Ongoing Research Projects for Interns

2017

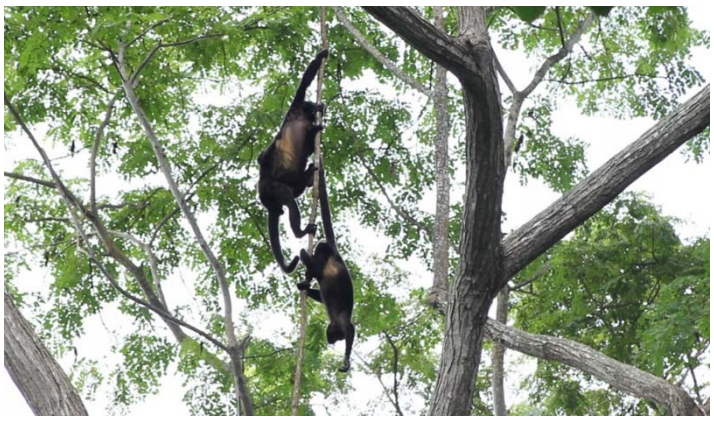
Lalo Loor Dry Forest
"Bosque Seco Lalo Loor"

Reserva Bosque Seco Lalo Loor
Ongoing Research Projects for Internships

Monitoring Biodiversity:

Howler Monkey Population Monitoring:

The purpose of the Howler Monkey Population Monitoring project is to study the demography, ranging, and feeding habits of the howler monkey population in the Lalo Loor Dry Forest Reserve, a 200 hectare fragment of seasonally dry tropical forest. Demography is the study of the number of individuals, their gender and their age, in a population. Ranging refers to the geographical locations that the monkeys use within the reserve, either for feeding, sleeping or traveling. Studying feeding habits allows us to estimate what constitutes their diet and how it changes over time. As a small forest reserve, BSLL has a strong interest in protecting the howler monkey population, studying their dynamics over time, and tracking the effects of season and the gradual changes in the landscape outside the reserve. Volunteers on this project go out 2 times per week to find howler monkey troops and collect data, including # of individuals, gender, age. Volunteers also record troop location and the trees the monkeys are feeding from. Volunteers are also responsible for entering field data they collect into a database.



Wildlife Road Mortality:

The highway mortality study attempts to demonstrate the impact of the coastal highway in Jama County, Manabí Province, Ecuador on the local fauna. The highway was recently expanded and repaved, and traffic has been increasing as the coastal area is developed. The objective of this project in the short term is to map the areas of highest incidence of animal mortality and to determine which species of animals are being most affected. The long term goal of this project is to determine where and what type of mitigation strategies should be placed along the road to best reduce its impact on the local wildlife.

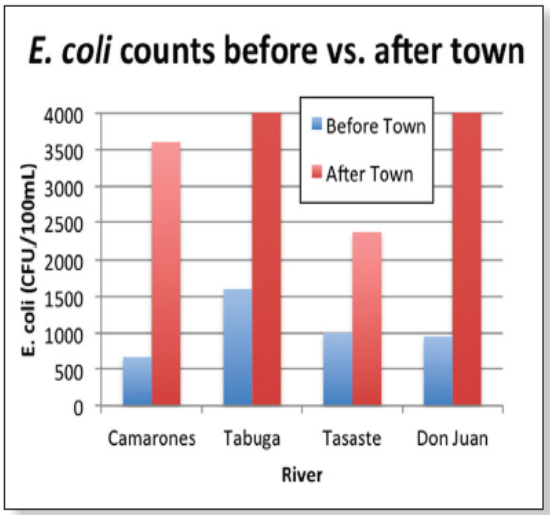
The survey consists of riding in a slowly moving vehicle on the highway from the Lalo Loor Reserve north to Pedernales and south to Rambuche. Monitoring of the two stretches of highway occurs on alternate weeks such that each stretch is sampled every two weeks. Sampling involves stopping the vehicle every time a dead animal (not including invertebrates) is spotted on the highway. Each carcass is identified to species if possible, or to taxonomic group (bird, reptile, etc.) and its location recorded with a GPS. Volunteers are also responsible for entering data into a database.

Camera Trap Mammal Census:

The initial goal of the camera trapping project at the Lalo Loor Dry Forest reserve was to obtain an inventory of the terrestrial mammal species present and estimate their relative abundance. Currently we aim to gain more information on the presence and abundance of animals in relation to various habitat factors: elevation, forest type, proximity to human presence, time of year, and time of day.
We currently have a total of 20 cameras. Camera traps are placed in the previously established locations where they will stay for a determined period of time. Volunteers are involved in relocating cameras; batteries and SD cards are swapped out and taken back to the EcoCenter for image review, data entry, and recharging.

Water Quality in Four Watersheds:

The purpose of the water quality monitoring project is the investigate biophysical parameter in four streams that drain four watersheds in Jama County: the Tabuga, Camarones, Tasaste and Don Juan rivers. We are examining relationships between forest cover and water quality, including turbidity, temperature, dissolved oxygen, flow, *E. coli*, and habitat suitability for macroinvertebrates (via a biotic index and a habitat quality score). Twenty-two permanent sampling locations are distributed from source (at the headwaters) to sink (the Pacific Ocean) in attempt to uncover landscape factors that explain changes in water quality. Each river is sampled every 2 months (Jan., Mar., May, July, Sept., Nov). It takes approximately two days to sample all points on each river, and involves rigorous field work including hiking for several hours, often off-trail, to headwaters in the coastal mountains. Volunteers collect water quality parameter data and incubate water samples for 24 hours to count *E. coli* colonies, indicating water contamination by fecal material. Volunteers are also responsible for data entry.



Harmful bacteria *E. coli* renders streamwater unsafe below villages

Seasonally Dry Tropical Forest Dynamics:

The purpose of the forest dynamics study at the Lalo Loor Dry Forest reserve is to gain basic biological information on the growth and survival of semi-deciduous forest tree species, and determine if forest structure is stable or changing through time in this 200 hectare fragment. Forest fragmentation can cause increases in tree mortality due to abiotic changes, a process known as “biological decay”.

There are two 1-hectare permanent plots established in the Lalo Loor reserve, each one made up of a grid of 25 20x20m subplots. All trees >10cm DBH (diameter at breast height) are identified and tagged within the plots. Volunteers participate in an annual census of trees that should occur during the rainy season or while the trees still have leaves. Volunteers measure the DBH, record whether the tree is alive or dead, and record and mark any new trees that have become >10 cm in diameter since the last census. Volunteers may also retag trees that have lost their marks, maintain the plot (replace broken posts, etc), and enter data.

Bird surveys in reforestation and agroforestry plots

The Lalo Loor Dry Forest reserve has a small area (~2 hectares) that was reforested from pasture in 2005. The aim of bird surveys here is to document the recovery of bird diversity, abundance, and community composition as the reforested area matures. In particular, we wish to detect the return of any endangered or threatened species to the plot, including the Red-Masked Parakeet, Rufous Headed Chachalaca, and Slaty Becard. These surveys can also be done in the new agroforestry plot to know the species that inhabit currently on it and see its evolutions over the years. To date, bird surveys have been conducted on an ad-hoc basis by volunteers interested in birds. We seek a volunteer with ornithology background and experience to write and implement a more formal monitoring protocol.

Conservation corridor

The province of Manabí has some of the most in-tact fragments of Ecuador's coastal dry forest. With approximately 2% of this habitat remaining, it is important to maintain and expand these patches in order to preserve biodiversity and facilitate species movement between these patches. Ceiba is working on a large scale reforestation project to connect more than 15,000 hectares of forest fragments by creating a biological corridor. By working with private landowners, we intend to reforest over 200 hectares in prioritized areas planting native species alongside cultivates such as coffee and cacao, thus creating an "analog forest" which suites the economic needs of the landowner as well as maximizing biodiversity. The goal is to collaborate with landowners to promote sustainable use of natural resources to increase the productivity of their land while improving soil fertility, water quality, and carbon sequestration. Improving habitat in this manner will also provide better habitat for the native flora and fauna. The interns´ activities, depending on the time of the year, are: map the plots to reforest; assist landowners in site preparation, provisioning trees, and planting; collect baseline data on planted trees such as basal diameter and height; biological monitoring (as baseline data or to evaluate the evolution of plots reforested in past years); nursery maintaining; conduct surveys of landowners and community members to evaluate the social and economic outcomes of the project.

Agroforestry plot

In order to research sustainable and productive agroforestry techniques, as well as to have a practical example to local landowners, Ceiba is implementing an agroforestry research plot to help provide data on the best techniques to be used throughout the coast, mainly within the Conservation Corridor (see above). The goal is plant native species, along with coffee and cacao, creating an "analog forest" that shows that it is possible to maximize the production in a sustainable way. The interns´ activities will vary depending on the time of the year and can be planting and maintaining the plants, collect baseline data on planted species, maintain the nursery or conduct biological monitoring on the plot.

Forest reforestation and restoration

Ceiba is working with the community of Tabuga to establish and manage a native tree nursery and produce seedlings for reforestation of lands within the reserve and for the Conservation Corridor. The intern will maintain plants in the nursery (watering, fertilizing, and weeding) and plant seeds of native species collected from local forests. The interns will work with interns of Conservation Corridor and agroforestry plot to calculate the number and species of trees to be planted on their property, map reforested areas, and take baseline data on planted trees for future monitoring of growth rates.

EcoCenter and native plants garden

The Lalo Loor Dry Forest Reserve offers a nature center (the EcoCenter) for visiting tourists and school groups with a variety of displays and exhibits about the ecology of the dry forest, the human history of the region (going back over 3000 years), the importance and complexity of marine ecosystems, and more. The center is surrounded by a native plant garden that demonstrates the diversity of plants found in Ecuador's coastal ecosystems, as well as plants with medicinal, cultural or other uses (fibers, construction, etc.). The EcoCenter and the botanical garden are the entry point for any visit to the reserve, and it is of utmost importance that they be well-maintained, informative, up-to-date, and above all, captivating. Interns with an interest in plants and a love of gardening are needed to make improvements and updates, and maintain the garden, and, secondarily, work on educational exhibits and visitor services in the EcoCenter.

EMPOWERMENT OF LOCAL COMMUNITIES:

Environmental education with students and teachers

In 2005, we started an environmental education program for the region, with the Lalo Loor Dry Forest reserve at its center. We provide environmental science and natural history training to local teachers, who pass their knowledge on to their students. We're also working directly with local school groups, organizing field trips to the reserve. The EcoCenter will provide a venue for environmental education programs, and houses displays on terrestrial and marine ecology, conservation and culture. In Summer 2015 and again in Fall 2016, environmental education interns helped lead a teacher training workshops with the University of Madison's Latino Earth Partnership Curriculum. Interns continue to work with these teachers in local schools to create school gardens and integrate hands on activities into natural science curriculum. Through working with local youth, interns become a part of the community and cultivate respect and love of the reserve and all coastal dry forests of Ecuador.

After the earthquake, Fabiola Vera (a resident of Tabuga) voluntarily started to take care of the community children as a day care. This activity has been growing and is now known as “Mundo Infantil”, a center where the kids of the community go to do homework, learn English or do different activities and games. Furthermore, Interns interested in environmental education can work with Fabiola, continuing the visits to the Reserve or doing activities related with the environment.

Support to ASOAGRITA Association

The association of agriculturalists from Tabuga (ASOAGRITA) was created last October 2016, intends to group all the local agriculturalists that are interested in more sustainable agricultural practices, promoting agroforestry projects (focused on coffee crops) and improving the existing crops. At the same time, ASOAGRITA intends to add value to the coffee product, since the process is done in and by the community to increase the income to the producers. The next step is to build a center to process the coffee, run by and owned by community. The interns could help in different phases of the process, for example giving workshops about topics related with agroforestry and sustainable management of natural resources or helping in the harvest and processing of the coffee (only in harvest season, usually between April and July).