

EARTHWATCH INSTITUTE ANNUAL FIELD REPORT

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Completed by: Sally Silverstone 3T Vakil

Period covered by this report: 2007

Dear 2007 Volunteers,

Once again it has been a really great fieldwork season at Las Casas. We managed to complete our survey of the Native Hardwoods and evaluate some potentially important factors effecting growth in our enrichment plantings, thus completing this part of our study. Due to your diligence and hard work we were also able to get a head start on the next phase of our study in preparation for 2008 teams.

This year we hosted our first family teams and our first teen teams. It really worked for us, and many thanks to all of you who helped to make it work: participants and facilitators. We hope to do many more family and teen teams in the future. Our project is continually evolving and thanks to the data collected by Earthwatch we are able to continually re-evaluate our planting strategies and deepen our knowledge of this incredible piece of rainforest land.

Las Casas really stepped onto the map in the forestry world this year with several great public presentations on our work including a radio show and two presentations at the University of Puerto Rico. Thanks to all of you, we had very relevant data to present, regarding sustainable management and forestry in Puerto Rico.

We had a lot of fun this year with you all, we hope you did too. Keep checking our web site www.eyeontherainforest.org for the latest developments.

Best wishes to you all,

Sally, 3T, Molly, Jo, Andres, Mark, Briony, Steve, Alei,

And of course Moppo and Selva.

Reporting on research objectives

Objective 1: Examining effectiveness of line planting techniques in current plantations for Mahogany and Mahoe.

Some final pieces of information were collected for this study in 2007. We evaluated the canopy types for all mahogany trees in our study plots and also made a more detailed evaluation of the trees position relative to the overall terrain. This data will be correlated with growth data. We also took overall basal area readings for each of the 16 Mahogany study plots. Data was collected on over 100 Mahoe trees to accurately measure diameter at commercial height, using a pentaprism.

This objective is now completed

Objective 2: Researching suitability of various native tree species for line planting techniques.

This work is ongoing. In 2007 we established one new study plot containing 40 seedlings and seven different species. We also continued to gather growth rate data on our eight, previously established study sites.

Objective 3: Pursue long-term monitoring of amphibians and establish a data base that will allow us to detect population trends through time.

This work is ongoing. This year we took six readings from our frog study transect with the Earthwatch volunteers. Volunteers also assisted Pamela Medina with her masters study on the behaviour of *Eleutherodactylus wightmanae*.

Objective 4: To examine the effectiveness of thinning techniques in our current plantings of Mahoe and Mahogany.

This work was not scheduled to begin until 2008 but we were able to start in 2007 by establishing two study plots and two control plots to evaluate the effectiveness of thinning techniques. The preliminary data was gathered on the trees in preparation to carry out the thinning work in early 2008.

Objective 5: To evaluate the availability and abundance of non-timber forest products that are of economic importance on the property, commencing with vines which are a source for fiber used in weaving and handicrafts.

This study is scheduled to begin under the 2008 proposal but we were able to make some preliminary vine studies this year in order to help us establish a suitable plot size for our final study. Twelve 100 square meter study plots were established.

Objective 6: In order to complement our previous studies on the rates of growth and economic potential of a managed and enriched secondary forest we will tag and measure the native timber trees of economic importance for timber in at least 50% (and more if time permits) of our newly established one acre plots.

This study was completed in 2007 and the native hardwood trees over 15 cm in diameter in all 16 of our one acre Mahogany study plots have been tagged and measured.

Non-technical summary of results

Our further work in the Mahogany plots this year was designed to see if there were any other factors that we could find that clearly affected growth. We looked at canopy type and at the position of the tree in relation to the overall terrain. To date this data has not been analysed fully but it seemed clear that the larger dbh mahoganies were the ones that had a dominant or co-dominant crown – this means that they had managed to outgrow the surrounding trees and were getting full sun. This further emphasises the necessity to provide some early thinning and pruning to allow the young trees to get up to canopy level. Suppressed trees (trees that had their entire canopy shaded by others) did very poorly. With the more accurate measurement of diameter of Mahoe at commercial height we will be able to make a better evaluation of the optimum time to harvest these trees and carry out thinning) this will also give us better data on how many trees we need to keep planting and harvesting in the future in order keep a sustainable cycle going.

With one exception *Cordia alliodora*, all our trial seedling tree species are doing well, including our experimental Ausubo, *Manilkara bidentata*, seedling plantation. Ausubo is a rare species now in Puerto Rico and is highly prized for its very hard wood. We introduced several new species for trial this year.

In addition we had a 100% survival rate so far on our new Mahoe seedling plot planted last summer. This plot was planted with seedlings retrieved from our own forest floor the previous year and was the first time we had found seedling regeneration of the Mahoe.

We now have data on 16 acres of native hardwood growth, including the identification and size of nearly all the native hardwoods over 15 cm dbh. Not only will this give informative data on the amount by which we have increased the timber value of the area by enrichment planting – it will also serve as excellent base line data for further studies.

How do these data contribute to achieving conservation impacts? (e.g. actions based on results, management plans, site protection)

All the data collected by Earthwatch volunteers helps us to plan our future work at Tropic Ventures. We will use the study to make long term strategies to ensure continuous production and regeneration of hardwoods and offer the benefit of our experience to others who are looking for sustainable ways to utilize rainforest land.

With regard to the frog study, long term population density data is extremely valuable in order to monitor future changes, especially at a time where amphibian declines are a global concern.

Systematic sampling for levels of chytrid infection will contribute to our knowledge on the biology of a recently evolved pathogen, and on how *Eleutherodactylus* frogs, with their unique reproductive biology may be able to cope with it.

The project site is currently being evaluated to see if it will be suitable for the release of the Puerto Rican Parrots that have been raised in captivity. This is a very rare and endangered bird and the data we have gathered so far will help to establish if we have tree species suitable for the birds.

The project has held approximately 800 hectares of rainforest land as a wilderness preserve for the last twenty-three years. This area is undisturbed apart from minimal access for scientific investigation and hiking. Two of the watersheds that feed Lake Patillas (the local

reservoir) are in this area. Demonstrating that this type of terrain can be used economically without clear-cutting it or destroying the ecology may encourage conservation of similar areas.

What is/ are the significance/ benefits of your research at the following levels?

- Local (to the area of the research site)

Please see the section under presentations and local communities which describes our education outreach efforts and involvement of the local community.

- National / Regional

The overall objective of this project is to find ways to grow native hardwoods (and some introduced hardwoods) without negatively affecting the ecosystem. Puerto Rico currently imports nearly all of its timber from the US and Canada, but a large percentage of that could be grown in Puerto Rico. This would also provide income to rural undeveloped areas such as Patillas (project location), where unemployment can be as high as 40%. The clearing of secondary rainforest in the local area has been done mostly to accommodate agriculture and livestock grazing. As much of the land in this area is on very steep slopes this results in severe erosion and production is poor without heavy use of chemical fertilizers. The project demonstrates sustainable management of timber production, utilizing line-planting techniques that ensure the maintenance of biodiversity, conservation of the soils, and protection of watersheds in this highly vulnerable ecological biome.

Communication of results

Printed: peer reviewed scientific publications; books / book sections; reports, management plans or policies; fact sheets, brochures, leaflets, pamphlets, posters, academic dissertations, annual reports, proceedings of conferences or workshops; letters; newsletters.

Papers under review for publication:

“The Impact of Hardwood Line-planting on Tree and Amphibian Biodiversity in a Secondary Rainforest of Southeastern Puerto Rico.”

In process:

Sustainable Forestry Management Plan, in collaboration with the Puerto Rican Department of Natural Resources, (DRNA), and The International Institute of Tropical Forestry, (IITF)

“Performance of Mahogany, (*Swietenia macrophylla* x *S. mahagoni*) and Blue mahoe (*Hibiscus elatus*) in line-planted plantations in the wet forest life zone of the mountains of south eastern Puerto Rico. A preliminary study for the purposes of sustainable hardwood production management.”

Visual: artwork; visitor centre, poster or display, slides, photographs

1) Photographic Poster for display: 26th Annual DRNA Symposium.

2) Slideshow for use at the project detailing Earthwatch volunteer research work, as well as all project activities.

Digital: database; internet - websites, email group/ blog/forum; CD Rom, e-newsletter

1) Quarterly e-newsletter detailing Earthwatch volunteer work and all project activities. Sent out to (approx 500) past research participants, international contacts, and friends of Las Casas de la Selva. Latest Issue: <http://www.eyeontherainforest.org/rfnewsletter192008.php>

2) The Project Website, www.eyeontherainforest.org (Dec07 to Feb 08, nearly 2000 visitors to the website. Tracking by Google Analytics)

3) Google Video: <http://video.google.com/videoplay?docid=5874896502085020087>
Original images of the biodiversity of our rainforest, research & forestry work, wood production and project life with original soundtrack.

Mass media: broadcast production; film; TV, radio, print (newspaper/ magazine coverage); Press releases; press conference; interview, article creation; press trip

April 2007: Interview for Earthday, Radio Isla, 1320 am, 'Naturalmente', hosted by Silverio Perez, a one-hour discussion focusing on the history, volunteer participation, and current events at the project.

Meetings and conferences: presentations/ lectures; conferences; workshops; training sessions; discussions; local community meetings and events.

Presentations

January 2007: Public talk at the project, '*Issues of Sustainability & the Rainforest*' John Allen, co-founder of the Las Casas de la Selva Rainforest Enrichment & Sustainable Forestry Project.

April 2007: About tree selection for harvest, Luis Rivera, USDA Forester, in the forest. Chainsaw Certification Workshop for USDA Forest Firefighters to fell Mahoe Trees at Las Casas de la Selva. Certifiers and trainers: Anastacio Gomez & Benjamin Fuentes, USDA.

April 2007: Escuela Elemental UPR, Earthday event. Talk and slide presentation of all aspects of Las Casas de la Selva, highlighting biodiversity, research, forestry, and community participation.

May 2007: Presentation in Mercado Organico, Plaza Roosevelt, Puerto Rico. Focusing on sustainable forestry management, research, and sale of wood and products.

July 2007: Frente Ambiental, Amigos de la Naturaleza, Patillas invited Tropic Ventures to show wood and sell products at a local festival.

Sept 2007: Department of Biology – University of Puerto Rico, Mayaguez

Sept 2007: Department of Biology - University of Puerto Rico, Rio Piedras

Both University presentations detailed the tree research and biodiversity studies that have been carried out by Earthwatchers at Las Casas over the last 6 years, with a brief summary of results. New and continuing scientific objectives were also outlined, and future collaborations in research work were solicited and encouraged from professors and students.

Oct 2007: DRNA Symposium – Convention Center, San Juan. Display booth and slideshow.

Educational Opportunities

Does your project directly or indirectly involve the following groups in your research topic?

- **Local communities:** The project employs local labor whenever necessary in forestry related work, and for harvesting, hauling and sawing of wood. It is important that local people really understand what this project is demonstrating with regards to sustainable forestry management practice, its potential economic benefits, erosion control on steep slopes.
Local artisans are employed to make quality items for sale using our sustainably harvested Blue Mahoe Hardwood.
- **Students:** Students of Botany and Biology from University of PR have helped and will continue with botanical identification and specimen collection.
- **Early career scientists:** Jon Every, an ex-Earthwatcher is now President of the University of Reading Botany Society, UK, and has helped with specimen collection, identification and plant propagation. He continues to participate as a *satellite* botanist.
- **Other groups:** Frente Ambiental, Amigos de la Naturaleza, Patillas.

How does your research help these groups better understand and act towards the conservation of a sustainable environment?

Rainforest enrichment provides watershed protection (the local reservoir – Lake Patillas is becoming increasingly silted). Project staff member, Andrés Rúa, is making a clean-up of this lake an annual necessity with the local community of Patillas, along with volunteers from Las Casas de la Selva. In 2007, the local bank in Patillas organized the clean –up, without much prompting.

Demonstrating that this type of terrain can be used economically without clear-cutting it or destroying the ecology may encourage conservation of similar areas. Part of the educational message at the project is purity of water. A Wastewater Garden (subsurface flow constructed wetland, planted with a diversity of tropical wetland species) onsite ensures that no polluted water from the homestead is contaminating ground or river water. All visitors are made aware of this treatment of their waste water, and inspired, we hope, to create these gardens as part of sustainable communal living.

Erosion control. Our project is an excellent illustration of the necessity to keep the steep slopes of the local terrain covered in trees. Clear-cut areas just off the borders of our property show signs of deep erosion gullies and land degradation. The project offers an alternative approach to use of this type of terrain.

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