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Ecosystem Restoration

Galapagos Conservancy’s Ecosystem Restoration Program seeks to rebuild healthy ecosystems in Galapagos, allowing plant and animal communities to return as close to their pre-human condition as possible. Fundamental to this effort is the identification of significant changes that were caused by human activities and/or the introduced species that arrived with humans, and the development of methods to reverse or control those changes.

**PROJECT 1:**  
Restoring Giant Tortoise Populations  
**PARTNERS:** Galapagos National Park Directorate, Charles Darwin Foundation, and international scientists  
**STATUS:** Several projects developed at 2012 planning workshop (funded by Galapagos Conservancy) are now underway. Additional funding for the next 2-5 years is being identified.

Since the early 1960s, the Galapagos National Park Directorate (GNPD), the Charles Darwin Foundation (CDF), and international scientists have made tremendous strides to address the declining number of giant tortoise populations in Galapagos. Successes of the tortoise breeding and invasive species eradication programs include restoring more than 600 tortoises to Pinzón Island and nearly 2,000 tortoises to Española Island; the removal of feral goats—a major threat to tortoise populations—from Pinta Island, Santiago Island, and the northern portion of Isabela Island; and the release of 39 sterilized tortoises on Pinta to serve as “environmental engineers” 38 years after Lonesome George was removed from the island. Recent advances in the eradication of introduced mammals, the expanded use of genetic research, and our understanding of how tortoises use the landscape have created opportunities that would have been impossible to imagine even a few decades ago.

Galapagos Conservancy’s Giant Tortoise Restoration Initiative is a collaborative effort involving the GNPD and an international team of giant tortoise experts. The long-term goals of the initiative are to fully recover the tortoise population on Pinta and Floreana through selective breeding. This project will also strengthen the genetic lineage of the original Wolf Volcano population through removal of non-Wolf tortoises and return tortoises to the island of Santa Fe where they will act as environmental engineers and help recover the islands’ landscape. An important component of this restoration work will include conducting population surveys and extensive genetic sampling to potentially uncover new lineages and possibly new species in southern Isabela, San Cristóbal, and Santiago islands. Determining the role of tortoise-plant interactions as they relate to restoration of islands and their giant tortoise populations will form part of the project, as well as work on refining and improving the captive rearing programs for tortoises. Equally important as tortoise rearing is tortoise protection; the project will include an international workshop to develop and implement effective strategies for reducing tortoise poaching.

**PROJECT 2:**  
Protecting Threatened Land Birds of Galapagos  
**PARTNERS:** Galapagos National Park Directorate, Charles Darwin Foundation  
**STATUS:** Funding being identified.

For more than a decade, several land bird populations have been in decline primarily on Galapagos’ human-inhabited islands. The mangrove finch (Isabela), the Floreana mockingbird (now only found on two satellite islands by Floreana), and the medium tree finch are all critically endangered. Researchers have been studying the first two species and exploring possible roads to recovery. Studies of the medium tree finch and other species, such as vermilion flycatchers, are crucial if we are to prevent what could be the first extinction of a bird species in Galapagos since humans discovered the islands. Studies will focus on the four inhabited islands – Santa Cruz, San Cristóbal, Isabela, and Floreana and will include the development of new management techniques and methodologies to ensure the survival of the remaining land bird populations.

Previous ecosystem restoration has primarily targeted uninhabited islands. As development continues in Galapagos, the inhabited islands (especially Santa Cruz) are being transformed by increasing networks of roads and other infrastructure in the highlands. The impact of these changes should be studied to provide recommendations to reduce the
resulting damage to native landscapes. Road mortality is having a major impact on songbird populations, including Darwin’s finches. Simple habitat management actions could significantly reduce road deaths if properly guided by research. This work will also have an education/participation component. A significant advantage of funding research on inhabited islands is that local residents can see the work in process, become directly involved, and better understand the implications of conservation not just for their home island but for all of Galapagos.

**PROJECT 3:**
**Increasing the Galapagos Penguin Population through the Use of Artificial Nests**
**PARTNERS:** University of Washington
**STATUS:** Funded in 2013 and currently being implemented.

The rarest and most endangered penguin in the world is the Galapagos penguin. One of the reasons for this is that there are limited options for nest sites. To increase the population, we will provide high-quality, shady nest sites on three major islands (Isabela, Fernandina, and Bartolomé) where penguins currently breed. These nests are monitored 2-3 times per year to determine if artificial nest sites do, in fact, increase reproduction and reproductive success when food is available. The long-term goal is to reverse the decline of the Galapagos penguin population and to strengthen the population so that it can better withstand the impacts of more frequent and intense climate fluctuations caused by El Niño events.

**PROJECT 4:**
**Citizens as Scientists: The Power of Observation in Natural Resource Management**
**PARTNERS:** Galapagos National Park Directorate, Charles Darwin Foundation
**STATUS:** Under review, identifying funding.

The Galapagos Islands require, but currently lack, an integrated system for tracking the “vital signs” of this globally significant ecosystem. A continual, reliable flow of monitoring information would help the institutions charged with protecting Galapagos to adopt management practices to match their needs. Monitoring activities can provide the information required to distinguish between human impacts and natural changes and, thereby, guide conservation management and policy. An ongoing project that illustrates the critical role that monitoring data can play in the adaptive management “loop” for Galapagos is the large-scale removal of introduced hoofed mammals such as goats. An investment in pre- and post-removal monitoring to guide the program execution has been important to the success of this project. Understanding and recording the baseline status (population density, presence and absence of species, etc.) allows us to use monitoring to understand whether we have achieved the desired outcomes. We now need to expand the use of monitoring from managing specific projects well to managing the entire archipelago. The concept is the same, but the scale and complexity of the problems are much larger.

Galapagos Conservancy’s *Vital Signs Monitoring Project* (2014-2024) seeks to develop the first systematic and archipelago-wide program for monitoring the health of the Galapagos ecosystem. Galapagos Conservancy chose the phrase “vital signs” for its initiative because it is the name of the ecological monitoring program of the United States National Park Service (USNPS). The USNPS realized a decade ago that it was facing major obstacles in effectively managing resources because it lacked a systematic monitoring program. A decade later the program is functioning well. The many lessons learned from implementation of the USNPS program could be readily applied in the context of Galapagos.

Participatory monitoring, also sometimes referred to as “citizen science,” involves members of the public as active partners in scientific research, often generating data to inform conservation management and decision-making. Although citizen science is currently used in many areas of the world with impressive results, it has yet to gain widespread use in the Galapagos Islands where it could be extremely valuable in creating a link among scientific research, management, and social-ecological sustainability. Specifically, the islands provide the opportunity to develop citizen science with both the local community (more than 25,000 permanent residents) and the community of tourists who visit the archipelago (currently more than 170,000 per year). In addition to generating vast amounts of well-distributed observations over large areas that could be useful to evaluate management and answer scientific questions, many of the greatest benefits of a participatory monitoring program...
are the experiences of the participants themselves. Participants learn about the environment, become familiar with research methods and project design, and experience firsthand how information contributes to decision and/or policy-making. Citizens gain a sense of ownership of the environment while expanding a collective sense of stewardship. Residents will have access to greater knowledge about the islands, which should translate into increased understanding and greater support for conservation and the development of sustainable local communities.

**PROJECT 5:**
**Digital Eye on Galapagos: Unmanned Aerial Vehicles for Monitoring and Management**

**PARTNERS:** Galapagos National Park Directorate

**STATUS:** Funded in 2013 and ongoing.

Three Unmanned Aerial Vehicles (UAVs – autonomous helicopters with GPS guidance systems) will be designed and built for use as monitoring tools in Galapagos. Each UAV will be equipped with a high resolution “still” camera. For each monitoring run, the helicopter autopilot will be programmed to take high-resolution (12 megapixel) aerial images from a low height (less than 50 m) at pre-determined sampling points. High quality imagery will be collected with specified GPS points and altitudes. The resulting imagery will be compiled as a seamless mosaic and made available to the Galapagos National Park Directorate as both raw imagery and also modified to be viewable and measurable on Google Earth. Pilot tests to determine the utility of the imagery for ecological monitoring will be undertaken on North and South Plaza and other designated islands. After initial experimentation with the UAVs for monitoring, a plan will be developed for expanding use of UAV technology for monitoring ecological change in Galapagos and inviting the public to help analyze the imagery. Galapagos National Park Directorate personnel will be trained in UAV maintenance, flight planning, image processing, and analysis.

**PROJECT 6:**
**Fighting Invasive Parasites to Save Galapagos’ Most Endangered Birds**

**PARTNERS:** Galapagos National Park Directorate, State University of New York College of Environmental Science and Forestry (SUNY-ESF)

**STATUS:** Funded in 2012 to be completed by 2014.

*Philornis downsi*, first discovered in Galapagos in 1997, is a blood-feeding, parasitic fly that was accidentally introduced and is causing substantial levels of mortality in several species of endemic birds, including the critically endangered medium tree finch, mangrove finch, and Floreana mockingbird. Nesting mortality is caused by blood loss. The presence of *Philornis* in a nest often causes 100% mortality of nestlings. The proposed research seeks to identify chemical attractants that can serve as a cornerstone of a future pest management effort. Insect chemical attractants may be food odors or pheromones, and combinations of them can be used to monitor pest populations or to suppress populations through a variety of strategies that are well established in agricultural and forestry pest management.

The study will use established methods of field observation, trapping, chemical sampling, and analysis to identify the most effective combination of chemical attractants for *Philornis*. Potential, specific uses of chemical attractants against *Philornis* include population monitoring, detection, mass trapping, and mating disruption. Any or all of these may be combined with other pest management strategies such as the sterile insect technique to enhance efforts to reduce or eliminate nestling mortality.

**PROJECT 7:**
**Research and Management of Invasive Insects**

**PARTNERS:** Galapagos National Park Directorate, Galapagos Biosecurity Agency, Dr. Charlotte Causton, Charles Darwin Foundation

**STATUS:** Funded in 2012 and ongoing.

Invasive invertebrates can have serious impacts on human health and the native flora and fauna of Galapagos. It is critical to continue efforts to control and/or eradicate these species. First and foremost is the battle against the introduced parasitic fly, *Philornis downsi*, which includes the coordination of research of collaborating scientists, continued research on control techniques, and the toxicological effects of pesticides on birds.

Other introduced species of concern — where coordination of research and management are needed — include the blackfly, the giant African land snail, the Mediterranean fruit fly, and the four introduced ant species (the little fire ant, the tropical fire ant, the Singapore ant, and the big-headed ant). All of these insects seriously impact native plants and insects, affect domestic food crops, and pose, in some cases, a human

*Sean Burnett (Wildlife Intel) and Washington Tapia (GNPD) test one of the UAVs to be used for monitoring Galapagos’ most hard-to-reach areas.*

Photo by Galapagos Conservancy’s partner scientist, James Gibbs of SUNY-ESF.
health risk. Much of the work is coordinated with the land
bird research and recovery project and also intersects current
efforts to control other invasives in agricultural zones, such as
blackberry control efforts.

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**SUSTAINABLE SOCIETY**

Long-term protection of Galapagos requires an economic
system that is compatible with biodiversity conservation,
an educational system that readies citizens to be productive
members of the local economy, and a strong civil society
dedicated to and engaged in Galapagos conservation.

With this in mind, we are working with a variety of local
stakeholders to support educational reform with a focus
on establishing examples of best practices in Galapagos
classrooms and professional development for Galapagos
teachers and administrators. We have supported local
municipalities in building recycling programs, alternative
transportation, and other environmental management
strategies. We have also supported a variety of local programs
that foster a greater involvement of people in their local
government through regular town hall meetings, citizen
science, and community action groups.

**PROJECT 1:**

**Strengthening the Tomás de Berlanga School as a Model
of Environment-focused Education and Teacher Training**

**PARTNERS:** Scalesia Foundation (Galapagos), Stanford
University School of Education, and independent educators

**STATUS:** Implemented certain activities; identifying
additional funding.

In 1994, the Scalesia Foundation established the Tomás de
Berlanga School as a model of best practices in education for
sustainable development. This is a private school that charges
tuition and fees. A donor-funded scholarship program helps
make this education available to students with financial need.
The school's educational system seeks to provide students with
a deep understanding of and appreciation for the environment
and to help them to develop the tools they need to be part of
the unique social and economic structure of Galapagos. The
school aspires to serve as an example for other schools and
as a teacher training ground for Galapagos. The school's new
directors are educators with decades of experience including
the consolidation of a similar model school and building an
education outreach initiative that trains teachers at 10 schools
in rural Honduras. The school has the potential to serve not
only its current 180 students, but also to play this broader role
in education reform across the islands.

Project goals include: 1) increase access to this education
opportunity for students with financial need; 2) strengthen
the academic and financial viability of the school by ensuring
the critical mass of students needed to provide a cost-effective,
quality education; 3) improve teaching skills of educators at the
school and other schools in the town of Puerto Ayora, and 4)
support innovative, hands-on learning of science at
the school.

**PROJECT 2:**

**Expanding Best Educational Practices Throughout
Galapagos**

**PARTNERS:** Scalesia Foundation (Galapagos), Ecuador’s
Ministry of Education, Stanford University School of
Education, University of North Carolina (Chapel Hill), and
independent educators

**STATUS:** Implementing certain activities; identifying
additional funding.

Building on our work with the Tomás de Berlanga School, we
have begun to collaborate with a broad network of partners in
the United States and Ecuador on an initiative that will share
the best practices implemented at the Tomás de Berlanga
School with public schools throughout Galapagos. We will
also develop formative extracurricular activities such as citizen science, leadership and entrepreneurship development, and environmental awareness-building that will reinforce what is learned in the classroom. Parents, teachers, business leaders, and representatives of the Ecuadorian Ministry of Education believe there is a need for a local voice for education in Galapagos — an organization that can speak to the specific educational needs in the islands and support public and private efforts to improve both formal and non-formal education. To fill this need, we are seeking 3-years of start-up funding to: finance the Executive Director of the Galapagos-based Scalesia Foundation to broaden the Foundation’s education-related activities well beyond the Tomás de Berlanga School; and launch an archipelago-wide teacher training and mentoring program. Trainers and mentors will be recruited from mainland Ecuador and the United States.

This project asserts that the quality of education will improve when stakeholders perceive tangible benefits from their educational investment. Tangible benefits range from the confidence gained from learning habits associated with sustainable living to sustainable business plan start-ups. The three principal goals of this project are: 1) to improve communication among youth, teachers, families, and international volunteers/tourists, especially in English; 2) to raise consciousness of the importance of Galapagos and awareness of social problems, and 3) to begin small community action projects that promote sustainable living habits. The project works both within and outside the school system to facilitate positive change in line with the current national education reform regulations that seek to help Galapagos education methods better respond to the unique reality of the islands. The project team facilitators encourage teachers and other leaders to improve existing English instruction and build multidisciplinary content into current student government structures, as well as build upon existing extracurricular cultural interchange programs, such as training creative camp counselors and building a youth leadership club.

**PROJECT 3:**

**Youth Leadership Development in San Cristóbal**

**PARTNERS:** Governing Council of Galapagos, Hacienda Tranquila S.A. (local educational ecotourism company)

**STATUS:** Originally funded in 2012, ongoing.

All ecosystems possess limits at which populations are unsustainable. With humans increasingly outmaneuvering these limits around the globe, the Galapagos Islands serve not only as a natural laboratory for evolution, but also as a social laboratory for research and programing to prevent the human population from reaching its carrying capacity and exerting irreversible damage on endemic biodiversity. Sustainability in Galapagos means populations living within their means and lessening impact not only on the 3% of private land hosting splintered communities, but also on the 97% of the land mass protected as national parkland.

On Floreana, the project included a vision document developed during multiple workshops on the island with the residents and technical staff. A technical code document accompanied this material, setting the policy, structure, and rules for developing the urban areas of the island. The Floreana project formed the basis for the work on subsequent urban codes and master plans, one of which is the work in the Santa Cruz highlands.
The Santa Cruz work also resulted in a vision document which detailed both an island-wide vision and a guide for developing the rural highlands in a sustainable manner. Like the work in Floreana, the Santa Cruz project included a technical policy and zoning structure document for use by municipal planners.

**PROJECT 5:**
*Monitoring Invasive Species in Cargo Ships and the Agricultural Zone to Improve Quarantine and Control Efforts*

**PARTNERS:** Galapagos Biosecurity Agency, Galapagos National Park Directorate, Ecuadorian Navy, Godfrey Merlen (independent researcher)

**STATUS:** Funded in 2013 and currently being implemented.

Invasive species are the greatest threat to the terrestrial ecosystem of Galapagos and can also have detrimental impacts on both agriculture and human health. While the current quarantine system has helped to decrease the number of species arriving to Galapagos, there is insufficient knowledge of the present rate of arrival on cargo ships and the risk these species present to biodiversity and human health. There is also a lack of sufficient monitoring for invasive species in the agricultural zone to detect new arrivals. In order to improve management actions and shipping systems, it is essential to understand the extent of the problem and to test the efficiency of the current regulations. Monitoring of cargo ships is a vital component of preventing the future arrival of new species to Galapagos. Results of this monitoring will be incorporated into the existing control and surveillance system, highlighting weak points in that system and providing practical solutions to any detected problems. The development of a monitoring system to detect invasive species in the agricultural zone is also critical. Galapagos Conservancy is supporting the first year of this effort. In 2014, the work will be included in the annual work plan of the Biosecurity Agency for Galapagos, establishing an effective system to be implemented in perpetuity.

**PROJECT 7:**
*Strengthening Local Non-profits: Capacity Building at FUNDAR-Galapagos*

**PARTNERS:** FUNDAR-Galapagos

**STATUS:** Funded in 2011, currently being implemented.

Effective decision-making and the development of project implementation skills is one of the crucial challenges both for the public and private sectors in Galapagos. The Foundation for Responsible Alternative Development in Galapagos, FUNDAR-Galapagos, is a leading local NGO which has focused on social science and citizen engagement in local and national decision-making.

As the only organization in Galapagos with this particular focus, FUNDAR quickly underwent significant growth with an increase in personnel, budget, and new management processes. In recognition of the importance of this organization and its work, FUNDAR’s Pajaro Brujo Reserve, named after the vermilion flycatcher, is a model of sustainability in the Galapagos Islands. It is a space for exploration and learning about how to live sustainably in Galapagos.

*Photo by Galapagos Conservancy member, Michael Perlmutter.*
unique role in Galapagos, Galapagos Conservancy supported a strategic planning and institutional re-engineering exercise, and provided staff to support this process. Strengthening FUNDAR’s organization as well as its financial and accounting capacity is a critical investment for the future of that organization and one that will generate positive social and conservation outcomes.

**PROJECT 8:**

**Improving the Visitor Experience at the Galapagos National Park**

**PARTNERS:** Galapagos National Park Directorate, Ministry of the Environment

**STATUS:** Funded in 2012, currently being implemented.

The Galapagos National Park Directorate is planning a complete overhaul of the visitor experience at the facilities on Santa Cruz, including the exhibit center, the walking paths, and the tortoise breeding and rearing center. This area receives approximately 9,000-12,000 visitors per month. The current visitor facilities are antiquated and ineffective in telling the conservation research and management story. A new design for the visitor experience, including a physical design for the visitor areas and more modern displays are needed. Improving these facilities can open up the potential for education and financial opportunities to support the conservation of the Galapagos Islands. An initial workshop was held in June 2013 to discuss the development of a comprehensive design for the visitor facilities, in order to create the best possible experience for international, national, and local visitors.

A component of the new visitor experience will be the chance to view Lonesome George, the last known Pinta Island tortoise. After his death in June 2012, Galapagos Conservancy provided the necessary funding to ensure that he received the highest level of taxidermy possible. Lonesome George was transported to the American Museum of Natural History in New York and is currently undergoing taxidermy by renowned taxidermist, George Dante from Wildlife Preservations in New Jersey. When the work is completed, Lonesome George will be on display for a brief period in New York and then will travel back to Ecuador where he will be a key component of the conservation story in the new visitor facilities.

**PROJECT 9:**

**Bringing Galapagos to You: Tortoise Webcams to Engage and Inform**

**PARTNERS:** Galapagos National Park Directorate

**STATUS:** Funded in 2013, ongoing.

Web cameras are fast becoming a standard tool to engage the broad public in species protection and awareness. With start-up funding from Dr. Jim Gallagher of New Jersey, one of Galapagos Conservancy’s loyal donors, a series of four “tortoise-cams” and supporting web and application delivery systems were installed at the tortoise breeding pens at the Galapagos National Park Directorate campus on Santa Cruz. Due to the inconsistent and unreliable internet connectivity to the islands, the cameras have been programmed to detect and record footage only when there is movement in the frame. With the webcams running continuously, uploads are sent daily to a remote server and then combined into one continuous streaming video that shows the highlights from all four cameras from the previous day. Footage is streamed on www.galapagos.org, where an interactive component allows interested observers to “chat” and comment on the footage. With the successful launch of these webcams, and overcoming the various technological hurdles that come
with working in such an isolated place as the Galapagos Islands, we anticipate using more of these integrated systems to engage visitors and residents in the daily conservation efforts in Galapagos.

**EMERGING ISSUES**

Conditions in Galapagos are continually changing, influenced by both natural events as well as mounting human-caused pressures. In response to this, Galapagos Conservancy has launched its Emerging Issues Program to identify and initiate discussion and evaluation of new impacts or trends that are compromising the conservation of Galapagos. The program also invests funds in research and management to respond to the identified issues, helping to provide focus on new or potential problem areas before their impact becomes extensive and/or irreversible.

**PROJECT 1:**
Population Monitoring of Blue-footed Boobies in Galapagos: Evaluation of Indications of Population Decline

**PARTNERS:** Wake Forest University, Galapagos National Park Directorate

**STATUS:** Funded in 2011, ongoing.

Blue-footed boobies are an iconic Galapagos species, well-studied in some respects, but we lack information about their population size and trends. Related information gaps include dispersal biology, foraging characteristics, and sex ratios. To evaluate recent concerns that the population is declining and experiencing unsustainable reproductive failure, scientists carried out a multi-year project monitoring blue-footed boobies. Methods included: 1) tagging and re-sighting colonies throughout the archipelago to estimate sizes of the breeding and non-breeding components of the population, sex ratio, and annual adult survival; 2) monitoring reproductive success at major colonies at four-month intervals, and 3) using bird-mounted GPS units and diet samples to evaluate dependence on sardines, and the effect of this preference on bird behavior.

This research showed significant population decline, with traditional breeding sites largely empty and few young surviving. Apparently linked to a scarcity of herring and sardine, no longer abundant in Galapagos waters, the ultimate cause is still being analyzed. We are arming Galapagos National Park officials with the best available data to develop management scenarios for this iconic sea bird.

**PROJECT 2:**
Biennial Symposium on Emerging Issues

**PARTNERS:** Government of Ecuador institutions, universities and academic institutions, individual researchers, local decision makers, conservation organizations, and other NGOs

**STATUS:** Identifying funding.

In 2014, Galapagos Conservancy plans to initiate a biennial symposium that will bring together experts from Galapagos and around the world to identify and discuss new and emerging issues within or directly affecting the archipelago, which if not addressed through research and/or management may have negative long-term effects on the future conservation of Galapagos. Within a symposium setting, long-term Galapagos stakeholders (governmental institutions, non-governmental organizations, naturalist guides, representatives of the education, tourism, and business sectors, municipal leaders, scientists, concerned citizens, elders, and others) will meet with a handful of external experts in island conservation, management, and sustainability. Fields of knowledge may change year to year but include: various science disciplines, tourism, education, government, socioeconomics, urban planning, process facilitation, and natural resource management. Each workshop will result in a publication with new priority projects defined and potentially developed.

**PROJECT 3:**
Climate Change and Its Potential Impacts in Galapagos

**PARTNERS:** Galapagos National Park Directorate, Charles Darwin Foundation, SUNY-ESF

**STATUS:** Identifying funding.

Galapagos Conservancy is initiating a one-year, “expert-in-residence” project to generate a sound scientific basis for understanding likely climate change scenarios and their ecological consequences in Galapagos. While ecological in focus, these outcomes will inform policy-making on adaptation strategies for social and economic systems in the archipelago. This information is urgently needed by decision-makers in all...
sectors of Galapagos, from natural resource managers to those responsible for human welfare. While Galapagos organisms are renowned for their particular adaptations, the rate of impending climate change could be more rapid than has been observed in many thousands of years and the native and endemic plants and animals may not be able to adapt quickly enough. The “expert-in-residence” will evaluate climate change implications for Galapagos, “down-scaling” general circulation models to the scale for the Eastern Tropical Pacific within which Galapagos lies. Based on this they should be able to evaluate which climate change scenario(s), including increasing El Niño Southern Oscillation (ENSO) frequency and/or collapse of the ENSO phenomenon, are most realistic for Galapagos. Once satellite data are cross-validated with local climate data, direct linkages can be made between global-scale climate change predictions and on-the-ground ecological processes in Galapagos.

The project will also include the creation of a network of climate monitoring stations spread throughout the archipelago to generate sufficient data to enable understanding of climate variability in Galapagos. This work may include a citizen science component in which participating members of the public (school children, farmers, home owners) can contribute data from the inhabited islands and others (cruise ship crews, guides, tourists) can provide data from the marine environment and visitor sites. Changes in plant life cycles will be simultaneously measured with low-cost, time-lapse cameras deployed at key sites, in order to determine the effect of climate change on the Galapagos flora. Identifying local climate processes and their linkage with biological productivity will greatly increase our ability to predict climate change impacts on ecosystems, biodiversity, and water supply.

**Knowledge Management**

There is a very real need for improved development of, access to, and use of knowledge about the Galapagos Islands. The primary goal of the Knowledge Management Initiative for Galapagos is to foster a culture that incorporates both knowledge and wisdom in decision-making and policy development at all levels of governance and ensures broad engagement and participation of all stakeholders. Developing and facilitating knowledge management for Galapagos will be a collaborative process to ensure engagement of all stakeholders. The Initiative will benefit many constituencies: the Ecuadorian government, managers and political appointees, researchers, Galapagos residents, tourists who visit the islands, and people around the globe interested in Galapagos even if unable to visit. Engagement and participation by all sectors of the community should result in better informed choices, and a shared vision for the future of Galapagos.

**PROJECT 1:**

**Knowledge Management for Galapagos**

**PARTNERS:** Governing Council of Galapagos, Galapagos National Park Directorate, Charles Darwin Foundation, external experts

**STATUS:** Knowledge Management Plan completed; funding for implementation being identified.

Through the Knowledge Management Initiative, Galapagos Conservancy is working with key institutions and individuals within and beyond Galapagos to bring together data collection mechanisms and protocols, data sets, anecdotal data, and published materials in one easily-accessed system. It will serve as a destination for new information and observations and will support and catalyze public policy, research, and management. Investments in building this system will increase the value and impact of information that already exists, as well as data collected in the future.

To move forward with the Knowledge Management Initiative, it is critical to know what is present, what is needed, what the parameters are in terms of technology and logistics, and who the participants will be. The process will begin with a general audit of the technological facilities and knowledge infrastructure in Galapagos. This will determine what technology exists (include internet access and equipment), and will provide recommendations for improving technology infrastructure in Galapagos to support the development of an effective, accessible Knowledge Management System.

In parallel, the project will conduct a general audit of existing knowledge about Galapagos (local, regional, national, and international). This will help to establish which institutions have data/knowledge pertaining to specific focus areas (social, economic, tourism, environment, etc.), the level of accessibility, the data quality, and the ability to share the data based on institutional ownership, copyright, and source of funds used to collect the data.
The third audit will be a needs assessment, determining the primary and secondary audiences for the Knowledge Management System, which audience will receive the most benefit from a functioning System, and what questions will likely be asked.

Given that the development of an umbrella knowledge management system for Galapagos will take time and given the importance of knowledge management to Galapagos, we are also beginning to include a knowledge management component in many of our long-term projects.

**PROJECT 2:**
**Data Collection and Library Support at the Charles Darwin Foundation**

**PARTNERS:** Charles Darwin Foundation

**STATUS:** Some funding secured, identifying additional collaborators/funders.

As a complement to the broader, multi-institutional Knowledge Management Initiative, this project will focus on the development of the *Galapagos Science Commons*, a web portal which gives access to both local and worldwide audiences to the Charles Darwin Foundation’s biodiversity knowledge resources. In 2014, the emphasis will be on meeting the needs of a diverse group of Galapagos and Ecuadorian stakeholders, and continuing to refine the web portal to provide relevant, accessible information according to audiences’ needs. Priorities will include: 1) enhancing the Checklist and Collections web materials by integrating images and geo-location information relevant to the species; 2) mapping the distribution of species; and 3) complementing our work on invasive species and recovering and incorporating the wealth of information gathered during a large project funded by the Global Environmental Facility during the 1990s. This project will also make improvements to the Charles Darwin Foundation’s library through a significant investment in data archiving, including film, print, and other media, ensuring that fragile materials are housed appropriately and that collections remain safe.

**PROJECT 3:**
**The Galapagos Report**

**PARTNERS:** Governing Council of Galapagos, Galapagos National Park Directorate, Charles Darwin Foundation

**STATUS:** Identifying funding for next issue.

The primary goal of the *Galapagos Report* is to provide decision-makers at all levels of government with up-to-date information, analyses, and recommendations that can inform policy and management decisions. While there is an abundance of research projects and evaluations of conservation management occurring in Galapagos, the information produced is not always shared with the larger Galapagos community or incorporated into policy and management, nor is it always available in accessible, less technical language, nor in Spanish. There is a very real need for improved development of, access to, and use of knowledge about the Galapagos Islands to ensure effective natural resource management, decision-making, and policy development in support of biodiversity conservation and a sustainable society.

The *Galapagos Report* is the only regular publication that is produced in Spanish and English that provides decision-makers access to important information and recommendations on a broad range of issues, including human systems, tourism, marine management, ecosystem restoration, and emerging issues. The *Galapagos Report* is provided free to all to ensure that everyone has access to the information.
For more than 25 years, Galapagos Conservancy has been connecting people across the globe to conservation efforts taking place in the most extraordinary islands in the world. We support innovative science and conservation management that seeks to protect and conserve the unique flora and fauna of Galapagos and which constantly strives to add knowledge and context to the world’s understanding of biodiversity conservation. We envision a healthy and engaged society within Galapagos that actively cares for and respects the sustainable and thoughtful use of local resources.