VOLUME I

SUSTAINABILITY REPORT

RESERVA ECOLOGICA PANAMAES

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PUERTO ESCONDIDO, PEDASI,
AZUERO PENINSULA, PANAMA

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EXECUTIVE SUMMARY

WHO WE ARE

Reserva Ecologica Panamaes is a 507 hectare land tract on 4km of coastline in the Azuero Peninsula composed of properties whose owners are united in their vision to regenerate and conserve the terrestrial, coastal and oceanic ecosystems through sustainable land management.

The Azuero was once a flourishing jungle ecosystem that provided a wealth of natural resources, and has long served as Panama's agricultural and cultural heartland. The native land cover, dry tropical forest (TDF), is conducive to agricultural practices due to its prolonged dry season, which subdues pest and weed cycles and enables fires to be an effective method of clearing pastures and fields. This history of cultivation has decimated the native forest: from 1992 to 2008, the province of Los Santos lost approximately 40,076 hectares of forest[1]. In 1903 Panama had 87.7% forest cover and in 2012 40.4%[2]. The continual extraction of natural resources and unsustainable land-use caused rapid soil degradation, erosion, contaminated watersheds, and loss of biodiversity.

The Panamaes property was no exception when we started Phase 1 in 2009: decades of slash-and-burn, cattle, and teak farming had degraded the natural environment. The property was a mosaic of abandoned pasture, teak plantation and isolated stands of remnant secondary forest. The native land cover, Tropical Dry Forest (TDF) once covered nearly half of the world's tropics[3]; now less than 2% is sufficiently intact to receive attention from traditional conservationists, making it the world's most endangered tropical forest type[4].

OUR VISION

To be a world-class model of sustainable development on the Azuero, characterized by environmental conservation, local community engagement, and outstanding sustainable living.

To regenerate the tarnished landscape and restore the critically endangered ecosystem, we developed Reserva Ecologica Panamaes: a long-term land management program to preserve the property's remaining natural capital. This model includes restoring the ecology of the degraded landscape, generating notable value for the surrounding community, and creating a case study for how private landowners can mitigate regional and global environmental concerns.

Since the outset of our plan in 2009, our vision has been realized through the initiatives outlined in this document and most notably has resulted in 60 hectares of reforested dry tropical forest, the stabilization of watersheds, removal of 10 hectares of destructive developments on the property, and extraction of 40 hectares of exotic teak plantations.

[1] CATIE et al. Análisis De Cambio De Uso De La Tierra (1992 2008) Y Formulación De Escenarios De Deforestación Futura De Los Bosques De Panamá. UN-REDD+ Panama, Dec. 2013
[2] Cherrington, Emil A. Asistencia Técnica Para El Mapeo De La Cobertura Boscosa De Panamá, Estimación De Tasas De Deforestación Y Proyección De Cobertura Boscosa Del 2014 Al 2035. Centro Del Agua Del Tropico Humedo Para America Latina Y El Caribe (CATHALAC), Nov. 2014
[3] Ceccon, Eliane, Pilar Huante, and Emanuel Rincón. Abiotic Factors Influencing Tropical Dry Forests Regeneration. Centro Del Agua Del Tropico Humedo Para America Latina Y El Caribe (CATHALAC), Nov. 2014
[4] Janzen, Daniel. Chapter 14: Tropical Dry Forests The Most Endangered Major Tropical Ecosystem. Biodiversity. National Academies Press, 1988

A LAND AND IT'S PEOPLE

Sustainability goes beyond the environment. Land use is also an economic and social issue, and thus employment, social equality and economic growth and resiliency are conservation imperatives. The prioritization of social, economic and environmental purpose in our land management ensures that the legacy benefits of Reserva Ecologica Panamaes are not confined to the borders of our reserve, but extend to our neighbors and beyond.

LOCAL ACTION, GLOBAL IMPACT

The practical application of our vision will regenerate the local landscape in a manner that addresses global threats such as climate change and exotic species invasion by promoting ecosystem resilience, biodiversity, and carbon sequestration, and maintaining ecosystem services such as clean water, food and fiber production.

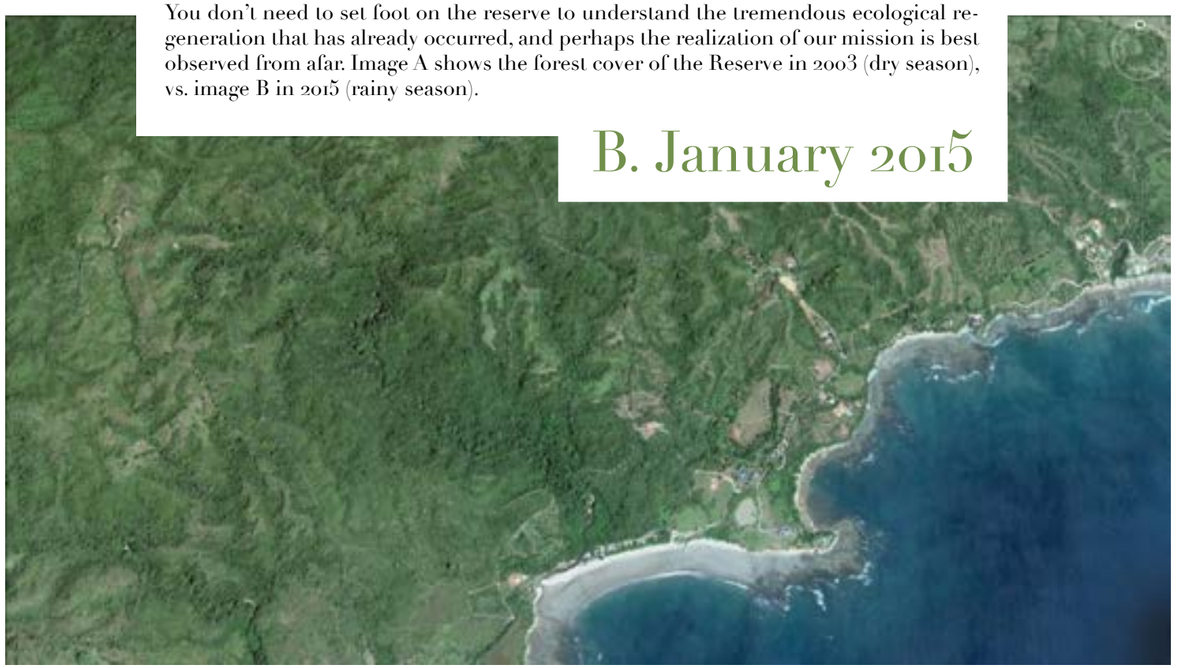
RESERVA ECOLOGICA PANAMAES - FOREST COVER MAP 2009-2015

"With almost 60% of [dry tropical forest] total extent currently extinct, and the remaining forests experiencing high levels of forest fragmentation, new efforts are urgently required for understanding land use/cover change processes."

— SANCHEZ-AZOFEIFA, ARTURO, GERALDO W. FERNANDES, JENNIFER S. POWERS, JENNIFER SARAH. POWERS, AND GERARDO-ARTURO SANCHEZ-AZOFEIFA. TROPICAL DRY FORESTS IN THE AMERICAS. N.P.: CRC, 2013.

A. March 2003

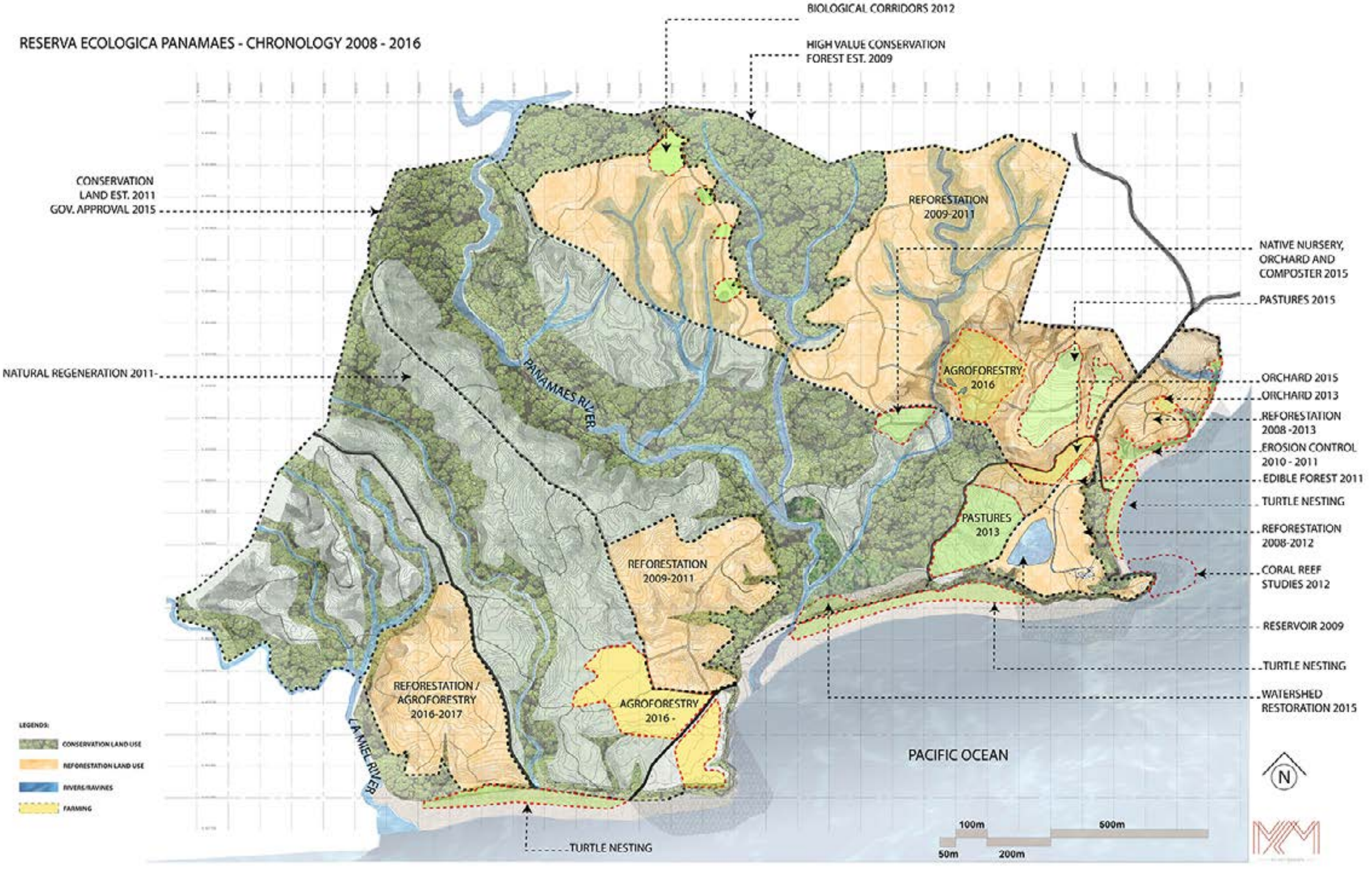
You don't need to set foot on the reserve to understand the tremendous ecological regeneration that has already occurred, and perhaps the realization of our mission is best observed from afar. Image A shows the forest cover of the Reserve in 2003 (dry season), vs. image B in 2015 (rainy season).



B. January 2015

Note: January marks the very beginning of the rainy season and March marks the latter part. Consequently, it's important to understand that the vegetation in considerably drier in March. Unfortunately, aerial imagery from the same months are not available.

RESERVA ECOLOGICA PANAMAES - CHRONOLOGY 2008 - 2016



PROJECT OVERVIEW

Our active land management efforts began in 2009 with the commencement of our mission to reforest this landscape under the company Main International SA #533631 (Reforestation Certification #ARALS-032010), a 127-hectare tract of land. At the outset of the project, this area was a mosaic of abandoned pasture, teak plantation and secondary forest and sufficiently illustrated a complete picture of the historical landscape degradation that took place.

The second phase of the project began with the acquisition of 380 hectares in 2011. This plot was adjacent to the phase one reforestation to the West, and land coverage consisted of a variety of forest types in different stages of succession: 6ha of primary forest, mature secondary forest, early successional secondary forest and abandoned pasture. This phase brought with it the management of the Panamaes River, the eastern side of the La Miel River and over 3 kilometers of coastline. This expanded the purview of our land management initiatives through the addition of programs in turtle conservation and coral studies, more intensive watershed management and forest management responsibilities, and other initiatives outlined in this document.

In the timeline on the following page, the trajectory of our conservation, farming, coastal management, social engagement and eco-tourism programs can be viewed at a glance to understand how our holistic land management program has progressed.

"We hope that by uniting private development with responsible land management practices and collaboration with the local community, we can preserve the incredible natural beauty and resources of the Azuero for generations to come. With this vision in mind, we are committed to environmental conservation."

– MAX LIECHTENSTEIN, PROPERTY OWNER, PANAMAES

Our first concern was with preserving the remaining tracts of forest, reforesting heavily degraded areas, and removing invasive species. The reforestation effort we began 7 years ago has resulted in over 60 hectares of new forest and over 60,000 trees planted. In 2009 we also initiated our soil health management program, created a lake and installed erosion control to support a healthy watershed, removed former destructive developments on the property, and installed firebreaks and wildlife protection measures. Crop production and perennial farming followed with our first orchards. With increased soil health we expanded that effort to include agroforestry, farming and a native plant nursery. With the acquisition of phase two, we launched our coastal management program, which has grown to encompass in-depth coral studies, beach-clean up programs, turtle conservation and watershed restoration. Social engagement was a priority early on, and we have provided our local employees with international training and research opportunities focused on conservation, sustainable agriculture, eco-tourism and safety management. We have a long-standing relationship with the local community, organizing beach cleanups, education programs related to tropical forest ecology, reforestation, organic farming, and waste management solutions. With these various programs flourishing, we are working with the land owners who support Reserva Ecologica Panamaes to implement conservation-driven tourism efforts. This includes the development of trails, and waste management solutions and farm-to-table dining experiences that aim to reach our eventual goal of to sourcing 2/3 of the food for the property from the farm, and all waste is recycled onsite.

The result is a land tract that is virtually unrecognizable from the degraded landscape surveyed at the outset of our land management program, an important example of dry tropical forest restoration and an exemplary case study in how environmental objectives can support social and economic objectives. Our holistic approach to land management is key to the success of this comprehensive effort and is further discussed in the following section of this document.

FSC STANDARD FORESTRY

The Forest Stewardship Council (FSC) is a non-profit organization that works to promote responsible forest management through a system of standards, certification and labelling of forest products that meet stringent standards and regulations. The forests of Reserva Ecologica Panamaes received certification in 2010 and 2012 for successfully meeting FSC forest management standards. Additionally, the Reserve's two high-priority forest stands received High Conservation Value Forest status through FSC certification. Achievement of FSC standard forestry was crucial in the progression of our land management approach, establishing an internationally recognized set of environmental and social principles by which we continue to operate today.

60%

INCREASE IN FOREST COVER REGENERATION FROM 2003 TO 2015

60,000

TREES PLANTED

9.8

HECTARES OF WATERSHED PROTECTION

11

OF PANAMA'S ENDANGERED SPECIES HAVE BEEN SIGHTED IN THE RESERVE

36

FULL-TIME JOBS CREATED FOR LOCAL PANAMANIANS

PROJECT TIMELINE

This document outlines the various steps that have been taken in the pursuit of our vision, summarizing the trajectory of the project's development. The colored bars indicate when the intiative began on the timeline below, and the numbers indicate the page where you can find a detailed project description.

CONSERVATION
17

- FSC Certification 1
- FSC Certification 2
- 5. Reforestation
- 8. Water Reservoirs
- 10. Restoration of Landing Strip
- 12. Soil Health Management
- 15. Firebreaks and Wildlife Protection
- 16. Restoration of Biological Corridors
- 17. MiAmbiente Collaboration: Animal Relocation

FARMING
29

- 30. Orchard
- 31. Agroforestry
- 31. Organic Farming
- 31. Native Plant Nursery

COASTAL MANAGEMENT
33

- 33. Reef Protection
- 34. Coral Studies
- 35. Quarterly Beach Clean-ups
- 37. Turtle Conservation
- 39. River Restoration

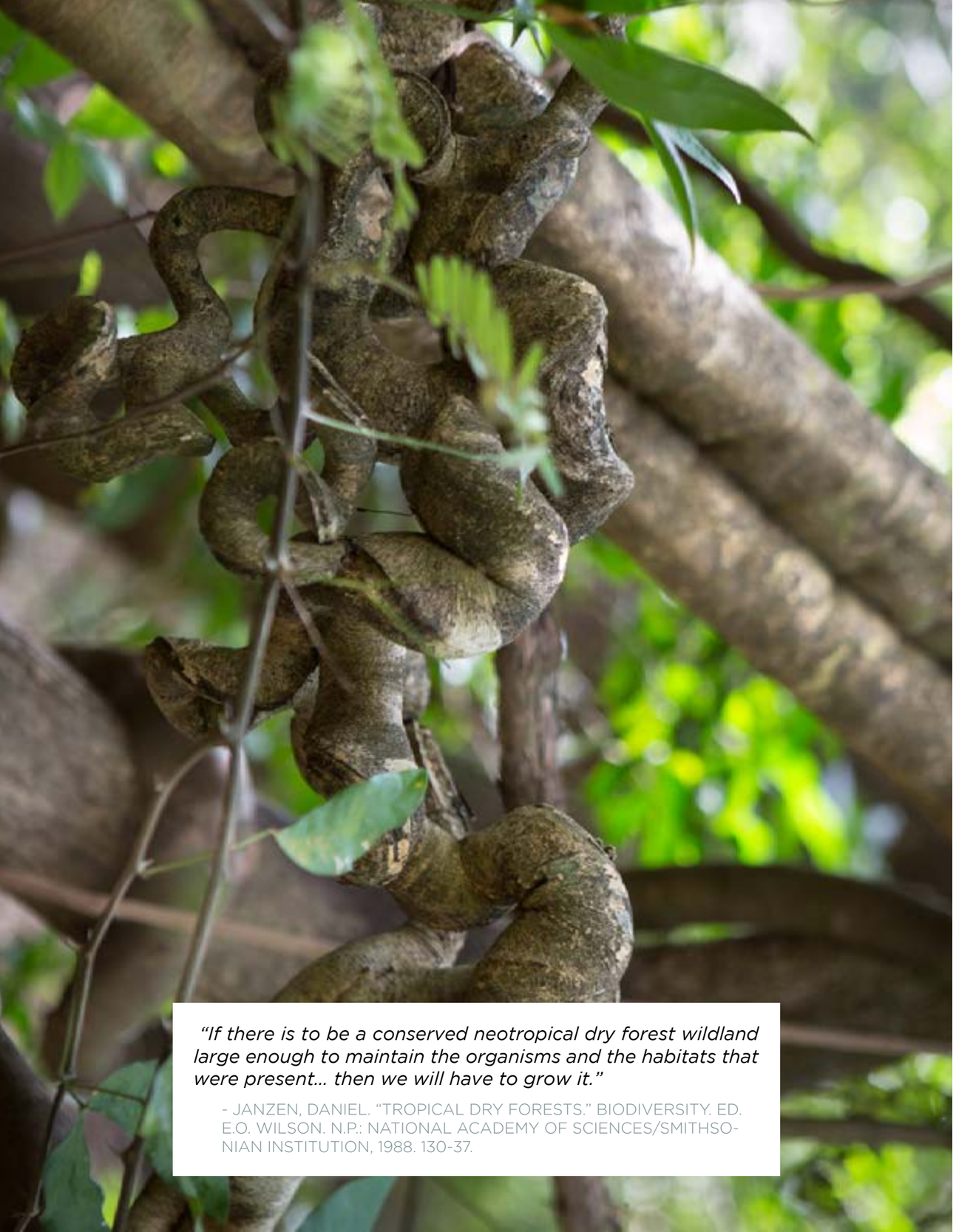
SOCIAL ENGAGEMENT
41

- 36. Community Beach Clean-ups
- 42. International Training for Employees
- 43. Safety Management
- 43. Environmental Education and Research Opportunities

ECO-TOURISM
45

- 45. Trail Construction
- 46. Waste Management and Compost

2009 2010 2011 2012 2013 2014 2015 2016



"If there is to be a conserved neotropical dry forest wildland large enough to maintain the organisms and the habitats that were present... then we will have to grow it."

- JANZEN, DANIEL. "TROPICAL DRY FORESTS." BIODIVERSITY. ED. E.O. WILSON. N.P.: NATIONAL ACADEMY OF SCIENCES/SMITHSONIAN INSTITUTION, 1988. 130-37.

MANAGEMENT APPROACH

The five areas of focus in our land management plan conservation, farming, coastal management, social engagement and eco-tourism - are interconnected and holistically managed to support the environmental social and economic objectives of the property. A cohesive management regime is crucial in uniting the various uses and functions of the property with local, regional and international conservation priorities.

Land management practices are often segregated into their respective fields by funding sources and interest groups: conservation, farming, timber extraction and development are traditionally managed in isolation. Not only do these practices rarely intersect, but they often conflict, vying for the same limited resource healthy, productive land. We believe that environmental, social and economic objectives can be united to drive sustainable and productive land use by applying a holistic approach that strengthens interconnections among these objectives and supports the various uses the landscape can support.

For example, sustainable farming and food production can be integrated within the larger landscape by creating ecologically functional farming systems that we manage for soil health and biological connectivity through the incorporation of native species and preservation of continuous forest cover. This landscape approach to farming increases biological diversity and interconnectivity, and ultimately ecological health throughout the reserve. In order to thrive, both reforestation and farming require the services that only a healthy ecosystem can provide, such as well-structured, nutrient-rich soil or a healthy watershed that retains sufficient water.

We understand the interconnectivity of natural systems and address this in our management programming. Like nature itself, we approach management as a cyclical, interconnected system watersheds are supported by forest cover and robust root systems to control erosion and hold water, root systems that retain topsoil and nourish our reforestation projects and a diverse system of orchards and gardens. Food production feeds and drives our ecotourism, as does the presence of healthy ecosystems, in the form of restored forests and clean beaches, and the ability to view rare birds and sea turtles. A healthy forest ecosystem requires biological diversity and interconnectivity to survive and provide its ecosystem services. The biophysical interaction of native animal species is crucial to maintaining biodiversity and facilitating natural regeneration. This is supported through reforesting biological corridors and this requires social engagement such as education to reduce poaching. Each project mutually benefits the other and is strategically aligned under a larger management paradigm that ultimately drives our environmental, social and economic objectives.

Adaptability is key to maintaining this balance. To practice informed decision-making and understand the impact of the individual programs, monitoring, recording and researching play a key role our land management regime, They allow us to invest into the program intelligently and develop new initiatives that support our greater vision. This holistic, adaptive land management strategy is an important opportunity for us to not only develop and better inform our management decisions, but also drive understanding of sustainable development, ecology and forestry in the tropical dry forest biome.

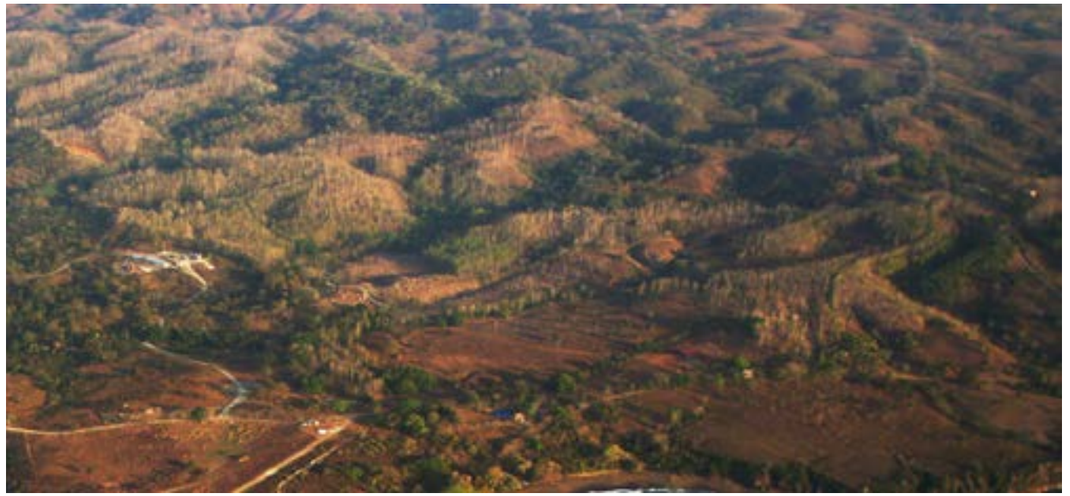
2. FOREST CONSERVATION AND ECOSYSTEM REGENERATION

MANAGEMENT OVERVIEW

Our approach to forest conservation and reforestation management is largely driven by our forestry engineer, Emilio Mariscal, from the University of Panama. We manage woodlands through sustainable forestry with the aim of protecting and facilitating natural processes that ensure the continuance and development of essential ecological processes, while also maintaining economic productivity. The underlying goal is to keep forest crowns intact, which in turn maintains the key themes associated with sustainable forest management: watershed protection, biological interconnectivity and soil health management.

REFORESTATION

Our first milestone is in 2009, when the reforestation efforts began at the land denominated Barsuza SA #32765. Upon acquisition the land composition was 44.5 hectares of teak plantation, 17.2 hectares of abandoned pastures, and 62.9 hectares of secondary forest in varying stages on natural succession, and 26.2 hectares high conservation value forest. Historically, Main International had experienced a prolonged period of extensive resource extraction and unsustainable land management practices. The native forests had been harvested: an ecologically diverse dry tropical forest had been replaced with cattle pasture and teak plantation. The landscape was barren, with depleted and eroded soils and diminished biodiversity.



Aerial image at teak plantation 2009

Tropical soils are highly weathered and nearly all of the mineral nutrient capital is held in the forest's vegetation. In this environment the leaf litter is recycled rapidly due to consistent warm temperatures and moist, humid conditions for a large proportion of the year. Trees are the source of organic litter, offering organic compounds from the leaves that help maintain a favorable soil structure, and providing much needed protection for soil from heavy rain, wind events and direct sun during the dry season. When trees are clear-cut, the site is stripped of its essential nutrient capital and the soils are exposed to further degradation brought on by significant precipitation events. Once soils are heavily weathered and depleted, such as these, the diminished nutrient stock makes reforestation efforts more challenging. In order to address this challenge we focused on generating a large quantity of organic matter on site by incorporating a great deal of early-successional pioneer species in our forestry plantation mix. As the project progressed we gradually thinned these species, leaving them to decompose on site. The topography of Main International is steep, varying between 30-70%. Considerable slopes leave the soil susceptible to erosion, which can be quickly exacerbated by poorly conceived land management regimes. Decades of unsustainable, intensive production practices, namely clear-cutting, cattle farming and teak plantations, resulted in a soil health that was heavily depleted: highly acidic, with low organic matter content and virtually no available phosphorus.

Before: View looking west from the northern pasture toward the reforestation project in sector 4.

2009

During the period in which teak was removed from the site, a series of erosion control techniques were implemented. One method was to build erosion barriers by using six-inch diameter teak logs anchoring them on a slope's contour using stakes. This technique proved very effective in holding topsoil in place. We continue to use a similar strategy during forest thinning treatments by placing cut logs, branches, leaves and other organic matter on the slope's contour. Erosion was also control by planting vertiver grass (Chrysopogon zizanioides) and piñuela (Bromelia penguin) to stabilize soil around roads. In addition, high-risk areas with extreme slopes were left untouched to maintain vegetation cover.

Soil tests at the outset of the reforestation project marked the beginning of our reserve-wide soil health monitoring operation. After 6 years of regenerative land management regimes the soils of Main International have experienced an average increase in soil pH of 1.1, from 4.8 to 5.9. Improved soil health and erosion prevention yield bigger benefits, such as aiding forest growth, carbon sequestration and balancing of the local hydrological cycle.

THE IMPACT OF TEAK ON LOCAL ECOLOGY

Teak plantations have little understory growth, leaving soil more susceptible to erosion than native species plantations. Teak modifies the soil environment making it difficult for native species to regenerate. This is why teak plantations have less ground cover vegetation and consequently higher levels of erosion.

Seasonal land clearance caused long-term ecological damage by eliminating lack of seeds and local seed dispersers. However, within the property lies a 26.2-hectare high conservation value forest, consisting of approximately 20 families and 28 species of plants. Close proximity of a healthy native forest tremendously aids and expedites our restoration efforts by providing the ecosystem services necessary to foster and support regeneration, namely a bank of native seeds and the habitat to support birds, bats, raccoons, deer, and rabbits, among other native seed dispersers.

Our active restoration process began in 2009 with the harvest of 20 hectares of teak followed by the establishment of a diverse 20 hectare native species plantation consisting of 26 different species, notably Terminalia Amazonia, Cordia alliodora, Cedrela odorata, and Dipteryx oleifera, among other native species.

After: View looking west from the northern pasture toward the reforestation project in sector 4.

2016

"Invasive exotic species are causing dramatic changes in many ecological systems worldwide, and there is no question that invasive species are profoundly altering many communities and ecosystems. Seeing these widespread changes, biologists, environmentalists and managers are alarmed about invasions leading to large-scale declines and extinctions of natives.[1]"

FIREBREAKS AND WILDLIFE PROTECTION

Since our pioneering effort in 2009 to regenerate soil health in the depleted sections of the Reserve, our reforestation efforts have grown to include an extensive ecological regeneration plan that is characterized by fire suppression, hunting prohibition, native tree planting and periodic teak clearing treatments.

In dry forest regions agricultural fields are often managed with fire. The intense dry season creates optimal conditions for fire to spread unintentionally: the 5-month dry season creates incredibly dry vegetation that is easy to ignite and the time of year also brings strong and consistent winds from the north. In order to protect the Reserve from wild land fires, the property lines have a four-meter fire break with live fence in the middle. Strategic thinning projects are administered in order to reduce ground and ladder fuels in an effort to manage the risk associated with spreading wild land fires. There are also approximately 15 km of trails and 11 km of road that are used as supplementary fire breaks in the event that fire spread onto the reserve.

Fauna play a crucial role in facilitating natural regeneration. In addition to their natural beauty we see the animals living in the Reserve as our most diligent workers, transporting seeds through out the immediate landscape and beyond. From the Reserve's beginning our conservation areas attracted a considerable amount of wildlife in relation to its surroundings. For this reason poachers would visit the Reserve with frequency in search of wild game, notably Conejo Pintado/ Spotted Paca (Cuniculus paca), venao/deer (Odocoileus virginianus), Iguana (Iguana iguana), and Sea Turtles (Chelonia mydas/Lepidochelys olivacea.) We prohibited hunting in the Reserve to address this issue and protect the species who live in the Reserve. This involved placing necessary signage to inform the public, installing a fence around the property, and patrolling the property for poachers.

1 Gurevitch, Jessica, and Dianna Padilla. "Are Invasive Species a Major Cause of Extinctions?"*TRENDS in Ecology and Evolution 19.9 (2009): 470-74*

Invasive species introduction is ranked as the second greatest threat to biodiversity only after habitat destruction, namely forest clearance.[1]

RESTORATION OF LANDING STRIP

This site had been cleared for cattle pasture and the construction an airplane landing strip made of packed soil and gravel. The existing ecology was very simple, having little species diversity that consisted of Swazi grass (Digitaria swazilandensis) and sparse forest cover, including a few mango trees and native species trees. The soils were heavily depleted and weathered at the beginning of the project. In order to restore this piece of the landscape, the packed soil was broken up and conditioned in preparation to reforest. A diverse mix of more than 15 different native tree species were planted to restore the local ecology.

FOREST COVER MAP 2003-2015

WATER RESERVOIR CONSTRUCTION

Concerted efforts have been made to bolster the ability of our landscape to most efficiently manage water in the face of both water scarcity and intense rain events. Degraded landscapes, like our Reserve was at its beginning, are less effective at holding water through dry periods and slowing its flow during strong storms. In addition to reforesting the landscape, we have initiated a series of projects to effectively manage the watershed and regenerate the ecology that protects, stores and filters this vital resource through the construction of reservoirs and buffer zones.

Healthy watersheds are key to sustaining life. The leading causes of pollution in waterways are sediments, bacteria and excessive nutrient runoff, namely nitrogen and phosphorus. Sedimentation is a chief concern in managing our landscape as it can have detrimental impacts on fish communities. Watershed management is our approach to protecting rivers, streams and lakes on the property through actively managing the land, i.e. watershed that drains into these water catchments.

In 2009 we shaped a lake into the landscape and planted a diverse array of native species trees around it. In addition, a series of erosion control strategies were implemented to prevent erosion caused by water overflowing from the lake to Panamaes beach. One solution was to plant Brachiaria decumbens with natural coconut fabric on the coastline to help support vulnerable sections of the lake's shore. Another measure was to bolster the earth between the lake and beach using teak logs and stakes to keep soil in place and propagating Maní forrajero (Arachis pintoi), an effective ground cover. The lake was cultivated to capture and store water to be used in a drip irrigation and sprinkler system. The outcome was a lake ecosystem that helped to revitalize the local ecology and supply fresh water needs for the property.

BIOLOGICAL CORRIDORS

Maintaining biological interconnectivity is a crucial underlying objective in our land management plan, and we work to maintain biological corridors throughout the Reserve. Healthy forest ecosystems depend on well-protected biological corridors to promote ecological health and natural regeneration by way of fostering species migration and seed dispersion. At the outset of our project, these corridors were broken by pastureland and deforestation. To connect the two High Conservation Value Forests, a series of biological corridors were established in 2012 by planting a diverse mix of approximately 20 different species of native species trees. These trees, such as Almendro de Montana (Dipteryx oleifera) Guaba (Inga sp) and Laurel (Cordia alliodora), attract wildlife, birds, mammals, butterflies, bees, and countless other insects, helped to facilitate migration.

SOIL HEALTH MANAGEMENT

With the addition of Phase 2 in 2011, the amount of land in our project quadrupled, adding a range of historic land-uses and varying stages of ecological succession. A soil health management plan was initiated to remediate and improve the nutrient content and overall health of the soil across the entire landscape. A soil monitoring protocol was implemented to track regeneration and to support the overall reforestation and landscape regeneration goals.

An initial qualitative assessment was administered to capture the general conditions of soils throughout the property, by evaluating historical land-use, such as teak plantation or abandoned pasture, and determining future land-use, which included forestry plantation, conservation forest, agroforestry or pasture. This initial assessment informed our reserve-wide soil monitoring protocol. Soil quality is monitored by observing the biological component (total carbon), the chemical component (primarily soil pH, total and mineralizable Nitrogen, and Phosphorus), and the physical component (bulk density).

These soil components are monitored throughout the property corresponding to a network of monitoring transects that are designed to give us a comprehensive picture of soil health in the various land-uses and regions of the reserve. This program enables us to observe key indicators of ecological health, track the impacts and effectiveness of our land management strategies and projects, and ultimately make more informed decisions in the future.

MIAMBIENTE COLLABORATION TO RELOCATE NATIVE ANIMALS

Following decades of destructive land use, the species variation on the reserve was missing key species that are present in the native population. As a step in regenerating the landscape to its natural balance, we developed a relationship with the Minister of the Environment's Department of Protected Areas and Wildlife (Departamento de areas protegidas y vida Silvestre de MiAmbiente) in Las Tablas to relocate displaced native fauna to the Reserve. To date we have administered three separate relocations: 1 Armadillo (Dasypus novemcinctus), 3 Nasua (Nasua narica), and 1 Mapache (Procyon cancrivorus). We welcome displaced native fauna to the Reserve for the same reason that we prohibit poaching: we understand the important role they have in a healthy ecosystem and the tremendous impact they can have in facilitating natural regeneration through seed dispersion.

3. FARMING AGROFORESTRY AND REGENERATIVE FARMING SYSTEMS

MANAGEMENT OVERVIEW

We design of our farm systems under the same lens that we approach our forestry projects: to create healthy and resilient ecosystems that support native land cover. The overarching mission of the farm operation is to implement ecologically regenerative and functional farming practices that will improve the holistic health of the soil. This includes increasing organic matter, eliminating the use of chemicals and tillage, and incorporating a diversity of native and locally adapted trees and perennial crops. Farming systems that improve the ecological health and structure of the agricultural ecosystem are not only ecologically responsible, but help us to grow better tasting produce, reduce input costs, and better withstand environmental elements, such as drought, strong winds, pests and diseases.

Forests and trees play an essential role in global food security and dietary diversity: by incorporating trees into farming systems we can create more resilient farm ecosystems that provide ecological benefits, sequester a larger amount of carbon and provide a buffer to climate change impacts and changes in environmental and economic landscapes.

The mission of the farming project is to utilize practices that bolster and protect the holistic health of the local ecosystem without sacrificing yield. In 2016, we will continue our efforts to expanding the farm operation, working towards a system of orchards, farms and gardens incorporated into the forest landscape. The underlying goal of sourcing the majority of produce needs from the property, with the exception of various specialty and bulk items and season-dependent produce.

AMA ESTANCIA

Located on Main International on the cliffs that front Puerto Escondido is AMA Estancia, a private villa estate completed in 2012. The 17,000-sqft villa with its neighboring pool house, stables and tennis center was designed as an ecotourism estate that integrates the highest level of hospitality service. The estate's farm-to-table program is integrated directly into the reforestation project: a biologist and farmer from our conservation team work directly with the chefs at the estate so that the natural yield of our farming projects is reflected in the culinary process and vice versa.

AMA ESTANCIA ORCHARD

An organic garden, nursery and orchard were established at AMA Estancia, encompassing approximately 4000 square meters of an area that was previously an abandoned pasture. The site was formerly degraded with little vegetation and depleted soil that lacked organic matter and nutrients. The AMA Orchard is a forest design that incorporates a large variety of species to realize a diversified, high quality yield of various fruits, vegetables and herbs. Forest gardening has a long history in the tropics; there is evidence of this practice dating back 1,500 years. The basic premise entails putting plants together in woodland-like patterns that forge mutually beneficial relationships, creating an ecosystem that is more than the sum of its parts. At the site of AMA Estancia, the degraded soil present when we began was not sufficient to support a crop yield. After seven years of planting a diverse, organically structured forest orchard, the soil is nutrient rich and yields year-round harvests.

ORCHARD AGROFORESTRY

Agroforestry is a land-use approach that involves the integration of trees and other woody perennials with crop fields. A 3,000 square meter agroforestry system was established at Reserva Ecologica Panamaes in 2013 that contains a diverse mix of fruit trees, such as Limon persa (Citrus latifolia) Limon criollo, Carambola (Averrhoa carambola), Mango (Mangifera indica), native species, Laurel (Cordia alliodora), Guachapalí (Samanea saman), Macano (Diphysia americana) and Corotu (Enterolobium cyclocarpum), and yucca and a ground cover, Maní forrajero (Arachis pintoi).

ORGANIC FARMING

This farming system includes a variety of staple crops, such as guandu, yucca, plantains and bananas, with a few specialty crops such as dragon fruit and cucumber. One side of the farm plot is also bordered with mango trees.

NATIVE PLANT NURSERY

The intensification of our reforestation, regeneration and landscaping efforts created a consistent need for a large quantity and variety of native species, and made constructing an on-site native plant nursery a necessary addition. The nursery includes a germination and preparation space, sun and shade areas and ample space to produce large quantities of native species for distribution throughout the Reserve.

4. COASTAL MANAGEMENT

MANAGEMENT OVERVIEW

The estate rests on approximately 4 kilometers of coastline composed of a bay, bluffs, coral and rock reef and approximately 3.5 kilometers of accessible sand beaches. The property's coastline is not only incredibly beautiful but possesses considerable natural value. In 2012, a coastal management plan was developed with the aim of taking a holistic approach to managing the various determinants of the coastline's ecological health. This management plan addresses sedimentation, coastal ecosystem restoration, and protection of endangered animals and their habitat, all of which largely influence our terrestrial land management practices in the coastal zone.

Preserving and restoring the ecological health of our coastline largely determines our coastal land-uses and development strategies. The coastline is a primary ecotourism motivator, making it imperative that conservation priorities direct our ecotourism and social engagement programs. Our terrestrial programs also work to protect the coastline: special precautions are taken to reduce sedimentation, by planting to protect against erosion and reforesting coastal areas as much as possible. Light emission from coastal building projects are intentionally managed in order to ensure that light pollution does not interfere with sea turtle nesting activity. Our approach to managing the coastal zone also includes a robust monitoring protocol to observe the health of the marginal reef in Puerto Escondido, water quality and sea turtle activity. These efforts are discussed in greater detail below.

SEDIMENTATION CONTROL AT PUERTO ESCONDIDO

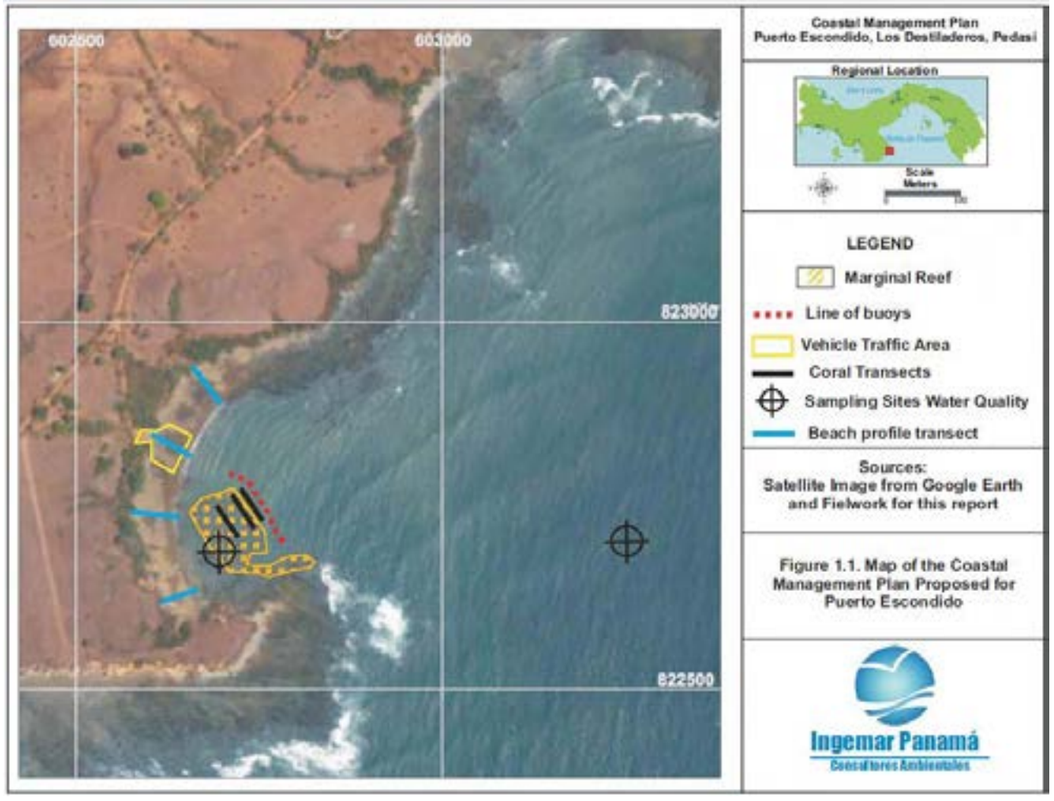
Terrestrial zones have a notable influence on coastal health. It was evident that the significant erosion occurring in the immediate watershed feeding into Puerto Escondido was leading to sedimentation in the bay and causing notable reductions in pH that were adversely impacting the coral health. Consequently, decisive action was taken to combat this through the construction of catch basins and the establishment of native vegetation to stabilize the soil on steep slopes. Vetiver grass (Chrysopogon zizanioides) was planted to stabilize the beach-front slopes of Puerto Escondido.

CORAL STUDIES

Coral reefs are among the most biologically diverse and valuable ecosystems in the world. As a significant ecosystem within the landscape that we manage, a formal study was conducted in 2012 on the marginal reef in Puerto Escondido by Ingemar Panama Environmental Consultants. This study analyzed the coral reef substrates, the coral diversity of the reef, and the flora and fauna associated with the reef. In addition, an important investigation was administered on the oceanographic dynamics impacting the reef ecosystem, namely the tides, water quality, bathymetry, waves, and currents.

The study was conducted in order to identify coral communities, create a monitoring baseline, evaluate the possibility to repopulate the bay with corals, identify management actions to improve coral and fish health, and identify additional monitoring actions to very effectiveness of management actions on coral health. To complete the study, the environmental consultants free dove and performed two scuba immersions. They found that there are two substrates present in the bay that contain coral: a 300 m2 Marginal Reef and a rocky area with dispersed colonies of reef. The Marginal Reef was found to be quite young, not more than 600 years old. Made up of nine different species of coral, including Common Branching Coral (Pocillopora damicornis) and massive coral (Pavona gigantean.) The northern part of the Bay and the continuation of the rocky shore towards the east contain a mix of basalt rocks covered with dispersed colonies of branching and massive corals.

This study revealed a higher than optimal level of sediment in the bay and prompted us to take additional erosion control actions. In 2012, we focused our efforts on stabilizing the immediate ravines that empty into the bay by propagating Vetiver grass (Chrysopogon zizanioides) with the help of natural coconut fiber.



"Healthy coral reefs support numerous important fish and aquatic species, which in turn support local fisherman and eco tourism - they are some of the most biologically and economically valuable ecosystems on earth. We knew how important it was to ensure the reefs fronting Puerto Escondido will maintain their biodiversity and health so that the coastline can be enjoyed for generations to come. We look forward to long-term protection of this incredible reef system."

- ERIC ZINTERHOFER, LANDOWNER

QUARTERLY BEACH CLEAN-UPS

Unfortunately, a considerable amount of oceanic trash washes ashore, necessitating periodic cleanups. The presence of plastic trash on the beaches is due to the intersection of endemic global waste issues and the configuration of oceanic currents in the Pacific Ocean. Ocean waste, specifically plastic, presents a serious problem to health of marine species and ecosystem as a whole. It never fully decomposes, only breaks down into smaller and smaller pieces, which many marine species mistake for food. We see it as our responsibility to provide a public service by periodically removing ocean waste from the three beaches that line the reserve's coastline. All recyclable material is removed from beaches once each quarter and resulting waste is sorted; the recyclable material sent to be recycled and the non-recyclable material disposed of properly.

TURTLE CONSERVATION

The property's beaches and the surrounding region experience high mortality rates with regard to sea turtle nests and hatchings. In addition to natural threats, such as crabs or birds, nests and hatchings must endure invasive species predation by coyotes and dogs and a host of anthropogenic threats in the form of poaching, marine debris ingestion and entanglement, and poorly planned coastal development resulting in the presence of artificial lighting and nesting habitat destruction. Locally on our beaches, it is clear how the two observed species of sea turtle, Olive Ridley (Lepidochelys olivacea) and Green Turtle (Chelonia mydas), came to be categorized as vulnerable and critically endangered, respectively, by The IUCN Red List.

Sea turtle nests experience an alarmingly high mortality rate. In addition to their natural predators, sea turtles must also endure invasive predators, namely dogs and coyotes, and a host of anthropogenic derived threats in the form of poaching, marine debris ingestion and entanglement, and the destruction of nesting habitat and obstruction of nesting activity due to poorly conceived development. Locally on our beaches, it is clear how the two observed species of sea turtle, Olive Ridley (Lepidochelys olivacea) and Green Turtle (Chelonia mydas), came to be categorized as vulnerable and critically endangered, respectively, by The IUCN Red List.

The first step in addressing this complex problem is taking the necessary measures to fully understand its intricacies. In order to design conservation efforts most effectively, continued ecological monitoring of species composition, nesting habits and turtle egg predation dynamics are crucial. In this effort an initial monitoring program was initiated during the peak turtle nesting season, September through November, 2015. This monitoring program was design to satisfy the following objectives:

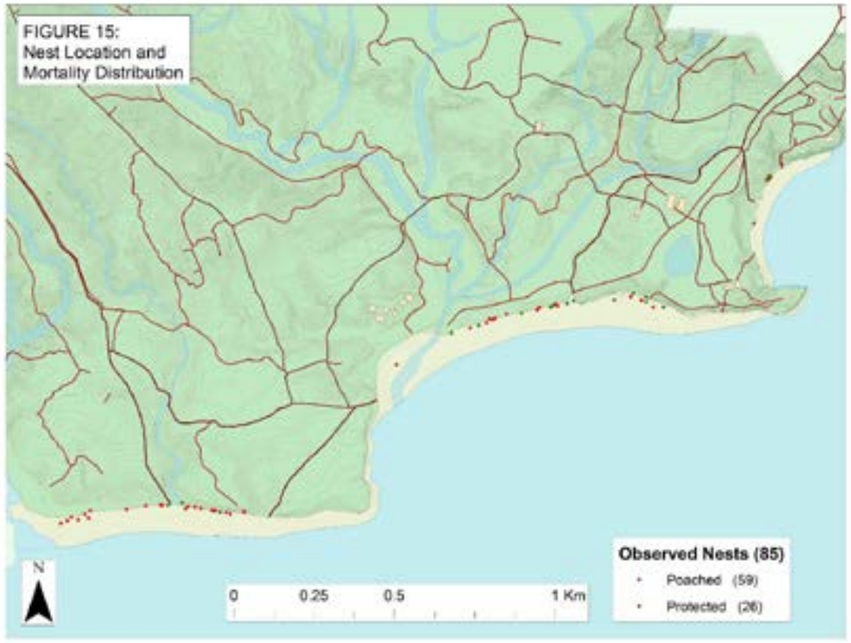
1.Identify the beaches and specific areas of the respective beaches that experience the most sea turtle activity;
2. Catalog the number and various species of sea turtles that frequent these beaches; and
3. Assess the prevalence, impact and nature of poaching on the nest survival rate in order shed insight on this complex problem.

There were 89 observed events in total and 85 of them were nests. Throughout the nesting season fresh turtle events from the previous night were indicated in the data so that "per night" statistical averages could be made. Based on per night averages, an average of 2.13 nests were observed per night. This data was collected using a hand-held GPS which enabled us to observe which areas of the beach had the highest concentrations of turtle activity and which areas are most susceptible to poaching. The spatial distribution of nests, mortalities and survivors, are presented in FIGURE 15.3.

"We knew there was a presence of sea turtles on our beaches, and also many threats to their survival. It was important to support worldwide efforts in protecting this incredible and endangered species through comprehensive scientific research that would allow us to give the species the best possible chance for survival on our beaches. Observing a turtle crawling to sea at sunrise is perhaps one of the most privileged wildlife sightings in the world, and we look forward to providing a safe haven for sea turtles for decades to come."

PAUL CORNET DE WAYS RUART - LANDOWNER

A nest mortality rate of 69% of the recorded nests was observed. It is important to note that this data is skewed. If this monitoring protocol did not call for the protection of intact observed nests, we can infer that *the mortality rate would have been approx. 15-20% higher* by comparing the mortality rate of newly discovered nests and old nests. A mortality rate of 53% percent was observed for newly discovered nests and the 88% for old nests. Of the 59 observed nest mortalities all but two were attributed to anthropogenic poaching. The other two nest moralities were due to dog or coyotes predation.



The anthropogenic pressure on sea turtle nests is substantial on the coast of the Azuero. The highest pressure on nests naturally takes place in areas with higher human populations. Due coastal ecosystem dynamics, Playas Puerto Escondido, Panamaes and La Miel receive notably more turtle activity than the beaches neighboring Pedasi (El Toro, Lagarta, etc.) and are considered to be a location where people searching for turtle eggs can more readily find them. Poaching is prevalent due to the notable rate of turtle activity and the relative proximity to nearby towns. Considering the particular dynamics of the situation, we are well positioned to protect sea turtles, have a notable impact on nest survival rates and spread awareness on this important topic through direct sea turtle protection, turtle conservation studies and proactive educational outreach to the local community. We are presented with a unique opportunity to have substantial impact on regional turtle conservation through the future implementation of a formal protection program and potentially the establishment of a sea turtle nursery to protect and propagate eggs. Next steps include continued monitoring efforts to develop a more refined understanding of turtle nesting habits and distribution on our beaches. This will help to shed more light on the ideal type of protection program and assess if a nursery is necessary and where the optimal location would be. An important piece of addressing this complex problem is education, which takes substantial time and a sustained long-term commitment to produce meaningful systemic change. This will be an important theme for us to explore as we expand our community outreach and engagement initiatives. The plan moving forward is to continue the necessary research in order to most effectively design and implement a turtle conservation program.

RIVER RESTORATION

The coastal ecosystem was in good condition with the exception of the Panamaes River mouth. The property's former owner created an access to the river mouth by clearing a large section of mangrove and bringing fill material to construct an access road parallel to the Panamaes beach. Several poorly-conceived concrete villas were constructed along the road on the beach-side. Furthermore, the river mouth was banked with many large rock in order to construct a beach bar structure along the river. Prior to these construction projects, this region consisted of a lush mangrove ecosystem similar to that of the adjacent stand on the other side of the river mouth.

Considerable action has been taken to restore this region by removing 3 concrete villas that equated to over 50 eight cubic meter truckloads of debris. The beach bar's location on the riverbank as it empties into the ocean has resulted in degradation of the river and its floodplain habitat by obstructing its natural meandering pattern. Through much effort the rocks and fill material were removed in order to restore the natural flow of the river.

before

after

5. SOCIAL ENGAGEMENT

MANAGEMENT OVERVIEW

Sustainability is more than environmental resiliency and economic viability: it is a story of social inclusion and outreach, of fair opportunities and employment. Social outreach holds an important role in our sustainable land management regime because it is paramount to our shared legacy vision for the Reserve: to honor the local community and celebrate its cultural heritage through land management and development that cultivates a path to a sustainable future for all who inhabit this incredible place. If a reserve or conservation area is to last indefinitely, it must be embedded within society and the local community. We see social engagement and outreach as of upmost importance to achieve our sustainability goals and foster the positive change we strive to realize not just within the Reserve's boundaries, but within the local, national and international communities as well.

Panama is developing rapidly and the Azuero is no exception. A strong surge in a region's development can bring many positive benefits to the local community, enlivening the economy and supporting residents, but growth also puts pressure on regional resources and can destroy pre-existing environments and livelihoods. The physical impact of development is often swift and irreversible on the environment and landscape, draining it of its resources at an unsustainable rate. This resource drain has wide-reaching social impact, and can often have a devastating impact on the most vulnerable members of the local population, including effects like displacement, social exclusion and higher costs of living.

Our social engagement initiative provides our neighboring communities and their residents with the knowledge and opportunities to thrive with the increasing pace of new development in the Azuero. We have created employment opportunities for 36 full-time staff, and strive to ensure far and meaningful career advancement through training programs and education. We value education because it fosters a deeper understanding of our vision and produces employees who are qualified to bring it to life - but it also fosters an appreciation of the natural environment that resounds through the local community and allows for personal, long-lasting knowledge. Many of our employees have not only advanced professionally, but also become leaders in our conservation initiatives and environmental stewards within the community. These personal initiatives have moved beyond the boundaries of the Reserve and job responsibilities to include educating their neighborhood about waste management, organizing beach clean-ups, and generating new, locally influenced applications of our vision. This is perhaps our biggest accomplishment: to see our vision extend outside of the boundaries of our reserve and manifest in our surrounding community through our staff. We view our educational and community outreach initiatives as an imperative long-term investment that will yield a tremendous social and environmental return.

INTERNATIONAL TRAINING FOR EMPLOYEES

ENGLISH LESSONS

In an effort to aid the advancement and opportunities of our Panamanian employees we hold weekly English classes for our site, environmental, hospitality and culinary managers.

MEXICO (2012)

In 2012, Horacio Peralta, our Environmental Manager, took a 14-day trip to Veracruz, Mexico to complete a permaculture design course. Before the course, Horacio already had a solid foundation of experiential local knowledge of reforestation and farming. This hands-on course helped him to further develop his skills and understanding of design thinking and strategic farm planning. Since completing this course he has applied this knowledge to design and manage several farming projects here on the Reserve, such as the AMA Estancia Orchard and the citrus Orchard Agroforestry system.

NEW YORK (2015)

In the fall of 2015, our Construction Site Manager, Saul Cedeno, was sent to New York on a research trip in order to further his understanding of farm management and operations and the concept of organic farm-to-table, thus enabling him to better manage his on-site operations, making him a stronger leader. He spent a total 7 days in New York, where he visited Stone Barns Center for Food and Agriculture to observe their farm operations and strategies and learn about organic agriculture and visited several plant nurseries as study for our native plant nursery. In addition, he prepared for his various projects, visiting our pool contractor in Connecticut and an array of tool stores and machinery dealerships. This was also a valuable cultural experience for Saul as it was his first time on an airplane and traveling outside of Panama. While visiting New York, he had the opportunity to tour New York City, attend a baseball game at Yankee Stadium, and visit several museums.

ENVIRONMENTAL YOUTH EDUCATION

To invigorate the connection between nature and culture within the local community, we invite students and the public to engage in hands-on environmental conservation and restoration experiences. In 2012, 2013, and 2015 we held ecological talks for the local children from the school of Los Destiladeros, Pedasi District. The primary topics taught at these sessions are reforestation and forest conservation, organic farming and seed germination, and the importance of respecting and protecting the environment.

By providing these educational opportunities on the reserve we are able to directly engage children in environmental education by facilitating the interaction with the concepts in real life. The landscape we manage tells a profound story and a cautionary tale of mistreating our natural environment and demonstrates the tremendous impact that we can have, as stewards, in saving and restoring it. Children have the opportunity to see and experience what a degraded site looks and feels like and can see first-hand the various stages of regeneration. They understand the biodiversity, plants and animals, present in a healthy ecosystem and develop an appreciation for it.

SAFETY MANAGEMENT

We are committed to the safety and well-being of our employees and all guests that visit the reserve. Maintaining this commitment requires proper planning, preparation and implementation. This plan exists to satisfy these requirements and to outline the steps to be taken to prepare for and respond to any type of emergency that could feasibly affect our staff and guests. Our mission in responding to an emergency situation is to ensure: the safety of all staff and guests, their physical and emotional well-being, the timely and efficient stabilization of any-given emergency situation and the protection of our facilities, property and the belongings. This plan applies to all employees, workers and management staff, and all guests or visitors on the property premises. The scope of this plan is intended to address preparation for and response to all emergency response situations. This includes the acquisition of first-aid medical equipment, emergency response planning to high-risk or high-probability incidents and securing a helicopter service to provide transportation in the event of a severe medical emergency.

6. ECO-TOURISM

MANAGEMENT OVERVIEW

The “Guest Experience” includes how guests interact with and relate to the natural landscape through carefully designed activities and adventure options, such as horseback riding or guided nature hikes. The landscape aesthetic in tandem with these activities are the unique qualities that come together to create an extraordinary experience. This experience is an essential asset in our mission for tourism to financially aid our conservation goals and enhance aesthetic value of the property.

SCENIC TRAILS AND PATHS

There are over 15 kilometers of scenic trails and paths through the Reserve for non-intrusive access and ecotourism. By incorporating sustainable trail design principles rooted in user psychology, physical forces, and integration with the local ecology a beautiful, durable and enjoyable trail system was created in order to access the property’s more remote locations. Visitors are able to fully enjoy the property’s natural features through the medium of a well-maintained trail system that was designed to provide and enjoy user experience while notably reducing the impact that people have on the local ecology.

WASTE MANAGEMENT AND COMPOST PRODUCTION

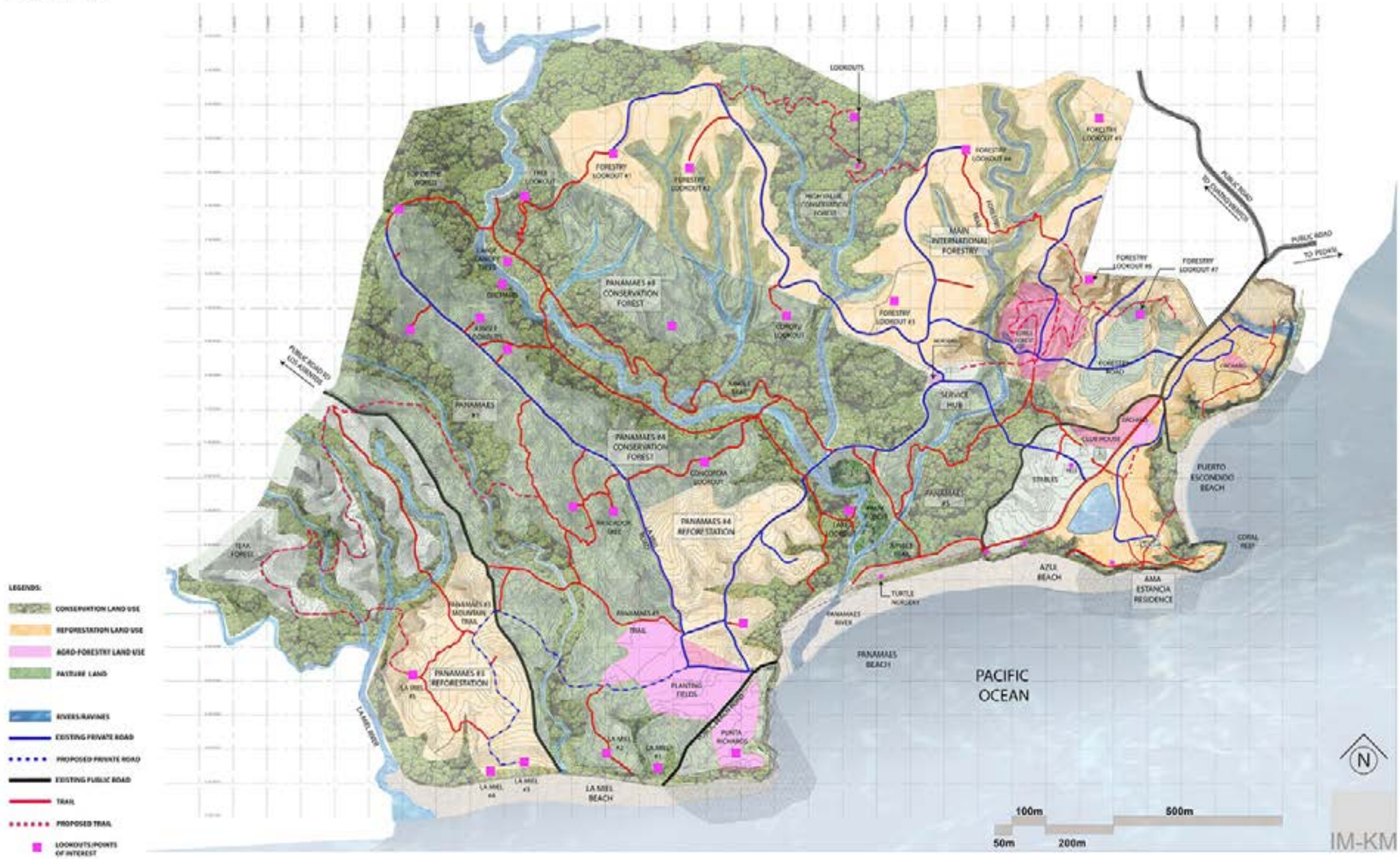
Through a comprehensive waste management program we have eliminated all organic and recyclable waste sent to landfill. Our fundamental approach is to reduce, reuse and recycle our various waste streams. In order to reduce the amount of waste that needs to be managed, we implemented a purchasing policy to manage our supply chain and minimize all potential waste that comes onto the property.

The property's organic waste (food, landscaping and agriculture) is used to create much needed compost, which in turn is used to nourish the nurseries, landscapes and farming projects. The products of the nurseries and farming projects are used to supply residents and guests with fresh, locally harvested produce. In the process of accomplishing this, about half of the property's waste stream is diverted from a liability into a valuable asset.

Ecotourism opportunities at AMA Estancia

PLAYA PANAMAES AND PUERTO ESCONDIDO PROPERTIES

LAND USE MAP - 2015



CLOSING: BUILDING ON A 7-YEAR FOUNDATION

Reserva Ecologica Panamaes has realized notable ecological regeneration and social inclusion over the past seven years, and we look forward to building on this legacy through the expansion of our management plan. We have identified four key focal areas in the expansion for 2016: Research Network; Conservation Programming; Economic Viability; Social Inclusion.

Our long-term management plan and its holistic approach to managing the landscape for environmental, social and economic sustainability has enabled the Reserve to become an important study of how responsible land management and development decisions can effectively drive environmental conservation and restoration goals. The identification and focus of our five key initiatives, conservation, farming, coastal management, social engagement and eco-tourism, is the foundation that has enabled us to realize our successes and tailor our plan for the future in the pursuit of our shared vision.

Regional conservation efforts can be notably improved by integrating private land management with government and institutional efforts to restore critically endangered ecosystems that support both the wildlife and people who depend on them to survive. If nature, and the myriad of benefits it provides for society are to be preserved indefinitely, it must be economically productive by conventional ideology and socially integrated within the communities it serves.

Our vision is to demonstrate that development and economic productivity can not only coexist with conservation, restoration and positive social engagement, but actually thrive because of it. As we expand and improve our long-term land management initiatives at the Reserve, in 2016 and beyond we will focus on the addition of civic, academic, economic, scientific and social partnerships that will expand our capabilities and allow our successes to positively impact as many people and species as possible.

1. RESEARCH NETWORK

In order to inform decision-making that will allow us to invest intelligently into our land management program, we are developing strategic partnerships with civic, scientific and academic organizations. These partnerships provide us with high-level institutional capabilities, and allow our local efforts to have international influence in understanding the ecology and conservation of the dry tropical forest Biome and sustainable land uses and management. In this effort we are in the beginning stages of creating a research program to study and advance the various projects and management concepts outlined in this document by collaborating with a variety of universities, professors, researchers and students. Our model of sustainable development is a multi-faceted and unique example of how private development can foster and finance conservation and drive positive social change. Consequently, we have a special opportunity to engage the scientific community in a mutually beneficial relationship.

A robust research platform is critical to our organizational development. Our objective is to engage and collaborate with various universities, researchers and their students to develop a research network around our initiatives. Reciprocally, we will provide research and educational opportunities for academia by engaging them in our mission to comprehensively investigate our projects and management decisions through research in the planning process, monitoring and studying throughout the program or project lifecycle, and continuous analysis and evaluation for sustained improvement.

"...papers on Tropical Dry Forests [were compared] with papers on rainforest ecosystems that were published between 1945 and 2005, and identified a ratio of 1 TDF paper for every 300 rainforest ecosystem papers published. This startling number underscores our limited understanding of this endangered ecosystem and also how much work is needed to support comprehensive and holistic management and conservation policies."

- SANCHEZ-AZOFEIFA, ARTURO, GERALDO W. FERNANDES, JENNIFER S. POWERS, JENNIFER SARAH. POWERS, AND GERARDO-ARTURO SANCHEZ-AZOFEIFA. TROPICAL DRY FORESTS IN THE AMERICAS. N.P.: CRC, 2013.

NORTHERN ARIZONA UNIVERSITY'S SCHOOL OF FORESTRY

In February of 2016 we finalized a partnership with Northern Arizona University's School of Forestry in conjunction with their Adaptive Restoration Community (ARC) for Tropical Ecosystems. The ARC at NAU is currently involved in the management of over 4 million experimentally-planted trees in Panama, Malaysia, Tanzania and the United States, and will build upon their efforts at the Reserva Ecologica Panamaes. A team of NAU professors and a doctoral student will work with the Reserve's management team to recruit three Panamanian students to pursue their masters in forest science at NAU on a full-scholarship provided by the University. This team will work together to establish a research plan surrounding the concept of developing innovative restoration strategies, such as climate change resilience, enhancing phosphorus availability in agroforestry, and reducing negative impacts of teak on native species regeneration. The recruited students will conduct their research and fieldwork here on the Reserve in support of these projects and involve k-12 students in their research.

PARTNERSHIP DEVELOPMENT

In order to expand our research network we are currently communicating with a selection of high-potential universities to identify opportunities for collaboration. Our objective is to develop a diverse network of universities based on their respective research expertise, geographical distribution and inherent potential to produce meaningful research in Panama.

We intend to involve researchers and their students to conduct various studies and theses. Some topics of discussion include restoration strategies, tropical dry forest ecology, watershed management, carbon dynamics, turtle conservation, economic performances of native species plantations and economic evaluations on our hybrid model of conservation and economic productivity. We also intend to provide study sites for classes and capacity building workshops to use for their instruction.

2. CONSERVATION PROGRAMMING

We are constantly searching for new opportunities to expand our conservation efforts and have identified several projects to put into action this year. These projects will enable us to take meaningful stride in realizing our organizational vision.

LAND ACQUISITION

This year we intend to expand the Reserve by approximately 70 hectares to the northwest part of the property. This acquisition will enable us to further our conservation and reforestation efforts and will aid us in our mission to further rehabilitate the Panamaes watershed. Through preliminary surveying we anticipate that it will be necessary to reforest an additional 50 hectares.

BEACH STEWARDSHIP CONCESSION

We are in the process of negotiating a government concession to manage the beaches that border the Reserve. This contract will grant us the legal right to better serve the public by maintaining this natural resource.

SEA TURTLE CONSERVATION PROGRAM

Last year's peak turtle nesting season was the first time that we collected data on nesting distribution and the impact that poachers have on the nest survival rate. This initial study was essential in providing us with a baseline reference on which to measure the effectiveness of our management decisions. We observed a 70% nest mortality rate despite our efforts to conceal nests which highlights the worthy challenge that lies before us. We are currently in the research and planning phase as we prepare for the next step of presenting a plan for how to most aptly approach this complex problem. The objective is to launch the next phase of this program for the 2016 upcoming peak nesting season.

CORAL REEF PROTECTION

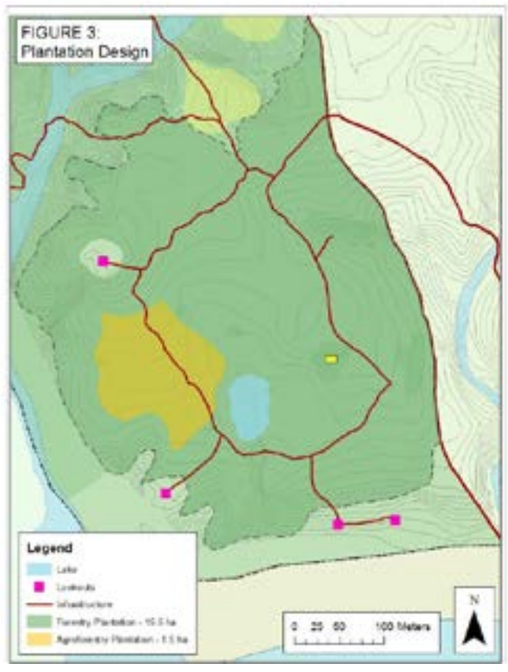
In an effort to manage Puerto Escondido bay most effectively we work with our local stakeholder who access it most frequently: the fishermen. In conjunction with the local fishermen we have identified several projects aimed at improving the holistic management of this fragile ecosystem in a mutual favorable manner. Buoys will be placed around the perimeter of the reef in order to prevent boats and anchors from damaging them. In addition we are engaging several researchers in preliminary discussion about further monitoring actions and to further assess the potential for coral restoration.

3. ECONOMIC VIABILITY

As we implement phase 3 of our reforestation effort we have the benefit of more than seven years of experience and 60,000 trees planted, which has granted us a strong understanding and methodology for stabilizing this fragile and degraded landscape. This knowledge of landscape restoration in conjunction with the expansion of our farming projects presents the opportunity to further rehabilitate the local ecology through regenerative farming systems that incorporate native species, trees, and perennials with an approach to farming that is engrained in restoring and maintaining ecological health.

PHASE 3 REFORESTATION: NATIVE SPECIES FORESTRY AND AGROFORESTRY PLANTATIONS

IIt is our mission to realize a multi-horizon investment by appreciating the real estate value of the farm through the production of fine tropical hardwood that will realize short-term revenue with an agroforestry component. Tropical forest plantations play an essential role as components of multi-functional landscapes by contributing to native biodiversity conservation and ecological restoration at different spatial scales. The proposed plantation design will protect watersheds, foster conservation of biodiversity, improve ecological processes, create ecological corridors for wildlife, and sequester carbon dioxide. The objective is to restore these ecological benefits in an economically resilient manner. Our diversified economic production strategy plans to realize value from the long-term sustainable harvest of fine tropical timber and from the short-term harvest of non-timber forest products in the form of perennial crops from an efficient agroforestry system.



As part of our initiative to prepare the Reserve for difficult to predict environmental pressures, we have identified several favorable locations to establish water reservoirs in order to address water scarcity. The first reservoir that we will establish will be in Panamaes 3 which will support the surrounding reforestation and farming project. We intend to further these efforts by improving and constructing additional reservoirs throughout the Reserve.

FARM-TO-TABLE ECOTOURISM DEVELOPMENT

Farm-to-table is a chef-driven culinary movement that has gained high acclaim and rapid adoption over the past few years. The popularity of the concept exhibits notable potential for sourcing better tasting, responsibly grown, and locally sourced produce. Unfortunately, the concept has been weakened through its commonality as a branding ploy and the relationship between farm and table often breaks down along the way. Selectively sourcing an assortment of produce from a variety of different farms to use in the kitchen is a one-sided relationship. Learning from exemplary chef-driven farms that go beyond trendy branding, our program looks at the other half of the system as well: the long-term viability of the farmers, agricultural systems, and farm communities that provide the produce on which the cuisine depends.

Our program will address what a farm, farming community and farming landscape need to thrive and truly be sustainable. This is the "recipe behind the recipe." The way our ingredients are grown not only dictates the flavor of our dishes, but also the ecological and financial health off our farm and our neighboring farmers.

The goal of our farm-to-table program is to curate great flavors and interesting dishes that integrate Panamanian culinary tradition and source two-thirds of the restaurant's ingredients from farms on the property. The remainder of our ingredients will be sourced from farmers who uphold high operational standards and whom we will engage in a supportive working relationship. Great-tasting, high quality produce requires healthy soil and farmland ecosystems. In order for this to occur the landscape dictates a diverse planting of various species, the inclusion of legumes, cover crops, compost and mulches, and the minimization and prohibition of synthetic

pesticides and fertilizers. Furthermore, it requires a community that recognizes and supports these farming practices by eating what the farm provides. The "table" component of our program includes a menu that supports good agriculture by acting as an engine to improve it. Integrating what a diverse, ecologically sustainable farming system produces curates innovative flavors and cuisine experiences that cannot be had anywhere else in the world.

We are uniquely positioned to foster the holistic farm-to-table concept by directly addressing both sides of the farm-to-table equation. As opposed to a "farm-to-table" restaurant, it is best to think of our culinary program as a restaurant in the middle of a farm. This simple distinction uniquely positions us to contribute to and shape the movement as it is applied to Central America. Moving forward we will continue to expand the farm enterprise, taking an experimental design approach to monitoring, developing and refining our systems. This means expanding the acreage of our farmland, but also developing the land that we already cultivate through crop rotations, cover crop trials, incorporating native species and utilizing our compost production. Finally we aim to serve as an advocate in support of community farmers practicing ecologically responsible farming. We aim to cultivate constructive, mutually-beneficial relationships in order to source needed ingredients from farmers practice agroforestry or silvopasture with a commitment to the ecological health of their land. Our objective is to honor landscape traditions and preserve the community around food. If a great, well-managed farm is not connected to a restaurant or the larger community and it does not translate into everyday food culture, then it cannot be sustainable.

4. SOCIAL INCLUSION

Our practical application of fostering sustainable development from a social perspective is two-fold. First, it translates into creating educational opportunities that help youth develop an appreciation for the natural world by teaching them about local ecology and showing how this understanding translates into responsible land management. For this reason we take a proactive stance on creating educational opportunities for youth of all ages and higher education opportunities in form of graduate school educations. Second, we also see an opportunity to provide employment, career development and higher education opportunities that empower local people to more effectively participate in the development occurring in their community. By bolstering environmental education at all levels and providing fair employment, we aim to foster the environmental stewards and managers of tomorrow.

ENVIRONMENTAL EDUCATION PROGRAM

We strive to invigorate the connection between nature and culture through engaging our various stakeholders and looking for collaborative relationships. Through our partnership with NAU, we will work with their team to design an environmental education curriculum as we develop a formal program to engage students of all ages at our local schools, beginning with Los Destiladeros. NAU's ARC has collaborated on curriculum design for semester-long programs for over 180 students internationally, through classroom discussions, lessons, and games focused on climate change, exotic species, and restoration, and hands-on activities such as tree plantings, and soil and insect monitoring. Their team's diversified background in conjunction with our solid foundation will prove to be an effective collaboration to expand this important initiative. The planning process has already begun and the program is planned to formally begin in 2016.

CAPITAL FOR JOB CREATION

Through the growth that the Reserve is realizing, we will be able to provide additional employment opportunities that contribute to a sustainable future. We understand the simple fact that it takes a culture to sustain these efforts and therefore involving local employees is imperative to our legacy vision and intergenerational scope. We take great pride in helping to stimulate the local economy through sustainability by providing additional fair employment opportunities and a safe and supportive work environment.

OUR VISION

To be a world-class model of sustainable development on the Azuero, characterized by environmental conservation, local community engagement, and outstanding sustainable living.

We invite you to our changing landscape –

When we began in 2009, you could stand at the edge of the forest and gaze across a barren expanse of land to see intermittent patches of green on the horizon. Today, you need a machete or a trail to navigate your way through the dense jungle that now connects the formerly isolated tracts of forest that were once just oasis' in a degraded landscape. We have quadrupled our commitment in hectares, planted over 60,000 trees, restored watersheds and biological corridors, accumulated a team of 36 staff, and reforested over 60 acres of a critically endangered ecosystem native to the Azuero Peninsula.

We believe that private land conservation is an imperative piece of the global effort to mitigate the effects of climate change, halt the rapid rate of species extinction, and ultimately contribute to healthy, holistically managed landscapes. Private conservation efforts are vital to supplement, enable and support governments in the preservation of the world's natural capital. As we move into year eight of our vision, our commitment is stronger than it has ever been, bolstered by the successes we've achieved at Reserva Ecologica Panamaes.

In 2016, it is our goal to share our successes and extend the impact of our work far beyond the borders of our reserve through key partnerships, social inclusion and eco-tourism. Thanks to the dedication of our private land owners who prioritize sustainability and honor their responsibility to the natural world, at Reserva Ecologica Panamaes a sustainable future is not just a vision: it's a diverse and productive landscape, and we invite you to explore it with us.

CREDITS

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