Manabí Dry Forest Conservation Project

YEAR THREE

Annual Progress Report for the San Diego County Orchid Society

Ceiba Foundation for Tropical Conservation

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I. Introduction

A. General Introduction

Ecuador has one of the most diverse orchid floras in the world (ca. 4,250 species) with endemism in excess of 70% (Gentry & Dodson 1987). Outside of the country's national park system, considerable areas of pristine habitat remain on private lands, creating a unique opportunity for local landowners to contribute to orchid conservation (Meisel & Woodward 2005). The Ceiba Foundation for Tropical Conservation has worked since 1997 to protect orchids and other species using private lands conservation in key areas in Ecuador: habitats with high levels of diversity, endemism, or threat of loss. This annual report, covering the third year of funding provided by the San Diego County Orchid Society, summarizes our activities to date in the coastal deciduous forests of northern Manabí, an ecological transition zone between the wet Chocó region to the north and the dry forests to the south.

Deciduous and semi-deciduous forests are the most threatened of terrestrial tropical ecosystems. In Ecuador, less than 2% of this habitat remains (David Neill, pers. comm.). Despite the overwhelming human pressure on this ecosystem, it has received disproportionately little attention from the scientific and conservation community, and many plant and animal species endemic to this biome are now vulnerable to extinction. While most orchidists have focused virtually all of their conservation efforts so far on moist forest ecosystems such as rain forests and cloud forests, there are more orchid species and higher rates of endemism in the deciduous forests of western Ecuador (156 spp. below 300 m) than in the Amazon rainforest of eastern Ecuador (138 spp. below 300 m) in the same land area (IUCN/SSC Orchid Specialist Group 1996). Surveys conducted by Dodson and Gentry (1991) as far back as the 1980's estimated that 27% of 250 orchid species found in western Ecuador were endemic. Unfortunately, natural populations in this diverse orchid habitat may well disappear before their distribution and ecology are completely understood.

Conservation International's selected the Chocó-Manabí Corridor (within the Tumbes-Chocó-Magdalena Hotspot) as a priority site for its Critical Ecosystem Partnership Fund. Their documents highlight the enormous diversity and endemism of the region. "The Chocó-Manabí Conservation Corridor has an extremely high degree of endemism -- by some estimates, one of the highest in the world, possessing several important attributes from a conservation perspective: biogeographically important as a transitional area between two hotspots (Tropical Andes and Chocó); the most floristically diverse region in the Neotropics; habitat for 6,300 species of plants, 20% endemic" (CEPF 2005).

B. Proposal Summary

The Manabí Dry Forest Conservation Project seeks to protect the tropical deciduous forest habitat in northern Manabí province through a combination of the establishment of forest reserves, environmental education, reforestation and scientific research. Although orchids remain a little-studied feature of coastal dry forests, there is substantial evidence of their diversity in this habitat. Project goals include identification of forested sites that harbor rare or endemic species, followed by negotiation of conservation agreements with landowners of these properties; protection of habitat through reserve management and support for local conservation initiatives; and promotion of sustainable development in the region through environmental education and capacity-building programs. The proposal funded by SDCOS provided support for several distinct aspects of the overall project:

a. orchid surveys within the Lalo Loor reserve and Manabí forest remnants
b. create facilities to receive and educate visitors, volunteers and researchers
c. develop environmental education programs for the reserve and the region
d. carry out conservation prioritization survey visits to nearby properties

II. Summary of Progress - Year Three

Ceiba has made considerable progress on many aspects of our dry forest conservation program in the past twelve months. Major renovations were completed to the Lalo Loor reserve biological station, and the EcoCenter at the reserve's entrance is now fully outfitted with educational displays and open for visitors. Biological inventories in the region have continued, thanks to SDCOS support, both in the reserve and on nearby forested properties. New nationally-sponsored initiatives provide powerful incentives for forest conservation, and Ceiba is working hand-in-hand with the Ministry of the Environment to implement these programs in the dry forest region. Reserve staff has visited a number of properties in the proposed biological corridor and are working with landowners to sign conservation agreements to protect them. We have expanded our relationship with the US Peace Corps, which this year stationed a third volunteer in the region. Our environmental education programs, many implemented by Peace Corps volunteers, are making an obvious difference in the attitudes of young people towards local nature. Ceiba is collaborated with a local NGO to promote sustainable development entrepreneurs in communities near the reserve. Combined, we feel that significant strides have been made towards the protection of dry forest habitat and establishment of a biological corridor in the region, and we are happy to report the details below (see Section IV).

We include here the list of "Upcoming Priorities and Objectives" provided in the second annual report, along with progress summaries for each:

1. Conduct orchid inventories in properties of Luis Dueñas and the Third Millennium Alliance. *Surveys pending in both sites.*
2. Continue to monitor orchids collected or marked during preliminary surveys to confirm taxonomic identifications. *Monitoring of collected specimens concluded; unfortunately the small number of unidentified specimens failed to flower in Quito's dry climate.*
3. Sign a new conservation agreement with Mr. Lalo Loor to strengthen the long-term protection of the Dry Forest reserve. *Conservation agreement for 20 years signed through SocioBosque, a federal program protecting private forests.*
4. Sign a conservation agreement with Luis Dueñas to protect his family's 300 ha property. *Family being encouraged to sign 20-year SocioBosque agreement.*
5. Discuss options with the Jama municipal government and local landowners for the establishment of a single conservation area (Bosque Protector Privado) to cover all forests in the region. *Collaborating closely with municipal government and Ministry of Environment to implement SocioBosque in Jama County, through Conservation International grant.*
6. Complete the creation and installation of environmental exhibits in the EcoCenter at the Lalo Loor reserve, and place orchid specimens on display along the principal visitor trail. *EcoCenter completed, open to the public and staffed; exhibits within EcoCenter and garden surrounding the structure have been completely installed.*
7. Officially inaugurate the EcoCenter in the summer of 2008, and open the reserve to day visitors. *EcoCenter inauguration completed, additional events planned throughout 2009; press coverage has been favorable, and visitor traffic continues to increase.*

8. Continue the environmental education programs in the communities of Jama, Tabuga and Camarones, through direct education of students and training programs for teachers. *Collaborated with U. Wisconsin to bring Global Health interns to all three communities; continued environmental education programs in local schools.*
9. Work with the Peace Corps to send a third volunteer to the region. *Third volunteer arrived to site (the village of Don Juan) in April of 2009. All three communities will retain volunteers at least through 2011.*

III. Use of SDCOS Funds

SDCOS funds for the second year were spent in accordance with the revised proposal budget (submitted with Year 2 annual report). Salary for reserve managers Marlon Nuñez and his replacement Jason Hendsch were supported; because Mr. Hendsch was hired at a full-time rate, Ceiba adopted the remainder of his salary burden. Management supplies funds are being spent on the installation of a telephone system in the EcoCenter, to provide constant communication (essential in case of visitor or volunteer emergencies). Reserve supplies funds were spent on a portion of the reconstruction of the biological station. Funds for creation of displays were spent on completing the installation of ecological and conservation themed displays in the EcoCenter. Curriculum development funds supported several programs bringing area school children to the reserve. Orchid surveys and other biological inventories were carried with SDCOS funds supporting lodging and transport.

The Ceiba Foundation has made a significant commitment, in terms of personnel and funding, to the Manabí dry forest project, which now constitutes our primary interest in Ecuador. In September of 2009 we will hire Andrea Crosby, Tabuga's Peace Corps volunteer until August, to serve as Ceiba's coordinator of conservation and development projects in coastal Ecuador; that position will be funded by private donor contributions. In the post, she will be able to continue many of the education and training programs she began as a Peace Corps volunteer, and provide invaluable coordination for our forest conservation and biological corridor efforts. We received substantial funding from Conservation International to support the implementation of Ecuador's SocioBosque forest conservation program in Jama County: funds will support a full-time coordinator for the program, as well as administrative and other costs. We are expanding our relationship with the University of Wisconsin, which in 2008 sent several Global Health students to communities near the reserve, and plans to launch a summer internship program to assist conservation and development projects in the region.

IV. Detailed Progress Report

A. Forest Conservation Programs

1. SocioBosque

We are pleased to report that the Ministry of Environment launched in 2008 a new program for protecting private forests across the country. The SocioBosque, or Forest Partner, program is a payment for ecosystem services approach that provides landowners with annual compensation in exchange for signing a 20-year conservation agreement. The program applies only to forests of native species (thus excluding most plantations) that have been in place for at least twenty years (excluding recent regrowth). Compensation rates begin at $35 per hectare per year, a sizeable sum when compared to pre-existing programs (such as the Dutch-sponsored PROFAFOR) that paid as little as $5/ha/y.

Funding is being drawn from international resources associated with carbon markets and the REDD program (Reduced Emissions from Degradation and Deforestation) that has been recommended to expand the scope of the Kyoto Protocol. Ostensibly, any landowner in Ecuador can apply to SocioBosque; however, the government has put higher priority in regions of the country meeting the following criteria: (a) high degree of poverty, (b) high level of deforestation threat, and (c) high biodiversity. Based on these criteria, all forest in Jama County was placed in Priority 1, in part thanks to lobbying by Conservation International and the Ceiba Foundation.

The Ministry of the Environment has selected partners to assist with regional implementation of SocioBosque. Thanks again to lobbying by friends within Conservation International (an organization deeply involved in the creation of SocioBosque), the Ceiba Foundation was selected as the partner organization in Jama County in particular, and the northern Manabí region more broadly. Through the agreement, the first of its kind in the country, Ceiba has been charged with promoting the program to local landowners, assisting them through the application and registration process, conducting site surveys and forest mapping operations, and participating in monitoring visits once the program is underway. Therefore, we have been handed a tremendous opportunity to provide a significant financial incentive to forest owners within our proposed Dry Forest Corridor.

Funding for Ceiba's participation in implementing the program is being provided by a $15,000 grant received in June from Conservation International. With these funds we will hire a full-time SocioBosque coordinator to work with coastal landowners for a 12-month period. We are optimistic that we will be able to apply to CI for additional funds once the first year is complete.

Although the program has only recent opened its doors, several coastal landowners already have initiated the application process. The Glandys & Nevardo Loor property, some 500 hectares of excellent forest immediately to the south of the Lalo Loor reserve, will be enrolled before year's end. The Third Millennium Alliance forest, located to the reserve's east, has completed the enrollment of over 100 hectares of high (up to 700 m) forest. Several coastal landowners from the area of El Matal also have completed the process (approx. 500 ha total); their forests will form part of the southern end of the original proposed corridor. The Lalo Loor reserve itself has nearly concluded the application process, which will guarantee protection of the forest for another 20 years. Thus, in only the first few months of operation, the SocioBosque program has supported the protection of over 1300 hectares (see map in Appendix for property locations).

2. Local and National Incentives for Conservation

In addition to the financial incentives for conservation provided by the SocioBosque program, two other legal incentives have emerged over the past year. On the local level, thanks to lobbying by Mr. Lalo Loor (currently a top advisor to Jama's mayor, Alex Cevallos) Jama county soon will adopt a forward-thinking land use ordinance eliminating property taxes on forested lands. Participating landowners will formally declare the boundaries of their forests, have the forest quality checked to ensure young regrowth or exotic species are not declared, and then be exonerated from tax payment on those areas. Ceiba sees this ordinance as an excellent option for local landowners, and applauds the progressive stance taken by the Jama municipal government.

On the national level, changes to Ecuador's constitution also provide a legal incentive for forest conservation. In 2009, the constitution was entirely rewritten. Some of the new clauses are, at least on

paper, commendable: for example, biodiversity was given an intrinsic "right" to exist, theoretically requiring federal intervention when that biodiversity is being negatively affected.

Sections of the new constitution regarding land use are more mixed, but do provide a specific benefit for forest conservation. In brief, the constitution includes a clause imposing a high tax on "non-productive lands," a move driven by desires to eliminate real estate speculation. Conservation organizations were swift to point out that this would provide a powerful incentive to cut forests, since by definition forests are considered non-productive. Thanks to their efforts, the government agreed to exonerate landowners from this new tax if they place their forest under some legal form of protection (exact definitions of acceptable protection remain to be ironed out). Therefore, landowners now can avoid a new tax on forested land if they enroll it in conservation.

3. Conservation Incentives and the Manabí Dry Forest

Thanks to the developments of the past year, there now exist a handful of incentives available to landowners who wish to protect their forests. We feel that Ceiba has made demonstrable progress over the last three years in convincing landowners that forest protection is beneficial, not only to plants and animals within the forest, but also to the local environment (e.g., through provision of reliable clean water). Now it can shown that such protection also directly benefits the landowner. Ceiba was instrumental in forming the Jama Association of Forest Landowners, an organization bringing together all the significant forest owners in the county to make the most of the various conservation incentives. Indeed, many of these landowners who have attended one or more presentations on habitat protection provided by Ceiba now can be seen explaining the value of protecting biodiversity to their neighbors. We are pleased at the progress we have made thus far in shifting the perspective of landowners and other citizens in the region, and now are tremendously excited to connect this emerging conservation ethic to the suite of incentives that now exist to support forest protection.

4. Carbon Markets and Reforestation

Now that powerful incentives are in place to support protection of standing forests, Ceiba has begun to explore mechanisms to finance reforestation of areas lying between these forest patches (see map in Appendix). One of the most promising funding sources is through private carbon credit markets. Many corporations in the USA have pledged to abide by the spirit of the Kyoto Agreement and create business models that are carbon-neutral. In order to achieve this goal, some form of carbon credits must be purchased to offset the corporation's energy expenditures. Some of these businesses are turning to private carbon credit markets, which are growing in size and popularity.

Ceiba, the Third Millennium Alliance, and outside advisors (among them Dr. Peter Tobias) are developing contacts with environmentally progressive businesses and professionals within progressive sectors of the energy trading market, to develop a program that will connect US businesses to reforestation projects in Ecuador. As private forests are enrolled in the SocioBosque program, or other legal protections, it will become increasingly important to identify key areas where connectivity between patches can be achieved only through reforestation. Based on the landscape position of protected forests, Ceiba will target high priority locations for reforestation (see map in Appendix). Small parcels (1-5 ha) will be purchased, fenced to eliminate cattle, and reforested. Thanks to our years of experience reforesting parts of the Lalo Loor reserve, we have collected considerable data on the species that survive best, and the growth rates of a wide variety of trees. We are developing carbon accumulation estimates based on these data and models developed in other dry tropical regions. We

anticipate the private carbon markets will be an important source of funding over the coming years, and will fill a critical need in our overall plans to establish the Manabí dry forest corridor.

B. Visitor Education & Research Facilities

1. Lalo Loor Dry Forest Reserve Conservation

The Lalo Loor Dry Forest remains the largest, most well-known, and most well-visited reserve in the region. Visitorship by tourists and school groups is increasing daily, as are the flows of long-term volunteers and researchers. Ongoing improvements to trails and signage provide environmental education to all visitors to the reserve, in a variety of interactive styles. The presence of Mantled Howler Monkeys (*Alouatta palliata*), and the ease with which they can be observed, has provided one of the strongest enticements for visitors to come to the reserve. Visitors also are entranced by the profusion of epiphytic orchids on display in more humid parts of the forest, and the incredible biodiversity of this region that harbors elements from both wet northern and dry southern forests.

2. Biological Station

Of the two main facilities at the reserve, the Biological Station (or volunteer house) is the largest and oldest. Having served ably for many years, it required substantial maintenance this year. The entire roof was replaced with a tin roof incorporating many transparent panels, allowing more light into the structure, to the delight of researchers struggling to read in the afternoon dimness. Several walls (made of flattened bamboo) have been replaced, with more slated for replacement during the upcoming 12 months. The entire kitchen was reconstructed, with stainless steel cooking surfaces, screened closets for food items, new sinks and more, to ensure that we continue to provide quality meals to a growing population of volunteers and visitors.

On the grounds of the Biological Station is a modest orchid display, which also was substantially reconstructed this year. Here, orchids that have fallen from their epiphytic perches are collected in the forest and installed for visitors to observe. Most species from the display have been identified and photographed, and were included in the previous annual report.

3. EcoCenter

At the entrance to the reserve, Ceiba has completed the construction of the EcoCenter, and the installation of nearly all displays. A full-time staff member operates the center, which receives visitors and provides them with a first look at the biodiversity of the dry forest region. Displays are divided into major sections: biology and ecology of the dry forest, marine biology and conservation, pre-Colombian culture of the region (the Valdivian people founded one of South America's earliest true civilizations), environmental education in local schools, and regional tourism offerings. Visitors can read about the creation of the reserve, the activities carried out by Ceiba and funded by its donors, and orient themselves for their visit.

School groups that come to the reserve with increasing regularity also use the EcoCenter as a base of operations, often carrying out craft-making activities or working in the surrounding gardens. These gardens showcase many of the plants characteristic of the dry region, including ornamentals, native forest plants and even crop species. The area around the Center is too hot and dry for orchids, but

photographs of several characteristic species are on display within the building. There is space in the exhibits section for school kids to create posters and displays that are installed on a rotating basis.

4. Trail System

Thanks to the participation of a large number of volunteers and Ceiba students, the trail system in the reserve enjoyed a complete makeover in the past 12 months. The trails were painstakingly evaluated and mapped, and several new portions added to create a series of connecting loops that offer visitors a wider range of options when hiking through the forest: everything from easy 20-minute level strolls to hour-long hikes of moderate difficulty to all-day explorations circumnavigating the forest perimeter are available. New trail maps have been created and installed in the EcoCenter and Biological Station. Signs were completely re-made this year, and all intersections now are clearly marked. High-quality metal signs were delivered in June to install along the self guided "Butterfly Trail," each giving an important piece of information -- delivered in a compelling and entertaining style - about dry forest ecology.

Several volunteers and student interns with prior trail building experience helped the reserve improve its approach to trail elements ranging from steps to bridges to handrails, benches, overlooks, etc. They put their expertise to work by training reserve staff in modern and tested (on, for example, the Appalachian Trail) techniques that will continue to be the standard for trail maintenance in the reserve.

C. Site Surveys and Biological Inventories

1. Site Surveys

Surveys of numerous forested properties in the proposed dry forest corridor were completed during the past year. Ceiba staff revisited the Glandys & Nevardo Loor property to the south of the reserve, hiking deeper into the property than on the previous survey (detailed in our second annual report). The back of the property rises to some 500-600 m of elevation, and is rich in epiphytic orchids, bromeliads, mosses and aroids. Species of orchids encountered were among those identified on other properties in the previous year. The forest was assuredly of high quality, prompting Ceiba's assistance to the landowners in applying for inclusion in the SocioBosque program (see above).

Informal surveys of the Third Millennium Alliance reserve, located east of Lalo Loor, were conducted by Peace Corps volunteers working in coordination with Ceiba staff. This property includes some of the highest-elevation forest found in the region, some 700 m in elevation (see map in Appendix). Much of the property is densely forested with what appears to be unaltered primary forest. Epiphytic communities, judging by reports and photographs, are abundant and diverse. Plans have been made to lead a follow-up survey to the site for more detailed analysis of the biota.

To the south of the municipality of Jama lies a long and mostly forested peninsula owned by a small number of families. After making connections with one of the largest owners, Joe Meisel surveyed the property (known as Punta Ballena, or Whale Point, after the humpbacks routinely seen offshore during their July/August migration), walking both the shoreline frontage and extensively touring the interior forest. As might be expected, the proximity to the ocean and low elevation renders this forest considerably drier than other sites further inland. Large *Ceiba trichastandra* trees dominate the forest, which showed evidence of substantial high-grading operations (removal of quality lumber trees). Epiphytic diversity was reduced, likely due to the dry winds and salty air, and was primarily represented

by lichens and hardy mosses. Nonetheless, several *Catasetum* orchids were observed in flower. The family representative showed every interest in conserving the forest, and currently is being encouraged to enroll the land in the SocioBosque program.

Ceiba staff has begun making connections in the growing tourism town of Canoa, about 40 minutes south of the reserve. Inland from this coastal town are several large remnants of quite dry forest, more strongly dominated by cacti and thorn scrub than the more humid habitats only a short distance to the north. One of the largest landowners in the region has invited Lalo Loor reserve manager Jason Hendsch to visit his property, which protects some 600 ha of mixed forest and productive land uses. This property also has caught the attention of the New York Botanical Garden, which found several rare dry forest plants there. It may very well transpire that this property will "anchor" the southern end of the proposed dry forest corridor, extending the initially planned range by some 30 miles.

2. Avian Inventory

Mist-net bird surveys were conducted in the reserve in May of 2009, and ongoing inventory work by reserve and Ceiba staff, visiting scientists and others continue adding species to the list. To date we have recorded 176 species in the Lalo Loor reserve. Please see our Year 1 report for details of the mistnetting methods and general comments about the bird fauna. The reserve's avifauna includes 11 confirmed species considered by the IUCN to be endangered (en), vulnerable (vu), or near threatened (nt), including:

Little Tinamou (*Crypturellus soui)* - nt
Pale-browned Tinamou (*Crypturellus transfasciatus*) - nt
Gray-backed Hawk (*Leucopternis occidentalis*) - en
Rufous-headed Chachalaca (*Ortalis erythroptera*) - vu
Rufous-necked Wood-Rail (*Aramides axillaris*) - lc
Red-masked Parakeet (*Aratinga erythrogenys*) - nt
Little Woodstar (*Chaetocercus bombus*) - vu
Orange-fronted Barbet (*Capito squamatus*) - nt
Guayaquil Woodpecker (*Campephilus gayaquilensis*) - nt
Pacific Royal Flycatcher (*Onychorhynchus occidentalis*) - vu
Slaty Becard (*Pachyramphus spodiurus*) - en

3. Mammal Sightings in Lalo Loor Reserve

Several students from Ceiba's 2008 semester-abroad program completed their internship component conducting research at Lalo Loor on the howler monkey population. Their surveys produced an estimate of 170 individuals living in the reserve's forest. Of greater interest were the confirmed sightings by these students of a jaguarundi (*Puma yagouaroundi*) and an ocelot (*Leopardus pardalis*). These two cats, although smaller and more generalist than the larger jaguar and puma, are top predators in forest ecosystems and are excellent indicators of high forest quality. We had previously seen tracks from both species, but had not obtained certain confirmation until these individuals were observed. Ceiba has collaborated with University of Florida graduate student Santiago Espinosa to write a proposal supporting the installation of trap cameras in an effort to more thoroughly document the mammalian fauna of the reserve and surrounding forests. We hope to capture photographs of jaguars, a species that once roamed the region in large numbers, but whose continued presence at this time is very much in doubt. The complete reserve mammal list is included in the appendix.

4. Butterfly Diversity Studies

The reserve has been fortunate to attract a team of butterfly researchers from the University of Florida, including Dr. Keith Willmott, one of Ecuador's preeminent lepidopterists. In their initial, brief survey they identified nearly 100 species in the reserve. Subsequently they have sent a graduate student, Fernanda Checa, to carry out a significant portion of her M.Sc. research at the reserve. Ms. Checa and her field assistants currently are monitoring the forest on a monthly basis, and hope to draw from their data an understanding of the role of forest microclimate in controlling distribution and movement of butterfly populations. Side benefits to the reserve will include her production of a professional list of butterfly species present, creation of a poster highlighting rare and spectacular species, and provision of educational seminars to local schools during several of her visits.

D. Community Environmental Education & Development

1. Education Programs

Thanks to our ongoing involvement with the US Peace Corps (see below), Ceiba has been coordinating the educational activities of two volunteers placed in communities neighboring the Lalo Loor reserve. In the towns of Tabuga and Camarones, Andrea Crosby and Paul Harbison have created an ongoing series of environmental education programs for students of all age levels. These programs include classroom lessons, schoolyard activities, teacher training programs, and day trips to the reserve to carry out a host of hands-on programs. Andrea and Paul have collaborated with Ceiba staff to develop a detailed environmental education manual that can be used by instructors throughout the county to teach their students about dry forest ecology, the many connections between humans and their environment, and the need for conservation of natural systems. Many of these activities are designed to be carried out at the Lalo Loor reserve; however our staff and volunteers continually point out that the same programs can be conducted in natural areas anywhere in the county. It is our goal to encourage schools to adopt "School Forest" programs through which each classroom becomes associated with a nearby forest, and thus acquires a sense of responsibility for its protection.

2. Peace Corps Collaboration

Since 2007 Ceiba has been building a strong collaborative relationship with the US Peace Corps. The Foundation currently serves as the local coordinator for Corps volunteers in Jama County. In April 2007, Andrea Crosby began her two-year term in the town of Tabuga, located by the entrance of the Lalo Loor reserve. Her assignment has been dedicated to environmental education in the schools of Tabuga and more than a half-dozen other communities in the region. She is deeply committed to conservation projects at BSLL, often serving as a staff assistant when large groups arrive, and she has organized many school visits to the reserve as part of her environmental education programs.

In August of this year, Andrea will complete her Peace Corps service. We are happy to report that she has accepted a full-time position with Ceiba and will serve as the foundation's coordinator of coastal conservation, education and development programs. She will supervise implementation of the Conservation International grant for SocioBosque, continue bringing education programs to area schools and local children to the reserve, and expand on fledgling efforts to support green entrepreneurs in the

region. She will be replaced in Tabuga this fall, with another Corps volunteer from the Rural Health program.

In April of 2008 a second volunteer, Paul Harbison, began a two-year assignment in the community of Camarones, located behind the Lalo Loor reserve. Paul has implemented environmental education and sustainable agriculture programs in that community, and contributed towards installation of a potable water system. He has expanded his activities to include the nearby fishing town of Punta Blanca, where he has conducted a variety of environmental education and sustainable development programs.

As we had hoped, in April of 2009 the Peace Corps awarded the region with a third volunteer, from the Rural Health program, in the community of Don Juan (south of the reserve). While Ceiba is not serving as this volunteer's official coordinating organization, we have had substantial interactions with him and his supervisors, Fundación Arena (with whom we have partnered to develop the PILAS program, described below). Thus we are happy to report that Peace Corps volunteers working alongside Ceiba are having a significant positive impact on rural communities near the Lalo Loor reserve, and that the Corps itself continues to show strong interest in placing quality volunteers in the region.

3. PILAS Community Development Program

The Ceiba Foundation understands the forest conservation depends not only on the protection of standing habitat, but also on the support for sustainable development strategies in surrounding communities. When local residents have few alternatives for generating cash income with which to buy food, it should come as no surprise that they are more likely to illegally enter nature reserves to poach lumber, bushmeat and other resources. Ceiba believes that residents with few options hardly can be blamed for such actions; rather, the burden of guilt lies on the economic system in which they are making choices.

To assist local communities in the development of forward thinking, ecologically sound businesses, the Ceiba Foundation, Peace Corps volunteer Andrea Crosby, and the local Fundación Arena have joined forces with community leaders to implement a sustainable development program called PILAS ("Programa Integrado de Liderazgo y Acción Social," or "Integrated Program for Leadership and Social Action"). Together with progressive members of four communities near the reserve (Tabuga, Camarones, Tasaste and Punta Blanca), we are developing grant applications to funding sources within Ecuador and internationally. The program charges community members to propose sustainable business models, which then are evaluated by a diverse review committee. In a back-and-forth fashion a business plan is developed that responds to the suggestions of the review committee and the total membership. Resources available in the Ministries of Tourism and Environment are being tapped to provide instructors and seminar leaders who visit communities during PILAS meetings to discuss green businesses that have been successful elsewhere in the country, and to provide a broader perspective to local residents.

Once the program is fully functioning, the best business plans in each community will be selected for adoption by the PILAS program. Funding and technical advice will be provided to implement the plan and get the proposed business up and running. Funds will be made available as grants and as zero-interest development loans, a concept already well established in Ecuador. We believe that as the flow of tourism to the region grows, particularly ecotourism, that those who most deserve to benefit from the potential revenue are the local communities. We anticipate the development of businesses that include small restaurants, lodging and camping facilities, bike and horse rentals, naturalist guide

services, and artisan handicrafts producers, all of which will perfectly suit the expanding green tourism sector.

4. Global Health Interns

During the summer of 2008 the Global Health program of the University of Wisconsin sent a team of four graduate researchers to the Lalo Loor reserve to study the relationship between environmental protection and rural human health. The team focused on water quality and water-borne disease rates, and collected considerable data on the health status of residents in the communities of Tabuga and Camarones, and their access to medical care. The analysis of the data collected still is underway, but one of the students has recently returned to the region to provide the communities with an interim report that made several surprising recommendations. Among them was the discovery that rates of water-borne diseases in households was strongly correlated with how long a given household stored water after taking it from the nearby stream. While we had anticipated problems from drinking unpurified stream water, as many local farmers take cattle and horses to streams to water them, there was strong evidence that the manner in which water was stored was at least as important as the timing or location of its removal from the river. Many households simply dump buckets of river water into small above-ground cement cisterns, in which it appears that bacteria such as *E. coli* breed exceptionally well and contaminate water that later is consumed by the entire household. Based on these, and other anticipated, findings from the Global Health study, the Peace Corps volunteers from the Rural Health program will make recommendations to these communities on how to reduce their risk from water-borne diseases.

V. Objectives for Phase II

Based on our current assessment of progress and needs in the region, and the overall goals of the Manabí Dry Forest Conservation Project, we have set the following priorities for the upcoming year (June 2009 – May 2010):

1. Work with Ecuadorian Ministry of Environment and Conservation International to enroll as many landowners as possible in the SocioBosque program. The explicit goal of the CI proposal is to conserve up to 10,000 hectares through this program.
2. Conduct orchid inventories in properties of Luis Dueñas and the Third Millennium Alliance
3. Sign a conservation agreement, in concert with SocioBosque program with Luis Dueñas to protect his family's extensive properties.
4. Continue site evaluations to identify properties critical to completing the proposed dry forest corridor, particularly on mountain ridges with high orchid and other epiphyte diversity.
5. Investigate private carbon markets as a mechanism for funding targeted land purchases and reforestation programs to connect disjunct forest patches within the corridor.
6. Continue assisting the Jama municipal government promote habitat conservation in the country and implement national incentive programs to support forest protection.
7. Continue environmental education programs in communities of Jama, Tabuga, Camarones, Tasaste and Punta Blanca through field and classroom activities, and training programs for teachers.
8. Collaborate with the Peace Corps to manage the region's three volunteers.

VI. Summary and Request for Continued Funding

Over the three-year period during which funding was provided by the San Diego County Orchid Society, we have seen amazing progress in conservation of Ecuador's coastal dry forest. We began by establishing the Lalo Loor reserve as a protected forest and ecotourism destination; now visitation is soaring as local hotels and restaurants increasingly recommend the reserve as a destination for their clients. We followed with a series of programs to raise environmental awareness among area school children; now most kids in the county have visited the reserve on at least one school field trip, every teacher in the county has received training from Ceiba staff and Peace Corps volunteers, and environmental education curricula and textbooks have been created and distributed throughout the region. We began to foster a close relationship with the municipal government of Jama to promote a vision of the region as offering a new kind of responsible, locally-based ecotourism; now we enjoy close professional friendships with Jama's mayor and entire staff, and the municipality has supported numerous environmental projects including providing all labor for the construction of the Lalo Loor reserve EcoCenter, installing conservation-themed road signs, and provided transportation for school groups to visit natural sites.

During these early years, we feel that Ceiba has gained a high degree of respect among local residents, community leaders, businesses and the municipal government as a strong supporter of biological conservation and an honest and responsive promoter of sustainable development in the region. We have earned the esteem of many of the region's largest landowners, who have begun asking us to assist them with inventories, mapping and forest protection programs. In brief, we have worked hard to establish ourselves within the broader community of coastal residents, and to be seen as an organization that values the progress of the citizenry as much as the protection of biodiversity.

In this, the third year of SDCOS funding, we have been able to capitalize on our respected position and on the appearance of several powerful incentives for forest protection to achieve with large strokes many of our conservation goals in the region. As well-known promoters of biodiversity preservation, as allies of large and small landowners, as valued advisors to the local government, and as official partners with the national SocioBosque program, we have an unparalleled opportunity in the coming months to protect large quantities of forest in Jama county, and make tremendous strides towards the establishment of the dry forest corridor for which we have long struggled.

While the initial award from the SDCOS Conservation Committee funded the Manabí Dry Forest project for three years, we respectfully submit a request for an extension of this funding for a fourth year. We believe that the current situation in Ecuador is one in which a modest amount of funding will yield enormous dividends in forest protection. These funds are needed to support biological inventories of forest sites being considered for SocioBosque enrollment, to continue operating the Lalo Loor reserve at a high level of professionalism, and to maintain and expand our educational programs in area schools.

At this critical juncture, we are confident that funding dollars can be translated into hectares of protected forest at an immensely efficient "exchange rate." We are capitalizing on the years of groundwork we have laid to become familiar with the region and be accepted as trustworthy promoters of conservation. Thus, funds put towards conservation at this time have the potential to achieve habitat protection at an exceptionally rapid pace. Attached you will find a budget for the requested Phase II

funding of $6140 (see Appendix). We would be delighted to have an opportunity to discuss this request with the Conservation Committee in greater detail.

VII. Supporting Documents

Attached, in digital format, are the following supporting documents:

- Photographs of Lalo Loor EcoCenter and Biological Station construction progress
- Photographs of regional environmental education programs
- Photographs of flora and fauna recorded in the Lalo Loor reserve during 2008/2009
- Updated map of proposed Dry Forest Biological Corridor, highlighting current SocioBosque participants and high-priority forests for 2009/2010 enrollment
- Newspaper (from *The Ecuador Reporter*) article about Lalo Loor reserve as tourism destination
- Updated species lists for birds, mammals, amphibians & reptiles, and butterflies
- Updated budget for requested fourth year extension

VIII. References

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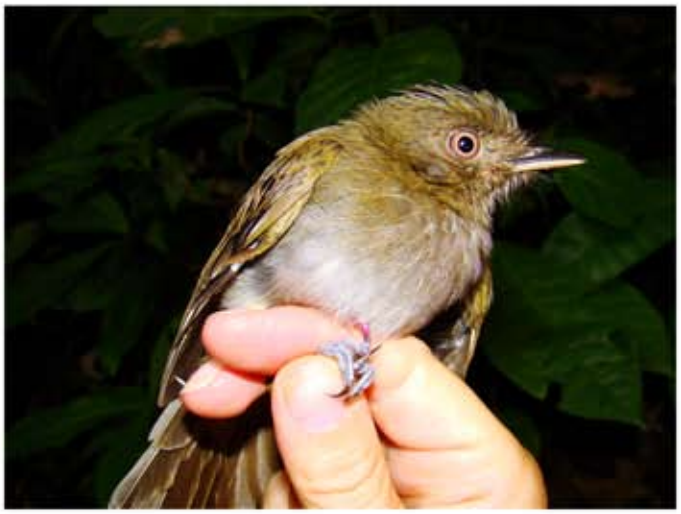
Lalo Loor Dry Forest Facilities

Biological station & trail improvements

EcoCenter, garden installation, mosaic

Lalo Loor Dry Forest Flora & Fauna

recently discovered gecko, likely a new species



*Brownish Twistwing (*Cnipodectes subbrunneus*), found in 2009*

orchid bee with attached pollinia

Lockhartia *flowering in orchid display area*

Boa constrictor along reserve trail

*Red-masked Parakeets (*Aratinga erythrogenys*), an endangered species, confirmed nesting in the reserve*

Jama County - Conservation & Environmental Education

SocioBosque Inauguration, September 2009

art competition at BSLL for Tabuga school children

Augustín Martinez (far right) represents Tabuga landowners at SocioBosque inauguration

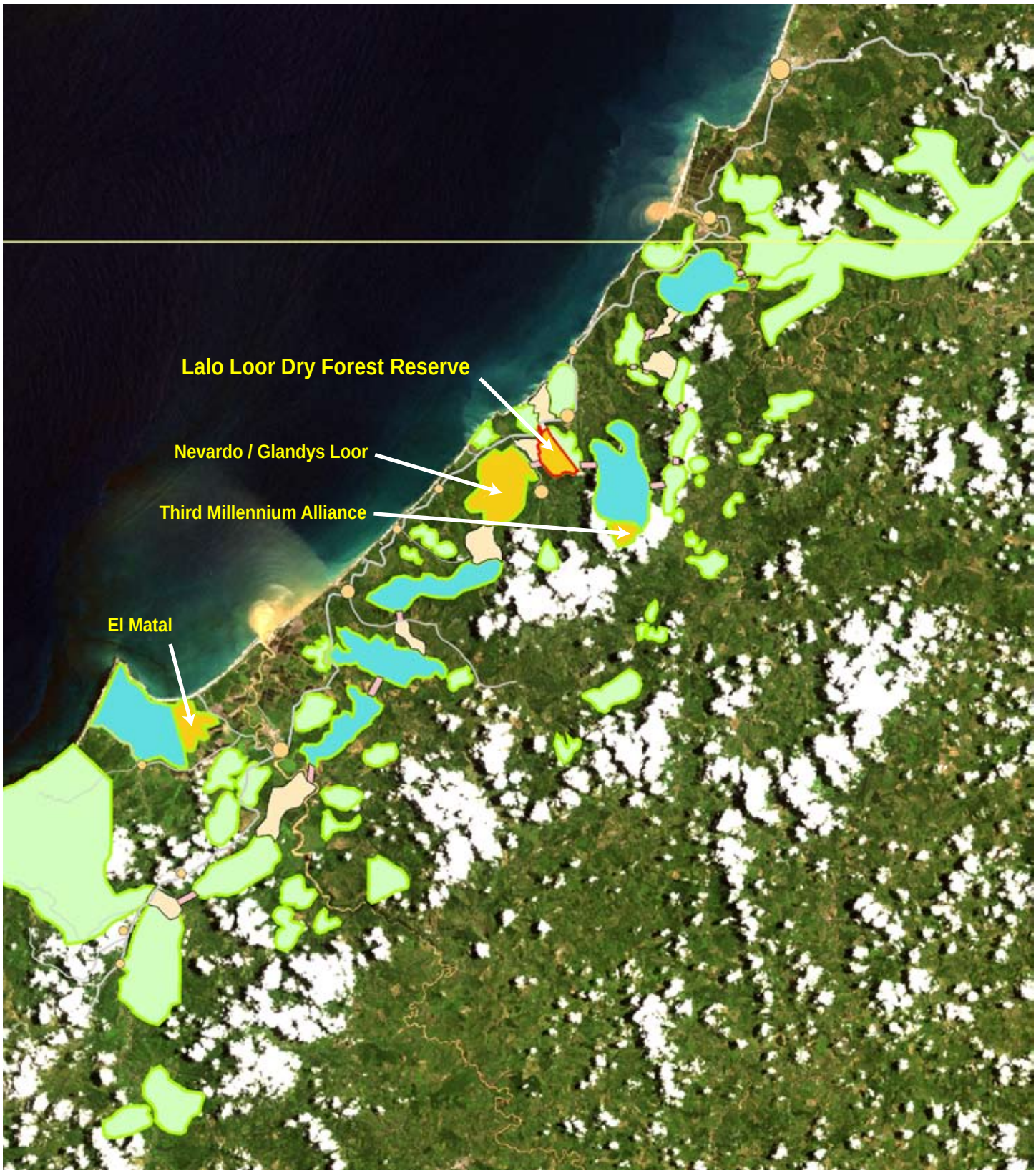
Ceiba student helps art class create EcoCenter exhibits

dry forest visit by local school group

Andrea Crosby (Peace Corps) leads ecology class

Manabí Dry Forest Corridor - June 2009

Showing existing forest (green), new 2009 SocioBosque participating properties (orange), top priority forests for 2009/2010 SocioBosque enrollment (blue), and key areas for future reforestation (pink) and regeneration (flesh),



Lalo Loor Reserve

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In the past 8 months of living in Canoa, I've had the privilege of working with a couple of amazing reserves in this area. One of my favorites is the Lalo Loor Dry Forest Reserve. I had a chance to visit the reserve and sit down with the on-site director Jason Hendsch, and collect some information about this special place.

The Lalo Loor Dry Forest Reserve is located in the northern Manabí province, about 25 km south of Pedernales, and approximately six hours from Quito by road. The seasonally deciduous tropical forest comprising the roughly 200 hectare reserve is a highly threatened ecosystem, with a unique assemblage of plants and animals representative of both more humid forests to the north and drier forests to the south. Several species of threatened birds are present, including the endangered Red-Masked Parakeet and Grey-backed Hawk.

Annual rainfall is approximately 950 mm, with most of it falling between November and March. Very little rain may fall during the dry season, from May to September. Temperatures are very warm during the day (around 80°F) and cooler at night.

The reserve was officially formed in 2004 by a conservation agreement between the landowner, Lalo Loor, the Ceiba Foundation for Tropical Conservation, and Fundación Jatun Sacha. In September of 2008, Ceiba assumed full management control of the reserve and oversees all ongoing projects. The reserve has several kilometers of hiking trails that access secondary and primary forest. The nature center was completed in late 2008 and a native plant garden is currently being installed. The purpose of the nature center and adjoining garden is primarily to serve as an educational resource for local people from communities within the Canton Jama, including Tabuga, Camarones, Tasaste, Punta Blanca, Don Juan, and Jama. It is also intended to serve foreign visitors, and one of Ceiba's goals in the region is to work with the communities to promote ecotourism and enhance tourist services.

photo by Peter Stromberg

Night hikes are a great way to see insects and spiders along the trials.

The biological station that was completed in March 2005 can accommodate up to 24 people. The station provides basic lodging for tourist visitors, researchers and volunteers and serves as the center for research, reforestation and conservation projects in the reserve and surrounding region.

There are a variety of trails to explore on the reserve including interpretive trails along the river and through the forest. The different trail loops range in difficulty and length, from a one hour leisurely stroll to a six hour trek. The majority of visitors catch a glimpse of the Mantled Howler monkeys (Alloutta palliata) as they feast on the reserve's many fig trees. It is not uncommon for the monkeys to be within a few meters from the biological station. Night hikes are amazing, the forest crawls because a large portion of the creatures that inhabit the rain forest are nocturnal.

Contact Ceiba to arrange for accommodation during your visit. The reserve accepts volunteers on a continuous basis and it is best to first consult the website http://www.ceiba.org/loor.htm to begin the application process. Day visitors are encouraged to come Wednesday thru Sunday 9a.m. -5p.m.