

THE PENNSYLVANIA STATE UNIVERSITY
SCHREYER HONORS COLLEGE

DEPARTMENT OF AGRICULTURAL ECONOMICS, SOCIOLOGY, AND EDUCATION

RELATIONSHIP BETWEEN PROTECTED AREAS AND NEIGHBORING COMMUNITIES:
A CASE STUDY FROM COSTA RICA

LINA MONTOPOLI
SPRING 2014

A thesis
submitted in partial fulfillment
of the requirements
for a baccalaureate degree
in Community, Environment, and Development
with honors in Community, Environment, and Development

Reviewed and approved* by the following:

Ruth Mendum
Director of the University Fellowships Office at Penn State
Thesis Supervisor

Theodore R. Alter
Professor of Agricultural, Environmental and Regional Economics
Honors Adviser

* Signatures are on file in the Schreyer Honors College

ABSTRACT

The relationship between protected areas and surrounding communities is very important to foster overall understanding and well-being between both entities. This study will discuss the perception of environmental and socio-economic benefits in relation to communities' distance from the protected areas as well as compare the perceptions across communities adjacent to the three separate protected areas. In addition, this study will investigate management practices and the potential for improved relationships between protected areas and nearby communities. Over one year, interviews were conducted in nine communities. It was found that perception of environmental benefits is higher than perception of socio-economic benefits overall. Socio-economic benefits increased with geographical nearness of the communities to the protected areas. Protected area management and protected area employee relationships with nearby residents are lacking in many communities.

TABLE OF CONTENTS

List of Figures	iii
Acknowledgements.....	iv
Chapter 1 Introduction: Protected Areas and their Human Neighbors	1
Chapter 2 Background	2
Literature Review	2
Chapter 3 The Costa Rican Context.....	4
History of Costa Rica’s Protected Areas.....	4
Current Infrastructure.....	7
The Socio-economic context of Costa Rica’s Protected Area system	10
The Ecotourism Industry.....	11
Management of Protected Areas	15
Chapter 4 Methods.....	18
Chapter 5 Protected area Profiles.....	20
Braulio Carillo.....	21
Irazú.....	22
Poás22	
Chapter 6 Results	24
Chapter 7 Discussion	28
Chapter 8 Conclusion.....	33
Appendix A Relevant Survey Questions.....	35
Appendix B Raw Data RE: perceived environmental and socio-economic benefits	37
BIBLIOGRAPHY	39
ACADEMIC VITA.....	45

LIST OF FIGURES

Figure 1. Illustration of increasing tourism. Costa Rican Institute of Tourism, http://www.amcostarica.com/tourismarrivasl051911.jpg	12
Figure 2. Location of the three protected areas studied in this paper. Anywhere Costa Rica, http://www.anywherecostarica.com/maps/protected areas-reserves-rivers	20
Figure 3. Comparison of communities' average perceived benefits from Poás, Braulio Carrillo, and Irazú protected areas in Costa Rica. Data collected through interviews in nine communities between fall 2011 and fall 2012.	25
Figure 4. Comparison of communities' perceived benefits, grouped by distance from the Poás, Braulio Carrillo, and Irazú protected areas. Data collected through interviews in nine communities between fall 2011 and fall 2012	26

ACKNOWLEDGEMENTS

I would like to thank the following people and establishments for their assistance in this process:

Dr. Ruth Mendum – for your unwavering support throughout this process, and for fostering a personal and professional relationship that I hope to continue long into the future!

Dr. Ted Alter – for helping shape me as a student and person throughout my time at Penn State. Your guidance and advice has been incredible for the last few years, and I honestly don't know where I would be without you

Char - for an endless stream of laughter, advice, for being the best listener of all time, for dozens of great nights at The Den, and for spending entirely too much time with me this semester

Kels - for allowing me to invade the student center, your apartment, your couch, and your life in general

P-dawg - for a million muffins, teas, jokes about Parks & Rec/Scandal/Fitzy, Jezebel links, celebrity gossip, music recommendations, and time well spent at Webster's

Grace - for the many mentally refreshing outdoor/indoor adventures, and for just being a generally inspirational person

Bernadette/the Sass House - for goats and cows, delicious soup, winter adventures, and fantastic laughs from all of you!

Todor – for inspiring one adventure per week, and for being an excellent life coach/guru

Tess - for repeatedly regaling me with heavy doses of real life when I desperately needed them, and for running things out West

Mom & Pop - for keeping everything in perspective and reminding me that, at some point, this will all just be a funny memory

Lindsay - for being an inspiration through this process last year and setting the standard for how to get. things. done.

Ben - for many well-timed text messages and general ability to find humor and energy in everything

Spencer - for your bugs

Melissa - for being a role model and general HBIC

Brandi - for a 7am full of love and laughter

Zoey - for your approach to life, selfless investment in people, and for salamanders!

Remy - Thanks for all the lyrically induced smiles/The poems helped massively with thesis stockpiles/Four lines could always put me in a good mood/Don't ever let your rhyming genius be subdued!

Johanna - Hikes. Hikes hikes hikes. Preserved foods. Refreshing perspectives. Critical thinking.

WFR class - if I can make a pull-traction splint on a femur, I can finish a thesis

Lila Yoga - for daily provision of mental balance and physical well-being

Webster's Bookstore and Café - for repeatedly allowing me to stay and use the Internet for a much longer period of time than was warranted by the purchase of one beverage

Zeno's - for provision of numerous non-judgmental afternoon beers

Chapter 1

Introduction: Protected Areas and their Human Neighbors

Understanding the relationship between a protected area and the communities surrounding it is critical for successful long-term management. For a community to maximize use of potential benefits provided by the protected area and vice versa, there must be a thorough understanding from both entities of the current status of this relationship, how it can be mutually beneficial, and options for improving the affiliation. This paper seeks to answer the question of communities' perception of environmental and socio-economic factors provided directly or indirectly by three protected areas in the *Cordillera Volcanica Central* (ACCV) conservation area of Costa Rica.

In the context of the many variables that need to be considered when evaluating the relationship between protected area and community, both socio-economic factors, such as tourism and community development, and environmental services, such as a source of clean water, are important. In addition, these two areas of study are essential when further contemplating how to improve relations between a protected area and its neighboring communities. This study will examine the contemporary situation, with emphasis on current and possible management practices, possible explanations for the discrepancies found between communities, and options for improving the affiliations between three Costa Rican protected areas and their neighboring communities.

Chapter 2

Background

Literature Review

Previous research and case studies have stressed the need for a bottom-up, participatory approach to protected area management (Andrew-Eissen and Bisong 2009; Agrawal 1999; Mendéz-Contreras et al. 2008; Suryanto et al. 2011). Systems of top-down management have been unsuccessful in fostering a beneficial and positive relationship between the protected area and adjacent populations due to a lack of communication and understanding between the many stakeholders involved (Stollkleemann 2010; Perez 2002). Other case studies have also stressed the need for, not only stakeholder involvement in terms of a physical presence, but a true understanding of the power structures within the community and how each stakeholder or group can optimally be approached and involved on an individual level (Brown 2002; McCalpin 2008; Petrova et al. 2009; Perez 2002). Xavier Basurto (2013), in an issue of *Conservation and Society*, discusses a few of the reasons for the importance of an emphasis on local stakeholder involvement. These include a higher level of interest in the sustainable use of resources, more information regarding local issues, and a more thorough understanding of how they can be dealt with while respecting local norms and traditions.

The amenity affect should also be taken into account when working with local communities to minimize negative effects that might counteract the overall goal of the protected area (Gimmi et al. 2011). This term refers to the idea that the establishment of a protected area can foster environmentally detrimental development in the surrounding area, thereby counteracting some of the benefits that may be associated with the presence of an established protected area.

Past research has concluded that, in general, a positive relationship exists between nearness to the protected area and general awareness of protected area goals as well as a positive view of the protected area (Ormsby and Kaplin 2008). However, in some instances, it has been shown that the establishment of a protected area can be viewed negatively by those living closest to the protected area because of the associated decrease in natural resource access (Anthony 2007; Secretariat of the Convention on Biological Diversity 2008). Another challenge to this relationship is finding the balance between inclusionary conservation that embraces nearby residents and exclusionary conservation in place solely for its biological benefits, without consideration of the people impacted by establishment of such an area (Kanath and Nepal 2011; Reid 2001). This study seeks to determine if distance from three protected areas in Costa Rica affects nearby residents' awareness and overall valuation of services that the protected area provides, within the context of the way in which the protected area is managed.

Specifically, this study seeks to determine if 1) there is a relationship between distance of towns from the protected area and a difference in presence and awareness of socio-economic versus environmental benefits and 2) if there is a difference in awareness of these benefits between the three protected areas. It should be mentioned that

environmental services can also be considered economically beneficial, but in this instance will not be quantified as such (Balmford et al. 2002).

Andam et. al. (2010) conducted a study exploring the “socioeconomic impact of protected areas on neighboring human communities.” The argument commonly made is that the establishment of protected areas can lead to a reduced ability of residents to profit from the land in the form of agricultural endeavors or resource extraction. This must be weighed against the possibility to profit from increased tourist income, “supplying ecosystem services, and improving infrastructure in remote areas” (Andam et. al. 2010). Both possible outcomes will be discussed.

Chapter 3

The Costa Rican Context

History of Costa Rica's Protected Areas

Costa Rica is approximately the size of West Virginia, and yet it contains about four percent of the world's biodiversity (Instituto Nacional de Biodiversidad 2014). The country's naturally difficult terrain left it relatively untouched by colonialism until the early 1900s. Development occurred at a very rapid pace, and in order to support its growing population and economy, inhabitants and foreign investors turned to the country's natural resources as a source of economic advancement. Large-scale logging took place, decimating a substantial amount of Costa Rica's natural canopy and leaving a miniscule 25% forested of an original 90% (Rosero-Boxby & Palloni). Small farmers attempted to grow a variety of fruit trees, such as apples, pears, and peaches, and vegetables in the poor soil, but this venture was largely unsuccessful. Cattle ranching soon followed, as demand for cheap beef to be shipped to the United States and other developed nations grew. The increase in ranching further decimated the country's forest cover and increased problems with soil health, erosion, and nutrient retention. In addition, monoculture plantations of bananas, coffee, and sugar have since become widespread, although there has been an economic shift in recent years towards tourism and technology; specifically the manufacturing of microchips.

Many factors contributed to an increased awareness of the value of environmental protection, among them Costa Rica's educational system, democratic governance

structure and citizen interest in maintaining a reputation as an environmental haven. Because Costa Rica dissolved its standing army in 1949, they have been able to invest more heavily in the educational system (“Education in Costa Rica”). One facet of the curriculum emphasizes the country’s important role in global biodiversity and an understanding of its unique ecological situation. Costa Rica spends an annual 6.3% of GDP on education. In comparison, the United States spends only 5.4% (Central Intelligence Agency). This has resulted in free education for almost all citizens and a literacy rate of 96% for males and females alike (Central Intelligence Agency). According to a UN report, Costa Rica received the highest ranking in Latin America for its education system. Overall, the government spends over 20% of GDP on social programs (Central Intelligence Agency).

The government has also been heavily involved in increasing environmental protection. In 1969, the congress of Costa Rica established a system of protected areas. The system grew quickly, and by 2000, 25% of the country was protected in either a reserve or protected area (Ferraro and Hanauer 2011). Researchers and academics also contributed significantly to the increased awareness of and importance given to issues of conservation and biodiversity, especially those facing tropical areas. In addition, Costa Rica established a system of payments for environmental services (*Pago por Servicios Ambientales*, PSA), which hugely incentivized forest protection and preservation. This was one of a number of efforts implemented locally, and internationally, to put a stop to massive forest clearing throughout the country. Because of the number of programs implemented, and their overlapping nature, it is difficult to parse out the effect of each program on the amount of land that was replanted or saved from clear-cutting. For

example, in addition to the PSA program, Costa Rica has become a partner country in the United Nations' Collaborative Programme on Reducing Emissions from Deforestation and Forest Degradation in Developing Countries (REDD).

These changes in land use tenure, ownership, and use in Costa Rica have been historically unorganized. According to Chacon et. al. (1998),

“Claims on lands have been established through a variety of forms, including active settlement and farming of lands, land grants by the state, distribution through agrarian reform programs, the claiming of community property rights by indigenous groups, through exploitation of logging or mining claims, or through the buying and selling of these claims” (p. 25).

In some instances, there are multiple parties that claim ownership of the same tract of land; for example in instances where one party has a legal claim and another has legal rights due to active settlement or “squatting” on the land. In such instances, the Costa Rican government is faced with payments to two different entities to incorporate the same parcel of land into a protected area. In many instances, this has been the agreement set forth to landowners (mainly people in the agricultural sector) and residents. This system is not operating completely efficiently; payments and relocation sites are often delayed. Even when residents are relocated, the requirement for equivalency does not extend beyond simple landmass, leaving the fairness of such a relocation system as fairly questionable.

Due partially to these land use rights issues, the transition to a system of protected areas throughout Costa Rica has not been without its difficulties and hurdles. According to Chacon et. al. (1998), “The Conservation Areas approach...seeks to improve the relationship of governmental authorities with local communities and to improve local attitudes towards protected areas by improving services and making the administration of

protected areas more responsive to local needs” (p. 9). There are, however, instances of conflict where protected areas were established where people had previously been using the land for other purposes. Corcovado Protected Area, for example, was a massive site of gold mining prior to being declared a protected area in 1975. To deal with the initial clearing of miners, who continued to operate illegally within the protected area’s boundaries, the government sent in additional protected area rangers and ramped up enforcement. This was an effort that could not be sustained financially, and Corcovado continues to be mined, with an increase in illegal activity when Costa Rica’s economy is suffering and the price of gold is high.

Current Infrastructure

Costa Rica’s SINAC (National Conservation Areas System) is housed within the Ministry of Energy and the Environment (MINAE). SINAC was formed in 1995 as a result of the merging of the protected areas, wildlife, and forestry departments (Induni et al. 2012). Since its inception, members of SINAC have been in charge of planning for, maintaining, and organizing the large system of protected areas throughout the country. A good portion of funding for these purposes is received through a Forest Carbon Partnership Facility grant, which assists financially with;

“five activities: (i) building an information system to build a complete chain of custody for timber, from the management plan through to the sawmill and transport to the end user; (ii) updating the principles, criteria and indicators of sustainable forest management as well as a certification scheme; (iii) developing a plan to encourage sustainable forest management, including from private protected areas; (iv) updating the

strategy for controlling illegal logging and developing practical tools; and (v) monitoring emissions from forest fires and try to prevent them by developing a weather-based early warning system using Moderate-resolution Imaging Spectroradiometer” (Brenes 2014).

“Within these areas, SINAC protects more than 186 areas, including protected areas, biological reserves, forest reserves, and wildlife refuges” (Costa Rica National Parks). In 1998, Costa Rica implemented a biodiversity law, outlining goals and guidelines for sustainable development principles:

“The legal framework has the following guiding elements:

- Equity in access and in the distribution of benefits derived from the use of the elements (genetic and biochemical) of biodiversity,
- Respect for human rights, especially the rights of groups that are marginalized because of their culture or socio-economic condition,
- Sustainable use of biodiversity, in order to respect the development options of future generations,
- Biosecurity in the broadest sense, including technological, environmental, alimentary and sanitary aspects, and
- Democracy as a guarantee of greater citizen participation in decision-making” (Cabrera et al., p. 5)

A number of other goals were outlined in this legislation, but the funding and manpower needed to accomplish them is lacking. According to a presentation made by a SINAC employee working at Poás Volcano National Park, the organization is underfunded and lacks the number of employees required to successfully follow through on plans for protected area maintenance and expansion throughout Costa Rica’s system. This is an issue throughout Costa Rica’s protected area system, although the protected areas discussed in this study are at an advantage due to their higher visitation rates and proximity to San José. An article in The Tico Times outlines the major difficulties that SINAC and MINAE face: according to SINAC’s 2012 budget, their funding dropped 16.4 percent between 2011 and 2012 (Fendt and Harrell 2013). MINAE also saw massive

budget cuts as they lost 15 percent of their funding between 2012 and 2013 (Fendt and Harrell 2013). ACOSA, one of the eleven conservation areas in the country, has a staff composed largely (86%) of people over 41, many of who are physically unable to participate in multi-day hiking patrols to safeguard the protected areas in that particular area (Fendt and Harrell 2013). In addition, Basurto (2013) mentions that many of the protected area employees are not members of the surrounding population and may lack the appropriate background to act as representatives of the local communities' interests and concerns. This is consistent with my own findings, as no one I spoke to living in the communities located closest to the three protected areas being studied was employed by the management of the protected area or its component parts.

Currently, Costa Rica is divided into eleven conservation areas. This is the result of a 1990 executive government decree, as well as the 1998 Conservation on Biological Diversity law. Each conservation area has a regional council, scientific and technical committee, and administrative and financial body. A main tenet of SINAC, via the 1998 law, was to focus on participatory management of the protected areas. The councils of each area were intended to involve local stakeholders in protected area oversight and management. The level of involvement and accomplishment of these goals varies widely between the various conservation areas.

Each of the eleven conservation areas is intended to have a council with a board of directors. Some of the conservation areas have established such a system successfully with local stakeholder involvement, some include a board composed of external actors, and some do not have an active board. The Area de Conservación Guanacaste (ACG) exemplifies the most participatory manner in which the board can operate. Many have

attributed this to the attention (and financial support) that was drawn to this region by Daniel Hunt Janzen, a prominent biologist with an interest in this area of Costa Rica. However, Basurto (2013) points out that other conservation areas with similar levels of funding have not been able to accomplish inclusionary development in the way that the ACG has. Basurto attributes the success of organizational and management efforts in this particular conservation area to the bottom-up approach implemented in the ACG, which is lacking in other areas.

Domestic and international support for continued development and improvement of protected areas in Costa Rica is clear, as there are numerous funding sources funneled to the country with these goals in mind. For example, in November of 2013, the Inter-American Development Bank (IDB) approved a \$20 million loan to “improve tourism infrastructure” (Arias n.d.). This includes improvement to four protected areas in the form of the addition of trails, repairs to existing infrastructure, and training of tour guides.

The Socio-economic context of Costa Rica’s Protected Area system

Important to note is that, although Costa Rica is ranked highly in many development areas, there is great internal inequality. Large differences exist between the economic well-being of the urban and rural populations throughout the country. According to the UNDP, in 2008, “Notably, rural poverty is a predominant factor in the areas where most PAs are located, where average poverty levels of 24.9% are higher than in the rest of the country” (Global Environment Facility 2008, p.11). Some of this

economic inequality can be attributed to the large growth in biotechnology as a source of income for the population. This industry is concentrated in urban centers, whereas the declining commodity production agricultural population makes up the majority of those living in rural areas. In addition, access to higher education is much greater closer to the urban centers of San Jose, Heredia, and Cartago, and is largely unavailable to those living in rural Costa Rica.

The Ecotourism Industry

As the interest in Costa Rica's environment increased, investments in tourism and ecotourism also rose. "Tourism doubled between 1970 and 1990 and currently brings in more money than the coffee or banana industry" (Hitzen, p.9).

The expansion of ecotourism in Costa Rica has been profound in recent years (Figure 1), and is growing to become a primary source of income for many Costa Ricans. Within the Central American context, Costa Rica is unique in that it does not rely heavily on remittances – money sent back into the country from friends or family who have moved elsewhere – which account for only about 2% of GDP (Central Intelligence Agency). According to the CIA World Factbook, 6.2% of Costa Rica's GDP can be attributed to agriculture, and 14% of the population is employed in this sector. This number is steadily decreasing. Concurrently, the percentage of people employed in the services sector continues to rise. As of 2012, 72.4% of the GDP of Costa Rica comes from services and 64% of the working population is employed in this sector.

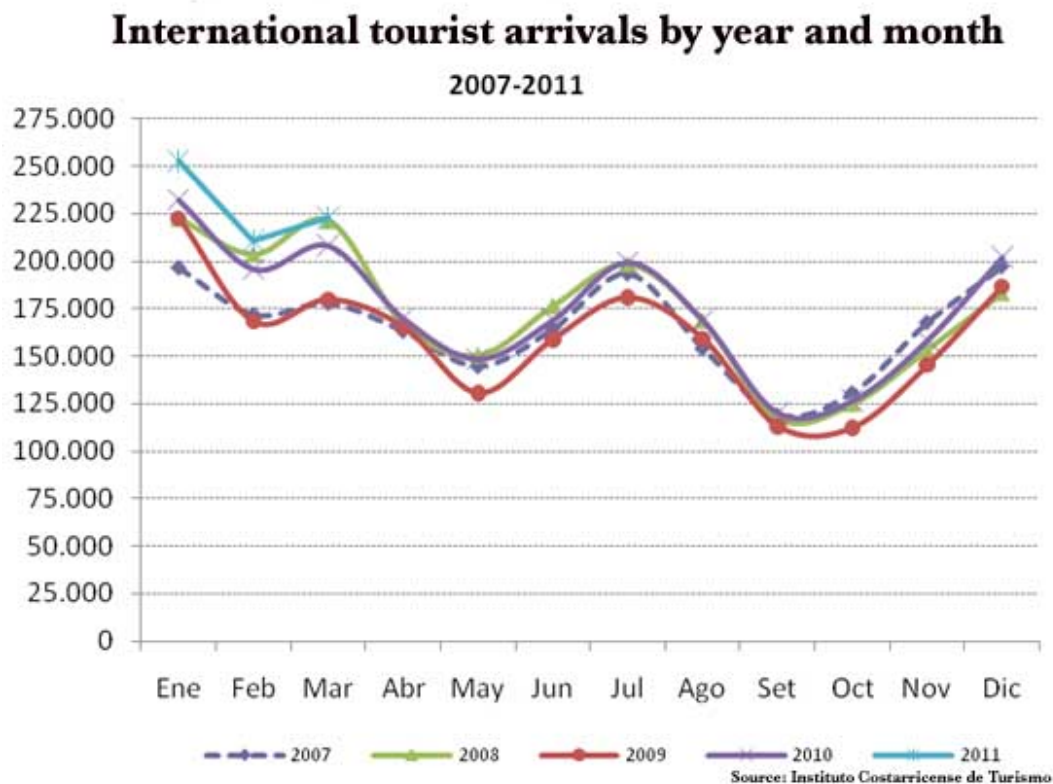


Figure 1. Illustration of increasing tourism. Costa Rican Institute of Tourism, <http://www.amcostarica.com/tourismarrivasl051911.jpg>

“During the past decade Costa Rica has successfully promoted its tourist industry with an image of natural beauty and environmental consciousness, and has become one of the most popular ecological tourism destinations in the world” (Hearne 2002, p. 154). Although this trend has a positive impact on the Costa Rican economy, it is worth mentioning that traveling, by its very nature, tends to be an ecologically detrimental activity. The ecotourism areas most attractive to foreign travelers are often located in some of the most fragile ecosystems.

At the base of the problem, the emissions created by flying far outweigh any potential benefits garnered from participating in an environmentally conscious vacation. However, those who intend to travel will do so, with or without ecotourism options. It is

in acknowledgement of this that endeavors in ecotourism seem the most reasonable and needed. Someone who flies to stay in a Florida resort with a hotel of over 4000 rooms, where most of the money spent goes to the distant headquarters of various corporations, is providing a very limited and temporary benefit to the local economy. If the management of that resort decides that it is no longer worthwhile to invest in that community, they have the ability to withdraw, leaving few options for those who were employed, and possibly dependent upon, the income from that establishment.

Alternatively, a tourist who flies to Costa Rica to engage in an ecotourism package has many opportunities to spend money that will remain within the local economy. A tour of a shade-grown coffee farm, for example, where the visitor has the opportunity to meet the farmers and purchase coffee directly from the source, is benefitting the local economy and creating a personal human connection. The dollar spent in this way creates a multiplier effect, wherein that farmer then has the opportunity to purchase a good or service from another local business. It is also important to note that “ecotourism” is not a universally agreed-upon term. Some tourists that engage in this type of travel are seeking remote, wilderness vacations, while others desire all the luxury of classic five-star accommodations while feeling that they are choosing a more environmentally friendly vacation option. The entities in Costa Rica that deal directly with visitors, and their associated finances, have the choice of how to market and promote the country’s vacation options. Those who are looking for an experience that involves an insulated resort setting are unlikely to engage in ecotourism, unless the two models can be merged. On the other hand, an increase in tourists seeking an environmentally oriented experience increases demand for those options. As it stands,

there is demand for both mainstream and eco tourism options. It will be interesting to monitor in which direction these ventures progress.

Farrell and Marion (2001) point out that much of the literature and legislation on Costa Rica's protected areas purports environmental protection above tourist visitation in management of the protected areas. This is attributed in part to concerns regarding increasing human impact. They investigate the impacts that visitation has had on the conditions of five protected areas; two of those are Braulio Carrillo and Poás, which overlap with this case study. As part of their methodology, Farrell and Marion (2001) interviewed those in management positions of the protected areas. They discussed a number of impacts, including loss of vegetation, impact on wildlife, water impacts, and erosion. The Las Palmas trail in Braulio Carrillo was classified as "experiencing a complete loss of vegetation cover and organic litter with areas of obvious soil erosion and exposed roots" (Farrell & Marion, p. 219).

Within the areas that were included in this study and that conducted by Farrell and Marion (2001), there was a noticeable absence of campsites and off-trail impact. This could partially be due to the climate of Costa Rica, which is not friendly to camping during the rainy season, and the dense vegetation, which makes it difficult to navigate off-trail. Although the impacts were not as great as some that have been recorded in the United States, these areas are also much more environmentally delicate than many studied in America. The presence of very high levels of biodiversity can translate to a greater overall impact, even if visible damage is less.

An additional impact of visitors that should be considered is their contribution to pollution levels in and around the protected areas. As Farrell and Marion (2001) point

out, it is often difficult to attribute pollution directly to visitors, as the local population also has an effect on contamination of water sources, erosion of sections of the protected areas, and litter.

Management of Protected Areas

Farrell and Marion (2001) discuss the concept of a “paper protected area,” a term used to describe a situation in which a legal document exists, but the premises outlined in the text are not supported by real-world implementation. The protected area managers interviewed cited a lack of employees and insufficient funding as the “most significant barrier to managing visitor impacts” (p. 221). This is consistent with my findings, as the people I spoke to also regarded these issues to have the most serious impact on protected area management and development. According to the Global Environmental Facility, in 2008, SINAC was working with a total staff of 1102:

Some 8% of the total SINAC staff (1102 people) is located in central offices, 50% is located in regional offices of the 11 Conservation Areas, and the remaining 42% is assigned on the ground for PA management. Of total SINAC staff, very few (9) have university degrees. Most have been trained as protected area wardens, with only limited training in tourism, despite a growing number of routine tasks by Protected area managers related to attending tourists (p. 16).

As stated by residents nearby and employees of the protected areas, this is not a large enough staff to manage the 160+ protected areas throughout the country, especially as they face increasing demand from tourists for accessibility and information to improve their experience in the country and the protected area.

This problematic situation also results in a wide variety of management techniques employed throughout Costa Rica. Although centralized, general goals and guidelines do exist, they are often not widely or thoroughly disseminated. As a result, communication between protected area management is minimal and decisions regarding how to handle the influx of tourists are made on a case-by-case basis, instead of following a centralized set of standards. This has not necessarily resulted in poor management as there are several instances in which trails are composed of porous materials (lattice blocks, cross-cut trees, galvanized screen, etc) that clearly outline a path for visitors without causing damage to the surrounding area. Farrell and Marion (2001) mention that those who they spoke with were not familiar with current “literature on trail design, construction, and maintenance, in part due to a lack of Spanish translations” (p. 222).

The Tropical Science Center (TSC) carried out a study to analyze management of 26 protected areas in Costa Rica. Utilizing the Management Effectiveness Tracking Tool (METT), this study found that there is a clear deficiency in management plans that extend beyond short-term goals. This deficit was attributed to shortcomings “regarding human and financial resources available,” amongst them an inefficient centralized financial management process that does not communicate well with or respond to the needs of individual protected areas (Global Environment Facility 2008). In addition, an absence of ongoing research or monitoring of current managerial practices leaves supervisors with few options when making recommendations regarding management decisions.

Despite these shortcomings, there are promising investments in ecotourism and protected area management, such as the financial support provided by the United Nations

Development Programme's Global Environment Facility (GEF). Since its membership began, Costa Rica has been the recipient of \$66 million in grants and assistance from the GEF. Because of these funds, Costa Rica has also been able to generate additional co-financing to assist in over 50 projects in and around protected areas (Global Environment Facility 2013). Specifically, in the ACCVC area, there is a pilot program entitled "Local partnerships and initiatives in managing buffer zones of the core areas of the Reserva de la Biósfera Cordillera Volcánica Central (Central Volcanic Range Biosphere Reserve, RBCVC)" (Global Environment Facility 2008, p. 72). They have identified the main stakeholders in this region to be as follows: Rural Water Canal Associations (ASADAS), Development Associations, Women's Groups and Associations, Local Tourist Guide Associations, Primary and secondary educational establishments, Natural Resource Watchdog Committees (COVIRENAS), Local Tourism Chambers, and Municipal Environmental Commissions. The GEF's identification of these groups as critical in management plans is consistent with what respondents in this study stated as being important groups to approach in this decision-making process.

Chapter 4

Methods

My study was completed using a questionnaire created during fall 2011 by Dr. Sergio Molina, who was assisted by two interns from the School for Field Studies and by Mauricio Arias, an official at the Central Volcanic Range Conservation Area (ACCVC). The design of the questionnaire included secondary data from the following sources: Gutierrez and Siles (2008), Gomez (2008), and ACCVC/UNA-IDESP (2011).

The questionnaire is in Spanish and includes 63 questions. It is designed to take approximately one hour to complete. The questionnaire is composed of three types of questions: those ranked on a semantic differential scale, those ranked on a dichotomous scale, and those that require an open-ended response. Questions ranked on a semantic differential scale were coded in alternating reverse order to avoid common method bias. These questions were then recoded in the dataset so positive responses corresponded with higher numerical values.

Data was collected using a stratified sample procedure with systematic random sampling of every other house. In addition, purposeful snowball sampling was used to include insights and input specifically from community leaders. Contacting leaders in particular was included as this aligned with the overall goal of the study.

Data was collected between fall 2011 and fall 2012, for a total of 245 completed questionnaires. Students read the questionnaires out loud to respondents. Interviews were completed in groups of two; one student read the questions and the other presented a chart that represented levels of agreement for questions on a semantic differential scale.

Data was collected in three one-week periods between the hours of 9 AM and 4 PM. Students traveled to nine different towns surround three different protected areas in Costa Rica. The protected areas were Poás Volcano Protected area (associated with the communities of Vara Blanca, Poasito, and Fraijanes), Braulio Carrillo Protected area (associated with the communities of Cubuquí, La Virgen, and Horquetas), and Irazú Volcano Protected area (associated with the communities of San Juan de Chicué, Tierra Blanca, and Portrero Cerrado).

The division between perceived socio-economic and environmental benefits was made based on how the variables impacted the community. Environmental variables were categorized by variables that resulted in a maintained or improved quality of a natural resource. Socio-economic variables were those that had the potential to increase the living situation, access to social services, and/or income for residents. Aesthetic enhancement falls into both of these categories and was categorized as an environmental variable.

Statistically, the Kruskal-Wallis analysis of variance was used and post-hoc comparisons were included after finding significance. The Wilcoxon signed-rank test was employed when comparing matched samples.

Possible errors in this study include the language barrier that existed because not all of the students conducting interviews were not fluent Spanish speakers. However, for the dichotomous scale questions included in this study, an answer of “yes” or “no” could be effectively attained. In addition, the groups of respondents included some that were composed of entirely men or entirely women, which could lead to a gender biased response. However, error as a result of these factors is minimal.

Chapter 5

Protected area Profiles

This section will explore each protected area's traits and characteristics. All three of the studied protected areas are within the same general area of Costa Rica, as can be seen in the following map:



Figure 2. Location of the three protected areas studied in this paper. Anywhere Costa Rica, <http://www.anywherecostarica.com/maps/protected-areas-reserves-rivers>

All three sites fall within the Área de Conservación Cordillera Volcánica Central (ACCV), one of the 11 conservation areas spanning the entire country. All three are accessible from the main entry point into Costa Rica, San Jose. However, these three protected areas are not equivalent in terms of size, accessibility, and development. In addition, in the past, entrance was free for residents of the areas surrounding the protected areas. Costa Rican residents continue to receive discounted rates for entry, but the entry fee is no longer waived. These are just some of the factors affecting visitation and perception of the protected areas being studied.

Braulio Carillo

Braulio Carrillo is by far the largest protected area (184.4 square miles) being studied. Although not always the case, larger tracts of protected areas are linked to increased biodiversity and decreased negative development impacts such as deforestation (Naughton-Treves et al. 2005). In this instance, the protected area contains “the source of important rivers and much of the potable water supply for Costa Rica’s densely populated Central Valley (Centro Cientifico Tropical 1982)” (Hearne 2002, p. 155). Despite its size, visitation rates are low (about 5,950 a year) due to the undeveloped nature of the protected area. Trails exist within the protected area, but they are narrow and infrequently maintained. There is no main visitors’ center or gift shop. Visitors have access to restrooms and drinking water at three ranger stations throughout Braulio Carillo. 9.2% of respondents in the three towns near Braulio Carillo knew the park director, and 39.7% knew someone else employed by the park.

Irazú

Irazú is the smallest of the protected areas in this study (7.7 square miles) and has been in existence for over 50 years. This protected area is named after and features the tallest of Costa Rica's four active volcanos. Visitors, who number at about 125,000 a year, can shop at a small gift store and purchase beverages and snacks at the coffee shop. There is one wide swath of traversable terrain where tourists can overlook the crater. There are no additional trails or options for further exploration. This protected area is maintained by a very small number of people and the road to access the vista is in poor condition. When asked, 6% of those interviewed in this study were familiar with the park director and 39.7% knew someone employed by the park.

Poás

Poás lies, in size, between the other two protected areas at 25.1 square miles. This protected area is particularly appealing to tourists because it is a comfortable drive to the entrance. It is the most visited protected area in Costa Rica, with just under 229,000 annual visitors. It is also possible to walk up all the way to the edge of the volcano's crater. The protected area features paved and, in some cases, wheelchair accessible trails. There is also a well-maintained visitor center with a café, restrooms, a gift shop, and a small museum.

The data show that, when asked about socio-economic benefits, many respondents believe that successful tourism development is not seen as a derivation of the presence of the protected area but rather as a self-motivated economic pursuit. When asked if they

considered the protected area to be a part of the community, those who replied negatively cited a lack of communication, the park entrance fee, and that the park and towns were separate entities. It is interesting that the communities surrounding this park had, in comparison to those living in the communities near Irazú and Braulio Carillo, the highest percentage of respondents who either knew the director (44% responded yes) or someone employed by the park in a different capacity (60% responded yes). In addition, the towns surrounding Poás had the highest number of residents who had been to the park (93%). The towns surrounding Poás illustrate an economically developed area catered heavily to tourists. Hotels, restaurants, souvenir shops, and other attractions draw in outside money. The development organization is more historically consistent and participatory than in the communities surrounding the other two protected areas. One respondent even mentioned a self-organized recycling group run by five women from Poasito and Fraijanes, an entity that did not exist elsewhere and is not state mandated. In contrast, the towns near Irazú and Braulio Carrillo are less economically developed towards the potential income from tourists, which was assessed based on an absence of hotels and shops with merchandise marketed towards visitors.

Chapter 6

Results

On average, residents interviewed perceived a greater number of environmental benefits as a result of the protected area's presence, as compared to socio-economic benefits. A statistically significant difference was found in perception of both environmental and socio-economic benefits between protected areas (Figure 3). In terms of environmental benefits, statistical significance was found between all three protected areas (Kruskal-Wallis $\chi^2 = 39.6$, $df = 2$, $p\text{-value} < .0001$). For socio-economic benefits, significant difference was found between Poás and Irazú, but not between Braulio Carrillo and the other two protected areas (post-hoc Tukey test $\chi^2 = 9.9$, $df = 2$, $p\text{-value} = .0072$).

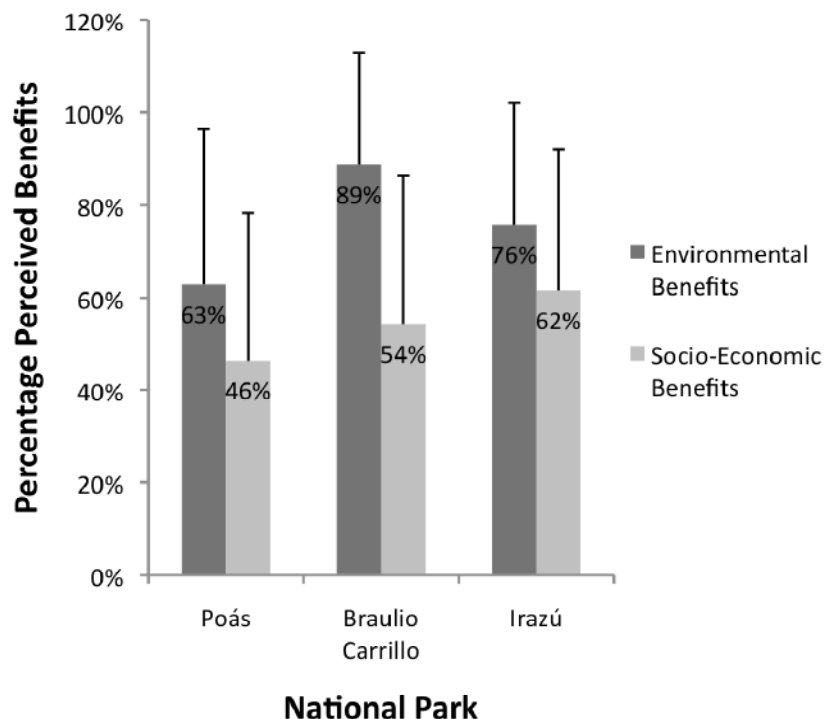


Figure 3. Comparison of communities' average perceived benefits from Poás, Braulio Carrillo, and Irazú protected areas in Costa Rica. Data collected through interviews in nine communities between fall 2011 and fall 2012.

As can be seen in Figure 4, communities closer to the protected areas were found to have a statistically significantly higher perception of economic benefits than those further from the protected areas (Wilcoxon $Z = 2.2$, $df = 1$, $p\text{-value} = .03$). Communities were grouped by relative distance from the protected area entrance, not by absolute distance between all nine communities. No significance was found between perception of environmental benefits and distance from protected area.

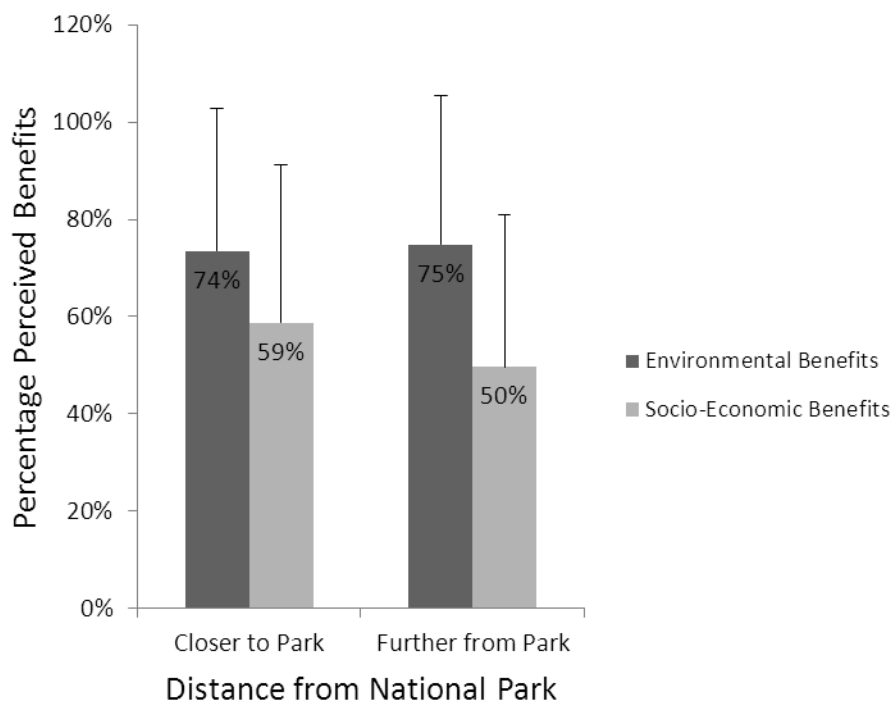


Figure 4. Comparison of communities' perceived benefits, grouped by distance from the Poás, Braulio Carrillo, and Irazú protected areas. Data collected through interviews in nine communities between fall 2011 and fall 2012

No statistically significant relationship was found in perception of benefits between leaders and non-leaders in the communities. In addition, perception of both types of benefits do not appear to be connected directly to the size of the protected area, the number of visitors, or how long the protected area has been established.

Poás was visited the most by Costa Rican residents (93%), Irazú was second most visited (85%), and Braulio Carrillo had very low visitation rates (17%). In terms of total number of visitors, the most recent data (2010) report the following visitation rates: Poás was the most visited protected area studied with 228,795 visitors, Irazú was second with 124,806 visitors, and Braulio Carrillo had the fewest with 5,950 (Jimenez 2010). In the case of Irazú and Braulio Carrillo, almost twice as many nationals as foreigners visited

the protected areas. In contrast, Poás was visited by more foreigners than nationals (Jimenez 2010).

Other characteristics of the respondents include the fact that those who responded positively to considering the protected area to be part of their community on average also perceived significantly more benefits than those who did not consider the protected area a part of the community. Overall, respondents' level of education ranged from some primary school to graduation from university, with an average falling between completion of primary school and some secondary education.

Chapter 7

Discussion

A possible source of explanation for the differences found between perceptions of environmental benefits can be attributed to a few factors that vary between the protected areas. Braulio Carrillo is by far the largest protected area, and therefore is protecting a larger amount of land that, in turn, protects provision of the natural resources, flora, and fauna of the surrounding communities. Larger tracts of protected areas are also linked to increased biodiversity and decreased negative development impacts such as deforestation (Naughton-Treves et al. 2005).

In the case of Irazú, the high percentage of residents who had visited the protected area (85%) is relatable to the relatively high perception of environmental benefits because of exposure to educational information presented to visitors that would increase understanding of the environmental role that the park fills in the area. It would follow, then, that with a 93% visitation rate by residents surrounding Poás, there would also be a very high perception of benefits. However, this is not the case; residents in the communities surrounding Poás have the lowest average rating of both categories of perceived benefits. The high level of development and self-organization present in the towns surrounding Poás could provide an explanation for this difference. As mentioned above, when asked, residents near Poás did not associate the protected area with these benefits. In contrast, the towns near Irazú and Braulio Carrillo are much less economically developed or oriented towards the potential income from tourists and are

less motivated to engage in such activities. They may place a higher value on socio-economic benefits from the protected area because they have not gone through the process of creating these benefits for themselves and therefore do not have a specific entity other than the protected area to attribute them to. In addition, the percentage of total visitors who are of foreign origin is much greater in Poás than in the other two parks. This could also be a reason for the high economic development in the communities near Poás, where foreigners, who might have more disposable income than domestic visitors, are present in high numbers. Irazú and Braulio Carillo, contrastingly, have visitation rates that include a high percentage of Costa Ricans, who may only be visiting for the day and have less potential to spend money on goods and services marketed to tourists.

Most residents interviewed were employed directly in agriculture or indirectly from agriculture. Because agriculture as a source of livelihood is so intertwined with environmental factors, this could explain why environmental benefits are of greater interest overall, and have a high average especially in the towns near Irazú and Braulio Carrillo where economic benefits from tourism are not as important. In addition, rural residents employed in agriculture may be more aware of environmental problems in general due to their reliance on the land and need for protection of these resources.

Many residents commented on the fact that they now have to pay an entrance fee, whereas in the past it was free for those living near the protected areas. The cost is relatively low (\$2 for residents), but is enough to discourage many from going to the protected area. However, this fee “contributes to the Protected area System of the Ministry of the Environment and Energy (MINAE), and the regional conservation areas

through the entrance fees to the system of the Protected areas. Income from the protected areas with high visitation rates is utilized for the protection and management of the entire protected area system” (Hearne 2002, p. 154). For a system that is largely underfunded and lacks the needed support to develop and maintain their protected areas in as desired, the income from these fees could be critical. In the case of Braulio Carrillo, many respondents mentioned that the highway that runs through the protected area is part of the community, but the protected area itself is not. In Irazú, a few mentioned that school and coworker groups used to go to the protected area for various activities, but that this is no longer the case, and the protected area has made little effort to invite community groups back. Older residents whose opinion of the protected area’s benefits and relationship with the community was more positive in the past have, in many cases, diminished opinions as a result of the fee.

Carrus et al. (2005) touch on the importance of regional pride and that it generally adds to support of protected areas, but only insofar as the protected area does not damage the integrity of the community. In instances where the protected area is established or enforced with external force that is seen to be intrusive, culturally or otherwise, the community may be against the concept and implementation of a protected area. Especially in instances of tourism development, it is critical to successfully involve the community in bottom-up development over time (Avramescu and Ungureanu 2008). Community leaders are important in spearheading this attitude and organizing community members in support or disapproval of the protected area’s actions. In keeping with this finding, although no significant relationship was found in perception of benefits when looking at leaders and residents of the communities interviewed in this study, it should

still be mentioned that many community members recommended the same community leaders and clearly held these individuals in high esteem. Contacting these individuals could prove to be an effective way of disseminating information and improving the relationship and frequency of contact between protected area employees and the surrounding communities.

Population density could also be a factor involved in the relationship between protected areas and the surrounding communities. Heinen (1996) discusses the importance of this as it applies to the areas surrounding protected areas. He states that a higher population density in communities very close to protected areas can lead to increased conflict and difficulty with forcible protection due to competition for resource extraction. In the case of the communities in this study, the population densities are very low and therefore this problem did not seem to be a current issue. If tourism increases dramatically, especially around Poás, this could change as developers obtain land and require additional resources.

In looking at distance between communities and protected areas, communities had very close average ratings of perceived environmental benefits. When looking at the data for socio-economic benefits, however, communities closer to the protected area perceived a significantly higher average than those further away. There are several explanations for this. Communities closer to the protected area, due to travel time, can more easily access the protected area. Some of the interview questions asked, such as those regarding creation of recreational spaces and increased value of properties surrounding the protected area, become more relevant closer to the protected area, and would therefore logically be perceived to exist more in closer communities.

Although visitation to the protected areas may have an effect on a community's perception of the protected area, other factors, such as employment opportunities from the protected area and age, have been found to have more of an impact (Anthony 2007; Nepal and Spiteri 2011). Only 36 (14.7%) of the 245 interviewed in this study knew an employee of the protected area; none were employed themselves. A few of the interviewees asked replied that the employees in the protected area come from outside and are not local community members. A stronger relationship between people in the closer community and people in the protected areas is necessary to improve perception of the protected area. However, as one respondent stated, "do we go to them, or do we wait for them to come to us?" (Ramirez 2012). This quote highlights both the dichotomy between the protected area and the communities as well as the confusion over how to approach the issue.

Chapter 8

Conclusion

This paper investigated only a small portion of a much larger interview, and the survey questions cited were not formulated specifically to answer the research questions defined in this study. The dataset was generated for a number of purposes, including to be of assistance to SINAC/MINAE in trying to facilitate a more thorough understanding of the current situation of the communities near several protected areas throughout Costa Rica. In addition, other students and instructors conducted much of the research over a long period of time, in which some factors could have changed.

There are many continuing research questions at the conclusion of the scope of this study. Options for Costa Ricans to utilize financial opportunities provided by tourists are numerous and need to be expanded upon with low-cost marketing. There definitely exists room for additional socio-economic development to take advantage of increasing rates of tourism in Costa Rica, and especially in this geographic area, as it is so close to the country's capital city.

I would also like to further explore the economic risk of investing heavily in tourism, as foreign dollars from visitors tend to fluctuate with global economic trends, health concerns, or general tourism preferences. Although not a huge decrease, there was definitely an impact on tourism visitation rates in 2009 following the housing bust and global recession. Income from goods and services provided to foreign visitors is not an inherently reliable source of revenue and, as with any other economic choice that is not

diversified, it is a dangerous investment. Any future discussion regarding relying on tourism as a major source of revenue needs to include options at every price point to sustain economic development in any scenario.

Additionally, this study addresses only three protected areas in a region that is economically supported by tourists who travel from San José to other areas of the country. A study covering a larger geographic scope of Costa Rica would be helpful in determining if there are any national management policies and best practices that could be applied to improve the protected area system.

In all cases, the protected areas have room for improvement in community relations. Communication between protected area employees and community members is insufficient. Additional outreach from both sides to enhance development and socio-economic benefits between the entities is needed. Residents, overall, perceive more environmental benefits from the protected area, which can be explained by the main source of income (agriculture) and a lack of socio-economic organization in many of the communities. Communities closer to the protected areas rated socio-economic benefits higher, which can be attributed to easier access by visitors. Improved protected area relations with surrounding communities is likely to lead to improved perception of socio-economic benefits, as this would create a greater understanding of the possibilities resultant from positive collaboration. A mutually beneficial relationship between protected areas and the communities surrounding them has the potential to create resilience and a positive future for both entities.

Appendix A

Relevant Survey Questions

RELATIONSHIP WITH PROTECTED AREA

Now we would like to ask you a few questions about the level of attachment that the community has with Volcán ____ National Park...

1. Have you ever visited Volcán ____?
 1. Yes___ 1b. How many times in the last 5 years? ___
 2. No___ Why not?

2. How many years has it been since you last visited Volcán ____? _____years

3. Would you consider Volcán _____ to be part of your community?
 1. Yes___
 2. No___ Why not?

4. In your opinion, the relationship between Volcán _____ and the community is...?

Value		X
1	Nonexistent	
2	Weak	
3	Regular	
4	Strong	
5	Very Strong	

5. Do members of this community participate in any of the following list of activities of Volcán _____?

	X
a. Volunteer as Local Guides	
b. Committee on Emergencies	
c. Environmental Education Activities	
d. Activities to control and protect natural resources (Groups like COVIRENAS)	
e. Others?	

6. Of the following list of benefits that Volcán _____ National Park could provide, which do you think the community has received?

	X
a. Protects water	
b. Helps to purify the air (produces oxygen)	
c. Protects plants, animals, and ecosystems in general	
d. Protects the soil (reduction in erosion)	
e. Increases overall landscape beauty	
f. Helps to prevent emergencies/natural disasters	
g. Collaborates in community development	
h. Creates recreational spaces	
i. Increases the value of properties surrounding the park	
j. Improves vital infrastructure	
k. Collaborates in installation of public services	
l. Is a source of employment	
m. Increases income due to tourist activities	
n. Has the park created any other benefits? What is/are they?	

7. Are there projects or activities in the community regarding _____?

	X
a. Support for micro and small businesses	
b. Municipal or master plan	
c. Workshops on environmental issues	
d. Collection of solid wastes	
e. River cleanup	
f. Disaster prevention and mitigation	
g. Environmentally friendly agricultural and industrial practices	
h. Others? Can you name them?	

8. Who do you know that works for the Park?

	X	¿Do you know his/her name?
a. The Director?		
b. Any other employee?		

9. Do you think the community would be willing to develop joint projects with the staff of the Park?

1. Yes___ What?

2. No___ Why not?

Appendix B

Raw Data RE: perceived environmental and socio-economic benefits

1: Average percentages, by community, of perceived environmental benefits received from Poás, Braulio Carrillo, and Irazú national parks. Data was collected through interviews in nine communities between fall 2011 and fall 2012.

	Generate and protect water	Help purify the air	Protect plants, animals and ecosystems in general	Protect soil Health	Increase overall landscape beauty
Vara Blanca	35%	50%	58%	42%	65%
Poasito	63%	63%	83%	54%	100%
Fraijanes	65%	52%	74%	61%	78%
Cubuquijú	76%	84%	88%	84%	88%
La Virgen	76%	91%	91%	88%	91%
Horquetas	93%	90%	100%	97%	97%
Tierra Blanca	74%	74%	83%	81%	96%
San Juan de Chicuá	88%	53%	88%	71%	94%
Portrero Cerrado	67%	62%	76%	67%	90%
Overall Averages	71%	69%	82%	72%	89%

2: Averages, by community, of perceived socio-economic benefits received from Poás, Braulio Carrillo, and Irazú national parks.
Data was collected through interviews in nine communities between fall 2011 and fall 2012.

	Help to prevent emergencies	Collaborate in community development	Generate recreational areas	Gives higher value to properties surrounding the park	Improvement of vital infrastructure	Collaborate on installation of public services	Generate sources of employment	Increase in economic opportunities due to tourism
Vara Blanca	46%	19%	27%	38%	15%	12%	15%	65%
Poasito	63%	54%	63%	71%	58%	54%	58%	71%
Fraijanes	48%	48%	48%	57%	35%	22%	65%	61%
Cujujuquí	52%	28%	36%	72%	48%	36%	44%	36%
La Virgen	73%	45%	67%	73%	70%	55%	76%	76%
Horquetas	45%	41%	45%	76%	41%	31%	69%	69%
Tierra Blanca	64%	47%	72%	70%	62%	51%	60%	57%
San Juan de Chicué	82%	76%	71%	82%	82%	65%	65%	65%
Portrero Cerrado	71%	52%	52%	57%	71%	43%	52%	52%
Overall Averages	60%	46%	53%	66%	54%	41%	56%	61%

BIBLIOGRAPHY

- ACCV/UNA-IDESP. 2011. Encuesta de percepción de las comunidades sobre la relación con el ambiente. Proyecto: gestión y promoción de proyectos socio-productivos con vocación ambiental en la RBCVC. 3pp.
- Agrawal, A. 1999. Enchantment and Disenchantment: The Role of Community in Natural Resource Conservation. *World Development* 27(4): 629-49.
- Andrew-Essien, E., and F. Bisong. 2009. Conflicts, Conservation and Natural Resource Use in Protected Area Systems: An Analysis of Recurrent Issues. *European Journal of Scientific Research* 25(1): 118-29.
- Anthony, B. 2007. The dual nature of protected areas: attitudes of neighbouring communities towards Kruger National Protected area, South Africa. *Environmental Conservation* 34: 236-245.
- Anywhere Costa Rica. N.d. [*Location of the three protected areas studied in this paper*]. Retrieved from <http://www.anywherecostarica.com/maps/protected-areas-reserves-rivers>
- Arias, L. "Inter-American Development Bank Approves \$20 Million Loan for Improvements in Costa Rica's Protected Nature Areas." *McClatchy - Tribune Business News* Nov 06 2013. *ProQuest*. Web. 1 Mar. 2014 .
- Avramescu, T. C., E. Ungureanu. 2008. The Effects of Tourism Development on Local Communities. *An Enterprise Odyssey: International Conference Proceedings*, University of Zagreb, Zagreb. 1584-1592.

- "Biodiversity in Costa Rica." *INBio*. Instituto Nacional De Biodiversidad, 2014. Web. 07 Mar. 2014.
- Brenes, G. C. 2014. National System of Conservation Areas (Costa Rica). *The REDD Desk*. Retrieved March 7, 2014, from <http://theredddesk.org/countries/actors/national-system-conservation-areas-costa-rica>
- Brown, K. 2002. Innovations for conservation and development. *Geographic Journal* 168(1): 1475-4959.
- Cabrera, J., Perron-Welch, F., Keenan, A., & Wandel, A. N.d. Crafting Visionary Biodiversity Laws: Costa Rica's Biodiversit Law 1998. *Worl Future Cuncil*. Retrieved March 7, 2014.
- Carrus, G., M. Bonaiuto, and M. Bonnes. 2005. Environmental Concern, Regional Identity, and Support for Protected Areas in Italy. *Environment and Behavior* 37(2): 237-57.
- Central Intelligence Agency. n.d. Costa Rica. *The World Factbook*. Retrieved March 7, 2014, from <https://www.cia.gov/library/publications/the-world-factbook/geos/cs.html>
- Cepeda Gómez, C. 2008. Relación entre el capital natural y el financiero con el bienestar de la comunidad en Holbox, Quintana Roo, México. Tesis Mag. Sc. Turrialba, CR, CATIE.116.
- Chacon, C., R. Castro, and S. Mack. 1998. Pilot Phase Joint Implementation Projects in Costa Rica: A Case Study. Center for International Environmental Law, Washington, D.C.

Costa Rica National Parks. n.d. *Costa Rica Guides*. Retrieved March 7, 2014, from

http://www.costaricaguides.com/national_parks

Costa Rican Institute of Tourism. n.d. [*Illustration of increasing tourism*]. Retrieved from

<http://www.amcostarica.com/tourismarrivasl051911.jpg>

Education in Costa Rica. n.d. *InterNations*. Retrieved March 7, 2014, from

<http://www.internations.org/costa-rica-expats/guide/living-in-costa-rica-15466/education-in-costa-rica-2>

Farrell, T. A., & Marion, J. L. 2001. Identifying and assessing ecotourism visitor impacts at eight protected areas in Costa Rica and Belize. *Environmental Conservation*.

Retrieved from

<http://journals.cambridge.org/action/displayAbstract?fromPage=online&aid=88153&fulltextType=RA&fileId=S0376892901000224>

Fendt, L., & Harrell, A. 2013. Gold miners invade Corcovado. *The Tico Times*. Retrieved

March 7, 2014, from <http://www.ticotimes.net/2013/03/01/gold-miners-invade-corcovado>

Ferraro, P.J., and Merlin M. Hanauer. 2011. "Protecting Ecosystems and Alleviating

Poverty with Parks and Reserves: 'win-win' or Tradeoffs?" *Environmental and Resource Economics* 48(2): 269-86. *Springer*. Web. 7 Mar. 2014.

Gimmi, U., L. Schmidt, J. Hawbaker, C. Alcántara, U. Gafvert, and V.C. Radeloff. 2011.

Increasing Development in the Surroundings of U.S. National Protected area Service Holdings Jeopardizes Protected area Effectiveness. *Journal of Environmental Management* 92(1): 229-39.

- Global Environment Facility. 2008. Request for CEO Endorsement/approval. *United Nations Development Programme*. Retrieved from http://www.thegef.org/gef/sites/thegef.org/files/repository/Costa%20Rica_09-03-08_Overcoming_Barriers_Sustainability_PAS_GEFID2773.pdf
- Global Environment Facility. 2013. Costa Rica y el FMAM. Retrieved from http://www.thegef.org/gef/sites/thegef.org/files/publication/Costa%20Rica%20-%20Fact%20Sheet%20-%20Feb2013_ES.pdf
- Goldman M. 2001. Constructing an environmental state: eco-governmentality and other transnational practices of a 'green' world bank. *Soc. Prob.* 48(4):499-523
- Gutiérrez, I. and J. Siles. 2008. Diagnóstico de medios de vida y capitales de la comunidad de Humedales de Medio Queso, Los Chiles, Costa Rica. IUCN, Regional Office for Meso-America; CATIE - San José, Costa Rica. 140 pp.
- Hearne, R.R., & Salinas, Z. M. 2002. The use of choice experiments in the analysis of tourist preferences for ecotourism development in Costa Rica. *Journal of Environmental Management*, 65, 153-163.
- Heinen, J.T. 1996. Human Behavior, Incentives, and Protected Area Management. *Conservation Biology* 10(2): 681-684.
- Hitzen, A. Costa Rica: Pros and Cons of Ecotourism. Retrieved from [http://www.as.miami.edu/clas/pdf/ncss/Costa%20Rica%20lesson%20plan%20\(Final\).pdf](http://www.as.miami.edu/clas/pdf/ncss/Costa%20Rica%20lesson%20plan%20(Final).pdf)
- Induni, G Castillo, J, & Osawa, M. 2012. *An overview to the Costa Rican protected areas*. from First Asia Parks Congress Web Site: http://asia-parks.org/pdf/wg2/APC_WG6-15_Gustavo%20Induni.pdf

- Jimenez, G. 2010. Estadísticas de visitación del año 2010 del ACCVC-SINAC.
- Kanath, K. and S. Nepal. 2011. Local Residents Perception of Benefits and Losses from Protected Areas in India and Nepal. *Environmental Management* 49: 372-386.
- McAlpin, M. 2008. Conservation and community-based development through ecotourism in the temperate rainforest of southern Chile. *Policy Sciences* 41(1): 51-69.
- Mendéz-Contreras, J., F. Dickinson, and T. Castillo-Burguete. 2008. Community Member Viewpoints on the Ría Celestún Biosphere Reserve, Yucatan, Mexico: Suggestions for Improving the Community/Natural Protected Area Relationship. *Human Ecology* 36(1): 111-123
- Naughton-Treves, L., M. B. Holland, and K. Brandon. 2005. The role of Protected Areas in Conserving Biodiversity and Sustaining Local Livelihoods. *Annual Review of Environment and Resources* 30: 219-252.
- Nepal, S. and A. Spiteri 2011. Linking Livelihoods and Conservation: An Examination of Local Residents' Perceived Linkages Between Conservation and Livelihood Benefits Around Nepal's Chitwan National Protected area. *Environmental Management* 47(5): 727-738.
- Ormsby, A. and B. A. Kaplin. 2005. A framework for understanding community resident perceptions of Masoala National Protected area, Madagascar. *Environmental Conservation* 32: 156-164.
- Perez, N. 2002. "Achieving Sustainable Livelihoods - a Case Study of a Mexican Rural Community." *Community Development Journal* 37(2): 178-87.

- Petrova, S., S. Bouzarovski-Buzar, and M. Cihar. 2009. From inflexible national legislation to flexible local governance: Management practices in the Pelister National Protected area, Republic of Macedonia. *GeoJournal* 74(6): 589-598.
- Rosero-Bixby, Luis, and Alberto Palloni. N.d. "Population and Deforestation in Costa Rica." *Social Science Computing Cooperative - University of Wisconsin*. Web.
- Secretariat of the Convention on Biological Diversity 2008. *Protected Areas in Today's World: Their Values and Benefits for the Welfare of the Planet*. Montreal, Technical Series no. 36, i-vii + 96 pages.
- Suryanto, P., M. Z. Hamzah, A. Mohamed, M. A. Alias, Nawari, and Wiratno. 2011. Exploring the Potential of Silviculture Agroforestry Regime as a Compatible Management in Southern Gunung Merapi National Protected area, Java, Indonesia. *Journal of Sustainable Development* 4(3): 81-93.

ACADEMIC VITA

Lina Montopoli
lmontopoli@gmail.com

Education

The Pennsylvania State University, University Park, PA *Expected May 2014*
The Schreyer Honors College
B.S. In Community, Environment, and Development: International Development Option

School for Field Studies
Sustainable Development Studies

Association Memberships/Activities

College of Agricultural Sciences Representative to the University Park Undergraduate Association (Student Government), April 2013 – April 2014

Executive Editor of the CED Undergraduate Research Journal, January 2011 – Present

Relevant Professional Experience

Research and Teaching Assistant for Ted Alter, Professor of Agricultural, Environmental and Regional Economics at Penn State University, Summer 2011 – December 2013

George Washington University Office of Sustainability Intern, September 2009 – January 2010

Publications and Papers

- Montopoli, L. (2013). The Power of Institutions: Standardized Test Cheating in Atlanta. *The Community, Environment, and Development Undergraduate Research Journal*.
- Fortunato, M. W -P, Theodore R. A., Bridger, J. C., Schramm, K. A., & Montopoli, L. (2013). Weighing the Universal Service Obligation: Introducing Rural Well-Being as a Consideration in the Viability of the United States Postal Service. *Community Development*.