

[ANCON]

FINAL REPORT

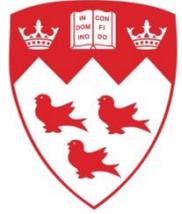
INTERPRETIVE MATERIAL FOR THE
HISTORY, CULTURE AND BIODIVERSITY
OF ANCON HILL
&
PRELIMINARY RISK ASSESSMENT FOR
ITS FAUNA

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EXECUTIVE SUMMARY

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Cerro Ancon is an urban forest hill that is the highest point in Panama City. The hill is important to Panama because it boasts both a rich cultural history and a diverse flora and fauna. Historically, the hill has had many uses and a diverse mix of residents. The hill belonged to the people of the city and remained public from the time of the Spanish settlement at current day Casco Antiguo in 1673 up until 1903 when it was taken over by the US as part of the official Canal Zone. From 1903 to 1914, when the canal officially opened, the area was converted into a quarry, where 3 million cubic yards of rock were extracted for construction of the canal. Cerro Ancon remained in the hands of the US for many decades as part of the official US Canal Zone, inspiring many Panamanian demonstrations for independence. Eventually the area was reclaimed by Panama, and today Cerro Ancon represents freedom from foreign powers, and sovereignty which are displayed proudly by the flying of the Panamanian flag atop the hill.

Cerro Ancon is a semi-dry tropical rainforest that is home to 68 species of fauna and over 200 species of flora. The local biodiversity of Cerro Ancon is of particular conservation interest because of the small size of the forest isolated within an urban area, and because of the amount of activity that occurs on the hill on a daily basis. As a result, Cerro Ancon was declared a Protected Area and Conservation Site in July, 2001 by the Acuerdo Municipal N°157. However, despite the hill's conservation status, it is unclear whether goals are being met because illegal human-wildlife conflicts have been reported, and the urban area may still be exacerbating negative pressures on the biodiversity that conservation alone cannot resolve. For this reason, a risk assessment for the fauna, and a possible update to the biodiversity database may be necessary.

Cerro Ancon, now a highly accessible site for tourists and visitors, has a main road leading to the hill's summit, as well as an Interactive Learning Trail for environmental education called *El Caucho*. Both the road and the trail have beautiful views, wildlife, and history to share, yet there is no tangible informative material or sufficient signage to successfully educate and inform the public about Cerro Ancon.

The objectives of this project are twofold. Firstly, we created interpretive material in the form of brochures for both the main road to the top of Cerro Ancon and the Interactive Learning Trail *El Caucho*. The first brochure aims at educating the population about the historical importance of Cerro Ancon as well as its biodiversity and the importance of its conservation. The second brochure aims at enhancing the environmental education resources of the interactive trail for school children: pictures, interesting facts about the ecology or the uses of plants to humans, and interactions between the flora and fauna were among the items included to add to the experience of the trail. The second objective was to create a preliminary risk assessment for the hill's fauna based on negative human impacts on the ecosystem as a whole and on individual fauna.

To accomplish our brochures we had to follow a logical methodology: we familiarized ourselves with the park's history and biodiversity through a thorough literature review, interviews and personal observations. We also had a number of days in the field taking photos of the flora, fauna, and views so that we could incorporate them into the brochures and make them more dynamic. The interviews were very important for distilling what was important to the Panamanians about Cerro Ancon, so that we knew what content to include. After all of our information and photos were edited, we designed aesthetic and functional templates for the brochure to best convey the information to the target audiences.

To undertake our preliminary risk assessment for the fauna, again we completed a literature review, interviewed multiple residents of the hill, made personal observations, and created a survey that was administered to the residents of Cerro Ancon via email. The survey included questions about observed changes in fauna populations, animal deaths witnessed by the residents, and negative impacts of humans on the local environment. Results were compiled and each open-ended response was taken into account individually.

We were able to create the two brochures that we hope will add to the current educational and tourist resources of Cerro Ancon. We also were able to discover trends within the data from our respondents in the preliminary risk assessment, but much more data would need to be collected before the results could be deemed conclusive.

With such a rich cultural history and biodiversity, it is imperative to preserve the splendor of Cerro Ancon. We hope that our projects help to not only enrich the environmental and historical education for visitors, but also help initiate a first step in uniting both the organization of ANCON and the residents of the hill in order to preserve the flora and fauna of the hill.

RESUMEN EJECUTIVO

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El Cerro Ancón es un bosque urbano y también el punto más alto de la Ciudad de Panamá. Este cerro es importante porque tiene una rica historia cultural combinada una flora y fauna variada. Históricamente, el cerro tenía muchos usos y una mezcla diversa de residentes. La colina perteneció a la gente de la ciudad y fue un sitio público desde la llegada de los españoles al Casco Antiguo desde 1673 hasta 1903, cuando los E.E.U.U. tomaron el control del cerro para convertirse como parte de la Zona del Canal. Desde 1903 hasta 1914, cuando el canal se abrió oficialmente, el área se convirtió en una cantera, donde 3 millones de yardas cúbicas de piedra se extrajeron para la construcción del canal. Los E.E.U.U. tomaron el control del cerro por muchas décadas, y desde entonces había muchas protestas panameñas para reclamar la independencia. Eventualmente, el área fue reclamada por Panamá, y hoy el Cerro Ancón representa la libertad del poder extranjero, y soberanía, que es demostrada por la bandera panameña sobre la cima del cerro.

El Cerro Ancón conserva un bosque semi-seco que tiene 68 especies de fauna y más de 200 especies de flora. La biodiversidad local en el cerro es importante para la conservación debido al tamaño pequeño del bosque y a su asilamiento en medio de una zona urbana. En consecuencia, el Cerro Ancón fue declarado como un área protegida en Julio 2001, mediante el Acuerdo Municipal N°157. Sin embargo, a pesar de su estado, no está claro si los objetivos del área protegida están siendo alcanzados porque ha habido muchos conflictos entre los seres humanos y la fauna reportada en el cerro, y las áreas urbanas alrededor añaden presiones contra la biodiversidad. Por esta razón, una evaluación preliminar sobre los riesgos de la fauna del cerro puede servir para reactualizar la base de datos que fue realizada en 1999.

El cerro es un área frecuentada por turistas y visitantes. Existe un camino que se dirige hasta la cima, y también un sendero interpretativo que se llama *El Caucho*. Ambos tienen vistas hermosas, una biodiversidad variada y una historia rica. Sin embargo, no hay ningún material informativo o suficientes señales para educar e informar al público.

Por lo anterior, teníamos dos objetivos para este proyecto. El primer objetivo era realizar dos guías que sirvieran de material interpretativo. Con la primera guía tratamos de educar a la población en general sobre la importancia histórica del cerro, y también sobre la biodiversidad y la importancia de su conservación. Con la segunda guía tratamos de enriquecer las visitas de los niños al sendero interpretativo *El Caucho* a través de fotografías, hechas sobre la ecología o los usos de las plantas para los humanos, e interacciones entre la flora y la fauna. El segundo objetivo fue la realización de una evaluación preliminar de riesgos para la fauna del Cerro Ancón para ver los impactos negativos de los seres humanos sobre el ecosistema.

Para realizar nuestras guías, teníamos que familiarizarnos con la historia y la biodiversidad a través de una revisión de literatura, entrevistas y observaciones personales. También, teníamos muchos días en el cerro para tomar fotos de la flora, fauna y las diferentes vistas que queríamos incorporar en las guías para hacerlas más dinámicas y atractivas. Las entrevistas eran muy importantes para decirnos qué es lo más llamativo del cerro para los panameños, para que supiéramos qué incluir. Después de la recopilación de la información y las fotografías, diseñamos un modelo de la guía para comunicar la información de manera eficiente al público.

Para hacer la evaluación preliminar de riesgos, hicimos otra revisión de literatura, algunas entrevistas, y realizamos una encuesta que fue enviada a los residentes de los alrededores del Cerro Ancón por correo electrónico. La encuesta tenía preguntas sobre los cambios observados en las poblaciones de la fauna, las muertes que se han visto, y otros impactos negativos de la presencia de los seres humanos sobre el cerro. Los resultados fueron compilados y cada comentario fue considerado individualmente también.

Con una rica historia cultural y biodiversidad, es imprescindible de preservar el esplendor del Cerro Ancón. Hemos sido capaces de crear las dos guías y esperamos que se sumen a los actuales recursos educativos y turísticos del Cerro Ancón. También tratamos de descubrir las tendencias en los datos de nuestros entrevistados mediante la evaluación preliminar de riesgos, pero hay muchos más datos que deben ser recogidos antes de que los resultados puedan considerarse concluyentes. Sin embargo, esperamos que nuestro proyecto ayude a iniciar un primer paso en la unificación entre la organización de ANCON y los residentes con el fin de preservar la flora y la fauna del cerro.

1. INTRODUCTION

i. Host institution

The host institution ANCON is a national conservation agency in Panama. The acronym stands for the Asociación Nacional para la Conservación de la Naturaleza. The privately funded organization was started in 1985 by a group of prominent scientists, businessmen, and community leaders (ANCON, 2011). The main goal of ANCON is to conserve biodiversity and natural resources within the country to ensure that the Panamanians of future generations will be able to enjoy the same quality of nature as their ancestors (ANCON, 2011).

One of ANCON's primary methods of conservation in Panama is the protection of biodiversity within protected and conserved areas. ANCON has had an influential role in the creation and maintenance of many of Panama's greatest national parks such as Parque Internacional la Amistad, Parque Nacional Coiba, Parque Nacional Chagres, and Parque Nacional Darien (ANCON, 2011).

ANCON is also involved with many projects throughout the country that attempt to detect environmental change, restore damaged ecosystems, and inspire environmental education. The diversity of projects under the supervision of ANCON includes cleaning of beaches & rivers, reforestation, Rapid Ecological Assessments (REA's), environmental management initiatives, community capacitation, and environmental education (ANCON, 2011). The scope of the projects spans the entire country of Panama (and Costa Rica in the case of Parque Nacional la Amistad).

The main headquarters of ANCON are located on Cerro Ancon itself, which was granted status as a conservation site within the past decade. The goals of our project are in line with the objectives of ANCON because they aim at improving environmental

education at Cerro Ancon and gaining a better understanding to possible threats to biodiversity on the hill.

ii. History context

Cerro Ancon is a dynamic landscape within Panama City that has undergone multiple transformations since the Spaniards relocated at its base in 1673. At this time the hill became a home to some of the first foreign inhabitants of Panama, and served as both a strategic lookout to the Pacific Ocean as well as a source of exploitable flora and fauna. As the city's population augmented in the following centuries, Cerro Ancon continued to be used as an area for timber extraction and hunting, as well as an area of residential development and even briefly as a portrero during which much of the hill's primary rainforest growth was cut down to create pastureland (Dames and Moore, 1999).

A diverse mix of inhabitants continued to access the hill over the years until 1903, when the United States claimed the area as its own for its use in the construction of the Panama Canal. During the next decade large sections of Cerro Ancon were converted into quarry where over three million cubic yards of rock were extracted from the hill to allow the construction of the Miraflores and Pedro Miguel Locks (Dames and Moore, 1999). The project represented the first open-pit mining project in Panama (Russo de Stec, 2011). The quarry permanently altered the shape and size of the hill, and today the only breaks in forest cover are the large, step-like rock faces that remain as a relic to the canal days.

During American occupancy, the hill became inaccessible to Panamanians because of its status as a US military zone. Canal officials and their families, military personnel, and foreign investors all moved to Cerro Ancon to create a new home exclusive to the foreign elite within Panama, inspiring neighborhoods such as Quarry Heights. After the construction of the canal, Ancon remained a part of the US Canal Zone for many decades, evoking tensions between Panamanians and Americans; Panama did not wish to be sequestered by foreign powers within its own borders any longer.

Panamanians wanted to negate the legitimacy of the US Canal Zone by declaring that the area should belong to Panama. In January of 1964, tensions reached a climax. A group of Panamanian high school students attempted to raise the Panamanian flag within the Canal Zone, and were harassed by some American “zonians” living within the region. The small dispute triggered a much larger display of public outcry, and hundreds of Panamanians took to the streets. The US military interpreted the outcry as a riot, and some soldiers opened fire on Panamanians, killing 21 students (Russo de Stec, 2011). Today, January 9th is a national day of remembrance, and many Panamanians climb to the top of Cerro Ancon for a commemoration event.

The tragedy was one of the crucial turning points in the ending of diplomatic negotiations between Panama and the US, which resulted in the beginning of a transitional phase during which the US Canal Zone was returned to Panama via the Torrijos-Carter treaty. Many of the residents of Cerro Ancon began to vacate their neighborhoods starting around 1967 because the area began opening up to

Panamanians, and tensions still existed. The hill became reminiscent of a ghost town until a couple decades later, when a diverse mix of residents began to resettle the empty wooden houses including members of the Panamanian government, and many wealthy Panamanians and foreigners (Russo de Stec, 2011).

Today, Cerro Ancon fully belongs to the people of Panama, which is displayed by the Panamanian flag waving atop the hill, high above the country's capital city. The hill is a symbol of independence and sovereignty in Panama that is greatly appreciated by all those who visit. The area was announced as an official Patrimonial Heritage site of Panama in 2003 because of its cultural significance and historical dynamism (Russo de Stec, 2011).

iii. Biology context

Biodiversity has been shown to increase ecosystem functioning (Duffy, 2009.) and is considered one of the basic indicators of ecosystem health. For this reason biodiversity is often at the core of conservation efforts, such as those at Cerro Ancon, because it is believed that ecosystem services may be diminished if biodiversity is reduced (Loreau, 2010). The concept of biodiversity has multiple dimensions, and is broken down into four main sections by the Global Biodiversity Assessment: ecological, genetic, organismal, and cultural diversity (Heywood, 1995).

Panama holds a large biodiversity for such a small country because of its location as a biological corridor between North and South America, its diverse topography, and its proximity to two very different marine ecosystems. These variations account for a high diversity of ecosystems, species, and genetic resources. Currently,

Panama boasts 10,444 species of plants, 972 birds, 255 mammals, 227 reptiles, and 197 amphibians (ANCON, 2011). Because of the high diversity of organisms and ecosystems in the region, Panama is incorporated into the Mesoamerican biodiversity hotspot, and is thus an important area for conservation.

Cerro Ancon is home to a rich biodiversity of Panamanian flora and fauna. There are 68 animal species, including 39 birds, 15 mammals, 9 amphibians and 5 reptiles (Dames and Moore, 1999) and over 200 plant species. Despite being a small green island in the middle of an urban area, Cerro Ancon has an importance over a larger area. For example, because of Panama's geographical location, many migratory bird species pass by Cerro Ancon, making it essential as a part of a biological corridor. Furthermore, it may be part of a series of interconnected metapopulations, and therefore any impacts on the hill may have repercussions on a larger scale. The isolation of Cerro Ancon can also have other interesting consequences, such as an isolation of gene flow. If the surrounding development has caused limited species movement in and out of the hill, it is possible that this isolation could create allopatric speciation.

iv. Current Situation/Problems:

Tourism, recreation and environmental education

Today, Cerro Ancon is a highly frequented urban forest that provides a recreational sanctuary to the residents of Panama City. Approximately 160 people visit the park for recreation (such as biking, running, or bird watching) and tourism (such as site-seeing) on a daily basis (Mojica, 2010). About 40 cars climb to the top of Cerro

Ancon every day as well, and that may be a burden on the small road that leads to the top of the hill (Mojica, 2010). Cerro Ancon is not only greatly appreciated by the residents of Panama because of its rich history and biodiversity, but also because it is a highly accessible forest in the midst of a large metropolitan area, which is rather rare in Latin America.

Although the hill remains a popular destination in Panama, its tourism resources are not adequately developed. The top of the hill has benches, gazebos, picnic tables, and some key memorials such as the statue of the poet Amelia Denis de Icaza, however, it still lacks a concrete and tangible brochure to introduce the hill overall. Visitors may come to see the biodiversity, views, and monuments without receiving much information about them, and thus more educational resources need to be provided to the visitors of Cerro Ancon.

One part of the forest where information is provided to visitors is the Interactive Learning Trail called *El Caucho*, located near the headquarters of ANCON. *El Caucho* is a 370-m trail that is used to educate the Panamanian youth about the country's biodiversity, as well as the importance of environmental stewardship (Del Moral, 2008). Many enigmatic flora and fauna of Panama can be viewed on the trail, giving the people of Panama City an excellent chance to see spectacular wildlife right in their own backyard. Currently on *El Caucho*, there are nine trees and plant species that are important to Panama that have been marked with signs that display their common and scientific names. Guided walking tours for children currently facilitate the transference of environmental education and information about the trees and other biota. While these

tours are interactive and informative, the trail lacks a interpretive material that provides concrete information, photos, and facts to the children.

Biodiversity threats

Cerro Ancon was announced as a Protected Area and Conservation Site in 2001 by *el Acuerdo Municipal N° 157* but its status was not entirely official until 2007 (Russo de Stec, 2011). The decree states in one section: “queda prohibida la caza, tala, quema, recolección y destrucción de los recursos naturales, así como cualquier otra actividad que atente contra el buen uso de la reserva natural, de acuerdo a lo establecido en el artículo 2 del presente Decreto Municipal” (Suaza, H.G. 2007). ANCON, residents, and Panamanians in general all supported the conservation effort because no one wanted to witness a site of historical, cultural, and biological significance fall victim to more development projects within the city. For example, in 2003, tourism development projects on top of Ancon Hill were proposed. These included a restaurant, a bird aviary, a botanical garden, different commercial sites for selling handicrafts, and perhaps the most significant of all, a cable car connecting the Amador Causeway to the top of Ancon Hill (Jackson, 2009). These projects would have required the use of 600m² on top of the hill for the different establishments and the flow of visitors on the hill would have gone from 50 to 300 visitors/day. The project was cancelled (La Estrella, 2009), largely because of a lack of support from the local community, demonstrating a collective wish to maintain the hill as is.

However, despite the hill’s status as a conserved area, and the apparent conservation-oriented mindset of the residents, its proximity to the city and the amount

of activity that occurs on the hill brings into question whether or not the conservation efforts are achieving their goals.

Residential homes, El Hospital Gorgas, El Corte Suprema de Justicia, and businesses fully surround the base of the hill. Because there is a substantial residential population and substantial infrastructure enclosing Cerro Ancon, it is feared that the flora and fauna may be at risk. This project attempts to elaborate on the potential threats the surrounding urban area and its inhabitants have on the biodiversity of Cerro Ancon.

One of the potential risks to biodiversity in Cerro Ancon is the amount of human-wildlife conflicts that may take place, whether they are accidental or not. Negative human-wildlife conflicts could include car accidents, illegal poaching, tree felling, animal abuse, or habitat destruction. While only negative conflicts may endanger the biological populations of Cerro Ancon, it may also be important to question what effect positive interactions may have on the populations; perhaps the residents have cared for certain animals for so long that they may now depend on them. Positive interactions between humans and wildlife could include feeding the animals, providing drinking water, or providing habitats (i.e. under the houses).

Direct conflicts between humans and the biota of Cerro Ancon do not constitute the only potential threats. Disturbances in the ecosystem itself could occur due to climatic variations, scarcity of resources, or low genetic diversity. Panama recently experienced one of the worst rainy seasons on record, and biologists are still trying to distill what the true consequences for animal and plant populations may be (Stefanski et al. 2008). Scarcity of resources on Cerro Ancon is not unlikely either because the forest

is isolated by the surrounding urban landscape, resulting in many animal populations sharing a finite area for foraging. Additionally, scarcity of water may be prevalent, seeing as the hill has no natural water source apart from rainfall (Dames and Moore, 1999).

Since Cerro Ancon is located directly in the middle of the city and also supports inhabitants, there are many effects that development and pollution could have on these urban forests and its populations, such as the alterations of forest cover, structure and function (Guedes-Bruni and Oliveira, 2010).

2. OBJECTIVES

Because Cerro Ancon currently lacks tangible information and sufficient educational resources for visitors, our project attempts to correct this deficiency through the creation of interpretive material. One of the main objectives of the interpretive material is to increase the environmental education experience for visits in the Interactive Learning Trail. In addition, the interpretive material should increase environmental education by stressing the value of conserving the biodiversity of the hill. Another important objective is to provide visitors with a basic understanding of the history, cultural significance, and biodiversity of Cerro Ancon. Overall, we attempted to enrich all visitors' experiences in Cerro Ancon by creating informative, engaging and tangible material that they will be able to bring home.

Secondly, in 1999, the Dames and Moore Company created a complete database of the biodiversity, a compilation of all plants and the 68 different animal species in Cerro Ancon. However, it was created over a decade ago and may not be

representative of the current situation of the area. ANCON has given us the objective to learn about the various human-wildlife conflicts occurring on Cerro Ancon and consequently note any reasons for potential changes in flora and fauna that have occurred. Updating the database will allow ANCON to keep track of the impacts of development plans in and around Cerro Ancon. Finally, we will also attempt to make links between what is occurring on the hill and its location within the greater urban ecosystem.

3. METHODS

i. Study Site

Our study site was located in Cerro Ancon. More specifically, our fieldwork was carried out in the two main trails of the hill: the Interactive Learning Trail *El Caucho*, and the main road going to the top of the hill. Furthermore, our study area also covered the Quarry Heights neighborhood located on the skirt of the hill. Most of our research was done in the Smithsonian Tropical Research Institute Tupper station and the administration offices of ANCON, since these two locations held an extensive database of resources, such as books, research articles and various reports crucial to the completion of our project.

ii. Interpretive material

The first step in the creation of the interpretive material for ANCON was the selection of content. Since there was too much information to encompass into a single brochure, we proposed that two separate brochures be created; one for *El Caucho* and

the other for the road leading to the peak of the hill. The first one will serve as support for the guided tours in the interactive trail, with an emphasis on the biodiversity of Cerro Ancon. It features the trees present in the trail, with interesting facts, photographs and characteristics about them and the different relations they have with the fauna. The second brochure will have an emphasis on the history of the hill and general information about its cultural importance and will feature photographs of the hill and of its vantage points over the city.

Since the potential audience for this interpretive material was too broad, the next step was to determine the target audiences for the two different brochures. Since the first brochure was created with the purpose of supporting *El Caucho*, the targeted age group for this brochure will be mostly children, as most visitors of the interactive learning trail are young school children in school field trips. The second brochure will cater to an older public, such as adults and tourists.

Once the focus of the two brochures was delineated, we gathered all the information for the text content. Through literature review, we looked at the plant species to feature, and collected facts about their biology and relationships with animals. We researched methods of identification for a few trees in *El Caucho*, and looked at the different uses of the fruits, seeds and wood. Discussions with the ANCON staff, many of which who have a biology background (e.g. botanist, ornithologist), provided us with additional information to add in the brochure. We also had discussions with the staff members responsible for giving the guided tours to the children, and they helped us note what aspects to focus on when dealing with children as a target

audience. Most of the information for the second brochure was gathered through interviews with the residents of the hill, which enabled us to learn more about the historical and cultural significance of Cerro Ancon. We also conducted a literature review of all the current periodicals about Cerro Ancon and its status, residents, and history.

In order to add visual support to the information compiled, photographs of key animal and plant species and of the different viewpoints of the hill were taken. To create images with a quality sufficient enough for presentation in a brochure, most of the photographs were taken on days where lighting was diffuse, avoiding harsh overhead direct sunlight. Discussions with the ANCON staff also helped us determine not only the best time of day but also the best locations to find the animals. For example, the mammals such as the ñeques were much more active during the late afternoon, when the temperature was lower. The poison dart frogs, absent during a hot dry day, became abundant right after rainfall. Furthermore, the staff helped us recognize a few birdcalls, such as the toucan's, in order to locate them more easily. The next step was simply returning to the field very often and waiting for long periods of time until photographs of all chosen animal species were taken. Photographs were only satisfactory when the animals were placed in front of a clean uncluttered background. Motion blur or lack of sharp focus resulted in the images being discarded. For the animals that were not encountered (e.g. White tailed deer), a visit to Parque Summit allowed us to photograph them. The photographs of the viewpoints of the hill were easier to take, as they only required photography in a day where the light was aesthetically pleasing. The equipment used for this process included a Nikon D7000 camera and a variety of lenses

including a Nikon AF-S 70-200mm f/2.8 VR telephoto lens, a Nikon AF-S 105mm f/2.8 VR macro lens and a Tokina 12-24mm f/4.0 wide-angle lens, as well as a 725B Manfrotto Tripod.

After the information gathering process, the content was narrowed down to the most relevant and interesting pieces of information in order to fit the template and avoid an overly wordy brochure. Out of the fauna photographed, we selected what we considered to be the most popular animals from the general impressions we received from the ANCON staff and the animals featured on their websites and posters. The remainder of the photographs were compiled in a photo database and given to ANCON for future use.

The different software used included Adobe Photoshop Lightroom 3.3 for the editing of the photographs (cropping, white-balance and contrast adjustments) and Microsoft Word for the creation of the brochure. The selected brochure template was a simple tri-fold (Figure 1) brochure. It was selected because it is the simplest format using standard sized paper and would minimize the printing cost for ANCON.

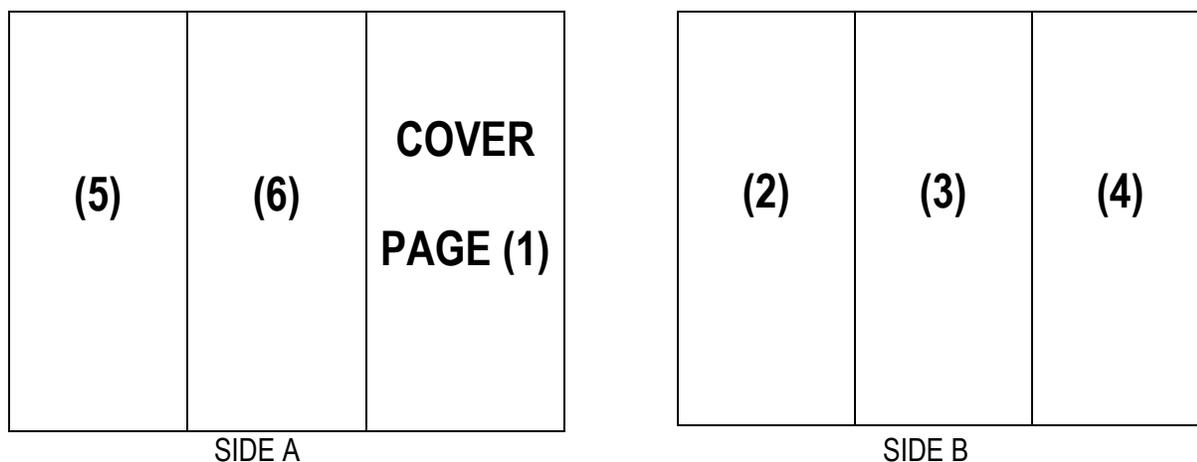


Figure 1. Tri-fold format used for brochure. The numbers represent the order in which the brochure will be read.

Different templates were formed in order to find one that is aesthetically pleasing, easy to read and best fits the organization's vision. One prototype was printed and presented to the institution, as well as the digital files for batch printing.

iii. Preliminary biodiversity risk assessment

In order to realize a preliminary biodiversity risk assessment that was feasible in our time frame, we decided to create this risk assessment with an emphasis on the hill's fauna. We then started a literature review, including a thorough review of the report by Dames and Moore (1999), to determine what the main risks to biodiversity at Cerro Ancon were, and which species were the most vulnerable. Because it was not feasible to note quantitative changes in the fauna populations since the Dames & Moore report in only a few months, we structured our research around the collection of qualitative and anecdotal data from the residents as a proxy for possible changes. In order to assess the status of human-environment relationships, the various potential threats, the different changes in species composition and compile eye-witness accounts, we conducted a series of interviews with the residents of Cerro Ancon. We also created a survey with the same questions, in order to reach a larger audience, and this survey was sent to the email list of the residents of Quarry Heights (Appendix I).

While conducting interviews and research, the McGill University *Code of Ethic* was closely adhered to. All respondents were informed that all information was only for educational purposes, no question was compulsory, and no respondents had to give

their name. Also, no animals were harmed during our photography or observations, and all material produced is for educational and investigative reasons.

4. RESULTS

Our interviews and survey allowed us to get a general impression of the changes in animal populations, the potential threats and pressures to biodiversity, and general opinions about development projects in Cerro Ancon from a total of 14 respondents. First, we listed a series of animal species (which were selected based on relevance) and asked respondents to answer if they had witnessed 1) a decrease, 2) an increase, or 3) no change in the animal populations, or if they 4) didn't know. The responses are summarized in Table 1. Out of all respondents, 1 had not lived in the neighborhood for more than 5 years, and therefore the respondent's responses were not considered in this table.

ANIMAL SPECIES	TREND WITH THE HIGHEST RESPONSE IN THE LAST 5 YEARS
Ñeques, deer, iguanas, armadillos, boas, parakeets, mono titi	Decrease
----	Increase
Squirrels, toucans, hummingbirds, vultures	No change
Amphibians, bats, migratory hawks	Don't know

Table 1. Overall trends of Cerro Ancon's fauna based on the highest responses from 13 respondents.

For observed trends in deer populations, all 13 respondents reported a decrease. The 14th respondent not included in the table reported no change. On the other hand, the species with the least amounts of reported decreases are the bats and vultures; only 2 respondents each reported decreases.

We also inquired about the potential trends and pressures in biodiversity threats to Cerro Ancon. The potential threats revealed by the anecdotal data include abuse of animals, disturbance of plants, tree cutting, and littering, with littering being the most commonly witnessed (92% of respondents).

Another existing human-fauna interaction is animal feeding, as 8 out of the 14 respondents reported that they did feed animals. Feeding included both having bird feeders (seeds and juice) and giving fruits and vegetables to ñeques, mono titis and bats. Respondents were asked to report observations about what they saw the animals doing on their own property. Responses included 1) ñeques feeding, drinking and taking shelter under houses, 2) birds feeding and drinking, 3) vultures foraging in the garbage, 4) iguanas drinking in the pool and 5) squirrels foraging.

Respondents were then asked to report animal deaths resulting from human-wildlife conflicts. Table 2 shows a summary of all eye-witness accounts.

TYPE OF INCIDENT	ANIMALS
Car accidents	Ñeques, deer, iguanas, boas, armadillos
Hunting	Ñeques, deer, iguanas

Table 2. Animal deaths and type of incident reported on Cerro Ancon.

Finally, respondents were asked to voice their opinions concerning the cable car and tourism development projects proposed in the recent past. All of the respondents were opposed to the idea of increased tourism resources on Cerro Ancon, with the majority declaring that Cerro Ancon should remain a pedestrian site. Although all of the respondents felt the same way about the project, the reasons for their sentiments were varied.

5. DISCUSSION

i. Limitations

With a relatively small sample size, we must be cautious not to assume that this anecdotal data truly represents the actual changes in the species abundance. Moreover, the animal deaths witnessed and reported might have been from the same incidents, and therefore an overrepresentation is possible. Also, it may be dangerous to automatically conclude that a species is at risk because there were large numbers of deaths reported; a species may simply have more fatal encounters with humans because its population is increasing, and as the habitat space becomes limiting, they are more abundant outside of their natural range. Likewise, the reverse may also be true. A species that has not been witnessed in fatal encounters with humans is not necessarily doing well; the populations may already be so low that the encounters with humans are rare. Also, there could be stochastic reasons for variations the observations of animal populations within the last few years such as irregular weather or disease, so we must be cautious to not blame only human-environment interactions for reported changes. For instance, one respondent said that there used to be more deer in the dry season than there are now, however, this could be due to the fact that deer used to

come down to look for water, yet with more precipitation in the last few dry seasons this was no longer a necessary trip for the deer to make. It is important to keep these limitations in mind as we analyze our data in order to not make any false conclusions.

ii. Changes observed

The results here are interesting, as the survey may have been biased in the way it was formed, since by asking questions about biodiversity threats, the respondents may have been likely to report more decreases than observed. However, a few species, such as hummingbirds, migratory hawks and bats could have been considered as control species, since, while still possible, there is no evidence of a decrease from recent reports. Therefore, a respondent indicating decreases in all animals may have had reduced credibility, but no such respondent existed.

All 6 species considered in danger of extinction, which include the ñeque, white-tailed deer, 9-banded armadillo, boa, iguana and mono tití (Paredes, 2004; Dames and Moore 1999), were found in the seven species whose trend was described as decreasing, according to the highest number of responses. Moreover, the seventh species with a decreasing trend, the orange-chinned parakeet, is listed as a II-species under the CITES species database, meaning that the species is flagged and “trade must be controlled in order to avoid utilization incompatible with their survival” (CITES, 2011). We must take the resident’s observed changes with caution, because if they were previously aware of the risk of extinction the animals were under, they may have described a species as decreasing despite not seeing any changes.

A noteworthy species was the deer, as the respondents all declared a decrease in the past 5 years. Interestingly, the 14th respondent had reported no change, possibly because with the population driven down so low, deer sightings may have become very rare in the neighborhood. The bats and vultures low responses in decreases are also interesting. It is understandable that bats are harder to see since they are usually only visible at night. This may explain the lack of “decrease” responses, with the majority of residents indicating that they did not know if there were any changes. The vultures, however, which are much larger and easily seen, may have an interesting underlying reason behind the lack of “decrease” responses they received. Being scavengers usually seen around dead carcasses, high numbers of animal mortalities in the neighborhood may have maintained a consistent population of vultures, which have been observed in the recent years.

iii. Biodiversity threats

The results regarding the threats to biodiversity were fairly consistent among the respondents. Almost all residents noted littering, while the majority also noted animal abuse. This data suggests that while Cerro Ancon is a conservation site, the large population that lives on it and visits it places urban pressures on the ecosystem. Urban pressures may impact biodiversity such that ecosystem services are degraded, or conversely, impact the ecosystem services directly so that the populations are negatively affected (Loreau, 2010).

The feeding of the animals is interesting because while it is not necessarily a threat to the biodiversity of Cerro Ancon, it still a human-wildlife interaction that may be

important to the populations. The majority of responses regarding animal behavior on private property noted that animals tended to come to the houses to feed, drink, or for shelter. The fact that wild animals are feeding on the residents' property may indicate scarcity of resources within the forest of Cerro Ancon, or it could simply indicate that food is easier to come by in the neighborhood, seeing as some residents reported having fed the ñeques, deer, or iguanas directly. The animals were also reported as coming to forage in the lawn and garden for fallen seeds from trees. This could either mean that the lawns and backyards of Quarry Heights are simply part of the animal foraging area on Cerro Ancon, or that perhaps animals tend to forage in open areas because more food can be found in a shorter amount of time when compared to foraging on the forest floor.

A couple respondents also mentioned that ñeques liked to make shelter in the foundations of many of the homes in Quarry Heights. Further, in one survey a man suggested that there might be less ñeques today than there were ten years ago because many people have rebuilt their wooden foundations with concrete, displacing many families of ñeque in the process that are unable to burrow beneath cement.

Animals coming to the residences for drinking water were also reported, which is interesting considering Cerro Ancon has no natural water source aside from rainfall (Dames & Moore, 1999). Iguanas, birds, deer, and ñeque all come to drink from the swimming pools, hoses, bird feeders, and even pot-holes in the street. Once again, this could suggest that foraging for water is potentially easier within the neighborhoods than within the forest. Water scarcity is of particular interest during the dry season when precipitation is the lowest, and since this is the season in which the survey was taken,

noted behaviors may have tended to swing towards those that occur in the dry season rather than those of the rainy season.

The majority of respondents reported the same animal deaths, being primarily ñeques, deer, armadillos, boas, and iguanas. Short anecdotes were given for each death, which helped to reveal a number of drivers behind the unfortunate trend. The majority of deaths reported were animals that had been run over by vehicles. Numerous residents hypothesized that these deaths were largely due to speeding, and a lack of enforcement of the speeding laws on Cerro Ancon. One resident also claimed that traffic had been increasing in the neighborhoods and on the main road to the top of Cerro Ancon, which had resulted in more animal deaths in recent years. This last observation is in agreeance with one of the security guards at Cerro Ancon who claimed that often times the road to the top of the hill is over-capacitated (40 cars a day when there should only be 8) (Mojica, 2010).

The other type of animal death reported was death by poaching. Poaching responses were different in the survey than car accidents because residents mainly reported having seen the poachers themselves, and not the dead animals. People reported having seen poachers hunting in the forest and from their trucks on the main road with firearms. Most residents believed that the poachers were primarily targeting ñeque, deer, and iguanas. Again, the residents hypothesized that this illegal activity was occurring because of a lack of law enforcement; some residents even claimed that police were directly authorizing poaching, or in one case, participating in the poaching of ñeques themselves.

Therefore, both types of animal deaths reported have been attributed to a lack of strict law enforcement on Cerro Ancon. It will be very difficult to achieve the conservation goals of Cerro Ancon if laws are not strictly enforced, and if there is any increase in illegal activity within the area.

The final threat to biodiversity that was covered by the survey was tourism and development projects, and in particular the overall sentiments of the residents toward these projects. All of the residents were opposed to the project and supported preserving Cerro Ancon as is. Some of their reasons given included the negative environmental impacts that projects would have, the increase in tourists to the hill, and the dangers to the flora and fauna that more cars in the area would bring. In addition, one respondent mentioned that in the Supreme Court the leaders of the project had even proposed that Cerro Ancon's status as a Protected Area be revoked, which upset the respondent and his neighborhood friends. Thus, there is a neighborhood consensus in favor of preserving Cerro Ancon for what it is today. However, this consensus will not help the biodiversity conservation initiatives of Cerro Ancon unless neighbors actively report any illicit activities and remain vigilant on behalf of their local flora and fauna.

iv. Implications

While these reports may not empirically prove anything, they should still be taken into account under the precautionary principle. As an isolated island with little migrants, it is imperative that these population levels be maintained. Otherwise, the numbers may drop under a threshold level that will prevent them from being able to recover to a normal population size, even with the pressures removed. Furthermore, the implications

of biodiversity loss on Cerro Ancon have repercussions that may affect more than just the hill, since it is used as a sanctuary for many migratory bird species. The loss of biodiversity may also threaten the cultural ecosystem services that the hill provides, such as the recreational purposes, environmental purposes, and the cultural and existence values.

6. DESCRIPTION & DISCUSSION OF INTERPRETIVE MATERIAL

i. Description

In both brochures, careful attention was paid to the formatting in order to present the information in an uncluttered way. The text was separated in different short sections, and placed into bubbles to prevent excessively wordy pages. This also allowed viewers to take breaks in between reading and appreciate the views. The brochure for children included more colors and was less text heavy than the second one. Each page had a different color theme, but the formatting remained the same for every page in order to prevent confusion (Figure 2).



Figure 2. Example of the formatting and color theme used in a) the brochure for *El Cacho*, aimed for a children audience and b) the general brochure about Cerro Ancon.

The cover pages for both brochures were created in a way to make them consistent, using a similar general layout, and paying recognition to our host institution of ANCON.

In the brochure for *El Cacho*, the 9 trees and plants of the Interactive Learning Trail were featured: árbol Panamá (*Sterculia apetala*), estrangulador (*Ficus obtusifolia*), caucho (*Castilla elastica*), jobo (*Spondias mombin*), barrigón (*Pseudobombax septenatum*), membrillo (*Gustava superba*), oteo lagarto (*Dieffenbachia longistpatha*), filodendro (*Philodendro Heredaceum*) and caña brava (*Bactris major*). Instead of creating a separate section for the hill's fauna, we decided to include the information about the animals by presenting the different interactions between the flora and fauna.

For example, we mentioned how the spines of caña brava could be used as herbivory protection from grazers such as deer, how poison dart frogs can use the pools of water accumulated in oteo lagarto, and how bats pollinate the barrigon's flowers. In addition, we added information to help the children recognize and identify the plants, such as showing them how to recognize the "eyes" of the caucho or the distinct green stripes of the barrigón. We included both common and scientific species names, and the various uses of the wood, seeds or fruits. To make children be more engaged, we added uses that were familiar to them. For example, instead of showing how the árbol Panama wood could be used for furniture, we mentioned that the wood was used to create popsicle sticks. Likewise, the uses of rubber from the caucho tree included the formation of balls for sports by indigenous people, rather than for tires. We tried varying the information about the trees: in some we mention how the seeds are dispersed, in others, how they grow, and in others, how humans and animals use them. Additionally, to increase the dynamism of the toured visits, we included a few questions to engage them. For example, we challenged the children to count the number of caucho trees in the trail and told them listen to the water drops by leaning their ear against the barrigón's trunk.

The second brochure contained more general information about the hill, including its historical, cultural and biological values. In the section focusing on the historical and cultural importance of the hill, we included the uses of the hill during the construction of the canal, its history of inhabitants, the events of January 9th 1964 and the origin of the hill's symbol of independence to Panamanians. We considered the history a very

important aspect of the hill, and hoped that the guide would increase general awareness about its interesting history.

The second section presented the biodiversity of Cerro Ancon, the importance of conserving it and the different threats it is under. This is another way to increase general knowledge about the park while creating more opportunities for environmental education, which is very important within Panama. Finally, there is a section on the different sites and views we can observe when visiting Cerro Ancon, including photographs, so that visitors can better orient themselves within Cerro Ancon, Panama City, and Panama as a whole.

ii. Discussion

Learning about local biodiversity and ecological interactions is meant to foster a caring relationship between the children and their environment. Research suggests that when children make even short educational trips into natural ecosystems, they tend to make more environmentally informed decisions than those children who were not given the same experience (Bogner, 1998). By creating tangible learning material for the children, it will help make their visit at Cerro Ancon more memorable. Before this brochure, the only visual support present in the Interactive Learning Trail was a poster at the entrance, and a small sign displaying the common and scientific name of 9 plant species. Furthermore, this is one small step towards the many advances ANCON has been making in order to increase environmental education and awareness. We hope that by featuring trees and plants as the main attraction, adding fun facts and interesting characteristics about them, we can make the children excited about the flora, rather

than just the fauna, that usually gets more attention. The brochure will also help ANCON to make their Interactive Learning Trail more interactive, as we included ways to make the children engage with the different trees and plants. We hope that in the end the brochure will contribute to the children's environmental education, as they will be able to recognize the plants featured and be able to understand a little more about the flora-fauna relationships, and in turn foster a caring relationship with their local biodiversity.

The second brochure will be useful for tourists who may have no idea about the history and significance of the hill. Again, it will also help enrich the visitor's experience by having tangible material they can bring back home. By showing its cultural importance, we could help spread the Panamanian's appreciation of Cerro Ancon to visitors. The section on biodiversity will make readers more aware of the different threats present and help them realize the importance of conservation. Finally, the brochure will also serve to explain the different views that visitors may see in their visit.

7. RECOMMENDATIONS

i. Interpretive Material

When the brochures will be completed and printed, we think ANCON should have a better way of distributing them to the public. Currently, small pamphlets can be found in the administration offices, but visitors will rarely enter the building. Having a stand near the entrance with the brochures will increase their accessibility. An additional suggestion is to put them near the entrance where the security is, so that it cannot be missed. This stand could not only provide visitors with the brochures but also have clear

indications of the two trails present on the hill, as very few directions are currently present.

Visits to the Punta Culebra marine station of the Smithsonian Topical Research Institute revealed how much more engaging and interesting biology-based tours can be. Currently, visits to *El Caucho* must be pre-arranged through reservations and most visits include a guide. Most visitors will most likely not have time to go through these logistics, and will eventually miss out on the Interactive Learning Trail. An open, free, display such as the Punta Culebra exhibits is much more accessible. Furthermore, this STRI station displays interactive signs that are not only educational but also engaging (Figure 3), by allowing visitors to participate and learn in a more dynamic way.

Since Cerro Ancon only has signs displaying the species names, the staff member giving the tour must provide most of the information in the visits. We think that the brochure, in addition to more complete and informative signs, could make *ElCaucho* more self-sufficient, and visitors could learn by themselves without having to book a guide if they don't want it. Furthermore, leaving the trail open at all times would increase the accessibility of the trail, and visitors who would usually just visit the top of the hill may also appreciate the interactive trail. On the summit of the hill, there are many benches for visitors to rest on and relax, and the informative material is limited to the Cerro Ancon poem by Amelia Denis de Icaza and her statue. Having more educational information about the history of the hill in the form of signs or poster can help enrich the visitors' experience.

Today, toured visits mostly talk about the biodiversity present in Cerro Ancon and the ecology. We think that a stronger emphasis could be put on the conservation and

the potential threats. This is the direction we feel like the environmental education should be going towards, and it would complement the biodiversity and conservation section we have presented in the Cerro Ancon brochure.

ii. Preliminary Biodiversity Risk Assessment

Finally, we think that our preliminary risk assessment was a good first step to unite the residents of Quarry Heights, give them a voice and contribute by helping ANCON with eye-witness accounts. Furthermore, out of all respondents, only a few had indicated that they often received news from the organization. By being more in touch, the community and ANCON could collaborate more in order to fight against development projects, such as the cable car project, that could threaten the biodiversity of the hill that all of its inhabitants want to preserve.

In order to determine the actual biodiversity of Cerro Ancon, we would recommend that a similar report to the one carried out by Dames & Moore be implemented. Because we lacked the time and expertise to collect quantitative biodiversity measures or changes in animal populations, we would suggest that any new report be another step in a long term monitoring project of the biodiversity of Cerro Ancon. Further, while anecdotal data was helpful in determining possible drivers of biodiversity change on Cerro Ancon, we recommend that a quantitative analysis be taken if ANCON makes it a goal to determine the current status of the populations in the area.

8. ACKNOWLEDGEMENTS

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Lastly, we would like to thank our internship advisors and mentors, Kecia Kerr, Roberto Ibáñez, and Rafael Samudio, for their direction, helpfulness, and feedback.

9. TIMELINE

Month	Field work days	Research Days	Total Days	Total Hours
January	2	2	4	32
February	2	3	5	40
March	2	5	7	56
April	4	9	13	104
Total	10	19	29	232

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11. APPENDIX

Appendix I. Survey sent to the residents of Quarry Heights.

ANCON fauna survey

1. How long have lived in the neighborhood?

2. Do you often receive news from ANCON?

3. Which of the following have you witnessed in the neighborhood or heard of?

- Abuse of animals
- Disturbance of plants
- Tree cutting
- Littering
- None of the above
- Option 6

4. In general terms, the frequency of animals you have observed since you were here has...

- Increased
- Decreased
- Not changed
- Don't know

5. How often do you visit Cerro Ancon?

- Each day
- Each week
- Each month
- Each year
- Never

6. Change in animal sightings

Select the changes you have observed in the following animals in the past five years (or from the time you moved here until today if it is under five years).

	Increase	Decrease	No change	Don't know
Neques	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Deer	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Iguanas	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Armadillos	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Amphibians	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Squirrels	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Boas	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Bats	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Toucans	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Parakeets	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Hummingbirds	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Mono Titi	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Vultures	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Migratory Hawks	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

6a. If you have observed changes in sightings of animals not included in the list above, please describe them.

7. Are there animals you feed?

Ex: leaving food outside your property, having a bird feeder, etc.

8. If you have observed animals on your property, what were they doing?

Ex: feeding on bird feeders, drinking, foraging in the lawn/garden, foraging in the trash, etc.

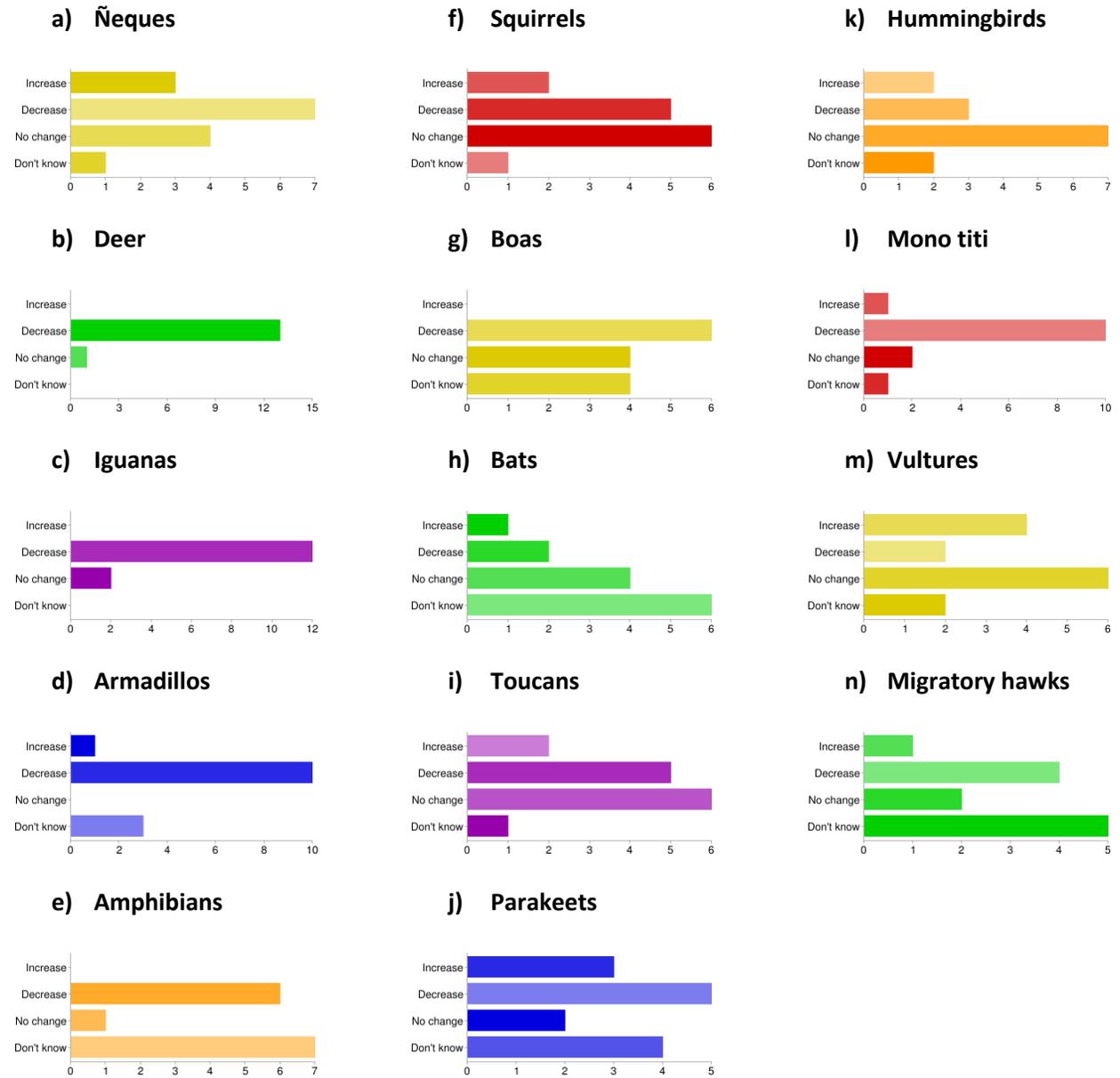
9. Have you heard of or witnessed any animal deaths? If so, please describe an estimate of the total number, time, and the circumstances. You can use the list from earlier for examples of animals.

Ex: 8-10 iguanas run over by cars in the past 3 years.

10. What is your opinion on the tourism projects (cable car, and more) proposed a few years ago?

Submit

Appendix II. Changes in faunal composition of Cerro Ancon witnessed by the residents of Quarry Heights.



Appendix III. Brochure for the Interactive Learning Trail *El Caucho*.

&

Appendix IV. Brochure for Cerro Ancon.

FILODENDRO

Philodendro hederaceum

Filodendro es una enredadera que crece en los árboles, vallas o plantas y, a diferencia del Estrangulador, este sólo utiliza los árboles para tener apoyo y no matarlos. La planta por lo general empieza su vida en la parte superior de la cubierta donde se producen raíces aéreas con el fin de obtener los nutrientes. A medida que crecen bajan hasta llegar al suelo de donde será capaz de obtener los nutrientes. Tiene hojas que crecen en formato de corazón, son tan especiales lo que explica porque el filodendro es una planta ornamental tan popular.



CAÑA BRAVA

Pseudobombax septenatum

¡Ten cuidado! Las largas y duras espinas de esta palma son una de las razones por las cuales usted debe tener mucha atención en donde pone sus manos cuando está caminando por los bosques. Aunque estas espinas pueden ser peligrosas para nosotros, ellas son esenciales para la supervivencia de caña brava. Ellas sirven como protección contra los depredadores herbívoros como el venado. Mientras que otras plantas utilizan productos químicos para evitar la herbivoría, esta palma posee sus espinas para mostrar que es muy brava.



LOS ANIMALES

TUCÁN PICOIRIS

Ramphastos sulfuratus



PEREZOSO 3 DEDOS

Bradypus variegatus



MONO TITI

Sapajus Geoffroyi



RANA VENENOSA

Dendrobates auratus



ÑEQUE

Dasyprocta punctata



TANGARA AZULEJA

Thraupis episcopa



TIRANO TROPICAL

Tyrannus melanchallus



SANGRETORO

Ramphocelus dimidiatus



VENADO COLA BLANCA

Odocoileus virginianus



TANGARA VERANERA

Piranga rubra



...¡Y mucho más!



ANCON

Asociación Nacional para la Conservación de la Naturaleza

Sendero El Caucho

¡Bienvenidos al sendero El Caucho!

El Cerro Ancón tiene una gran biodiversidad con 68 especies animales y muchas más plantas. Con este guía, usted podrá ver algunos árboles destacados del sendero y aprender un poco más sobre su biología y su enlace con la fauna del Cerro.

LOS ÁRBOLES DEL SENDERO

ÁRBOL PANAMA

Sterculia apetala

Se puede reconocer este gigante y majestuoso árbol por sus distintas y hermosas flores pequeñas de color amarillo-rojo, o tal vez si usted ve este árbol al final de la época seca, verá el suelo cubierto profusamente con hojas del árbol Panamá. Las semillas son deliciosos bocadillos para los animales como insectos, ardillas y monos. Sin embargo, los animales no son los únicos que hacen uso de este árbol. Los seres humanos lo utilizan también: su madera es utilizada para hacer muchas cosas diferentes tales como canoas, cajas de empaque, formalitas, espátulas de médico y hasta mangos de helado.



BARRIGÓN

Pseudobombax septenarium

El tronco en forma de barril y sus distintivas rayas verdes hacen que el barrigón se destaque en el bosque. Sus grandes flores blancas producen un néctar que atrae a los murciélagos y en cambio, los murciélagos les ayudan a polinizar las flores. Las semillas están adaptadas para ser fácilmente transportadas por el viento, ya que las fibras pueden flotar como globos. El tronco del barrigón puede almacenar una gran cantidad de agua: ¿sabía usted que a veces se puede escuchar las gotas de agua, si usted presiona la oreja contra el árbol?



ESTRANGULADOR

Ficus obtusifolia

El estrangulador es uno de los árboles más únicos que vas a ver. Las aves ayudarán a dispersar las semillas, y cuando la semilla cae en la grieta de un árbol, se inicia el proceso de estrangulamiento. El árbol comenzará a crecer hacia abajo, envolviéndose alrededor del árbol huésped. A veces podrá ver estranguladores con el tronco hueco o vacío. Esto indica que han pasado muchos años y el árbol se asfixió, no recibió los nutrientes y la luz solar, por eso se ha descompuesto.

CAUCHO

Castilla elastica

Este árbol es el árbol destacado del sendero interpretativo. Se puede reconocer por su tronco distinto con pequeños "ojos" que le cubren. Los indígenas utilizaban el hule para hacer ropa impermeable, así como pelotas para deportes. Al látex puede ser visto sangrado de la cajuela cuando se corta, y cuando esto se mezcla con el jugo de un pejuco que se llama *Ipomoea alba*, la mezcla crea caucho. Esto es la razón por la cual el caucho se denomina de esta manera. Ahora, utilicen sus ojos para buscar los ojos del caucho, ¿cuántos árboles pueden encontrar?



JOBO

Spondias mombin

Antes, las flores y la corteza del jobo se utilizaban para diferentes usos medicinales contra los dolores de garganta, la fiebre malaria y la congestión. Este árbol, capaz de crecer hasta alturas de 30 m, es vulnerable a ataques de termitas y a los Hongos del Azulado de la Madera. La madera es excelente para la leña y para la producción de papel. Pero lo más valioso de este árbol son sus deliciosos frutos. Se utilizan para producir jarabes, helados, gelatinas y bebidas.



OTOE LAGARTO

Dierffenbachia longispatha

Otoe lagarto es una hierba monoica del sotobosque y sus hojas grandes lo hacen ser reconocida como una atractiva planta ornamental. Cuando llueve, el agua se recoge en las axilas de las hojas y en estas cuencas de agua, las ranas como la rana venenosa pone sus huevos. La planta también tiene una relación especializada con los escarabajos, ya que ayudan con la polinización de la planta.



MEMBRILLO

Gustavia superba

Este árbol es conocido por sus hermosas y grandes flores y largas hojas. Una característica interesante es que las ramas no son comunes en el membrillo. Las hojas se irradian desde la parte superior del tronco, generalmente desde 6 a 10 metros de altura, parecido a una palma. Muchos animales como los ñeques consumen las semillas del árbol. Sin embargo, a veces ellos las entierran para las reservas y si se olvidan de recuperarla, ¡un nuevo árbol puede nacer!



“...un bosque muy importante para proteger y conservar para las futuras generaciones de Panamá...”

Siendo como una pequeña isla de vida silvestre dentro de la ciudad, el Cerro Ancón es un bosque muy importante para proteger y conservar para las futuras generaciones de Panamá. El bosque urbano del Cerro Ancón fue declarado oficialmente un área protegida y reserva natural en el año 2001, sin embargo, su proximidad a la ciudad hace que sea imperativo que los visitantes extranjeros y los panameños por igual tomen precauciones para no dañar la flora o fauna del área. También, muchos residentes y las instituciones en la falda del Cerro, se convierte en actores muy importantes para reducir los impactos humanos sobre la flora y la fauna. Si bien el Cerro Ancón debe ser disfrutado por todos, igualmente, no debe ser perjudicado por nadie.



“...seis de las especies animales en Cerro Ancón han sido declaradas en peligro de extinción...”

Seis de las especies animales en el Cerro Ancón han sido declaradas en peligro de extinción en Panamá: el ñeque, el armadillo de 9 bandas, el mono tití, el venado de cola blanca, la iguana verde, y la boa están en riesgo. El Cerro Ancón es un lugar muy especial para aprender acerca de la conservación, porque los niños pueden visitar un santuario de biodiversidad dentro de su propia ciudad, y familiarizarse más con la fauna de su país a medida que la aprecian. Todos aquellos que disfrutan de los dones del Cerro Ancón, deberían contribuir a conservar el ecosistema de bosque natural, de modo que siga siendo una parte integral de Panamá en el futuro.

VISTAS Y SITIOS

Skyline: En la cima del Cerro Ancón, los visitantes están casi al mismo nivel con el horizonte de la ciudad de Panamá, el hogar de 1 millón y medio aproximadamente de panameños.



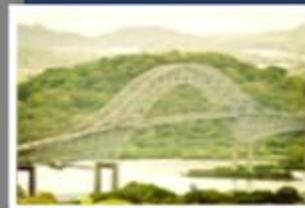
Casco Antiguo: Justo en las faldas del Cerro Ancón, en el Océano Pacífico está el Casco Antiguo, donde la presencia de descendientes españoles, mestizos, prevalece. Este sitio es donde los españoles decidieron construir su segunda ciudad, y el segundo puerto después de que el Pirata Morgan destruyó el primer asentamiento que hoy se conoce como Panamá la Vieja. En la actualidad, el Casco Antiguo es un animado barrio que ha pasado por una transformación a un popular destino turístico y artístico. Casco antiguo de Panamá, catalogado como patrimonio histórico de la humanidad por la UNESCO.

El Canal de Panamá: Si usted mira al norte del Cerro Ancón, podrá ver el Canal de Panamá y sus esclusas de Miraflores y la zona de Albrook, donde flotas grandes son cargados y descargados para ser transportados en todo el mundo, ya que como todos sabemos que Panamá en este momento es la encrucijada del comercio mundial. A un costado podemos observar el puerto de carga y descarga más grande del Pacífico panameño, "The Panamá Port Company."



"En el Cerro Ancón": No se olvide de visitar el busto de la poetisa Amelia Denis de Icaza, que encarna en su poema al Cerro Ancón la pasión sobre cómo los panameños se sienten acerca del hermoso cerro cuando estaba limitada por la antigua zona del Canal.

Puente de Las Américas: Este puente situado al lado pacífico del Canal de Panamá ha sido un componente muy importante de la carretera Panamericana desde el 12 de octubre de 1962, y es uno de los pocos puentes que conecta las masas de tierra del norte y de Suramérica.



ANCON

Asociación Nacional para la Conservación de la Naturaleza

Cerro Ancón

Cada año el Cerro Ancón es el hogar de numerosos visitantes a causa de su belleza natural, impresionantes vistas, y la importancia cultural en Panamá.

HISTORICAMENTE...

...el bosque y sus alrededores han sido reivindicados por diferentes grupos de personas por sus múltiples usos. En 1673, los españoles se asentaron en las faldas del Cerro Ancón, en lo que hoy conocemos como el Casco Antiguo. El cerro servía como un mirador sobre el océano Pacífico, y fue también importante por su abundancia de recursos naturales. Los franceses también hicieron casas en el Cerro Ancón, a unos 200 años más tarde, cuando se construyó el Hospital Gorgas, que hoy sigue al pie del cerro. Cerro Ancón, permaneció abierto en la época de los españoles y luego en la época en que llegaron los franceses, y albergaba una variedad de clases de residentes en sus alrededores.



Sin embargo, en 1903 los Estados Unidos se hizo cargo de la construcción del Canal de Panamá, y el Cerro Ancón fue declarado una sección privada de la Zona del Canal de EE.UU. y el acceso a los panameños ya no era posible. Entre los años 1909 y 1914, el Cerro Ancón fue utilizado como cantera. Tres millones de metros cúbicos de roca fueron extraídos de la colina y se utilizaron para construir la Esclusas de Miraflores y Pedro Miguel. Hoy en día, grandes acantilados se pueden ver en el lado de la colina como una reliquia de la cantera.



Los funcionarios del proyecto del Canal y sus familias se mudaron a Ancón, la creación de barrios exclusivos como Quarry Heights; el acceso restringido a los panameños en Ancón fue una de las razones por la que los panameños no les gustaban la presencia extranjera de la zona del Canal. En enero de 1964, después de las manifestaciones sobre izar la bandera en la zona del Canal, muchos panameños salieron a las calles a protestar, y enarbolar su bandera. En consecuencia, 21 estudiantes panameños fueron asesinados a tiros por los militares de EE.UU., y hoy son recordados como mártires. Todos los 9 de enero de cada año; son homenajeados en la cima del Cerro Ancón.



En 1977, después de la firma de los tratados Torrijos-Carter, los barrios exclusivos para "gringos" comenzaron a cambiar; mezclándose residentes de diferentes orígenes, incluyendo muchos panameños. Hoy en día la única bandera que ondea sobre el Cerro Ancón es la bandera panameña, lo cual representa la recuperación de la soberanía del istmo de Panamá y el hermoso bosque y fauna que aún se conserva en esta área, área revertida desde el año 1999 al gobierno de Panamá. El bosque ahora se mantiene firme y orgulloso de la ciudad capital como un símbolo de la independencia Panameña.

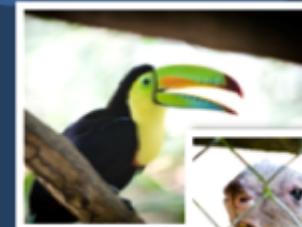
“...un símbolo de la independencia Panameña...”



LA BIODIVERSIDAD

El Cerro Ancón localizado en el centro de la ciudad de Panamá, es un gran ejemplo de la increíble biodiversidad y la lucha por la soberanía. Es el hogar de 68 especies de animales, incluyendo 15 mamíferos, 9 anfibios, 5 reptiles y 39 aves. Los visitantes pueden encontrar fácilmente la fauna local, si están pendiente de ello. Ranas venenosas, ñeques, tucanes picoiris e iguanas verdes son abundantes y activos. Por la noche, un nuevo grupo de animales salen para buscar alimentos, como por ejemplo el mono tití, venado cola blanca, y el armadillo de nueve bandas.

“...un gran ejemplo de la increíble biodiversidad...”



“...más de 200 especies de flora se han documentado...”

La cubierta forestal en Ancón está compuesta por un bosque secundario semi-seco, que se ha reforestado después de haber sido un potrero y una cantera. El bosque es el hogar de muchas especies de árboles nativos en Panamá, que crean un dosel, diverso y variante bosque tropical donde Más de 200 especies de flora se han documentado. Árboles como el caucho, el estrangulador, el jobo, y el árbol Panamá. Todos recrean una hermosa vista al bosque que se puede apreciar desde nueva y futurista ciudad de Panamá.