Management Plan for La Esperanza Nature Preserve In Ponce, Puerto Rico

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Abstract

This project analyzed La Esperanza, a 500-acre property of abandoned land in Ponce, Puerto Rico to determine how to implement hunting, fishing and passive recreation within a manageable reserve. The team worked with the Department of Natural and Environmental Resources (DNER) to examine how to include these different activities simultaneously. After the use of GIS mapping software, first hand observation of the land, and retrieving feedback from the local communities and businesses feedback, the team developed a set of recommendations for the DNER. The team proposed creating new trails, boardwalks, observation towers, and infrastructure for La Esperanza along with a breakdown for the location of each activity on the land. The team was able to assess the locals' opinions, through questionnaire interviews, to suggest a community involved recommendation plan to the DNER.

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Authorship

The following shows which writer wrote each section of our proposal; each name is represented by their respective initials. (i.e. Matthew Bourque – MB, Drew Digeser – DD, Stephen Partridge – SP and Hussein Yatim – HY)

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Executive Summary

There are over 161,000 protected areas in the world. These areas make up about 10% of the earth's land surface. With urbanization increasing and the global population growing, protected areas are becoming more important than ever. Protected areas not only benefit the environment but also benefit people. These areas can be tourist attractions while also educating people about the importance of conservation. These lands can be used for passive recreation, hunting, fishing, or wildlife refuge. One of the most famous preserves in the United States is Yellowstone National Park. This area is able to host almost all types of recreation from hunting to hiking. Each type of activity a preserve can host requires a proper management plan. The management plan must consider many factors. It must have provisions that will be able to protect the land while allowing visitors to enjoy the preserve with the least effect on the environment.

We will be working in Ponce, Puerto Rico, on a 500-acre preserve called La Esperanza. This property was recently acquired by the DNER to mitigate the impacts caused by the Puerto de Las Americas Project. The DNER has certain activities that they would like implemented on this property, including, sport fishing and hunting, bird watching, hunter's and angler's education programs, and wildlife conservation areas, among others.

The goal of this project is to create a recommendation to the DNER focusing on creating a conservation and management plan for La Esperanza. To accomplish this goal there are various objectives that we need to achieve. We must identify and develop a plan of activities

that will be allowed in the preserve, map the property with GIS software, identify costs of the operation and funding, and determine socio-economic factors of project. We plan on accomplishing these tasks by first using GIS to map out the area and highlight key parts of the land. There are different features of the land that need to be considered before we can plan out areas for the different activities. For example, La Esperanza has wetlands that require more attention to ensure their preservation. Trails in these areas must not damage the terrain and must be well maintained so visitors do not go over boundary lines. With GIS software we will be able to identify areas that can be dedicated to hunting and fishing, while not conflicting with other passive recreation activities. We will map out hiking trails by locating attractive spots on the property that would draw a number of visitors and base the trails off of these locations.

A vital element for this project is to determine what the public's opinion regarding this preserve. To this end, we will survey the neighboring communities as well as political, business, and social leaders of these communities. Such information will hopefully provide us a range of community opinions so we can present a management plan to the DNER that includes their viewpoints. Our research aims to provide a management plan that the DNER will be able to use and implement in La Esperanza.

After following the methods presented we will be able to provide the DNER with a well-rounded management plan for La Esperanza. This management plan will accomplish the DNER's mission while satisfying the local community and help raise awareness for protecting the environment.

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1. Introduction

Many large tracts of land do not have a management plan even though one may be needed; this can sometimes cause misuse of the land. Inappropriate use of the land can result in damaged habitats, environmental destruction and major threats to endangered species (Lopoukhine, 2008). An unaffected natural ecosystem functions to achieve equilibrium, however; the impacts of urban development can cause a great imbalance. Constant disregard for the land over long periods of time can lead to a permanent loss of natural resources.

Ideally, conservation groups would be able to study and manage all undeveloped or abandoned land appropriately. Unfortunately this has not been the case in the property known as La Esperanza in Ponce, Puerto Rico. The Department of Natural and Environmental Resources, DNER, recently acquired this property because of the Puerto de Las Americas Project's impact on the ecosystem, which is close in proximity to La Esperanza. The DNER received this property and has to create a management plan that follows the regulations and protects the land. La Esperanza is a 500-acre piece of land consisting primarily of wetlands, which are home to a variety of bird and aquatic species, some of which are endangered (U.S. Fish & Wildlife Service, 2012). To ensure these threatened species can remain in this habitat for future generations, a detailed and sustainable management plan for the land is needed.

In the United States, government environmental agencies coupled with private environmental organizations join together in the fight to save and protect wildlife and their habitats. Strict regulations related to hunting and fishing are one strategy implemented in the

U.S. that requires outdoorsmen to be educated about habitats and the species that live in them. This education enables a person to obtain a license to hunt or fish for a range of species. For example, New Hampshire Fish and Game Department (2012) requires hunters to obtain a mandatory $2.50 Wildlife Habitat Fee that must be paid once annually for all hunting licenses. This approach in turn allows hunters and fishermen to actively support conservation groups while protecting the wildlife, land, and water.

La Esperanza is currently an undeveloped property, where conservation plans and the community's involvement in the property have not yet been determined. The lack of a management plan for this 500-acre parcel of land can lead to an unbalanced use of the property's natural resources. One of the DNER's main concerns is the amount of local community support they will have to manage the property successfully. The DNER will need the cooperation of the people living adjacent to the property to make it a sustainable preserve for hunting, fishing and passive forms of recreation. No systematic research has been undertaken to determine the community's attitudes and desires on how La Esperanza might be managed and used. There are some potential conflicts with neighbors of the property that could arise from having hunting and fishing in the preserve, for example. Moreover, the DNER has not yet determined exactly how and where such activities could be introduced in the preserve to make it acceptable and attractive to all potential visitors.

2. Background

This chapter discusses the need for sustainable management of land and the environment and how this can be accomplished. These topics are the key focal points of our project and the ultimate goal of providing a recommendation to Puerto Rico's Department of Natural and Environmental Resources (DNER) on how to transform the abandoned 500-acre parcel of land known as La Esperanza into a thriving nature preserve. We also review a few examples of community affect based management plans in different parts of the world and ultimately focus on Puerto Rico in order to provide background on our project setting of La Esperanza.

2.1 Environmental Conservation/Land Management

As the world's population continues to grow and become more urbanized, the United Nations has predicted that by 2050, 69% of the world's population will be categorized as urban dwellers (Rishi, Ernest and Young, 2012). Due to this movement towards a more urban lifestyle, the importance of environmental conservation and sustainable land management has been seen as a major focus for research across the globe.

Wildlife is a resource of cultural, ecological and economic significance (Kideghesho, 2006). Wild animals are renewable resources whose survival depends, among other factors, on the quality of the habitats in which they are living. The importance of habitats stems from their ecological roles in the provision of shelter, breeding places, dispersal and foraging grounds for a variety of wildlife species. Habitats may also allow free movement for animals to other geographical localities where access to critical resources for survival and a larger gene pool for

reproductive success can be found. Wildlife habitats are, therefore, critical components for maintaining ecological integrity and the long-term survival of an ecosystem.

2.1.1 Destruction of Habitats

The destruction of habitats and natural resources has been a threat to biodiversity in regions throughout the world; it is a problem they continue to face (Kideghesho, 2006). This destruction takes different forms, which include degradation, fragmentation or outright loss. These categories correlate with growing human activities - prompted mainly by demographic factors, land tenure systems, inadequate conservation status, development policies and economic incentives.

Degradation occurs when the quality of a given habitat diminishes for certain species (Kideghesho, 2006). One main contributor is pollution by the way of littering and improper disposal of waste. Pollution also damages the quality of the land. Human activity is responsible for the loss of approximately half the forests that at one time covered the earth (Evans, 2012). Although habitats can recover, their rate of loss is ten times greater than their rate of regrowth. In Europe, wetlands habitats have been damaged to be used as a source for clean drinking water. Fragmentation occurs when a natural ecosystem is broken up into various disconnected sections of land due to human activities, which affects the functioning of the ecosystem as a whole (Kideghesho, 2006). Outright habitat loss is characterized by the habitat being degraded and destroyed to a point where it is no longer usable by the indigenous species. This can be caused by the transformation of natural vegetation to temporary or permanent land for crops.

The expansion of human settlements has led to the destruction of flora species (Biology Online, 2008).

Achieving the balance between allowing human activity in a natural environment and preserving it is a difficult task wildlife agencies face (Knight, 1995). Recreationists in natural environments often degrade the land, water, and resources in that ecosystem by increasing animal morality, destroying plants and vegetation, and displacing the wildlife. This tension between human interaction with an ecosystem and preventing harm has led to management strategies for regulating recreational activities on land by restricting access to public lands and improving land management. Wildlife managers discuss challenges that include ensuring protection and conservation of the wildlife while simultaneously providing ways for people to enjoy and gain knowledge about the environment.

2.1.2. Global Importance and effects

The sustainable management and conservation of ecosystems is evident in places with diverse ecosystems. An example of this is the Serengeti ecosystem in Northern Tanzania (Kideghesho, 2006). An estimated 80% of the Serengeti ecosystem receives legal protection through the National Park, Game Reserves, and Ngorongoro Conservation Area. There are also many unprotected areas in Tanzania that are affected by factors such as human population growth that put a strain on the environment's natural resources. To lessen these affects there are current state/communal land tenure and other policies restricting commercial and mechanized agriculture in Tanzania because constant use of land for crop production can degrade the soil over time. There have been recent plans to establish Wildlife Management

Areas (WMAs) in the buffer zones surrounding Serengeti National Park, which Kideghesho believes is a step in the right direction. These buffer zones are important because it places areas with valuable and rich wildlife in a more secure habitat. Activities have developed in these secure preserves such as safaris and guided tours for tourists to see the wildlife in their natural habitat. However, these measures may increase economic and social costs to local communities since they translate into improved and increasingly effective conservation areas and increased wildlife populations in proximity to human assets such as crops and livestock. Locals in the surrounding communities may view this as a negative due to the fact that wildlife may prey on their cattle and consume their crops. Community involvement is a major role of operating a successful nature preserve in order to garner support.

Another example of a preserve with a more evident positive community involvement is in the case of the Gresswell Forest Nature Conservation Reserve in Victoria, Australia (La Trobe University, 2012). In 1978, La Trobe University took over the management of the land to show its commitment in restoration biology. Community involvement, and their increasing awareness of natural values of the bushland, has been fundamental to the success of the Gresswell Forest. Currently, various groups of volunteers from Conservation Volunteers Australia and the Friends Group, carry on the community involvement. These community organizations are involved in processes such as revegetation, or large scale tree planting, weed and pest control, fencing and seed collection.

Hawaii is another setting where the conservation of the environment, improved land management, and community input has been assessed. As the popularity of coastal and marine

areas for tourism and recreation have continued to increase in Hawaii, concerns have been raised that additional use of these areas could damage the ecological integrity of resources and reduce the quality of user experiences (Needham, 2011). Regulatory agencies face a number of challenges in this context, as they attempt to implement appropriate management strategies that moderate social, environmental, cultural, and facility impacts of increased public use to ensure that both user satisfaction and environmental conditions do not deteriorate.

There has been discussion of both direct and indirect management practices to enforce protection from littering in Hawaii (Needham, 2011). Direct management practices aimed at reducing litter in a coastal area could include a regulation prohibiting littering, combined with enforcing this policy with fines or other sanctions. An indirect practice could be an educational program informing users of undesirable environmental and aesthetic impacts of litter and encouraging users to stop littering. Surveys were administered onsite to tourists and residents visiting three sites with high tourist activity during two weeks in July 2007 and two weeks in August 2007. Tourism and recreation use trends showed only marginal seasonal variation in visitation to coastal and marine areas. The factors that were looked at were overcrowded areas with correlation to degraded land. The opinion of the public was assessed in the survey where they were asked what area should be enforced. What should be enforced included improved awareness/education of people at the site, restrict the number of people allowed at the site, improve maintenance or upkeep of the site, and provide more facilities or services at the site. The opinion and input of the community on how certain environmental programs for an area should be implemented is critical in order to gain support.

Another example, that is similar to the preserve we will be working on, is in Manatí, Puerto Rico. La Esperanza, the name of a preserve in northern Puerto Rico, is a nature preserve that had a management and conservation plan implemented in September 2002 and eventually opened to the public in 2003 (Chermayeff, 2002). The human presence at La Esperanza has been a vital part in its history. Its diverse ecosystems, and large variety of plant and wildlife species that reside there, has made it an area of human inhabitation since the aboriginal times. The last few decades of the 19th century saw La Esperanza become one of the largest, wealthiest, and most technologically advanced sugar plantations in Puerto Rico. This 2,278 acre parcel of land is a rich natural environment, extending along the shoreline with diverse ecosystems, and a wide variety of plant and wildlife species. It was acquired by the Conservation Trust of Puerto Rico to conserve the ecological, aesthetic, historical, and cultural value of the land. The plan for this preserve was to reforest and restore the habitat and create new facilities and areas for passive recreational activities, which includes biking and kayaking trails. The historical integrity of the land led to the restoration of the Mill Complex, which implemented historic structures and a visitor's center with educational displays, a conservation field station, classrooms, staff offices, and a visitors parking area.

The incorporation of the community played a major role in developing this preserve, as an interpretive strategy was used to allow visitors to participate in the process of research and discovery (Chermayeff, 2002). Interpretive methods were broken down into three groups: exhibitions and printed materials, programs, and new media. Exhibitions are self-directed activities enabling visitors to explore the site at their own pace, with the aid of materials

presented through the exhibits, signs, interpretive trails, and visitor guides. Programs are activities conducted by the Conservation Trust for visitors, school programs, and neighboring residents. New media incorporates an expanded website with interactive activities and digital archives.

Community participation in La Esperanza was encouraged through partnerships with local schools, institutions, and other various organizations (Chermayeff, 2002). Visitors worked with personnel from the Conservation Trust to explore and investigate the natural and historical resources on site. The ultimate goal of this was to spark interest concerning the topic of conservation as well as nature, science, technology, history, and culture. The incorporation of recreational activities on the preserve are for visitors to enjoy the natural beauty, along with serving the environment. The idea of an innovative, hands-on learning experience was decided upon to meet the needs and interests of the visitors that were displayed on Trust sites. The process of restoring the physical nature of an environment is the obvious focus of thought when discussing habitat destruction, however; community involvement and interaction is sometimes an underestimated component in ensuring a preserve's future protection.

The natural features of La Esperanza were assessed and documented (Chermayeff, 2002). It contains roosting, feeding and breeding areas for rare and endangered wildlife, including residential and migratory birds. Various birds either migrate to Puerto Rico for winter months, or stop en route to other locations such as South America. The integrity of the terrain also plays a large factor in correlation with plant species. In La Esperanza the predominant are

savannas, seasonal evergreen tropical forests, mangrove forests, salt and fresh water tropical marshes, coastal forests, sand dune scrubs, and riverbank vegetation.

Even though the idea of protecting and managing land may seem fairly straightforward, there are many different elements that environmental managers must address and take into account when implementing a wildlife preserve as is seen in Tanzania, Australia, Hawaii and northern Puerto Rico.

2.2 Need for Conservation

Puerto Rico has a unique ecosystem due to isolation from other land masses. The need for management plans in certain areas of Puerto Rico is to protect and preserve mismanaged regions and regions that are bound to be. The government agency that is responsible for doing so in Puerto Rico is the Department of Natural and Environmental Resources (DRNA, 2006). It is their mission to "protect, conserve and manage natural resources and environmental development in a balanced way to ensure future generations enjoyment and stimulate a better quality of life" (p. 3). This is shown in the city of Ponce, Puerto Rico, which is the largest city in southern Puerto Rico, where the central government has recently acquired a 500-acre property known as "La Esperanza" to be managed as a Wildlife Management Area (Miguel A. Garcia, personal communication, November 30, 2011). The reasoning behind this acquisition is to compensate for the adverse impacts to the wetlands and marine habitats at the Ponce harbor from the development of the Port of the Americas (Puerto de Las Américas Project Puerto Rico, 2006). The Puerto de Las Américas Project will welcome many commercial boats and ships to Ponce at the expense of the 59 acre coastal region it will reside on. Federal regulations require

that port authority provide effective compensatory mitigation to the adverse effects of the project in order to minimize the overall impacts to the natural resources within the affected area. In agreement with USACE regulations and requirements, the Port of the Americas Authority submitted a compensatory Mitigation Plan to address these impacts. This led to the acquisition of La Esperanza as an area set aside for restoration and management. The mitigation plan can be viewed in Appendix E.

2.2.1 Land Uses in Wildlife Preserves

There are endless possibilities for the use of land, from commercial uses to outdoor recreation (USDA, 2007). Different areas are better suited for different activities, and this can become a big debate among different groups of people. Many organizations like World Wide Fund for Nature want to see land undeveloped and protected to preserve it for the animals living there and to protect the natural environment, while others would rather develop the land for commercial or other purposes.

Land with water such as ponds, lakes, and rivers are key requirements for setting up fishing grounds (USFWS, 2012). Fishing can be a big attraction for tourists and is a way of life for many communities. It is a sport that many find relaxing and educational by spending time in nature. Fishing is important for regulating fish populations, but it is imperative to have strict regulations that will prevent over-fishing. One rule that can be implemented on a section of property is a “catch and release” program. This is when fishing is allowed, but one is not allowed to keep any fish that are caught. This enables people to enjoy the recreation of actually catching fish while not causing any negative effects on the fish population.

Hunting around the world is seen on private property as well as on government owned lands. Hunting is sometimes viewed as having a negative impact on an ecosystem, although legally killing a designated percentage of certain species can actually impact the environment in a positive way by preventing overpopulation of that species (Page, 1998). Some animals are facing an overpopulation problem. A strict set of rules and regulations must be set and obeyed, in order to protect an area from becoming overpopulated or, even worse, becoming under populated with key species. Sometimes, unfortunately, an area with minimal or loose regulations can face the consequence of extinction of a certain species in the area.

Many humans, birds and other species coexist using the same land. Puerto Rico has a large variety and population of certain bird species. Many species migrate to select areas in Puerto Rico when traveling to surrounding countries. Migratory birds are only present during a single season and their stay on the island depends on food and weather conditions. Some years they are seen much more than others.

Passive recreation, such as hiking, is becoming very popular around the world (Enfield, 2005). People from all cultures can appreciate the beauty of Mother Nature. Some ways to enable people to enjoy nature are by establishing nature-hiking trails, where people can walk or hike while observing the sights around them.

Observation towers are particularly useful for bird watchers and hikers (Bridge Builders USA, 2012). An observation tower is a structure used to view the surrounding area that may be not be visible from the ground level. It also can create a full, 360-degree view of the surrounding land. A tower's average height is about 20 meters or roughly 65 feet. Observation

towers are composed of various materials. Mainly they are made from stone, steel and wood. These materials are mainly used because they do not negatively affect ecosystems. The construction of an observation tower alone can be disruptive to the ecosystem not considering the materials they are built with. Careful and strict construction methods must be used to successfully build observation towers. Successful construction of observations towers can be seen in various wildlife refuges in Puerto Rico.

Humacao Wildlife Refuge, which is a protected reservation located in Puerto Rico, has introduced many different activities on a single piece of land while shielding the land from any damages (Personal communication, Humacao employee). This wildlife refuge is operated by the DNER, and is similar to La Esperanza preserve we will be working on. In the sense it incorporates both active and passive recreation. The entrance of the preserve includes DNER offices and infrastructure, which houses excursion companies for kayaking and bicycling. In addition, there is a small area that sells snacks and beverages to visitors. The owner of the food kiosk stated items, such as cups, need to be eco-friendly and biodegradable to avoid environmental damage to the preserve. This preservation also included nature trails, fishing and hunting. Some amount of money that the concessions make in sales goes back to the DNER to use to help maintain the land.

2.2.2 Endangered Species

A main purpose of wildlife reservations all over the world is to preserve habitat for endangered species (The Wildlife Trusts, 2009). Endangered species are populations of certain species that are at risk of becoming extinct. These animals require protection against hunters as

well as having their habitats protected against destruction. Many species all over the world are endangered, and this is no different in Puerto Rico. It is necessary to carefully manage the land while also keeping the species safe and not disturbed.

2.3 Management Planning

Regardless of property ownership, a management plan is vital for maintaining and enhancing any ecosystem (Helmer, 2004). A government management plan translates the government's policies and regulations into a well-drawn up program that is easy to follow and maintain. It can also be described as a collection of specific goals for the land. Objectives are set to ensure that the goals are fulfilled.

2.3.1 Criteria for a Successful Management Plan

The purpose of a successful management plan is to implement ongoing managerial efforts to regulate and provide a basis for monitoring large areas of land (Thomas, 2003). Management plans can vary depending on the goals and objectives of the specific parcel of land. The most important portion of the plan is the goals; clear goals will ensure the desired outcome of the plan. These goals must be well planned with great understanding of the specific parcel of land. Understanding the history of the land is an important first step in the planning process. Often the history of the land can help influence the outcome of the management plan. A management plan should also contain maps of the region to show the future uses of the land, such as hunting and fishing grounds, passive recreation trails and areas, as well as the other uses of the land.

Management plans also require a resource inventory that contains all the natural resources within the parcel of land (Olson & Orr, 1999). With a region as large as La Esperanza, in Manati Puerto Rico, it is impractical to record every resource; an inventory in such cases would be created from sampling portions of the land. When working with large territories multiple small portions of the land can be sampled to create an overall picture of what resources the property contains. Gathering this information on the specific regions in addition to using Geographic Information System (GIS) maps can help keep everything organized. GIS is a computer program used for obtaining, storing, interpreting, and displaying spatially organized information. GIS can also assist with selecting the areas of land to be sampled in order to collect the natural resources data.

The surrounding communities' thoughts about a parcel of land impact the management plan greatly (Enfield, 2005). A large number of the potential hunters, fishers and hikers could come from the surrounding communities. Using some of their suggestions could provide other views about the land, which could lead to high quality hunting, fishing and passive recreation areas. To help facilitate drawing up a management plan the planners must know what the government's laws and regulations are.

The Department of Natural and Environmental Resources enforces law No. 241, which is known as New Wildlife Act of Puerto Rico (Legislature of Puerto Rico, 2002). The purpose of this law is to protect, conserve and foster native and migratory wildlife species as well as to define the faculties, powers and duties of the Secretary of the Department of Natural and Environmental Resources. This law gives the Secretary the powers to regulate hunting and the

use of hunting weapons as well as their registration. The Secretary also has the power to issue, renew and revoke hunting licenses and permits. This law has 25 sections. Many of these sections give definitions to words or phrases used throughout the law. This sets a guide line and leaves little margin for confusion about what the law and all of its sub- sections are stating.

The law declares a large range of regulations, illegal acts and penalties. The regulations range from Game Preserves regulations to hunting regulations. The game preserves cover everything from management to the permits for breeding to repopulate certain species in a given region. The hunting regulations cover everything from the permits to the gun regulations (Legislature of Puerto Rico, 2004). For example, the shotgun regulation requires a hunter to use nothing smaller than a .410 gauge and no larger than a 12 gauge, with a barrel length of 20 inches or more, and the guns are not allowed to be loaded with more than three cartridges at once.

The illegal acts are declared in section 6 of the law (Legislature of Puerto Rico, 2004). Main subsections discussed in this section are hunting and fishing without the proper permits and hunting species that were not declared as the proper game by the secretary as well as hunting out of the declared season. The introduction of exotic species to the wild as well as the sale, trade or act of keeping exotic or unauthorized species captive, which are identified by the Secretary, are also declared to be illegal within this section. Another main subsection is gun registration and regulation. All weapons must be registered through the Secretary.

The last main section of this law covers the penalties for violating anything mentioned in the previous paragraph (Legislature of Puerto Rico, 2004). These are discussed in section 22 of

this law. Any person who violates these laws will be subjected to a fine of no less than 100 dollars and no more than a $500 fine or a term of imprisonment no longer than 6 months. Breaking certain laws can bring higher penalties, however, such as importing exotic species illegally, which can bring a fine of no less than 5,000 dollars and no more than 50,000 dollars as well as a term of imprisonment of anywhere from 90 days to 3 years. The last major penalty is for fraudulently obtaining a hunting license. This action brings penalties of anywhere from a 100 dollar to 500 dollar fine. All laws discussed can be seen in Appendix F.

2.3.2 Wetland Management

A wetland is an area of ground that is saturated with water (Water Sheds, 2012). "Generally, wetlands are lands where saturation with water is the dominant factor determining the nature of soil development and the types of plant and animal communities living in the soil and on its surface" (p. 2). Wetlands range widely from region to region, which is mainly caused by the differences in the local soil, climate, hydrology, vegetation as well as many other factors. Wetlands are found all over the world, from the tundra to the tropics, and on every continent except for Antarctica. These areas include lakes, ponds swamps, bogs and other areas on a coast or near other types of water sources.

Wetlands vary widely due to local and regional differences. A coastal wetland such as the wet lands in La Esperanza can provided habitats for fish and animals alike. "Wetlands provide a multitude of ecological, economic and social benefits. They provide habitat for fish, wildlife and a variety of plants. "Wetlands are nurseries for many saltwater and freshwater fishes and shellfish" (USFWS, 2001, p. 3). These nurseries provide the perfect environment for a

recreational hunting area because the young fish attract a large variety of water fowl. These areas also attract a large variety of ocean fish. While these large ocean fish are occupying the region, fisherman will flock to get a chance at catching a large fish while fishing off shore. Therefore these nurseries would provide for excellent fishing areas as well.

Hydrology is the study of the movement, distribution and quality of water in a certain area on the Earth (WRP, 1998). Hydrology generally is not determined by field observation alone, since this evaluation involves an extended period of continuous monitoring of saturation during the growing season. There are seven tools to determine the hydrology of the land (Scientific Software Group., 2012). The seven tools are: a stream gauge, water budget analysis, aerial photographic analysis, DRAINMOD, scope and effective equations, drainage guides and observation of well presented data. The use of these tools depends on the local conditions. To determine which tools are needed for this project we will consult with the DNER.

Stream gauge is used to establish the hydrology of over- or out-of-bank flooding (Scientific Software Group., 2012). Water budget analysis to estimate daily runoff values, these can be used to determine the water balance of the wetland. Aerial photographic analysis establishes the frequency of occurrence and duration of saturation. DRAINMOD is a computer program that establishes the degree of saturation of a wetland under a wide range of drainage conditions. The scope and effective equations are used to evaluate the effects of drainage measures on wetlands. Drainage guides provide useful information for evaluating the specific drainage system of the wetland. Observing the data collected from the wide range of tests above can establish the saturated conditions of a wetland.

Another large determining factor for a specific wetland is the soil. Soils will vary from texture to density (Scientific Software Group., 2012).. More dense soils hold water while maintaining a more solid state, while less dense soils can lead to softer land and land covered in water. The type of soil will dictate the type of recreation allowed within the curtain area of land. Navigation on foot through the more dense soils will be possible; the softer land that is covered by water is much harder to navigate, although boats or kayaks are very effective in navigating through these regions.

Wetlands are classified into five different wetland systems (Water Sheds, 2012). These five systems are marine, estuarine, riverine, lacustrine and palustrine. Marine wetlands are classified as open ocean or continental shelves, such as beaches, rocky shores and shallow coral reefs. Estuarine wetlands are deep water habitats such as salt marshes, bays and coastal rivers. Riverine wetlands are freshwater streams comprised of deep water habitats contained within a channel. Lacustrine wetlands include inland water bodies that occupy at least 20 acres; this includes lakes, large ponds and bayous. Palustrine wetlands are non-tidal wetlands covered with emergent vegetation, such as marshes, swaps and bogs. The different types of wetlands will dictate the types of recreation activities allowed within them.

Wetland management is slightly different from managing other types of land. These unique environments require more regulations, and the regions demand more attention (Knight, 1995). These regulations are largely due to the fact that wetlands are more susceptible to harm than many other ecosystems. The DNER works closely with the US Environmental

Protection Agency and US Fish and Wildlife Service to work for the management and protection of wetlands (DRNA, 2006).

2.3.3 Managing for Endangered Species

Some pieces of land become protected because of endangered species (Loughlin, 2009). Animals have become endangered because of loss of their habitat. This is crucial in Puerto Rico to manage land use around endangered species habitats. The wetlands are home to many different fish and bird species. These are also the habitats for many of Puerto Rico's endangered species, such as the Buff Breasted Sandpiper (Earths endangered, 2006). Puerto Rico is home to 17 endemic birds. Endemic specie is a specie that is unique to a specific area and not found anywhere else. This is common with islands because of evolution and isolation. "The reality is that human pressure can often tip the balance so that even a minor natural disaster, like a hurricane, can cause their demise" (Loughlin, 2009).

Preserves that have passive recreation such as hiking and watch towers have to be designed so that trails and structures are placed so to not disturb the animals' habitats (Loughlin, 2009). Rare animals are highly sought out to see by tourists and going to a preserve with rare species can be a big attraction. Because rare species are a big attraction for people, viewing points or towers overlooking areas known for housing endangered species can be a big hit. There is a fine line of what structure can be placed and how close these spots are located to the area housing these creatures. There must be prior research and trials to see where these locations can be placed without disturbing an animal's natural habitat.

2.3.4 Managing for passive recreation

Passive recreation for a preserve consists of hiking trails, viewing towers, and other forms of nature watching (Helmer, 2004). The main purpose of passive recreation like these are having visitors being able to go into nature safely and not causing any more damage or disturbance to the environment.

There are many precautions that must be taken in order for visitors to safely go into the outdoors by themselves (Helmer, 2004). There must be well built trails that clearly show where one is allowed to be and prevent people from going into areas that should not be disturbed, especially wetlands. As previously mentioned, areas that are home to endangered species must be well protected. For safety reasons trails must be well maintained and clearly shown so no one gets lost as well. Many spots that people are attracted to are areas high up overlooking scenery. This can be very dangerous as well because of the hazards of people falling. For areas like these every precaution must be taken such as installing barriers that prevent curious visitors from going beyond the boundaries and causing danger to themselves.

Preserves with different activities such as passive recreation and hunting and fishing need to take more precautions to make sure these three activities do not conflict. By using GIS software the planning team for a property can map out designated hunting areas and route trails around these more dangerous spots. This is very important for the safety of hikers and people using the trails.

For a successful management plan there must be available funding for maintenance and daily operation costs (Becker, 2009) There are different options that can be used to get revenue to run a reserve. The DNER is a government organization so government funding, if available, can be used to cover the costs that a preserve requires. If hunting and fishing attracts a lot of the visitors to a preserve, that preserve can almost be self-sufficient. Many larger organizations and companies like to contribute to wildlife preservation for public relation reasons and this is another possible way to receive revenue. This option cannot be relied upon as the only source because a business could stop contributing at any time for any reason. With Ponce being a tourist area there are a few hotels in the region. This can be very beneficial for any type of excursion tourist attraction. The hotels can become a good source of advertisement. Another source of money and labor can come from community support. The community around a preserve can help contribute to a lot of the work involved. This requires community support for the area. Many preserves have a group of volunteers that schedule clean up dates during certain times of the year. This helps offset costs of government workers getting paid to come in. The community can also help by raising donations towards running the preserve.

2.3.5 Managing for hunting and fishing grounds

One of the biggest factors for setting up hunting and fishing grounds on a preserve is to create a safe environment for other visitors as well as endangered species (Illinois, 2009). There are many benefits of hunting and fishing preserves. This attracts a larger group of people and creates a new tourist attraction, without damaging the environment; this is always beneficial for local economy and wellbeing.

When mixing passive recreation with hunting and fishing in the same preserve many extra precautions need to be implemented (Illinois, 2009). Signs must be present giving notice to non-hunters about where and when hunting is active. Trails for hikers must remain far enough away from these designated areas so as not to be in danger of firearms and disturbing the hunter's experience.

Even though some might think of hunting and fishing as being destructive for an ecosystem, it can actually be beneficial if well regulated. Hunting can be a learning experience for people by going out and appreciating nature (DRNA, 2006). It is also vital when looking at population control of different species. Hunting helps regulate animal populations and helps gene pools. This helps gene pools by eliminating weaker animals and keeping more alert, smarter animals alive for reproduction.

Many preserves that are acquired have been vacant or abandoned and have been used by the local people for their own personal endeavors. When first regulating a new preserve it is important to make sure that the people are aware that it can no longer support unregulated fishing and hunting, as this is now poaching. It makes it almost impossible to be able to regulate the amount of fish and game taken when illegal hunting and fishing is occurring.

Preserves with hunting and fishing grounds within the property are able to generate a steady income (Page, 1998). Setting up hunting and fishing grounds brings in a steady income due to hunters buying the required hunting tags and permits for the preserve. Even though there are not fishing permits in Puerto Rico setting up concessions that rent fishing poles and bait will help create revenue for the area. Preserves in the United States generate 1.6 billion

dollars of revenue a year that is put back into the economy. Adding hunting and fishing grounds can make a preserve much more self-sufficient and add to its longevity by not having to rely on outside funding as much.

2.4 Conclusion

Even though there are many preserves throughout the world similar to La Esperanza, a management plan cannot copy the same plan for another piece of land. Each management plan is specific to that preserve and La Esperanza is unique with its wetlands and home to the endangered species of the brown pelican and the manatee. There are many ways to go about creating a plan for La Esperanza. This plan must take in consideration the impacts this preserve will have on the surrounding community, environment and economy.

3. Methodology

In this chapter we discuss the methodology we used for developing a feasible management plan for La Esperanza. We discuss specific research methods we used for determining hunting, fishing and passive recreation areas, as well as methods used to determine the costs and sources of funding for the project including how we predicted yearly revenue for the recreation area. Finally, we explain how we measured the potential social and economic impact of La Esperanza on the surrounding communities as well as how we identified ways to best promote this recreation area.

3.1 Determine a feasible management plan

Puerto Rico's Department for Natural and Environmental Resources (DNER) is working to create a management plan for La Esperanza to allow hunting, fishing and passive recreation. To determine the plan best suited for La Esperanza we used GIS (Geographic Information System) mapping software and first-hand observation of the land. We developed a plan that follows all laws and regulations. This plan provides a basis for the DNER to successfully introduce hunting, fishing and passive recreation to La Esperanza.

3.1.1 GIS Mapping

A geographic information system (GIS) lets one visualize, analyze, interpret and understand data in ways that reveal relationships, patterns and trends in the form of maps, reports and charts (ESRI, 2011). GIS software includes a broad range of applications; all of these applications involve some combination of digital maps and geospatial data. A main application

of GIS is answering questions and solving problems by looking at data in a way that is quickly understood and easily shared. This mapping technology has many benefits that helped us to identify hunting, fishing, and passive recreation areas in La Esperanza. These benefits include cost savings and increased efficiency, better decision-making, better recordkeeping, and sound geographical management.

GIS software greatly assists in the decisions of where to place the specific recreation areas. GIS is helpful in distinguishing the main assets of the land, such as mountainous or hilly regions, valleys and riverbeds. Another benefit of the GIS software is recordkeeping. This system saves all mapping and data sheets in convenient folders to open and to share. When working on our project in Puerto Rico we needed to be able to send and share data quickly and easily with our project sponsors.

The GIS mapping software assisted us to delineate passive recreation grounds such as determining the location of hiking trails. We looked for trail alignments based on the topography of the land as well as their potential to lead hikers to magnificent views of the Cordillera Central mountain range and the shore line. This software provided us a series of map layers of the entire land area. With these maps we systematically determine a layout for the trails that traverse a large area. These trails will also be navigated to observation towers to overlook large regions of La Esperanza. GIS mapping software also offered specific maps to determine boundaries for the specific recreational activities. These borders are crucial in order to keep passive recreationists and fishers from wandering onto hunting grounds during the hunting season which takes place during the fall.

GIS also helped us to determine the best areas for the hunting and fishing. As with passive recreation areas, the maps generated by the software helped show the specific features that would allow hunting and fishing areas to thrive. For hunting grounds, we had to look for calm open marshes or small ponds that would attract a large variety of water fowl. For fishing areas we looked for larger ponds and lake regions, as well as the potential for off shore fishing. Using this software early in our project process helped us focus the rest of our research. The DNER provided us with the maps from their GIS mapping software database for La Esperanza, we then analyzed the maps at DNER's office headquarters. We began our process by making a plan for the region using the maps and confirmed what we had seen on the maps with first-hand observation of the land.

To determine the hydrology or the movement of water within La Esperanza we used GIS mapping as well. From these maps we were able to see the directions in which the main source of water is coming from. There is a main water gate in the northern region of the preserve that will be used to flood certain areas. The ditches and canals will be used to transport water to different areas to potentially fill up fishing ponds. The connection between canals and ditches was evident through GIS maps because they gave a view of the reserve as a whole. Actual observation of the land will not assist in doing this because when we visited La Esperanza it was during the dry season. During the dry season, La Esperanza resembles a desert on the coast of Puerto Rico. The areas where there are wetlands during the rainy season were composed of dry, cracked mud. From these maps we will determine the direction of water flow throughout La Esperanza.

3.1.2 Observation of the Land

Observation of the land was another step in determining the layout of La Esperanza. We used the maps and data collected through the GIS software as general maps of the area. Using these maps we were able to understand where potential recreation areas could exist. Once we had identified these potential areas, we directly observed them. This enabled us to understand what the maps had displayed. We visited La Esperanza for the first time on Wednesday, March 21, 2012. We then returned to Ponce, to complete our surveying and interviewing of the surrounding communities from April 9th to April 11th.

Actual observations also allowed us to select the best areas for hunting and fishing. The GIS software can map the land, but it cannot inform us where the areas with large bird and fish populations are. A large factor in the success of the hunting and fishing grounds will be the presence of significant wildlife. We will not designate hunting and fishing grounds in areas where there is not a significant amount of wildlife activity.

We visited one of the three hunting preserves on the island of Puerto Rico, Humacao, on March 29, 2012. We also were in contact through email with Idelfonso Ruiz, the manager of the Boqueron hunting preserve. We discussed with the managers of the parks how they determined their specific recreation areas as well as the number of recreationists who use the parks. We also discussed how they manage hunters and fishermen. Since the surrounding community is an important consideration for our project, we asked how they have kept a good relationship with their surrounding communities. The last item we spoke about is how they

manage their hunting permits as well as prices for different types of permits and if an entrance fee is charged to enter the preserve. No permits are needed for fishing in Puerto Rico.

During our first visit to Ponce, observation of the land was the main focus. This included identifying the land suitable for passive recreation. The GIS software helped greatly in determining the routes of hiking trails, but we needed to observe the land directly to ensure everything was safe to navigate on foot. We toured the property using a DNER government vehicle, stopping at certain points to ground truth and to obtain GPS coordinates of suitable points for infrastructure, such as observation towers and visitor buildings. We completed our observations of the land on our second visit to the area.

3.2 Costs and Funding

The implementation of an environmental preserve can require a great deal of funding. The sources of this funding can come from the government or the private sector. To estimate operating costs we analyzed how many laborers would be needed and other costs of operation. The reason for this was to get a range of costs for how much it would take to hire the necessary workers for the preserve.

3.2.1 Determining costs of operation

In this particular case, where La Esperanza is being restored and recreational activities are being put in place, there will need to be hired personnel for the area. This will include park rangers and conservation specialists. Such personnel, wildlife managers and biologists, will be provided by the DNER; however, the number of people needed will affect the labor costs. We

conducted a budget analysis to determine the cost of how many personnel and what type of personnel will need to be hired. Relevant information was gathered from Manuel Corbert, the manager of the Humacao nature preserve. We were in communication with Mr. Corbert to ask questions regarding how many people are needed to operate Humacao, and what the professional titles of those people are. We chose Humacao due to its similarities to La Esperanza. Humacao is a nature preserve which contains hunting and fishing, along with passive recreation. Also, this preserve contains concessions for snacks, and companies that provide visitors with the opportunity to kayak through the wetland areas and bike throughout the preserve. To create our own budget analysis for La Esperanza, we used a budget analysis from the Humacao nature preserve as a guideline in the form of a table from Iván Llerandi Román, a wildlife biologist and our group's liaison from the DNER.

There are additional costs besides labor. Designating fishing and hunting grounds and hiking trails will require signs and descriptions of the various parts of the preserve to enable interpretive trails, which inform visitors of the terrestrial and aquatic flora and fauna in the area. Trails will need to be built and maintained for passive recreation. There will be costs for marking trails and designating certain areas where human activity should not disturb the native plant and animal habitats. These costs were determined from the American Association Port Authority, or AAPA, mitigation plan (seen in Appendix E), which contains all the information regarding salaries for personnel working in the preserve and implementation plans for building such things as trails and ponds. Once the preserve has completed the implementation phase, most of the preserve's expenses will simply be operational and maintenance costs.

3.2.2. Determining sources of funding

We conducted interviews with business owners of hunting and fishing shops as well as tourism outfitters and restaurants during our April 9th trip to Ponce. We interviewed representatives from hotels such as the Ponce Hilton Golf and Casino Resort, the Holiday Inn, the Texan Guest House, the Ramada Ponce , and the Howard Johnson Hotel due to their proximity to La Esperanza. A potential major source of international tourism to the area is from the hotels in which visitors are staying. Hotels contain desks in their main lobbies that inform tourists of excursions, so the idea of La Esperanza being a tourist attraction is the main reason why we chose to interview hotel staff. While interviewing the hotel staff, we discussed what interest there would be for guests looking to hunt, fish or hike through a nature preserve. Refer to Appendix D for our interview protocol.

3.2.3 Predicting yearly revenue

We predicted yearly revenue by estimating the number of hunting permits that would be sold. These permits would be sold to locals in the area who want to take part in hunting and also to tourists visiting the preserve who want to hunt. How long a person would use the preserve was also considered in setting rates for permits and other fees.

In the area around La Esperanza, we went to the town offices that keep the records of the existing hunting permits. We found out the number of people who have permits in the area and how many permits the government issues each year. From this information our team gained a sense of how popular this area has been for hunting activities, since La Esperanza is

already being used by hunters and fishers illegally. With this information we were able to predict the number of local people who will most likely use the preserve for these types of recreational activities, and we could thus estimate the revenue that could be obtained by selling permits.

3.3 Surrounding community relationships

The effects of the management and restoration of La Esperanza could have a large impact on the surrounding communities. A major component of this project is to gain community support for the incorporation of a nature preserve, and secondly incorporate the communities with the growth of La Esperanza. This section discusses the process of how we gathered information concerning community opinions and desires for La Esperanza.

3.3.1. Determining Socio-political Effects

The people of the surrounding communities of La Esperanza need to be supportive of the overall goal of the DNER, which is to protect and manage this 500-acre plot of land. The response of the local people to this project is going to be vital in how effective the management plan turns out to be. We conducted personal interviews and administered questionnaires to the local people to find out their opinions about La Esperanza.

The team interviewed leaders in the community about their personal attitudes to conservation and the establishment of a nature preserve. Community leaders included business leaders because of their influence on the local population. Mr. Iván Llerandi Román, our liaison in the DNER, determined that there are five focal communities around the La

Esperanza preserve. These communities are Villa del Carmen, Los Caobos, Villa Flores, Merceditas, and Jueyes. Most of these communities are relatively small; however, one is larger due its location near the center of Ponce. We attempted to survey an even amount of persons in each community, but once there, we surveyed as many people that were willing to take part in our data collection. A few individuals refused to be surveyed because they only worked in the area but did not live there. We surveyed a total of 125 members of the community using a check box formatted questionnaire. The last question in our questionnaire was open-ended in which we asked what community members would like to see happen in the preserve. This question in some cases was expanded upon with other questions to stimulate more discussion.

We went to Ponce and traveled through all five communities interviewing and surveying the local population. We drove around with four government officials from the DNER and two government officials from Ponce, Puerto Rico. If the person we were interviewing and surveying was a hunter or fisherman we had them answer additional questions in the questionnaire, which can be seen in Appendix C. The survey was translated into Spanish, and the government officials who were with us were used as translators. We also sent the President of the Hunting Association in Ponce, Puerto Rico, the hunting and fishing survey to give out to his colleagues and associates to provide us with more responses on the hunter-specific survey because not many of the local people we surveyed directly were hunters or fishermen.

3.3.2 Determining Economic Effects

The establishment of a preserve like La Esperanza can bring in revenue for the local people. We spoke to business owners in the area who deal with hunting and fishing and other

forms of recreation that will have a direct impact on the preserve. We visited a gun store in Ponce called Armería Williams and an aquatic recreation store called Ponce Nautic Center, Inc. We also emailed five other gun shops, which were not located in the immediate area, ultimately collecting information from six gun shops. We visited the Ponce Department of Sports and Recreation to gather their thoughts on various activities they would like to see introduced in La Esperanza. Also, other business owners we interviewed included restaurant owners and tourist souvenir shopkeepers in the area who could potentially be impacted by an increased number of tourists in the area. We spoke to and interviewed a local convenient store owner, six hotels, and a local restaurant bar near La Esperanza called El Fogón de Yuya. This is due to the possibility of concessions being set up in the preserve to aid the growth of these businesses. Refer to Appendix D for our interview protocol.

3.4 Summary

To determine a feasible plan for La Esperanza to allow hunting, fishing, and passive recreation we used GIS mapping software to produce maps of the region. Using these maps we undertook field observations of the land to fully understand the landscape we were working with. The creation of a nature preserve in La Esperanza will have costs, but also benefits by way of positive economic effects. The costs of implementation, labor, and maintenance were determined as well as the predicted yearly revenue. The thoughts and opinions of the community were taken into consideration by conducting interviews with business owners, hunting organizations, hotel representatives, and restaurant owners. This enabled us to

analyze the information we gathered to devise a plan for La Esperanza so it can become a popular and well maintained wildlife preserve.

4. Results

In this chapter we discuss our proposed layout and management plan for the La Esperanza preserve in Ponce based on the research that we completed using field observations, GIS maps, interviews and a survey. We also analyze the potential social and economic impacts that may occur because of the creation of the La Esperanza preserve. In addition, we provide a budget analysis for the development and operation of La Esperanza.

4.1 Mapping the Preserve

To determine a complete detailed map of the preserve we used two data collecting methods. These methods were the use of GIS mapping software as well as first-hand observation of the land, also known as ground truthing. In this section we describe our findings and outcomes from these methods Figure 1 below is a detailed map of the preserve, along with Figure 2 as a legend for the map.

Figure 1: Map of La Esperanza Preserve

Legend	
	Observation Tower 1
	Observation Tower 2
	Observation Tower 3
	Observation Tower 4
	Observation Tower 5
	Potential Observation Tower 6
	Concessions
	Existing road
	Man-made ditch
	Potential board walk
	Potential board walk
	Fishing area
	Hunting area
	Visitor Center

Figure 2: Legend for Map Above

4.1.1 Proposed Hunting Grounds

To determine the hunting areas we looked for certain features of the land such as flat landscape, in addition to certain features that could potentially attract a variety of waterfowl. For example, we found that shallow wetland regions will attract small fish; since a great deal of the waterfowl hunt for smaller fish, they will flock to these regions. We also selected land that was flat and open, which would allow hunters to see waterfowl from a distance.

The hunting areas were also chosen based upon the bird population in each area as well as past recreational use. When we were walking through these regions we found many shotgun shells. These shells indicate that hunting had already taken place in these regions. There is interest in having three hunting areas; this is shown in Figure 3 below. The three sections of the land are outlined in orange. For the hunting areas we checked a few different regions with a large area of open space as well as a few regions that had noticeable bird activity. As it was the dry season in Ponce when we visited, we noticed small dead fish throughout one portion of the proposed hunting areas. These small fish had perished because the wetlands dried up due to the dry season. With the evidence of the shotgun shells in addition to the small dead fish we are able to identify quality hunting areas. Refer to Appendix H for the complete reptile, fauna, flora, and bird evaluations.

In the eastern section of the preserve and shown in Figure 3, presented by red lines, will be ditches. These ditches are for the purpose of controlling the movement of water into the hunting and fishing areas. This hydrological method of controlling water allows certain areas to

be flooded, in particular the designated area we have recommended for establishing fishing ponds.

Figure 3: Hunting ground overview

4.1.2 Proposed Fishing Grounds

Iván Llerandi Román, our liaison who works for the DNER, had shown interest in creating a man-made large body of water in the form of a pond or a lake in part of the preserve This large body of water may need to have a rubber liner so the pond or lake will be able to retain water during the dry months of February to April. Such a structure would allow fishing all year round as well as maintain a sustainable fish population for La Esperanza. This lake will be

populated naturally by fish entering the land through water connections with the ocean. Some of these fish will include tarpon and other local species. We also found that another possible fishing area in La Esperanza is off the coast. There are some coral reefs along the coast of the preserve that serve as an excellent environment for a variety of ocean fish. Although the coral reefs are protected so fishing will not be allowed directly around them, coral reefs bring many fish to the region. The fish inhabiting the reef area would be able to be caught from shore.

Because there is no large natural body of water in La Esperanza construction will be necessary to create an appropriate body of water that can serve as fish habitat to satisfy the fishermen in the region. The construction will consist of excavating a large area to become a lake. The area will be dug in a way that will create different depths to cater to different fish species. The fishing area is signified by the area outlined in blue in Figure 4, in between the boardwalks. We also noticed there is a sizable cove with noticeable fish activity on the coast that could serve for as a great fishing area. These designated fishing areas as well as the entire length of the coast will serve as the fishing area for La Esperanza. The fishing areas we proposed are outlined in blue in Figure 4 below.

Figure 4: Map displaying fishing areas

4.1.3 Proposed Passive Recreation

From analyzing the maps of the region and from ground truthing the land we came up with proposed trails and locations for observation towers. When discussing this with Iván Llerandi Román, he explained that the trails and boardwalks will cover a majority of the western portion of La Esperanza. The plans are depicted in Figure 6. The boardwalks, signified by green lines, travel over the wetland region. The boardwalk also stretches west to an open deck for an additional viewing spot as well as including grill stations and picnic tables. The yellow lines on the map signify the dirt and grassy roads that already exist on the region. This plan allows hikers to walk a large loop around one of the proposed fishing areas using the boardwalks and the roads, which are quite easy to navigate on foot.

The second boardwalk is in the north western region of the preserve. This boardwalk can be easily accessed by the road. The first portion of this boardwalk is a short boardwalk that reaches a large deck for viewing and possibly fishing purposes. The second portion of the boardwalk stretches over a large wetland to another deck with an observation tower. In this region, there is a large amount of clinker as shown in Figure 5, which is a clay-like material, produced by limestone used to manufacture cement. When this clinker gets wet it becomes slippery and makes the road hard to navigate. To counter act, this we suggest the DNER places gravel on the road. The gravel will provide traction for vehicles making the road easier to navigate even when wet.

Figure 5: Image of Clinker in La Esperanza

Observation towers are places around the land to give visitors an elevated view of the property. There will be three observation towers along the wetlands of the property. Two are accessible by the boardwalks and the other is placed in between the hunting areas, which is accessible by the roads. There will be five observation towers in total. The other two towers will be placed on opposite ends of the coast and will be accessible by the roads. These towers will offer a view of the entire coast of the property and an elevated view of the ocean. The combination of these towers will give hikers and other passive recreationists magnificent outlooks of the preserve.

Other types of passive recreation could also take place within La Esperanza, such as horseback riding, kayaking, snorkeling, bicycling and children's activities. These activities will be operated through kiosks next to the concessions. These will be placed at the end of the main road of the preserve, which are shown in Figure 6 by green triangles on the coast.

Figure 6: Passive Recreation within La Esperanza

4.1.4 Visitor and Information Centers

A possible location for the visitor center is at the main entrance of the preserve. This building will act as the focal point for the preserve. Visitors can go to this building and find out exactly what is on the property and what activities are available. The visitor center can have maps and personnel that show visitors trails and highlights of the property. Any questions visitors have can be answered here. Maps of the entire preserve will also be given out at this center. As it is the starting point of the preserve. Outside of the visitor center there should be some sort of amphitheater, with a small area to give educational interactions to children and all other visitors to the preserve.

An information center can be placed along the coast of the preserve near the concession areas where a building already exists, although this building will need some repairs. It would also be interesting to have a timeline of the property's history going back as far as

possible showing how the land had been used, and how it had developed up through the present in the center. The information will include how La Esperanza was a vacation area for the Serrallés family, the founders of Don Q rum. There would also be maps showing the development of the area during the half century, when the Serrallés family was in control of the land. An example of a map showing the visitor and information centers in La Esperanza's is displayed in Figure 7 below. This center could also have visual displays about the fauna and flora in the area, the destruction of the coral, and the importance of conservation. This will be beneficial for the environment and for people to know about the endangered species in the area to disturb them. Visitors could also be provided with educational posters and flyers on how to snorkel near the coral properly without causing more damage.

Figure 7: Locations for Visitor and Information Centers

4.1.5 Concessions

The DNER will set up concession and activity areas within the preserve for local community member to operate. The DNER will rent these concessions to community members for fifteen percent of the concession revenue. These concessions might consist of a coffee and snacks stand or a place to purchase souvenirs. The reasoning behind a coffee/ snack concession rather than a full scale restaurant is to avoid the potential for competition between restaurants in the surrounding communities and restaurants in the preserve. Also, items that the coffee shop contains such as cups, must be bio degradable and eco-friendly so if they are not disposed of correctly it will not hurt the environment. These concession areas could also be used by local community members to run different activities on the preserve. Based on information from our interviews and survey with local people, we selected the most popular activities, which include kayaking, snorkeling, picnic areas, children's activities, and horseback riding. Activities such as horseback riding, bicycling, snorkeling and kayaking could be offered at an hourly rate, while children's activities could range from educational sessions about the environment and conservation to fishing competitions.

4.1.6 Staffing

We came up with a desired number of staff to work in La Esperanza. We decided upon having eight members for a staff at La Esperanza. This staff includes a manager for the preserve, two wildlife biologists, a heavy equipment operator and three workers. The manager of the preserve is in charge of ensuring the preserve runs smoothly. The wildlife biologists will educate visitors of the preserve for good environmental practices as well as are in charge of

most of the field and monitoring work for the preserve. The biologists coordinate research and investigations conducted by interviewing scientists, students and professors. The heavy equipment operator will be in charge of mowing the grassy roads as well as will be the sole operator of all other equipment such as the excavator. The three workers will be in charge of maintaining the preserve such as the boardwalks, the concession stands, the docks and ditches as well as maintenance work equipment and buildings. These are staff needed to run La Esperanza nature preserve in Ponce.

4.2. Proposed Budget and Funding Sources

The implementation and maintenance of a nature preserve such as La Esperanza requires a great deal of funding. Based on data we collected from discussions with managers of two hunting reserves and with community members in the Ponce area, we developed a budget for the first three years of La Esperanza's operation. We also identify viable revenue sources that will be an integral part of ensuring that La Esperanza is successful.

4.2.1 Costs for First Three Years

In talks with our liaison Iván Llerandi Román, and the managers of Humacao and Boquerón hunting preserves operated by the DNER, we found that a budget for La Esperanza's operational costs was necessary to identify the funding needed to implement and run the preserve for the first three years. Once La Esperanza has been approved to be operated as a nature preserve, a large percentage of the costs will occur in the first year of operation. In the first year, construction and renovation of the infrastructure need to take place. These expenses include the construction of observation towers ($130,000 per tower) at specific points in the

preserve in addition to walkways over wetlands to connect various areas of the preserve ($150,000). We interviewed Manuel Corbert, the manager of the Humacao hunting preserve, and Idelfonso Ruiz, the manager of Boquerón hunting preserve, from this we determined the staffing needed to run such a preserve (see Appendix D for the Interview Transcript). They mentioned the need to hire wildlife biologists and assistant workers and to determine their classification levels, which affects their salaries.

Our proposed budget for year two and beyond demonstrates that the costs drastically decrease because start-up costs have already been completed and all construction has been completed after year one. The estimated cost for year one is approximately $1.9 million, but for the following two years the costs are about $360,000 and $275,000, respectively. Also, after year one the bulk of the costs will relate to maintenance and for ensuring the preserve remains eco-friendly and clean. Table 1 below displays part of the costs from year one to year three. For the full budget analysis from year one to year three, refer to Appendix K.

Year 1

	Other Costs			
Equipment		Cost	Federal	State
Vehicles	2 @ $30,000	$60,000	$60,000	$0
ATV	2 @ $10,000	$20,000	$20,000	$0
Tractor	1 @ $65,000	$65,000	$65,000	$0
Tractor mower attachment	1 @ $25,000	$25,000	$25,000	$0
Boat	1 @ $25,000	$25,000	$25,000	$0
Kayaks	2 @ $750	$1,500	$1,500	$0
Gasoline/Lubrication/vehicle insurance		$8,000	$8,000	$0
Toll fees		$500	$500	$0
Per diem		$2,000	$2,000	$0
Services (Vehicles and ATV repairs)		$2,000	$2,000	$0
Construction materials				
Road and Trail costs		$150,000	$150,000	$0
Visitor Center with consessions		$600,000	$600,000	$0
Signs, information centers, etc		$20,000	$20,000	$0
Observation Towers	5 @ $130,000	$650,000	$650,000	$0
Docks		$150,000	$150,000	$0
Gazebos	3 @ $5000	$15,000	$15,000	$0

Year 2

	Other Costs		
Equipment	Cost	Federal	State
Water pumps	$25,000	$25,000	$0
Excavator	$75,000	$75,000	$0
Gasoline/Lubrication/vehicle insurance	$8,000	$8,000	$0
Toll fees	$500	$500	$0
Per diem	$2,000	$2,000	$0
Services (Vehicles and ATV repairs)	$1,000	$1,000	$0
Maintenance			
Road and Trail costs	$15,000	$15,000	$0
Visitor Center/concessions	$20,000	$20,000	$0
Signs, information centers, etc	$2,000	$2,000	$0
Observation Towers	$10,000	$10,000	$0
Docks	$15,000	$15,000	$0

Year 3

	Other Costs		
Equipment	Cost	Federal	State
Gasoline/Lubrication/vehicle insurance	$8,000	$8,000	$0
Toll fees	$500	$500	$0
Per diem	$2,000	$2,000	$0
Services (Vehicles and ATV repairs)	$15,000	$15,000	$0
Maintenance			
Road and Trail costs	$15,000	$15,000	$0
Visitor Center/concessions	$20,000	$20,000	$0
Signs, information centers, etc	$2,000	$2,000	$0
Observation Towers	$10,000	$10,000	$0
Docks	$15,000	$15,000	$0

Table 1: Budget analysis comparing the first three years La Esperanza is in operation

4.2.2 Identifying Funding Sources

We have determined that funding for La Esperanza will come from a variety of sources. Primarily, after presenting the preserve proposal to the DNER funding office, the funding office will formulate a response on how much funding they will provide.

We found that the American Association Port Authority (AAPA) is a contracted funding source. Since La Esperanza was acquired by the DNER as part of the mitigation plan due to the construction of the Ponce Port, the APA is required to fund various tasks concerning the preserve such as start up costs and fencing of the property's boundaries. The property also has clinker deposits at the north and west ends of the property. Clinker is a clay-like material, produced from processing limestone in the production of cement. These clinker deposits have not been used since the 1960s, so vegetation growth has encroached on them. The AAPA is no longer going to dispose of these clinker deposits due to the enormous cost and instead is going to let nature take over and slowly allow vegetation growth over these deposits.

According to our liaison, Iván Llerandi Román, the APA is under contract to complete the initial cleanup and restoration of the land, so the DNER can focus on establishing and devising the recreational components of the preserve. The funding of certain tasks such as the removal of the clinker and what the APA will actually be willing to do will be a challenge due to the great amount of expense and time that would be required to remove all of the clinker.

While funding for the restoration of La Esperanza should come from the APA, small businesses established in designated areas of the preserve in the form of concessions could help fund implementation costs for the DNER. A rise in tourism to the area may bring more revenue to the surrounding businesses. Once the businesses notice an increase in the number of tourists, they may be willing to donate to the park since they indicated strong support for the project as shown in Table 2 (as indicated in our survey results presented in Appendix J).

Will your business benefit during the hunting season?	**Yes**	**No**	**I don't know**	
	8	0	0	
Creation of reserve will have impact on business?	Yes	No	I don't know	
	8	0	0	
Increase of tourism/clients in area?	Yes	No		
	8	0		
Support of development of reserve next to business?	Yes	No		
	8	0		
What types of activities would you like to see?	Hunting	Fishing	Educational activities	Passive recreation
	8	8	8	8

Table 2: Responses to survey questions from Businesses (stores) in the La Esperanza Area

Some funding will come from concessions located within the preserve, even though the main source of funding for the preserve will come from the government (Alexis J. Martínez-Muñoz, personal communication, 3/29/2012. Based on our visit to DNER's preserve in Humacao, we believe that the concessions for La Esperanza should be run by locals in order to boost the local economy. While visiting Humacao, we interviewed several different concession owners, including those offering food, gifts, and bicycle and kayak rentals. Owners rented the property that these concessions were on from the DNER and paid the DNER fifteen percent of their earnings. The fifteen percent is paid to the DNER as rent. This money then went into an account that is directly used for maintaining the preserve. They mentioned that being eco-friendly is mandatory, and that the people working and operating the concessions have to be from the local area. This is because the government wanted this preserve to help the local economy. From the interviews with the local community members we learned that individuals

want the community involved throughout the preserve. We believe that these concessions create jobs for local people and create more community involvement in the preserve.

4.2.3 Unfeasible Entrance fee

La Esperanza is a federal and state funded preserve, thus no admission fee can normally be charged. Although there are gaps in the law that could make charging an entrance fee possible, the amount of government funding the preserve would get would decrease if they choose that option. Since the DNER wants to maintain its federal funding, there will not be an entrance fee for La Esperanza. The other preserves the DNER operates—such as the one Humacao—do not charge an entrance fee either. The unfortunate but true fact is that this preserve will not generate much money outside the money generated by the concessions (Iván Llerandi Román, personal communication, 3/22/2012). The DNER is using government money, from the Sport Fishing Restoration Program and Wildlife Restoration Program, which comes from taxing the people of Puerto Rico as well as the tourists. This use of tax revenues is a way for the government to give back not only to the tourists but also to the locals.

4.3. Community Support and Impact

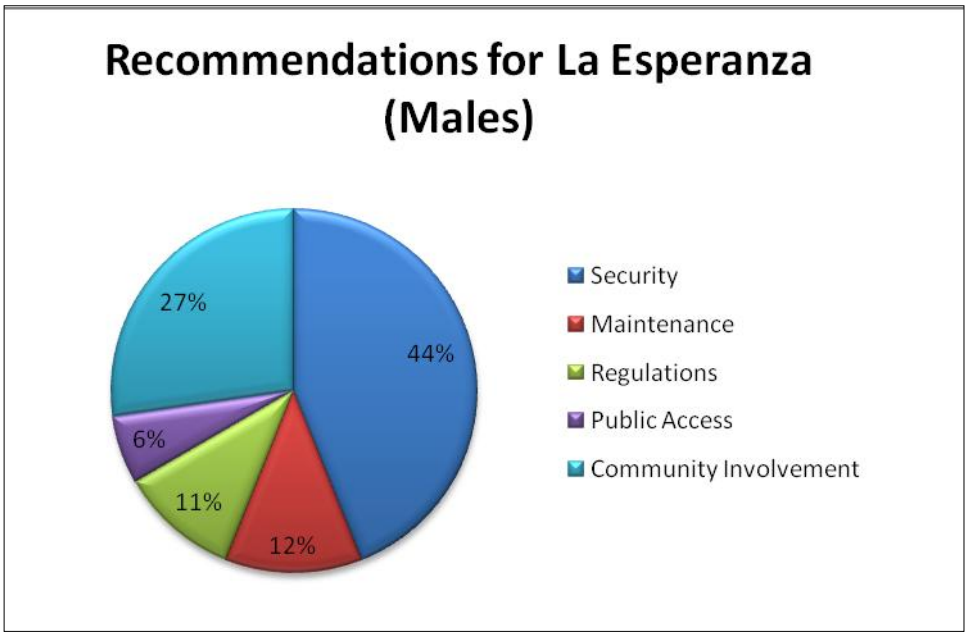
During our visit to Ponce between April 9 and April 11, 2012, we completed all our surveying and interviewing to assess the social and economic impact of La Esperanza on the surrounding communities. Our Ponce trip Itinerary can be seen in Appendix I. This section discusses what impacts the La Esperanza project may have on the local community members, the hunters and fishermen, and the local businesses.

4.3.1 Community Support

Our team and staff from the DNER indentified five focal communities surrounding La Esperanza in which to do interviews. These locales include Villa del Carmen, Los Caobos, Villa Flores, Merceditas, and Jueyes. We completed a total of 125 interviews with community members using a survey questionnaire. We divided responses based on the gender or the interviewee. We analyzed our results from 52 females and 73 males separately, but we also completed a combined analysis. Overall, there was 97 percent support for La Esperanza and its establishment in the area. This information is critical for this project since it signals the support the preserve will receive once it is operating. The presence of hunting in the area was supported by the majority, with slightly greater male than female support (70% vs. 65%). Since there are only three hunting preserves on the island of Puerto Rico and a lack of hunters living in the communities we surveyed, it is important that the majority still support hunting so that it can be integrated into the preserve's set of activities. From what we were told by the non-hunters that we surveyed, they view hunting as dangerous and gruesome. Fishing was viewed differently from hunting with 92% supporting fishing in La Esperanza. The reasoning behind this result is because fishing can be used as a source of educational recreation. There has been discussion with the DNER staff about implementing a "catch and release" program, where visitors can catch fish and release them back into their habitat. This strategy helps fishermen gain expertise in fishing techniques as well as an appreciation for the aquatic wildlife.

We believe that one of the most important questions that we asked was what the community would like to see as part of the preserve's operation. Answers that residents

mentioned include security, maintenance, public access, passive recreation, and community involvement. Surveyed members repeatedly brought up community involvement as a topic of concern. There was strong interest in setting up concessions in or near La Esperanza where visitors could buy snacks or souvenirs. In one case, we received a telephone call from an elderly woman who owned a souvenir shop in the neighborhood of Los Caobos; she had heard of the plans for the reserve and was interested in setting up a food concession in the preserve. Figure 8 shows a pie chart of the responses we got for recommendations for La Esperanza. For the rest of the graphs generated from survey responses see Appendix J.



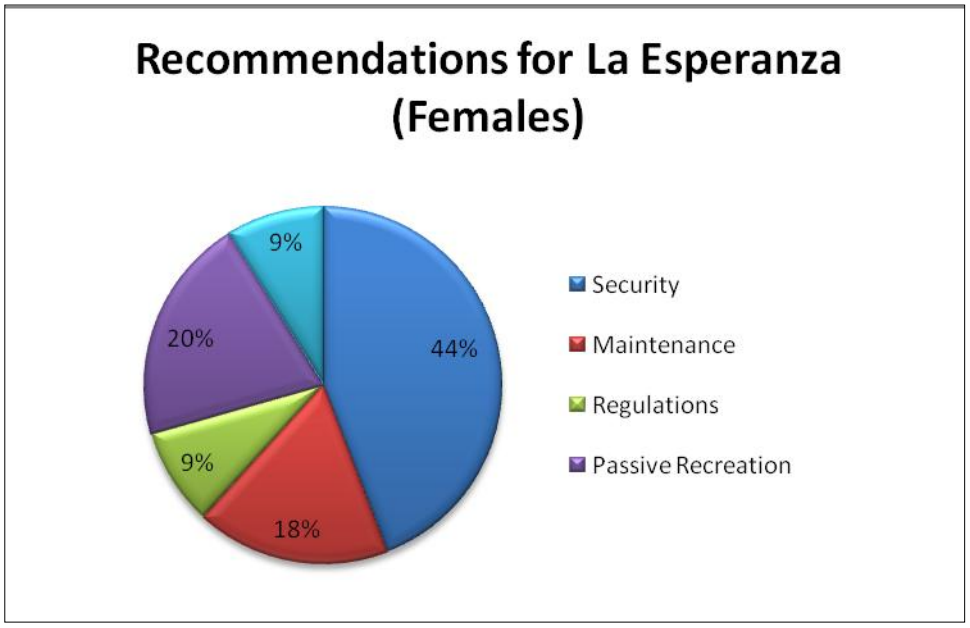


Figure 8: Charts of Male/Female community member recommendations for La Esperanza

Most prominently the community members' indicated a desire to see the preserve cleaned up. There is an abundance of litter around the property that needs to be completely cleaned up before any activities can start. There are also abandoned buildings on the property that are unsuitable for any activity and need to be demolished due to safety reasons.

4.3.2 Hunters and Fishermen Outcome

There were not many hunters and/or fishermen in the communities we surveyed. As such, one of the members of the DNER, Alexis J. Martínez-Muñoz, emailed our questionnaire to a hunting organization in Ponce. They responded promptly, answering questions regarding what kinds of birds they hunt and what kind of setting they prefer for hunting or fishing. This information provided us insights on what kind of areas to recommend for hunting and fishing to

take place in the preserve. See Appendix J for the complete hunter and fishermen survey data analysis.

4.3.3 Local Business Owners' Desires: Gun stores, Fishing stores, Hotels

After interviews with local businesses and commercial personnel in the Ponce region such as Armería Williams and El Fogón de Yuya, we have determined that there is strong support from the business sector of the community. Appendix J includes a chart showing the questions we asked during the interviews and their responses. It is evident that there is a tremendous amount of support from the hotels near La Esperanza because close to 100% of the managers we spoke to believe that their businesses will be impacted positively by the opening of the La Esperanza preserve and therefore support it. In fact, the manager of the Holiday Inn happened to be an advocate for nature preserves. We were also told many guests of these hotels ask for places to hike, hunt, or fish, and currently there are only charter companies for these tourists. They take customers hunting and fishing in different areas. This includes fishing off boats. A popular excursion in the area is a boat trip to La Caja de Los Muertos, an island off the coast. They stated that a reserve for such activities nearby would boost the satisfaction of visitors to their hotels.

The hotel managers gave us many suggestions as to what types of passive recreation to introduce in the preserve. With those suggestions in mind, we suggest passive recreation activities ranging from kayaking to horseback riding as well as snorkeling off the coast of the preserve. Based on the managers' feedback, we also suggest the creation of picnic areas and children's activities such as fishing tournaments and treasure hunts.

The two most popular activities that tourists seek, according to the hotel managers, are kayaking and snorkeling. Kayaking is a healthy activity that many people are attracted to, and it does not harm the environment. Originally kayak concessions were planned for a canal that leads to the east mangroves and to the ocean, but an oceanic study indicated the infeasibility of this plan due to low water levels. The DNER'S marine assessment suggested the more western mangrove area for the kayak concession as seen in Figure XX. By using this route, kayakers can easily access the ocean and also see the bird and plant species nearby. The full marine assessment can be seen in Appendix G.

Figure 9: West mangrove channel entrance

At the Humacao preserve we noticed that kayaking was popular; the DNER has incorporated water trails that visitors can follow through the mangroves into lagoons. La Esperanza's waterways, however, are quite different albeit with a lot of potential. We suggest that La Esperanza have signs along the land-based trails pointing out different flora and fauna

and explaining what they are. Such markers can also be placed along the waterways at different spots to indicate different trees and bird species that can be expected to be seen. In fact, an area near the mangroves is home to the brown pelican, which is an endangered species. Manatees, which are also endangered, can be found in deeper waters near these mangroves. The possibility of seeing these animals will make kayaking more intriguing for visitors, while proper signs along the waterways describing these animals will both educate and help protect these two species. Once people are done kayaking not only will they have the experience of seeing the beauty of this area, but they will be able to take with them knowledge of interesting species and how to conserve and protect them all while having fun.

According to the hotel managers, snorkeling is one of the two most popular activities for tourists. When people think of tropical islands, one of the first things that come to mind is snorkeling and seeing all the tropical fish. Snorkeling would make a great concession because of its popularity. Close to the coast not far from the beach are coral reefs. From the DNER'S marine assessment of the area, it was found that these coral reefs are dead, but they could still support an ecosystem that includes certain fish species. We believe this area also offers an educational opportunity; we suggest that the DNER place plaques with labels and pictures of fish near the coral skeletons, thereby enhancing snorkelers' experiences by educating of them about the local fish. By witnessing dead coral and a depleted ecosystem snorkelers should be able to better understand the ways in which humans negatively impact the environment.

According to our research, horseback riding would be one of the more complicated concessions to start and operate. Introducing a new species onto the preserve is always a

challenge since horses are not naturally indigenous to the area. If a horseback riding concession were to open in the preserve, there will need to be construction for stalls to house and feed them. Another possibility is to have this concession based outside the preserve. Housing the horses outside the preserve would allow visitors easier access to the horses. La Esperanza is a large area with many sites to view; horseback riding would make it easier to travel around and see more of the land. Additionally, it would also be a fun activity that could attract a good number of tourists to the preserve. Indeed, horseback riding is more of a tourist attraction than a daily local activity, whereas locals would be more likely to participate in the other activities that we have suggested. There are other excursion companies in Puerto Rico that offer horseback riding, but no one area hosts all the activities we have recommend for La Esperanza, thereby making it a unique attraction among the places to visit in Puerto Rico.

We believe that La Esperanza can become a great family-oriented preserve where people get together to enjoy the day. Setting up picnic areas with BBQ pits, gazebos, and picnic tables would attract many families. This would be an inexpensive area to create that would add a lot to the property and help to enhance the feeling of community within the area.

From our survey we learned that many families have young children. There are several activities that La Esperanza could host for children only. Such activities could be fishing tournaments, treasure hunts, and other similar activities. Such events would primarily serve locals and the few tourists who are visiting at the same time. The fishing tournaments could be held in the canals where we observed some smaller snook and bass, which would be fun for children to catch. There could be prizes at the end for the biggest catch to spark more

enjoyment. In fact, we believe that in addition to families with children La Esperanza could serve as a field trip location for schools. This preserve could become a significant location for educating young people about the importance of conservation and wildlife preservation.

There were a large number of business owners whom we interviewed. One business we visited was Armería Williams where we interviewed the store's manager. We noticed that this gun store is primarily for selling personal defense weapons rather than hunting equipment, but they also do sell some hunting equipment such as shotguns. The manager noted that Ponce and its surroundings do not offer a place to go hunting, so evidently the majority of the hunters go to Boquerón in southwestern Puerto Rico because it is the closest site for hunting in Puerto Rico to Ponce. For this reason he believes if La Esperanza is established, it will attract hunters in the region.

Another type of business that we interviewed was an aquatic store, Ponce Nautic, Inc., located next to the Ponce Port. This store sells aquatic and boat gear, along with standard fishing poles. Their responses were similar to other businesses in that they were in support of the preserve and excited about the potential positive effect it could have on their business.

4.4 Conclusion

Through our data collection and analysis we found that an overwhelming majority support the establishment of La Esperanza. The question we asked regarding whether the locals support the preserve was the most important one, and the results were very encouraging. We also asked what kind of activities the local community members would want to participate in. We discovered that people and businesses in the area would like to see

activities involving passive recreation, along with hunting and fishing. We have recommended that the local community members run all businesses associated with the preserve, either directly or indirectly. These could involve kayaking, horseback riding, and food concessions. Based on our results we have been able to come up with a set of recommendations for the DNER to consider in developing La Esperanza as an attractive and successful venue for hunting, fishing and passive recreation.

5. Conclusions and Recommendations

After analyzing the data from our surveys and interviews, visiting La Esperanza, and developing a proposed budget for the preserve we were able to come up with recommendations to implement hunting, fishing and passive recreation within La Esperanza. This plan aims for a balance between community involvement and protection of the environment. Our recommendations were developed to allow visitors to enjoy the land without the consequence of damaging the environment. New trails and structures were recommended to enhance the visitors' experience on the preserve.

5.1 Hunting

After analyzing maps and going through the property we are recommending three hunting zones. These zones can be seen in Figure 10 in red. These spots that we are recommending are areas that have the most bird activity and have suitable landscape for bird hunting. These zones are away from hiking trails and can be accessed from the main road.

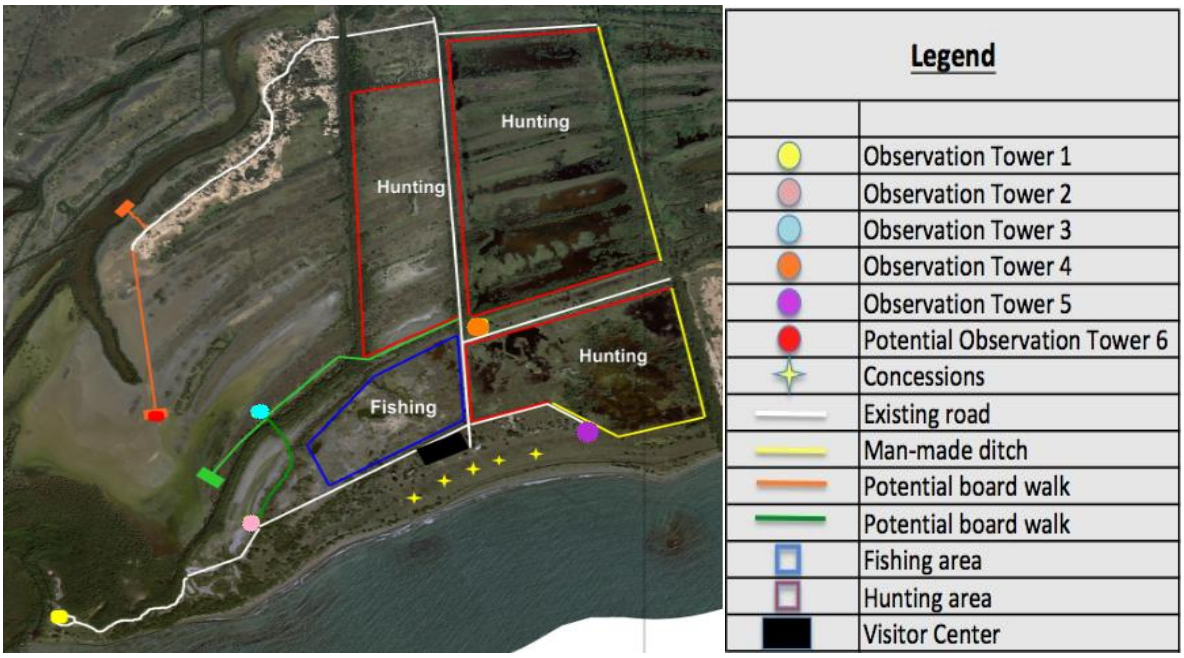


Figure 10: Hunting Zones

5.2 Fishing

There are going to be two fishing zones. The first can be seen in Figure 11 in the southwestern region of the property in blue. The second is the entire shore line. The first fishing area is an area where a proposed man-made pond or lake will be created for fishing. This will be stocked with fish by the DNER and a catch-and-release fishing program will be implemented for this area.

Figure 11: Fishing grounds

5.3 Passive Recreation

Passive recreation will include activities such as hiking, bird watching, and kayaking among others. We have suggested five observation towers. They are spread out around the preserve with some next to the wetland areas as well as on the shore line. There are also two potential areas for wooden boardwalks that would be constructed next to the wetlands and lead to the observation towers. These two boardwalks can be seen in Figure 10, one being green and other orange.

5.4 Visitor and Information Center

A possible focal point for the preserve should be the visitor center. We are recommending establishing a visitor center off the main road next to the main entrance. The visitor center would include:

- Maps of property
- Amphitheater
- Visual displays of local species

We are recommending having a small amphitheater that could be used to hold educational talks for visitors.

The information center should be located adjacent to the beach just off the main road. The information center will include:

- Displays on importance of conservation
- Information on coral reefs and associated species
- Historical timeline of La Esperanza

5.5 Concessions

To entertain visitors we came up with a few recommendations for specific concessions to be in La Esperanza. The concessions that we are recommending are:

- Kayak renting
- Snorkeling trips
- Horseback riding
- Children's activities (i.e. fishing tournaments, etc.)
- Bicycle renting
- Coffee shop
- Souvenir shop
- Fishing rentals(i.e. fishing poles and tackle)

Local community members would run these concessions, and pay around fifteen percent of profits to the DNER to be used to maintain the preserve.

5.6 Proposed Budget and Funding

We developed draft budgets for the first three years of the preserve's operation. Start-up costs make the first year's budget much larger than the following years' budgets.

First year: $1.9 million

- Visitor Center
- Concession buildings
- Observation towers and board walk
- Equipment; tractor, boats, four-wheelers etc.
- Signs and creating trails

Second year: $360,000

- This is the cost of operating the preserve if everything is completed in the first year.

- Maintenance costs: roads, docks, and buildings.
- Water pumps and excavator

Third Year: $275,000

- This is the cost of operating the preserve and does not include any additional items

5.6.1 Proposed Staffing

We came up with a desired number of staff to work in La Esperanza.

- Manager II
- Wildlife biologist II
- Wildlife biologist I/ Educator
- Heavy Equipment operator
- Worker I
- Worker II
- Worker III

The number of people needed directly correlates to the number of activities on the property. These seven workers would be able to complete all the daily tasks and keep the preserve running. Security, such as Park Rangers, is supplied by the DNER at no additional cost to the preserve because this is mandatory. A personnel breakdown can be seen in Table 3.

Personnel				
Classification	**% Time**	**Salary/Cost**	**Federal**	**State**
Manager II	100	$31,457	$31,457	$0
Wildlife Biologist II	100	$27,509	$27,509	$0
Wildlife Biologist I / Educato	100	$26,037	$26,037	$0
Heavy Equipment Operator	100	$20,310	$20,310	$0
Worker I	100	$20,310	$20,310	$0
Worker II	100	$20,310	$20,310	$0
Worker III	100	$20,310	$20,310	$0

Table 3: Personnel classifications and their salary breakdown

5.6.2 Funding Sources

AAPA- American Association Port Authority

- Obligated to pay for and execute the initial clean up of debris
- Construction of signs for visitors and border fencing
- Improvements on roads

Federal Government

- Operational costs
- Buildings, trails, observation towers
- Staffing Automobiles and machinery

Concessions

- Pay percentage of sales to DNER (15%)
- Help relieve some of implementation and operational costs

5.7 Conclusion

Conservation of land is becoming more of a problem every year. This is due to population growth and urbanization. This is even more of a problem on islands with less land

and therefore fewer natural resources. This is why the DNER has such an important role in Puerto Rico. Their mission, to protect and conserve the natural resources and the environment of Puerto Rico in a balanced way so as to guarantee the enjoyment for generations to come, is the foundation of this proposal.

La Esperanza is a piece of property that is being protected due to destruction of wetlands at the port in Ponce. This shows how important conservation is especially for an island like Puerto Rico. Puerto Rico has many unique species, and these animals need to be protected. With hunting in the region protecting endangered species is a concern. La Esperanza is home to a few endangered species such as the brown pelican and the manatee. It is very important to be able to protect these animals' habitats and prevent further damage to the environment. One way to do this is to educate people, and hopefully La Esperanza will be an educational preserve in which people leave knowing more about conservation and what part they can play in protecting the environment.

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Appendix A: Sponsors Description

This appendix is an overview of our project sponsor, which is the Department of Natural and Environmental Resources (DNER), also known as El Departamento de Recursos Naturales y Ambientales (DRNA) in Puerto Rico. We will describe our sponsor's mission and vision, along with the funding and organizational structure. We will also discuss the resources that are available to the DNER and current organizations with which they are associated.

The DNER was founded in 1972 and is part of the Constitutional Office of the Governor (DRNA, 2006). The mission of the DNER is to "protect, conserve and manage natural resources and environmental development in a balanced way to ensure future generations enjoyment and stimulate a better quality of life" (DRNA, 2006 p.1). Their vision is "to promote a safe and healthy environment through the promotion of sustainable use of natural resources management of environmental management and environmental transformation of the Puerto Rican culture to one of conservation with the participation of all sectors of society to improve the quality of life" (DRNA, 2006 p.1).

The DNER is a government agency that is comprised of two administrations, four assistants, seven counseling offices, four assistant secretaries, six negotiates, seven regional offices, the ranger corps and the commissioner of navigation (DRNA 2006). The DNER works closely with the National Oceanic and Atmospheric Administration (NOAA), Regulations and Permits Administration (RPA), and the United States Fish and Wildlife Service (USFWS) among others. The U.S. Fish and Wildlife Service has 8,806 employees with an annual budget of $1.3 billion (allgov, 2009).

The DNER has a variety of technological resources available that they use to help them achieve their mission (DRNA 2006). Some of the tools they use are the Geographical Information System software (GIS), advanced Global Positioning System (GPS), and satellite imagery. These technologies are used to help manage different areas of Puerto Rico and identify spots that are in need of high attention. They have been used to track physical, environmental, and social changes in environments through the use of aerial and satellite photographs. These resources will be extremely valuable to our team as one of our objectives is to map out the management and conservation areas in the 500 acre property, known as La Esperanza, in the municipality of Ponce, Puerto Rico.

The project undertaken at La Esperanza is overseen directly by the Wildlife and Fisheries Bureau. The Wildlife and Fisheries Bureau is a division of the DNER (allgov, 2009). A big part of this agency's objectives is protecting endangered species and preserving habitats for these delicate species. "For much of its history, the agency has been a respected steward of the environment." (allgov, 2009 p.1) Waterfowl hunting will be the main hunting taking place in La Esperanza. This will involve a lot of regulation due to migratory birds and other local birds. Another topic that the Wildlife and Fisheries Bureau deals with is releasing fish into areas. This helps maintain population levels due to fishing and natural causes. Something that makes La Esperanza unique is that it will have all three things that the Wildlife and Fishery Bureau deals with; fishing, hunting, and preservation of Puerto Rican land.

Appendix B-What is an IQP, and how our project is considered an IQP

"The Interactive Qualifying Project (IQP) challenges students to address a problem that lies at the intersection of science or technology with society (WPI, 2012 p. 1)." This quote explains that an IQP intersect technology with society, this means that students will use their science and engineering backgrounds to solve a problem as well as focusing on the impact on the surrounding society. "During the IQP, students work in interdisciplinary teams, often with an external sponsoring organization, to develop solutions to real world problems. In doing so, students learn something about the role of science and technology, its impact on society, its place in meeting human needs and human efforts to regulate, control, promote and manage our changing technologies (WPI, 2012 p. 1)." IQP is completed in a student's junior year. IQP's can be completed either abroad, international, or within WPI. WPI is highly recognized for its project-based curriculum.

Our project fits these criteria stated before to be an IQP. We will be working abroad in Puerto Rico with the DNER to come up with a solution for a land management program in La Esperanza. This is a new piece of land acquired by the DNER, and a specific management program for La Esperanza has to be created. This is a unique problem that cannot be solved without using new technology and having a background in the sciences. Specifically to our project we will be using GIS software technology to map out the conservation area to create a blue print for hunting, fishing and passive recreation areas. Although this type of technology does not impact the society or surrounding communities to La Esperanza directly, we will also examine the social and economic impact the conservation will have on the region. We will

create a sound methodology that will have multiple ways to go about solving this problem and present the DNER with a proposal for La Esperanza. At the end of the project we will be able to demonstrate the skill and understanding we acquired of our projects technical, social and humanistic context.

Appendix C-Questionnaire Protocol

Cuestionario para residentes de comunidades cercanas a la Finca La Esperanza, Ponce Puerto Rico

1. ¿Cuántos años tiene?

☐0 -18 ☐19-36 ☐36-50 ☐50+

2. Género

☐ Masculino
☐ Femenino

3. ¿Cuál es el nivel de educación más alto al cual haya asistido? ***(Marque solo 1 de las 8 alternativas disponibles)***

☐ No asistió a la escuela
☐ Escuela Elemental (1^{ero} a 6to)
☐ Escuela Intermedia (7mo a 9no)
☐ Escuela Superior (10mo a 12mo)
☐ Programas técnicos y/o vocacionales
☐ Universidad (ej., grado asociado, bachillerato)
☐ Estudios graduados de maestría
☐ Estudios graduados doctorales

4. ¿Cuál de los siguientes mejor describe su ingreso anual? ***(Marque solo 1)***

☐Menos de $10,000
☐$10,000-$19,999
☐$20,000-$29,999
☐$30,000-$39,999
☐ $40,000-$49,999
☐ $50,000-$59,999
☐ $60,000-$69,999
☐ $70,000 en adelante

5. ¿Cuantas personas conforman su núcleo familiar inmediato?
_____ ***personas***

6. ¿Está usted de acuerdo en que se cree una Reserva Natural administrada por el DRNA en Finca La Esperanza?

☐ De acuerdo
☐ Neutral
☐ En desacuerdo

7. ¿Está usted de acuerdo en que la Reserva Natural se realicen las siguientes actividades?

☐ Cacería deportiva:	☐ De acuerdo	☐ Neutral	☐ Desacuerdo
☐ Pesca Recreativa:	☐ De acuerdo	☐ Neutral	☐ Desacuerdo
☐ Recreación Pasiva:	☐ De acuerdo	☐ Neutral	☐ Desacuerdo

8. ¿Participa en actividades de cacería deportiva? ***(Si contesta no, continúe en la pregunta #9)***

☐ Sí
☐ No

a. ¿Cuál es la frecuencia con que realiza esta actividad en una temporada?

☐ 1-3
☐ 4-6
☐ 6-10
☐ Más de 10

b. ¿Hay cazadores en su familia? Si hay, ¿Cuánto(s)?

☐ 1
☐ 2
☐ 3
☐ Más de 3

c. ¿Qué tipo de cacería practica?

☐ Palomas y tórtolas
☐ Aves acuáticas

d. ¿Qué terrenos utiliza principalmente para cazar?

☐ Terrenos públicos
☐ Terrenos privados

e. ¿Qué tipos de áreas usted prefiere para cazar?

☐ Campos
☐ Ciénagas
☐ Charcas o lagunas

f. ¿Pagaría una tarifa para cazar si la Reserva Natural La Esperanza fuera manejada para cacería?

☐ Sí
☐ No

g. ¿Participa de la pesca recreativa?

☐ Sí
☐ No

h. ¿Prefiere pescar desde la orilla o sobre un bote?

☐ Orilla
☐ Bote
☐ Ambas

i. ¿Tiene su propio bote o alquila uno cuando usted va a pescar?

☐ Tengo un bote
☐ Alquilo un bote

j. ¿Donde adquiere el equipo necesario para cazar o pescar?

☐ Tiendas por departamento
☐ Tiendas especializadas
☐ Compras por internet

9. ¿Participa en actividades pasivas como caminar u observar la naturaleza?

☐ Sí, ¿Cuál es la frecuencia con que realiza esta actividad en una semana? _____ ***días***
☐ No

10. ¿Está usted de acuerdo en que la comunidad tenga participación como concesionarios dentro de la Reserva Natural Finca La Esperanza?

☐ De acuerdo
☐ Neutral
☐ Desacuerdo

11. ¿Entiende que las actividades dentro de la propiedad han tenido algún impacto en la comunidad?

☐ Sí; Positivo____, Negativo_____.
☐ No

12. ¿Qué recomendación, si alguna, podría ofrecer para que el establecimiento de esta Reserva Natural sea exitoso?

Appendix D-Interview Protocol

Reserva Natural La Esperanza

Encuesta para dueños de negocios que se pueden ver impactados por la creación de la Reserva.
(Negocios relacionados a la caza y pesca; restaurantes, Hoteles)

1.) ¿Piensa usted que su negocio se beneficia de alguna manera de las actividades de cacería entre los meses de Agosto a Enero en la región?

- ☐ Sí
- ☐ No
- ☐ No sé

2.) ¿Piensa usted que la creación de la Reserva Natural La Esperanza tendría algún impacto en su negocio?

- ☐ Sí
- ☐ No
- ☐ No sé

3.) ¿Piensa que habrá un aumento del turismo y los clientes en el área?

- ☐ Sí
- ☐ No

4.) ¿Apoya el desarrollo de una reserva como ésta cerca de su negocio?

- ☐ Sí
- ☐ No

5.) ¿Qué tipos de actividades usted querría ver en la reserva?

- ☐ Cacería
- ☐ Educativas
- ☐ Pesca
- ☐ Recreación pasiva

Appendix E-Mitigation Plan

PLAN DE MITIGACION SUGERIDO – FINCA LA ESPERANZA

1. ACONDICIONAMIENTO DE CAMINOS - limpieza, nivelación y cubierta con gravilla o algún otro material apropiado.

a. camino principal (norte a sur): aproximadamente 1,400 metros de largo x 4 metros de ancho (5,600 mts^2).

b. camino hacia el este: aproximadamente 630 metros de largo x 4 metros de ancho (2,520 mts^2).

c. camino hacia el oeste (hacia Punta Cabullones): 1,300 metros de largo x 4 metros de ancho (5,200 mts^2).

AREA TOTAL DE CAMINOS = **13,320 mts^2** (**3,330 metros lineales de largo x 4 metros de ancho**)

2. LIMPIEZA SELECTIVA DE LOS MARGENES DE LOS CAMINOS – remoción de vegetación indeseable y creación de pendientes suaves hacia los humedales.

Son 3,300 metros lineales de caminos. La limpieza es a ambos lados (selectivamente), o un total aproximado de **6,600 metros lineales**. Tanto la nivelación como la extensión de la misma pueden ser a uno o ambos lados dependiendo de las condiciones existentes.

3. SIEMBRA DE ÁRBOLES NATIVOS DE "UPLAND" A LO LARGO DE LOS CAMINOS

3,300 metros lineales x 2 = 6,600 metros lineales de siembra. "Spacing" recomendado de 4 metros = 6,600 / 4 = **1,650 árboles**. Costo aproximado de $50 dólares el árbol (este número depende del mercado, la especie y el tamaño). Se recomiendan arboles de no menos de 3 pies de altura. El costo aproximado es de 1,650 x $50 = **$82,500.00**

4. SIEMBRA DE ÁRBOLES DE HUMEDALES EN LA BASE DE LOS TALUDES

El estimado es el mismo que para los arboles de "upland" a lo largo de los caminos. **$82,500.00**

5. MEJORAR LAS "CHARCAS" AL ESTE DEL CAMINO PRINCIPAL

Profundizar para crear charcas que se mantengan inundadas por periodos prolongados de tiempo. Debido a la escasa lluvia que cae en el área, se sugiere profundizar hasta el nivel freático. De acuerdo al "Soil Survey" de Ponce, los suelos en las áreas donde se proponen las charcas 1 y 2 (al norte del camino hacia el este) pertenecen a la serie Serrano arenoso con profundidad al nivel freático de entre 30 y 42 pulgadas (0.76 y 1.07 metros). Considerando, para este estimado, una profundidad de 1.07 metros, el volumen de material a excavarse seria de:

Charca 1: aproximadamente 114,000 mts^2 (28.17 acres) x 1.07m = 121,980 mts^3

Charca 2: aproximadamente 114,000 mts^2 (28.17 acres) x 1.07m = 121,980 mts^3

Volumen estimado de material = 243,960 mts^3

Aunque en el informe de la visita del 21 de enero de 2011 se propusieron áreas al sur del camino que va hacia el este, estas se descartan ya que de acuerdo al "Soil Survey" de Ponce los suelos en este sector se encuentran clasificados como Mero arenoso con profundidad al nivel freático de más de 80 pulgadas (2.03 metros).

Se hace la salvedad de que estos estimados están basados en las profundidades al nivel freático que da el "Soil Survey". Los volúmenes reales pueden variar considerablemente dependiendo de los valores reales de esta profundidad a ser determinados en el campo.

6. LIMPIEZA SELECTIVA DEL ÁREA DE BASURA

Área aproximada de **28,000 mts^2** (7 acres).

7. SIEMBRA DE ÁRBOLES Y ESPECIES DE HUMEDALES

Si se considera un "spacing" de 4 metros, o un árbol cada 16 mts^2, serian aproximadamente 1,750 árboles. Costo aproximado de $50 dólares el árbol (este número depende del mercado, la especie y el tamaño). Se recomiendan arboles de no menos de 3 pies de altura. El costo aproximado es de 1,750 x $50 = **$87,500.00**

8. REPARACIÓN DE VERJAS Y PORTONES

No está considerada en este estimado, pero si es componente esencial del Plan de Mitigación.

Se acompaña informe del 27 de enero de 2011 como referencia.

Appendix F-Laws and Regulations

(H.B. 3452)

(No. 176)

(Approved August 1, 2004)

AN ACT

To amend Section 4 of Act No. 241 of August 15, 1999, known as the "New Wildlife Act of Puerto Rico," with the purpose of banning the importation or ownership of any monkey or simian species in Puerto Rican households, for the protection, safety, health and life of human beings; and to eliminate the requirement of belonging to the American Zoological Association for scholar and zoological entities.

STATEMENT OF MOTIVES

During past years, several groups of monkeys have settled in the southwestern area of Puerto Rico, threatening agricultural endeavors and on occasion obstructing the public thoroughfares and even attacking humans. These monkeys are carriers of various diseases that are harmful to our health and could even cause the death of a human being, should he or she contracts a disease from one of these exotic animals.

In Puerto Rico, there are persons who have in their homes certain pets that are dangerous animals and which are unlawfully in our jurisdiction; among these, monkeys. Some of these monkeys have been seen and vaccinated by veterinarians who are aware and know that the persons who own them, own them illegally. Furthermore, these are inoculated with vaccines made for cats and dogs, which affords no protection or salubrity in terms of counteracting the diverse diseases that monkeys carry or might

carry, such as herpes, hepatitis, and Simian Immunodeficiency Virus Syndrome (SIVS), among other diseases and medical conditions.

It is just that the great majority of wild animals are unable to adapt as domestic animals. We must remember that they are accustomed to their natural habitat, where they find all they require to grow, develop, and reproduce. The bottom line is that a monkey will always be a monkey, a tiger will always be a tiger, and a snake will always be a snake; no matter how many training methods we may use to try and domesticate them, their natural instincts might drive them to rebel, and it is an undisputable fact that in many cases, they attack their owners and other humans.

It is necessary to demand that our government approve ecological and biological protection laws as well as animal protection laws, and to demand that these are applied. The creation of reasonable laws is a fundamental and primordial principle, and necessary in order to protect, conserve and manage wildlife in Puerto Rico, along with the protection, safety, health and life of humans.

Act No. 241 of August 15, 1999, created an Advisory Board to offer guidance to the Secretary of the Department of Natural and Environmental Resources in the formulation of the public policy concerning wildlife, all this in conformance, at the same time, with the powers conferred in this Act. A Technical Committee was also created to advise the Department on the importation and ownership of exotic species. These bodies are necessary to develop and formulate the indispensable mechanisms to strengthen the habitats of the wildlife species that are part of our island and prevent them from being affected by foreign species or human activities.

We have the duty to respect and comply with all the laws that protect exotic animals and endangered species. We need not to ever acquire a

protected or banned animal, and we need to alert the authorities as to the illegal commerce of these species. We have the duty to respect the diversity of species and the ecology of our planet.

Therefore, this Legislature, in seeking to protect the wildlife species that are a part of our island, as well as human safety and life, hereby bans the importation or ownership of any species of monkeys or simians, except for those cases that are exempted by the regulations under Act No. 241, *supra*, such as circuses and zoos.

BE IT ENACTED BY THE LEGISLATURE OF PUERTO RICO:

Section 1.—Section 4 of Act No. 241 of August 15, 1999, known as the "New Wildlife Act of Puerto Rico," is hereby amended to read as follows:

"Section 4.—Advisory Board and Technical Committee.—

A Board is hereby created to advise the Secretary in the formulation of the public policy concerning the regulation of hunting as a sport, the designation of critical habitats and the acquisition of land for wildlife reserves and for the establishment of biological stations and shelters. This Board shall be composed of a representative of an organization that supports hunting as a sport, a representative of an organization that promotes the conservation of wildlife, a biologist specialized in wildlife from the U.S. Fishing and Wildlife Service, a biologist specialized in wildlife who represents an academic entity and a biologist specialized in wildlife designated by the Secretary pursuant to the recommendations of each and every one of the entities constituting this Board. The Department shall approve bylaws for the operations of this Advisory Board and the Technical Committee that is created below.

In addition, a Technical Committee is hereby created to advise and recommend to the Department on the importation and ownership of exotic

species, the members of which shall be designated pursuant to the bylaws adopted under this Section. The Committee shall be composed of a biologist specialized in wildlife designated by the U. S. Fishing and Wildlife Service, a biologist specialized in wildlife from a duly accredited academic institution, a biologist specialized in wildlife from the Department, a representative from an organization that promotes bird-watching, a representative from an organization that supports hunting as a sport, and a representative of the importers of exotic species.

The Committee shall assist the Department's biologists specialized in wildlife in the creation of a list of exotic species, of which the importation and ownership as pets shall be allowed. On said list, no species of monkeys or simians shall be included. The importation and ownership of species not included on the list shall be prohibited.

The Secretary may only approve a short-term permit to import and exhibit animals in a circus or carnival, provided it is determined that the animals to be exhibited shall be managed by a professional trainer and that they are free from any contagious diseases. In addition, he/she may approve exotic species importation permits for scientific purposes, or for academic entities or zoos."

Section 2.—This Act shall take effect immediately after its approval.

CERTIFICATION

I hereby certify to the Secretary of State that the following Act No. 176 (H.B. 3452) (Reconsidered) of the 7th Session of the 14th Legislature of Puerto Rico:

AN ACT to amend Section 4 of Act No. 241 of August 15, 1999, known as the "New Wildlife Act of Puerto Rico," with the purpose of banning the importation or ownership of any monkey or simian species in Puerto Rican households, for the protection, safety, health and life of human beings; and to eliminate the requirement of belonging to the American Zoological Association for scholar and zoological entities,

has been translated from Spanish to English and that the English version is correct.

In San Juan, Puerto Rico, today 16th of May of 2005.

Luis E. Fusté-Lacourt
Director

(H. B. 3402)

(No. 368)

(Approved September 2, 2000)

AN ACT

To amend subsections (b) (1), (c), (q) and (cc) of Section 2, subsections (h), (k) and (t) of Section 6; subsection (a) of Section 11; subsection (d) (2) of Section 16 and subsections (a) and (b) of Section 22 of Act No. 241 of August 15, 1999, known as the "New Wild Life Act of Puerto Rico," for the purpose of clarifying the definitions of public roads and modifying the definition of critical natural habitat and how arms may be borne; to establish the maximum limit of hunting weapons; to clarify when minors may own a license; to establish penalties for non-compliance with obligations by hunters and to clarify that every single animal hunted in excess of the quota justifies a penalty.

STATEMENT OF MOTIVES

The Legislature understands that it is imperative to make some amendments, among others, to the measure; it must be pointed out that critical habitats are lands designated by the Secretary, that is to say, that they require a formal designation by the Department. Several amendments have been made to avoid constructions of the act that result in the dismissal of cases against violators. It must be clarified that hunters who lend their weapons to another hunter, including a son, must have visual or oral contact with the latter, since they are responsible for the illegal acts that others may commit with said weapons. Concerning the bearing or the transportation of any sports weapon outside the hunting season, the law is hereby amended, making it illegal to transport or to bear any sports hunting weapon outside of

the hunting season on an animal or any other means of transportation. Act No. 241 does not establish with certainty that each bird or animal hunted in excess of the established quota is a separate violation. Consequently, the Act is hereby amended to rule out any different construction. Public roads of public corporations are eliminated from the list of public roads because these roads are patrimonial and the owner must decide whether to allow hunting or not. Finally, other amendments are made herein to improve the wording in some Sections.

BE IT ENACTED BY THE LEGISLATURE OF PUERTO RICO:

Section 1.- Subsections (b) (1), (c), (q) and (cc) of Section 2 of Act No. 241 of August 15, 1999, are hereby amended to read as follows:

"Section 2.- For purposes of this Act, the following terms shall have the following meanings:

a) ...

b) Hunting Weapon

1. Any rifle whose caliber is not under .410 and does not exceed caliber 12, whose cannon is 20 or more inches long and is not capable of loading more than three bullets at a time.

2. ...

4. ...

c) Public roads - Any state or municipal public way, whether a street, local road or highway.

d) ...

e) ...

f) ...

g) ...

h) ...

i) ...

j) ...

k) ...

l) ...

m) ...

n) ...

ñ) ...

o) ...

p) ...

q) Importer - Person authorized by the Department to import animal species.

r) ...

s) ...

t) ...

u) ...

v) ...

w) ...

x) ...

y) ...

z) ...

aa) ...

bb) ...

cc) Critical natural habitat - Specific land within a geographic zone where a species designated as vulnerable or in danger of extinction with physical and biological characteristics essential for the conservation of the species can be found or reintroduced.

dd) ...

Section 2.- Subsections (h), (k) and (t) of Section 6 of Act No. 241 of August 15, 1999, are hereby amended to read as follows:

"Section 6.- The following actions shall be considered illegal and subject to being penalized as provided below in this Act:

a) ...

b) ...

c) ...

d) ...

e) ...

f) ...

g) ...

h) To hunt for sports an amount of birds and animals in excess of the maximum established for each hunting day or in a life phase or sex different from those established by the Secretary for each specimen of bird or animal game.

i) ...

j) ...

k) To bear or to transport any weapon for sports hunting outside of the hunting season, whether on the hunter's person, in the vehicle or on any other means of transportation, including an animal on which the hunter is or on any animal. If the weapon must be transported for purposes unrelated to sports hunting, a written authorization by the Police Superintendent must be obtained, or the person must have a valid license for target shooting and the weapon must be registered for such purpose, unloaded and duly covered.

l) ...

ll) ...

m) ...

n) ...

ñ) ...

o) ...

p) ...

q) ...

r) ...

s) ...

t) Performing modifications in the critical habitat and the essential critical habitat of vulnerable species or species in danger of extinction without a mitigation plan approved by the Department.

u) ..."

Section 3.- Subsection (a) of Section 11 of Act No. 241 of August 15, 1999 is hereby amended to read as follows:

"Section 11.- Registration of Hunting Weapons

a) The Secretary shall organize and maintain a registry of hunting weapons registered in Puerto Rico and the Secretary shall notify the Police Superintendent of the weapons so registered.

b) ...

Section 4.- Clause (2) of subsection (d) of Section 16 of Act No. 241 of August 15, 1999, is hereby amended to read as follows:

"Section 16.- The Secretary may also issue the following types of licenses or permits:

a) ...

b) ...

c) ...

d) ...

violations against Section 6 of this Act shall be considered administrative violations, subject to the corresponding payments:

Section 6.-

(a) $500.00

(b) $500.00

(c) $ 1,000.00 for each specimen whose market value does not exceed $ 1,000.00 or $ 5,000.00 for each specimen whose value exceeds $1,000.00.

(d) $200.00

(e) $500.00

(f) $1,000.00

(g) $250.00

(h) $150.00

(i) $250.00

(j) $150.00

(k) $500.00

(l) $500.00

(ll) $1,000.00

(m) $100.00

(n) $250.00

(ñ) $500.00

(o) $5,000.00 for each specimen or product

(p) $500.00

(q) $500.00

(r) $500.00

(s) $5,000.00

(t) $10,000.00

1) ...

Minors holding such conditional licenses may use the weapons registered in the name of their parents' or legal guardians' names and must have visual or oral contact with them at all times when they are bearing the weapons, or dedicated to hunting."

Section 5.- Subsections (a) and (b) of Section 22 of Act No. 241 of August 15, 1999, are hereby amended to read as follows:

"Section 22.- Penalties

a) Any person who breaches any of the provisions of this Act and of the regulations issued pursuant to it, excepting what is established in this Section, shall incur in a misdemeanor and, if convicted, shall be punished with a fine of not less than one hundred (100) dollars and not more than five hundred (500) dollars, or with jail for a maximum term of six (6) months or both penalties, at the court's discretion. The importation of illegal exotic species for profit, and the violation of regulations concerning vulnerable species or those in danger of extinction, shall be considered as a felony and shall be punished with a fine of not less than five thousand (5,000) dollars and not more than fifty thousand (50,000) dollars, or jail for a term of not less than ninety (90) days nor greater than three (3) years, or both penalties, at the court's discretion. Further, any person who violates any of the provisions of this Act and of the regulations enacted pursuant to it, shall incur in an administrative violation. As of the date of effectiveness of this Act, the following

(u) $5,000.00 per occurrence

(v) $5,000.00

b) The law enforcement officer in charge of public order shall issue a ticket for the offenses in a pre-printed form prepared by the Department with the perpetrator's name and address, a brief description of the violation, the applicable legal provision and the penalty corresponding to Section 22. Each animal specimen hunted in violation of the law or each weapon of which the possession or the act of bearing is illegal shall justify the imposition of a separate penalty.

c) …"

Section 6.- This Act shall take effect immediately after its approval.

CERTIFICATION

I hereby certify to the Secretary of State that the following Act No. 368 (H.B. 3402) of the 7th Session of the 13th Legislature of Puerto Rico:

AN ACT to amend subsections (b) (1), (c), (q) and (cc) of Section 2, subsections (h), (k) and (t) of Section 6; subsection (a) of Section 11; subsection (d) (2) of Section 16 and subsections (a) and (b) of Section 22 of Act No. 241 of August 15, 1999, known as the "New Wild Life Act of Puerto Rico," for the purpose of clarifying the definitions of public roads and modifying the definition of critical natural habitat and how arms may be borne; to establish the maximum limit of hunting weapons; to clarify when minors may own a license; etc.,

has been translated from Spanish to English and that the English version is correct.

In San Juan, Puerto Rico, today 10th of March of 2005.

Luis Fusté-Lacourt
Director

(H. B. 4581)

(No. 295)

(Approved September 15, 2004)

AN ACT

To amend Sections 2 and 4 of Act No. 241 of August 15, 1999, known as the "New Wildlife Act of Puerto Rico," to clarify its terms and definitions, to adjust the legal provisions in effect and to set forth exceptions.

STATEMENT OF MOTIVES

The "Organic Act of the Department of Natural and Environmental Resources," Act No. 23 of June 20, 1972, as amended, delegates on said agency the ministerial duty of taking all the necessary steps for wildlife conservation, protection, distribution, restoration, and management. Pursuant to this mandate, Act No. 241 of August 15, 1999, known as the "New Wildlife Act of Puerto Rico," established that the Department of Natural and Environmental Resources has the ministerial duty of protecting, conserving, and fostering the development of wildlife species, as well as their natural habitat, through the active management of both.

By virtue of this Act, the Department regulates aspects pertaining to hunting exotic and harmful species, and the export, import, sale, purchase, capture and possession of wildlife, and the protection of vulnerable or endangered species, as well as the procedures concerning the relative licenses and permits.

After several years of implementing the New Wildlife Act, the Department of Natural and Environmental Resources has gathered and

analyzed information about various aspects regarding its practicality and implementation. This includes the need for clarifying terms and definitions contained in the Act to make its implementation more effective, and thus to close the loopholes that exist in the legislation in effect.

Moreover, at times, the agency faces special circumstances, *sui generis*, whereby the Secretary must have some discretion in establishing exceptions in the quasi-judicial process and in the granting of permits. Such is the case when an owner or seeker of a specimen of a prohibited species presents forceful and exceptional reasons, such as serious physical or mental health problems, which warrant being allowed its possession. As long as the condition lasts, these individual cases justify that the Secretary of the agency, without failing in his/her ministerial duty, take into account these aspects when granting a permit or adjudicating a controversy with regard to the possession of a specimen of a regulated species. In such cases, to avoid detracting from the purposes of this Act, which is geared toward the protection of wildlife, discretion shall be restricted to the cases of individual specimens of a species and never applied in cases concerning the unlimited importation of prohibited species for commercial purposes.

BE IT ENACTED BY THE LEGISLATURE OF PUERTO RICO:

Section 1.- Section 2 of Act No. 241 of August 15, 1999, as amended, is hereby amended to read as follows:

"Section 2.- For the purposes of this Act, the following terms shall have the meaning expressed below:

a) Game Animals - Those animals deemed to have sports value for which the Secretary may establish a hunting season.

b) Hunting Weapon

1. Any shotgun not smaller than .410 gauge and not to exceed 12 gauge, with a barrel length of 20 inches or more and which cannot be loaded with more than three cartridges at once.
2. Any shotgun of a gauge or barrel length as described in clause (1) of this subsection or to which a removable plug has been adapted, only if disarmed in such a manner so that it cannot be loaded with more than three (3) cartridges at once.
3. Any instrument, equipment or weapon whose design, gauge or ballistic properties are the most appropriate for hunting exotic species and wildlife fauna for management, control and scientific research purposes, or which allows hunting or capturing said species without endangering the safety of the hunter or other species, nor marring their scientific value.
4. Bows and arrows, according to the regulations established by the Secretary.

c) Public Roads - Any municipal or Commonwealth public thoroughfare, be it a street, road or highway.

d) Sport Hunting - Recreational activities authorized by the Secretary during which the participant, known as a sport hunter, uses a weapon to capture a game animal during the seasons established by the Secretary.

e) Non-sport Hunting - Hunting activity for scientific, educational and population control purposes or any other non-sport hunting activity authorized by the Secretary by permit.

f) Hunter - Person authorized by the Secretary to hunt in Puerto Rico.

g) Sport Hunter - Person to whom the Secretary issues a license to practice sport hunting in Puerto Rico.

h) To Hunt - To pursue, wound, kill, catch, shoot, disturb or destroy any species of wildlife in Puerto Rico.

i) To Collect - To capture or take possession of any species of wildlife.

j) Department - The Department of Natural and Environmental Resources.

k) Hunting Day - The period of time for hunting within a calendar day that the Secretary determines through regulations.

l) Species - Includes any species, subspecies or variety of wild flora or fauna, as well as any segment of its population.

ll) Endangered Species - Those species that, although not in critical danger, face a high medium-term risk of extinction in the wild.

m) Critically Endangered Species - Species that face an extremely high risk of extinction in the wild in the immediate future.

n) Harmful or Invasive Species - Species that the Secretary designates by means of regulations that cause or may cause economic or environmental damages, or damages to human health.

ñ) Vulnerable or Endangered Species - Those wildlife species whose population numbers are such that in the judgment of the Secretary require special attention to ensure their perpetuity in time and in the physical space in which they exist, and to be designated as such by means of regulations.

o) Exotic Species - Those species that, according to the opinion of the Secretary of the Department of Natural and Environmental Resources, are not a part of the native or migratory flora or fauna of Puerto Rico.

p) Wild Fauna - Any resident animal species whose natural propagation or survival does not depend upon human diligence, care or breeding and is found in the wild, whether native or adapted to Puerto Rico, or any migratory species that visits Puerto Rico any time of the year, as well as exotic species, as defined in this Act. Provided, that this definition comprises birds, reptiles, aquatic or land mammals, amphibians and all invertebrates, and includes any part, product, nest, egg, brood or the dead body or part thereof; also included are vulnerable and endangered species.

q) Wild Flora - Those native or exotic plants whose survival or propagation does not depend upon humans, including rare and endangered species.

r) To Import - To unload, enter, introduce or attempt to unload, enter or introduce flora and fauna into any location within the jurisdiction of the Commonwealth of Puerto Rico, regardless of whether or not this activity constitutes an import as defined in United States Customs Laws or any other definition contrary thereto.

s) Importer - Any person authorized by the Department to import species.

t) License - A written authorization issued by the Secretary to practice diverse activities as defined in this Act and its

regulations.

u) Migratory - Any bird covered under the provisions of the "Migratory Bird Treaty Act," of August 16, 1916, and those that emigrate to Puerto Rico from countries non-signatory of said Treaty, be they resident or migratory species, or any mutation or hybrid of any of these species, including any part of the bird, the nests or eggs of these birds or any product, be it manufactured or not, consisting of or containing any part of the bird, nest or egg.

v) Person - Any natural or juridical person, including the Commonwealth of Puerto Rico, its agencies and instrumentalities.

w) Wildlife Reserve - An area administered by the Department for the management and propagation of wildlife where sport hunting, and recreational and scientific activities, among others, are permitted, pursuant to the regulations in effect.

x) Hunting Reserve – A tract of land used mainly for sport hunting purposes in which the owner, person in charge or administrator, by means of the introduction of game animals raised in captivity or raising the same by semi-natural methods or practices, including the improvement of the natural habitat, offers to hunters such hunting resources in exchange for payment.

y) Secretary - The Secretary of the Department of Natural and Environmental Resources.

z) Hunting Season - The time allotted by the Secretary during which it shall be permitted to hunt any species of wild fauna designated by the Secretary as game.

aa) Wildlife - Includes any organism found in the wild whose natural propagation or survival does not depend on the diligence or care of or breeding by man, whether native or adapted to Puerto Rico; or any migratory species visiting Puerto Rico at any time of the year, as well as the exotic species as defined in this Act. Provided, that this definition shall include but is not limited to birds, aquatic and land reptiles, aquatic or land mammals, amphibians, all land invertebrates, and plants, and any part, product, nest, egg, brood, flower, seed, fruit, leaf or body or part thereof.

bb) Law Enforcement Officer - Any member of the Ranger Corps, the Puerto Rico Police, the Municipal Police, the Federal Forestry Service and the U. S. Fishing and Wildlife Service.

cc) Sanctuary - An area designated by the Secretary of the Department where sport hunting is not permitted and where other compatible uses are governed by regulations.

dd) Natural habitat - Tracts of land whose ecological conditions allow the existence and reproduction of wildlife populations. Urbanized lands are excluded. Includes but is not limited to forests, wetlands, and grassland prairies, among others.

ee) Critical Natural Habitat - Specific tracts of land within a geographical area where a species designated as vulnerable or endangered may be found or reintroduced and whose physical or biological characteristics are essential for the conservation of the species and require special protection or management.

ff) Critical Natural Habitat Essential to Vulnerable or Endangered Species - Any habitat necessary for the survival of vulnerable or

endangered species whose characteristics appear only in a particular area of Puerto Rico.

gg) Habitat Modification - Any manmade change in the natural habitat which kills or affects native and migratory wildlife or which could cause those effects by altering its shelter or its essential patterns of normal behavior, such as reproduction and feeding.

hh) Natural Reserve - Special designation. Areas identified by the Department of Natural and Environmental Resources and designated by the Planning Board which, because of their physical, ecological, and geographical characteristics, and the social value of the natural resources held therein, deserve to be conserved, preserved or restored to their natural condition."

Section 2.-Section 4 of Act No. 241 of August 15, 1999, is hereby amended to read as follows:

"...

The Committee shall assist the biologists of the Department specializing in wildlife in the creation of a list of exotic species that may only be imported and owned as pets. The importation and possession of those species not included in said list shall be prohibited. The Secretary shall have discretion to exempt from these provisions those specific cases that exhibit exceptional reasons whereby human health, whether physical or mental, is affected. Such reasons shall be well founded and this exemption shall only be made for individual specimens of a species, and never in cases that imply the sale or breeding of prohibited species.

The Secretary may only approve a permit of short duration for the import and exhibit of animals in a circus or carnival, provided it is

determined that the animals to be exhibited shall be managed by a professional trainer. Furthermore, he/she may approve permits for the import of exotic species for scientific purposes, duly accredited academic entities, or accredited zoological gardens."

Section 3.-This Act shall take effect immediately after its approval.

CERTIFICATION

I hereby certify to the Secretary of State that the following Act No. 295 (H.B. 4581) of the 7th Session of the 14th Legislature of Puerto Rico:

AN ACT to amend Sections 2 and 4 of Act No. 241 of August 15, 1999, known as the "New Wildlife Act of Puerto Rico," to clarify its terms and definitions, to adjust the legal provisions in effect and to set forth exceptions,

has been translated from Spanish to English and that the English version is correct.

In San Juan, Puerto Rico, today 13th of March of 2007.

Francisco J. Domenech
Director

(H.B. 1502)

(No. 241)

(Approved August 15, 1999)

AN ACT

To establish the New Wildlife Act of Puerto Rico for the purpose of protecting, conserving and fostering native and migratory wildlife species; to declare as property of Puerto Rico all wildlife species within its jurisdiction; to define the faculties, powers and duties of the Secretary of the Department of Natural and Environmental Resources; to regulate hunting and the use of hunting weapons and their registration; to issue, renew and revoke hunting licenses, permits for operating game reserves and permits for hunting or collecting game for scientific, educational, recovery and population control purposes; to establish regulations for the introduction of exotic species into Puerto Rico; to fix penalties for violations of the provisions of this Act and of the regulations promulgated by virtue thereof and to repeal Act No. 70 of May 30, 1976, as amended.

STATEMENT OF MOTIVES

It is of fundamental and paramount importance that reasonable and necessary laws be created for the protection, conservation and management of the wildlife of Puerto Rico. It is likewise imperative that these laws ensure a balance between the economic and commercial development of the population and the permanence of the wildlife resources.

Among the functions and duties inherent to the office of the Secretary of the Department of Natural and Environmental Resources as provided by Act No. 23 of June 20, 1972, known as the "Department of Natural Resources Organic Act", is to regulate all hunting activities and to protect and foster the dissemination of all wildlife species in Puerto Rico. The purpose of this Act

is to update and redirect the principles promulgated by Act No. 70 of May 30, 1976, in accordance with the scientific information gathered, the needs and privileges of all citizens for their enjoyment of activities related with the wildlife resources and their environment, the tenable development of industries and the responsibility for preserving our natural resources. It is likewise necessary to establish regulations concerning those activities which in one way or another are related to the use, conservation, preservation, protection or dissemination of all wildlife species in Puerto Rico.

In view of the fact that human beings in one way or another depend on and interrelate with wildlife, it becomes imperative that we acknowledge the importance of effective regulations to exercise control over all activities related to the same, so as to ensure that our citizens and future generations may enjoy and maintain this interrelationship while at the same time improving their quality of life. Our wildlife resources are of great ecological, recreational, aesthetic, ethical, economic and scientific value and as such we must ensure that they thrive. In that regard we recognize the value of preserving and wisely using all wildlife for the benefit of our society.

The protection, conservation and management of wildlife species is achieved by identifying and giving special attention to the natural habitat where these species survive and multiply. This measure provides for the inclusion of new concepts and essential mechanisms to prevent the inadequate modification of the natural habitat of wildlife species, while acknowledging the importance of the natural habitat, the critical natural habitat and the essential critical natural habitat of rare or endangered species. A fundamental aspect of this Act is its declaration of the public policy of the Government of Puerto Rico regarding the protection of all wildlife, particularly the natural habitat of all species.

An Advisory Board is hereby created to advise the Secretary of the Department of Natural and Environmental Resources about the public policy to be drafted concerning wildlife pursuant to the faculties conferred by this Act. A Technical Committee is furthermore created to advise the Department on the importation and possession of exotic species. These entities are needed to develop and set forth the essential mechanisms required to strengthen wildlife habitats and thus prevent them from being affected by human activity.

Although this Act permits hunting as a sports activity it also empowers the Secretary to more rigorously regulate the issue of hunting licenses as well as their revocation and suspension for violations of the provisions of this Act or its regulations. It furthermore requires that hunters take and pass an Education Course in order to obtain the sports hunting license.

It is essential that a Special Fund be created to defray the costs of managing all wildlife resources so as to comply with the federal legislation.

BE IT ENACTED BY THE LEGISLATURE OF PUERTO RICO:

Section 1.- This Act shall be known as the "New Wildlife Act of Puerto Rico ".

Section 2.- For the purposes of this Act the following terms shall have the meaning expressed below:

a) Game animals - Those animals deemed to have sports value for which the Secretary may be able to establish a hunting season.

(b) Hunting weapon

1. Any shotgun not smaller that .410 gauge or larger than 20 gauge, with a barrel length of 24 inches or more and which cannot be loaded with more than three cartridges at once.

2. Any shotgun of a gauge or barrel length as described in clause (1) of this subsection to which a removable plug has been adapted to limit the number of cartridges to three.

3. Any instrument, equipment or weapon whose design, gauge or ballistic properties are the most appropriate for hunting exotic species and wildlife fauna for purposes of management, control and scientific research or which allow hunting or capturing said species without endangering the safety of the hunter of other species or marring their scientific value.

4. Bows and arrows, according to the regulations established by the Secretary.

c) Public roads – Any municipal or Commonwealth public thoroughfare, be it a street, road or highway, as well as those within land belonging to public corporations created by law and their subsidiaries used as public access.

d) Sports hunting - Recreational activities authorized by the Secretary during which the participant, known as a sports hunter, uses a weapon to capture a game animal during the season established by the Secretary.

e) Non-sports hunting - Hunting activity for scientific, educational and population control purposes or any other non-sports hunting activity authorized by the Secretary by permit.

f) Hunter - Person authorized by the Secretary to hunt in Puerto Rico.

g) Sports hunter - Person to whom the Secretary issues a license to practice sports hunting in Puerto Rico.

h) To hunt - Pursue, wound, kill, catch, shoot, disturb or destroy any species of wildlife in Puerto Rico.

i) To collect - Capture or take possession of any species of wildlife.

j) Department - The Department of Natural and Environmental Resources.

k) Hunting day - The period of time for hunting within a calendar day the Secretary determines through regulations.

l) Species - Includes any species, subspecies or variety of wild flora or fauna as well as any segment of its population.

ll) Harmful wildlife species - Those species designated through regulations by the Secretary as harmful to the best interest of Puerto Rico.

m) Rare or endangered species - Those wildlife species whose population numbers are such that in the judgment of the Secretary require special attention to ensure their perpetuation within the time and physical space in which they exist and that are designated as such through regulations.

n) Exotic species - Those that have been introduced and which in the judgment of the Secretary of the Department of Natural and Environmental Resources are not part of the native flora and fauna of Puerto Rico.

ñ) Wild fauna - Any resident animal species found in the wild whose natural propagation or survival does not depend of the zeal, care or breeding of man, whether native to or adapted in Puerto Rico; or any migratory species visiting Puerto Rico at any time of the year, as well as the exotic species as defined in this Act. Provided, that this definition shall include the birds, reptiles, aquatic or land mammals, amphibians, and all invertebrates. This category also includes any part, product, nest, egg, and young or its dead carcass or part thereof as well as all rare or endangered species.

o) Wild flora - Those native or exotic plants whose survival or propagation does not depend on man, including rare and endangered species.

p) To import - To introduce or allow the entry of any species of fauna or flora into Puerto Rico be it from any state of the United States of America or any country of the world.

q) Importer - Any person authorized by the Department to import exotic species.

r) License - A written authorization issued by the Secretary to practice diverse activities as defined in this Act and its regulations.

s) Migratory - Any bird covered under the provisions of the Migratory Bird Treaty Act of August 16, 1916, and those that emigrate to Puerto Rico from non-signatory countries of said Treaty, be they resident or migratory species, or any mutation or hybrid of any of these species, including any part of the bird, the nests or eggs of these birds or any product, be it manufactured or not, consisting of or containing any part of the bird, nest or egg.

t) Person - Any natural or juridical person, including the agencies and instrumentalities of the Government of Puerto Rico.

u) Wildlife reserve - An area administered by the Department for the management and propagation of wildlife where sports hunting, and recreational and scientific activities, among others, are permitted, pursuant to the regulations in effect.

v) Game reserve - A tract of land used mainly for hunting purposes where its owner, caretaker or administrator, through the introduction of game animals bred in captivity or by semi-natural methods or practices, including the improvement of the natural habitat, offers such game to the hunter for pay.

w) Secretary - The Secretary of the Department of Natural and Environmental Resources.

x) Hunting season - The time allotted by the Secretary during which it shall be permitted to hunt any species of wild fauna designated by the Secretary as game.

y) Wildlife - Includes any organism found in the wild whose natural propagation or survival does not depend of the zeal, care or breeding of man, whether native to or adapted in Puerto Rico; or any migratory species visiting Puerto Rico at any time of the year, as well as the exotic species as defined in this Act. Provided, that this definition shall include, but not be limited to, the birds, aquatic or land reptiles, aquatic or land mammals, amphibians, all land invertebrates, and the plants and any part, product, nest, egg, young, flower, seed, fruit, leaf or body or part thereof .

z) Public law enforcement official - Any member of the Ranger Corps, the Puerto Rico Police, the Municipal Police, the Federal Forestry Service and the Federal Fishing and Wildlife Service.

aa) Sanctuary - An area designated by the Secretary of the Department where sports hunting is not permitted and where other compatible uses are governed through regulations.

bb) Natural habitat - Specific tracts of land whose ecological conditions allow for the existence and reproduction of wildlife populations. It excludes urbanized lands and includes but is not limited to forests, wetlands and herbaceous prairies, among others.

cc) Critical natural habitat – Specific tracts of land within a geographical area where may be found or introduced an endangered or a designated species, whose physical or biological characteristics are essential for the conservation of the species and that need special protection or management.

dd) Critical natural habitat essential to rare or endangered species - Any habitat necessary for the survival of rare or endangered species whose characteristics appear only in a particular area of Puerto Rico.

ee) Habitat modification - Any change in the natural habitat caused by man which kills or affects the native wildlife or which could cause those effects by altering its essential patterns of normal behavior such as reproduction, feeding or sheltering.

ff) Natural reserve - Special Designation. Those areas identified by the Department of Natural and Environmental Resources and designated by the Planning Board which, because of their special physical, ecological, geographical characteristics and the social value of the natural resources they hold, deserve to be conserved, preserved or restored to their natural condition.

Section 3.- The protection of all wildlife and in particular the natural habitat of said species is hereby declared to be the public policy of the Government of Puerto Rico. All public agencies and instrumentalities shall consult the Department on any matter, permit or franchise that may have a predictable significant impact on wildlife. The Department may seek the advise and take into consideration recommendations from agencies such as the Federal Forestry Service, the Planning Board, and duly credited Natural Science Departments of academic institutions, concerning any proposal that may affect the critical natural habitat essential to rare or endangered species. Any public organization or entity that fosters the conservation of wildlife may request that a particular species or its critical natural habitat be designated as rare or endangered provided it presents scientific information to that end. The Department shall handle such a request pursuant to the

provisions of Act No. 170 of August 12, 1998, as amended, better known as the "Uniform Administrative Procedures Act."

This Act establishes a prohibition against modifying those critical natural habitats essential to rare or endangered species. In the case of critical natural habitats that are non-essential to rare or endangered species modifications may be permitted solely if the proposal is of vital public interest and if there is no other alternative. In making a determination as to whether alternatives do or do not exist, the cost of these may not be taken into consideration as an element for analysis. Should a critical natural habitat be finally modified, a similar ecologically valuable habitat at least three times larger that the area to be modified must be acquired to be transferred to the Department.

When modifying a natural habitat, the Department shall be required to employ a mitigation mechanism for the acquisition of tracts of land of equal or greater ecological value that shall be ceded establishing as a priority the acquisition of land to extend the existing Commonwealth forests and biological corridors and to create new Commonwealth forests, natural reserves and riparian areas.

The fragmentation of forested areas shall be avoided and the mitigation of wetlands shall be achieved in coordination of the Corps of Engineers.

Section 4.- Advisory Board and Technical Committee

A Board is hereby created to advise the Secretary about the formulation of the public policy concerned with regulating sports hunting, the designation of critical habitats and the acquisition of land for wildlife reserves as well as for establishing biological stations and sanctuaries. Said Board shall be constituted by a representative of a sports hunter's organization, a representative of an organization that promotes wildlife conservation, a

biologist specializing in wildlife of the Federal Fish and Wildlife Service, a biologist specializing in wildlife as representative of an academic institution and a biologist specializing in wildlife designated by the Secretary pursuant to the recommendations of each of the entities that constitute said Board. The Department shall approve by-laws to govern the functions of said Advisory Board and the Technical Committee created below.

A Technical Committee is furthermore created to advise and counsel the Department about the importation and possession of exotic species, whose members shall be designated according to the provisions of the regulations to be adopted pursuant to this Section. Said Committee shall be constituted by a biologist specializing in wildlife designated by the Federal Fish and Wildlife Service, a wildlife specialist biologist from a duly credited academic institution, a biologist specializing in wildlife from the Department, a representative of an organization that promotes bird watching, a representative of a sports hunter's organization and a representative of importers of exotic species.

The Committee shall assist the biologists specializing in wildlife of the Department in the creation of a list of exotic species that may only be imported and owned as pets. The importation and possession of those species not included in said list shall be prohibited.

The Secretary may approve only short-term permits for importing and exhibiting animals in circuses and carnivals, provided it is established that the animals to be exhibited shall be handled by a professional trainer. The Secretary may also approve permits for importing exotic species for scientific purposes and by duly credited academic institutions or zoos credited by the American Zoological Association.

Section 5.- No person shall hunt or collect wildlife species found in Puerto Rico without a license or permit issued for such a purpose by the Secretary.

Section 6.- The following acts shall be deemed unlawful and subject to penalties as provided below in this Act:

a) To practice sports hunting in Puerto Rico without the corresponding sports hunting license or without the official seasonal stamp, if applicable.

b) To practice sports hunting of any wildlife species that has not been designated by regulations as game. To collect any wildlife species without the authorization of the Secretary. Those invertebrates and flora that have not been properly designated by regulations are exempted from this provision.

c) To introduce, import, own or export exotic species without prior permission of the Secretary, excepting those exotic species authorized by regulations.

d) To purchase or sell wildlife species, their young, nests or parts thereof. This prohibition does not include those exotic species born in captivity in game reserves or breeding places authorized by the Secretary through regulations for the purpose of populating game reserves.

e) To practice sports hunting of wild fauna designated by the Secretary as game outside the established hunting season. However, hunting wildlife species for scientific and animal control or educational purposes by persons duly authorized by the Secretary to do so, shall not be deemed unlawful.

f) To practice sports hunting in Commonwealth Forests or in public land administered by the Department, except in wildlife reserves and those natural reserves where the Secretary determines hunting is a compatible activity.

g) To hunt with any weapon not authorized by this Act or without a permit issued by the Secretary or to use ammunition prohibited by the regulations.

h) To hunt for sport a number of birds and animals in excess of the maximum number established for each hunting day or during a stage in their lives or their sex other than those set by the Secretary for each species of game birds or animals.

i) To hunt or collect any wildlife species in a number greater than that authorized by the Secretary, or during a stage in their life or their sex, other than that authorized by the latter, in those cases whereby the Secretary has granted a special permit to hunt or collect said species for scientific and animal control purposes.

j) To carry, transport or hunt with an unregistered weapon as established below in this Act.

k) To carry or transport any sports hunting weapon outside of a hunting season, be it on the person of the hunter, in the vehicle the latter is using or in any animal being used for transportation. In case said weapon must be transported for a purpose other than for sports hunting, a person must obtain a written authorization from the Police Superintendent or possess a current target shooting license. The weapon must also be registered for such a purpose, and be unloaded and duly covered.

l) To carry or transport any hunting weapon in public land where hunting has been prohibited, unless with a written permit issued by the Secretary.

ll) To establish or operate game reserves without a permit issued by the Secretary.

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m) To hunt in a game reserve without the proper license or permit issued by the Secretary.

n) To hunt in a game reserve any of the species of wild fauna not designated as game by the Secretary through regulations.

ñ) To hunt for sport any species of wild fauna along any public road or at a distance of less than one hundred meters from populated and housing areas, unless the house belongs to the hunter or to a person who has authorized the hunter to hunt within a one hundred meter perimeter.

o) To hunt or collect rare or endangered species; to own, transport or sell articles derived from rare or endangered species as designated by the Department.

p) To own or keep in captivity any species of wild fauna or game animal except for scientific, educational or recovery purposes, in which case a written authorization must be obtained from the Secretary.

q) To hunt in private land or property without the confirmed consent of the owner, administrator or caretaker.

r) To hunt in any manner other than that authorized through regulations.

s) To operate a business for the purchase and sale of exotic species or to sell exotic species without the proper license or authorization of the Department and the Regulations and Permits Administration.

t) To modify the designated essential critical natural habitat of rare or endangered species without the mitigation plan approved by the Department.

u) To modify the natural habitat without a mitigation plan approved by the Department.

v) To own, transport, catch or destroy individuals, nests, eggs or the young of wildlife species without the prior authorization of the Secretary.

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Section 7.- Game Reserves

a) The Secretary shall establish through regulations the relevant and necessary requirements for granting the permit to operate a game reserve so as to ensure compliance with all the provisions of this Act.

b) The owner, administrator or caretaker of a game reserve shall register in his/her name the hunting weapons to be used by game reserve clients. Provided, that the owner, administrator or caretaker of the game reserve shall request that the Secretary register said weapons following the procedure established for such purpose. Provided, that when registering the weapons to be used at a game reserve, the Secretary shall fix the number of hunting weapons than may be registered for each game reserve. The owner, administrator or caretaker and the clients of a game reserve may not use, carry or transport said hunting weapons outside the limits of said game reserve whether on their person or in a motor vehicle.

c) The Secretary shall establish through regulations the game animals that may be used in the game reserves, excluding those species that may be harmful. The game animals used in the game reserves may be hunted throughout the year, except for those animals covered by the Migratory Bird Treaty Act.

d) The Secretary shall suspend or revoke the authorization to operate any game reserve when in his/her judgment the provisions of said authorization, or of this Act or the regulations promulgated pursuant thereto have been violated, provided that the suspension of said authorization shall extend for the term established by the Secretary through regulations.

e) The Secretary shall give notice in writing about the suspension or revocation of the authorization to operate any game reserve, stating the reasons therefore. The person affected by said determination shall return the

permit to the Secretary by mail or in person within five (5) days after having been notified of the decision of the Secretary and shall immediately surrender the registered weapons to the Ranger Corps of the Department or to the nearest Police station. Said person may also request an administrative hearing according to the procedure to be established below in this Act, so as to protest the action of the Secretary.

f) The owner, administrator or caretaker of a game reserve shall render monthly reports to the Department about all hunting activities, including the statistics about the use of the wildlife resources or any other species included in the authorization.

g) The Secretary may grant animal breeding permits to populate the game reserves. The fees to be charged for said permit shall be covered into the Fund created by this Act.

Section 8.- The Secretary may delegate any of the functions conferred in this Act, except that of approving, amending and repealing regulations to fulfill the purposes of this Act pursuant to the Uniform Administrative Procedures Act or Act No. 170 of August 12, 1988, as amended, which after being promulgated shall carry the force of law.

Section 9.- The Secretary is hereby empowered to promulgate regulations related to the following matters, among others:

a) Those areas where it shall be permitted to hunt in Puerto Rico.

b) The establishment and administration of areas that foster the propagation, conservation, protection and management of wildlife.

c) The introduction, possession, purchase and sale by any natural or juridical person in Puerto Rico of exotic species of wildlife in general.

d) To establish the procedures and the steps to be taken by those persons interested in obtaining the licenses or permits authorized in this Act, as well

as their fees. The revenues collected from these activities shall be covered into the Special Fund for Wildlife Management.

e) To determine the exotic species and any other species that may be harmful and provide for the eradication of those species that have established themselves in Puerto Rico, were it necessary to do so.

f) To determine the wildlife fauna that may be hunted in Puerto Rico and its hunting season, pursuant to the available information.

g) To fix the number of game animals of each species that may be hunted by a sports hunter each day and establish the maximum number of animals that a hunter may hunt per hunting day in relation to the total sum of animals hunted without ever exceeding the individual limit authorized by the Secretary for each species.

h) To designate the wildlife species that may be hunted or collected.

i) To designate the wildlife species deemed to be rare or endangered and take the necessary measures to ensure their perpetuation at the time and in the space where they exist.

Section 10.- The Secretary shall have the following faculties, powers and duties besides those already provided in this Act:

a) Acquire, through purchase or by any other lawful means, lease or in any other way possess or dispose of any property, land or lakes deemed necessary and suitable for establishing biological stations, sanctuaries and wildlife reserves to study and promote the acclimatization and propagation of wildlife species, whether native, migratory or capable of being introduced into Puerto Rico for their propagation. Provided, that the land, lakes and lagoons which the Secretary may acquire or possess for the purposes provided in this subsection are hereby declared to be of public utility and

shall be used in a manner compatible with the scientific management, protection, recreational use and conservation of wildlife.

b) Accept and receive donations from private persons or entities, as well as any other type of aid proceeding from agencies and instrumentalities of the Government and the Municipalities of Puerto Rico, from the Government of the United States of America and from the state Governments, in order to achieve the purposes of this Act, for which end the Secretary is authorized to execute the necessary public utility agreements.

c) Execute all necessary legal instruments in the exercise of his/her powers.

d) Take any other convenient and necessary actions so as to most effectively achieve the purposes of this Act.

e) Take all pertinent measures to restore the natural habitat that has been affected and demand that those who have caused the unauthorized modifications restore the system.

Section 11.- Registration of Hunting Weapons

a) The Secretary shall initiate and maintain a registry of the hunting weapons registered in Puerto Rico, pursuant to the provisions of Section 29 of the Puerto Rico Weapons Law, Act No. 17 of January 19, 1951, as amended, and the Secretary shall periodically notify the Superintendent of Police as to the hunting weapons thus registered.

b) Any application for registering hunting weapons must be filed with the Department. The Secretary shall evaluate the application for registering a hunting weapon and if deemed pertinent, shall proceed with the registration according to the procedures, if applicable, established in Section 29 of Act No. 17 of January 19, 1951, as amended.

c) The Secretary shall not proceed with the registration of a hunting weapon if the person applying for such a registration has failed to previously obtain the corresponding hunting license or the permit to operate a game reserve, as the case may be.

d) No dealer in hunting weapons shall deliver a hunting weapon to a purchaser until the latter has shown that he/she possess a hunting license or a permit to operate a game reserve issued by the Secretary and that he/she has obtained the corresponding written authorization from the Secretary to purchase said hunting weapon.

e) In those cases whereby the Secretary issues special hunting permits for scientific purposes or temporary licenses to non-residents, as provided below, he/she may grant those who possess such temporary licenses a special permit to use the hunting weapon of a resident hunter who expressly authorizes the non-resident in writing, to use such a weapon, provided said hunting weapon is duly registered and its owner holds a current hunting license issued to him/her and accompanies the holder of the temporary license and the special permit.

f) In those cases whereby a bow and arrow are to be used as hunting weapon, the hunter shall register said bow with the Department. The Secretary shall issue a registration document indicating the model and serial number of said bow.

Section 12.- No person may hunt for sport in Puerto Rico without first applying for and obtaining a license for such a purpose from the Secretary. Licenses shall expire on June 30 of each year regardless of their date of issue.

Section 13.- Sports hunting license

a) Sports hunting license - Any person applying for a sports hunting license shall meet the following requirements:

1. To be mentally and physically fit. The applicant shall establish said fitness by attaching to his/her license application a certificate from a physician duly authorized to practice medicine in Puerto Rico. Said certificate shall be made in the blank form authorized for such a purpose by the Secretary.

2. To have reached the age of eighteen (18), except as hereinafter provided.

3. To have passed a course of study for sports hunters which will include an examination on the provisions of this Act, the regulations promulgated by virtue thereof, the skills and knowledge needed for using and handling hunting weapons and basic knowledge of the wildlife of Puerto Rico. Said course shall be applied for by filling out the blank form authorized by the Secretary for that purpose and given in the form and manner determined by the latter.

4. To be a person of recognized moral probity in the judgment of the Secretary, as based on all the information submitted to that effect. The Secretary shall establish through regulations, the procedure to obtain the information needed to comply with this objective; however it shall be deemed to be sufficient evidence to present a copy of the target practice license currently in effect or of any other license or permit to possess firearms relative to which the Puerto Rico Police and the Ranger Corps of the Department conducts an investigation to include the moral probity of the applicant.

5. To furnish together with the application for a hunting license, an affidavit stating that the applicant has never been convicted by any court of the Commonwealth of Puerto Rico, of a foreign country or of the United States of America, of a felony or of any other offense involving acts of

violence or moral turpitude, or of any violation of the Puerto Rico Weapons Law, Act No. 17 of January 19, 1951, as amended, or of Act No. 4 of June 23, 1971, the Puerto Rico Controlled Substances Act, or for having been convicted or fined for violations of any provision of this Act or the regulations promulgated by virtue thereof or any federal wildlife regulations.

6. To have a clean penal record as stated in a good conduct certificate issued by the Puerto Rico Police.

7. To pay the corresponding fees prescribed by the Secretary through regulations. The revenues collected on this account shall be covered into the Special Fund for Wildlife Management in Puerto Rico.

8. To fulfill any other requirements the Secretary may deem pertinent in order to carry out the purposes of this Act.

b) Renewal of sports hunting license - The Secretary may renew a hunting license after the applicant has filed with the Department the blank form provided for that purpose. Said form shall include an affidavit stating that the conditions which existed at the time the original license was granted continue unaltered.

1. The application for renewal shall be filed with the Secretary in writing thirty (30) working days before the 30th of June of each year on which the original license was issued.

2. In case renewal is not sought within said term and if not more than six (6) months have elapsed from the date of expiration of the license, the interested party shall fill out a sports hunting license renewal form and pay the late renewal fees fixed by the Secretary through regulations.

3. If a term of over six (6) months has elapsed, the interested party must meet all requirements established in Section 12(a) so as to be able to obtain a hunting license from the Secretary.

4. The Secretary shall fix the fees to be collected for the renewal of licenses through regulations. The revenues collected on this account shall be covered into the Special Fund for Wildlife Management.

5. Hunting licenses may be renewed in the manner provided by Section 13(b) for only three (3) consecutive terms; provided, that when applying for a fourth renewal, the petitioner must comply with the requirements of Section 13(a), with exception of the course of study for hunters. However, the Secretary may require that hunters pass a continuing education course for sports hunters.

c) Denial of sports hunting license - The Secretary shall refuse to issue or renew a sports hunting license in any of the following cases:

1. When the applicant fails to fulfill some requirement of this Act or the regulations promulgated by virtue thereof.

2. When the information furnished in the application for a hunting license and in the accompanying affidavit proves to be false or insufficient.

3. When the applicant, by virtue of reliable information, constitutes a menace to public safety or, in the judgment of the Secretary, is unfit to handle a weapon.

d) The Secretary shall revoke the sports hunting license if the hunter has violated the provisions of this Act or its regulations or any provision of federal wildlife laws and regulations or if the information furnished by the hunter proves to be false.

e) Educational Program for Hunters - Those who apply for the study course for hunters and its instructors may use the facilities of the target shooting clubs as well as those of any private or government shooting range for training in the use and handling of firearms. The weapons to be used

during said training shall be provided by the instructors certified by the Secretary for such a purpose.

Section 14.- The Secretary shall submit to the Puerto Rico Police Superintendent in writing, a report of the hunting licenses and any other type of license authorized pursuant to the provisions of this Act that has expired, or those whose renewal was not sought after the term herein granted has expired, or those that were revoked or whose issue or renewal was denied.

a) Any person who at the date of effectiveness of this Act has a hunting weapon registered and to whom the Secretary has revoked a hunting license of any other kind, or whose license has expired according to the provisions of Section 12, or whose renewal has not been sought on time, shall deliver said weapon to the General Police Headquarters or to the local Police Station according to the procedures established in Sections 29 and 30 of the Puerto Rico Weapons Law, Act No. 17 of January 19, 1951, as amended, and notify this fact to the Department.

b) The person affected by the determination of the Secretary may petition for an administrative hearing according to the procedure provided by the Uniform Administrative Procedures Act, Act No. 170 of August 12, 1988, as amended, provided that filing said petition for an administrative hearing shall neither interrupt nor affect compliance with the provisions of subsection (a) of this Section. Filing a motion for review shall neither exempt the person affected from the provisions of subsection (a) of this Section.

c) When a person dies while in possession of a hunting license or any of the licenses or permits to which this Act refers, the heir, administrator, executor, or person legally authorized to administer his/her estate, shall surrender the weapons within ten (10) days from the date of death pursuant to

the provisions of Section 14(a) of this Act. The provisions established in Sections 29(j) and 30 of the Puerto Rico Weapons Law, Act No. 17 of January 19, 1951, as amended, shall apply in this sense and in relation to the provisions concerning hunting weapons.

Section 15.- The Secretary may issue and renew permits for operating game reserves. Said permits shall expire on June 30 of their second year of effectiveness and their issue or renewal, as the case may be, may be sought by complying with the requirements established in this Act.

a) The person authorized by the Secretary to operate a game reserve shall pay to the Government of Puerto Rico the annual fees established through regulations, which shall be covered into the Special Fund for Wildlife Management.

b) The Department shall renew permits provided the applicant or petitioner has not violated any of the conditions of the permit or any of the provisions of the wildlife laws or regulations and provided the conditions governing the original permit have remained unaltered.

Section 16.- The Secretary may also issue the following types of licenses or permits:

a) Special non-sports hunting permits when applied for to kill, collect or keep in captivity in Puerto Rico wildlife species as specimens for scientific, educational or population control purposes. The Secretary shall establish through Regulations the terms, fees and conditions under which said permits shall be issued.

b) Permits for capturing, exporting, buying and selling, possessing and importing exotic species.

c) The Secretary may require the purchase of a stamp per specimen or per sports hunting season and for the exportation and importation of exotic species.

d) Conditional sports hunting licenses to minors fourteen (14) years of age or older with the prior written authorization of the parents, legal guardians or custodians who must themselves hold a sports hunting license in effect issued by the Secretary.

1. The sports hunting licenses authorized through this clause shall be issued upon the payment of fees and in compliance with the requirements, insofar as applicable, for the regular licenses. They shall have the same term of effectiveness and may be revoked for the same reasons as the regular licenses or if the license of the parent, legal guardian or custodian is revoked or not renewed pursuant to the provisions of this Act. The income collected on this account shall be covered into the Special Fund for Wildlife Management.

2. Minors who hold such conditional licenses may use the weapons registered in the name of their parents, legal guardians or custodians and shall be accompanied by these whenever they carry or transport a hunting weapon or engage in hunting.

c) [sic] Hunting licenses to nonresidents who hold or carry with them a hunting license in effect in any state of the United States or foreign country where the requirements are similar to those established herein for issuing hunting licenses. It shall be an indispensable requirement that before engaging in sports hunting in Puerto Rico, nonresidents show evidence of having approved an educational course for hunters at a duly credited institution prior to paying the fees required in order to obtain a license from

the Department. The income collected on this account shall be covered into the Special Fund for Wildlife Management.

1. Those nonresidents that meet the requirements mentioned above shall be authorized to practice sports hunting in Puerto Rico, subject to the applicable provisions of this Act, during the first sixty (60) days after their arrival. After said sixty (60) days they must meet the requirements established in Section 13 of this Act, should they remain in Puerto Rico and wish to continue hunting.

Section 17.- It shall not be an impediment for granting an applicant convicted of aggravated assault and battery a hunting license or a permit for operating a game reserve after ten (10) years have elapsed from the date the last sentence was served or after fifteen (15) years in the case of a felony. Neither shall it be an impediment for granting said licenses or permits if one (1) year has elapsed from the date the last sentence was served for the offenses of assault and battery or breach of the peace or if over one (1) year has elapsed since the date the applicant served his/her sentence for violations of this Act or the regulations promulgated by virtue thereof or complied with the resolution or fine imposed by the Department or by the Federal Government for violations of any provision of the wildlife laws and regulations. However, any person who within a term of ten (10) years has violated any provision or regulation of the Wildlife Act, the Department, or the Federal Fishing and Wildlife Service more than once, may be denied the possibility of applying for a license or permit for a term of up to ten (10) years. Should a person violate any wildlife law or regulation for a second time, he/she may be permanently denied a hunting license.

Section 18.- Any duly authorized hunter shall have the following rights:

a) To hunt during the open season as designated by the Secretary.

b) To hunt in those areas authorized and designated by the Secretary.

c) To transport hunting weapons in the manner and according to the limitations established in this Act and the Puerto Rico Weapons Law.

d) Any other rights the Secretary may establish.

Section 19.- All duly authorized hunters shall have the following duties:

a) To know and comply with this Act and the regulations promulgated thereunder.

b) To hold and carry with them whenever transporting hunting weapons or hunting, their hunting license or any authorized licenses or permits, as well as the registration certificate of any hunting weapon, and to show these, is so required, to another hunter, or to a duly identified law enforcement officer or official of the Department of the Natural and Environmental Resources.

c) To never transfer or lend their sports hunting license to another person.

d) To never lend their hunting weapons, except that in the game reserves they may use the hunting weapon provided by the owner, administrator or caretaker thereof, and in the case of other sports hunters with active licenses, they must accompany said hunters whenever they carry or transport said weapon or are engaged in hunting.

e) To abstain from hunting during the closed seasons, except in the game reserves.

f) To see to the enforcement of this Act and its regulations.

g) To fulfill any other obligations established by the Secretary.

h) To furnish the information required by the Department in order to monitor all sports hunting activities.

i) No hunter may kill or wound any game animal without making reasonable efforts to recover and take possession of said animal for its

consumption and for taxidermy for educational and exhibition purposes in the case of those animals that may be deemed to be trophies.

Section 20.- Administrative hearings

a) Any person directly and adversely affected by acts, orders or resolutions issued by the Secretary in relation to the issue, renewal or revocation of licenses or permits authorized by this Act may petition for an administrative hearing pursuant to the provisions of Act No. 170 of August 12, 1988, as amended, the Uniform Administrative Procedures Act.

Section 21.- Surveillance

a) The surveillance needed to enforce compliance with this Act and the regulations promulgated thereunder, shall be in charge of Law Enforcement Officers.

Section 22.- Penalties

a) Any person who violates any of the provisions of this Act and the regulations promulgated thereunder, except for the provisions of this Section, shall incur a misdemeanor and if convicted, shall be punished with a fine of not less than one hundred (100) dollars nor of more that five hundred (500) dollars, or with a term of imprisonment not to exceed six (6) months, or with both penalties at the discretion of the court. The importation of illegal exotic species for profit and the violations of the regulations pertaining to rare or endangered species shall be deemed to be felonies and shall be punished with a fine of not less than five thousand (5,000) dollars nor of more that fifty thousand (50,000) dollars, or with a term of imprisonment of not less than ninety (90) days nor of more than three (3) years, or with both penalties at the discretion of the court. Furthermore, any person who violates any of the provisions of this Act and the regulations promulgated thereunder shall incur an administrative fault. As of the date of effectiveness of this Act the

following violations of Section 6 of this Act shall be deemed as administrative faults subject to the payment of fines as set forth below:

Section 6.-

(a) $500.00

(b) $500.00

(c) $1,000.00 for each specimen whose market value does not exceed $1,000.00 or $5,000.00 for each specimen whose value exceeds $1,000.00.

(d) $200.00

(e) $500.00

(f) $1,000.00

(g) $250.00

(h) $150.00

(i) $250.00

(j) $150.00

(k) $500.00

(*l*) $500.00

(*ll*) $1,000.00

(m) $100.00

(n) $250.00

(*ñ*) $500.00

(o) $5,000.00 for each specimen or product

(p) $500.00

(q) $500.00

(r) $500.00

(s) $5,000.00

(t) $10,000.00

(u) $5,000.00 per occurrence

(v) $5,000.00

b) The law enforcement officer shall issue a ticket for the offense in a preprinted form prepared by the Department. Said ticket shall contain the name and address of the offender, a brief description of the offense, the provisions of the regulations which has been violated and the proposed penalty therefore.

c) The alleged offender shall have the option of paying the amount indicated on the ticket within thirty (30) days following its issue or of requesting a review of the alleged offense or the proposed fine by means of a written request addressed and sent to the Secretary by certified mail with acknowledgement of receipt or personally delivered within fifteen (15) days after the ticket was issued.

d) All administrative hearings shall be notified to the offenders thirty (30) days prior to their scheduled date. Said hearings may be attended by the offenders accompanied by their attorneys. The former shall be entitled to hear the evidence presented against them and offer evidence in their favor.

e) Any person who intentionally has given false information or committed fraud when submitting the application for a hunting license as provided in Section 12, shall incur a misdemeanor and if convicted shall be punished with a fine of not less than one hundred (100) dollars nor of more than five hundred (500) dollars.

Section 23.- Special Fund for Wildlife Management.-A special fund to be known as the Special Fund for Wildlife Management, is hereby created to be administered by the Department in benefit of all wildlife resources. The amounts collected on account of the license and permit fees and the stamps established in this Act, as well as those collected on account of the fines,

donations and interest, shall be covered into the Fund and be mainly used to operate the licensing, permit, hunter education and surveillance programs as well as the program for the administration of hunting activities and for providing information regarding this Act and its regulations as well as research programs for the protection and management of wildlife resources pursuant to the Fishing and Wildlife Resources Management Plan of the Fishing and Wildlife Bureau and the Federal Act known as the "Wildlife Restoration Act". The Secretary shall be appointed as wildlife trustee and custodian and as such may initiate civil actions to claim compensation for damages.

Section 24.- Act No. 70 of May 30, 1976, as amended, is hereby repealed.

Section 25.- This Act shall take effect immediately after its approval. The regulations approved pursuant to Act No. 70, supra, shall remain in effect until regulations are approved pursuant to this Act, except for inconsistent provisions, in which case the provisions of the Act shall apply.

August 5, 2002

Elba Rosa Rodríguez-Fuentes, Esq., Director of the Office of Legislative Services of the Legislature of Puerto Rico, hereby certifies to the Secretary of State that she has duly compared the English and Spanish texts of Act No. 241 (H.B. 1502) of the 5th Session of the 13th Legislature of Puerto Rico, entitled:

AN ACT to establish the New Wildlife Act of Puerto Rico for the purpose of protecting, conserving and fostering native and migratory wildlife species; to declare as property of Puerto Rico all wildlife species within its jurisdiction; to define the faculties, powers and duties of the Secretary of the Department of Natural and Environmental Resources; etc.,

and finds the same are complete, true and correct versions of each other.

Elba Rosa Rodríguez-Fuentes

Appendix G-Marine Evaluation

10 April 2012

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EVALUATION OF LA ESPERANZA PROPERTY FOR RECREATIONAL MARINE ACTIVITIES

BACKGROUND

There is a property in Ponce, called La Esperanza, which the Department of Natural and Environmental Resources might acquire for management. The Land Resources Division requested support for the evaluation of this property, regarding its potential uses for recreational marine activities, in particular the use of kayaks and the accessibility of the area by boat. The property is adjacent to or might include part of Punta Cabullones. There are two mangrove channels at Punta Cabullones. The Land Resources Division is principally interested on the channel on the eastern side (Figure 1).

OBJECTIVES

1. Evaluate potential use of the east mangrove channel for the use of kayaks.
2. Evaluate the feasibility of locating a dock along the eastern side of the east mangrove channel.

3. Evaluate possible access routes for small boats.
4. Evaluate the condition of the reef in front of the property.
5. Evaluate possible kayak trips or routes.

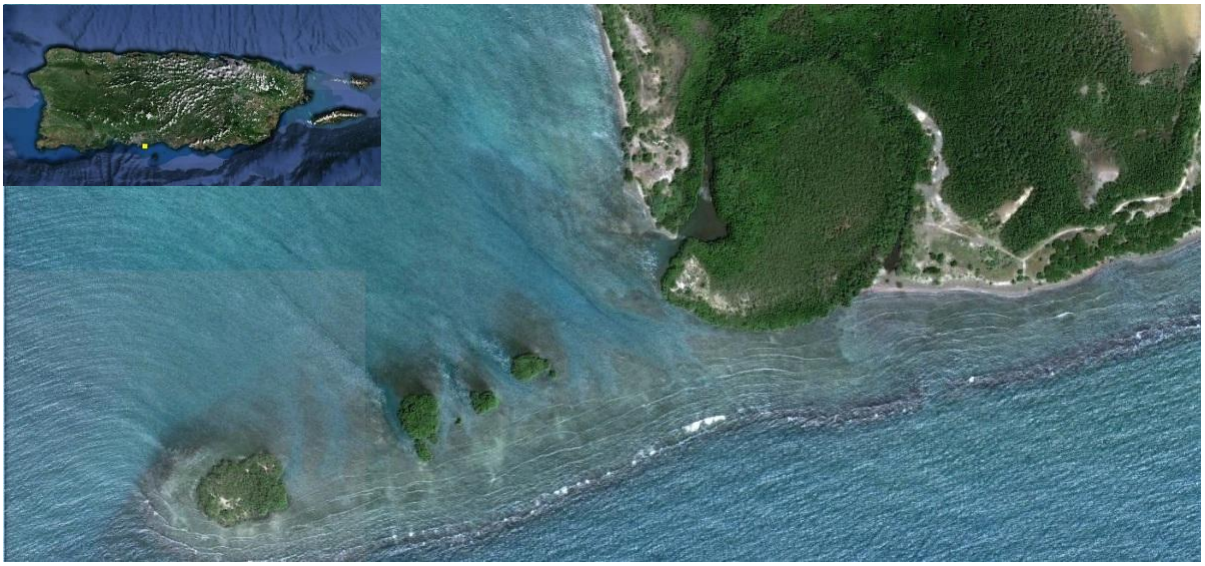


Figure 1. Punta Cabullones

METHODOLOGY

Kayaks (11.5′ singles) were used to navigate the area of interest. Information on the benthic composition and depth were collected at various locations. A section of the inner reef in front of the property was snorkeled and pictures were collected.

DISCUSSION

Potential use of the east mangrove channel for the use of kayaks

The east mangrove channel has a narrow small sandy beach on the east side (Figure 2). The west side is bordered with red mangroves. The entrance to the channel is extremely shallow. It is possible that during low tide the entrance to the channel is blocked by a sand bank. The depth at the entrance of the channel ranges from a couple of centimeters to 0.45 meters. Within the channel, the depth reaches one meter. The flow of water in the channel seems to be low judging from the appearance of the water. The sea floor of the channel was covered with vegetative material and the water was dark brown, probably from the tannins secreted by the mangroves. Upside-down jellyfish were observed while evaluating the area. The sea floor composition was mainly sand and silts. Although the open area of the mangrove channel is small, the channel has the potential to be extended approximately 50 meters inland if trimmed. Figure 3 shows the possible extension of the channel.

The east mangrove channel could be used for kayaks. The kayaks could go into the channel if the path were cleared. To exit the channel, the persons might need to drag the kayak to deeper water. Once outside the channel it is recommended that a path be established and marked to avoid damaging the sea grasses and corals in the inner reef (see Figure 4 and 5).

Figure 2. Entrance to the east mangrove channel.

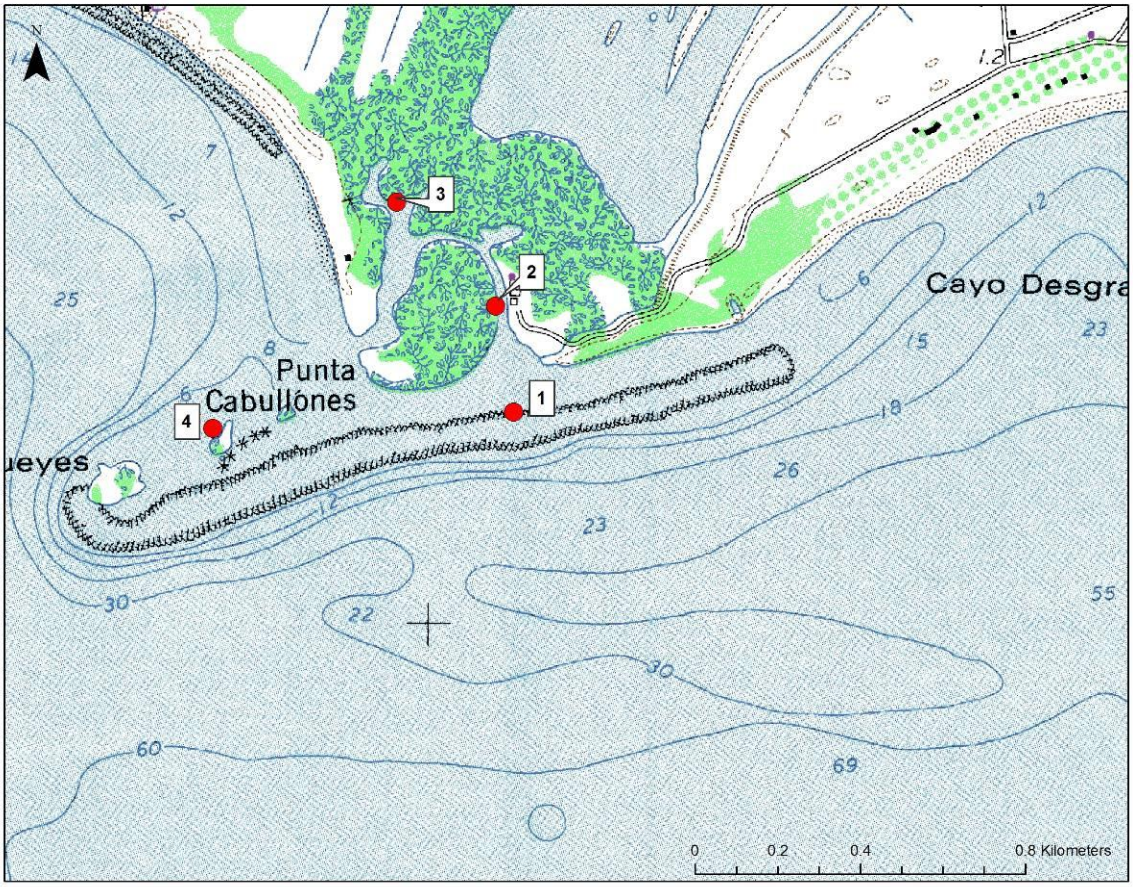


Figure 3. Punta Cabullones area. (1) Possible boat path. (2) End of east mangrove channel. (3) End of west mangrove channel. (4) Mangrove key with illegal structures.

Figure 4. Shallow *Thalassia* bed in the vicinity (west side) of the entrance to the east mangrove channel.


Figure 5. *Acropora palmata* colony in the inner reef in front of La Esperanza property.

Feasibility of locating a dock along the eastern side of the east mangrove channel.
The entrance to the east mangrove channel is extremely shallow. The channel itself has a maximum depth of one meter, but the entrance has a sand bank that at some areas reaches the surface. If the purpose of the dock is for small boats, the channel would need to be dredged to allow them to pass.

Evaluate possible access routes for small boats.
The reef in front of La Esperanza property has a reef crest parallel to the shoreline. There is a narrow passage on the reef crest (Figure 3) where the reef crest breaks which could serve as a boat path for small boats. The depth at this passage is 3 meters. Notwithstanding, there are some large dead coral structures that reach up to one meter below the surface, which the boats would need to avoid. In addition, once past the reef crest, the depth decreases towards the entrance of the east mangrove channel. The depth changes to one meter and reaches a couple of centimeters towards the entrance of the mangrove channel. There is no other boat path besides that point in the reef crest.

The inner reef area is comprised of shallow seagrass beds that reach the surface and reef structures, some of which breach the surface.

Evaluate the condition of the reef in front of the property.

The inner reef is composed mainly of massive dead coral structures colonized primarily by algae with few coral colonies (Figure 6). The amount of algae observed suggests that there is a flux of nutrients present. A filamentous green algae, *Dictyota*, and *Caulerpa racemosa* were the algae most frequently observed. The inner reef is very shallow averaging one meter depth. A few colonies of *Acropora palmata* were present (Figure 5). If a characterization of the inner or outer reef is desired an additional site visit would be needed. Few fish were observed on the reef during the evaluation.

Figure 6. Dead coral structures colonized mainly by algae on the inner reef in front of La Esperanza.

Possible kayak trips or routes

West of La Esperanza property there are various mangrove keys which present an excellent alternative for a kayak tour. Three of these keys are used by Brown pelicans for roosting (Figure 7). One of the keys has apparently been illegaly managed by the public, and there are benches, two docks, and various structures that might serve as cooking area and outhouse (Figure 8-10). If the kayaks depart from the east mangrove channel, a path should be marked to prevent damage to sea grasses and corals, as well as for the safety of people. There is a second mangrove channel (west mangrove channel) in Punta Cabullones. This mangrove channel has a wider and deeper entrance (Figure 11). Large fish and abundant baitfish were observed at this location, but we were not able to identify the species except for one barracuda. The west mangrove channel has the potential to be extended 250 meters if trimmed (Figure 3). This could be another alternative to be included in a kayak tour.

Figure 7. Brown pelicans at some of the mangrove keys west of La Esperanza property.

Figure 8. Bench structure ("Tree house") at a mangrove key, west of La Esperanza property.

Figure 9. Dock at one of the mangrove keys, west of La Esperanza property.

Figure 10. Structures found at one of the mangrove keys, west of La Esperanza property.

Figure 11. West mangrove channel entrance.

Appendix H-Reptile, Fauna, Flora, and Bird Evaluation

Bird Species

Date	Estation	Scientific name	English name	Common name	Observer1	Observer2
10/4/2012	Pozas	*Setophaga petechia*	Yellow Warbler	canario de mangle	A. Matos	M. Delgado
10/4/2012	Pozas	*Tiaris bicolor*	Black-faced Grassquit	chamorro negro	A. Matos	M. Delgado
10/4/2012	Pozas	*Quiscalus niger*	Greater Antillean Grackle	mozambique	A. Matos	M. Delgado
10/4/2012	Pozas	*Egretta caerulea*	Little Blue Heron	garza azul	A. Matos	M. Delgado
10/4/2012	Pozas	*Egretta tricolor*	Tricolored Heron	garza pechiblanca	A. Matos	M. Delgado
10/4/2012	Pozas	*Ardea alba*	Great Egret	garza real	A. Matos	M. Delgado
10/4/2012	Pozas	*Ardea Herodias*	Great Blue Heron	garzón cenizo	A. Matos	M. Delgado
10/4/2012	Pozas	*Tiaris olivaceus*	Yellow-faced Grassquit	gorrión garganta amarilla	A. Matos	M. Delgado
10/4/2012	Pozas	*Buteo jamaicensis*	Red tailed-Hawk	guaraguao cola roja	A. Matos	M. Delgado
10/4/2012	Pozas	*Vireo altiloquus*	Black-whiskered Vireo	julían chivi	A. Matos	M. Delgado
10/4/2012	Pozas	*Butarides virescens*	Green heron	martinete	A. Matos	M. Delgado
10/4/2012	Pozas	*Coccyzus minor*	Mangrove Cuckoo	pajaro bobo	A. Matos	M. Delgado
10/4/2012	Pozas	*Anas bahamensis*	White-cheeked Pintail	pato quijada colorada	A. Matos	M. Delgado
10/4/2012	Pozas	*Pelecanus occidentalis*	Brown pelican	pelicano pardo	A. Matos	M. Delgado
10/4/2012	Pozas	*Tirannus dominicensis*	Gray Kingbird	pitirre	A. Matos	M. Delgado
10/4/2012	Pozas	*Calidris alba*	Sanderling	playero arenero	A. Matos	M. Delgado
10/4/2012	Pozas	*Limnodromus griseus*	Short-billed Dowitcher	Agujeta Piquicorta	A. Matos	M. Delgado
10/4/2012	Pozas	*Actitis macularius*	Spotted Sandpiper	playero coleador	A. Matos	M. Delgado
10/4/2012	Pozas	*Charadrius vociferus*	Killdeer	playero sabanero	A. Matos	M. Delgado
10/4/2012	Pozas	*Coereba flaveola*	Bananaquit	reinita comun	A. Matos	M. Delgado
10/4/2012	Pozas	*Setophaga adelaidae*	Adelaide's Warbler	reinita mariposera	A. Matos	M. Delgado
10/4/2012	Pozas	*Columbina passerina*	Common Cround-Dove	rolita	A. Matos	M. Delgado
10/4/2012	Pozas	*Mimus polyglottos*	Northern Mockingbird	ruiseñor	A. Matos	M. Delgado
10/4/2012	Pozas	*Molothrus bonariensis*	Shiny Cowbird	tordo lustroso	A. Matos	M. Delgado
10/4/2012	Pozas	*Zenaida asiatica*	White-winged Dove	tórtola aliblanca	A. Matos	M. Delgado
10/4/2012	Pozas	*Zenaida aurita*	Zenaida Dove	tórtola cardosantera	A. Matos	M. Delgado
10/4/2012	Pozas	*Zenaida macruora*	Mourning Dove	tórtola rabilarga	A. Matos	M. Delgado
10/4/2012	Pozas	*Icterus icterus*	Troupial	turpial	A. Matos	M. Delgado
10/4/2012	Pozas	*Margarops fuscatus*	Pearly-eyed Thrasher	zorzal pardo	A. Matos	M. Delgado
10/4/2012	Pozas	Eulampis holosericeus	Green-throated Carib	zumbador	A. Matos	M. Delgado
10/4/2012	Charca2	*Setophaga adelaidae*	Adelaide's Warbler	reinita mariposera	Hana Lopez	Helena Antoun
10/4/2012	Charca2	*Spindalis portoricensis*	Puerto Rican Spindalis	reina mora	Hana Lopez	Helena Antoun
10/4/2012	Charca2	*Coccyzus minor*	Mangrove Cuckoo	pájaro bobo menor	Hana Lopez	Helena Antoun
10/4/2012	Charca2	*Quiscalus niger*	Greater Antillean Grackle	mozambique	Hana Lopez	Helena Antoun
10/4/2012	Charca2	*Pandion haliaetus*	Osprey	águila pescadora	Hana Lopez	Helena Antoun
10/4/2012	Charca2	*Tiaris bicolor*	Black-faced Grassquit	gorrión negro	Hana Lopez	Helena Antoun
10/4/2012	Charca2	*Butorides virescens*	Green heron	martinete	Hana Lopez	Helena Antoun
10/4/2012	Charca2	*Mimus polyglottos*	Northern Mockingbird	ruiseñor	Hana Lopez	Helena Antoun
10/4/2012	Charca2	*Zenaida aurita*	Zenaida Dove	tórtola cardosantera	Hana Lopez	Helena Antoun
10/4/2012	Charca2	*Zenaida asiatica*	White-winged Dove	tórtola aliblanca	Hana Lopez	Helena Antoun
10/4/2012	Charca2	*Crotophaga ani*	Smooth-billed Ani	judío	Hana Lopez	Helena Antoun
10/4/2012	Charca2	*Buteo jamaicensis*	Red tailed-Hawk	guaraguao cola-roja	Hana Lopez	Helena Antoun
10/4/2012	Charca2	*Coereba flaveola*	Bananaquit	reinita común	Hana Lopez	Helena Antoun
10/4/2012	Charca2	*Egretta thula*	Snowy Egret	garza blanca	Hana Lopez	Helena Antoun
10/4/2012	Charca2	*Egretta caerulea*	Little Blue Heron	garza azul	Hana Lopez	Helena Antoun

10/4/2012	Charca2	*Egretta tricolor*	Tricolored heron	garza pechiblanca	Hana Lopez	Helena Antoun
10/4/2012	Charca2	*Ardea alba*	Great Egret	garza real	Hana Lopez	Helena Antoun
10/4/2012	Charca2	*Tringa spp*	Yellowlegs	guineilla spp	Hana Lopez	Helena Antoun
10/4/2012	Charca2	*Petrochelidon fulva*	Cave Swallow	golondrina	Hana Lopez	Helena Antoun
10/4/2012	Charca2	*Parkesia noveboracensis*	Northern Waterthrush	pizpita de mangle	Hana Lopez	Helena Antoun
10/4/2012	Charca2	*Anas bahamensis*	White-cheeked Pintail	quijada colorada	Hana Lopez	Helena Antoun
10/4/2012	Charca2	*Setophaga petechia*	Yellow Warbler	canario de mangle	Hana Lopez	Helena Antoun
10/4/2012	Charca2	*Zenaida macroura*	Mourning Dove	rabiche	Hana Lopez	Helena Antoun
10/4/2012	Charca2	*Megaceryle alcyon*	Belted Kingfisher	martín pescador	Hana Lopez	Helena Antoun
10/4/2012	Charca2	*Columbina passerina*	Common Cround-Dove	rolita	Hana Lopez	Helena Antoun
10/4/2012	Charca2	*Gallinula galeata*	Common Gallinule	gallareta	Hana Lopez	Helena Antoun
10/4/2012	Charca2	*Ardea Herodias*	Great Blue Heron	garzón cenizo	Hana Lopez	Helena Antoun
10/4/2012	Charca2	*Molothrus bonariensis*	Shiny Cowbird	tordo lustroso	Hana Lopez	Helena Antoun
10/4/2012	Charca2	*Podilymbus podiceps*	Pied-billed Grebe	zaramago	Hana Lopez	Helena Antoun
10/4/2012	Charca2	*Vireo altiloquus*	Black-whiskered Vireo	julián chiví	Hana Lopez	Helena Antoun
10/4/2012	Charca2	*Anthracothorax dominicus*	Antillean Mango	zumbador dorado	Hana Lopez	Helena Antoun
10/4/2012	Charca2	*Calidris pusilla*	Semipalmated Sandpiper	playero Gracioso	Hana Lopez	Helena Antoun
10/4/2012	Charca2	*Falco sparverius*	American Kestrel	falconcito	Hana Lopez	Helena Antoun
10/4/2012	Esperanza 1	*Zenaida asiatica*	White winged-Dove	tórtola aliblanca	Dwight Colon	
10/4/2012	Esperanza 1	*Zenaida aurita*	Zenaida Dove	tórtola cardosantera	Dwight Colon	
10/4/2012	Esperanza 1	*Streptopelia roseogrisea*	African Collared-Dove	collarina	Dwight Colon	
10/4/2012	Esperanza 1	*Falco sparverius*	American Kestrel	falcon	Dwight Colon	
10/4/2012	Esperanza 1	*Gallinula galeata*	Common Gallinule	gallareta	Dwight Colon	
10/4/2012	Esperanza 1	*Tiaris bicolor*		gorrión negro	Dwight Colon	
10/4/2012	Esperanza 1	*Plegadis falcinellus*	Glossy Ibis	ibis lustroso	Dwight Colon	
10/4/2012	Esperanza 1	*Crotophaga ani*	Smooth-billed Ani	judío	Dwight Colon	
10/4/2012	Esperanza 1	*Vireo altiloquus*	Black-whiskered Vireo	julián chiví	Dwight Colon	
10/4/2012	Esperanza 1	*Coccyzus minor*	Mangrove Cuckoo	pajaro bobo menor	Dwight Colon	
10/4/2012	Esperanza 1	*Zenaida macroura*	Mourning Dove	rabiche	Dwight Colon	
10/4/2012	Esperanza 1	*Columbina passerina*	Common Cround-Dove	rolita	Dwight Colon	
10/4/2012	Esperanza 1	*Mimus polyglottos*	Northern Mockingbird	ruiseñor	Dwight Colon	
10/4/2012	Esperanza 1	*Podilymbus podiceps*	Pied-billed Grebe	zaramago	Dwight Colon	
10/4/2012	Esperanza 1	*Anthracothorax dominicus*	Antillean Mango	zumbador	Dwight Colon	
10/4/2012	Marina/Salina	*Setophaga petechia*	Yellow Warbler	canario de mangle	Alexis Martı	Ramon L. Rivera
10/4/2012	Marina/Salina	*Quiscalus niger*	Greater Antillean Grackle	mozambique	Alexis Martı	Ramon L. Rivera
10/4/2012	Marina/Salina	*Falco sparverius*	American Kestrel	falcon comun	Alexis Martı	Ramon L. Rivera
10/4/2012	Marina/Salina	*Fregata magnificens*	Magnificent Frigatebird	Tijereta	Alexis Martı	Ramon L. Rivera
10/4/2012	Marina/Salina	*Egretta caerulea*	Little Blue Heron	garza azul	Alexis Martı	Ramon L. Rivera
10/4/2012	Marina/Salina	*Ardea alba*	Great Egret	garza real	Alexis Martı	Ramon L. Rivera
10/4/2012	Marina/Salina	*Thalasseus maximus*	Royal Tern	gaviota real	Alexis Martı	Ramon L. Rivera
10/4/2012	Marina/Salina	*Petrochelidon fulva*	Cave Swallow	golondrina de cueva	Alexis Martı	Ramon L. Rivera
10/4/2012	Marina/Salina	*Tiaris bicolor*	Black-faced Grassquit	gorrion negro	Alexis Martı	Ramon L. Rivera
10/4/2012	Marina/Salina	*Buteo jamaicensis*	Red tailed-Hawk	guaraguao cola roja	Alexis Martı	Ramon L. Rivera
10/4/2012	Marina/Salina	*Crotophaga ani*	Smooth-billed Ani	judio	Alexis Martı	Ramon L. Rivera
10/4/2012	Marina/Salina	*Elaenia martinica*	Caribbean Elaenia	jui blanco	Alexis Martı	Ramon L. Rivera
10/4/2012	Marina/Salina	*Vireo altiloquus*	Black-whiskered Vireo	julianchivi	Alexis Martı	Ramon L. Rivera
10/4/2012	Marina/Salina	*Butorides virescens*	Green Heron	martinete	Alexis Martı	Ramon L. Rivera
10/4/2012	Marina/Salina	*Megaceryle alcyon*	Belted Kingfisher	martin pescador	Alexis Martı	Ramon L. Rivera
10/4/2012	Marina/Salina	*Coccyzus minor*	Mangrove Cuckoo	pajaro bobo menor	Alexis Martı	Ramon L. Rivera
10/4/2012	Marina/Salina	*Pelecanus occidentalis*	Brown pelican	Pelicano pardo	Alexis Martı	Ramon L. Rivera
10/4/2012	Marina/Salina	*Tyrannus dominicensis*	Gray Kingbird	pitirrre	Alexis Martı	Ramon L. Rivera
10/4/2012	Marina/Salina	*Parkesia noveboracensis*	Northern Waterthrush	pizpita de mangle	Alexis Martı	Ramon L. Rivera
10/4/2012	Marina/Salina	*Charadrius semipalmatus*	Semipalmated Plover	playero acollarado	Alexis Martı	Ramon L. Rivera
10/4/2012	Marina/Salina	*Pluvialis squatarola*	Black-bellied Plover	playero cabezon	Alexis Martı	Ramon L. Rivera
10/4/2012	Marina/Salina	*Rallus longirostris*	Clapper Rail	pollo de mangle	Alexis Martı	Ramon L. Rivera
10/4/2012	Marina/Salina	*Zenaida macroura*	Mourning Dove	rabiche	Alexis Martı	Ramon L. Rivera
10/4/2012	Marina/Salina	*Setophaga magnolia*	Magnolia warbler	reinita manchada	Alexis Martı	Ramon L. Rivera
10/4/2012	Marina/Salina	*Columbina passerina*	Common Cround-Dove	rolita	Alexis Martı	Ramon L. Rivera
10/4/2012	Marina/Salina	*Mimus polyglottos*	Northern Mockingbird	ruiseñor	Alexis Martı	Ramon L. Rivera
10/4/2012	Marina/Salina	*Molothrus bonariensis*	Shiny Cowbird	tordo lustroso	Alexis Martı	Ramon L. Rivera
10/4/2012	Marina/Salina	*Zenaida asiatica*	White-winged Dove	tórtola aliblanca	Alexis Martı	Ramon L. Rivera
10/4/2012	Marina/Salina	*Icterus icterus*	Troupial	turpial	Alexis Martı	Ramon L. Rivera
10/4/2012	Marina/Salina	*Eulampis holosericeus*	Green-throated Carib	zumbador pechiazul	Alexis Martı	Ramon L. Rivera
10/4/2012	Salitral Grande	*Pandion haliaetus*	Osprey	aguila pescadora	Iván Llerandi	

10/4/2012	Salitral Grande	*Quiscalus niger*	Greater Antillean Grackle	mozambique	Iván Llerandi
10/4/2012	Salitral Grande	*Egretta tricolor*	Tricolored heron	garza pechiblanca	Iván Llerandi
10/4/2012	Salitral Grande	*Tyrannus dominicensis*	Gray Kingbird	pitirre	Iván Llerandi
10/4/2012	Salitral Grande	*Vireo altiloquus*	Black-whiskered vireo	julianchivi	Iván Llerandi
10/4/2012	Salitral Grande	*Coereba flaveola*	Bananaquit	reinita común	Iván Llerandi
10/4/2012	Salitral Grande	*Ardea Herodias*	Great Blue Heron	garzon cenizo	Iván Llerandi
10/4/2012	Salitral Grande	*Egretta caerulea*	Little Blue Heron	garza azul	Iván Llerandi
10/4/2012	Salitral Grande	*Setophaga petechia*	Yellow Warbler	canario de mangle	Iván Llerandi
10/4/2012	Salitral Grande	*Falco sparverius*	American Kestrel	falcon comun	Iván Llerandi
10/4/2012	Salitral Grande	*Setophaga adelaidae*	Adelaide's Warbler	reinita mariposera	Iván Llerandi
10/4/2012	Salitral Grande	*Charadrius melodus*	Piping plover	Chorlito Melódico	Iván Llerandi
10/4/2012	Salitral Grande	*Charadrius nivosus*	Snowy plover	playero blanco	Iván Llerandi
10/4/2012	Salitral Grande	*Charadrius wilsonia*	Wilson plover	playero maritimo	Iván Llerandi
10/4/2012	Salitral Grande	*Charadrius vociferus*	Killdeer	playero sabanero	Iván Llerandi
10/4/2012	Salitral Grande	*Arenaria interpres*	Rudy turnstone	playero turco	Iván Llerandi
10/4/2012	Salitral Grande	*Calidris mauri*	Western sandpiper	playero occidental	Iván Llerandi
10/4/2012	Salitral Grande	*Calidris minutilla*	Least sandpiper	playero menudo	Iván Llerandi
10/4/2012	Salitral Grande	*Calidris alpina*	Dunlin	Playero Espaldicolorado	Iván Llerandi
10/4/2012	Salitral Grande	*Calidris alba*	Sanderling	Playero Arenero	Iván Llerandi
10/4/2012	Salitral Grande	*Columbina passerina*	Common-grounded Dove	rolita	Iván Llerandi

Reptile Species

Scientific name	English name	Common name
Anolis cooki	Dryland Anole	lagartijo del seco
Anolis stratulus		lagartijo manchado
Iguana iguan	Green iguana	iguana verde
Ameiva exsul		siguana comun
Anolis poncensis		

Terrestrial Vegetation Characterization

The vegetation of Finca la Esperanza has been severely impacted mainly by previous anthropogenic activities. These activities included fire, deposit of klinker material, deposit of garbage (crystal bottles, metals etc.), livestock (cattle, horse) and others. As consequence of these activities, some natural habitats have been severely damaged. At present, habitats are composed of pastures, upland woodland, mangrove forest, saltpeter bed, seasonal wetlands and thickets. The predominant vegetation is clearly shrubby and herbaceous.

The woodland habitats are located in the wetland, small patches in the coast (near the ruins), and a fringe of vegetation developed in the borders of the dirt road and drainage channels. This vegetation includes mangrove (black and red mangrove) and upland trees and shrubs. The coastal wetland is the best representation of the forest. This forest is composed of all mangrove species, in some areas there are pure stands of red mangrove or black mangrove, or a combination of red mangrove (*Rhizophora mangle*), black mangrove (*Avicenia germinans*), white mangrove (*Laguncularia racemosa*), and button mangrove (*Conocarpus erectus*) which is less common. In the drainage channel, the black and the red mangrove are the dominant species. Toward the east the open areas show pure stands of black mangrove and herbaceous vegetation that become a marsh when it receives rainfall during the raining season.

The best representation of the upland woodland is close to the shore at the south, between the mangrove forest and the building ruins. Although this forest shows open areas that were burnt, it maintains a representative vegetation of coastal forest. The trees species documented in this forest are *Guaiacum officinale* (Guayacan), *Pithecelobium dulce* (Guamá Americano), *Tabebuia heterophyla* (Roble blanco), *Bursera simaruba* (Almácigo), *Pilosocereus royenii* (Sebucán), *Coccoloba uvifera* (Uva de playa), *Coccos nucifera* (Palma de coco) and, *Jaquinia arborea* (Barbasco). The predominant vegetation in the burnt area is herbaceous like *Megathirzus maximus* (Yerba de Guinea), *Pennisetum ciliaris* (Yerba buffel), and the woody vine *Caesalpinia bonduc* (Mato de playa) as the most common species. In some areas the trees are covered by vines. The dominant vines are *Stigmaphylon emarginatum* (Bejuco de toro) and *Commicarpus scandens* (Pegapollo).

The most important herbaceous vegetation is located in the seasonal wetlands. *Sagitaria lancifolia* (Flecha de agua), *Paspalidium geminatum* (Yerba de agua) and *Eleocharis mutata* are the dominant species in this habitat. Associated to this vegetation is *Phyla nodiflora* (cidrón) that is present in all vegetative associations. *Ruppia maritima* (Yerba de Zanja) is the only vegetation present in the seasonal lagoon where the water does not reach one feet of depth.

The herbaceous vegetation (pastures) is present in open areas between maritime-terrestrial zone and the woodland in the transitional zone. It is dominated by the species *Pennisetum ciliaris* (Yerba buffel) and *Sporobolus virginicus* (Matojo de burro). *Sesuvium portulacastrum* is abundant in the saline soils close to the trails and in the transitional zone between the saltpeter bed and mangrove forest.

Fauna Species

Family	Species	Common name
Acanthaceae	Avicennia germinans	Mangle negro
Agavaceae	Agave sp.	N/A
Agavaceae	Agave sp.	N/A
Aizoaceae	Sesubium portulacastrum	Verdolaga rosada
Alismataceae	Sagittaria lancifolia	Flecha de agua
Amaranthaceae	Achyranthes aspera	Abrojo
Annonaceae	Annona glabra	Cayure
Apocynaceae	Matelea maritima	Guanabanilla cimarrona
Apocynaceae	Calotropis procera	Algodón de seda
Apocynaceae	Cryptostegia madagascariensis	Canario morado
Arecaceae	Coccos nucifera	Palma de coco
Asteraceae	Mikania cordifolia	Guaco
Asteraceae	Xanthium strumarium	Bardana
Bataceae	Batis maritima	Varilla
Bignoniaceae	Tabebuia heterophyla	Roble blanco
Boraginaceae	Eliotropium curassavicum	Cotorrera de playa
Boraginaceae	Cordia oblicua	Cereza blanca
Burseraceae	Bursera simaruba	Almácigo
Cactaceae	Pilosocereus royenii	Sebucan
Capparaceae	Capparis flexuosa	Paliguan
Casuarinaceae	Casuarina equisetifolia	Casuarina
Cleomaceae	Gynandropsis gynandra	Jazmin de río
Combretaceae	Laguncularia racemosa	Mangle blanco
Combretaceae	Bucida buceras	Ucar
Convolvulaceae	Ipomoea imperati	Bejuco de puerco
Convolvulaceae	Ipomoea tiliacea	Bejuco de puerco
Convolvulaceae	Ipomoea	
Convolvulaceae	Merremia quinquefolia	Batatilla blanca
Crassulaceae	Kalanchoe sp.	N/A
Cucurbitaceae	Momordica charantia	Cundeamor
Cyperaceae	Cyperus ligularis	Junco de agua
Cyperaceae	Cyperus rotundus	Yerba coqui
Cyperaceae	Eleocharis mutata	N/A
Cyperaceae	Fimbristilys cymosa	N/A
Cyperaceae	Fimbristylis ferruginea	N/A
Cyperaceae	Eleocharis sp.	N/A

Euphorbiaceae	Euphorbia serpens	Sanguinaria
Euphorbiaceae	Euphorbia mesembriantemifolia	N/A
Euphorbiaceae	Jatropha gossypiifolia	Tuatua
Euphorbiaceae	Hippomane mancinela	Manzanillo
Fabaceae	Neptunia plena	Desmanto amarillo
Fabaceae	Sesbania sericea	Papagallo
Fabaceae	Parkinsonia aculeata	Palo de rayo
Fabaceae	Desmanthus pernambucanus	Desmanto
Fabaceae	Samanea saman	Samán
Fabaceae	Pithecelobium dulce	Guamá americano
Fabaceae	Prosopis julliflora	Bayahonda
Fabaceae	Vachellia farnesiana	Aroma
Fabaceae	Vigna luteola	Frijol silvestre
Fabaceae	Caesalpinia bonduc	Mato de playa
Fabaceae	Darbergia ecastaphyllum	Marai-marai
Fabaceae	Mimosa pigra	N/A
Fabaceae	Abrus precatorius	Peronía
Fabaceae	Clitoria ternatea	Conchita
Malphigiaceae	Stigmaphylon emarginatum	Bejuco de toro
Malvaceae	Gossipium barbadense	Algodón
Malvaceae	Malachra alceifolia	Malva
Malvaceae	Sida salvifolia	Escoba
Malvaceae	Guazuma ulmifolia	Guacima
Malvaceae	Corchorus hirsutus	Malvabisco
Malvaceae	Sida acuta	Escoba
Moraceae	Ficus sp.	Jagüey
Nyctaginaceae	Commicarpus scandens	Pegapollo
Nymphaeaceae	Nymphaea ampla	Flor de agua
Oleaceae	Jasminum fluminense	Jazmín oloroso
Onagraceae	Ludwidgia octobalvis	Yerba de clavo
Passifloraceae	Passiflora suberosa	Flor de pasión
Passifloraceae	Passiflora foetida	Tagua tagua
Phytolaccaceae	Trichostigma octandrum	Bejuco de paloma
Poaceae	Arundo donax	Cana de castilla
Poaceae	Paspalidium geminatum	Yerba de agua
Poaceae	Sporobolus virginicus	Matojo de burro
Poaceae	Chloris inflata	Paragüita
Poaceae	Megathirzus maximus	Yerba de guinea
Poaceae	Pennisetum ciliaris	Yerba buffel
Poaceae	Cynodon dactylon	Yerba Bermuda
Poaceae	Eriochloa polystachya	Malojilla
Poaceae	Hymenachne amplexicaulis	Tropetilla
Poaceae	Ichnanthus pallens	Carrucillo
Poaceae	Melinis repens	Yerba rosada
Poaceae	Urochloa distachya	Gramita
Polygonaceae	Coccoloba uvifera	Uva de playa

Appendix I- Ponce Trip Itinerary (April 9th-Aprill11th)

LA ESPERANZA, PONCE

April 9-13, 2012

Contact info

Alexis Martínez	787-594-7282
Dwight Colón	787-668-9585
Miguel Delgado	787-505-4743
Iván Llerandi	787-233-2543
Ramón L. Rivera	787-405-3812
Nilda Jiménez	787-645-5593
José Sustache	787-486-0327

Helena Anton	787-453-7204
Milagros Cartagena	787-930-7246
Drew Digeser	518-810-2353
Hussein Yatim	508-523-0469
Stephen Partridge	787-587-2423
Matt Bourque	603-689-3845

Sites to be visited

Name	**description**
Ponce Hilton	Hotel
Quality Inn	Hotel
Hampton	Hotel
Holiday Inn	Hotel
Ramada	Hotel
Los Caobos	community
Sports complex Los Caobos	community

Villa del Carmen	Community
Jueyes	Community
Nursing-home (Los Caobos)	community
Merceditas	community
Villa Flores	community
Plaza del Caribe Mall	Commercial
Merceditas International Airport	Commercial
Fogón de Yuya	Commercial

** We will look for other commercial establishment when we get to Ponce*

Gun-shops

Name	**Phone #**	**email**	**address**
Deportes Tormes	787-267-1004	deportestormes@hotmail.com	26 Paseo Café, Yauco, PR 00698
West Shooting Supplies	787-851-3257	pabloary@yahoo.com	#33 José De Diego ST Local 1-C, Cabo Rojo, PR 00623
EJ Accuracy Guns	787-873-5579	accyracy@coqui.net	Ave. 5 de diciembre #85, Sabana Grande, PR 00637
Armería Williams	787-843-3415	---	A-17 Las Américas, Villa Gillasca, Ponce PR
Armería Pont	787-864-3505	---	1 Calle Vicente Pales, Guayama
RL America y Distribuidor	787-845-6363	---	Plata Oasis, Santa Isabel

ITINERARY

Monday April 9, 2012

- We will be using 4 available official vehicles (2 Liberty (W-21 & F-35), Ford, Dakota)). Two of them will come back to San Juan

<table>
<tr><th colspan="2">Team</th><th>Activities</th></tr>
<tr><td>Drew</td><td>Helena</td><td rowspan="5">1. Guayama – stop by the observation tower
2. Guayama – pick-up the room keys in Jobaner before stating to work
3. Questionnaires – AM
(a) To make the approach to the Elderly home and Fogón de Yuya administrations. To explain them the project purposes. To ask for permissions for interviews in their facilities on Tuesday morning and noon.
(b) To perform interviews to Hotel administrations.
4. Questionnaires – PM (~3-6pm)
To visit the following communities:
- Los Caobos (visit sports complex)
- Villa Flores</td></tr>
<tr><td>Hussein</td><td>Miguel</td></tr>
<tr><td>Stephen</td><td>Hana</td></tr>
<tr><td>Matt</td><td>Dwight</td></tr>
<tr><td>Iván</td><td></td></tr>
</table>

- Miguel and Nilda will be picked-up in Ponce
- WPI students will be lodging in Ramada Hotel

Team	Activities
Ramón	Terrestrial habitat characterization
Sustache	

Team	Activities
Nilda	Marine habitat characterization
Craig	
Mili	

Tuesday, April 10, 2012

Team		Activities
Drew	Helena	1. Questionnaires to administrations (AM) - Elderly home, Fogón de Yuya - Commercial establishment (fishing shop) 2. Questionnaires PM - Merceditas - Villas del Carmen - Villa Flores
Hussein	Miguel	
Stephen	Hana	
Matt	Dwight	

Team	Activities
Nilda	Marine habitat characterization (to continue if not finished)

Wednesday, April 11, 2012

Team		Activities
Drew	Helena	1. Questionnaires to commercial establishment (AM) 2. Questionnaires PM - Villa Flores - Merceditas - Villas del Carmen
Hussein	Miguel	
Stephen	Dwight	
Matt	Iván	

Team	Activities
Ramón	1. Terrestrial habitat characterization (to continue if not finished) 2. Bird survey
Sustache	
Alexis	
Mili	
Matos	
Iván	

Notes:

- If the training on Tuesday is cancelled, Iván, Sustache, Alexis, Matos, Mili, and Ramón will join the rest of the group and the activities planned for Wednesday will be moved to Tuesday.
- Hana will come back to San Juan on Tuesday afternoon or Wednesday noon.

Community Locations: La Esperanza, Ponce

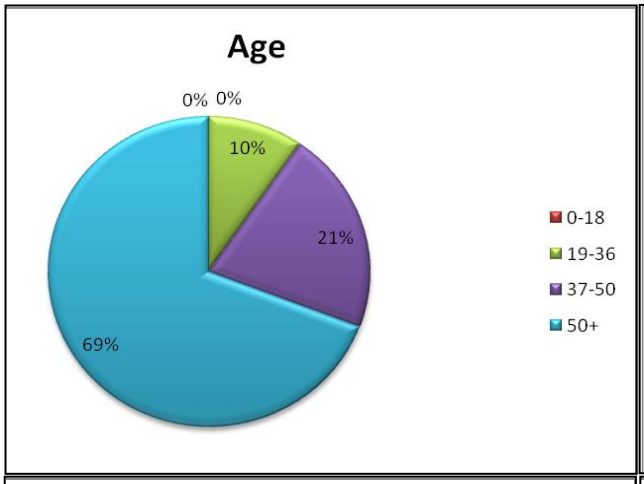
Bird Count Stations, La Esperanza, Ponce

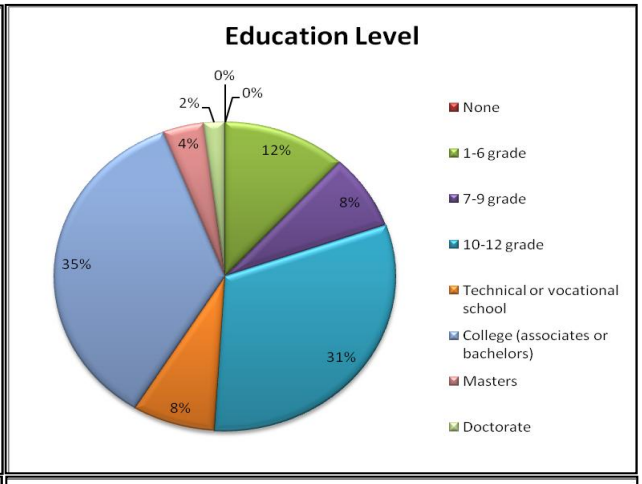
Appendix J- La Esperanza Community Questionnaire Data

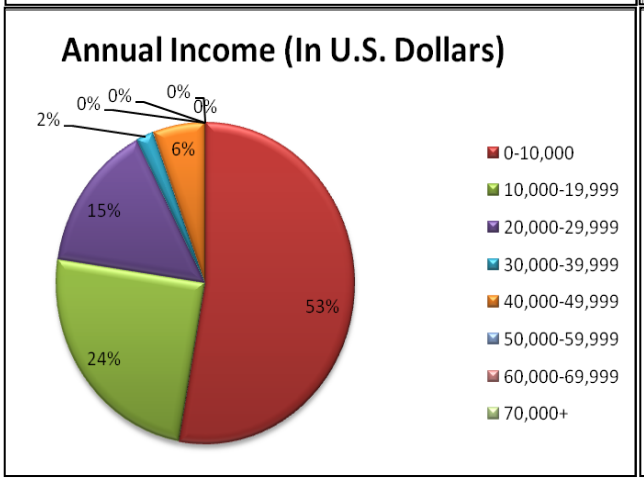
Females

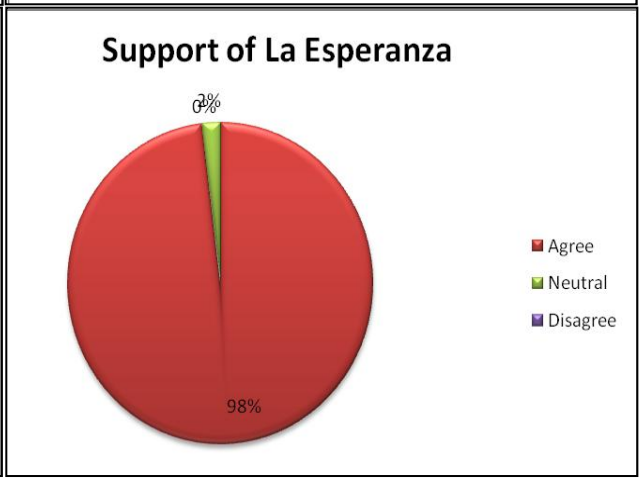
Age:	0-18	19-36	37-50	50+									
	0	5	11	36									
Gender:	Male	Female											
		X											
Education:	None	1-6 grade	7-9 grade	10-12 grade	Technical or vocational school		College (associates or bachelors)		Masters		Doctorate		
	0	6	4	16	4		18		2		1		
Annual Income	0-10,000	10,000-19,999	20,000-29,999	30,000-39,999	40,000-49,999		50,000-59,999		60,000-69,999		70,000+		
	28	13	8	1	3		0		0		0		
Support of reserve on La Esperanza	Agree	Neutral	Disagree										
	51	1	0										
Activities:													
Hunting	Agree	Neutral	Disagree										
	34	5	13										
Fishing	Agree	Neutral	Disagree										
	46	2	1										
Passive Recreation	Agree	Neutral	Disagree										
	52	0	0										
Participate in hunting?	Yes	No											
	1	50											
Participate in passive recreation?	Yes	No											
	40	9											
How many days a week do you participate in passive recreation?	1-2days	3-4days	5-7days										
	20	14	6										
Should the community be involved with concessions?	Agree	Neutral	Disagree										
	46	3	0										
Will activities affect the surrounding community?	Yes, Positive	Yes, Negative	No										
	8	2	39										
Recommendations for La Esperanza	Security	Maintenance	Regulations	Passive Recreation	Community Involvement								

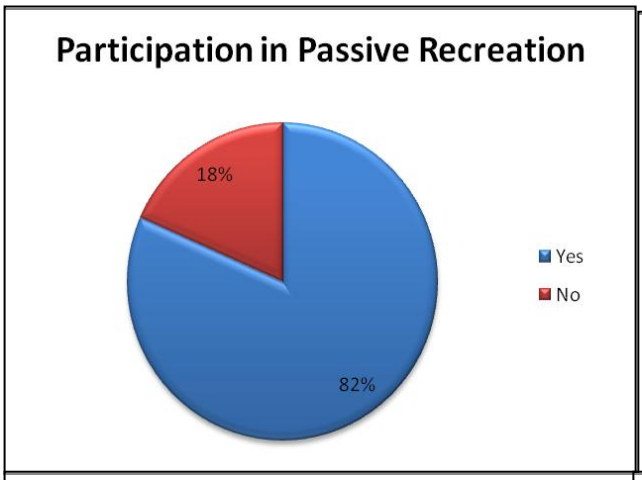
Additional Hunting and Fishing Questions				
How often do you hunt?	1-3days	4-6days	6-10days	more than 10
	1	0	0	0
How many hunters in your family?	1	2	3	more than 3
	1	0	0	0
What kind of hunting do you do?	pigeons and doves	water fowl		
	0	1		
What land do you use?	public	private		
	1	1		
What type of areas do you prefer to hunt in?	fields	marshes	lagoons	
	0	1	1	
Would you pay a fee to hunt in the reserve?	yes	no		
	1	0		
Do you fish?	yes	no		
	2	0		
Do you prefer to fish from shore or a boat?	shore	boat	both	
	0	0	2	
Would you rent or do you own a boat when fishing?	rent a boat	own a boat		
	1	1		
Where do you buy hunting and fishing equipment?	department stores	specialized stores	internet	
	1	2	1	



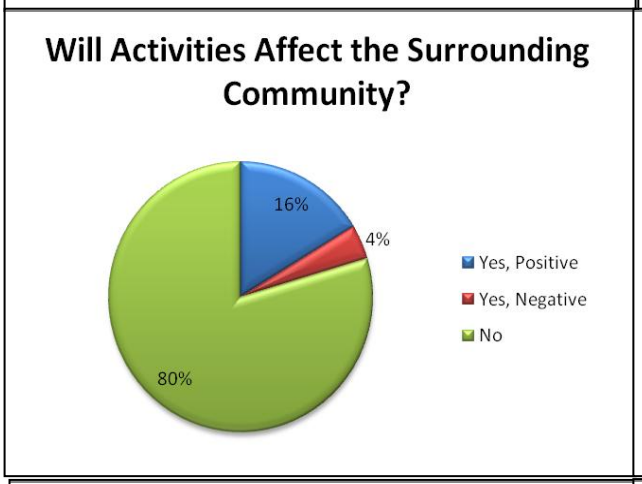


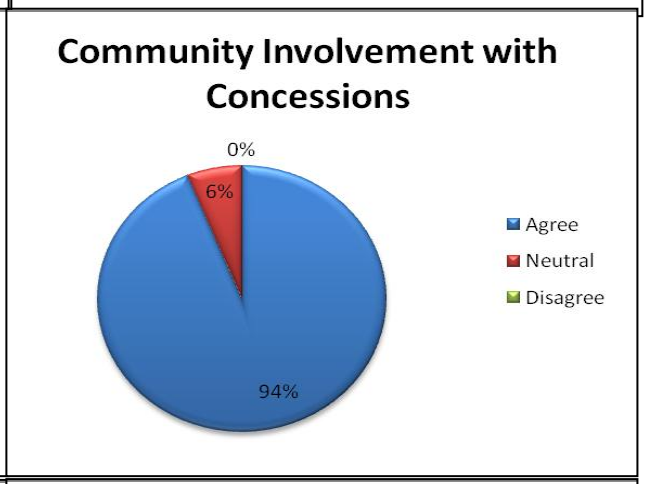


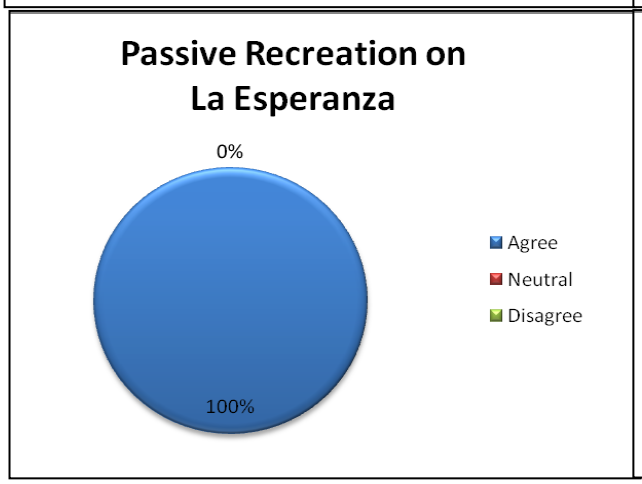


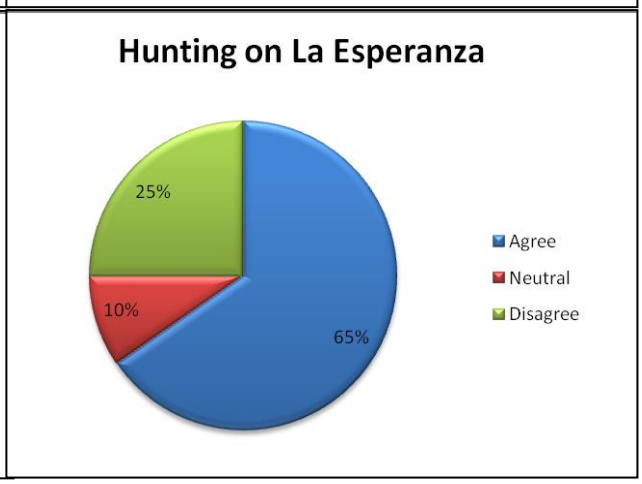

Participation in Passive Recreation
18%
82%
Yes
No

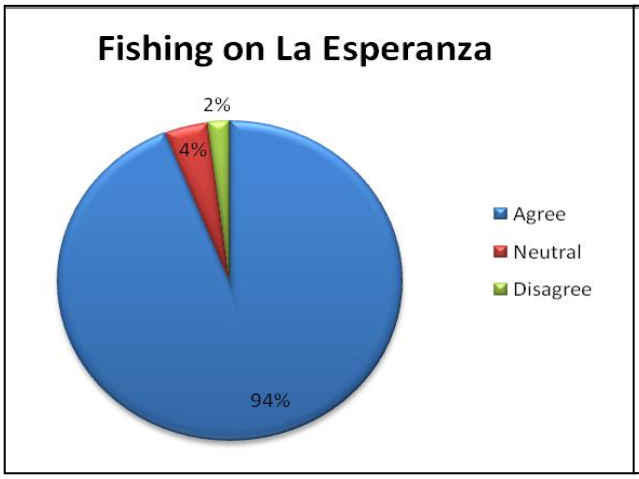

Participation in Hunting
2%
98%
Yes
No

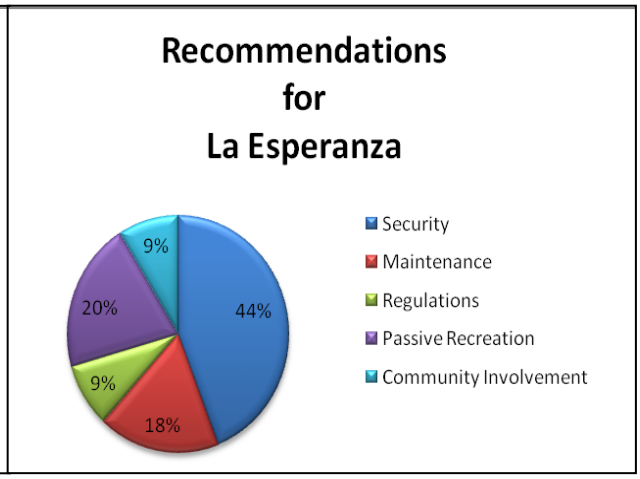

Will Activities Affect the Surrounding Community?
16%
4%
80%
Yes, Positive
Yes, Negative
No


Community Involvement with Concessions
0%
6%
94%
Agree
Neutral
Disagree


Passive Recreation on La Esperanza
0%
100%
Agree
Neutral
Disagree


Hunting on La Esperanza
25%
10%
65%
Agree
Neutral
Disagree

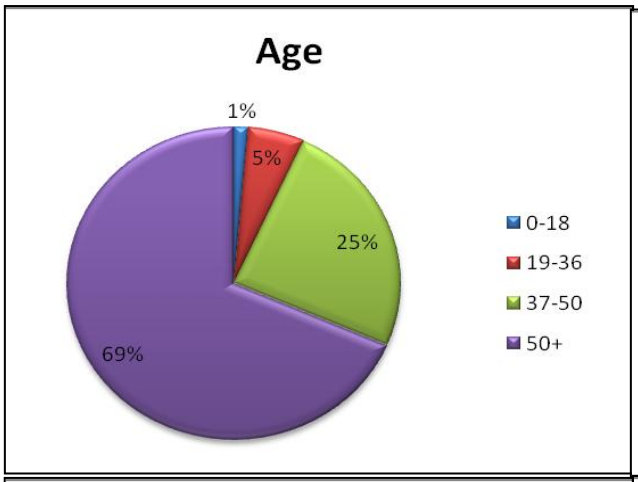

Fishing on La Esperanza
2%
4%
94%
Agree
Neutral
Disagree

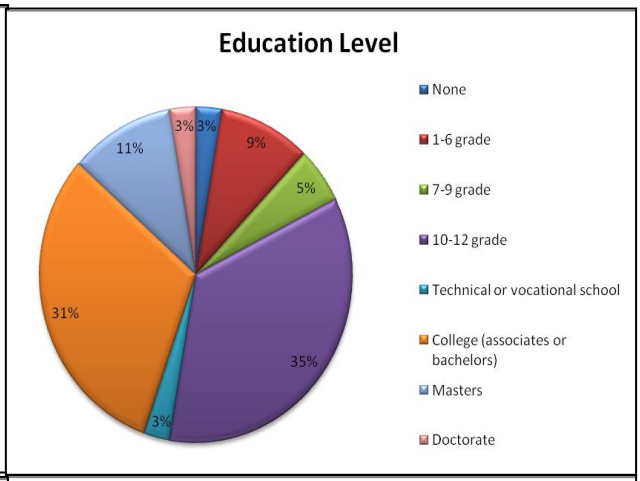

Recommendations
for
La Esperanza
9%
20%
44%
9%
18%
Security
Maintenance
Regulations
Passive Recreation
Community Involvement

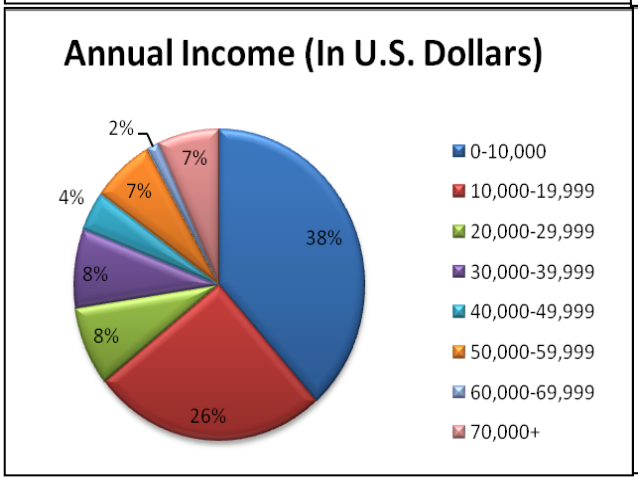
Males

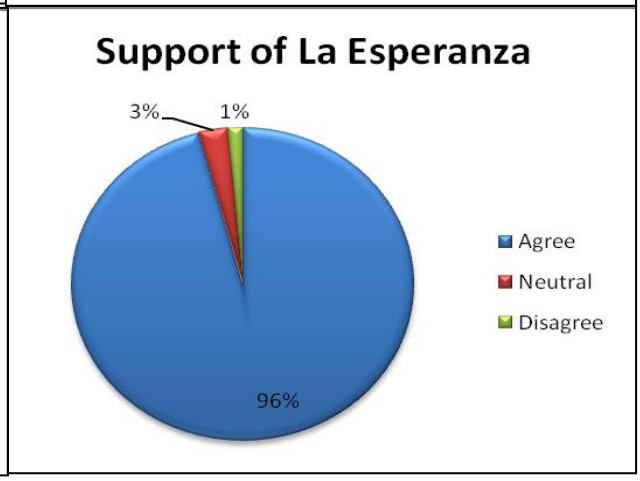
Age:		0-18	19-36	37-50	50+					
			1	4	18	50				
Gender:	Male	Female								
	X									
Education:	None	1-6 grade	7-9 grade	10-12 grade	Technical or vocational school	College (associates or bachelors)	Masters	Doctorate		
	2	7	4	26	2	23	8	2		
Annual Income (In U.S. Dollars)	0-10,000	10,000-19,999	20,000-29,999	30,000-39,999	40,000-49,999	50,000-59,999	60,000-69,999	70,000+		
	28	19	6	6	3	5	1	5		
Support of reserve on La Esperanza	Agree	Neutral	Disagree							
	70	2	1							
Activities:										
Hunting	Agree	Neutral	Disagree							
	53	5	15							
Fishing	Agree	Neutral	Disagree							
	61	3	4							
Passive Recreation	Agree	Neutral	Disagree							
	69	1	3							
Participate in hunting?	Yes	No								
	9	59								
Participate in passive recreation	Yes	No								
	61	10								
How many days a week do you participate in passive recreat	1-2days	3-4days	5-7days							
	22	19	17							
Community Should be involved with concessions	Agree	Neutral	Disagree							
	64	6	2							
Will activities affect the surrounding community?	Yes, Positive	Yes, Negative	No							
	20	7	44							
Recommendations for La Esperanza	Security	Maintenance	Regulations	Public Access	Community Involvement					
	29	8	7	4	18					

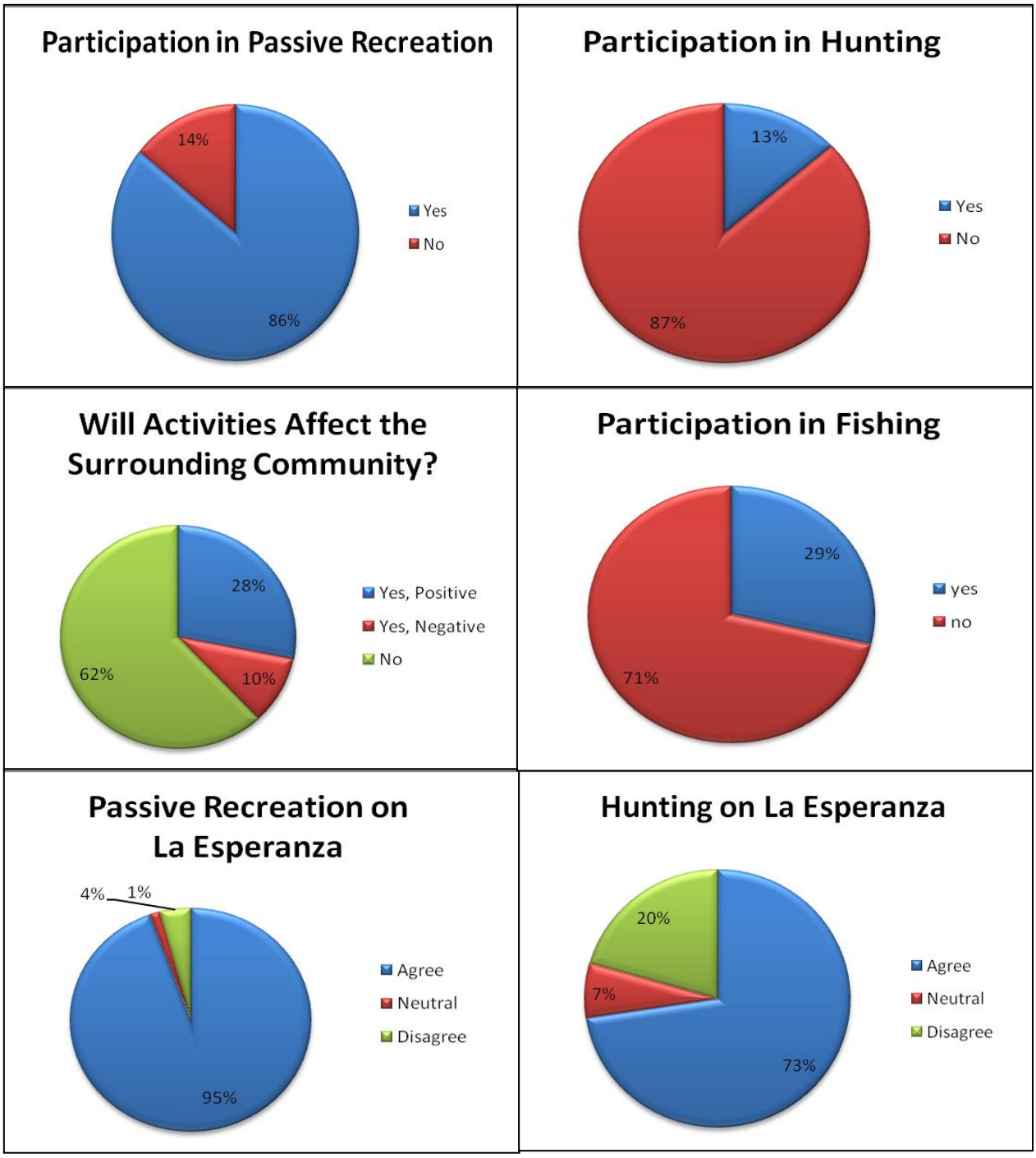
Additional Hunting and Fishing Questions				
How often do you hunt?	1-3days	4-6days	6-10days	more than 10
	0	0	1	8
How many hunters in your family?	1	2	3	more than 3
	6	2	1	0
What kind of hunting do you do?	pigeons and doves	water fowl		
	7	7		
What land do you use?	public	private		
	7	9		
What type of areas do you prefer to hunt in?	fields	marshes	lagoons	
	7	3	8	
Would you pay a fee to hunt in the reserve?	yes	no		
	6	2		
Do you fish?	yes	no		
	21	52		
Do you prefer to fish from shore or a boat?	shore	boat	both	
	7	3	11	
Would you rent or do you own a boat when fishing?	rent a boat	own a boat		
	11	3		
Where do you buy hunting and fishing equipment?	department stores	specialized stores	internet	
	14	8	13	

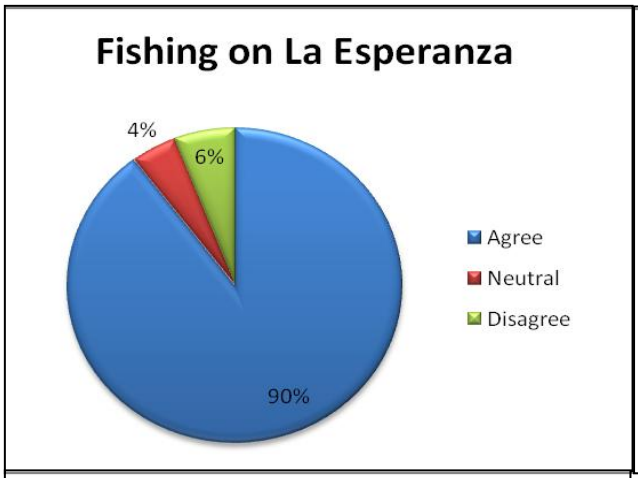


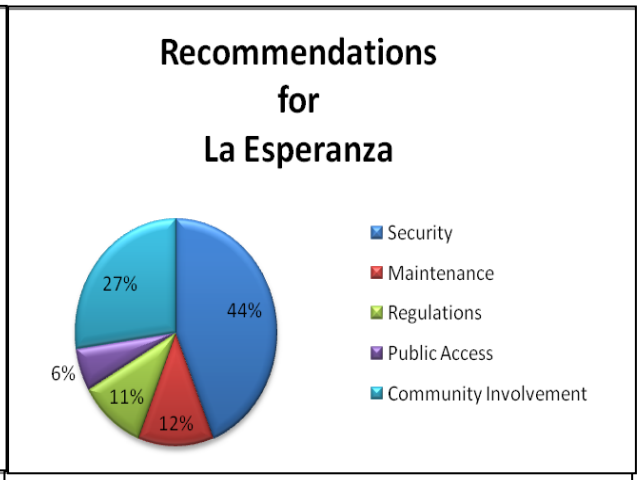




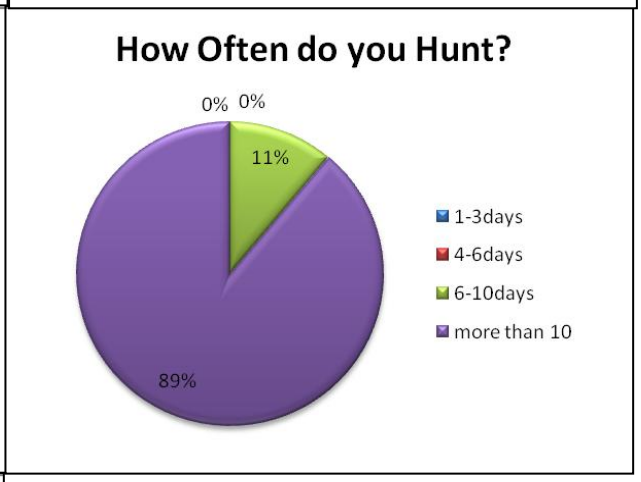


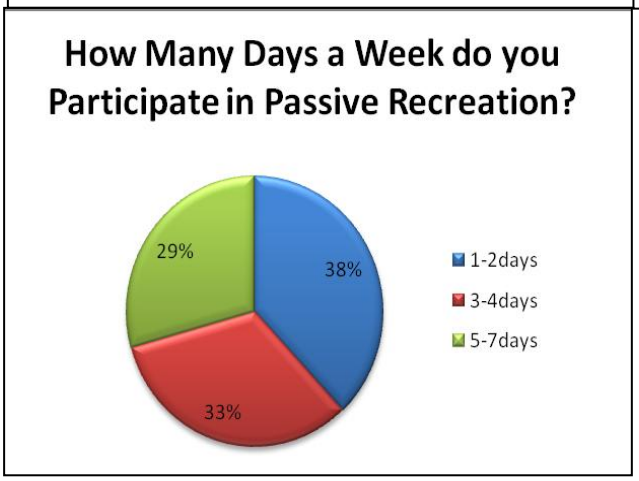

Participation in Passive Recreation
14%
86%
Yes
No
Participation in Hunting
13%
87%
Yes
No
Will Activities Affect the Surrounding Community?
28%
10%
62%
Yes, Positive
Yes, Negative
No
Participation in Fishing
29%
71%
yes
no
Passive Recreation on La Esperanza
4%
1%
95%
Agree
Neutral
Disagree
Hunting on La Esperanza
20%
7%
73%
Agree
Neutral
Disagree


Fishing on La Esperanza
4%
6%
90%
Agree
Neutral
Disagree


Recommendations for La Esperanza
27%
44%
6%
11%
12%
Security
Maintenance
Regulations
Public Access
Community Involvement


Where do you Buy Hunting and Fishing Equipment?
37%
40%
23%
department stores
specialized stores
internet


How Often do you Hunt?
0%
0%
11%
89%
1-3days
4-6days
6-10days
more than 10


How Many Days a Week do you Participate in Passive Recreation?
29%
38%
33%
1-2days
3-4days
5-7days

Businesses (Hotels)

Will your business benefit during the hunting season?	Yes	No	I don't know				
	4	0	1				
Creation of reserve will have impact on business?	Yes	No	I don't know				
	5	0	0				
Increase of tourism/clients in area?	Yes	No					
	5	0					
Support of development of reserve next to business?	Yes	No					
	5						
What types of activities would you like to see?	Hunting	Fishing	Educational activities	Passive recreation	Kayaking/snorkeling	Nature walks	Biking
	4	5	5	5	4	3	3

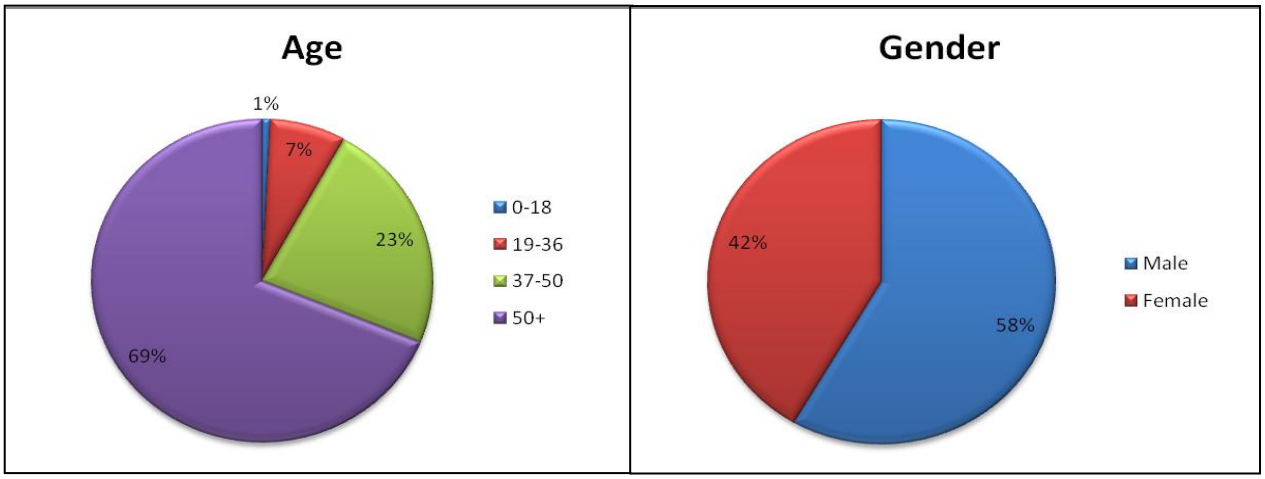
Businesses (Stores)

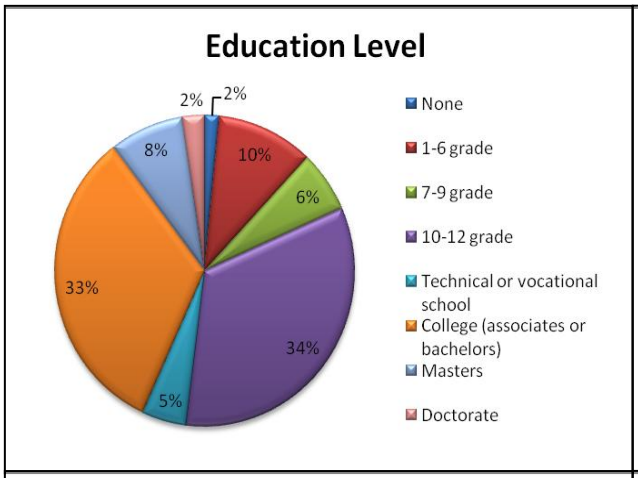
Will your business benefit during the hunting season?	Yes	No	I don't know	
	8	0	0	
Creation of reserve will have impact on business?	Yes	No	I don't know	
	8	0	0	
Increase of tourism/clients in area?	Yes	No		
	8	0		
Support of development of reserve next to business?	Yes	No		
	8	0		
What types of activities would you like to see?	Hunting	Fishing	Educational activities	Passive recreation
	8	8	8	8

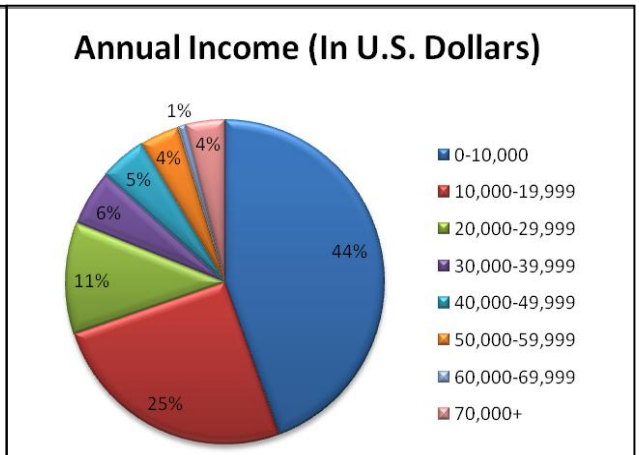
Combined Data Collection (Males and Females)

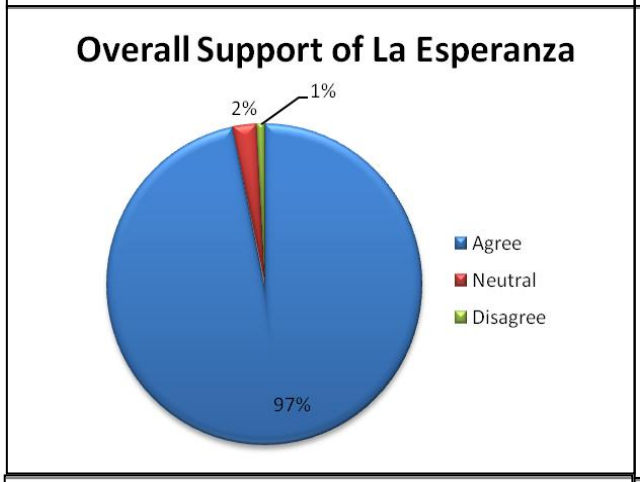
Age:	0-18	19-36	37-50	50+				
	1	9	29	86				
Gender:	Male	Female						
	73	52						
Education:	None	1-6 grade	7-9 grade	10-12 grade	Technical or vocational school	College (associates or bachelors)	Masters	Doctorate
	2	13	8	42	6	41	10	3
Annual Income	0-10,000	10,000-19,999	20,000-29,999	30,000-39,999	40,000-49,999	50,000-59,999	60,000-69,999	70,000+
	56	32	14	7	6	5	1	5

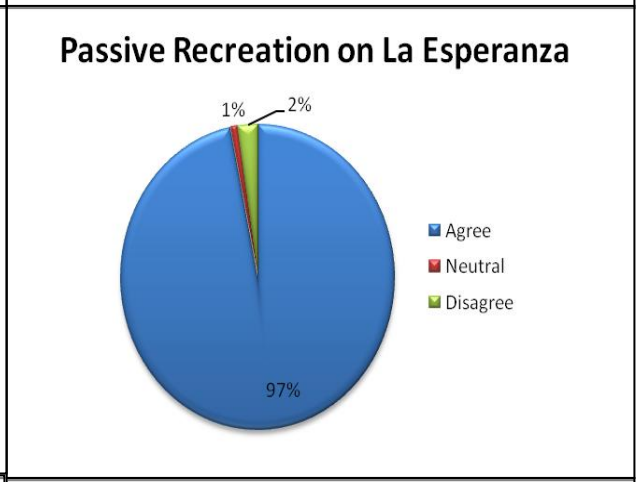
Overall support of reserve on La Esperanza	Agree	Neutral	Disagree
	121	3	1
Activities:			
Hunting	Agree	Neutral	Disagree
	87	10	28
Fishing	Agree	Neutral	Disagree
	113	5	7
Passive Recreation	Agree	Neutral	Disagree
	121	1	3
Total Number Surveyed: 125			

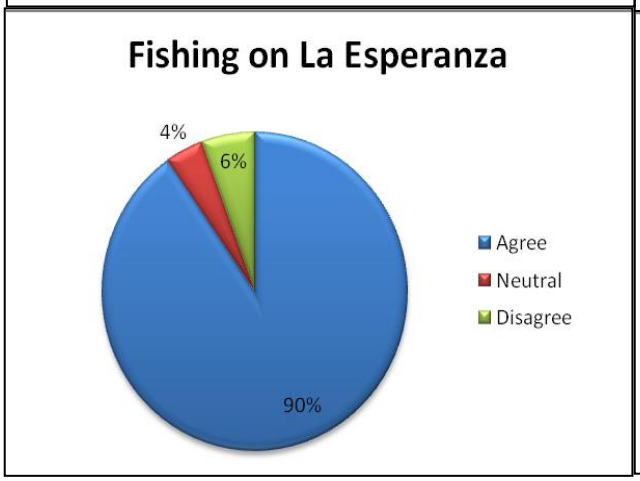


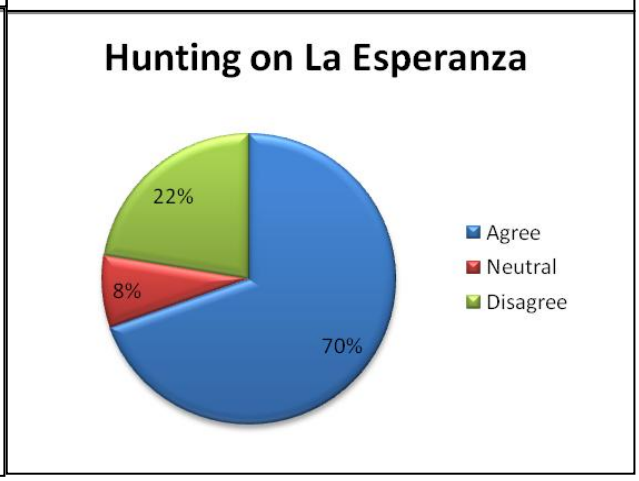

Education Level
2%
2%
10%
6%
34%
5%
33%
8%
None
1-6 grade
7-9 grade
10-12 grade
Technical or vocational school
College (associates or bachelors)
Masters
Doctorate


Annual Income (In U.S. Dollars)
1%
4%
4%
5%
6%
11%
25%
44%
0-10,000
10,000-19,999
20,000-29,999
30,000-39,999
40,000-49,999
50,000-59,999
60,000-69,999
70,000+


Overall Support of La Esperanza
2%
1%
97%
Agree
Neutral
Disagree


Passive Recreation on La Esperanza
1%
2%
97%
Agree
Neutral
Disagree


Fishing on La Esperanza
4%
6%
90%
Agree
Neutral
Disagree


Hunting on La Esperanza
22%
8%
70%
Agree
Neutral
Disagree

Appendix K- Budget Analysis (Years 1-3)

La Esperanza Proposed Budget	YEAR 1				
Ponce, Puerto Rico					
	Personnel				
Name	**Classification**	**% Time**	**Salary/Cost**	**Federal**	**State**
TBA	Manager II	100	$31,457	$31,457	$0
TBA	Wildlife Biologist II	100	$27,509	$27,509	$0
TBA	Wildlife Biologist I / Educato	100	$26,037	$26,037	$0
TBA	Heavy Equipment Operator	100	$20,310	$20,310	$0
TBA	Worker I	100	$20,310	$20,310	$0
TBA	Worker II	100	$20,310	$20,310	$0
TBA	Worker III	100	$20,310	$20,310	$0
	Other Costs				
Equipment					
Vehicles	2 @ $30,000		$60,000	$60,000	$0
ATV	2 @ $10,000		$20,000	$20,000	$0
Tractor	1 @ $65,000		$65,000	$65,000	$0
Tractor mower attachment	1 @ $25,000		$25,000	$25,000	$0
Boat	1 @ $25,000		$25,000	$25,000	$0
Kayaks	2 @ $750		$1,500	$1,500	$0
Gasoline/Lubrication/vehicle insurance			$8,000	$8,000	$0
Toll fees			$500	$500	$0
Per diem			$2,000	$2,000	$0
Services (Vehicles and ATV repairs)			$2,000	$2,000	$0
Construction materials					
Road and Trail costs			$150,000	$150,000	$0
Visitor Center with consessions			$600,000	$600,000	$0
Signs, information centers, etc			$20,000	$20,000	$0
Observation Towers	5 @ $130,000		$650,000	$650,000	$0
Docks			$150,000	$150,000	$0
Gazebos	3 @ $5000		$15,000	$15,000	$0
Operation expenses					
a.) Emergency Supplies			$2,000	$2,000	$0
b.) Maintenance Materials			$4,000	$4,000	$0
Services Expenses					
a.) Electricity expenses			$2,000	$2,000	$0
Indirect Costs					
			Total Cost	Total Federal	Total State
			$1,968,243	$1,968,243	$0

La Esperanza Proposed Budget	YEAR 2				
Ponce, Puerto Rico					
	Personnel				
Name	**Classification**	**% Time**	**Salary/Cost**	**Federal**	**State**
TBA	Manager II	100	$31,457	$31,457	$0
TBA	Wildlife Biologist II	100	$27,509	$27,509	$0
TBA	Wildlife Biologist I / Educato	100	$26,037	$26,037	$0
TBA	Heavy Equipment Operator	100	$20,310	$20,310	$0
TBA	Worker I	100	$20,310	$20,310	$0
TBA	Worker II	100	$20,310	$20,310	$0
TBA	Worker III	100	$20,310	$20,310	$0
	Other Costs				
Equipment					
Water pumps			$25,000	$25,000	$0
Excavator			$75,000	$75,000	$0
Gasoline/Lubrication/vehicle insurance			$8,000	$8,000	$0
Toll fees			$500	$500	$0
Per diem			$2,000	$2,000	$0
Services (Vehicles and ATV repairs)			$1,000	$1,000	$0
Maintenance					
Road and Trail costs			$15,000	$15,000	$0
Visitor Center/concessions			$20,000	$20,000	$0
Signs, information centers, etc			$2,000	$2,000	$0
Observation Towers			$10,000	$10,000	$0
Docks			$15,000	$15,000	$0
Operation expenses					
a.) Emergency Supplies			$2,000	$2,000	$0
b.) Maintenance Materials			$4,000	$4,000	$0
Services Expenses					
a.) Electricity expenses			$2,000	$2,000	$0
Indirect Costs			$10,000	$10,000	$0
Insurance			$4,000	$4,000	$0
			Total Cost	Total Federal	Total State
			$361,743	$361,743	$0

La Esperanza Proposed Budget	YEAR 3				
Ponce, Puerto Rico					
	Personnel				
Name	**Classification**	**% Time**	**Salary/Cost**	**Federal**	**State**
TBA	Manager II	100	$31,457	$31,457	$0
TBA	Wildlife Biologist II	100	$27,509	$27,509	$0
TBA	Wildlife Biologist I / Educato	100	$26,037	$26,037	$0
TBA	Heavy Equipment Operator	100	$20,310	$20,310	$0
TBA	Worker I	100	$20,310	$20,310	$0
TBA	Worker II	100	$20,310	$20,310	$0
TBA	Worker III	100	$20,310	$20,310	$0
	Other Costs				
Equipment					
Gasoline/Lubrication/vehicle insurance			$8,000	$8,000	$0
Toll fees			$500	$500	$0
Per diem			$2,000	$2,000	$0
Services (Vehicles and ATV repairs)			$15,000	$15,000	$0
Maintenance					
Road and Trail costs			$15,000	$15,000	$0
Visitor Center/concessions			$20,000	$20,000	$0
Signs, information centers, etc			$2,000	$2,000	$0
Observation Towers			$10,000	$10,000	$0
Docks			$15,000	$15,000	$0
Operation expenses					
a.) Emergency Supplies			$2,000	$2,000	$0
b.) Maintenance Materials			$4,000	$4,000	$0
Services Expenses					
a.) Electricity expenses			$2,000	$2,000	$0
Indirect Costs			$10,000	$10,000	$0
Insurance			$4,000	$4,000	$0
			Total Cost	Total Federal	Total State
			$275,743	$275,743	$0