

Galapagos Islands, Ecuador

June 13-16, 2008

Notes from U.S. Rep. Bob Inglis (SC-4)

Washington, DC to Guayaquil, Ecuador

Friday, June 13, 2008

En route to the Galapagos Islands, we stopped for refueling and customs inspection in Guayaquil, Ecuador. While there, Nan Fife, State Department Political Officer, provided a political-economic briefing. Among other things, we discussed:

- Andean Trade Preference Pact, which is set to expire December 31, 2008
- Important to Ecuador and to the U.S. that it be renewed
- Columbia Free Trade Agreement stalled in House in May 2008
- Important that Andean renewal not meet the same fate
- Quito, the capital of Ecuador, (population 2,000,000) reflects the mountain culture of Ecuador
- Guayaquil, the financial capital of Ecuador, (population 2,280,000) reflects the coastal culture
- Ecuador is currently served by an elected president and one-time-only constitutional assembly
- The country has withstood a series of bloodless coups and is now developing a constitution
- Ecuador is almost the size of Nevada; is bordered by Columbia to the north, Peru to the east and south, and the Pacific Ocean on the west
- The Galapagos Islands are along the equator, 600 miles west of mainland Ecuador
- More information about Ecuador can be found at [State Department Background Note: Ecuador](#)

Guayaquil, Ecuador to Baltra Island to Santa Cruz Island, Galapagos

Friday, June 13, 2008

We landed at Baltra Island on a runway originally developed by the U.S. during World War II, took the very short Itabaca Ferry across to Santa Cruz Island, and traveled by bus for 30 to 40 minutes to the town of Puerto Ayora. While on the bus, we were briefed by our naturalist guides, Rafael Pesantes and Emma Ridley.





2

Upon arriving at Puerto Ayora, we went directly to the Charles Darwin Research Station for a briefing by its directors and for a tour of the tortoise breeding areas.



3



4

Source: USAID

**Scene Setter # 1
CODEL Baird to Galapagos
Friday, June 13, 2008**

CHARLES DARWIN RESEARCH STATION (CDRS)

PURPOSE: Briefing from Darwin Center Director
Visit to giant tortoise and land iguana breeding center

TIME: 5:00-6:00 PM

DRESS CODE: Business Casual (no ties...)

LANGUAGE: English

LOCATION: Charles Darwin Research Station

CONTACT: Roslyn Cameron (09-747-8133); Graham Watkins, CDRS
Executive Director (097-407-987)

SITE OFFICER: Thomas Rhodes (099-817-345); Rocio Cedeno, (09-821-8031)

PARTICIPANTS: CODEL Members
Quito Embassy officials
Graham Watkins, CDRS Exec. Director (052520434; 09740)
Felipe Cruz, Director of Technical Assistance (093-379-717)
Rafael Pesantes, Red Mangrove Guide (098-400-767)
Emma Ridley, Red Mangrove Guide (099-232-632)
Sixto Naranjo, Acting Director, Galapagos National Park

DESCRIPTION OF THE EVENT:

Delegation will depart by bus at 4:50 PM from Red Mangrove Inn to the research station. Graham Watkins and Felipe Cruz will meet the delegation at the entrance of the station.

Dr. Watkins will provide a briefing about Galapagos and the Charles Darwin Foundation's scientific and management missions, and the role of private and governmental support to their mission. He and Mr. Cruz will guide the tour around the giant tortoise and land iguana breeding center. CDRS has received approximately \$3.1 M in grants from USAID in recent years.

At the end of the tour, the delegation will depart by bus to the Red Mangrove Inn. The distance is only about a mile, so individuals may choose to walk.

One of the most helpful discussions of the trip took place during dinner with Dr. Julian Sachs, University of Washington Professor of Chemical Oceanography.

Dr. Sachs explained that, while climate change models are complicated and subject to some debate, the chemical process by which elevated levels of atmospheric CO₂ are absorbed into the oceans is well established. Dr. Sachs described the chemical equation by which CO₂ dissolves in water to form carbonic acid (also known as dihydrogen carbonate), an acid that lowers the pH of ocean water. Just as the shell of an egg dissolves in vinegar (an acid), the shells of calcium-based ocean organisms (oysters, clams, etc.) may begin to dissolve as the ocean becomes more acidic. The greatest concern is that a more acidic ocean may cause the calcium structures of phytoplankton to fail, leading to a hole at the bottom of the food chain. As many as 1 billion humans rely on that food chain for daily sustenance.

Dr. Sachs suggested that reductions in CO₂ levels can be viewed as a wise purchase of an "insurance policy" against the risks hypothesized by the climate change models. He also suggested that contingency plans should be developed for a whole range of engineering options (including dramatic options like launching reflective particles into the upper atmosphere).

Source: USAID

Scene Setter # 2
CODEL Baird to Galapagos

Friday, June 13, 2008

DINNER WITH CHARLES DARWIN FOUNDATION (CDF) AND UNIVERSITY OF WASHINGTON FACULTY

PURPOSE: To discuss CDF's challenges and plan of action in the Galapagos, and University of Washington's research on climate change.

TIME: 7:30-9:00 PM

DRESS CODE: Casual

LANGUAGE: English

LOCATION: Red Mangrove Inn Restaurant

CONTACT: Roberto Dager, Red Mangrove Manager (Cell: 097-270-465)

SITE OFFICER: Thomas Rhodes (099-817-345)

PARTICIPANTS: CODEL Members and Staff
Quito Embassy officials
Dr. Graham Watkins, CDRS Executive Director
Dr. Julian Sachs, Univ. Washington Professor of Chemical Oceanography
Dr. Gabrielle Rocap, Univ. Washington Professor of Biological Oceanography

DESCRIPTION OF THE EVENT:

Seats will be indicated with name tags. Representatives, key staff, and special guests will be seated together. Additional participants will be at several smaller tables. No formal remarks are planned, but the small and informal setting allows for toasts, questions and answers, etc.

Galapagos National Park

Saturday, June 14, 2008

On Saturday morning we met with Galapagos National Park officials and NGO representatives to learn about and encourage the conservation efforts underway at the park. The discussion also revealed the need to balance development and protection. Visits to the Galapagos have grown exponentially to 160,000 visitors per year. Along the coast in South Carolina we face similar challenges in striking the appropriate balance between job-producing development and quality of life-ensuring conservation.



5



6

In the course of our discussions with representatives of several NGOs, it became clear that they feel a need to buttress the efforts of the fledgling Ecuadorian government.

Source: USAID

Scene Setter # 3
CODEL Baird to Galapagos
Saturday, June 14, 2008

GALAPAGOS NATIONAL PARK (GNP)

PURPOSE: To discuss Galapagos National Park threats and challenges, and the role of U.S. and international assistance

TIME: 9:00-10:00 AM

DRESS CODE: Business Casual (no ties...)

LANGUAGE: Spanish. GNP will provide interpreter.

LOCATION: GNP Headquarters conference room

SITE OFFICER: Thomas Rhodes (099-817-345); Bridget Premont (085-888-160)

CONTACT: Ruth Boada (094-263-367); Sixto Naranjo (092-322-965)

PARTICIPANTS: CODEL Members and Staff
Quito Embassy officials
Sixto Naranjo, GNP Acting Director
Ana Sancho, UNDP/GEF Invasive Species Project Coordinator
Danny Rueda, GNP staff (Cell: 084-969-324)
Ruth Boada, GNP staff

DESCRIPTION OF THE EVENT:

Delegation will leave the hotel at 8:50 by bus, accompanied by Embassy officials. Mr. Naranjo and GNP staff will meet you at the entrance of the Park offices.

This is an opportunity to discuss challenges of managing a sensitive park area. GNP has received approximately \$3.9 M in grants from USAID in recent years, and is the largest beneficiary of technical assistance programs implemented through NGOs and contractors.

The Acting Park Director will welcome the delegation and staff will make presentations on Invasive Species and Climate Change. Other topics to discuss are key management challenges, comparisons to U.S. parks and protected areas, and balancing conservation and economic development.

All participants will be in a roundtable meeting setting.

The following meeting will take place in the same conference room.
(Restrooms are to the left of the conference room entrance.)

SUGGESTED TALKING POINTS

- The USG is proud to be a partner of the Galapagos National Park. Congratulations in your work.
- How do you prioritize among the multiple challenges you have described?
- How do you balance national and local priorities?
- How do you expect the status of Galapagos to change in Ecuador's new constitution? (*It is now a province.*) How will that effect management?
- UNESCO determined that Galapagos is a "Threatened World Heritage Site" (with a vote from the U.S. delegation). Do you agree? How is the park responding to that resolution?
- What are the anticipated impacts of climate change in the Galapagos? Are there adaptation and mitigation plans?
- What is role of the U.S. and other international cooperation in conservation and sustainable development of the Galapagos? What should it be?

NB: current support, from USAID's ecotourism program, focuses on developing a new concessions system to replace the confused and corrupt existing system.

**CODEL Baird to Galapagos
Saturday, June 14, 2008**

MEETING WITH INTERNATIONAL NGOs

- PURPOSE:** Discuss priorities for Galapagos and adjacent seas from some of the world's largest conservation organizations.
- TIME:** 10:15-11:30 AM
- DRESS CODE:** Informal Business
- LANGUAGE:** English
- LOCATION:** GNP Headquarters conference room (same as previous meeting)
- SITE OFFICER:** Thomas Rhodes (099-817-345); Bridget Premont (085-888-160)

PARTICIPANTS:

CODEL Members and Staff
Quito Embassy and USAID officials
Scott Henderson, Fernando Ortiz, Conservation International (HQ: Arlington, VA)
Michelle Castro, Sea Shepherd (HQ: Friday Harbor, WA)
Godfrey Merlen, WildAid (HQ: San Francisco)
Pablo Guerrero, World Wildlife Fund (US HQ: Washington, DC)
Carlos Zapata, FUNDAR (a Galapagos NGO)

DESCRIPTION OF THE EVENT:

This is an opportunity to discuss the past and current role of the international and local conservation organizations in the Galapagos. All of these organizations have received direct or indirect grants from USAID in recent years, except Sea Shepherd.

All participants will be in a roundtable meeting setting.

After this meeting, Delegation will depart to *Perla del Pacifico* (Women's Cooperative Bakery) **OR** return to Red Mangrove Inn for free time until 12h30.

SUGGESTED TALKING POINTS

- What are your priorities in the Galapagos? How do these fit with priorities for the rest of Ecuador and the rest of the world?

- We have learned that Galapagos is considered a “threatened world heritage site” by UNESCO. What is at risk?
- How do you coordinate among each other, and with the complex Ecuadorian governmental institutions?

What is the role of the USG in your work? What should it be?

U. S. Rep. Darlene Hooley and several others left the NGO briefing early in order to celebrate the expansion of a bakery funded, in part, by USAID.

Source: USAID

**Scene Setter # 5
CODEL Baird to Galapagos
Saturday, June 14, 2008**

**COOPERATIVA PERLA DEL PACIFICO,
WOMEN’S COOPERATIVE BAKERY**

PURPOSE: To deliver a check to a women’s micro-enterprise in Puerto Ayora.

TIME: 11:30-12:00 AM

DRESS CODE: Informal Business

LANGUAGE: English and Spanish (interpretation will be provided)

LOCATION: Intersection of Karl Angermeyer and Isla Floreana. (Jorge García’s house. One-floor white house -Sector Coliseo- to the right, unpaved street.)

SITE OFFICER: Bridget Premont (085-888-160); Rocio Cedeno (098-218-031)

CONTACT: Aldo Salvador (092-751-795); Alexandra Guerrero (091-620669)

PARTICIPANTS: Rep. Darlene Hooley
Delegation Family Members
Quito Embassy officials
Margarita Diaz, Women Cooperative President
Maria Moreta, Women Cooperative Manager
Aldo Salvador, National Association of Tourism Enterprises in Galápagos (ASOGAL), Executive Director
Alexandra Guerrero, ASOGAL Coordinator in Galapagos
ASOGAL Board of Directors Members

DESCRIPTION OF THE EVENT:

Rep. Marlene Hooley will deliver a check for the purchase of bakery equipment to a women's cooperative on behalf of USAID. The group will briefly tour the installation with a member of the cooperative and the national tourism association that established the group.

USAID is providing a \$5,000 grant to *Cooperativa Perla del Pacífico*, which develops sustainable alternatives to fishing for fishermen's wives and other members. This grant is to purchase a stove, refrigerator, scales and other equipment needed to bake bread that will be sold to tourist operators. This check is for 80% of the donation (\$4,000). The balance will be paid on verification that the equipment is being used as approved.

The Cooperative is an initiative of the National Association of Tourism Enterprises in Galápagos (*Asociación Nacional de Empresas Turísticas en Galápagos, ASOGAL*). Their goal is to integrate more actors and sectors to the tourism value chain in the Galapagos.

The cooperative is selling their bakery products to four significant local tour operators and to other local businesses. The women are working on improving the quality in order to increase the number of clients.

These small grants to community groups are separate from USAID's primary conservation and economic development programs. Galapagos groups have received approximately \$40,000 in such grants since 2000.

AGENDA:

- | | |
|------------------------|---------------------------------|
| 1. Welcome | Aldo Salvador, ASOGAL |
| 2. Check Delivery | Rep. Marlene Hooley |
| 3. Remarks | Maria Moreta, Coop. Manager |
| 4. Tour and taste test | Margarita Diaz, Coop. President |

SUGGESTED TALKING POINTS:

- It is my pleasure and my honor, on behalf of the USG, to offer this grant to Perla del Pacífico. [*pronounced pa-SEE-fee-ko*]
- The U.S. recognizes that the Galapagos Islands and Galapagos Marine Reserve is one of the great natural treasures of the world. We also recognize that the future of this ecosystem is inseparable from the future of you and your families.
- We are committed to supporting conservation that creates economic growth, and development that supports conservation. This grant, to help you build a sustainable business in a sustainable industry, is part of that effort.

Good luck in your enterprise!

Puerto Ayora Bay
Saturday, June 14, 2008

On Saturday afternoon we set out on a waterborne tour of sites in Puerto Ayora Bay.



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Since El Niños have dramatic effects on The Galapagos Islands (interrupting the upwelling of the cold ocean currents and thereby interrupting the supply of nutrients that support the food chain), measuring the historical impacts of previous El Ninos may help predict the impacts of future events.

Throughout our land and water tours of Puerto Ayora Bay sites we had the opportunity to quiz the scientists about their investigations.



9



10

Mangroves that shed salt through their leaves and marine iguanas that spit salt are examples of species that have adapted to their circumstances. If climate change were slow and steady, many organisms could adapt. Rapid changes (in geological terms) and shoreline development make it less likely that organisms can adapt.



11

Source: USAID

Scene Setter # 6
CODEL Baird to Galapagos
Saturday, June 14, 2008

EXCURSION: PUERTO AYORA BAY

- PURPOSE:** Introduction to marine fauna of Santa Cruz.
- TIME:** 12:30-5:00 PM
- DRESS CODE:** Casual, for snorkeling, light hiking over lava rock, bright sun
(Small restrooms on the boats are difficult for changing clothes)
- LANGUAGE:** English
- LOCATION:** Puerto Ayora Bay
- SITE OFFICER:** Thomas Rhodes (099-817-345); Bridget Premont (085-888-160);
Rocio Cedeno (098-218-031)
- CONTACTS:** Rafael Pesantes, Red Mangrove Guide (098-400-767)
Emma Ridley, Red Mangrove Guide (099-232-632)
- PARTICIPANTS:** CODEL Members and Staff
Quito Embassy officials
Eduardo Espinosa, GNP staff (Cell: 093-573-255)
Mattias Wolf, CDF Director of Marine Science (Cell: 097357343)
Rafael Pesantes, Red Mangrove Guide (098-400-767)
Emma Ridley, Red Mangrove Guide (099-232-632)
Dr. Julian Sachs, Univ. Wash. Prof. of Chemical Oceanography
Dr. Gabrielle Rocap, Univ. Wash. Prof. of Biological
Oceanography

DESCRIPTION OF THE EVENT:

Delegation will leave from the Red Mangrove by bus at 12:30 PM, to board boats at the Puerto Ayora pier. Box lunches will be served at Tortuga Bay Beach around 1:30 PM. Red Mangrove will provide snorkel equipment (masks and some wet suits). Snacks and soft drinks will be available.

We will visit the following sites (*descriptions largely from Red Mangrove brochures*):

Loberia Island is named after its colony of sea-lions (*Lobos de Mar*, or “Sea Wolves”), about 10 minutes away from Puerto Ayora. This small island is a great place to snorkel with sea turtles and a great variety of colorful fish, and for playing with the ever-friendly and inquisitive sea lions.

After 30 minutes travel will get to **Tortuga Bay**, a nesting beach of the black sea turtle. It is a great place to see marine iguanas, white tip sharks, and Galapagos sharks. In the dunes behind the beach, several plants stabilize this sandy zone. *Nolana Galagensis* is an endemic plant of the beaches that can grow to one meter in height. *Ipomea pes-caprae* is a tropical vine with bright purple flowers covering the ground of sand dunes and beaches.

Playa de los Perros (Dog Beach) is approximately 10 minutes from Tortuga Bay . When tide is high, landing is done by the channel, if the tide is low, landing can be done by a wooden pier. The white-sand beach is about 75 m long.

Lover’s Tunnel is a viewing point for white-tip sharks, Blue-footed Boobies, Pelicans, Great Frigate Birds, and Sooty Terns.

Return to Puerto Ayora and hotel by 6:00PM.

Upon returning from the tour of Puerto Ayora Bay sites, we had dinner with the Mayor of Santa Cruz.

Source: USAID

**Scene Setter # 7
CODEL Baird to Galapagos
Saturday, June 14, 2008**

DINNER WITH LOCAL AUTHORITIES

PURPOSE: Discuss local development and management issues

TIME: 7:30-9:00 PM

DRESS CODE: Casual

LANGUAGE: Spanish – Interpretation is required

LOCATION: Red Mangrove Restaurant

SITE OFFICER: Thomas Rhodes (099-817-345)

CONTACTS: Roberto Dager, Red Mangrove Manager (Cell: 097-270-465)

PARTICIPANTS: CODEL Members and Staff
Quito Embassy and USAID officials
Leopoldo Bucheli, Santa Cruz Mayor

DESCRIPTION OF THE EVENT:

This is an opportunity to meet island leaders and discuss migration and urban development in a sensitive Park area.

INGALA is an executive agency charged with regional planning and implementation of special Galapagos laws, such as those for immigration and phytosanitary controls. Puerto Ayora is the largest town in the Galapagos. Elected mayors are frequently arguing for greater access to Park resources and against park rules.

Seats will be indicated with name tags. Representatives, key staff, and special guests will be seated together. Additional participants will be at several smaller tables. No formal remarks are planned, but the small and informal setting allows for toasts, questions and answers, etc.

SUGGESTED TALKING POINTS:

- How are policies set by the national government managed at the local level? What is the mechanism?
- How do Galapagos residents feel about the conservation—is it a priority?
- What are the development priorities for Galapagos and Santa Cruz?
- Will the status of Galapagos (now a province) change under the new constitution?

Floreana Island

Sunday, June 15, 2008

On Sunday the seafaring portion of our group traveled via the Galapagos National Park patrol boat *Sierra Negra* to Floreana Island to see the sediment coring and water sampling at two sites on a high salinity lagoon and to view coral and other underwater features. At the lagoon we witnessed—first-hand—the problem of invasive pests. Wasps that were introduced to the islands have multiplied rapidly in the last several years, making the work on the lagoon this day somewhat treacherous.





13



14



15

Source: USAID

**Scene Setter # 8
CODEL Baird to Galapagos
Sunday, June 15, 2008**

EXCURSION TO FLOREANA

PURPOSE: Observe sediment coring to obtain historical records of El Niño

TIME: 8:00AM-6:00 PM
(May move earlier, depending on weather)

DRESS CODE: Casual, ready for swimming, light hiking, bright sun

LANGUAGE: English

LOCATION: Convene at Red Mangrove Restaurant

SITE OFFICER: Thomas Rhodes (099-817-345)

CONTACTS: Rafael Pesantes, Red Mangrove Guide (098-400-767)
Emma Ridley, Red Mangrove Guide (099-232-632)

PARTICIPANTS: CODEL Members and Staff
Quito Embassy officials

Ruth Boada, GNP
Eduardo Espinosa, GNP
Dr. Julian Sachs, Univ. Washington Professor of Chemical
Oceanography
Dr. Gabrielle Rocap, Univ. Washington Professor of Biological
Oceanography
Ms. Alyssa Atwood, graduate student
Mr. Dan Nelson, graduate student

DESCRIPTION OF THE EVENT:

Delegation will leave Red Mangrove at 6:45AM to travel to the Galapagos National Park patrol boat *Sierra Negra* by zodiac. Red Mangrove will provide naturalist guides, snacks and soft drinks, snorkeling gear, and wet suits. Lunch will be served on the return trip. A restroom is available on-board.

The excursion includes visits to the following sites:

Sampling Sediments and Water from Flamingo Lagoon

The delegation will disembark in two groups to separately observe water sampling with Dr. Rocap and sediment sampling with Dr. Sachs. Total time on shore will be approximately 45 minutes.

Sediments preserve historical records of past environments. Dr. Sachs is conducting NSF-funded research on El Niño-Southern Oscillation cycles (summarized below). Over the past ten days his team has taken long cores from Flamingo lagoon covering the past 6,000 years. They will take high-resolution short-cores with our group.

Devil's Crown: This old volcanic cone that has been eroded by the ocean. Hammerhead sharks are frequently seen around the Crown, in the sites with stronger currents. The most common species of coral is the branching coral *Pocillopora*. The sea urchin, *Eucidaris thouarsii* is a significant predator of *Pocillopora*, a relationship apparently unique to the Galapagos. Structural coral reefs are not common in Galapagos, presumably because of cool water temperatures, but the few that do exist here are tremendous.

Research Objective on Floreana

The primary science goal is to recover a sediment core from Flamingo Lagoon on Floreana for the purpose of reconstructing El Niño and climate variations. We will analyze the hydrogen isotope ration in algal lipids that we extract from the sediment to infer variations in rainfall.

Continuous Holocene Climate Records from Equatorial Pacific Islands

Molecular and isotopic indicators of climate will be measured in well-dated, rapidly accumulating, and primarily laminated sediments from freshwater, saline and hypersaline lakes in Palau, Kiribati and the Galapagos to reconstruct the mean state of equatorial Pacific climate during the Holocene. The robustness of our climate reconstructions will result from the application of multiple hydrologic proxies in three island groups across

the equatorial Pacific that experience large inter-annual precipitation anomalies associated with El Niño.

That we do not yet know the sign or magnitude of change in the intensity or frequency of El Niño--the largest natural climate perturbation on inter-annual time scales--in a warmer or glacial climate implies a conspicuous gap in our understanding of climate physics. A principal reason for the uncertainty stems from a lack of paleoclimate data in the equatorial Pacific with which to validate models. Much of the data that do exist are from single locations using a single proxy, or are short, discontinuous records. We endeavor to remedy this data deficiency by producing continuous, highly resolved records of hydrologic changes across the equatorial Pacific that span the last 12,000 years.

The less seafaring members of the group traveled by bus to several sites on Santa Cruz Island, learning about volcanic activity, species adaption and farming on the island.

Source: USAID

Scene Setter # 9
CODEL Baird to Galapagos
Sunday, June 15, 2008

TOUR OF SANTA CRUZ

PURPOSE: Visit sites of scientific interest on Santa Cruz Island

TIME: 9:00AM-4:00 PM

DRESS CODE: Casual, ready for swimming, light hiking, bright sun

LANGUAGE: English

LOCATION: Depart from Red Mangrove Restaurant

SITE OFFICER: Rocio Cedeno (098-218-031)

CONTACTS: Red Mangrove Guide, TBD

PARTICIPANTS: TBD

DESCRIPTION OF THE EVENT:

9.00 VISIT TO EL CHATO FARM:

The reserve includes two zones, the Caseta and Cerro Chato. Both are open areas. The trail that begins in Santa Rosa is bordered by high pastures and follows the boundaries of farms. Depending on the season, it may be muddy and slippery. About 1 km from the Caseta there is a pond of water that in the rainy season is full of tortoises. Giant tortoises like to submerge themselves in water and mud. It is believed that this is for thermoregulation (to warm or cool themselves) or to kill ticks and protect themselves from mosquitoes. The walk to the Reserve is one of the best places to observe ground birds, tree and ground finches, vermilion flycatchers,

cattle egrets, and occasionally Galapagos rails. Passing through an illuminated lava tube, you can appreciate the formation of stalactites, stalagmites and the sulfur-colored walls.

14:00 GARRAPATERO BEACH

This beach and lagoon is located 19 km to the northeast of Puerto Ayora. It is possible to arrive by road, via Bellavista (50 minutes) or by boat (20 minutes). The main attractions of this site are the white sand beach, flamingos, and white-cheeked pintail ducks. Beware of the manchineel trees, found on the last part of the trail, because its fruit is very poisonous. The vegetation that covers both sides of the trail belongs to the arid zone: giant cactus, croton, mesquite, yellow codia, holly, thorn shrub, and leather leaf. Other fauna at the site include Galapagos mockingbirds, several finches, American oystercatchers, sally-lightfoot crabs, and occasionally marine iguanas.

16:00 RETURN TO HOTEL

Santa Cruz to Baltra to Guayaquil to Washington

Monday, June 16, 2008

On Monday morning we left Puerto Ayora, traveled by bus across Santa Cruz Island, took the Itabaca Ferry across to Baltra Island and departed for Guayaquil. After refueling in Guayaquil, we returned to Andrews Air Force Base.



16

General Observations

Being on the House Foreign Affairs Committee and the House Science Committee doubles the opportunity for impressions from trips like this one to the Galapagos Islands.

Learning more about the scientific work being done, exercising oversight over National Science Foundation investments and encouraging funded scientists advance Science Committee objectives.

As a member of the Foreign Affairs Committee, I was also glad for the opportunity to meet with Ecuadorian officials, to encourage their conservation of the islands, to learn more about Latin America (this being my first trip to a Spanish-speaking South American country), to build good will towards the United States and to encourage our Foreign Service officers.

Along the way there were substantive discussions among members of Congress about topics related and unrelated to the trip.

Most of all, as in all previous congressional trips, I found that I could understand my own country better having viewed it through another people's lens. The words of G.K.

Chesterton come to mind: "The whole object of travel is not to set foot on foreign land; it is at last to set foot on one's own country as a foreign land."

For this trip, the main “takeaway” is an impression of the United States as the indispensable innovator – the creative and capable country that can deliver technological innovation worldwide.

Additional helpful information gathered by USAID follows:

<p><i>Source: USAID</i></p> <p style="text-align: center;">PROFILES OF PEOPLE AND INSTITUTIONS</p> <p>a. Galapagos National Park (GNP) The Park was founded on July 4, 1959. The staff includes a team of about 300 persons in Santa Cruz, San Cristobal, Isabela, and Floreana, the four inhabited Galapagos islands. The GNP has five patrol boats and eight small boats, which serve for GNP logistics and for patrolling the marine reserve.</p> <p>Sixto Naranjo – Acting Park Director since March 2008. Marcela Aguiñaga, Ecuador’s Environment Minister, delegated the Directorship to Sixto Naranjo while the selection of a new Director is under way. Mr. Naranjo has a degree on Education Sciences, majoring in Chemistry and Biology. He arrived to the Galápagos in 1984, and has worked for the Park since then. He has been the Manager of the Protection Unit, responsible for all land and sea patrol operations, an instructor for official Naturalist Guides, as well as senior advisor for the control of invasive species in agricultural areas. He has also collaborated in the preparation of the National Park’s Management Plans since 1984.</p> <p>Ana Sancho – UNDP/GEF Invasive Species Program Coordinator. She is a biologist and also has a degree on Business Administration. Mrs. Sancho has worked in several international NGOs (IUCN-Traffic, Ecu-Ambiente). She has been nominated for Ecuador’s Women of the Year award. She will make a presentation on the Park’s invasive species program.</p> <p>Eduardo Espinosa – GNP staff. Mr. Espinosa is responsible for marine research. He is a marine biologist with a master degree in marine resources. He has worked in the Charles Darwin Foundation in charge of monitoring fisheries. His experience includes evaluation of the Machalilla National Park and International Tropical Tuna Commission observer.</p> <p>Danny Rueda – GNP staff. Mr. Rueda is the Sustainable Use of Natural Resources Manager. He is native of the Galapagos. He studied Agronomy at the Escuela Panamericana Zamorano, in Honduras, and afterwards Agronomical Engineering, majoring in Socioeconomic and Environmental Development.</p> <p>Christian Sevilla – GNP staff. He is in charge of control and eradication activities within the Park. Mr. Sevilla previously worked with the Charles Darwin Foundation on</p>
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invertebrate projects. He is a professional in geographic information systems and is about to get his environmental engineering degree.

Ruth Boada – GNP staff. She works in the Park's technical coordination unit, specifically in charge of the scientific research studies conducted in the Galápagos. She is the former invasive species project link between the Park and CDF. She is a biologist and has a master degree in entomology.

b. Charles Darwin Foundation (CDF)

This international organization was founded in 1959, under the auspices of UNESCO and the World Conservation Union. It operates the Charles Darwin Research Station (CDRS) in the Galapagos with a team of some 200 scientists, educators, volunteers, research students and support staff from all over the world.

Graham Watkins – *Executive Director*. A Guyanese born British citizen, Dr. Watkins has spent most of his life in tropical South America, mainly in Ecuador and Guyana. Prior to joining the Foundation in 2005, Dr. Watkins was director general of the Iwokrama International Center for Rain Forest Conservation and Development in Guyana from 2003 to 2005, and senior wildlife biologist with the center from 1998 to 2003. His professional portfolio includes more than 20 years of experience in ecological research, collaborative wildlife and fisheries management, and enterprise development in aquaculture, fisheries and tourism. Dr. Watkins holds an undergraduate degree in Zoology from St. Catherine's College, Oxford, in the UK and a Ph.D. in Ecology and Evolution from the University of Pennsylvania. His Ph.D. studies were carried out on the Ecuadorian coast, and he worked as a guide in the Galapagos in the late 1980s.

Felipe Cruz – *Director of Technical Assistance*. Galapagos native Felipe Cruz is the leader of the new team that provides advice and supports building of institutional and individual capacities for conservation and sustainable development. Most recently Mr. Cruz was the technical director for Project Isabela, a joint project with the GNP aimed at the ecological restoration of Northern Isabela. His previous professional experience includes several years as a naturalist guide in Galapagos. From 1991 to 1992, he worked with the GNP as head of protection and later as deputy director (1993 to 1994). Mr. Cruz has represented the Galapagos National Park on the UNESCO World Heritage Committee on several occasions, and the CDF in many international forums. Currently, he is a member of the CDF General Assembly and a member of the WildAid Foundation's board of directors.

Dr. Matthias Wolff - *Marine and Coastal Science Director*. German-born Dr. Wolff has worked extensively in Latin America on the study of climate change, fisheries biology, population dynamics, resource assessment and modeling of aquatic ecosystems. Prior to joining CDRC's executive team in 2008, Dr. Wolff was professor of theoretical ecology at the Bremen University in Germany. Dr. Wolff has a Ph.D. in biology from Kiel University, Germany. His doctorate studies were carried out in the Peruvian coast on the El Niño-effects on species assemblages and tropic flows in the Peruvian upwelling system and elsewhere.

c. Local Authorities

Eliecer Cruz – Governor of Galapagos. USAID/Ecuador’s relationship with Eliecer Cruz started in 1999 when he was the Galapagos National Park Director and participated in the International Visitor’s Program in the United States. He was the Director of the Park for approximately eight years, until 2002. He then worked for World Wildlife Fund for four years, directing USAID’s program to strengthen the Galapagos Marine Reserve. He is a native of the Galapagos with a vast knowledge of the islands and the threats to this delicate environment from illegal immigration, population growth, invasive species, poorly regulated tourism, and illegal fishing.

Leopoldo Bucheli – Major of Santa Cruz since 2002. He is from Esmeraldas Province, in northeastern Ecuador. He has studied biology and has worked as naturalist guide in the Galápagos. He has owned a small tourism company since 1992.

Fabian Zapata – Galapagos National Institute (INGALA) General Manager. He is a chemist, with at Masters Degree in Business Administration. He is native of the Galapagos, son of fisherman. Mr. Zapata was designated as INGALA manager in 2007.

d. University of Washington

Dr. Julian Sachs - Associate Professor, School of Oceanography, University of Washington. Dr. Sachs holds a B.Sc. and a Ph.D. from MIT. His research focuses on using chemical and biological records in sediments to reconstruct past climates and improve predictions of climate change.

Dr. Gabrielle Rocap - Assistant Professor, School of Oceanography, University of Washington. Her research focuses on the ecology and evolution of marine algae.

e. Non-Governmental Organizations

Fernando Ortiz – Conservation International. Born in Guayaquil in 1964. He is a biologist. He is a professional naturalist guide and diving instructor. He has lived in the Galapagos for 14 years and has extensive experience on land, marine and submarine guiding. He speaks English, Spanish and Italian.

Scott Henderson – Conservation International. Scott Henderson is a graduate of Oxford University (UK) where he earned an M.Sc. degree with honors in Environmental Change and Management in 1999. He obtained his undergraduate degree from Washington and Lee University in 1987 with magna cum laude honors in Biology and English Literature. Scott is a conservation practitioner with field experience as a researcher, consultant and as NGO staff primarily in Latin America, especially Ecuador, Costa Rica, Panama, Colombia and Ecuador, but has also worked in Africa, in the Seychelles, Cote d'Ivoire and Madagascar where he undertook research for his M.Sc. thesis. Scott's main areas of expertise relate to marine conservation, large project development and management and fund-raising with both private and public foundations. He lives in the Galapagos Islands with his Ecuadorian wife and presently is Conservation International's Regional Director of Marine Conservation in the Andes and Eastern Tropical Pacific regions.

Pablo Guerrero – World Wildlife Fund (WWF). Born in Guayaquil and graduated from Guayaquil University as marine biologist, he currently is WWF's Ecoregional Director. Mr. Guerrero is a former GNP Marine Resources Unit Director. He has worked as Inter-American Tropical Tuna Commission (CIAT) observer. Also has worked as CIAT Coordinator for the Dolphin/Tuna program in Ecuador.

Michelle Castro – Sea Shepherd.

Godfrey Merlen – WildAid. A permanent resident in Galápagos for 30 years. He has a vast knowledge about the Galapagos' biology, geology, climate change, and sperm whales. Has worked with the Charles Darwin Foundation, the Galápagos National Park, He works for WildAid Foundation and the social development NGO AVINA. He is a member of the Charles Darwin Foundation's General Assembly.

Carlos Zapata – FUNDAR –*Fundacion para el Desarrollo Alternativo Responsable para Galápagos*. Mr. Zapata studied Agronomy at the Zamorano Institute in Honduras. He also has an Administration master degree. He comes from a fishermen family from San Cristóbal Island. He worked for CDF, leading the development of the Galapagos quarantine and inspection system. He has wide experience on introduced species control. Mr. Zapata is currently the Director of FUNDAR, a local NGO focused on ecology, education, and citizen participation in the islands.

GALAPAGOS INFORMATION

a. Some facts about the Galápagos Islands

Population: 30,000 (2007 census data, all estimates)

-Puerto Ayora: 18,000

-Puerto Villamil: 2,000

-Puerto Baquerizo Moreno: 10,000

Estimated Illegal immigration: 3,000

Annual population growing rate: 5.82%

Fishermen: Approximately 1000 from the three inhabited islands

Fishing boats: Total 446: 122 in Isabela, 211 in San Cristobal, and 113 in Santa Cruz.

Tourism: 82 boats (local and continental Ecuador operators).

Economics:

- More than 50% of the municipal revenues come from the entrance fee collected by the GNP.
- Approximately 130,000 tourists visited the Galapagos Islands in 2007.
- Approximately \$180 million of revenue is generated from tourism in the Galapagos per year. Of this amount, \$9 million is distributed to the Galapagos National Park and local governments. Twenty to thirty percent of the total is generated by local tourism operators with the remainder going outside of the island economy.
- Scientific information has identified sustainable levels of harvest for both commercial and subsistence fishing. However, decisions are still taken which exceed sustainable levels which threaten the local economies in the islands. Local fishermen are forced to change harvest species when levels are not productive, and this threatens both the economic and ecological stability in the islands.

Species status: Approximately 50% of the Galapagos flora is in danger or threatened, but just 1% is extinct. Regarding vertebrate fauna, 90% is in danger. Galapagos has more than 1,700 native and endemic invertebrates. In addition, there are 314 introduced invertebrate species reported to date. In sum, more than 95% of Galapagos native species are being conserved. Galapagos is one of the best conserved archipelagos in the world.

Key Issues and Threats

- Governance and conflict management among stakeholders
- Migration control
- Invasive Species control
- Fishing: strategies for reducing number of artisan fishermen
- Tourism: boat safety, boat cruises vs. land based tourism, lack of control, clean practices.
- Energy: oil spill, disaster preparedness.

Illegal fishing: The Marine Reserve is threatened by illegal practices of local, mainland and foreign fisherman who target protected marine life, such as sharks for their fins and sea cucumbers out of season. There is constant pressure to allow industrial fishing in the Reserve. Drift net and long line fishing provide two serious threats to the Reserve by allowing fishermen to catch massive amounts of fish. In addition, selling shark “accidentally” caught is a lucrative business for fishermen.

Invasive species: Unique land-based species are constantly threatened by the introduction of invasive species of animals, insects and plants arriving with tourists, local trade and illegal fishing operations.

Development and human migration: Both terrestrial and marine species are threatened by development and associated problems, like pollution. The thousands of tourists who visit annually and a growing local population of over 30,000 people leave their mark on the fragile environment.

Other International Donors:

- Spanish Cooperation, through their Araucaria project is providing \$500,000 for a four-year multi-sectoral assistance program. (ends 2009)
- Japanese Cooperation provided \$5M for a five-year project on conservation and sustainable use of the marine reserve. (ends 2008)
- Global Environment Facility/United Nations Development Program (GEF/UNDP) project for \$18M to eradicate introduced species in Isabela Island. It also has education, communication, quarantine, and INGALA institutional strengthening components. (ends 2008)
- Inter-American Development Bank (IDB) project for \$13M to finance activities in the marine reserve, municipality strengthening, Charles Darwin Foundation, quarantine and control, environmental education, and institutional strengthening. (ended 2007)
- IDB grant in the amount of \$3M to finance technical assistance and training to three productive sectors in Galapagos (fishing, tourism and agriculture). (ends 2009)
- Approximately \$3.5M have recently been provided to the Charles Darwin Foundation from different sources: CDF Inc., Friends of Galapagos, Linblad Expeditions, other donors, NGOs, etc.

Police: There is an environmental police unit comprised of 15 members that works in coordination with the GNP to control and surveillance terrestrial activities.

Navy: Main offices are located in San Cristobal. There are port offices in the other inhabited islands. Navy provides support to the GNP during the patrol operations of the marine reserve. 5% of park entrance fees are provided to the Navy for their operations in Galapagos.

b. History of Galapagos

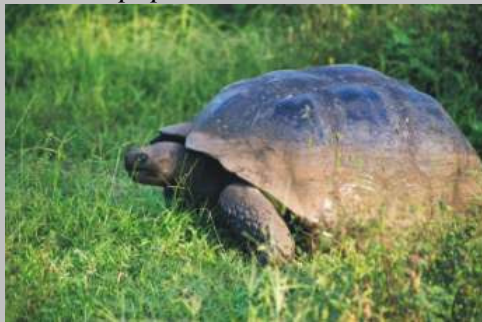
(From The Galapagos Conservation Trust, an international NGO)



Due to their inhospitable nature and lack of water, the Spanish paid the islands little attention, giving them the name 'Las Encantadas' or bewitched islands. This was due apparently to the strong currents and light winds which made them hard to find, appearing as though it was the islands, rather than the ships, that were moving. On the other hand the European sailors, pirates and buccaneers found them to be a useful hideaway, especially as they had by this time located watering places on Santiago, Floreana and San Cristobal.

The first intentional and extended visit to the islands was made in 1683 by an English buccaneer vessel, the *Batchelor's Delight*, under Captain John Cook; she numbered amongst her crew William Dampier, Lionel Wafer, Ambrose Cowley and Edward Davis, all of whom would leave us with literary records of their visit. Dampier was the first to provide us with an accurate description of the islands and their fauna and flora. In 1687, William Hacke published a Galapagos map based on Cowley's visit there in 1684. Although not very accurate, it took more than 100 years until a better version was prepared by Aaron Arrowsmith for James Colnett's book published in 1798. After the voyage of *HMS Beagle* the first truly accurate map was published by the British Admiralty based on Captain Robert FitzRoy's detailed survey of the islands. (Map to the right reproduced with permission from John Woram).

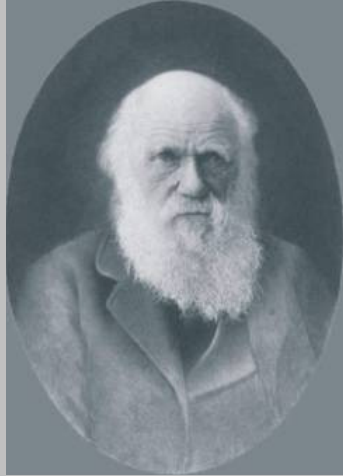
Tortoise populations decline



As demand for European goods grew, normal trade progressively replaced piracy and those few islands which had supplies of water came to be heavily used by new breeds of

seamen; the whalers and seal-hunters. Whaling was a highly profitable business in the first half of the 19th century but it caused decimation not only of the whales but also of the giant tortoises, which were used as food by the whalers owing to their ability to survive for long periods without food or water. In 1846 it was reported that none at all were left on Floreana, Santa Fe or Rabida. The killing of tortoises for their oil continued into the early years of the 20th century, by which time the populations of Pinta and Fernandina had disappeared, and those on most of the other islands were severely reduced.

Scientific expeditions



Visits to the islands were much more frequent by now and increasingly their purpose was scientific and strategic as well as commercial. A new period began in 1832 when Ecuador proclaimed its sovereignty over the islands. There were only a handful of permanent settlers at that time but their number had increased to around 300 by 1835 when the *HMS Beagle* arrived with Charles Darwin on board.

Darwin spent five weeks in the Galapagos collecting and preserving specimens from four separate islands. This started the process of enquiry which led him finally to conclusions published in *On the Origin of Species by Means of Natural Selection* in 1859. Meanwhile, the Ecuadorian colonists had grown in numbers. A series of attempts were made to exploit such crops as orchilla (dyers' moss) and sugar, but none lasted long and several ended violently. Only fishing and subsistence farming on four of the larger islands; Santa Cruz, San Cristobal, Isabela, and Floreana was able to sustain people for long. This resulted in the population growing very slowly so that by 1955 it was only some 1500. In 2006 there were 19184 permanent residents in the populated areas of the archipelago.

While some scientific work, mainly the collection of specimens, had been going on since Darwin's visit, the first expedition that made a serious attempt to catalogue the flora and fauna of the islands was the expedition of the Californian Academy of Science in 1905/06 under the leadership of Rollo Beck, aboard the schooner *Academy*. It is from this expedition that we first learnt of the truly remarkable nature of the islands. In 1923 and 1925, William Beebe led two expeditions for the New York Zoological Society and wrote

two books on the islands, *'Galapagos, Worlds End'* (1924) and *'The Arcturus Adventure'* (1926) which provide us with fascinating and eminently readable accounts of the islands by a trained observer.

European settlers arrive

With the construction of the Panama Canal in 1914 the Galapagos Islands became much more accessible. Following the First World War, a number of European settlers arrived in the islands; firstly there was a group of Norwegians who set up a fish canning factory on Floreana. When this failed a number of them either stayed on or returned later and settled on Santa Cruz. A number of German settlers also arrived in the 1930's - the Wittmers on Floreana and the Angermeyers on Santa Cruz established themselves permanently and their descendants remain a part of the social fabric of the islands. However the best known or most notorious were two 'couples' who settled on Floreana. Friedrich Ritter, a dentist, and his partner Dore Strauch arrived in 1929, and the 'Baroness' Eloise Wagner-Bousquet who arrived with her two lovers in 1933. Of these five people, three died mysteriously on Floreana, one died as a castaway on Marchena and only Dore Strauch returned to Germany alive.

Baltra air force base

With the outbreak of the Second World War and the joining in of the USA after Pearl Harbour in 1942, the Galapagos gained strategic importance to maintain control of the sea lanes to Panama and so the USA received permission from the Ecuadorian government to construct an air force base on the island of Baltra, just north of Santa Cruz. When the Americans withdrew after the war, all of the island residents were allowed to remove one of the many wooden buildings from the base, and for the next 40 years or so these clapboard houses were visible on all the inhabited islands. With Ecuadorian sovereignty reestablished, having declined a US purchase offer, the site now serves as the main airport for the archipelago. In 1968 one of the two runways was resurfaced and regular flights from continental Ecuador began, originally on a fortnightly basis serving the first regular tourist vessel, the *Golden Cachalot*, and then in 1969 on a twice weekly basis when the larger *Lina A* came into operation. Today there are 3 or more flights each day to both Baltra and the new airport on San Cristobal.

The rise of fishing, farming and tourism

In the post-war era the population grew slowly with a number of other European and North American settlers arriving, as well as larger numbers of Ecuadorians who came out to fish and farm. At that time the economy was largely based on fishing for 'bacalao', a rock bass salted and dried, then shipped to the mainland as a traditional Easter food. In the 1960s a spiny lobster fishery was added, with the frozen catch exported. Other inhabitants lived on subsistence farming with some exports of coffee, and later, cattle. The arrival of tourism in the late 1960s and early 1970s brought people and economic prosperity. As the industry burgeoned in the 1980s and '90s, and as new fisheries were developed, the population grew rapidly, so that by the turn of the century it had risen to

some 20,000. In 1975 the islands were declared a province of Ecuador which had the effect of bringing mainland politics out to the islands, something that has had a mixed impact on the conservation of the islands.

Conservation is born



The islands had already been declared a National Park in 1937, but at the time nothing was done to implement that decision or to protect the fauna and flora. However, a visit in 1957 by Drs. Robert Bowman and Irenaus Eibl-Eibesfeldt, under the sponsorship of the UNESCO, resulted in the establishment in 1959 of the Charles Darwin Foundation (CDF) with a mission to preserve the remarkable flora and fauna of the islands. The Charles Darwin Research Station (CDRS) was established on Santa Cruz in 1960 to provide the knowledge and information that are so essential to the conservation of the islands ecosystems. In 1964, the Californian Academy of Science sent the largest ever expedition to Galapagos, resulting in a large number of scientific papers, as well as the first flora of the islands, which expanded our knowledge of their natural history and started the 'modern era' of scientific and conservation research in the islands. In 1968 the Ecuadorian Government established the Galapagos National Park Service (GNPS) which gradually took over the hands on conservation role that the CDRS had initiated in the early 1960s.

World Heritage Sites

In 1978 the Galapagos were designated as the first World Heritage site, and when the Galapagos Marine Reserve was established in 1998, that too was designated a World Heritage Site. They are a Biosphere Reserve, a Whale Sanctuary, a RAMSAR site and they have recently been designated as one of only two Particularly Sensitive Sea Areas (PSSA) by the International Maritime Authority. In Fernandina they possess the largest 'near pristine' island in the world.

On the 26 June, 2007 the World Heritage Committee inscribed Galapagos on UNESCO's List of World Heritage Sites in Danger, with a view to mobilising support for their conservation.

The future of Galapagos

Today the islands boast the highest standard of living of any province in Ecuador but, with a rapidly growing population, conflicts have inevitably arisen between the population needs and the fragile Galapagos ecosystem. The pressures on the archipelago's

natural resources threaten their biodiversity and ecological integrity, as well as the sustainability of the natural resources upon which the livelihoods of the islanders depend. As the population grows, these pressures are likely to increase rather than decrease. More than ever there is a need for all involved to work together to influence decision makers, in order to preserve these unique and beautiful islands for all their inhabitants and for the world.

c. USAID Assistance to the Galapagos Islands

Key Accomplishments.

- Galapagos Special Law passed on March, 1998, and Creation of the Galapagos Marine Reserve
- Implementation of a participatory governance system for the marine reserve
- Marine Reserve management plan developed in 1999
- Zoning of the marine reserve in 2000
- Galapagos marine reserve declared as World Patrimony Site in 2001
- Fishing and Tourism regulations enacted in 2002
- Isabela Island's wetlands declared as RAMSAR site on 2002
- Support for the shark protection campaign
- Purchased of a patrol plane and over-hauled the primary GNP patrol vessel
- New Galapagos National Park Management Plan approved in 2005
- Jointly with other donors, supported the Ministry of Environment to develop the selection criteria for the Director of the Galapagos National Park
- NOAA provided technical assistance to install mooring buoys in the marine reserve.
- NOAA trained GNP staff on Hazardous Spill Response and Habitat Restoration.
- Creation of a migration control system for visitors to register and purchase the in-transit-control card at Guayaquil and Quito airports. This provides authorities a precise picture of how many visitors enter and leave the islands.
- Eradication of invasive Nile perch from the largest lake in Galapagos (El Junco, San Cristobol) in 2008.
- Technical assistance and training for the Municipality of Santa Cruz for Trafficking in Persons, Tourism Planning, Health Care, and Land-Use Planning.
- **Current activities** focus on development of Galapagos Tourism Concessions to replace the corrupt and confusing "patent" system in place now.

Since 1994, USAID has invested approximately **\$11 million** in the Galapagos, including approximately \$3.1 million channeled through the Charles Darwin Foundation.

The following research work was performed by Conservation International, a frequent partner of USAID/USG conservation efforts.

Shellshock

Mar 27, 2008; From *The Economist* print edition

The Galapagos Islands show the mixed blessings of greenery

TOURISM has a long history in the Galapagos Islands. An early visitor was Charles Darwin nearly 175 years ago, on a trip that inspired his theory of evolution by natural selection. A lot has changed over the years. Visitors are now central to the future of the isolated archipelago. Income is needed to raise standards of living and create incentives for local people to conserve the fragile natural environment.

Edward Taylor, an economist at University of California, Davis, and colleagues report on ecotourism and economic growth on the islands in a forthcoming paper in *Environment and Development Economics*. They say the conservation strategy of relying on income growth in the islands has failed owing to uncontrolled migration from mainland Ecuador.

Between 1999 and 2005, GDP increased by an estimated 78%, from a base of \$41m—giving the archipelago an annual growth rate of around 10% and making it one of the world's fastest-growing economies. Tourism provided 68% of this growth. Despite this, average income per head rose by only 1.8% annually. This is because Ecuador's economy collapsed in 1999 and large numbers of migrants sought opportunities elsewhere. Because of migration, the islands' population rose by 60%.

More people have put increased strain on the islands' water supply, sewerage and waste disposal, not to mention its fragile wildlife. Exploitation of fish from the marine reserve is increasingly intense and there is plenty of antagonism between fishermen and conservationists; the fishing fleet doubled during the study and illegal catches are common. However, fishing is a relatively minor contributor to GDP. Just under 4% of the recent growth can be attributed to sales of fish.

Even the conservationists and scientists are making things worse—they, too, are an important source of GDP growth. Although their spending is focused on environmental protection, it also injects millions of dollars into the economy each year, further stimulating migration.

The authors say that the slow growth in GDP per head creates even more political pressure to explore development options for the economy, whether through commercial fishing in the nature reserve, or additional numbers of tourists.

Visitors to the islands who hope to help the Galapagos may want to bear in mind that every \$3,000 more the islands earn—every three extra visitors, in other words—sucks in another migrant. Not very eco-friendly.

Galapagos islands get tough on invasive species

The Galapagos make up one of the world's most ecologically intact and diverse oceanic archipelagos. As much as 95 percent of the islands' original species composition remains, compared to extinction rates of over 50 percent in many other archipelagos. This is attributed largely to the late arrival of humans and the fact that in 1959, 97 percent of the islands' land area was set aside as a National Park by the government. However, the islands' biodiversity still faces pressures.

The most significant current threats to the islands' biodiversity stem from the introduction and spread of alien invasive species, that out-compete, prey on, or smother native fauna and flora. Many alien invasive species have been introduced in the past 30 years, corresponding with the growth of the human population, now estimated at over 20,000, and visitor numbers (some 120,000 per year). Controlling the spiraling bio-invasion requires mainstreaming invasive species management into the main production sectors – trade, tourism and agriculture – that drive their introduction and propagation. This measure also protects the nature-based tourism that provides the Galapagos with its principal livelihood (77 percent of income, and 61.3 percent of jobs). Complementary action includes reducing and, where feasible and cost-effective, eradicating populations of key invasive species to make future prevention and control more feasible and sustainable.

Project description

The project is working with a number of Galapagos institutions, municipalities and the general public to prevent the introduction of new invasive species and control the propagation and growth of existing populations. It is working to overcome a number of barriers that hamper prevention and control including barriers at the systemic level, such as sectoral policies that do not address invasive species control. At the institutional level, the project works to strengthen quarantine and inspection procedures and, at the individual level, to build capacity among stakeholders. A cross-cutting issue for the project is to secure long-term funding to maintain prevention and control at sufficiently high levels. This is critical, as the threat posed by bio-invasion is a permanent one.

Project results

Systemic level

- The project has helped introduce policy and regulatory instruments that provide stricter control over species introductions. There is now a legal requirement for all arriving organic material cargos, passengers and luggage to be inspected. A list of restricted or forbidden imports has been approved and manuals detailing 28 inspection procedures have been produced. Regulations for the disinfection of arriving commercial airplanes and some ships have been approved, and are enforced by trained inspectors.
- An invasive species control strategy for the agricultural and livestock sector is in the final stage of approval and a similar proposal for the tourist sector is being advanced. The INGALA Council – the main governing body for regional development planning – approved a Total Control Plan (TCP) in 2007.

Systemic level

The project has helped strengthen local and national institutions and increase community involvement in further improving inspection and quarantine systems. The quarantine system is now estimated to be 95 percent effective for air transport and 60 percent for marine, compared to five percent for both services at the start of the project. Around 80 percent of inspectors have been trained and 80 percent of the system is judged to be operating according to international standards. Institutional Committees of Invasive Species Management have been set up in the three inhabited islands and are fully operational in two. A system to coordinate regional planning on invasive species control measures between INGALA and the national, regional, and local levels has been created. Public participation now forms an integral part of the fight and includes local regulations for pets, increased awareness of the problem and pilot community monitoring programmes to help early detection.

Institutional and individual capacity

Individual and institutional capacity building for eradication and control of existing species has helped bring several key aggressive invasive species under control. They include goats, cats, donkeys, feral pigs and dogs, black rats, ants, Rock Pigeons; fire ants and two species of blackberry. The successful eradication of feral goats on Isabela island, which makes up half of the archipelago's land mass, was the world's largest programme of its type. National capacity has been raised so that the Galapagos National Park service is able to implement the eradication methods developed by the project without outside assistance and complement its mainstreaming work for prevention of new introductions.

Financial sustainability

An endowment fund – the Fund for the Control of Invasive Species in the Galapagos Archipelago – has been established to ensure that the recurrent costs of bio-invasion control can be met after GEF funding ends. All the legal instruments to operate the fund are ready and its design and structure has undergone external evaluation. The fund has already received \$ 1 million from the Ecuadorian government and another \$ 2.19 million through the UNESCO World Heritage Center, with support from UN Foundation and Conservation International. In March 2008 the Galapagos National Park committed \$ 1 million and a further commitment is expected from the Ecuadorian government in addition to the GEF contribution of \$ 5million.

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