larger island of Floreana in late 2015.

SOLAR WATER TAXI

An illegal fishing vessel impounded by the Galapagos National Park in 2011 has been transformed into the archipelago's first solar-powered water taxi. There are over 20 water taxis that ferry tourists and residents to and from Puerto Ayora. The new taxi, refitted under the guidance of the World Wide Fund for Nature (WWF) in Galapagos, has been named Solaris after the 24-arm endemic marine sea star *Heliaster solaris*, which has not been seen in Galapagos for more than 30 years. “This venture can help pave the way for sustainable development of commercial activities while promoting ecotourism in Galapagos under a clear reduction of the fossil fuel footprint in the islands,” says Veronica Toral Granda, program officer for the WWF in Galapagos.

NIGHT VISION

Swallow-tailed gulls, the only nocturnal-feeding gulls in the world, hunt most often under a new moon, according to a new study. Researchers fitted gulls with data loggers and water sensors, enabling them to record when the birds were at sea. This revealed that gulls are influenced by the lunar cycle, concentrating their foraging efforts to coincide with the new moon when the abundance of prey species at the surface is at its greatest. “With a diving depth of no more than one meter, the prey is quickly beyond their reach on nights with a full moon,” says Martin Wikelski of the Max Planck Institute for Ornithology in Germany. The swallow-tailed gull is noted for having particularly large eyes, an adaptation that helps it to detect its prey in low-light conditions.

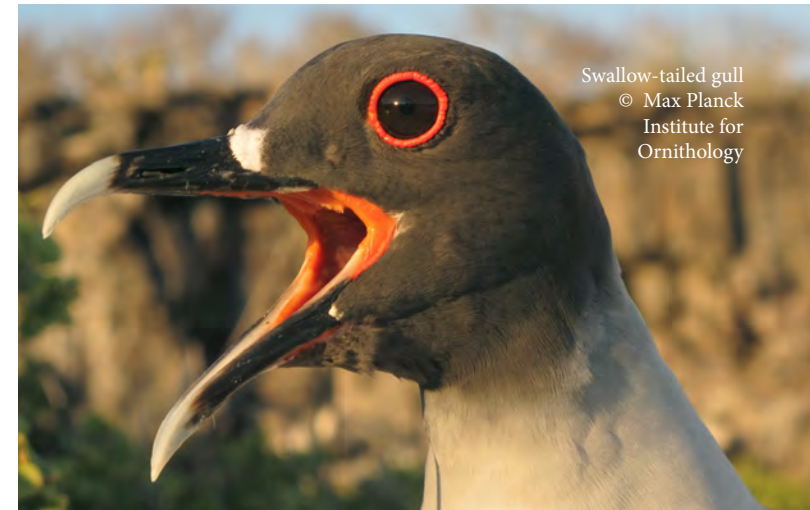
NEW PARK DIRECTOR

Ecuador's Ministry of Environment has named Dr. Arturo Izurieta as the new director of the Galapagos National Park. He replaces the biologist Edwin Naula, who has been in office for the last three years. This will be Izurieta's second term in this post. He was director of the GNP between 1991 and 1995.

ALBATROSS COLONY DISCOVERED

A large colony of waved albatrosses has been recorded in the center of Española, according to the Galapagos National Park Directorate. The discovery was made during a routine survey of the island to monitor its recovery following the eradication of goats nearly 40 years ago. Elsewhere, researchers have used the waved albatross to test out a new tracking system that combines GPS and environmental data. “This is a powerful tool for understanding how weather and land forms affect migration patterns,” says Roland Kays of North Carolina State University. This revealed that the waved albatross takes advantage of tailwinds by flying a clockwise journey from Galapagos to feeding grounds on the Peruvian coast and back again.

Waved Albatrosses on Española
© James Gibbs



Swallow-tailed gull
© Max Planck
Institute for
Ornithology

SHARK LEGISLATION

The European Parliament has voted overwhelmingly in favor of an amendment to legislation on shark finning, closing a loophole some member states were exploiting to continue the practice. As of November 2012, European fishermen must leave fins attached to all sharks brought to port. “The EU legislation is a major step in the right direction with regard to managing the take of sharks from the oceans,” says Ian Dunn, chief executive of the Galapagos Conservation Trust. “It is, however, not yet enough and continued action is required across the globe, including in key shark regions like Galapagos, to ensure we can assign shark finning to history,” he says.

SEA LION STRESS

The presence of humans in Galapagos may be placing a significant burden on sea lions, according to a new study. On San Cristóbal, where there is a significant human population, the sea lions were thinner and had more active immune systems than on the uninhabited island of Santa Fe, report scientists from the Zoological Society of London. This may be because of infectious diseases introduced by household pets or through increased levels of sewage exposing sea lions to microorganisms.

LONESOME GEORGE STAMP

The Ecuadorian Postal Service issued a Lonesome George stamp to mark the anniversary of the death of the famous Pinta tortoise on June 24, 2012. In March 2013, the Galapagos National Park Directorate sent George's body to the American Museum of Natural History in New York, where expert taxidermists are preserving it before his return to Galapagos.



Want an LG stamp?
We're selling them in
our store – see page 15.

© Jonathan Green

THE GREAT GALAPAGOS WHALE SHARK MYSTERY

by Jonathan R. Green, Project Manager of Galapagos Whale Shark Project

An encounter with a whale shark is something one never forgets. Even now, after more than two decades diving in Galapagos, every brush with a whale shark is an incomparable thrill. In fact, the more I have seen of this species in Galapagos, the more captivated I have become.

There are two observations that are particularly fascinating: almost all sightings are made in the far north of the archipelago, just off the tiny island of Darwin with its renowned dive site near Darwin's Arch ("The Arch"); and over 99% of all sharks that are spotted are adult females, a statistic that sets Galapagos apart from any of the other dozen-or-so whale shark aggregations around the world where sightings of males and juveniles are a common occurrence. What is going on?

The Galapagos Whale Shark Project, a collaboration involving scientists from the Galapagos National Park, the Charles Darwin Foundation and the University of California at Davis, is beginning to find some answers. In 2011, with funding from the Rapier Family Foundation, we began one of the most ambitious tagging projects ever attempted for this species, obtaining unprecedented data on the sharks that visit The Arch during the cool season between May and December.

In the first year, we succeeded in tagging more than 20 animals, most of which were adult females in an advanced state of pregnancy. When they left the waters around Darwin, they travelled some 100 km north along a series of sea

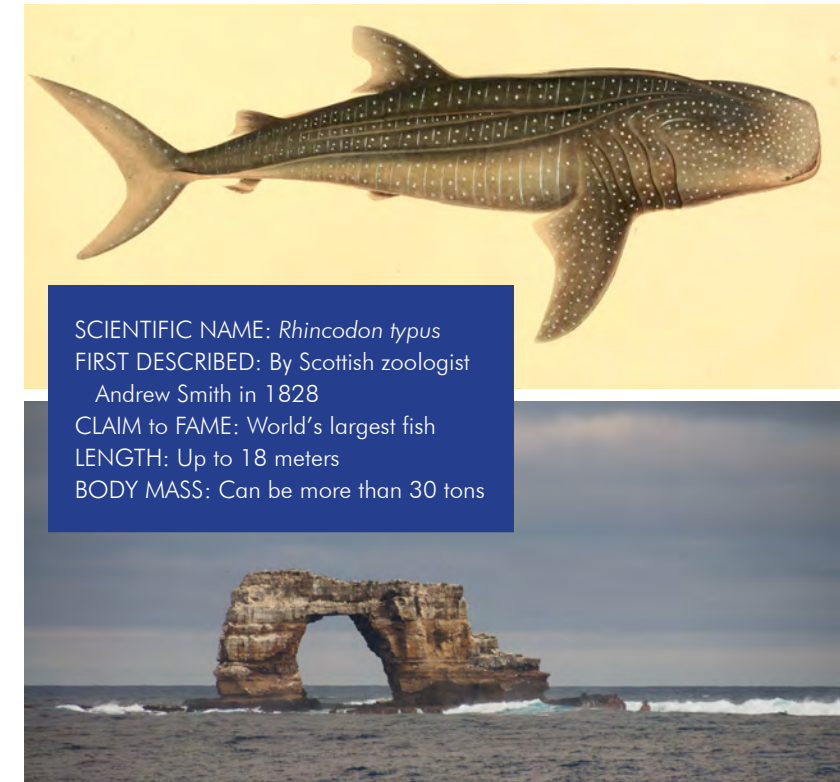
mounts and fissures until they reached the Galapagos Rift, the east-west cleft between the Cocos Plate to the north and the Nazca Plate to the south. At that point, the satellite signals showed that most of the whale sharks did something extraordinary. They turned west along the Rift and began to swim towards its junction with the East Pacific Rise. At this point, one of only two juveniles in the cohort – a young female we named Kymberly – turned due south and followed a sequence of fissures for more than 2,000 km before her tag became detached and her signal was lost. The tags deployed in our second year yielded similar results: when the sharks reached the Galapagos Rift, most of them made a sharp 90° turn, just as a driver might do at an intersection.

These are still early days, but it's looking increasingly clear that whale sharks are navigating by way of features on the ocean floor, sensing the magnetic "signature" of fault lines, ocean trenches and seamounts that lie thousands of meters beneath them.

Such features cross the oceans, quite literally, and it is possible that whale sharks use them to travel vast distances. This is supported by the preliminary analysis of DNA carried out by geneticists at the University of Illinois in Chicago, which found no significant difference between the genetic architecture of the whale sharks that were tagged in Galapagos and those tagged elsewhere in the world. This strongly suggests that genetic material is flowing freely between oceans and that whale sharks must be globetrotters.

In spite of these insights, we still do not know the reason why they appear to be so fond of The Arch. Satellite tracking data provide conclusive evidence that sharks come to the area early in the season, travel away and then return later the same season. Could they be feeding? As the plankton in this area is relatively scarce and sharks almost always keep their mouths clamped shut, this seems unlikely. How about mating? The apparent absence of adult males suggests not, unless they are hiding out of sight in deeper waters nearby. What about the possibility that the waters around The Arch act as the elusive birthing grounds of this species? This would certainly account for the abundance of pregnant females but it would not explain why there are so few juveniles.

It may be many months or, more likely, years until we have answers to these and other questions that have emerged from this work. Next year, we will dive again in an effort to fathom the mysteries that surround this fascinating, awe-inspiring species. Much remains to be done. In order to build up the bigger picture, we need to cast the net wider and tag the sharks that frequent the coastal areas off of Peru and Chile to find out where they go when they leave these waters. Even then, if we really want to understand the whale shark, perhaps the only option is to climb into a submersible, follow them as they dive, and enter their world. ■



SCIENTIFIC NAME: *Rhincodon typus*
FIRST DESCRIBED: By Scottish zoologist Andrew Smith in 1828
CLAIM to FAME: World's largest fish
LENGTH: Up to 18 meters
BODY MASS: Can be more than 30 tons



Top, right: An early engraving of the whale shark that appeared in *Illustrations of the Zoology of South Africa* by Andrew Smith, the Scottish zoologist who first described the species from a specimen harpooned in Table Bay, South Africa in 1828.

Middle, right: Darwin's Arch ("The Arch") in the northwest of the archipelago is the best place to go whale shark watching. © Tom Gruber.

Above: A researcher projects lasers onto the body of a whale shark, a technique that allows accurate measurement of each individual. If the animal is recaptured, it is then possible to determine its rate of growth. © Jonathan R. Green.

MULTIPLE METHODS

The Galapagos Whale Shark Project is using several different approaches to collect data on individuals in the archipelago. In order to record movements, it is necessary to fix a tracking device to the shark. These can come in several different forms: one tag allows the shark to be tracked in real time (provided it is not too deep); another is designed to record variables like the depth and temperature of the water before detaching from the shark, floating to the surface and being recovered; a third tag – the gold standard – combines the properties of both these tags. We are also using a software program, initially developed by NASA for the mapping of constellations, to discriminate between whale sharks based on unique differences in their characteristic white markings. An even more recent development is the use of lasers to estimate the length of a fish with unprecedented accuracy. Finally, we have been taking a small tissue sample for DNA analysis. This will indicate how closely related individuals are, both within a population and between populations from different oceans, specifically to what degree they are meeting, mixing, and mating. This, in turn, could indicate possible mating and birthing areas that may inform the conservation strategy for this species and the long-term planning of marine protected areas.

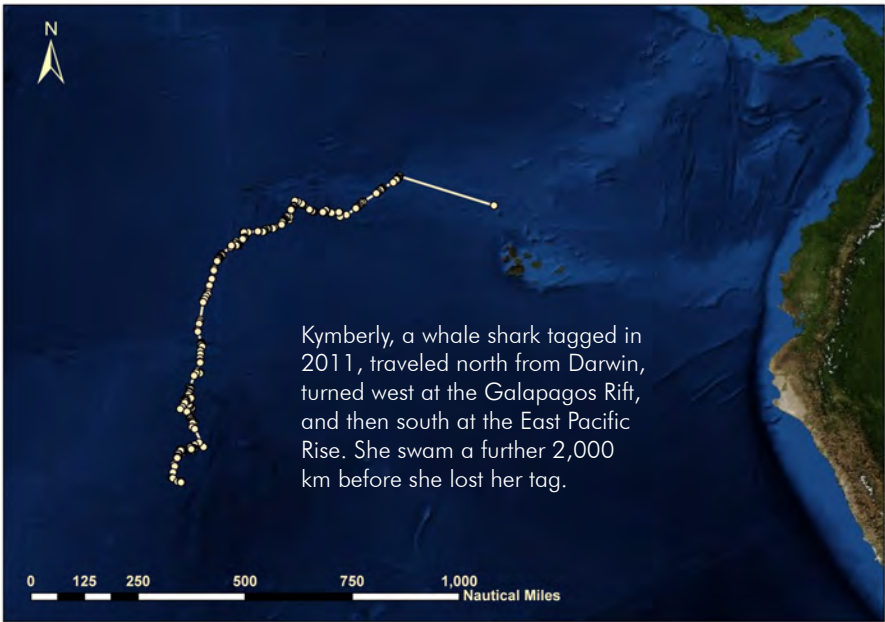
The Global Status of WHALE SHARKS

by Dr. Simon Pierce

WHALE SHARKS are a globally distributed species, ranging from Canada in the north to New Zealand in the south. Before 1986, only 320 sightings had been confirmed globally and while much has been learned since then, many aspects of their biology and ecology remain a mystery.

In certain areas throughout the tropics and subtropics, aggregations of whale sharks are known to occur, coming together to feed on zooplankton or small fishes. Ongoing discovery of these feeding areas, along with the realization that each individual shark can be photo-identified by their unique spot pattern, has given scientists an insight into their numbers and movement patterns for the first time (see whaleshark.org). But although there are more than 4,000 whale sharks in the global database, only a handful of individuals have been sighted in more than one country and their migration patterns are still largely unknown.

Certain characteristics, such as slow growth rate and late maturation age, make the whale shark particularly susceptible to overfishing and they are currently considered “vulnerable” to extinction. With their population in decline, getting answers to some of the fundamental questions is essential to the future conservation of this species. ■



Whale Sharks and Galapagos Conservancy

Galapagos Conservancy, through a generous gift from the **Rapier Family Foundation**, helped fund much of the work discussed in this article in order to further our knowledge of the mysterious whale shark.

With more than \$190,000 in funding provided, two 15-day field surveys were carried out in 2012 at The Arch, near Darwin Island in the northwestern tip of the archipelago. Scientists tagged several whale sharks with satellite positioning devices in order to assess their diving behavior and movement patterns. Other goals of the study were:

- Build the local capacity in the study of whale sharks, through training in the use of acoustic and satellite technology and collaborative analysis of results;
- Characterize the abundance and population structure of whale sharks visiting the marine reserve using photo identification;
- Assess the seasonality of whale shark occurrences within the reserve in relation to changes in ocean currents or temperatures;
- Determine the migratory routes taken by whale sharks;
- Raise local awareness of the importance of the Galapagos Marine Reserve for migrating pelagic species using whale sharks as a high profile species example.



A whale shark dwarfs two scuba divers in the Galapagos Marine Reserve. © Kathy Reis

Left: Beautiful but deadly. Since around 2000, the red lionfish's presence in the eastern Atlantic and Caribbean has been growing rapidly, with devastating consequences for native reef fish. © Abel Valdivia.

Inset: Underwater clipboards. The survey team gets to work recording species along a 50-m transect on the ocean floor. © Ken Collins.

HIDDEN INVADERS

by Inti Keith, Marine Ecologist at the Charles Darwin Foundation

“3... 2 ... 1 ... Splash!” I enter the crystal-clear water and descend past a school of yellow-tailed surgeonfish, a pair of king angelfish, a parrotfish. A juvenile sea turtle swims past. I can make out a couple of white-tip reef sharks resting on the bottom. It’s 6 am and time to work.

I began diving in the Galapagos Marine Reserve 11 years ago. I can still clearly remember my first encounter with a school of hammerheads, the first time a playful sea lion imitated my movements, and my admiration of the colorful reef fish swimming among the rocks. It’s experiences like these that underscore the special nature of the marine realm in Galapagos and the importance of an international, collaborative project to protect it from invasive species.

In 1997, the Charles Darwin Foundation (CDF) began extensive monitoring of the Galapagos Marine Reserve. Among much else, these surveys have revealed the presence of a number of marine invasive species, most likely introduced to the islands along with the increasing boat traffic between mainland Ecuador and the archipelago. Since April 2012, the UK government’s Darwin Initiative has been funding a project (run jointly by CDF and the University of Southampton and in collaboration with several other Ecuadorian and international institutions) to improve the detection of invasive species in the marine reserve, characterize the impact they are having on the native ecology, and suggest how best to manage them.

Off the island of Fernandina in the west of the archipelago,

I am hit by a blast of chilled water. Even deep down, the cold current can throw you around like a beach ball. I begin to navigate a prescribed path along the ocean floor, joined by others on the diving team. At each monitoring site we lay out 50 meters of tape. One member of the team records the fish along this transect while others note larger species living on the seabed and use a quadrat at regular intervals to study the seabed community in detail. In particular, we are on the lookout for the seaweed *Caulerpa racemosa*, the red algae *Asparagopsis taxiformis*, and the Christmas tree hydroid *Pennaria disticha*, three invasive species that have already been observed in Galapagos waters. Our concern is that these could grow rapidly and out-compete native species.

Others – like the red lionfish *Pterois volitans* – have yet to reach the islands. But this species, native to the Western Pacific and Indian Ocean, has spread owing to its popularity as an aquarium fish and its predatory appetite. In the Caribbean, for instance, non-native lionfish are thought to have contributed to an alarming loss of biodiversity in recent years. If they make it through the Panama Canal and reach Galapagos, the consequences could be devastating.

Prevention will always be far more effective than trying to control invasive species once they’ve become established. At present, supply ships from mainland Ecuador visit each of the four inhabited islands. A better system, which the Galapagos National Park and the new Galapagos Biosecurity Agency are working towards, is for cargo ships to service a single dock, with local vessels subsequently distributing supplies throughout the archipelago. It will be more work, but if we are to prevent such species from reaching Galapagos – transported either on hulls or in ballast water – this is the sort of vigilance that will be needed. ■



PROTECTING THE PENGUINS

by **Johannah Barry**, *President of Galapagos Conservancy*

Situated at the confluence of cold- and warm-water ocean currents, the Galapagos marine ecosystem is a unique environment where sea lions swim with marine iguanas and penguins. As global climate change shifts long-term weather patterns and impacts our oceans, marine species found nowhere else on earth, including corals, Galapagos penguins, marine iguanas, and many more, are at risk.

The Galapagos Penguin is the rarest and, sadly, the most endangered species of penguin in the world. This iconic species has never recovered from its massive population decline during the 1982-83 El Niño weather event. Since then, several nest sites have collapsed or been destroyed, some by the tsunami triggered by the 2011 earthquake in Japan. Galapagos Conservancy has partnered with Dr. Dee Boersma, a University of Washington scientist, to test an unusual method of trying to help Galapagos penguins weather the effects of a warming climate. By building artificial nest sites (also known as “penguin condos”) out of natural materials found in Galapagos such as lava rocks, the penguin population can increase in good years, providing a buffer during the stronger, more frequent El Niño years predicted with climate change.

Dr. Boersma has been studying Galapagos penguins since the 1970s, but she has been working closely with the Galapagos National Park Directorate and local naturalists in recent years to improve the penguins’ reproductive success. Their combined efforts will not only seek to illustrate the value of creating artificial nests in order to complement existing nests, but she and her team are also monitoring disease in penguins, and removing introduced predators from nesting areas. Dr. Boersma’s last monitoring trip earlier this year confirmed that the artificial nests are, in fact, being used and future monitoring trips will tell us how significantly they are enhancing penguin numbers. ■



WANTED! Your Best Penguin Photos!

Dr. Boersma and her team at the University of Washington are seeking the public’s help in documenting penguin activity in Galapagos throughout the year. She has created the website, **iGalapagos.org**, and is asking Galapagos visitors to upload their photos of Galapagos penguins with the date and location. From this photo database, her research team can determine when penguins are molting and when juveniles appear in the population. Breeding is dependent on local upwelling, so reports will help us understand location-specific patterns. Please see us at www.galapagos.org for more information on how you can upload your pictures and how you can stay in touch with Dr. Boersma’s research.

Photos by GC Members: Claire Nadeau Lavoie (top) and Jared Sutton.



LIFE ON THE EDGE: MANGROVE FORESTS

by **Pete Haskell**, *Marine Ecologist and Communications Officer at Galapagos Conservation Trust*

Living an amphibious life at the boundary between land and sea, mangrove forests provide a degree of stability in an otherwise harsh and changing environment. Being partially submerged in salty seawater one hour and in baking hot equatorial sunshine the next, only the hardiest of species can survive in this tidal habitat, yet mangrove forests are among the most productive and complex ecosystems on Earth. They provide food for scavengers, nesting space for birds, hunting grounds for predators, and nursery areas for fish.

Why then is this habitat so often overlooked and seldom visited by tourists? For some, it may be the pungent smell of decaying organic matter that puts them off, but the real reason probably lies in the dense, interlocking aerial roots that make mangroves so difficult to penetrate. It’s these intertwined growths that enable the mangrove to cope with the challenges of an intertidal lifestyle: not only do they allow the plants to “breathe in” oxygen from the air to support respiration in the root system, they also provide a wide anchor for the mangroves to prevent them from being washed away by the relentless lapping of the waves.

That’s not all. By forming a barrier between the sea and the land, the root system traps sediment that is washed off the land and slows its onward oceanic journey, a service that benefits coral reefs just off shore that are sensitive to sedimentation. For many animals, the roots also provide a refuge, impenetrable to larger predators. Fiddler crabs can be found scavenging on fallen leaves. Galapagos penguins, flightless cormorants, sea lions, sharks, golden cownose rays, sea turtles, and a whole host of other species seek both prey and protection among the tangle of roots. Brown pelicans and great blue herons stalk fish in the shallows, while the branches above provide a nesting site for red-footed boobies and a home for the critically endangered mangrove finch, an endemic species with a population now estimated to be less than 100 individuals.

Despite their importance, mangroves face a variety of threats, including coastal development, pollution, and climate change. “The main threat lies in populated areas and the destruction of mangroves for housing,” says Leonardo Garcia, a technical director at the Galapagos National Park. Their importance cannot be overstated, he says. “Besides acting as natural barriers, mangroves play an important role in the dynamics of the Galapagos marine life. They are areas that supply organic matter to the sea, shelter for juveniles of many species and food for others. Inside the program of environmental education, the importance and protection of mangroves is one of the main topics.” As the stress placed on forests through tourism, community expansion, land degradation, and climate change increases, even tighter regulations may be necessary in the future to protect what pockets of this incredible habitat remain. ■



Top: Black Turtle Cove on Santa Cruz. ©Hanna Tozer

Above: A sea lion makes a meal out of a juvenile Galapagos shark in one of Galapagos’ mangrove coves. © Greg Cope

MEMBER UPDATES

NOW LIVE! TORTOISE CAMS

Galapagos Conservancy

is thrilled to announce a new and exciting feature on our website – streaming “tortoise-cams,” featuring the daily life of select giant tortoises and hatchlings at the Fausto Llerena Tortoise Center at the Galapagos National Park on Santa Cruz Island in Galapagos.

Through funding provided by Galapagos Conservancy, the Galapagos National Park and a team of international tortoise and technical experts installed a series of four web cameras at the breeding center. Now you can be one of the first to watch the daily life of hatchlings and adult giant tortoises that are part of a massive project to restore the tortoise populations and their home islands.

Around the world, web cameras have become an important tool to promote species protection and conservation awareness. Galapagos Conservancy is proud to be a partner in establishing the first webcams streaming footage from the Galapagos Islands – a true challenge, given the islands’ isolation and unreliable digital connectivity.

We hope you will visit our website soon to watch and enjoy this unique perspective of conservation in action. Viewers can share the webcam footage easily with friends – we encourage you to share and give us your feedback. ■

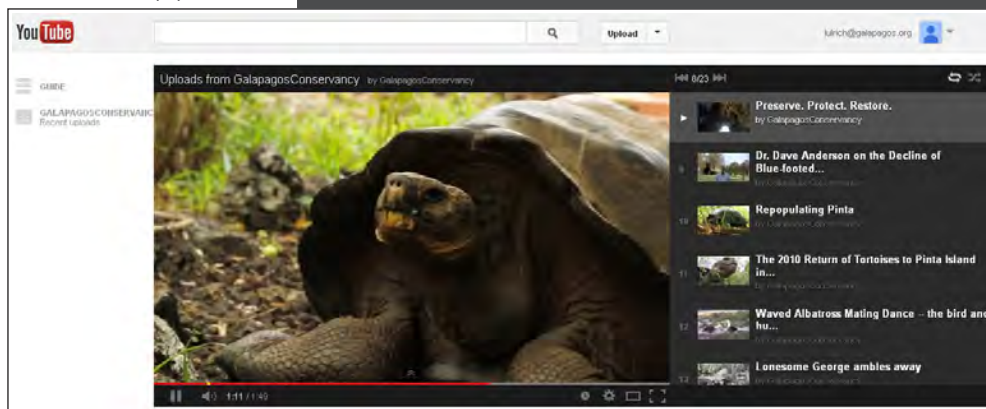
Top: A young tortoise vies for the camera’s attention. © James Gibbs of SUNY-ESF, and GC partner scientist who played a large role in setting up the cameras.

Right: A snapshot from Galapagos Conservancy’s YouTube channel.



DID YOU KNOW? Galapagos Conservancy has a YOUTUBE channel!

YES! Now you can “visit” the islands while browsing on your computer or tablet. In recent months, we have added several new videos that highlight many of the important conservation efforts in which we have played a significant role. And if you’re simply interested in seeing gorgeous footage of Galapagos wildlife, we’ve got that, too. You can watch GC’s president speak about our responsibility to nature, our partners discuss invasive species, education, and tourism, and Linda Cayot, GC’s science advisor, eulogize Lonsesome George.



On **February 22, 2014**, GC’s Science Advisor, Dr. Linda Cayot, will present “**Restoring the Giant Tortoises of Galapagos**” as part of the San Francisco Zoo’s Science Saturday Lecture Series.

Linda has worked in and for Galapagos conservation for more than 30 years. She will discuss our conservation efforts for giant tortoises and other species through ground-breaking research, ambitious projects to eliminate introduced species, and long-term management programs to ensure recovery of threatened populations. An informal reception for GC supporters will follow the presentation.

In addition to Linda’s lecture, GC Board and staff will be reaching out to friends in the Bay Area to participate in small events to help us identify, develop, and implement activities that will advance Galapagos conservation. GC will be assisted in this process by The Piras Group (thepirasgroup.com), a Bay Area organizational consulting firm providing its services on a pro-bono basis. Two members of the Piras Group, Carol Piras and Sara Zeff Geber, participated in Galapagos Conservancy’s cruise in 2011. Upon returning to San Francisco they were determined to mobilize others to become involved in supporting the important work they learned about in Galapagos. According to Carol, “There is so much at stake in Galapagos and so many resources in the Bay Area—intellectual, technological, and financial—that could strengthen the excellent conservation work taking place in the Islands. Sara and I are thrilled to be working with GC’s staff and Board members to build a lasting support network in the Bay Area.”

To learn more about these San Francisco events or to inquire about similar activities in other parts of the US, please contact us at: comments@galapagos.org. ■



DONOR SPOTLIGHT

CHARLES CASSARD (“CASEY”) KAESEMEYER is an example of both the longevity of the impact the Galapagos Islands can have on a person and the impact one person can have on the islands. A native of Baltimore, Maryland, and lover of nature, he and his late wife Marjorie first visited Galapagos in 1979. They began supporting Galapagos conservation that year and have been loyal Galapagos enthusiasts ever since. Casey received his SCUBA certification at age 59 and forged lasting friendships with divers who have helped him experience many memorable underwater experiences in Galapagos and elsewhere, “resulting in nothing less than a new life” for him. Although age has not permitted him to return to Galapagos in recent years, Casey enjoys connecting with the Islands through Galapagos Conservancy. He is one of our few donors who can boast about outliving many of the infamously long-lived tortoises – on February 16, 2014, Casey will celebrate his 100th birthday! After nearly 100 years on earth and having visited countless places with Marjorie, whom he recounts as “a woman with the fun-loving heart of a child, an instinctively skillful mother, and a wonderful partner for more than 75 years,” Casey still cannot forget the unique and unforgettable place that stole his heart many years ago. *“If I weren’t 99 1/2 I would try to visit the Galapagos one more time.”*



GALAPAGOS CONSERVANCY MEMBERSHIP

GALAPAGOS CONSERVANCY STANDARD MEMBERSHIP

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

Friend:	\$25	Advocate:	\$250
Family:	\$50	Protector:	\$500
Supporter:	\$100		

GALAPAGOS AMBASSADOR SOCIETY

With your gift of \$1,000 or more (or cumulative annual giving of \$1,000), we will welcome you to the Galapagos Ambassador Society. Many of our Galapagos Ambassadors are often willing to become closely and regularly involved in our programs. Ambassadors receive special updates and briefings; invitations to attend special member events; recognition in the GC Annual Report; and a special Ambassador welcome gift.

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

GALAPAGOS GUARDIAN SOCIETY

Galapagos Guardian Society members give recurring monthly contributions that are charged automatically to a credit card. These members help us reduce our fundraising costs because we do not send them annual membership renewal notices for the duration of their support. This is an easy and secure way to provide GC with ongoing funds that we can use to address the most critical conservation challenges in Galapagos.

Join at www.galapagos.org or call **703-383-0077**.

PLANKTON

UNDER PRESSURE

by Nicholas Owens, Professor of
Ocean Science at the University of Plymouth

“IF YOU CAN SEE IT IN THE SEA, IT IS NOT IMPORTANT.” This was the take-home message of a lecture I used to give to the new crop of marine biology undergraduates at the University of Newcastle. Those students with visions of snorkelling over coral reefs or recording the songs of humpback whales were inevitably a little put out. But there was a very serious message to my lecture.

I want to convey the importance of marine plankton, a catch-all term that includes animals (zooplankton), plants (phytoplankton), bacteria, and viruses. The common feature of these organisms is that they drift at the mercy of oceanic currents (the Greek word *planktos* translates as *drifter*). Although some planktonic organisms are large, like jellyfish, the vast majority are invisible to the naked eye. But in spite of their small size most are highly complex and well adapted to their environment.

The statistics about plankton are amazing. If you weighed all living things on the planet, plankton would be responsible for more than half of it. One drop of seawater contains at least a billion viruses, tens of millions of bacteria, and many tens of thousands of other animals and plants. Since plankton sits at the base of the food chain, every living thing in the ocean is – in some way – dependent upon it. Even land-dwelling creatures depend on it too: half of all the oxygen we breathe, for instance, has been produced by marine phytoplankton.

Yet plankton is under pressure on several fronts. Climate change, for example, is having a profound effect on planktonic biodiversity. As the ice caps melt, so sub-Arctic species are beginning to struggle and sub-tropical and

temperate species are moving steadily northwards. We are also observing dramatic changes in the timing of the key events in the life cycles of many plankton, with certain species appearing ever-earlier each spring, most likely because the oceans are getting warmer. We cannot yet predict the consequences of such rapid changes and it is vital that we keep monitoring. But as no two organisms will respond to these pressures in the same way, it's almost inevitable that significant imbalances in the food chain, and hence biodiversity, will develop.

Plankton and the wider marine environment are also facing the problem of ocean acidification, a little-known consequence of the production of carbon dioxide (CO₂) from the use of fossil fuels. It's estimated that around half of the CO₂ produced by human activity since the start of the industrial revolution has dissolved in the sea rather than accumulating in the atmosphere. As a consequence, the oceans have become, largely imperceptibly, more acidic. This is of concern for many marine organisms, notably those with shells or body parts made from calcium carbonate as is the case for many planktonic species.

What are the consequences for Galapagos? We can only speculate, much as we have to for any specific region. Although we do not have a long-term dataset on marine plankton in Galapagos, it's almost certain that the archipelago's suite of planktonic organisms has experienced the same pressures as other regions in recent decades. If anything, in fact, the relatively cold currents that feed Galapagos are likely to make marine organisms even more sensitive to changes in CO₂. It would be of great value to initiate an enduring plankton survey around the islands. Without third-party support the costs of such an initiative are prohibitive. If nothing else, however, we should acknowledge the importance of plankton. For without this hidden majority, none of the wonderful Galapagos 'megafauna' would exist. ■



© Sir Alister
Foundation for
Ocean Science

GALAPAGOS GIFTS

Proceeds from all gifts purchased in the Galapagos Gift Shop benefit Galapagos conservation.

<http://www.galapagos.org/shop/>

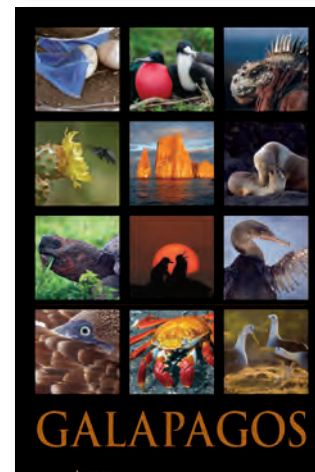
For **Lonesome George** fans ...



Framed Limited Edition Postage Stamps, \$30
Lonesome George Keepsake Ornament, \$20



For **Proud GC Supporters** ...



Embroidered Logo Cotton
Military-style cap, \$15

Recycled Plastic GC
Tote Bag, \$17

Galapagos Poster, \$10

Galapagos Bumper
Sticker, \$5

AVAILABLE December 6th! Booby ornaments!

Lonesome George was the inspiration for our first keepsake ornament in 2012. The ornaments were such a big hit that we decided to make a series. The **Blue-footed Booby** is the star of our ornament for 2013!



For **ANYONE** who loves Galapagos!



More than 40 stunning photos showcase the best of Galapagos! Galapagos 2014 Calendar, \$15

NEW! Galapagos Jewelry! Galapagos Conservancy supports local artisans who work with sustainable materials.



Galapagos Recycled Paper Bracelets and Necklaces range from \$12 to \$20

At Galapagos Conservancy, we strive not only to preserve the diverse species of plants and animals on the Islands, but to create a sustainable society that includes local residents in conservation efforts. When we met **local artisan Daysi Patiño**, we knew that we wanted to showcase her work and support her distinct style of conservation. Daysi told us, "My creations are the perfect fusion between art and conservation." We certainly agree. You can read more about Daysi in our website blog and shop her jewelry in our online store.



GALAPAGOS
CONSERVANCY

11150 Fairfax Boulevard, Suite 408
Fairfax, VA 22030 USA

NOW BOOKING:
GC CRUISE 2015
JUNE 10-21, 2015

Details and a downloadable brochure can
be found at **www.galapagos.org**

Call Dana at 703-383-0077 or email
dkaasik@galapagos.org with questions
or to request a brochure.



View from top of Bartolomé Island. © GC Member, Joe Mansfield