2-1-2018 1:30 PM

Perceptions of Primates and Protected Areas: Ethnoprimatological Implications for Conservation in the Pacoche Refuge

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Graduate Program in Anthropology
A thesis submitted in partial fulfillment of the requirements for the degree in Master of Arts

Abstract

This research uses an ethnoprimatological approach to investigate people's perceptions of primates and protected areas through a case study in the Pacoche Marine and Coastal Wildlife Refuge in Manabí, Ecuador. Twenty-one agricultural workers from the community of Pacoche were interviewed using a photo pile-sorting exercise and structured open-ended interviews between July and August 2018.

Key findings regarding perceptions of primates indicate that despite previous local practices, in comparison to other faunal species in the park, primates are no longer commonly targeted for food or medicinal purposes. White-fronted capuchins *micos*, while reported to be damaging to corn and orange plots, and commonly viewed as aggressive, were also widely respected as human-like and intelligent. This indicates promise for their conservation status in this area. The mantled howler *mono* also demonstrated similar promise, in that participants indicated a respect and harmony living alongside this primate. Results reveal folkloric beliefs of howlers as "rain prophets" calling to the gods to bring the rain during times of drought. These traits, alongside their ability to attract tourists to the area, indicate reciprocal relationships between humans and alloprimates that benefit the livelihoods of both parties.

While connections between the community and the environment indicate a natural-cultural balance, interactions with the Ministry of the Environment (MAE) reveal more contentious results. For instance, this study found an overall decrease in hunting and exotic pet ownership since the introduction of the protected area ten years ago. However, discrepancies between community members and the MAE still exist over natural resource extraction, particularly in regards to guadua bamboo and firewood. The results indicate a need for improved community engagement in conservation initiatives, in addition to the incorporation of local ecological knowledge in park policy.

Keywords: Ethnoprimatology, ecological knowledge, pile-sorting, primate conservation, community perspectives, protected areas, mantled howler monkey, white-fronted capuchin, coastal Ecuador.

Acknowledgements

My decision to return to school to pursue my passion for primates was one of the best and riskiest choices I've ever made. While not everyone in my life understands why I selected this path, after years of feeling lost, or stuck "chasing my own tail", I finally feel like I am in the right place.

The completion of this Master's thesis would not have been possible without the support and advice of a few key individuals who deserve a special thanks. Firstly, I would like to thank my incredible husband Santiago. You arrived in Canada right as I was two months into my Master's program, and have had a front seat to all the late nights, and frustrations that make up the life of a graduate student. Thank you for your forgiveness and patience with me, as I am not always my best self when I am on a deadline. Your constant support as I chase my dreams has given me the confidence to reach for the sky and to push myself to take on new challenges. Thank you for taking care of me when I am not taking care of myself, and for reminding me that the process is just as important as the final product.

Thank you to my family and friends, Judy and Bob MacDermott, Lyndsay Boyes, Barry and Josie Britton, and Amanda Suko, for the late night chats, writing tips, feedback and financial support which made this study possible.

I would also like to thank my supervisor Dr. Ian Colquhoun, for his humor, his advice, and his time spent listening to my many plans and ideas. Thank you for guiding me in the right direction, introducing me to some fabulous literature, and for putting up with my typos. Dr. Kim Clark also deserves a special thanks, as my thesis advisor she has been a vital member of my Master's team, helping me navigate graduate school and assisting with translation double checks. I would also like to thank Dr. Adriana Premat, Dr. Andrew Walsh and Dr. Jean-Francois Millaire whom all have offered valuable advice during this thesis.

I would like to thank the Anthropology Department for your generosity in supporting my research expenses, and for making my dream of meeting my idol Dr. Jane Goodall come true. Funding was also provided for this study from the Graduate Research Award and the Regna Darnell Graduate Award for Fieldwork in Sociocultural Anthropology. I am so very appreciative.

This study would not be possible without the incredible people of Pacoche who welcomed me into their homes with open arms, I am so grateful to you all. In particular, I would like to thank Fabiola Lopez Calderon and Johnni Montalvan, Ramon Flores, and Reina Heinz for their support and friendship while in the field. Finally, a special thanks goes out to Ana de la Torre, and Adolfo Cevallos from Greenearth Ecuador who supported my logistics while in the field, and I look forward to our continued collaboration in future endeavors.

Table of Contents

Chapter One: Statement of the Problem

Western Ecuador is a region rich with numerous endemic species (Cervera et al., 2018; Myers et al., 2000; Mittermeier & Rylands, 2017) but some of the most threatened tropical forests on the planet are found here (WWF, 2015). Data on the conservation status of even well-known species is sparse at best (Cervera et al., 2018; de la Torre, 2012). Ecuador has "one of the highest deforestation rates in South America, estimated between 70,000 and 190,000 hectares per year" (MAE, 2013, Cervera et al., 2017, p. 10), with the widespread deforestation in the coastal regions of the country being the leading threat to primate habitats. Forest loss and fragmentation due to anthropogenic pressures has resulted in the loss of an estimated 72% of original forest coverage over the past few decades (Conservation International, 2007; Cervera et al., 2015; MAE, 2012). According Cervera et al. (2018), the earthquake that hit the coast of Ecuador in 2016 caused additional widespread damage to the forests. This was due to landslides and the increased demand for natural resources needed to reconstruct infrastructure. This humanitarian crisis diverted attentions and resources to rebuilding, which further threatened the balance of these fragile ecosystems.

Today, due to their proximity to the city of Manta, rural communities within and bordering the Pacoche Coastal and Marine Wildlife Refuge are increasing at a rapid rate with an estimated population of 3,948 inhabitants (MAE, 2009). These communities lack basic services, infrastructure and access to employment opportunities, depending primarily on fishing and agriculture to meet their most basic needs. Pimbert and Pretty (1995) state that the costs of conservation can be high for the people that live in protected areas. Conservation goals often threaten people's livelihoods, forcing local residents to find solutions for themselves.

Due to the flat terrain, fertile soil and access to water "the exponential increase in agricultural activity, such as timber extraction, and the establishment of large-scale palm oil, eucalyptus, *toquilla* straw, and sugar cane plantations are the major causes of forest loss in the coastal region" (Cervera et al., 2015, p. 2). The wide-scale forest clearing for agriculture has resulted in the transformation of the coastal forest landscape, producing a topography of fragmented forest patches that continue to shrink with each passing year (MAE, 2009). The Pacoche Refuge has been a protected forest since 2008, meaning that regulations have criminalized activities

including natural resource extraction, such as wood for cooking and sale, and agricultural practices, such as the common slash and burn approach, which continue to threaten its biodiversity. Campos and Jack (2013) also propose tree felling, and uncontrolled fires associated with this type of land clearing, as common anthropogenic concerns.

According to de la Torre (2012), habitat loss has been historically greater in the coastal regions where the two Critically Endangered primate taxa *Cebus aequatorialis* and *Ateles fusciceps* are found. This catastrophic forest loss across western Ecuador has been documented since the early 1990's (Dodson & Gentry, 1991), meaning that all of the remaining areas containing suitable habitat for *Cebus aequatorialis* and *Alouatta palliata* should be considered highly threatened and irreplaceable. Research conducted in 2003-2005 by Campos and Jack (2013) present the Pacoche Wildlife Refuge (before its inception as a protected reserve) as one of the few ideal habitats left for these species due to its extent of continuous and undisturbed forest.

Despite the distinct nature of this region, the primate species inhabiting these coastal forests have not received the same attention within the academic community as those of the Amazonian regions (Cervera, et al., 2015; de la Torre, 2012). Adequate scientific knowledge on these species has been limited by socio-economic constraints and lack of political support (de la Torre, 2012). According to de la Torre (2012), studies of primate species west of the Andes have been much more limited, and tend to be concentrated on two ecological reserves, Bilsa Biological Station and Los Cedros Biological Research Station (Tirira, 2011; Helenbrook et al., 2015). While this trend is beginning to change, there remains limited information on the size of the home ranges, or the population status of coastal primate species, with particular concern for the Critically Endangered *C. aequatorialis* (de la Torre, 2012). With over 20 years of experience as a primate biologist in Ecuador, de la Torre (2012) contends that some of the key obstacles to Ecuadorian primate conservation are evident by the low environmental awareness of local communities, and a relatively low and dispersed collaboration with international institutions regarding conservation concerns.

While a Conservation Action Plan for the entirety of the Ecuadorian coastal region is currently in the making, most forest fragments west of the Andes cordillera are unprotected and are unlikely to support extant populations of endangered primates (Campos & Jack, 2013). Therefore,

focusing more readily on the Pacoche Coastal and Marine Wildlife Refuge is a valuable and attainable first step to conserving these species, due the high degree of endemism found there.

Given these circumstances, the natural-cultural dichotomy[1] could not be more conspicuous between the local communities struggling to meet their most basic needs, and conservationists fighting to protect these fragile ecosystems. Haraway (2008) proposes that if we look at the natural-cultural interface as layers of reciprocal relations, constantly co-shaping each other, in complexities across space and time (Haraway, 2008; Ingold, 2012), we gain an appreciation and a respect for these inter-species connections. In order the address this challenge, Leslie Sponsel (1997) coined the term "ethnoprimatology" which positions human beings as an integral component in an ecosystem, not as an outsider divorced from the ecological context. This approach focuses on the multitude of interconnections that exist between human beings and other primates (hereafter, "alloprimates").

Cervera et al. (2015), argue that in the case of Pacoche, given the precarious nature of these habitats, local support of conservation initiatives is essential. They highlight that the permanent engagement of community members through awareness to foster perceptions of local ownership of the protected area is needed to improve the conservation status of primate populations (Campos & Jack 2013; Horwich et al., 2012; Shanee et al., 2014).

In order to begin this process, this thesis therefore uses an ethnoprimatological approach to investigate people's perceptions of primates and protected areas through a case study of the Pacoche Marine and Coastal Wildlife Refuge in Manabí Ecuador. The results of this study expose the value of this method in harnessing local ecological knowledge[2] to provide insights

[1] The natural–cultural dichotomy refers to a theoretical foundation of anthropology regarding perceived tensions between nature and culture (Haraway, 2003). These tensions, rooted in colonialism, minimize the interconnectivity between *Homo sapiens* and the environment by dictating a hierarchy of humans as exceptional and superior beings.
[2] Ecological knowledge refers to forms of knowledge regarding sustainability and use of local resources. Within the field of study in anthropology it is referred to as a body of knowledge, belief, and practice, evolving by accumulation of knowledge about the relationship of living beings with the environment that is handed down through generations. For the purposes of this study, "ecological knowledge" refers to the epistemologies of participant agricultural workers in the community of Pacoche within their specific local environmental context.

that challenge top-down conservation paradigms[3], while simultaneously revealing areas of promise and potential to redefine conservation objectives.

The key research questions for this study are twofold:

1) What relationships exist between alloprimate and human communities, and what cultural relevance and values do people associate with these species?

2) How do these values and local ecological knowledge relate to current conservation strategies in the Pacoche Refuge?

It is proposed that using an ethnoprimatological approach offers a valuable tool for investigating modern conservation issues, as these initiatives "must be both environmentally and socially durable" (Caldecott 1996, p. 250). Through the interdisciplinary nature of the ethnoprimatological method, a coexistence paradigm is applied to conservation which uses a holistic approach to link together the survival challenges faced by both humans and alloprimates. This model focuses on finding locally relevant and community-based solutions to conservation concerns.

Addressing the aforementioned research questions will begin in Chapter Two with a brief introduction to ethnoprimatology. This section will provide detail on the foundations of this interdisciplinary approach and its valuable contribution to the field of anthropology and conservation. This will be followed by contextual detail in Chapter Three, which provides background information on the field-site, as well as the human and alloprimate study subjects who are the focus of this investigation. In Chapter Four the methods used for this study are discussed, covering topics such as sampling/recruitment and ethnographic methods, including study limitations, data analysis, ethical considerations, and positionality. Building on the previous section, these methods are then demonstrated in Chapter Five: Natural-Cultural Results with a presentation of the study results in the following order: socio-demographic patterns, representative data from structured interviews, and community perceptions of primates and relevant species comparisons from the pile-sorting activity. Chapter Six: Ethnoprimatological

[3] Top-down conservation paradigms refers to the "fortress conservation" model. Based on Yellowstone National Park, this model positions wilderness in opposition to civilization, where policy presents an ideal protected space as untouched by modernization (Nash, 1982).

Contributions to Conservation, then discusses the key themes that emerged from the data that show potential conservation implications, these include: 1) policy meets practice, 2) folkloric and anthropomorphic belief systems, and 3) touristic value of primates. This chapter demonstrates the ways in which these new perspectives highlight natural-cultural connections and proposes future research efforts to include local knowledge in conservation planning. Chapter Seven is the conclusion of this thesis, presenting a summary of the findings and a brief discussion of areas for future research.

Chapter Two: What is Ethnoprimatology?

> Alloprimates do more than just occupy tourist sites, agricultural spaces and forest patches, they co-produce and co-construct human landscapes… [and livelihoods] (Fuentes, 2010, p. 610).

The key premise behind ethnoprimatology is to provide alternative insights to effectively conserve the world's primate species. Given that "60% of primates are now threatened with extinction and 75% have declining populations, … as a result of escalating anthropogenic pressures" (Estrada et al., 2017, p.1), understanding the human dimensions of the conservation puzzle is essential. The majority of alloprimate species exist in biodiversity hotspots located in some of the most highly populated and impoverished parts of the globe (Strier, 2010), thus studying how we can coexist with our closest biological relatives in increasingly human-dominated landscapes becomes of utter urgency.

Ethnoprimatology contributes a wider field of agents and structures otherwise disregarded in purely ecological investigations. It opens up the potential to socialize ecosystems, through ideological lenses and power imbalances that are present within the conservation paradigm (Dore, 2018). By adding ethnographic perspectives to ecological issues, ethnoprimatology helps to bridge the natural-cultural divide that often prevents sustainable solutions from surfacing.

As the field of anthropology is concerned with understanding what it means to be human, exploring the human–other interface allows us to learn about ourselves, and why we do what we do, in terms of how we treat our environment through the creation of cultural and ecological niches. Ethnoprimatology adds a theoretical and methodological lens to this tool kit in order to study the multifaceted ways the ecologies, histories, and livelihoods of human populations worldwide intersect with alloprimates and the implications of those interconnections for conservation (Riley, 2007; Riley, 2018).

While not the first scholar to bring awareness to the human–primate interface (Baker, 1992; De Vore & Washburn, 1992; Fa, 1991; Jay, 1963; Southwick et al., 1965; Strum & Western, 1982; Wrangham, 1974), sociocultural and ecological anthropologist Leslie Sponsel officially coined the term "Ethnoprimatology" in 1997 in his chapter "The Human Niche in Amazonia:

Explorations in Ethnoprimatology". Here he challenged the rigidity of biological and cultural anthropological traditions, stating that "human phenomena are not so neatly compartmentalized. *Homo sapiens* is simultaneously an organic, mental, linguistic, and cultural being, all of these four are important components in adaptation to the natural environment" (p.114). Sponsel (1997) then proposed six overlapping lines of inquiry within the ethnoprimatological approach: 1) comparative ecology, 2) predation ecology, 3) symbiotic ecology, 4) cultural ecology, 5) ethnoecology, and 6) conservation ecology. This particular study focuses predominantly on the intersection of what Sponsel defines as cultural/ethno and conservation ecology.

Cultural ecology is defined by Sponsel (1997) as, "the relevance of [allo]primate species and the cultural level of interaction between a human population and its ecosystem" (p.144). This overlaps with what Sponsel calls ethnoecology, or "knowledge, beliefs and values regarding environmental domains such as [allo]primates" (p.144). Conservation ecology is then explained as "human use and management of [allo]primate populations as a renewable resource including the positive and negative impact of humans on the population and their habitats" (p.144). According to Riley (2018), early ethnoprimatology thus became used as a methodology by sociocultural anthropologists and scholars trained in the Kyoto school of primatology by stressing the importance of thick descriptive data to explain these ecological relationships (Asquith, 1996; Jay, 1963; Takasaki, 2000).

Ethnoprimatology in its foundation brings together theoretical and methodological approaches from various fields, across the social and natural sciences, to provide a holistic perspective from which to investigate the social, cultural, ecological, historical, political and economic factors involved with primate conservation (Campbell et al., 2010; Fuentes, 2012; Humle & Hill, 2016; Setchell et al., 2017; Riley & Ellwanger, 2013). Integrated methodologies commonly used in the ethnoprimatology tool kit include: "field primatology, behavioral ecology, human ecology, ethnography, ethnology, folklore, history, geography (including landscape analyses), economics, surveys, and interviews" (Fuentes, 2012, p.106). The conservation challenges facing us today are complex and do not have a simple one-size fits all solution, thus the need to integrate various perspectives provides an opportunity to tackle these issues from a wider point of view. Given the fluidity of human and alloprimate interactions, it is a common strength in ethnoprimatological research for investigators to utilize a mixed-methods approach to data collection, and to rely

heavily on an interdisciplinary approach and collaboration with local experts (Setchell et al., 2017; Riley & Ellwanger, 2013). Reliance on these collaborations is stressed throughout the literature on the subject (Campbell et al., 2010; Fuentes, 2012; Humle & Hill, 2016; Setchell et al., 2017; Riley & Ellwanger, 2013). As few primates today live in habitats untouched by human effects (McKinney, Westin, & Serio-Silva, 2015), studying these complex interactions is crucial to promote the conservation of primate species around the world.

While ethnoprimatology is a relatively new subfield of anthropology, Campbell, Fuentes, & MacKinnon et al.'s (2010) chapter on the "Future of Ethnoprimatological Research" states that primatology itself has always been interdisciplinary in its inquiry about human evolution and innate behaviours. Although an evolutionary approach to primatology is just one of the many areas of focus, a more modern approach to the field requires a higher reliance on cross-disciplinary collaboration than ever before. It has led to exciting new areas of study, such as primate eco-tourism, crop-foraging, and primate hunting, and thus new data sets which help us to understanding the possibility of coexistence. However, Campbell, Fuentes, & MacKinnon, et al. (2010) also allude to how these collaborations are by no means flawless, and are often wrought with deeply-rooted tensions between the natural and social sciences. Within the competitive arena of academia, where funding and tenure positions are scarce, researchers have a tendency to be territorial over their work. This presents an obstacle to the discipline moving forward. Thus, these authors call for the need and appreciation for various complementary niches of investigation and global communication networks of sharing information in order to strengthen the discipline in the future.

Given the widespread effects of anthropogenic disturbances, ethnoprimatologists have responded by expressing the need for a new paradigm to think about human relationships with the environment. Across the literature, authors suggest that we need to move away from a conflict paradigm where humans are targeted as the destroyers of the environment (McKinney, Westin, & Serio-Silva, 2015; Riley, 2007; Sponsel, 1997), where primate-human interactions are viewed as problematic (Humle & Hill, 2016), and conservation projects are implemented from a top-down perspective (Lee, 2010). Instead of a resource as something to be exploited, we need to change the way human beings "think" about the environment and the animals that live within it (Riley, 2007; Fuentes & Hocking, 2010). Thus, ethnoprimatology provides us with an alternative

perspective that focuses on the ways in which human beings and the environment are linked and depend on one another. It allows human beings the opportunity to overcome nature-culture dichotomies, and to open up to new possibilities of reciprocal relationships, complex power dynamics, and intertwined histories that connect our species to each other and the landscape.

For instance, Fuentes (2010) argues that humans and animals are part of the same global ecology, in that these species are simultaneously actors and participants in sharing and shaping mutual ecologies. He uses the concept of niche construction to explore human-macaque contact zones where natural-cultural boundaries become unclear. It is within these shared spaces that he investigates how "human perceptions and land use intertwine with macaque social behavior and pathogen physiologies … [in turn] affecting the local ecologies and economies of both species" (p.619). He argues that anthropologists and primatologists should engage more with natural-cultural frameworks in order to understand these cultural, historical, and physiological dimensions at deeper levels.

Malone and Ovenden (2017) highlight the contribution of these frameworks of coexistence by arguing that mutual ecological and natural-cultural perspectives in ethnoprimatology create new insights into the various layers of socioecological relationships that remain under-explored. They explain that these insights become increasingly important as we continue to move into more globalized and complex ecological relationships with the natural environment.

Riley (2007) adds to this argument through her work in the Sulawesi Highlands where she investigates how people's link to place shapes how they interact with the natural world and their attitudes towards conservation and macaques. She discovered that respect for nature is linked to place, through direct long-term encounters with the environment. She then provides two strategies to encourage people to reconnect with nature. The first is the practical use of anthropomorphistic perspectives in order to gain respect for non-human primates. She says that adopting this point of view requires being able to see ourselves with animals and not opposed to them, as it emphasizes the human alloprimate connectivity as a means of understanding behaviour. Secondly, she highlights the need to encourage appreciation of shared spaces through the biological and morphological continuity between humans and non-human primates. By focusing on the need to share space harmoniously due to constantly overlapping livelihoods,

conservation decisions can be made that are mutually beneficial. Setchell et al.'s (2017) discussion of "transvaluation" mirrors these frameworks by arguing that critical reflection is needed, and humans must learn to value species based on their ecological, economic and symbolic roles in human lives, which move beyond colonial dichotomies of humans and animals.

By investigating the shared spaces and ecologies of humans and non-human primates and thus "retying knots of ordinary multispecies living on earth" (Haraway, 2008, p. 40), ethnoprimatologists provide a fresh perspective to modern anthropological and ecological challenges. These frameworks provide valuable tools for addressing the conservation issues of today because they invoke a new way of thinking about the environment which problematizes ideologies of human exceptionalism and grounds us within the ecosystems upon which we rely..

The key strength of the ethnoprimatological approach revolves around the inclusion of the "ethno" prefix, as it represents the addition of sociocultural anthropological theories and methods to primatology (Fuentes, 2012). By adding a sociocultural lens, ethnoprimatologists are able to investigate the belief systems as well as social, economic and political histories of the communities that share space with non-human primates. It is only through the inclusion of these components that ethnoprimatologists are uniquely positioned to adopt culturally-relevant and community-based strategies to conservation challenges. Ensuring that the interests and the needs of human populations are met, and that local populations feel a sense of ownership and pride in their ecosystem, is the most efficient way to work towards a sustainable conservation plan.

By understanding local value systems, Savage et al. (2010) demonstrate how finding culturally appropriate alternatives can have positive effects for both the local community and endangered primate species. Through their implementation of "Proyecto Titi" in Colombia, a community conservation project for cotton-top tamarins, Savage et al. (2010) found that families regularly harvested firewood from protected forest areas for cooking and heating purposes. This practice was not only destructive to the natural environment but also detrimental to human health, due to constant exposure to smoke in the confines of the home. Through a cultural assessment, a culturally-acceptable alternative called *bindes*, a traditional stove model that uses less wood and produces less smoke, was re-introduced for cooking, and created local jobs in the making of these stoves using local materials. Thus, by improving the health and practical needs of the

community, this project was also able reach its conservation goals of protecting natural resources. Through the creation of a waste disposal program that collected plastics from the forest, this project was also able to establish a new artisanal company for women's groups making eco-backpacks out of recycled materials. By putting people at the center of the conservation project, there is more likely to be a sense of ownership and support moving forward (Caldecott, 1996; Humle & Hill, 2016; Lee, 2010; Savage et al., 2010; Setchell et al., 2017; Sherrow, 2011; Wallis & Landorf, 2010). Without understanding how the local people perceive the environment they live in and the interconnections at play, any attempt at a long-term conservation strategy will be short-sighted and ineffective.

Ethnoprimatology, as a multi-faceted discipline, is interested in all forms of human alloprimate interactions; thus, investigations into primate tourism are becoming increasingly popular with ethnoprimatologists, as a means of finding sustainable solutions to conservation issues. Tourism is one of the fastest growing industries on the planet, and for many primate habitat countries, it is a leading source of income. While primates as tourist attractions present an opportunity to fund conservation initiatives, the commoditization of flora and fauna is wrought with ethical concerns for both the human beings and primates involved, often including power dynamics regarding wealth distribution (De la Torre, 2014).

Zhao (2005) provides an example of the challenges involved with primate tourism, through his investigation of tourist perceptions and local values associated with Tibetan macaques at Mt. Emei in China. His research uncovers that the traditional practice of Buddhist monks feeding the macaques during the winter to prevent famine, has gradually become a touristic "forced feeding" experience for personal merit. This has resulted in sometimes dangerous and even life-threatening exchanges for both humans and macaques. By investigating these tourist-primate interactions, Zhao was able to recommend more sustainable strategies for the tourist attraction to remain profitable, but reduce the danger to humans and non-human primates.

Ethnoprimatological Critiques

Leblan (2013) draws attention to the interdisciplinary weakness inherent in ethnoprimatology by claiming that collaboration between the social and natural sciences is an unrealistic partnership. He states that ecologists and biologists may have opposing scientific ideologies on what

"objective scientific" data consists of, and that conflicts might arise based on studying the social and cultural under the realm of the biological. He also argues that the combination of the prefix "ethno" and the interdisciplinarity of the approach itself creates a sort of "disciplinary uncertainty" where the addition of "ethno" could in fact be added to the study of any mammal in order to produce a similar social-scientific method (Leblan, 2013). The counter-argument here is that, because of our shared evolutionary history, and their "human-like" characteristics, alloprimates allow us to travel across these disciplinary boundaries more easily than other mammals (Fuentes, 2012).

An additional logistical challenge to incorporating multiple approaches in the field are the time and resources required. Often these types of research endeavors are conducted over long periods of time, and involve the incorporation of numerous researchers and/or research teams (Campbell, Fuentes, & MacKinnon, et al., 2010; Treves & Brandon, 2005). As a lone researcher with a limited budget and time frame, there is pressure to focus one's research on one or a few interconnecting factors in the field. In regards to this challenge, Riley & Ellwanger (2013) highlight the importance of having realistic expectations, a clear research plan, and local connections before setting out to conduct field-work.

Lee (2010), on the other hand, is skeptical of ethnoprimatology's role in conservation practice. She questions whether or not the approach functions in practice, in order to reach its conservation goals, and states that some of the key issues involve community engagement and deep-seated local resentments often involved with conservation and development in rural communities. Many well-intentioned projects fail because of lack of community support, often stemming from lack of cultural relevance, lack of long-term commitment, and lack of financial support. She advises us that the key strategy moving forward should be to listen more and tell less.

Thus, Savage et al. (2010) argue that an integrated approach to conservation is needed which develops environmental entrepreneurs by providing economic alternatives for communities and addressing their needs first. They explain that a behavioral change must take place before conservation programs begin, and that non-human primates can be used as a flagship species to evoke local pride in their own natural resources.

Humle and Hill (2016) add to this discussion through their investigation of human risk perception of crop loss. They stress that the importance of identifying people's concerns about alloprimate species is the first step to creating mutual tolerance and spreading awareness. They highlight how many conflicts between humans and alloprimates are the result of how people value a particular species and the power relations related to conservation planning. For example they explain that the lack of autonomy in the conservation process, or a lack of benefit sharing from tourism initiatives can lead to conflicts between local people, wildlife and the state. It is important to note that the presence of a protected area often heightens negative perceptions of local fauna and authority figures, including the impact of certain species on crops (Humle & Hill, 2016).

For example, Setchell et al. (2017) conducted a participatory action research project with Moroccan shepherds to uncover the history of exclusion they experienced from the state resulting in an imbalance of power relationships and mistrust. This investigation revealed diverse sociocultural and political perspectives surrounding how shepherds interact with the environment and the Barbary macaques that inhabit these spaces. A cultural assessment also uncovered that due to Islamic belief systems that view primates as degraded human beings, the shepherds were reluctant to share their knowledge about the macaques for fear of ridicule from their peers. Setchell et al. (2017) argue that by making people central to the project, it makes hidden impediments to conservation visible, thus opening up the potential to address these issues and harness local knowledge, which can make conservation goals possible.

By harnessing local knowledge of the environment, ethnoprimatology with its interdisciplinary focus looks at how everything is connected as a whole, and Sherrow (2011) suggests that instead of exclusively primate conservation, this approach allows us to focus much broader on nature's overall role in human health and wellbeing. Wallis and Landorf (2010) agree that using an ecosystem health theme that links local livelihoods to local ecology can help to inspire community engagement. They state that balancing community needs with conservation needs and the full cooperation of local people is required to achieve a successful conservation project.

As the discipline continues to advance, Campbell, Fuentes, and MacKinnon (2010) state that the future promises to offer further degradation to tropical forests and ever-expanding human

populations, therefore human primate contact zones with undoubtedly intensify. As these spaces become increasingly shared, they warn us about the possibility of disease transmission between species and suggest there needs to be more research in these areas to protect both human and alloprimate populations from dangerous outbreaks. In order to face these challenges moving forward, ethnoprimatologists must work to develop partnerships across typical academic boundaries and with local experts to raise awareness of pressing concerns and inspire engagement with forest-edge communities to encourage harmonious coexistence in these shared habitats (Campbell, Fuentes, & MacKinnon, 2010; Sherrow, 2011).

This chapter has demonstrated how using an ethnoprimatological approach can help to break down the natural-cultural dichotomies that restrict human beings from viewing themselves as part of the ecosystem. Through its socio-cultural frameworks, ethnoprimatology offers a valuable tool for addressing modern conservation issues, as it incorporates the knowledge, belief systems and values that human beings associate with wildlife and conservation. In finding culturally acceptable alternatives to environmentally hazardous behaviours, ethnoprimatology's unique approach is an ideal tool to inspire community engagement and raise awareness about conservation issues. By putting people at the center of primate conservation, human development needs are also addressed, thus making conservation projects more sustainable in the long-term. This study tests these claims through a case study in coastal Ecuador. The people, alloprimates and location where the research took place will be discussed in the following chapter.

Chapter Three: Field-site and Subject Description

This chapter will provide context regarding both the human and alloprimate subjects for this study, including a description of the field-site in the Pacoche Marine and Coastal Wildlife Refuge and the community of Pacoche. Detailed information concerning primate ecology and ethnoprimatology of *Cebus albifrons aequatorialis* and *Alouatta palliata aequatorialis* will conclude this chapter.

Field-site Description

> My first impression of Pacoche was from the back of a beat-up yellow taxi. Leaving the port-side city of Manta, I focused my attention on the mesmerizing ocean scenery, taking deep full breaths of the sweet-salty air, as the car zipped down the winding coastal highway called the "Ruta del Spondylus" (*Route of the Spondylus*). The province of Manabí depends on the flow of tourists from all over Ecuador and abroad eager to enjoy the fresh seafood and beautiful beaches in hopes of catching a glimpse of a humpback whale breaching in the distance. I myself, was there for a different kind of natural encounter of the arboreal variety. I peered out the dusty window, admiring the coastal landscape scorched by the hot Ecuadorian sun. Steep sand dunes, rocky cliffs, and dry thorny bushes lined the roadside, accompanied by groupings of the majestic *ceiba* tree (similar to a baobab) leaflessly towering over the alien landscape. While sparse, there was something eerie about the vegetation here. So mangled, twisted and sharp, thirstily reaching to the skies for a drop a water. As we continued our journey south we passed a few small towns, and a green hue began to emerge. Tall grasses and leaves started to appear on the low brush; small trees budding with foliage surrounded us as I cracked the window to feel the cool breeze, and the faint sound of crickets tickled my ears. As we passed through this dry forest ecosystem, I noticed solitary cows and mules tied up along the roadside, munching on grasses and flicking off flies with their tails, unbothered by the vehicles racing past. I smiled at goats eating the trash that littered the deep highway ditches. After about twenty minutes, the air began to feel heavy and cool, the sun disappeared behind a dark clouded sky, and in a blink the green hue instantaneously transformed into a thick dense jungle. The rapid climate change caused the windows in the car to fog up, fat raindrops splashed on the windshield and the road ahead of us disappeared through the mist. As the windshield wipers flew, the driver did not slow down, I assumed he must know this road well, because I couldn't see a thing. All I could do was smell the intoxicating richness and dampness in the air, accompanied by the sound of the tires squealing as we rounded each corner. My heart racing, I gripped the back of the seat in front of me, wiped my sleeve on the window, and peered out into a tropical forest oasis. I was getting closer… I took it all in. The enormous palm fronds, and towering bamboo stalks waving in the sky. I could feel the humidity on my skin. In that moment, the car jerked off the road to the right, disappearing into the thick jungle through a gate made of moss-covered bamboo, with a sign that read Pacoche Lodge. I had arrived (Britton, field-notes, June 2018).

The Pacoche Marine and Coastal Wildlife Refuge

Founded in October of 2008, the Pacoche Marine and Coastal Wildlife Refuge (henceforth known as The Pacoche Refuge) (Appendix A) is one of the few protected areas in Ecuador that exists west of the Andes Cordillera (MAE, 2012). Pacoche was created as part of Ecuador's expansion of protected areas and enhancement of environmental policy brought about by the new constitution during the Correa administration. These constitutional changes were the first in Latin America to promote the rights of nature within the indigenous knowledge framework (Gudynas, 2009) of *Buen Vivir* or "good living", as a model that values the relationship between nature and human beings (Article 72). The 2008 Constitution also affirms the right of citizens to participate in crafting government policy and in the management of protected areas (Gravez et al., 2013). As part of this model, 33% of the 51 protected areas across the country were created over the past 10 years, covering almost 20% of the nation's territory (Article 406; MAE, 2017; Gudynas, 2009). The coastal and montane forests of western Ecuador are part of the Tumbes–Chocó–Magdalena hotspot, and home to important ecosystems characterized by unique coastal geography which include a patchwork of tropical cloud forests, and dry forest, beaches, bluffs, islands, estuaries, mangroves, rocky and sandy sea beds. A part of this patchwork, the Pacoche Refuge is located only 20 minutes away from the port city of Manta, and appears as green "oasis" in the middle of a semi-desert area on the coast of the province of Manabí. The protection of this area is due to its unique micro-climate which has resulted in a wide variety of flora and fauna, including 42 species of mammals (two of them primate species), and over 250 species of birds; 55 taxa which are endemic to the area (Greenearth Ecuador, 2017; MAE 2017). The park spans a marine-coastal area of 26,468.21 hectares, and a terrestrial area of 5049.69 hectares, of both coastal dry forest and "garua" rainforest. The "garua" term is due to the high amount of rain concentrated in this pocket located 300m in altitude, where the majority of endemic plant and animal species with risk of extinction occur (MAE, 2009). The ecosystem sustained in the Pacoche Mountains modifies the local climate and adjacent areas between Pacoche and the surrounding communities. Due to these orographic conditions, the temperature inside the mountains vary between 23 ° C and 24.5 ° C, in relation to the external temperature that vary between 25.5 ° C and 27 ° C. The aquifers found in the Pacoche forest provide the continuous supply of water to the mountain vegetation which creates a high level of humidity

from the air that is trapped by the foliage, forming the constant “garuas” the area is known for (MAE, 2009; MAE 2017).

Initially, the Pacoche protected area was created as a response to conflict spurred by large-scale clear cutting to make way for a local oil refinery “la Refinería del Pacífico” (Heinz, 2018). The refinery exists today on the northern border of the protected area, and although its construction was never completed, the destruction of the forest ecosystem in preparation was immense. Pending foreign investment, the local government hopes the refinery will be up and running in the near future.

Human Populations

The most recent census in 2009 estimates the human population of the Pacoche Refuge at 3,948 with high population density (263.2 hab. / km) (MAE, 2009). Of the nine communities that exist within or on the borders of the park, seven are coastally located. These settlements include: Santa Marianita, El Aromo, Pacoche, Liguiqui, San Lorenzo, Santa Rosa, Las Pinas, La Solita, and Pile.

Archaeological remains of Pre-Columbian settlements are found in this area, where inhabitants depended on saltwater and freshwater fish resources, hunting, gathering fruits and wood, and the possibility of short-cycle crops during the rainy season (MAE, 2009). According to Harris et al. (2004) the province of Manabí exists within a unique climatic zone, where contemporary human populations in rural areas continue to be situated in the same river valleys and proximity to beaches as their early ancestors. These settlement patterns reflect similar subsistence strategies such as a heavy reliance on marine resources and less so on inland agriculture and livestock, which remains true today. However, unlike modern populations, early inhabitants depended greatly on shell harvesting and the working of shell species (particularly Spondylus) into manufactured products during much of the prehistoric period.

Today, due to its proximity to the city of Manta, rural communities in the Pacoche Refuge are increasing at a rapid rate. They also lack basic services, infrastructure and employment opportunities, contributing to a growing consumption of forest and marine resources and resulting in their deterioration over the past decade (MAE, 2012).

According to the most recent study conducted by the Ministry of Environment (2009) the main agricultural crops in this region consist of sugarcane, *toquilla s*traw for making the famous Panama hats, and corn; however coffee, cocoa, bananas, and other fruit plots are also common. Locals also readily extract firewood and timber for construction materials from the forest. The continuous production of agricultural and forestry products creates income for local communities throughout the year, with key products consisting of panela and cane juice, and locally sold handicrafts made from the *toquilla* straw. However, it is estimated that only 17% of the population in the area relies on agriculture as their main source of income, while the largest proportion of the population (over 30%) depends primarily on fishing and other trades, such as sewing, carpentry, artisan handicrafts and tourism, which tend to exist as secondary sectors of employment (MAE, 2009). The most recent study conducted in the Pacoche Refuge indicates that industrial agriculture, the demand for infrastructure and services, and the lack of key protection initiatives, are putting a great amount of ecological pressure on the area (Cervera, et al., 2015).

Manta also has a rapidly growing tourism sector, as one of the largest cruise ship ports in South America. There has also been a significant increase in national tourism over the past five years due to the elimination of park entrance fees. For example, the local beach Los Frailes located in nearby Machalilla National Park, received 40,545 tourists in 2011, and in 2012 there was an increase to approx. 100,000 (MAE 2009; MAE 2017). Tourists come to the area primarily to explore the hiking trails – "El Faro" (1km) of dry forest, cliffs and marine areas, and the "Monkey Trail" (1.5km), which requires a MAE tour guide in order to see the howler monkeys at a close distance. Tourists also come to San Lorenzo to see the sea turtles hatch, as well as to visit nearby Santa Marianita, Ecuador's most famous site for kite-surfing. Other tourist attractions include an ethnographic museum in the town of Pacoche, in addition to archaeological ruins in nearby Liguiqui and Agua Fria. Tourists are often entertained with demonstrations of *la molienda*, or sugar cane processing, as well as the making of Panama hats and baskets from locally grown *toquilla* straw. Tourists are given the option to purchase a variety of locally sourced handicrafts made from guadua bamboo and *tagua* nut, as well as coffee, chocolate and sugar-based products. There is no formal marketplace that sells these items, so the sale of these items is restricted to a few local parties contracted by hotels to provide these services.

Ecuador is currently feeling the impacts of immigration, with the largest refugee population in Latin America (Jokisch 2014). In the 1980s many Ecuadorians migrated to Venezuela in search of employment opportunities. Now during the economic crisis in Venezuela, many are returning to Ecuador, with a large influx of immigrants joining the fishing sector.

The Community of Pacoche

> Travelling in the passenger seat of Ana's car, we flew past the fork in the road between Ligüiqui and Pacoche. As we jerked to the right, the paved road turned to dirt and the car bounced along skipping over pot holes, and spraying up gravel in its tracks. On either side of the road I could see the landscape changing, from thick dense jungle to smaller more sparsely covered trees and bushes. The humidity in the air turned dry, and the sun began to peek out from behind a cloud overhead. Soon, I was able to see far in the distance, a less familiar sight of steep rocky cliffs and sand dunes. I was amazed at how quickly the countryside transformed. Ana slammed on her breaks as we came up behind a herd of cattle spread across the width of the road. She honked her horn, but they just continued to mosey along. Undisturbed by the car behind them. As we trailed the herd, a man in his mid-60s drifted back through the herd, atop a mule carrying a pile of *toquilla* palm fronds. He tipped his hat at us, and urged the cattle to disperse so we could pass. I noticed the mule dragging several stalks of guadua bamboo behind him. This was a common occurrence in Pacoche, as the few farmers who own cattle take them to the mountain to graze each day. After about a 10 minute ride, we entered the town of Pacoche. The wind blew dusty clouds along the streets, and goats and chickens meandered in the ditches. We passed over a bridge, and pulled the car up in front of "El Museo de Pacocha", the Pacoche ethnographic museum. I got out of the car, leaned against a short sugar-cane fence, and looked out upon the town. Some homes were made of brick and others of the more traditional cane hut style, on stilts. There were bunches of bristly trees scattered about, and blackened piles of smouldering garbage. Just down from the museum I noticed a large impressive Catholic church, with a cross on the roof, the exterior painted bright turquoise and white. Its vibrant colours stood out in a landscape of browns and beiges. Then I noticed another brightly painted building to the south, a turquoise school house with a brightly coloured alphabet mural painted on one side. I breathed in the hot air and enjoyed the feeling of sun on my arms for the first time in almost a week. Now it was time to try and meet some of the locals (Britton, field-notes, June 2018).

The rural community of Pacoche is nestled within the Pacoche "mountains", a foothill range that stretches NW to SW at a height of 100-300m above sea level. The town gets its name from "Pa" meaning land, and "*cocha*" meaning water, but also related to *mococha,* the *tagua* palm nut that is abundant in the area (MAE, personal communication, August 2018). According to the

Ministry of Environment Management Plan for the Pacoche Refuge (2009), the community of Pacoche has a total of 441 inhabitants, with 98.17% of the population having access to electricity in their homes, and 93% of households having access to water. An estimated 10% of households use outdoor latrines (MAE, 2009). The community has two churches, one Catholic and one Evangelical, one school-house, a large grassy soccer field, and a cemetery at the far northwestern end. There are many small stores operating out of people's homes along the main street selling items like soft drinks, candy, chips and cigarettes. Most homes are organized along this main road that connects Pacoche to Santa Marianita and eventually the main highway. However, some side streets jet off, and lead to smaller settlements scattered around the town center.

Pacoche is located in a semi-arid bioclimatic zone where it receives less that 200mm of rain annually (MAE, 2009). The village is surrounded by steep-sandy cliffs on all sides with low desert brush-vegetation, and wild twisted-branched trees scattering the landscape. Through the center of town cuts a deep divide, once a river bed full of freshwater fish and shrimp, now a dusty gorge littered with trash, where goats feed on tuffs of grass speckling the incline. The community borders the Pacoche Marine and Coastal Wildlife refuge located a few kilometres south east of the settlement. However, many inhabitants own agricultural land within the border of the protected area and make the daily trek to tend to their plots.

Most people living in Pacoche do not own a vehicle, and the town itself is not located on a major bus route. While many residents hitch a ride with friends, neighbours or family when they need to travel, those who make the trek back and forth to the mountain daily typically do so by foot or by mule. The taxi companies rarely visit this community, so in order to secure transportation many people walk to and from the main highway (La Ruta del Spondylus) to catch bus or pickup truck transportation from there.

I was fortunate to be present in the field for the annual feasts of Saints Peter and Paul in August, a week-long festival to give thanks for plentiful fishing and harvests they have obtained throughout the year. This festival is a crucial part of the cultural identity in Manabí, which pays homage to the Catholic saints, Peter and Paul, but it is also considered a ritual of encounter and

abundance as a result of interculturality (*cholos*[4], *montubios*[5], Afro-Ecuadorians, Spanish) and of daily work (planting, harvesting, fishing). The daily activities consist primarily of feasting, church services and public parades, while the evening is filled with more parades, dancing and drinking. Families in the town are divided into two groups, the republic of the whites and the republic of the blacks, depending on which Saint is represented. These groups later come together at the end of the festival signifying the unity of the two republics through the exchange of presents, processions, flag bearing, fireworks and public speeches. Each republic has its own palace "tent", and their own elected President for the festival in charge of organizing the event. If the elected person does not agree to take on the responsibility, it signifies a misfortune will occur in the coming year such as being bitten by a snake, a bad harvest, a shipwreck or bad fishing yields (Miguel, personal communication, August 2018). This festival is an extraordinary celebration that indicates the importance of tradition and balance between culture-nature, male-female, Catholic and ancestral belief systems, as well as a means of redistributing the earnings of the year with all members of the community. My participation in these events highlighted the close-knit communal nature of Pacoche and their respect for their reliance on the fragile ecosystems that they inhabit.

This next section will focus on the two alloprimate species that inhabit the Pacoche Refuge, providing both an ecological and ethnoprimatological background for each.

Primate Ecology and Ethnoprimatology

Ecuadorian Mantled Howler (*Alouatta palliata aequatorialis*)

While howler monkeys are the most widespread primate genus in all of the Neotropics (Estrada, 2015), the Ecuadorian mantled howler monkey (*Alouatta palliata aequatorialis*), is a subspecies found only in the highly fragmented coastal forests of western Ecuador. It is listed as Vulnerable in the International Union for Conservation of Nature and Natural Resources (IUCN) Red List database, however due to high rates of deforestation resulting in forest fragmentation and habitat loss, it is estimated that this subspecies will decline over 30% within the next 3 generations (36

[4] "Cholo" refers to a person of indigenous or partly indigenous ancestry (in some parts of Latin America).
[5] "Montunbio" is a distinct ethnic category for people of mixed-ancestry from coastal Ecuador. They are known for their ranching activities, machete agricultural work and distinctive attire (Panama hats).

years) (Cervera et al., 2015; Cuarón, et al., 2008). Thus, a recent reassessment designates *A. aequatorialis* as Endangered in the Ecuadorian Red Book of mammals (Cervera et al., 2015; Tirira, 2011). Results from a Landstat image modelling study done by Cuarón (2000), also estimate that despite its wide distribution, prime habitat for this genus will be lost by 2025 (Kinzey, 1997). The urgency to protect their natural habitats is heightened because howler monkeys do not survive, socialize or reproduce well in captive conditions (Kinzey, 1997).

The rapid decrease of primary and secondary forests in coastal Ecuador has resulted in a series of "forest pockets" generating a conservation challenge. According to Cervera et al. (2015) "habitat fragmentation reduces habitat quantity and quality making howlers inhabiting degraded forests more vulnerable to disease, inbreeding depression, and predation" (p.9). In response to such conditions, howler monkeys have been reported crossing large open spaces of approximately 1km in distance between forest patches (Kinzey, 1997). As the principal coastal highway *Troncal del Pacifico* is a major source of fragmentation dividing the reserve, which creates a very dangerous route of passage for howlers daring to cross (Cervera, et al., 2015).

Howlers are folivorous-frugivores with small home ranges of 1.3–60 ha (Cervera et al., 2015; Estrada, 2015) and a highly variable diet that consists largely of young leaves, fruits, flowers and bird eggs (Kinzey, 1997). However, howlers are known for being highly adaptable, and able to adjust their diets based on resource availability (Estrada, 2015). Mantled howlers living in wetter habitats similar to that of the Pacoche Reserve were reported to spend similar amounts of time feeding on leaves and fruits (Cervera et al., 2015), however, according to Kinzey (1997) protein consumption tends to be a key consideration behind their food choice. Thus, Cervera et al. (2015) contends that the survival and population size of howler groups is greatly connected to the variety of food resources available, particularly in fragmented forest habitats like the Ecuadorian coast. The social behaviour of the mantled howler can also be affected by forest fragmentation in a variety of ways. For instance, males are known to invade other groups in order to displace the alpha, often causing violent altercations. During and immediately after these confrontations males have been reported to commit acts of infanticide also resulting in a high rate of injuries in sub adults (Kinzey, 1997; Estrada, 2015). The need for accessible forest corridor systems between fragments is increasingly important, as the rate of male displacement and infanticide increases based on the population density of various groups (Kinzey, 1997).

The conservation significance of *A. aequatorialis* has been emphasised in various studies, as howlers are important seed dispersal agents for an estimated 15 different plant species (Estrada, 2015; Garber & Kowalewski, 2015; Kinzey, 1997). This is key role in the ecosystem is largely due to howlers' slow digestion rate that ensures seeds are dropped far away from parental plants (Amato & Estrada, 2010). According to Amato and Estrada (2010), seed dispersal is crucial for rainforest regeneration as primates disperse the seeds of twice as many plant species, in comparison to birds. Mantled howlers in particular were reported to disperse seeds from between 9-35 fruit species, and are thus stated to disperse more total seeds on average than other howler species (Kinzey, 1997). Their role in the ecosystem is critical for a wide variety of plant species (Amato & Estrada, 2010; Garber & Kowalewski, 2015).

The ethnoprimatological literature indicates that howler monkeys play important roles in the symbologies, cosmologies and mythologies of various peoples across the neotropics. Urbani & Cormier (2015) explain how certain social groups have varying preferences and taboos surrounding the consumption of primate meat, with the howler monkey genus involving the highest number of taboos in comparison to other primate species. They state that "taboos on howlers as food are often linked to magical contagions whereby ingestion of howlers is believed to pass on their undesirable traits, such as lethargy" (p.259). Thus, although howler monkeys are one of the most hunted primate species in the Neotropics, with over 16 different societies claiming them as part of their diets (Cormier, 2006), due to their human likeness and their haunting howl, they are often perceived as a bad omen. For instance, howler monkeys play a vital role in the diet of the Waorani people of the Ecuadorian Amazon (Papworth et al, 2013). However, Mittermeier (1991) also reported that for some communities, howler infestation with botflies and their strong smell may serve as a deterrent to their consumption. According to Shepard (2002) the Matsigenka of Peru report that howlers do not taste as good as other monkeys, which can be attributed to their highly folivorous diet. However, among the Guajá of Brazil, howler monkeys are eaten at a much higher rate than any other primate species (Cormier 2003; Cormier 2006).

Howler monkeys are also hunted because of their associated medicinal value across the Neotropics, with Urbani and Cormier (2015) stating that "their throats (referring to the hyoids)

are used to help those that suffer from asthma and other illnesses of the chest, by drinking the infused water that remains inside it" (p. 264; Caulín 1966, p.75–76).

Mythological beliefs in howlers indicate numerous continuities where nonhuman beings share a common origin with humans. Viveiros de Castro (1998) described a theme across Amazonian belief systems about animals as former human beings who have been transformed. This is particularly common in regards to monkeys who often appear as predominant figures in these transformations.

Cormier (2003) provides a specific ethno-ecological example in the case of the Guajá peoples of Brazil. Her research uncovers that Guajá animistic belief systems dictate that howler monkeys are more closely related to them than any other species. In fact, they are considered kin more so than anthropologists. Due to this intrinsic ideology, howler monkeys are also nurtured as children, worn as accessories to promote a women's aesthetic appeal and fertility, and hunted for human consumption, as a symbolic form of cannibalism. Thus, howler monkeys represent a vital component of Guajá society. The intricate connection these people have with their forest ecosystem is a prime example of shared ecologies, and how habitat destruction can have equally damaging effects for both humans and non-human primates.

Ecuadorian White-Fronted Capuchin (*Cebus albifrons aequatorialis*)

The Ecuadorian capuchin (*Cebus albifrons aequatorialis*) is a critically endangered primate found only in the fragmented forests of western Ecuador and northern Peru (Campos & Jack, 2013; Albuja & Arcos, 2007; Cornejo & de la Torre, 2008). One of the two most threatened primate taxa in Ecuador, this subspecies is listed as Critically Endangered by the IUCN (2011) based on a severe decrease (>80%) in forest habitat over the past three generations (approximately 48 years). Cornejo and de la Torre (2008) estimate that small populations remain in less than 10 protected areas and small private reserves in north-western Ecuador (IUCN, 2011).

As omnivores, capuchins are highly adaptable in their diets (Fedigan & Jack, 2001), and can readily exploit a variety of habitat types ranging from disturbed areas and secondary forest to mature forest (Campos & Jack, 2013). However, *C. albifrons* has one of the largest home ranges of the *Cebus* genus, and has been known to prefer canopy trees of approximately 30m or higher

(Kinzey, 1997). This concern is further investigated by Campos and Jack (2013) who found that "percent tree cover is the main variable for habitat suitability for *C. aequatorialis*" (Cervera, et al., 2015, p.3). This presents a challenge in fragmented forest areas such as coastal Ecuador where this subspecies may have issues finding sufficient forest connectivity to fulfill their active lifestyles (Cervera et al., 2015; Fedigan & Jack 2001). Forest fragmentation can also be linked to *Cebus* overall species success rate as Kinzey (1997) explain how females in larger groups (15+) have greater reproductive success than those in smaller groups. This is because, typically, one dominant male mates with the adult females to sire the most offspring, thus larger groups where there are more adult females also have higher rates of reproduction (Kinzey, 1997, p. 255; Robinson and Obrien, 1991). The most recent comprehensive study to date on this subspecies predicts that given the current conservation climate west of the Andes, and the large home ranges needed to support this subspecies, conservation strategies should focus their attention on the enforcement of environmental laws to protect the connectivity of designated reserves such as Pacoche (Campos, & Jack, 2013). The low detection rate of *C. aequatorialis* underscores the need for immediate conservation action (Cervera, et al., 2015).

In regards to conservation significance, like howler monkeys, capuchins also help to ensure the success and regulation of numerous plant species, by playing an important role in the forest ecosystem both as seed dispersers and seed predators (Fedigan & Jack 2001; Kinzey, 1997). According to Campos and Jack (2013) capuchins are also "good indicators of overall ecosystem health because they are conspicuous, require relatively large areas of forest and tend to disappear from small, isolated forest fragments and heavily disturbed areas, … [Thus], *C. aequatorialis* can serve as umbrella species for identifying and delineating areas of high-quality forest" (p. 900). Given the increasing disturbance of home ranges, understanding the key threats to this subspecies, as well as more information on how they adapt to fragmented habitats; is crucial to its survival. Unfortunately, updated information on *C. aequatorialis* population density and conservation status is deficient (Albuja & Arcos, 2007, Campos & Jack, 2013) as Cervera et al. (2015) explains, there remains a concerning "paucity of primatological data for the coastal region" (p. 3).

Unlike their howler monkey relatives, no formal publications have been released describing the widespread "ethnoprimatology of capuchins". However, much of the literature available tends to

focus on the role of capuchins in crop-foraging and tourist attractions, as well as their use in folk medicine and their consumption as bushmeat. For instance, studies on capuchins suggest that 21 different indigenous groups reported them to be a vital food source (Cormier, 2006), and that the taboos associated with consuming capuchin meat are less common than for howlers. For example, the Cashinahua hunt capuchins and spider monkeys but consider howler and squirrel monkeys to be inedible based on specific social and ritual status of group members (Kensinger et al., 1975; Cormier, 2006). However, among the Shipibo, *Cebus albifrons* is commonly eaten, but there is a post-partum taboo for both parents (Behrens, 1986, p. 648-649; Cormier, 2006). Finally, according to Vilaça (2002) "a Warí shaman told parents that their child was turning into a monkey because the parents had not followed the appropriate protocol for eating capuchins" (Cormier, 2006, p. 23).

Like howlers, myths surrounding human-animal and animal-human transformations are also common for capuchins. Shepard (2002) shares a Matsigenka myth involving two species of capuchins living in their area.

> These monkeys were at one time shamans who both made failed attempts to steal fire-making technology from an all-female tribe. One had the hair singed off his face and was turned into the brown capuchin. The other became drunk and fell into the women's toilet, becoming the white-fronted capuchin with its dark brown cap. In another tale, two impolite guests at a party were transformed into the woolly and the spider monkey (Cormier, 2006, p.22).

Ethnoprimatological data also indicates that capuchins are frequently persecuted as a crop pest by farmers, as well as being popular candidates for the pet trade (Cornejo, & de la Torre, 2008). Rocha & Fortes (2015) explain that capuchins are among the most common primate species described in reports on human-wildlife conflict in the neotropics. Suzin et al. (2017) for example, states that people have negative perceptions of primates when their resource use overlaps with that of humans, causing damage to economic crops, or where there is a risk of disease transmission between species (Bicca-Marques & Freitas, 2010; Lee & Priston, 2005).

Also, while no studies have been conducted specifically on the full effects of the pet trade on Ecuadorian coastal primate populations, a country-wide investigation between 2003-2008 by the Ministry of the Environment revealed that "primates accounted for 46% of the captured mammals, representatives of 18 of the 20 Ecuadorian primate species were captured and two of

them, the squirrel monkey and the white-fronted capuchin, accounted for 27% of the mammalian captures and 50% of the primate captures" (MAE, 2012; de la Torre, 2012, p.28).

This chapter has provided background on the field-site and human communities, in addition to demonstrating the breadth of information garnered from conceptualizations about primates across the neotropics, which can prove useful to inform culturally relevant and localized conservation management strategies.

Chapter Four: Methods

This chapter will describe the methods used for this study and their limitations starting with sampling procedures/recruitment of participants, and followed by ethnographic methods, primate surveys, data analysis, and ethical considerations. As discussed in the previous chapter, "*Homo sapiens* are among the species of primates essential to the faunal community of an ecosystem" (p.143), thus the modest aims of this investigation focus on three of Leslie Sponsel's (1997) heuristic categories of ethnoprimatology: cultural ecology, ethnoecology and conservation ecology (p.144). To accomplish this task, an ethnographic mixed-methods approach was adopted for this study. Setchell et al. (2017) state that combining ethnographic and quantitative research methods can produce more holistic responses to conservation problems. They argue that incorporating ethnographic approaches can help to provide a more nuanced understanding of relationships between human beings and the environment. As the purpose of this investigation is to critically examine ethnoprimatology's engagement with conservation narratives, Blommaert and Jie (2010) argue that "the use of ethnography helps to expand rather than reduce the complexity of activities that make up social actions" (2010, p. 11–12). Through analyzing cultural perceptions of phenomena, ethnography can also help to understand the various ways people adapt to change (Mannik & McGarry, 2017).

Data collection, therefore, involved a combination of standard anthropological research methods such as participant observation and both unstructured (open-ended) and structured survey format, interviews. Within these interview processes, additional research strategies were employed such as walking interviews and photo-pile sorting to understand local context and capture community perceptions of alloprimates in comparison with other resident faunal species. These qualitative techniques were then complemented by using quantitative primate surveys to record the location and group size of alloprimate species in the protected area.

While heavily ethnographic, the mixed-methods nature of this study involved multiple data sets that were used to create themes that cut across all sources and that reinforced one another to produce a stronger result. This was to ensure both the validity of the data and a holistic gathering of information by comparing and contrasting results across all sources (LeCompte & Schensul,

1999). A more detailed description of each of the methods used in this study is outlined in the following section.

Sampling

A total of 25 interview participants were included in this study. The inclusion criteria for participants were based on residence and occupation. Informants with current or past experience within the local forest ecosystem, either in agriculture, tourism, forest resource extraction, or other forest-based occupations were included in the study. These occupation-based criteria were decided upon to improve the probability of alloprimate-human interaction, as agricultural workers in Pacoche must travel an estimated two to three kilometres to the mountain to access their plots and in doing so, encounter monkey populations. Four of these informants were selected solely based on their occupation as tour guides and park staff working within the protected area. Regardless of their residency, they were recruited based on their knowledge of the area and ability to provide necessary context during the initial stages of the investigation. In regards to the remaining 21 participants, based on my association with the NGO Greenearth Ecuador and their connections in the community of Pacoche, permanent residence in this specific community was an inclusion requirement. I chose this community from previous research of the Pacoche Marine and Coastal Wildlife Refuge which stated that Pacoche has the highest density of agricultural workers of all nine communities within the protected area. The remaining communities depend predominantly on fishing as their primary occupation. Some informants, however, lived on the border of Pacoche and Santa Marianita, or were long-time residents of Pacoche with strong family ties there, but who currently live in a nearby community. Based on these parameters, participants were all male mostly ranging in age from 50 to 75, with one participant in his late 20s and one in his late 80s. While this demographic distribution was not anticipated initiating the field study, it appears women in Pacoche do not commonly work in forest-based occupations. For this reason, they were not included in this sample. Some women did, however, assist their husbands with the photo-pile sorting activity when asked about cooking and medicinal uses for local faunal species. The age skew towards participants over the age of 50 is also largely justified by occupation. Conversations with community members revealed that much of the younger generation is disinterested in learning to work on the mountain, because of its laborious and dangerous nature, coupled with the lack of profitability.

Recruitment

Greenearth Ecuador (Appendix B) is a small non-governmental organization (NGO) based in the Pacoche Refuge. It is committed to collaborating with the communities of Pacoche to find sustainable solutions to local environmental concerns and the generation of alternative employment opportunities. The goal of the organization is to help build the capacities of communities directly affected by climate change, through awareness campaigns, workshops and other educational activities. The local knowledge Greenearth possesses greatly assisted with providing community contacts, organizing meeting spaces and recruiting participants for this project, alongside a local field assistant. Greenearth's positive relationship with the Ministry of Environment will also assisted the project in gaining local support at the governmental level, especially in regards to permit requirements.

It was through the context they provided me regarding inclusion criteria and their assistance during introductions to potential informants that I was able to find participants for this study. Their long-term ties to the community greatly helped in sending out informal invitations at a community information session scheduled shortly after my arrival. It was through this meeting that I was able to introduce my project and its intentions, then upon acquiring permission and contact information, I later followed up with the attendees for interviews. While many of the participants were encountered in this manner, I also conducted door-to-door recruitment under the guidance of my local field assistant. Door-to-door recruitment is a standard sampling method used in ethnoprimatological research to investigate public perceptions and knowledge (Fiallo & Jacobson, 1995; Nahallage et al., 2008; Papworth et al., 2013; Quinten et al., 2014; Riley, 2007). For instance, a similar study just south of the Pacoche Reserve in Machalilla National Park used oral door-to-door recruitment to survey five communities surrounding and within the park regarding residents' perceptions of protected areas and knowledge of local conservation issues (Fiallo & Jacobson, 1995). While the study revealed a growing interest in conservation concerns, it also exposed little local support for protected areas mainly based on distrust of local authorities that is rooted in a history of top-down decision-making processes lacking community participation. Similarly, and more recently, an island-wide survey of 360 households was conducted on Siberut Island in the Mentawai Archipelago, Indonesia. This door-to-door sampling method interviewed residents of over 50 communities, using a semi-structured method

to explore local knowledge, attitudes, and practices towards hunting and conservation of local primate populations (Quinten et al., 2014). The study identified patterns in hunting preferences, as well as overall concern for primate conservation.

Participant Observation

Participant observation is a staple method for anthropological research that involves building relationships and making interpretations of patterns and connections witnessed during personal experiences (Mannik & McGarry, 2017). Participant observation provides context for the development of the investigation and further data collection. It also helps to improve the quality of data interpretation and facilitates the development of new research questions (Dewalt & Dewalt, 2002). According to Bernard (2017), this method reduces the problem of reactivity, which refers to people changing their behaviour because they know they are being studied. It also helps to gives the researcher an intuitive understanding of what is going on helping them to ask the right questions and provides the context needed to cross-check information from other data sources (LeCompte & Schensul, 1999).

Between June and August 2018, I actively participated in various social events and daily activities in the community of Pacoche to observe social dynamics and try to understand these processes within the context of my research questions. Mannik and McGarry (2017) describe the active participant as having a high degree of involvement and interaction with the study population; however, the researcher is never fully accepted by informants as an "insider." My position as a foreign student researcher was evident at all stages of interaction, and I never achieved full cultural integration with my study population. Given the time constraints of my field season, I do not believe this etic perspective hindered my investigation but allowed me to maintain a relative level of objectivity regarding the various viewpoints I was privileged to access. These viewpoints ranged from community members of varying socio-economic backgrounds, government officials, park employees, and NGO stakeholders. I attended all engagements I was invited to including funerals, festivals, tourism activities, artisan and educational workshops, presentations, conservation initiatives, and daily chores such as clearing trails, preparing meals, and agricultural tasks. I also participated in the harvesting and processing of natural resources, such as sugar cane and guadua bamboo. The emergent design of my

research meant that my participation was mostly dependent on the situations that arose while I was present in the field. People present during any events or activities were informed of the purpose of my study, to ensure transparency of my research procedures. This method helped me to gain a deeper understanding of the kinds of relationships that permeate daily life, with particular attention to alloprimate-human interactions, and to verify other methods of data collection through the triangulation of sources (LeCompte & Schensul, 1999).

Walking Interviews (unstructured, open-ended)

Unstructured open-ended interviewing was chosen to generate rich data, using the voice of participants to gain insight into their perspectives and values and to glean contextual and relational aspects to help interpret the data. More specifically, this interview format was chosen as a means of evoking conversation and discussion, to discover in what ways the participants' voice either confirms or denies prior assumptions. Limitations which exist within this particular method of data collection revolve around potential threats to the validity of the data, such as through the use of "leading questions or the researcher's preconceived ideas influencing what is and is not worth discussing" (Newton, 2010, p. 4). Responses to open-ended questions can also be limited by memory bias, where respondents recall fewer items than elicited by other methods (Weller, 2006). Finally, there exists a considerable level of subjectivity regarding the participants' interpretation of the questions, as well as how they may perceive and respond to the interviewer, which could alter their answers. While these are all concerns regarding this type of method, Newton (2010) explains how "this same vulnerability and complexity produces a richness and depth to data worth many of the risks" (p. 5). Despite these limitations, unstructured interviewing is consistent with participatory models (Newton, 2010), which support the objectives of this investigation. Newton (2010) also states that the researcher's choice to interview face-to-face recognizes the potential significance of context in the investigation, and is appropriate where the depth of meaning is important, and the research is primarily focused on gaining insight and understanding (Gillham 2000; Ritchie & Lewis 2003, Newton, 2010, p.4). Newton (2010) summarises this purpose by stating that, "in order to understand another person's constructions of reality, we would do well to ask them…and to ask them in such a way that they can tell us in their terms (rather than those imposed rigidly and a priori by ourselves) and in a depth which addresses the rich context that is the substance of the meanings" (p. 4).

Weller (2006) states that the initial stage of the investigation is descriptive and exploratory. If little is known about the research area and study population, an unstructured, open-ended approach is generally best. Therefore, in line with Weller (2006), the goal during this phase was to develop questions and material to provide context and critical themes relevant to the area of inquiry and to better understand the use and meaning of specific spaces and resources in the community.

The aim of the walking interview, more specifically, was to elicit particular conversational topics related to what is encountered enroute. In this study's case, it was also to showcase some of the key locations where alloprimate and human interactions take place, as well as some of the relationships people have to the land, while also learning about the area (plant species and landscape). Questions and topics were elicited through the natural flow of the open-ended conversation. Later research phases then modified this information into more structured research questions. For logistical reasons, walking interviews were not audio-recorded, instead short-hand notes and photos were taken to record key points and places.

Structured Interviews (open-ended)

According to Weller (2006) “after a descriptive or qualitative phase elicits relevant themes, structured interview materials can be developed to examine knowledge, attitudes, beliefs, and behaviours about those themes” (p. 344). Weller (2006) also states that combining a preliminary exploratory phase using open-ended unstructured questions followed by a structured phase produces a stronger study than using one method alone. Therefore a two-part structured interview instrument was created based on data gathered through previous research phases. A common limitation found within this structured method is that the interviewer may focus on items of their interest and may misrepresent or entirely miss topics of importance to the informants. To avoid this problem, I shared my preliminary structured-interview instrument with local collaborators and key informants to be checked for cultural relevance. Cultural relevance requires having an understanding of the local context in framing one's questions and refers not only to the types of questions asked but also to the way questions are phrased and the terminology used. In "Field and Laboratory Methods in Primatology: A Practical Guide," Jones-

Engle, Engle & Fuentes (2011) stress the importance of this step in efficient research design and implementation.

The first section of the interview included questions regarding demographic and socio-economic information in addition to multiple choice questions regarding perceptions of protected areas (Fiallo & Jacobson, 1995). While the multiple choice section contained a total of 24 questions, for the purposes of this report, only the data from select questions directly relevant to the themes of this investigation will be incorporated. Additional data will be used for future research purposes (Appendix C).

Weller (2006) explains how the use of a structured format with the same set of questions for all participants allows for comparable information across all respondents. The open-ended nature of the instrument refers to how participants were encouraged to explain why they chose specific multiple choice responses over others. In some cases, this meant the respondent talked themselves into changing their answer. In other instances, participants chose more than one response as true, and this was noted. Questions were read aloud to the participants, and responses were recorded on the survey instrument; this section of the activity took approximately thirty minutes to complete. Upon acquiring consent, I audio-recorded all sessions and took hand-written notes. The local collaborator or field assistant was present for each of these interviews to assist with local terminology when needed. The majority of the interviews took place in the participant's home, either on the spot, or pre-arranged. The second part of the structured interview process was the photo pile-sorting activity.

Photo Pile-Sorting

Boster (1994) states that pile-sorting is one of the most effective anthropological methods to investigate one of the most common anthropological questions: What do people know about specific cultural domains and how do they judge similarities and differences? Thus pile-sorting can best be described as a format that asks participants to sort items based on similarities and differences and to make comparisons and give reasoning for their pile choices (Bernard, 2006). This method is frequently used in folk taxonomy research to identify how people categorize various species (López et al., 1997; Koster et al., 2010; Papworth et al., 2013; Stafford et al.,

2016). In ethnoprimatology, pile-sorting has been used to investigate the importance of different primate species to a particular cultural group. For instance, in the Ecuadorian Amazon, Stafford et al. (2016) used photo-pile sorting to investigate folk taxonomies within a Quichua community. The study aimed to document the importance of primates as targets for bushmeat hunting in relation to other species, the scale of primates as pets, and whether primates are acknowledged to play an essential role in the ecology of the forest. Also, Papworth et al. (2013) used this same strategy amongst the Waorani in Ecuador to study how primates are categorized in relation to other common mammals. This method has proven to be a useful tool for conservation planning in assisting with the identification of cultural barriers to the protection of threatened species. For this study, like Papworth et al. (2013), the pile-sorting method was utilized to investigate community perceptions of local fauna to compare how primates were perceived in comparison to other species. However, like Stafford et al. (2016), this study focused more on the community values and uses associated with these species rather than how they are categorized taxonomically.

This activity aimed to reveal key conservation barriers and/or priorities as identified by local people, in addition to whether or not primates are given different attributes in relation to other species. To achieve this aim, photo flashcards of seventeen locally identified faunal species (Appendix D) were shown to participants as part of the structured interview process. Three of these species are considered extirpated from the area (MAE, 2009), and were included in the sample to encourage a discussion reflecting change. All of the species were chosen as a sample based on feedback from previous unstructured interview and participant observation phases, which reported these species as commonly identifiable and vital to local people, either presently or in the past. Participants were asked to identify each species by its common name, and group photos based on several criteria including personal observation, currently present in the area versus no longer present, medicinal value, nutritional value, household pet, crop pest, dangerous attributes, folkloric beliefs, and other unique attributes. Asking the participants at the beginning of the activity to identify species aided in learning local names as well as removing animals from the exercise that the participant was unable to identify. As participants grouped photos, they were probed with more specific open-ended questions to explain and provide more detail about their choices. For instance, if various species were arranged in the medicinal value category, the

participant would be asked to explain how, why and what part of each animal was used for these purposes. Participants were also asked about the time frame of their knowledge. For instance, when had observations of species occurred and when had certain practices taken place. Participants were asked about change in the practices they described, as well as if they noticed a difference in the number of species over time. They were also asked why they think these changes occurred. The activity frequently opened up space for more conversation on these topics afterwards, and often participants offered stories to contextualize their responses. Upon consent of the participant, all activities were audio-recorded and I also took hand-written notes. Each exercise took between 30-45 minutes.

According to Himmelspach and Conrad (2010) one of the limitations of this method is that it is sensitive to missing data, and therefore requires the researcher to include only species that will be recognized by the majority of participants, or to ask participants to sort animals which they do not recognize. This can be problematic if many of the species are nocturnal, as is the case with some species in this sample. However, given the open-ended nature of this exercise and its aim to capture local knowledge, not personally observing an animal was not necessarily a reason to discount it from the activity. If participants could identify the species, they were able to continue with the exercise. Another difficulty with this method was that it frequently caught the attention of other nearby parties. For instance, during an interview spouses often joined in to assist their husbands with identifying medicinal or cooking details about individual species. Children also sometimes joined in the activity to try and guess the name of the animals. Given the qualitative social nature of this research and the location of the interview in the participant's home, this was a common occurrence. Therefore, this study does not disregard these responses but welcomes them as part of the overall community knowledge of species. Specifically indicating where, or from whom, the information was sourced is not the objective of this study, but more the information itself, thus family units were counted as one respondent.

Primate Surveys

These qualitative techniques were then complemented by using quantitative primate surveys to record the location and group size of the mantled howler (*A. palliata aequatorialis*) and the white-fronted capuchin (*C. albifrons aequatorialis*) in the protected area. As my explorations of

perceptions of alloprimates assumes that most participants have had previous interactions with these species, the purpose of these surveys was to help to identify locations of alloprimate-human interaction, to contextualize these perceptions. To accomplish this task, direct spot observations (Osborne & Glew, 2011; Hope et al., 2004) of these species were undertaken by walking trails within the Pacoche Refuge. Due to time constraints, the difficulty of the terrain and to minimize the impact on threatened habitat, only pre-existing trails were used (Cervera et al., 2015). Data were collected either alone when walking trails near the Pacoche Lodge or accompanied by a Ministry of the Environment employee or a local community member.

The GPS location of each sighting, time, group size estimates and a brief description of the habitat, concerning proximity to anthropogenic land-use, was collected. Coordinates were obtained using a Garmin e-Trex Touch 25 and distance was calculated in yards using a Halo XRT7 Rangefinder to an estimated center of the group (Grueter et al., 2008). Trails were walked at a speed of approximately 1.5 km per hour, and all trails were recorded using the GPS. In addition to the lodge, a total of nine different trails were included (Appendix E) in this study based on sighting reports from community informants. Between June and August 2018, trails were walked three days a week in the morning (07:00–12:00 h) and afternoon (14:00–17:30h) avoiding hours when primates are less active (Agostini et al., 2012; Quinten et al., 2014). Trails with no primate sightings were only walked once. As the focus of this investigation was on the community of Pacoche, only paths in the north part of the refuge closest to this community were explored. Many community members owned and or worked agricultural plots on the mountain and thus the study area concentrated on these sectors. It is important to note, the results of the primate surveys were inconsistent and not statistically significant, and thus they are only used to triangulate the primate distribution data collected from community members during the pile-sorting activity.

Data Analysis

Data gathered through all interviews, observations and surveys were combined for purposes of analysis through the triangulation of sources. As ethnographic research is an inductive process, key themes emerge directly from the data as it is reviewed. Thus the research process is not linear, but cyclical as it requires continuous revision (Mannik & McGarry, 2017).

The analysis began by quantitatively analyzing the structured interview data using a salience analysis (Quinlan, 2005; Smith, 1993). Quinlan (2005) explains this method further by stating that "frequently mentioned items (or species) among individuals indicate common knowledge, or consensus within the community, whereas differences indicate measures of variation" (p.225). An Excel spreadsheet was created to organize each multiple choice question and response as well as socio-demographic data. Totals were extracted from each of these sections to quantify the results. Photo-pile sorting data were also quantified using this same analysis method concerning how many respondents shared similar perspectives regarding each of the categories as mentioned earlier. These results were later included during the coding process. Qualitative analysis was then applied by listening to all recordings, reading through all field-notes and writing down important points and themes, as well as reviewing all of the data to gain a general sense of the overall meaning. My interpretations of my notes and thoughts were also recorded during this process. Next, coding began, which is defined as "the process of organizing material into chunks or segments of text before bringing meaning to information. It involves labelling these chunks with terms based on the actual language of the participants" (Creswell, 2009, p. 186). Coding progressed through open, focused and selective coding processes which refined themes and subthemes (Mannik & McGarry, 2017). As much of the data consisted of audio-files, handwritten notes and printed survey forms, no computer software was used to analyze the data. All analysis was completed manually.

Ethical Considerations

In compliance with the 2012 American Anthropological Association's (AAA) Statement on Ethics (article 1), I honoured the anthropological obligation to do no harm. As research with human participants was a central part of this investigation, ethics clearance for this study was obtained by the Western University Non-Medical Research Ethics Board (NMREB) (Appendix F). "The method of interviewing allows individuals to disclose thoughts and feelings which are private. It relies on the inter-personal skills of the interviewer, and one's ability to establish a relationship and rapport. These qualities are valuable but can be ethically sensitive" (Newton, 2010, p. 7). Thus this investigation acknowledges the importance of maintaining trust, respect, professionalism and confidentiality throughout the entire process, as well as providing participants with a copy of the finished report upon completion. With this in mind, all interview

questions went through a rigorous process before being confirmed and were designed to be as informative and objective as possible, without being overly intrusive or personal. As discussed earlier, informed consent was required from all participants. They were given a copy of the consent form (Appendix G), including the study description, and contact information. While I provided a verbal consent option, all participants granted permission to be audio-recorded and provided written consent.

While the risks associated with participation in this study were minimal, it is possible that some participants may have felt uncomfortable when questioned about knowledge of "illegal" activities such as hunting, owning of "exotic" pets, resource extraction, and slash and burn agriculture in the protected area. To alleviate these concerns, participants were asked to report on general knowledge of these behaviours and were not required to admit involvement in any way. All participants were informed that they were able to stop the discussion at any time and were in no way obligated to continue or respond. By giving the participants the power in these sessions, any potential risk was mitigated. No participants requested to stop the interview process.

No identifiable information from participants has been displayed in this final report. Similarly to the Quinten et al. (2014) study, where researchers discovered that most of the hunting on the island of Siberut Indonesia was considered illegal as it took place within the protected park, any personal or socio-demographic information revealed during the investigation will only be displayed as a percentage or discussed broadly here in the report's findings. When direct quotations are presented in this report, pseudonyms will be used so as not to reveal the identity of participants.

The data regarding any contact or identifiable information collected during the research process including audio-recordings were securely brought back to my place of residence at the end of the day and stored on a password protected computer, encrypted file, and hard copies in a locked desk drawer. Audio files were saved under a pseudonym/numbered file that was assigned to each participant, and only accessible through password encryption. The information regarding pseudonyms (the key) has been kept in a separate online file away from the identifying hard-copies. I remain responsible for the secure storage of this information for up to seven years, and will not disclose this primary data to anyone. All participants were made aware of the security of their information and confidentiality in the consent package.

Positionality

One of the defining characteristics of the ethnographic method lies not in that it is a purely objective or replicable technique, but rather that observations are always filtered through our positionality and perspectives that we bring with us into the field. Bourke (2014) explains that during the research process it is reasonable to expect that the researcher's own beliefs, cultural background, gender, class, ethnicity, political perspectives, educational background, life experiences, and so on, are all variables in how the research is framed. "Just as the participants' experiences are framed in social-cultural contexts, so too are those of the researcher" (Bourke, 2014, p. 1). As "research is a process, not just a product" (England, 1994, p. 82), our identities affect our perceptions, not only of others but also in how others perceive us, as researchers. Thus, the researcher's bias shapes the entire process, and by recognizing this fact, we can gain insight into ourselves and how we might approach a situation (Bourke, 2014). In this manner, reflexivity or the self-conscious awareness of the relationship between the researcher and the participant is a crucial part of the research process.

As an active participant during my fieldwork, I was always introducing myself as a student researcher. Both the acceptance and performance of this identity was crucial as it reminded myself and others of my role as a student "learner," not an expert. Based on my outsider appearance, many informants also referred to me as a tourist. I embraced this identity because I was essentially a curious visitor in their community. Despite the spectacular hospitality and warmth of the coastal people, at no time did I feel as though I was an "insider" with my study population. Early in the research process during my community introduction meeting, it was proposed that some residents felt intimidated by my presence, as though my intentions were perhaps to "steal their land." I did my best to remedy this situation by personally meeting with each attendee and explaining in detail the purposes of my research. I also made sure to take part in all community activities and events to get to know people in more informal settings. Even when partaking in alcoholic beverages as offered by locals, I was always careful to present myself professionally and respectfully.

In addition to this situation, I had to navigate my relationship with the Ministry of the Environment and the local community very carefully. Although community members were crucial to my investigation, the Ministry of the Environment also functioned as a gatekeeper to information and bureaucratic support while in the field. Due to the complicated relationship between these entities, I felt an obligation to pick sides. I eventually distanced myself from the Ministry, stating specifically upon my introductions to community members, that while I must share a summary of my findings, I was not working with the state. This choice did not come without a cost, by making it much more difficult to obtain a qualified field guide and hindering my access to park-owned primate survey data. It is hoped in the future I will be able to navigate this relationship with the Ministry more effectively.

It is also important to note that I am aware of my Spanish accent or way of speaking the language may have influenced the way I was received and interpreted by the participants in this study. I attempted to alleviate this concern by requesting a local collaborator and or field assistant accompany me during interviews. This strategy alongside after dinner briefings helped to clarify specific terminology and context perhaps lost in translation. I learned to have a sense of humour when it came to interpreting local expressions, and not to take comments personally associated with my single-white-female appearance. I chose to use my Ecuadorian married name while in the field in order to develop rapport with community members and to highlight my married status. For personal safety, I also wore my wedding ring, and gave reference to my husband's Ecuadorian nationality when appropriate. This transparency may have improved my approachability towards my subject population, as I became quite popular very quickly. However, as I reflect on when I found myself outside drinking with the men while the women were in the church during a funeral, perhaps I again inadvertently chose sides that may have come at another unforeseen cost. By not including the women's perspective in my research due to occupational assumptions, I acknowledge that I skewed the results to reflect previous patriarchal trends in the discipline. While I feel this is justified based on my specific research question, in future studies I will be more conscious and inclusive in my sampling criteria.

Based on the access I was granted, and the relationships I was able to make during my short field season, my research only includes the perspectives of a select group of older men. Thus I cannot claim to have obtained "cultural salience" (Quinlan, 2005) across the entire community. Perhaps

in future research endeavours, including the opinions of other age demographics will improve the study. I do also admit that my "outsider" status may have limited the data I received during interviews. It is possible not all participants were as forthcoming as others. However, I believe that through the triangulation of various data sources I was able to achieve a deeper interpretation of the information I received.

This chapter has discussed *how* this study was conducted, the reason for choosing each method and their limitations. The following chapter will present the key findings garnered from these methods.

Chapter Five: Results

The results for this study will be presented in the following order: socio-demographic patterns, representative data from the structured interview exercise, and concluding with perceptions of primates and relevant species comparisons from the pile-sorting activity.

The sociodemographic section discusses data in relation to respondent's age, residency, education, occupation, and agricultural plots. The structured interview data discusses a sample of multiple-choice questions that are relevant to the themes found throughout this investigation. Finally the pile-sorting data are displayed focusing on our primate relatives, the mantled howler and white-fronted capuchin. Here I will discuss data collected on distribution and sightings in relation to my own primate surveys, followed by data on primate meat consumption, primates as pets, crop damage, folk medicine, folkloric beliefs, anthropomorphic sentiments, and concluding with more general characteristics attributed to primates. Following each theme, a brief description of how other animals displayed in the pile-sorting data relate to these findings is also included.

Sociodemographic Patterns

A total of 25 interview participants were included in this study, however four of these participants were Ministry of the Environment employees, and were only included in the walking interview process. The remaining sample of 21 participants took part in the pile-sorting and survey activity. This chapter shares the findings from "Section 1" of the structured interview process which asked participants to respond to socio-demographic questions in a survey format.

The total age range of participants was between 29 and 86 years of age, with the proportion of younger (> 40) to older (< 40) individuals heavily skewed towards participants over 40 years of age (mean age of 62.6). In terms of ethnicity, the majority of the population of the province of Manabí (69.7%), including (90%) of participants in this study, identify as *mestizo* (INEC, 2010), meaning a person of mixed race, particularly of Spanish and indigenous descent. The other participants in this study identified as Afro-Ecuadorian descent, reflecting 6% of the total population of Manabí (INEC, 2010).

The number of living children per participant ranged from 0-11, with a mean of 4.8 children per person. The child mortality rate reported for respondents' children was 5.68%. This compares to the country-wide child mortality rate of 15.9 deaths/1,000 live births (UNICEF, 2012).

Residency

In terms of residency, 76% of participants currently resided in Pacoche, while some informants, however, lived on the border of Pacoche and Santa Marianita (14%), or were long-time residents of Pacoche with strong family ties there, but who currently live in nearby San Lorenzo (9.5%). A total of 71.4 % of participants had parents from Pacoche indicating long-term ties to the community. In regards to birthplace, 52% of participants were born Pacoche, while 33% of the remaining respondents were born in nearby communities within the protected area (*Figure 1*).

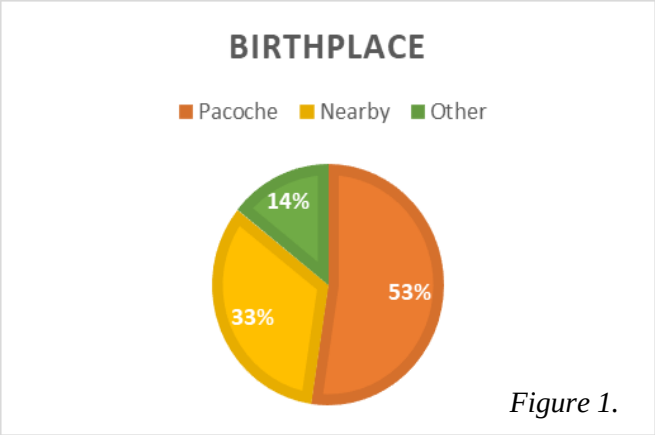

Figure 1.

According to the Ministry of Environment Pacoche Refuge Management Plan (2009), the community of Pacoche has a total of 441 inhabitants, followed by 693 in bordering Santa Marianita, and 725 in nearby San Lorenzo (INEC, 2010). These communities experience partial access to basic services, including electricity, sewage systems and potable water. Water from nearby river systems is stored in tanks and supplied to 72% of the population in the protected area, and an estimated 82% of the population from these localities burns their garbage for disposal. In Pacoche, 98.17% of the population has access to electricity in their homes, and 93% of households have access to water. An estimated 10% of households use latrines (MAE, 2009). Finally, 49% of all people in the province of Manabí boil their water before drinking (INEC, 2010).

Education

In Ecuador, grades 1 to 6 are considered *primaria* or elementary/primary school, and grade 7 to 12 is *secondaria* or high school. The adult literacy rate country-wide (2007-2016) is 94.4%, however in the province of Manabí the adult literacy rate is 89.8% (INEC, 2010).

The highest grade of formal education completed by participants ranged from grade 2 to high school completion, with 9.5 % of respondents obtaining a high-school diploma, and an additional 23% completing primary school as their highest level of education (*Figure 2*). The mean education level is a grade level of 4.9. According to INEC (2010) the average education level for the rural population of Manabí is a grade level of 6.2.

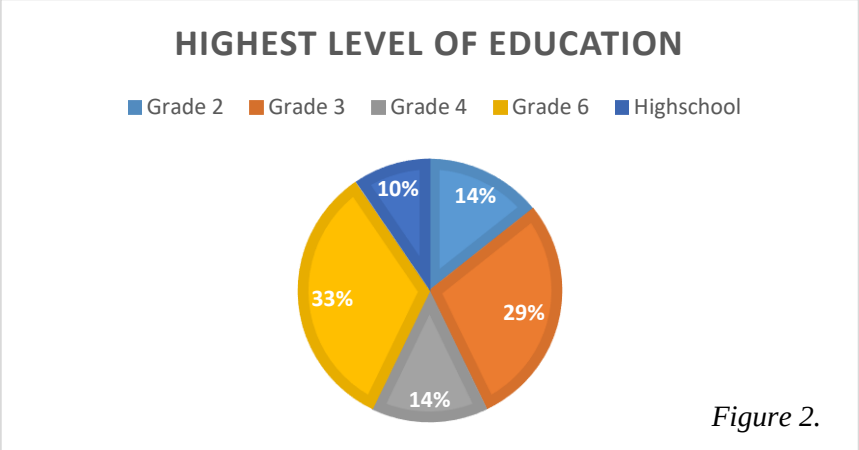

Figure 2.

The education level of participant's children was also recorded. Some of the children are still currently attending school, and many respondents could not provide the education level attained by all of their children. However, based on the data collected, results indicate that three children completed or are currently attending university, seven completed high-school, six attained a 6th grade level of education, two acquired a 5th grade education, and four acquired a 3rd grade education. All respondents did state that all of their children attended school.

Occupation

While the principal occupation across all communities within the Pacoche protected area is fishing, 17% of the total population is dedicated to agriculture as their primary source of employment. This includes the extraction of guadua bamboo (*Guadua angustifolia*) and toquilla

straw (*Carludovica palmate*) (MAE, 2009). The principal occupation of participants was agriculture (66.6%), this includes extraction of guadua bamboo, toquilla straw and machete labour. This was followed by maintenance or mechanic (14%), taxi driver (9.5%), and either public service, tourism, livestock or entrepreneurship (4.7%) reported as their primary occupation. A total of 80.9% of participants reported either working secondary jobs to supplement their income or reported changing occupations in the past. These supplementary or previous occupations include fishing (61.9%), agriculture (28.5%), other (23.8%), construction (19%), hunting (9.5%), tourism (4.7%), municipal government (4.7%), and oil refinery (4.7%) (*Figure 3*). A total of 47.6% participants reported more than one significant occupation change over their lifetime.

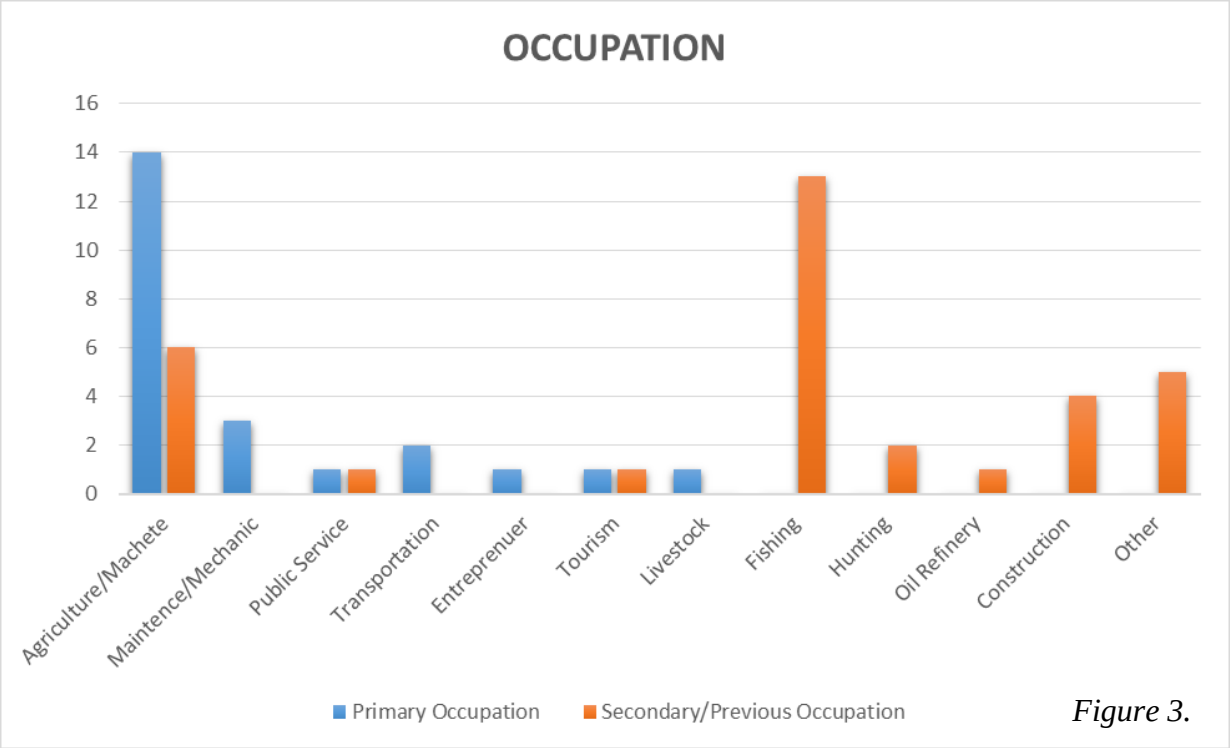

Figure 3.

Additional family income was also reported by some participants from the modest sale of surplus produce, including predominantly sugar cane products, and also guadua bamboo and toquilla straw. While all respondents stated that their spouses are housewives, some women operate modest convenience stores out of their homes, selling items such as soft drinks, bottled water, chips, chocolate, candy, gum, cigarettes and cookies. Some women also make modest sales of

artisan goods, primarily baskets made of toquilla straw which they sell to tourists locally, or take to Manta or Montecristi for sale in the shops.

In 2009, the poverty line for vital family income in Ecuador was calculated as USD $360.00 for a household of five members. The average monthly income of households was calculated for the Pacoche protected area, and is estimated at USD $160.84 (MAE, 2009). The results from this study regarding average monthly salary are inconsistent, as many participants did not feel comfortable sharing this information, or simply avoided the question. However, results achieved from a small sample of seven responses indicates an average monthly salary of USD $187.00.

The primary occupations of participants' children of working age are as follows: fishing (6), agriculture (3), professional (3), security (2), taxi driver (1), government (1), beauty (1), abroad (1), and other (1).

Agricultural Plots

A total of 90.4 % of all participants are owners of their own land and plots. All of these respondents reported that their land was inherited from their parents. Only two participants stated they do not own land, and this is because they migrated to the area later in life, and thus did not benefit from this inheritance. The majority of these plots are located near the La Guayaba and La Bomba trails, while some are located closer to the community of Pacoche on the west side of the *Ruta del Spondylus* highway.

Participants were asked to list what crops they produce and if any are sold as surplus. The variety of plots owned by respondents are as follows: sugar cane (78%), bananas (78%), coffee (73.6%), plantains (57.8%), yucca (47%), oranges (42%), corn (36.8%), watermelon (26%), cade palm (mococha) (15%), avocado (10.5%), beans (10.5%), sapote (10.5%), pumpkin (5%), peas (5%), sweet potato (5%), limes (5%), guaba (5%), papaya (5%), cilantro (5%), peppers (5%), pineapple (5%), cacao (5%), and toquilla palm (5%). Many respondents reported plots that were lost and never recuperated due to the severe drought that occurred in the region (5-12 years ago), and these include oranges, bananas, plantains, coffee, corn, cacao, yucca, and watermelon (*Figure 4*).

Many participants also discussed a significant change in their agricultural productivity after the drought, saying that they are no longer able to produce the same surplus as years ago. A total of

31% of participants said they use to sell surplus harvests before the drought. People discussed the effects of this drought, which forced many to look for other occupations to supplement their income, or to switch occupations altogether.

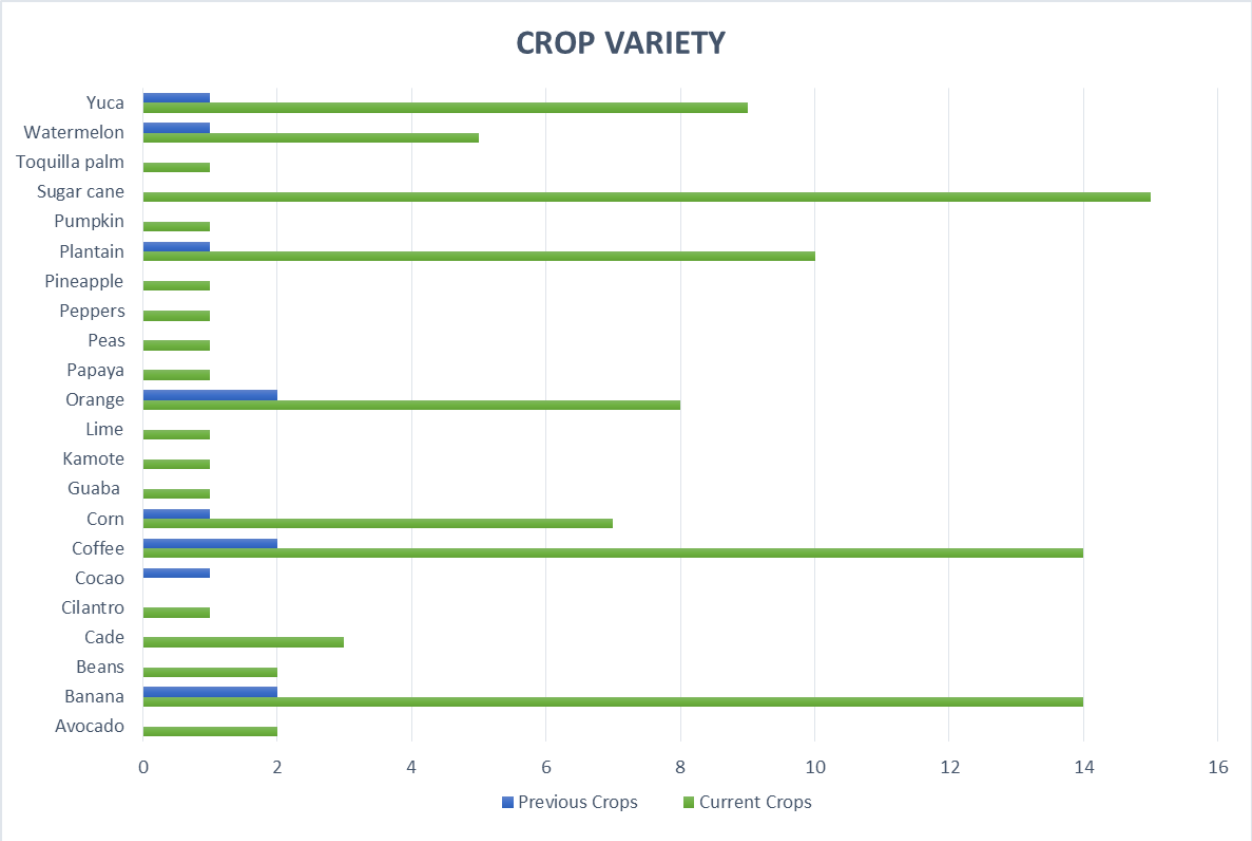

Figure 4.

In terms of surplus sales, all participants shared that their produce is primarily for family consumption, and many stated if they have any extra they usually give it to friends and extended family, or those in the community who do not own crops. A total of 47% of participants said they sell their produce occasionally, and this includes coffee, sugar cane products and fruit, and 21% of participants said they rarely sell their harvests, because they usually only produce enough for familial consumption.

When asked if wildlife is responsible for lost harvests, 57.8% of participants responded no, and others shared that their primary concern was with rats eating their sugar cane plots, or *micos*

destroying their orange yields. All participants stated that there is nothing they can do about the damage and they have learned to live with it.

Structured Interviews

Section 2 of the survey instrument involved a total of 24 multiple-choice questions (Appendix H) surrounding the theme of perceptions of protected areas. As stated in the methods section, for the purposes of this report only questions that directly related to themes found in the pile-sorting activity will be included. Additional data will be used for future research purposes. Of the 21 participants who were included in pile-sorting and socio-demographic data collection, only 20 participated in the multiple-choice section.

Natural Resource Restrictions

Question 7 (A, B and C) asked participants their opinions regarding natural resource restrictions in the protected area. These questions are directly related to agricultural activities involving resource extraction and hunting as discussed in previous sections. The results from this question are as follows: A) 85% of respondents chose "No", stating that people should not be able to hunt animals in the protected area *(Figure 5).* Some people stated that exceptions should be made for people who are very poor, or allowances should be granted for hunting solely for family consumption. However, most respondents were very clear that hunting should no longer be permitted because without animals the tourists would stop coming to the area. Participant

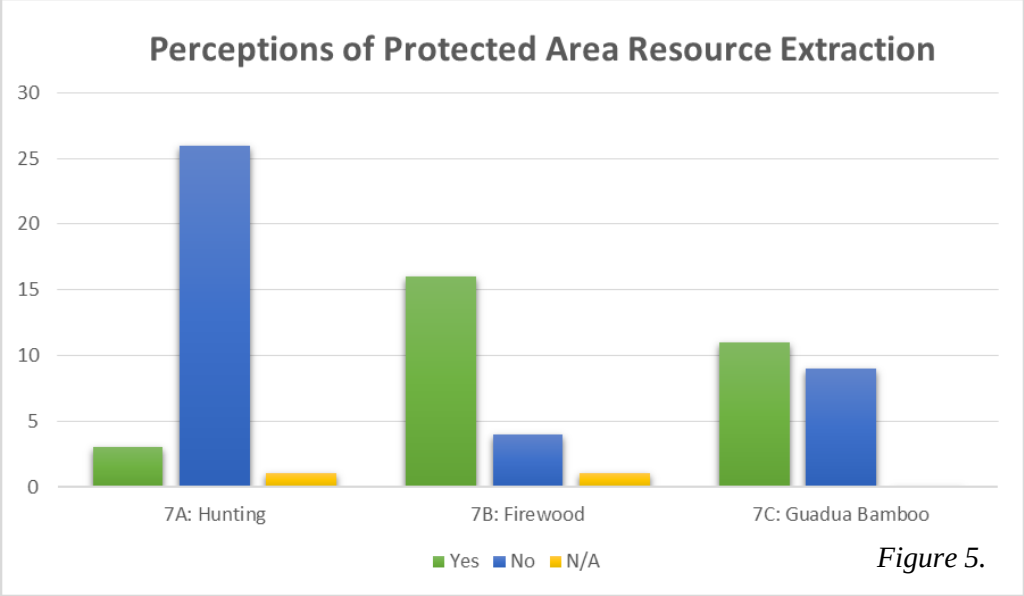

Figure 5.

observation data and pile-sorting data confirm that some people still hunt at night to provide for their families, however the animals targeted are typically large rodents (the paca and the agouti), and armadillos.

B) A total of 80% of respondent selected "Yes", stating that people should be able to extract firewood from the protected area *(Figure 5).* As participants were encouraged to provide reasoning for their choices, most respondents added that taking the dry or dead wood and cutting up fallen trees from the forest for *la molienda* sugarcane processing and cooking was vital to their livelihoods. They insisted that this practice was not harmful to the forest ecosystem. These responses were contextualized through participant observation activities where I witnessed the processing of sugarcane into *panela* or *raspadura* (unrefined whole cane sugar) through the extraction of cane juice using a *trapiche* and the extensive boiling required to reduce the liquid to sugar. This lengthy process involved large quantities of quality hardwood that would burn for long periods of time, and the sale of these products provided much needed supplementary income for people with few economic alternatives. I also participated in the collection of firewood from a protected area trail, which was later used for cooking. This was a daily activity for most women who would frequent this trail because of the availability of dry brush, and bring home as much as they could carry for the day's food preparation.

C) A total of 55% of participants indicated "Yes", stating that people should be able to harvest guadua bamboo from the protected area. The respondents who selected "No", did so stating that this is only acceptable with a permit (*Figure 5*). This topic was highly controversial, with many participants criticizing the Ministry of the Environment's required permit process. Informants stated that the office is too far away and too complicated for many people to apply. Guadua bamboo, locally known as *caña guadua*, is used primarily as a building material for houses, but is also used in other construction projects and in the making of artisan handicrafts. It is a very abundant resource in the Pacoche Refuge, and my research defines its extraction as the most common natural resource taken from the protected area. Based on conversations with informants, and my own participant observation activities, there are a lot of discrepancies between individuals over what is and is not permitted in regards to bamboo extraction. Many believe that if it is located on their own property and they only cut down a few at a time, this is acceptable without a permit. Some state that you only need a permit if you plan to cut down more than a

dozen stalks. Many participants also argued that the cutting down of old *caña* guadua stalks is crucial for overall forest health. They state that if the stalks are left to rot, they will infect all the surrounding foliage. Informants demonstrated how to clean up the brush around the base of the stalks to promote healthy growth. They also discussed that there are certain times of the month when you can harvest this resource because of the moon and the tides. People mentioned that the Ministry of the Environment does not understand how to care for *caña* guadua, and appeared frustrated at the topic. Discussions with the Ministry of the Environment staff reveal that only one permit per month is applied for on average, and that increased illegal extraction is due to road developments in the area allowing access deeper into previously undisturbed forest areas. A dozen stalks can be sold for approximately USD $60, and given the nearby earthquake in 2016, the demand for guadua bamboo as an "earthquake proof" building material has risen significantly. Many agricultural workers supplement their income through the sale of this resource, and harvesting generally occurs at night to avoid authorities. While this topic is not the focus of the particular research project, it speaks to the context of socio-demographic patterns of the participants in this study, potential threats to wildlife habitat, as well as political-ecological entanglements that will be explored further in future research endeavors.

The Role of Animals in the Ecosystem

Question 14 in the survey instrument asked participants, what would happen to the environment if there were no longer any animals inhabiting the forest? They were given four options, and the majority of participants (45%) responded D) the forest would remain the same. A total of 30% of respondents chose B) the forest would grow without animals eating all the plants, 15% said A) the forest will die without animals, and one person said C) I don't care, animals will never be gone. These data are particularly interesting in comparison with the pile-sorting activity where individuals identified certain fauna no longer found in the Pacoche forest. This included peccaries, the jaguarondi, and arguably the ocelot, all said to have been hunted to regional extinction or driven from the area due to development.

Tourism

Question 23 asked participants their opinion about what attracts tourists to visit Pacoche? They were given five options, and some participants chose more than one. The results indicate that 55% selected C) tourists come to see the forest and all the wildlife here, 35% chose A) tourists come to see the monkeys, and 20% indicated E) people come to go to the beach (*Figure 6*). Other less common responses stated things like: they come to see the sea turtles, the whales and to learn about the communities. These results reflect how the value of the forest and the animals living there appears to be highly connected to tourism.

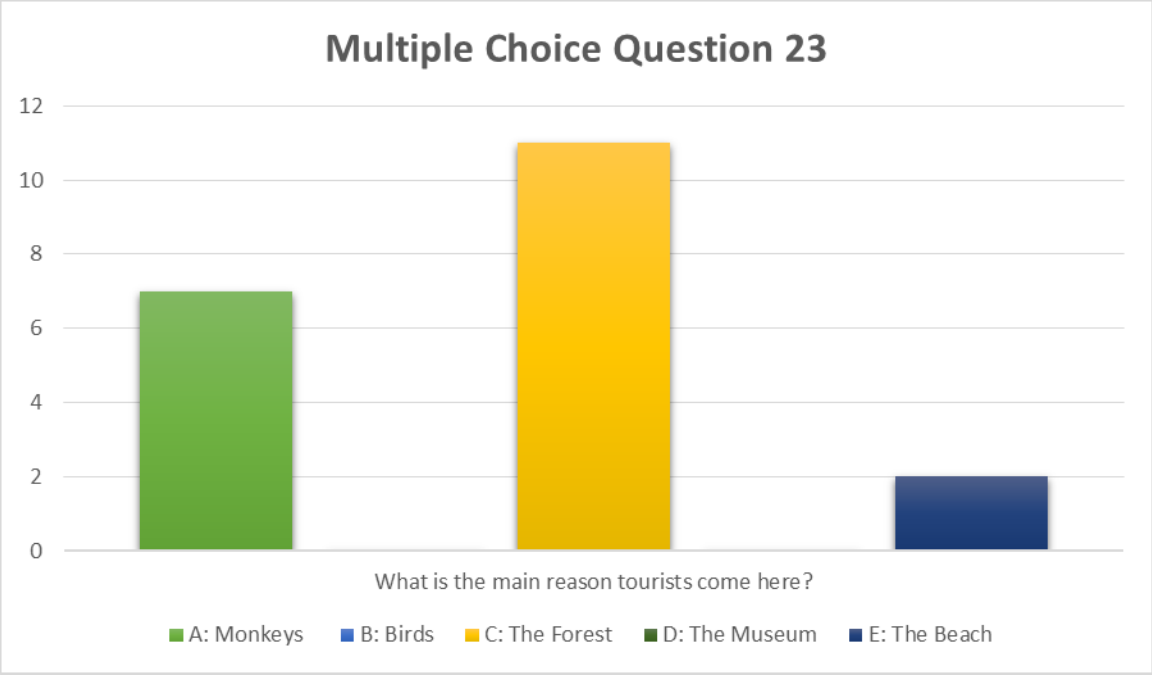

Figure 6.

These findings also relate to Question 4 in the survey instrument which asked participants to voice their opinion regarding the purpose of the protected area. The majority of respondents selected C) the protected area was created predominantly for tourists (40%). This was followed by D) the protected area is important to take care of the forests for our children (25%). These data are also complemented through participatory observation research and discussions with Ministry of the Environment staff members, where I became aware that none of the employees had any environmental, ecological, geographic or biological education, but in fact had all been trained in or studied tourism in school. This was reinforced by my participation in formal

workshops on sustainable tourism development agendas alongside provincial government representatives and academics. These conversations revealed a skew in available academic programs towards the tourism industry. The lack of environmental science options for students in the province was something that attendees agreed needs to be addressed. They also created a workshop series, in which I participated, to have Ministry of the Environment staff give lectures on conservation education to university students in tourism departments. The interconnections and inconsistencies between these two government entities, the Ministry of the Environment and the Ministry of Tourism, is another area for future research.

Perceptions of Primates

As stated earlier, the results from the pile-sorting activity presented in this thesis will focus on local perceptions of primate species, followed by relevant comparisons with other notable fauna. Based on previous ethnoprimatological literature, the data collected through this exercise focused on specific categories including community uses, attributes, and folkloric stories shared about each primate species in addition to the location and frequency of sightings. Dominant themes which emerged from the data include primate blood as a remedy for asthma, anthropomorphic sentiments, and howler monkeys as barometers for predicting and announcing rainfall. In order to understand conceptualizations of primates in relation to other animals in Pacoche, a total of 15 additional faunal species were included in the exercise. The following section discusses the results of this semi-structured activity where participants were encouraged to share their knowledge of each species represented in the photographs (Appendix I). A summary of these results follows.

Primate Identification, Sightings, and Location

1) White-fronted capuchin (*C. albifrons aequatorialis*) is known by participants as “mico”, but was also referred to as “mono-mico” or “mico of the mountain”.

According to all participants, sightings of *micos* were infrequent (frequency (f)=19), with a total of seven respondents reporting that this species has not been seen in over a year, eight reporting their last sighting was over the past few months, and four respondents sharing they had never seen a *mico* in the wild. For instance, one participant stated: “They are very difficult to find now - many people say they don’t exist here anymore because of the refinery and all the building”

(referring to Pacoche zone in the north part of the protected area) ("Mauricio", personal communication, July 2018). Those that reported sightings stated that they occurred on La Bomba trail (2), Montaña Verde trail (1), La Guayaba trail (1), or near Rio Seco/Rio Caña (3), and the community of Las Piñas (3). Other participants, including additional discussions with Ministry of the Environment personnel, commented that *micos* are found deeper in the forest, in less disturbed areas, because they prefer older forests only found higher up on the mountain (6). Other participants stated *micos* are rarely seen because: "they don't like to be near people" ("Javier", and "Rafael", personal communication, July 2018). When asked if there are presently more or less capuchins on the mountain in comparison to 10 and 20 years ago, 13 participants claimed there are now fewer *micos* in general, six participants did not respond directly to the question, one person said there are more, and one said their numbers have remained constant over the years.

The three trails, La Bomba, Montaña Verde, and La Guayaba, were included as part of my primate surveys, in addition to the community of Las Piñas. My findings from these surveys are in line with those reported by the Pacoche community members (Appendix J), who state that sightings of *micos* are infrequent. I unfortunately did not find *C. aequatorialis* on any of my surveys in the protected area, but given the pile-sorting data, these results are not unexpected. Perhaps including other survey tracks in the south-eastern part of the protected area further away from human development would have improved the success of these surveys. However, as this research project was concerned with the community of Pacoche, only areas utilized by these participants in the northern part of the refuge were explored.

The infrequency of these findings are consistent with Cervera, et al's (2015) surveys of primate distribution in Pacoche, where they reported only three capuchin sightings during their three month research period. "This low detection rate underscores the need for immediate conservation action for this species" (Cervera et al 2015, p.1).

2) Mantled Howler (*A. palliata aequatorialis*) known by locals as "mono", also referred as "howler monkey" (*mono aullador*), "mono-negro" or "gorilla".

According to 18 participants, sightings of the mantled howler monkey are frequent, if not daily for those who have plots in forested sectors (frequency (f) =15). For instance, participants stated

"I see them every day I am working on the mountain" ("Mateo", personal communication, July 2018). People report seeing them every time they visit their plots, or at the very least hearing them in the distance. Only three participants stated that they had not seen howlers in over one year.

Most people living in Pacoche have plots in the north-eastern part of the protected area, accessed primarily through one of two back-route trails: 1) La Guayaba and 2) La Bomba. Thus these two trails, in addition to the fork in the road to nearby Liguiqui, were the primary locations reported for howler sightings. They are often spotted in the fig/mulberry tree (*Ficus membranacea/ Ficus cuatrecasana*) locally known as *higueron*, or in *guadua* bamboo (*Guadua angustifolia*), locally known as *caña guadua*, as a common sight around and enroute to agricultural zones. People report howlers to be seen in groups ranging from 7-12, however three people said they have spotted solitary individuals as well.

While these two trails were part of my primate surveys, the frequency of these sightings does not correspond with my data set for focal sampling (Appendix J). While I did in fact hear howlers in the distance on all of my hikes on these trails, the discrepancy in the data comparisons could be due to one of two factors; one is the amount of time participants spend on the mountain working their plots (in one centralized area). Agricultural workers typically tend to their plots solitarily between 6am and 1pm Monday to Friday. Their constant and repeated presence in one location would greatly enhance the probability of a howler encounter, given that this is known howler monkey territory. My surveys, on the contrary, were only three days a week, and I was actively hiking the trails, so I was not in one central location at any one time. The noise chatting with the guide, while moving through these trails may have deterred the howlers from approaching, or may have meant that I was simply "unlucky" on many of my attempts. Also, due to the misty and rainy climate, it is possible that due to my lack of experience that I may have simply not seen the howlers resting in the thick vegetation as I passed. A second possibility, is that the participants are exaggerating the frequency of their sightings. However, given the continual repetition of these findings with all participants, it is unlikely all respondents embellished their encounters.

When asked if there are presently more or less howlers on the mountain in comparison to 10 and 20 years ago, six participants said there are less *monos* in general, for instance, one informant

shared his opinion about a decrease in wildlife saying, "there are less animals now than 20 years ago, now you see nothing when you go on the mountain" ("Daniel", personal communication, August 2018). Another participant commented that "years ago this forest was pristine, but the animals have had to face the consequences of all the destruction and they are less resistant than us" ("Benjamin", personal communication, August 2018). However, based on frequency the results for this topic were not significant because five participants stated there are more howlers today than in previous decades, and an additional five claimed howler numbers have remained constant over the years. The inconsistency in these responses could be due to the amount of time each individual spends on the mountain and the location of their plots.

Primate Bushmeat Consumption

While there have been no systematic studies conducted on the effects of hunting on Ecuadorian primate populations, research in the Yasuní National Park and north of the Napo River suggests that in certain forest areas hunting could have a substantial impact on some primate populations (de La Torre, 2012; Papworth et al 2013; Stafford et al 2016; Suarez et al, 2009; Zapata-Ríos, 2001). For instance, the Waorani people of the Ecuadorian Amazon are specialists in hunting monkeys and birds for subsistence, and thus primates are of great cultural importance in these communities (Papworth el al, 2013). The preference for certain primates for consumption over others can also be rooted in socio-cultural taboos linked to species traits. For instance, according to Urbani and Cormier (2015) "taboos on howlers as food are often linked to magical contagions whereby ingestion of howlers is believed to pass on their undesirable traits, such as lethargy" (p.259). Mittermeier (1991) also reported that howler infestation with botflies and their strong smell may serve as a deterrent to howler consumption.

Based on its prevalence in the literature, especially within an Ecuadorian context, and the direct correspondence to conservation, this study decided to inquire about people's preferences for primate consumption in the community of Pacoche. The findings indicate that *micos*, neither presently nor in previous decades, have been considered a food source in this community, as zero of the twenty-one respondents designated this to be true. One respondent in fact specified, "No, no one would eat *micos* because they are too fatty" ("Fernando", personal communication, August 2018). This response suggests that perhaps the preference against the consumption of

capuchin meat is more related to the quality or taste of the meat, than to social taboos or anthropomorphic sentiments. Distaste for capuchin meat may also be related to the proximity of Pacoche to the city of Manta and access to other sources of protein, in addition to the community's proximity to and dependence on marine resources which make up a large portion of people's diets. While not practiced in Pacoche, informal discussions with Ministry of the Environment staff (2) reveal that people in other more inland sectors of the province of Manabí and Esmeraldas do occasionally consume *mico* meat, particularly near the town of Chone.

The results for howler meat consumption were more significant, with five of the twenty-one respondents claiming howler monkey meat as a food source. Of these five responses, only two reported that this is still practiced, by stating "yes, the meat is delicious some people eat it, but not everyone" ("Mauricio", personal communication, August 2018). Another participant shared how howler meat is consumed by discussing that "the meat is often smoked or cooked in a stew" (Fernando, personal communication, August 2018). The other three participants discussed how howler meat used to be consumed in the past, but it was no longer a common practice in Pacoche. "Yes, mono meat was a part of our diet, but not anymore. It was the preferred food for our ancestors" ("Javier", personal communication, July 2018). Given the frequent presence of monkeys depicted in the archaeological record in this region the importance of howler meat in the diet of previous inhabitants is probable.

While no one expressed any social taboos to provide reasons for not eating howler meat, eight respondents reported that howler monkeys are not a food source in the community to their knowledge, with one person who was previously a hunter by profession sharing, "No, I have never killed a howler for meat, I would feel bad eating them" ("Patricio", personal communication, August 2018). This response suggests the potential for anthropomorphic sentiments influencing food choice. These results demonstrate that although the consumption of primate meat is a common practice in other areas of Ecuador, predominantly in the Amazonian region, the effects of the Ministry of Environment regulations in Pacoche have likely decreased the prevalence of illegal hunting of primates for human consumption.

These regulations, however, are not followed by all inhabitants, with one respondent stating "God put animals on the earth so humans can eat them I don't know why it is prohibited"

(“Marco”, personal communication, August 2018). This individual claims that prior to the Ministry of Environment (MAE) regulations in the protected area, he used to hunt for his family an average of two to three nights a week, now he does so significantly less. Another participant shared his thoughts on this subject saying, "you can no longer buy bullets at the hardware store, they have become very hard to find in recent years” (“Mauricio”, personal communication, August 2018).

Other participants talked about the consequences for hunting in the protected area, saying that if you are caught with a rifle by the MAE you are put in prison. They shared that most people who continue to hunt do it at night, when the MAE is not patrolling, and they only hunt to provide for their own family. Some people commented that hunting should be permitted in the protected area if it is only for personal consumption.

Other animals included in the pile-sorting sample that were considered a food source in Pacoche include the lowland paca locally known *guanta*, and the agouti locally known as *guatusa.* One respondent showed me a recent photo on his phone of his kill (“Sebastian”, personal communication, August 2018). Armadillos were also expressed by many as being very delicious, cooked in the oven or on the barbeque. One respondent stated “If I find one, I’ll eat it” (“Alfonso”, personal communication, August 2018). Another participant hungrily exclaimed, he had not had armadillo in months but was craving it (“Mauricio”, personal communication, August 2018). White-tailed deer was also expressed by many to be a food source, although all respondents mentioned especially that this was before the Ministry of the Environment regulations. I did however witness a deer strapped to the roof of a truck one day in the field. The chachalaca, locally known as *guachalaca*, was also a common food source; again few claim they still eat this bird, but those who do say that it is like a partridge and its meat is very good. The pit viper was said to make an excellent snack, by frying its skin to make a crispy treat, and African land snail was said to be consumed in *ceviche* (cold, spicy, citrus soup). The responses regarding the consumption of these aforementioned species, were much higher than accounts of primate meat consumption. Other animals not as commonly reported to be consumed include the squirrel, the ocelot, the tapeti, and the peccary. Despite all of these sources, it does seem that hunting has significantly decreased in the protected area over the past 10 years. Consumption of these

animals appears to be a rarity or a delicacy now, as hunting activities are said to take place infrequently and only at night.

Primates as Pets

Ecuador signed the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) agreement in 1975 forbidding the trade of wildlife according to Ecuadorian law. The punishment of this crime can result in imprisonment, confiscation of animals and fines for all people involved in all stages of illegal wildlife trafficking (De la Torre, 2012). However, despite these laws, according to a report by UNEP-WCMC in 2015, the wildlife trade in Ecuador has a minimum estimated value of US $35 million a year (Sinovas & Price, 2015). Based on the prevalence of primates as household pets in the literature, and the effects of this behaviour on primate conservation, this study decided to inquire about people's perceptions of primates as pets in the coastal community of Pacoche.

Overall findings from this investigation suggest that illegal wildlife is not presently common amongst household pets. Participant observation and walking interview data revealed that most households have domestic animals as pets including dogs, cats, goats, pigs, rabbits and chickens. Other animals were not observed to be household pets. In regards to capuchin monkeys, participants mentioned that this was a common practice before the Ministry of the Environment regulations ten years ago (5), four of these participants reported that *micos* were previously common household pets, with one person claiming to have kept one personally. The rest of the participants (16) did not discuss capuchins as pets in any capacity.

Results from discussions about howler monkeys reveal a similar trend with three participants stating that howler monkeys made good pets, or that they themselves previously had a howler monkey as a pet. However each participant also mentioned that people in the community no longer keep monkeys as pets because it is illegal and the Ministry of the Environment will confiscate them. This behavior is something that has changed over the past decade, and according to participants once confiscated, primates are taken to a local animal sanctuary in Puerto Viejo for rehabilitation. Seventeen participants did not share any comments regarding howlers as pets.

These results indicate that neither *micos* nor *monos* are presently considered pets by most participants, which suggests a significant difference between this coastal community and findings from the Amazonian region. For instance, Stafford et al.'s (2016) research with a Kichwa community in the Ecuadorian Amazon highlight the prominent position of primates as preferred pets, and argue that this is often an overlooked area in studies examining reasons for neotropical primate declines. Also, previous research conducted in an animal rehabilitation center in the Amazonian town of Puyo indicates that the majority of domestic tourists, consisting primarily of local school children either have a monkey as a pet or know someone who does (Britton, 2012). These results suggest that although keeping primates as household pets remains a common practice in the Amazonian region, the effects of the Ministry of Environment regulations have decreased the prevalence of this behavior in the coastal community of Pacoche over the past decade. No other species in the pile-sorting sample were discussed as pets, either presently or in the past.

Crop Damage

Analyzing people's perceptions of primates in relation to crop damage is a common ethnoprimatological focus because it can provide useful insights into areas of conflict and coexistence which directly affect people's livelihoods. Dore (2018) refers to crop damage in St Kitts as the "monkey problem" when investigating rates of contact between farmers and green monkeys and the socio-economic politics embedded in these relationships. Other ethnoprimatological literature instead highlights areas of sympatry between humans and alloprimates, as opposed to conflict (Hockings & Sousa, 2013). These studies shift to a crop-foraging model that seeks to identify potential routes to coexistence between humans and alloprimates through the partitioning of resources (Riley & Fuentes 2011), and other mutually beneficial strategies. For instance, Spagnoletti et al (2017) investigated capuchin crop-foraging in Brazil, and found that despite high crop losses, farmers showed a positive attitude towards capuchins. Inspired by this literature, this study incorporated questions about crop damage into the pile-sorting activity in order to investigate whether or not these primate-human interactions were perceived as conflictual or harmonious to local farmers.

The findings from Pacoche indicate that the majority of farmers find *micos* to be destructive (*f*=14) in comparison to other local fauna. Participants specified orange plots as the most affected (13), followed by corn (4), banana (3), papaya (3), and other assorted plots (avocado and *tagua*) (2). For instance, one participant shared: "*Micos* are very damaging to orange crops. They don't eat them all, they just destroy them and they throw them on the ground, and there is nothing you can do to prevent it because once you find the damage it's too late. Twenty years ago they did not do this much damage" ("Miguel", personal communication, August 2018). Another participant stated: "They [capuchins] are more damaging than other animals, if no one is there they will eat everything in a few days" ("Marco", personal communication, July 2018).

In contrast to these responses, four participants gave reference to support the crop-foraging and coexistence model by insisting that capuchins do not cause damage. They stated that: "they (*micos*) are not destructive, they just need to eat, like us" ("Fernando", "Federico", "Sebastian", and "Patricio", personal communication, July and August 2018). An additional three participants did not discuss primate crop damage in any of their responses.

Despite the high reports of crop damage in Pacoche, none of the respondents stated they caused any harm to the culprits. Most participants shared that they had no strategies to prevent the destruction, as typically it occurs when no one is present. This is with the exception of two respondents, one who admitted to slapping the trees with his machete to scare them away, while the other confessed to firing shots in the air.

In regard to the data on howler monkeys and crop damage, while respondents stated that howlers consume a variety of fruits ranging from oranges and papaya to bananas, avocado and sapote, no one referred to the howler monkey as damaging to crops. Some people mentioned other tree species that howlers prefer including the trumpet tree or snakewood (*Cecropia peltata*) locally referred to as "guarumo", the fig/mulberry tree (*Ficus membranacea* or *Ficus cuatrecasana*) locally known as "higueron", and the strangler-fig tree (*Ficus obtusifolia*) locally known as "matapalo". Ten participants in particular stated specifically that howler monkeys do not damage crops, and compared this species with capuchins.

Other species that were discussed in relation to crop damage include forest rats. While they were not part of the pile-sorting sample, they were the most commonly discussed in relation to

damage. Rats were seen as the most destructive species, particular in reference to sugarcane crops. Some farmers reported using poison in their fields to try and alleviate the problem (3), because the rats chew the stalks at the root and cause them to fall over and rot the surrounding area. African land snails were seen as the next most serious cause of destruction particularly in reference to coffee and banana plots. Capuchins were the next most destructive as stated earlier in this section. Animals that were reported to cause less harm were the tayra to papaya and sugarcane yields, the white tailed deer to yucca, pumpkin and sweet potatoes, the chacalaca to coffee plants, and squirrels to coffee and cacao plants. Also, the tree ocelot (*tigrillo/tigre*) is no longer reported to be in the area, although this could be due to its nocturnal behavior. Participants discussed how this mammal would steal and kill their livestock, particularly chickens and goats, so many people hunted them to get rid of them from the area. One participant reported that people in the community used to consume their meat, although this was not confirmed by other respondents. One respondent also discussed how he used to sell their pelts for money before the area became protected.

Folk Medicine

The medicinal or magic value of products derived from primate species contributes to accelerated rates of hunting in certain parts of the world. A review by Alvez et al. (2013) of primates in traditional folk medicine revealed that "at least 110 species of primates, belonging to 41 genera and 11 families, are used in traditional folk practices and in magic-religious rituals throughout the world" (p.135). New World primates account for 22.7% of these totals (Alvez et al., 2013), and the demand for these products can have detrimental effects on the survival of these species. Around the world various parts of primates are utilized, including fur, legs, fat, oil, eyes, bile, blood, gall bladder, viscera, bone, meat, brain, and skull, as the most common (Alvez et al., 2013). Urbani and Cormier (2015) also state that the use of hyoids in howler monkey was reported to have medicinal value for many neotropical peoples.

The extent of these practices worldwide highlights the importance of understanding socio-cultural context to inform sustainable conservation action plans. Therefore, each participant in Pacoche was asked if they were aware of any medicinal uses for the animals displayed in the pile-sorting photos.

The results for primate species indicate that capuchins (*micos*) are not commonly used in folk medicine, with 16 participants not discussing the subject and three participants stating specifically that they did not know of any medicinal uses for this animal. Two participants, however, did state that *mico* blood is used as a cure for lung illnesses, specifically mentioning asthma. This medicinal practice was primarily based on accounts from their youth and previous generations, and according to these respondents it is no longer commonly practiced.

The findings for howler monkeys (*monos*), however, were more significant. While ten respondents did not comment on this practice, and three specifically stated that they are not aware of monos used for medicinal purposes, eight participants stated that howler blood is used to treat asthma, coughing and other lung ailments. Participants explained the process by stating that: "their blood is very good for a cough or asthma treatment- take half a glass of blood mixed with coffee or orange juice ("Mauricio", personal communication, August 2018). Other informants also added that sometimes the blood is drank with cola. One participant specified that "their blood is an excellent remedy for chronic cough, but you have to kill them [*the mono*] to get it" ("Tomas", personal communication, August 2018). He then proceeded to describe how to kill a monkey explaining the strategy involved, that you have to angle and time the shot perfectly while distracting the monkey otherwise they will not fall from the tree and they will wrap their tails around a branch and just stay up there after they die. He also indicated that many people do not know this strategy. Like the results from the capuchin monkeys, most respondents stated that using primate blood is no longer a common practice (7), however one participant admitted to killing a mono recently. He said "their blood can save someone's life who has an illness in their lungs, you drink it [the blood] with coffee or cola. I killed one a few months ago to save a child's life" ("Fernando", personal communication, August 2018).

These findings suggest that traditional belief systems in the medicinal value of primate blood are still present today. The decrease in this practice over the past few decades is likely related to the Ministry of Environment regulations on hunting in the protected area which have been generally respected, especially in regards to primate species. Also, increased access to other pharmaceutical options due to Pacoche's proximity to the city of Manta, the in-town health center, and the increase in tourist presence to see monkeys in recent years all likely play roles in the reduction of this practice.

Other animals included in the pile-sorting activity that were mentioned to have medicinal properties include the white-tailed deer, the ocelot, the armadillo, and the pit-viper. Respondents shared stories about how deer hooves are heated and used to help small children with constipation, and deer fat is heated and rubbed on sore muscles. Fat from ocelots, pit-vipers and armadillos was also said to be used for this purpose, similarly for relief of hemorrhoids and arthritis. Pit-viper fat was also said to be heated, diluted and drank to help treat a bad cough. Finally, when visiting one participant he showed me how the tail of an armadillo is heated and put inside your ear to ease an earache.

Folklore[6]

Primates often have symbolic roles in the cosmologies and symbologies of people worldwide. For instance, monkey to human transformation is a common theme in mythology (Urbani and Cormier, 2015; Viveiros de Castro, 1998), likely based on our shared evolutionary history and similar traits. These human-animal associations can reveal important information about multi-species social relationships but also about human social organization. For instance, how primates are classified in a society can reveal insights into kinship order, like among the Guajá, where "howler monkeys are considered to be in a patrilineal sibling relationship with humans" (Cormier 2003, p. 274). Taboos on howlers are also relatively common, and they are often considered to be bad omens. It is believed that they may transmit diseases and lethargy (Urbani and Cormier, 2015). Motivated by the frequency of primates in cosmologies of people worldwide, it was decided to ask participants in this study whether or not they were aware of any special folkloric traits, or stories about primates that they could share.

The pile-sorting data on capuchins reveal only two folkloric beliefs from two individuals. One participant shared, "they say they [capuchins] live for hundreds of years, they were the first to arrive in the forest" ("Sebastian", personal communication, August 2018). He then explained how this story was passed down through generations in his family. Another respondent told a story about a capuchin being killed for its blood to save a child. The *mico* pleaded for his life, and performed Hail Marys desperately begging to be spared. After the man killed him, bad luck

[6] Folklore/myth refers to the traditional beliefs, customs, and stories of a particular community of people that are passed through the generations by word of mouth. Community refers to shared residence and ancestry in a particular town.

was brought down on the family for years to come ("Pablo", personal communication, July 2018). While other information regarding this species was shared, none of the other 19 participants confirmed these particular stories.

The most common belief shared about howler monkeys was discussed by seven participants. They each talked about howlers as barometers for announcing oncoming rain showers. One person also stated that they announce natural disasters before they happen. "Our ancestors say that they howl to the gods to ask for the rain, they need water just like us" ("Benjamin", personal communication, August 2018). Another participant stated, "When they howl it means it's going to rain, our parents teach us this when we are children" ("Mateo", personal communication, August 2018). "Fernando" later added to this discussion and said "They howl to announce the rain or an earthquake that is coming (like a warning). When all the howlers died in February [2016] it was a warning to us that the earthquake would follow" (personal communication, August 2018). Finally, "Benjamin" claimed in reference to climate change that howler monkeys feel time (personal communication, August 2018). While 13 respondents did not have any stories to contribute to this topic, the frequency of this particular belief system is significant.

Relevant folkloric comparisons with other animals in the pile-sorting sample were only referenced when speaking about three species. The first was part of the sample, the rufous-headed chacalaca (*Ortalis erythroptera*), locally known as *guachalca.* One respondent stated that their call/song provides a warning to people that there is a snake nearby ("Alfonso", personal communication, August 2018). This was not corroborated by any other participant. However, another similar story was widely shared by seven participants concerning a new species that was not included in the sample: called the laughing falcon (*Herpetotheres cachinnans*), referred to by locals as *la Valdivia* or *al hueco va*. According to respondents, their call means someone is going to die soon, or be bitten by a snake. This is interesting as this bird is also known in the neotropics as the "snake hawk" because it is an expert snake-eater. Some participants also said that their call announces the birth of a child ("Mauricio" and "Alejandro", personal communication, August 2018). Finally, there were many stories about the pit-viper, locally known as *equis*, which was reported as the most feared animal in the pile-sorting sample, with much discussion surrounding altercations. Nearly every participant reported knowing someone who had been bitten and died from the venom. Rooted in this fear, participants have developed numerous strategies to deal

with this snake given the amount of time they spend on the mountain. One of these strategies involves crushing up eggshells and scattering them in front of your home, so the *equis* will not come near. Other farmers routinely scatter old boots and shoes in the crops, like scarecrows, with the belief that this will keep the *equis* away. As I walked with Mauricio through the tall grass towards his banana plots I noticed numerous moss-covered boots thrown about. He explained that this was a strategy his father taught him, and that many farmers do the same. I started noticing boots and shoes everywhere I went as I explored the trails and agricultural plots around Pacoche. Stories about what to do if bitten were also frequently shared. If bitten, you must not only see a doctor for the anti-venom, but also see a healer because they have to suck the poison out of the wound. If this step is not taken the person will die. There is only one healer still alive in the region, and she currently resides in Montecristi, an hour drive away from the community of Pacoche. All respondents stated that if they see an *equis,* they kill it immediately by chopping off its head with a machete. Then, the body must be burned completely to get rid of any trace of the snake, because its bones are like needles and will prick you in the feet and you will get sick. These stories were told by nearly all participants (18), highlighting the intensity of fear for this animal. One respondent referred to the *equis* as, "the enemy of man" ("Alfonso", personal communication, August 2018).

Anthropomorphism

Anthropomorphism, defined as the attribution of human traits, emotions, or intentions to non-human entities, was a dominant emergent theme from the results of the pile-sorting activity. Riley (2013) argues that anthropomorphism can be used as a tool to promote conservation support by garnering respect for nonhuman beings. Within a sample of 17 different animal species in this activity, anthropomorphism was only attributed to the two primate species in the sample. This result in itself suggests that primates are classified differently or are given a special classification in the animal kingdom by participating Pacoche community members. Anthropomorphism was counted when participants referred to primates as human-like, or attributed other human characteristics to primates. Statements such as "I like to see them and hear them because they remind me of humans" ("Mateo", personal communication, August 2018), "we are friends, we are always happy to see one another" ("Benjamin", personal communication, August 2018), and "the howler monkey feels more like a human to me, they are

religious and they carry babies like a human mother" ("Federico", personal communication, August 2018), were common expressions (10) during open discussions.

The most frequent occurrence of anthropomorphism was in reference to both capuchins (2) and howler monkeys (5) performing Hail Marys when feeling threatened by human presence. This statement was usually followed by comments such as, they are so much like us, or they are religious like us (4). Another commonly shared story in reference to capuchins was that they fall in love with females and follow them in the forest (6). Other respondents reported feeling accompanied while in the forest, knowing that the presence of howler monkeys made them feel less alone ("Alfredo", personal communication, July 2018).

Other anthropomorphic descriptions include: "they [capuchins] are like people because they look like us, they act like us, the way they eat and carry things in their arms, and they take care of each other in groups like a gang" ("Sebastian", personal communication, 2018). Another respondent commented that "*monos* have their own song and like to sing just like us and they hide from the cold just like us" ("Daniel", personal communication, August 2018).

Other negative anthropomorphic attributes were only ascribed to capuchins, in reference to their lewd behavior (2) and jealousy towards human beings (2). For instance two participants discussed how *micos* are badly behaved, and self-serving because they masturbate in front of female human observers in the forest.

Religious and harmonious anthropomorphic attributes were more commonly ascribed to howler monkeys rather than capuchins, which relates to other more generalized characteristics used to describe the behavior of each species discussed in the following section.

Characteristics and Opinions

Common general characteristics participants attributed to capuchins include giving reference to their level of intelligence, in fact stating that they are most intelligent animal (5). "Sebastian" comments "they [*micos*] are the most intelligent animals and are very curious- they eat healthy. They are in a different class than other animals" (personal communication, August 2018). One person even mentioned observing tool-use, with a capuchin breaking open a snail using a rock ("Javier", personal communication, August 2018). Many people also commented on them being

bold and daring (7) with one person saying "*micos* are daring, they will come close to you and try to caress you" ("Alfonso", personal communication, August 2018). However, when most people referred to capuchins using these traits it was followed by expressions of them as dangerous and aggressive (7). "*Micos* are bold and daring, they attack women who are alone in the forest" ("Rafael", personal communication, August 2018). Some people shared personal experiences with capuchins stating that "*micos* are bold and aggressive they jump on your back and bite you" ("Marco", personal communication, August 2018). Capuchin attacks were discussed by four respondents, with one person claiming "they are very dangerous, when we saw them in the forest they started throwing rocks at us and we had to run away" ("Javier", personal communication, August 2018). Consequently, four participants also reported being afraid of them.

Curious and agile were other terms used to describe *micos* (4), while two others described *micos* as naughty and badly behaved, referencing to them as thieves. Eight participants did not attribute any particular qualities to capuchins.

Common general characteristics that participants attributed to howler monkeys differed considerably. Terms such as passive (3), curious (4) and noisy (1) were used to describe them. Other people talked about how they bring the tourists to the area (4).

However, the majority of conversations about howler monkeys in this context were in relation to the widespread mysterious deaths that occurred in February 2016. Participants mentioned that nothing like this has even happened before, and many did not believe it was linked to drought, as the Ministry of Environment claims, because participants have lived through many droughts in their lifetimes and the one in 2016 was not severe. Only three respondents believed that it was due to drought, likely based on the discourse shared by the local news. Eight participants, however, presumed this death was due to an epidemic. In "Alejandro's" response he states "An epidemic killed many of the howler monkey in the area, the MAE put medicine in the trees to try to help them" (personal communication, August 2018). "Federico", had a different take on the illness theory, he stated "The death of howlers in 2016 was due to disease transmission from too many tourists in the area - tourists wear/bring too many chemicals to the area and they smell

bad" (personal communication, August 2018). Two other participants had different theories as to why this mass die-off occurred. "Pablo" explained,

> During this time, planes use to fly overhead spraying toxic poisons on the forest, I think it was supposed to kill the mosquitos when zika was a problem here. Every time they would spray I would get sick, with a fever and have to lie in bed for a few days, my body would hurt a lot. I think this is what killed the howler monkeys. Because I can wash this off my skin, but they can't. When we found them dead, over 50, most of them had yellow eyes and long black tongues. The scientists said it was due to poisoning. They took many bodies to Quito to be examined. The government is trying to cover it up and blame it on drought, but there was no drought! (personal communication, July 2018).

One other participant talked about howler monkey deaths but in a different context: he said that he has also seen many howlers dead from electric shock of hydro wires along the roadside ("Mauricio", personal communication, August 2018). During walking interviews with this informant, he showed me places along the road where he has seen this happen. He also talked about how howlers sometimes come down from the trees and try to cross the highway. He has seen some dead as roadkill as a result. A Ministry of the Environment staff member corroborated this story by showing me places along the road where howlers sometimes dare to cross. These are zones near the Monkey Trail, where the foliage hangs over the road and the crossing distance is reduced.

This chapter has presented the key findings found from each of the data collection methods. The next chapter will discuss these findings in relation to one another and the central research questions in order to provide insights that may enhance conservation objectives in the protected area.

Chapter Six: Discussion - Ethnoprimatological Contributions to Conservation

The purposes of this study were to uncover what people's perceptions of alloprimates can tell us about the human experience in the Pacoche Refuge, and how these conceptualizations can inform conservation management strategies. The key findings from the community of Pacoche indicate three central themes which emerged from the data that show potential implications for conservation: 1) policy meets practice, 2) folkloric and anthropomorphic belief systems, and 3) touristic value of primates. These themes assisted in the extraction of complex socio-political and economic entanglements hidden inside the prescribed conservation model. Throughout this chapter these themes will be shown to demonstrate new perspectives that highlight natural-cultural connections and introduce areas for future research to include local knowledge in conservation planning.

Policy Meets Practice

The first dominant theme that emerged from the data was centered on "policy meets practice". Using an ethnoprimatological lens opened up the potential to socialize ecosystems, highlighting ideological lenses and power imbalances that are present within the conservation paradigm (Dore, 2018). By adding ethnographic perspectives to ecological issues, ethnoprimatology helped to bridge the natural-cultural divide that often prevents sustainable solutions from surfacing. The methodologies utilized in this study not only uncovered valuable data on perspectives of alloprimates, but also ecological knowledge more broadly speaking. This ignited conversation about topics such as bushmeat, crop damage, and pet ownership, and laid the groundwork to branch into more politicized conversations about protected area policies and restrictions. It became apparent through the interview process that what is written in park policy is often quite different in practice. Reasons for these inconsistencies are many, and it was through these conversations about primates in the protected area that I was able to explore these topics further.

A quick quantitative look at the data on the surface appears promising, suggesting that in fact Ministry of the Environment regulations have had a positive effect of the reduction of hunting and exotic pet ownership in the community of Pacoche. A total of 85% of respondents stated that

people should not be able to hunt animals in the protected area. Yet, through the use of ethnographic techniques, speaking directly with community members, these selections are not so concrete, and various factors aside from park policy can also be attributed to the reduction of these behaviors.

While all respondents indicated they were aware of the laws in place to prevent hunting and exotic pet ownership, and some indeed appeared threatened by the severe consequences, many participants seemed to take these regulations as suggestions to be more conscious of their own environmental impact, rather than a hardline. For instance, when asked about restrictions on natural resource extraction over half of the respondents indicated, "It's okay/should be okay as long as it's only for personal consumption, or if someone is very poor" (personal communications, August 2018). Others alluded to this same concept by saying, "it's okay to cut down a tree as long as you replant one" (personal communications, August 2018). This idea of a balance of give and take with the environment was consistent across most interviews especially when discussing the practice of extracting resources from the protected area. While these data indicate conservation of the forest ecosystem is valued by most participants, when asked, few knew many details surrounding official park policies and regulations, including where the actual boundaries of the protected area are located.

Other more controversial park polices on the extraction of firewood and *caña guadua* also reflect this same respect for the natural environment. While most participants did not support the restrictions on these resources, they also commented on the importance of only extracting dry or deadwood, and repeated maintenance of the *caña guadua* stalks required to ensure its productivity. The vital importance of these resources in the everyday lives of local residents requires people to develop alternative strategies and justifications to reclaim balance in their place in the ecosystem. These practices are not accounted for in park policy (MAE 2009; MAE 2017), where permits are required to extract *caña guadua* regardless of the amount or the location. The permit process was highly criticized by participants, with "Tomás commenting that "the permits aren't a terrible idea, they just need to improve the system and make it more accessible for people" (personal communication, August 2018). This forces residents to sneak around at night and expose themselves to increased danger in order to meet their basic needs. Conservation management should account for the socio-economic context, and include more

sustainable alternatives for local residents. These findings are consistent with Pimbert and Pretty (1995) who discuss that the costs of conservation can be high for the people who live in these protected areas. Conservation goals can threaten people's livelihoods, forcing local residents to find solutions for themselves.

The Management Plan for the Pacoche Refuge (2009) claims socio-economic characteristics were taken into account during the planning process, however it does so in a way that villainizes human behaviors. The report states that "field visits, meetings, interviews and workshops with local communities were obtained to create a list of human activities that threaten the existence of the elements of conservation" (MAE, 2009, p.124). The Management Plan designates specific conservation zones within the park with varying activity restrictions: 1) Strict conservation zone, 2) Active conservation zone, 3) Recuperation zone, and 4) Buffer zone. While the agricultural areas are located in zone 2, "the extraction of native trees is prohibited, hunting and fishing activities of wildlife species are prohibited, and the extraction of standing trees of exotic species to the area that have been cultivated, requires authorization [permits] from the Ministry of the Environment" (MAE, 2009, p. 124; MAE, 2017).

It becomes clear through the data that while the inclusion of community members is written on paper in their management plan (MAE, 2009; MAE, 2017), the Ministry of the Environment has been reluctant to share power with local people or assist in capacity building to help communities use to power they are entitled to as stated in the Ecuadorian constitution (Kothari, el al, 2013). This discrepancy is evident in comments such as "Marco's" argument where he states:

> Now we can't touch anything in the protected area- everything is for the tourists. We know more about the land/agriculture than the MAE - most of them aren't even from here, there should be open zones that the community has their own control of/access to. When *caña guadua* dies/gets too old it affects all the other *caña* nearby and causes it all to rot. It needs to be tended to properly and harvested, but they don't know any better (personal communication, August 2018).

The reduction in certain extractive behaviors such as hunting and pet ownership over others, is likely also tied to this need for an environmental balance spoken of in the previous section. While infrequent, certain animals continue to be targeted as food, including the lowland paca, the agouti and the armadillo, while others like the howler monkey, despite their medicinal uses, have

shown significant improvements. This could be tied indirectly to their conservation status, in terms of the perceived quantity of these species in the refuge. However, it is also possible that the reduction in primate hunting is associated with its folkloric, anthropomorphic and touristic attributes that will be discussed in the following section. Another possibility for this discrepancy could also relate to increasing modernization of the area, proximity to the city of Manta, and access to alternative resources.

While the threats of hunting and pet ownership are no longer pressing in the area, new threats surrounding human development are increasing. Due to these changes, residents acknowledge the need to find new strategies to live in better balance with nature. Participants spoke of the rapid changes they have seen in regarding the landscape, demonstrating areas on our walks that were once green and are now dry and barren. One participant shared with me, “The trees call for the rain and the fresh air, without them our whole zone would be a desert” (“Gabriel”, personal communication, August 2018). Fiallo and Jacobson (1995) discuss how restricting access to natural resources has often created negative attitudes about conservation among local residents and led to conflict. The data from this study, however, tells a slightly different story. Most respondents acknowledged the value of conservation, as they spoke about the changes in the landscape. Participants mentioned the decrease in trees, and the dryness of the soil, in comparison to years ago. Many reminisced about their childhoods growing up surrounded by lush tropical foliage and plentiful fish and shrimp in the river which cuts through the town of Pacoche. Today this riverbed has dried up and people must travel several kilometers to reach the garua forest.

Participants gave reference to the deforestation caused by the oil refinery, the highway, and electrical lines. During a conversation about a tree planting initiative, one participant stated: “That’s a good idea, sure, but it’s pointless if the MAE just cuts them down for rich people and construction” (“Miguel”, personal communication, August 2018). Another respondent added to this by asking, “Why doesn’t the MAE buy all the property that is for sale in the reserve, instead of letting people from the city buy it? I mean if they really want it to be protected?” (“Federico”, personal communication, August 2018).

These comments are examples of the complex socio-political and economic entanglements hidden inside the Pacoche conservation model. The policy of conservation remains as a monopoly in hands of the formal sector, rather than bringing the knowledge, practices and skills of local people to the forefront to create meaningful and lasting solutions to conservation concerns.

Utilizing an ethnoprimatological approach which combines ethnographic and ecological elements generated valuable insights into the power dynamics at play in this particular case study. It is through this paradigm that the various agents and structures embedded in the conservation model began to emerge, but also revealed how essential community participation is to achieving sustainable conservation solutions.

Primate Perspectives

The second theme that emerged from the data falls under Sponsel's (1997) *cultural or ethno-ecology* approach, which draws on folk biology. This is best described as the intersection between cultural and ecological belief systems and values of alloprimates. Ethnoprimatology is concerned with how these conceptualizations and relationships shape people's behaviour towards alloprimates and nature in general, and how these perspectives can contribute to nature conservation.

Human societies have elaborate beliefs, values and customs regarding forests and wildlife. This section argues that these conceptualizations can aid in the conservation of species in Pacoche by garnering a respect that emphasizes human–non-human continuity through the ability "to see ourselves with animals as opposed to against them" (Daston and Mitman, 2005; Riley, 2013). Haraway (1989) argues that primatologists following the Euro-American tradition often "apologize for 'violating' what should be a more 'neutral' relationships between animals and humans" (Haraway 1989, p. 249). Therefore, putting these relationships at the forefront reveals how folkloric, anthropomorphic and other common characteristics associated with primate species can help explain why most participants in the community of Pacoche classify primates differently than other animals, and why these species have consequentially experienced reduced pressures from hunting for consumption and medicinal use. These conceptualizations can also be

used to explain why farmers express a greater tolerance for primate species connected to crop damage, in comparison to their responses to other forest animals.

Capuchins

The data from the pile-sorting activity presented in the results chapter indicates that human relationships with capuchins are actually quite conflictual. This is evident in common traits associated with *micos* as bold, daring, aggressive, dangerous, and badly-behaved. Some people reported being afraid of capuchins, however the most common conflictual response was in reference to crop damage. The majority of participants identified *micos* as particularly destructive to orange and corn plots. Capuchins were also not commonly mentioned in folkloric tales, with only two stories shared by participants. One of these stories discussed a belief in the ability of capuchin monkeys to curse a family with bad luck from the afterlife as revenge for killing them. Despite these findings, there was also a strong anthropomorphic sentiment shared about this subspecies that I find valuable in relation to their conservation potential.

Milton (2005) suggests that anthropomorphism is rarely intended as a direct comparison between humans and animals, and "rather tends to be employed as a "metaphoric device" (Milton, 2005, p. 260). Milton renames this device "egomorphism", since she argues that it does not represent a comparison between animals and humans per se, but rather an identification between self and other. In other words, Milton argues that anthropomorphism is a form of "empathy" (Milton, 2005; Palmer, 2012, p. 62).

Consistent use of the term "human-like", continuous reference to their intelligence, and frequent stories about capuchins falling in love with girls in the forest and following them, all reveal a certain commonality: the ability "to see ourselves in animals". Alger and Alger (1999) argue that the concept of anthropomorphism "allows us to socially construct beings, who can be used, unimpeded by moral considerations" (Palmer, 2012, p. 64). This commonality to see "one's self reflected in an animal", explains why although many people expressed fear of capuchins and negative associations, there was a certain respect, allure, and relatability associated with their responses about this primate. While rats were associated with the most destruction to plot yields, and subsequently were poisoned, this was not the case for capuchin culprits. Why did farmers not poison or shoot capuchins? It is possible, that the lack of violence towards capuchins could

be associated with the economic value of the types of agricultural plots they tend to damage. However, this theory does not explain why capuchins were less frequently consumed and used for medicinal purpose than other forest animals, including their howler monkey relatives?

My findings suggest that these questions can be alternatively answered by the strong anthropomorphic sentiments felt for this primate, in connection with their current precarious conservation status. Sightings of capuchins were reported as infrequent, and the IUCN states that they are critically endangered. Therefore, anthropomorphic attributes associated with capuchins in Pacoche appear to influence people's behaviour towards this subspecies, thus contributing to their overall conservation.

Howlers

Results for howler monkeys were considerably different, as participants' relationships with *monos* were instead best summarized as passive, friendly, and coexistent. The values associated with this primate were found to fall predominantly under the folkloric realm, premised by two key areas: religion and predictions, both of which indicate a relationship of mutual respect. Smuts (2006) and Haraway (2006, 2008) refer to this relationship as "a dance of relating" (Haraway, 2006, p. 110). Participants told stories of howlers signaling Hail Marys when feeling threatened, indicating an anthropomorphic affinity to this species, more commonly communicated than that with capuchins. As the Catholic religion is very strong in this area, these findings prove particularly revealing to the moral code associated with killing this primate. Also given the deterioration of the landscape over the past few decades, coupled with periods of severe drought, the belief that howler monkeys sing to bring the rain could also be associated with their value to local people. Urbani and Cormier (2015) share analogous findings amongst the Guajá peoples of Brazil, as howlers are said to be like humans because they "sing," which is the way the people travel into the spirit world. The ability to experience empathy, and thus "see one's self with as opposed to against primates", could in fact contribute to their conservation importance to local people.

However, despite these harmonious relationships, howler monkeys were more commonly hunted for their meat and medicinal value than capuchins. This behavior has decreased significantly in the past decade, and is now quite uncommon in comparison to hunting of other animals in

Pacoche. It is proposed that while perhaps this species was more easily hunted in the past due to its size, passive and lethargic characteristics, the reduction in the hunting of this primate could also be attributed to the folkloric beliefs about it. This is particularly in reference to the belief in their ability to announce or bring the rain, a highly valued resource in the aftermath of the drought. Many people spoke about the severity of the drought in the region seven to twelve years ago, and gave reference to this, predominantly when talking about changes in their own plots and how they are less productive today. However, in addition to these folkloric and anthropomorphic beliefs, an added finding emerged from the data that could have implications for howler monkey conservation. These results suggest that in fact, tourism, more specifically, the attraction of howlers to draw tourists to the area, provides additional conservation value for this primate.

Tourism

Tourism as an agent of conservation can be seen with both benefits and drawbacks for the wildlife, ecosystems and human populations living in the touristic area. Ecotourism, more specifically, has become a growing solution to conservation and development problems because of its ability to place a value on threatened biodiversity. While the influx of tourists and their dollars can provide economic growth opportunities for local populations around protected areas (Brandon & Wells 1992; Hidinger 1996; McKinney et al., 2015; Treves & Brandon 2005), revenue-sharing is wrought with power imbalances that often only benefit privileged members of the community (Macfie et al, 2010; Sandbrook, 2006).

Direct benefits of ecotourism are frequently related to tour guide positions, available in Pacoche only to those with formal education, who have paid for the official tour guide training course. Other direct benefits include community members fortunate to have employment at the hotels and restaurants targeted by tourists, or who have agreements with hotel owners to sell their artisan products and to demonstrate cultural activities for tourists. In Pacoche, only four participants reported that they benefit directly from tourism. This included being hired to do machete labour work (yard work) to maintain tourist trails and hotel properties, taxi services to and from the airport or major city center, demonstrations of the *trapiche* to process sugarcane, and selling artisan handicrafts. Aside from a few hotel accommodations and restaurants, there is currently little tourism infrastructure in the protected area. Two tourist trails do exist, monitored

by the Ministry of the Environment, 1) the monkey trail in the garua forest, and 2) the lighthouse trail located in San Lorenzo along the beach and dry forest sector. Also, a modest ethnographic museum with free admission exists in the community of Pacoche. There are no formal marketplaces to sell handicrafts to tourists currently operating in the protected area.

Indirect benefits of tourism can be seen in reference to improved infrastructure and basic services, police presence, and locally owned enterprises. According to Plumtre and Williamson (2001), this can inspire a sense of pride and ownership in local residents. However, presently in Pacoche, the majority of tourism infrastructure is owned by upper-class investors from Guayaquil and Manta, or foreign stakeholders. While few participants from Pacoche reported benefiting from tourism, either directly or indirectly, 68% of survey respondents stated that the community in general benefits from tourism. There were few individuals that expressed negative sentiments towards tourists (3).

Ecotourism's effects on primate species remains a new area of investigation, as studies reveal that "primates are among the most sought-after groups of wildlife—they are active, gregarious, and eerily reminiscent of us" (Grossberg et al., 2003; Jha & Bawa, 2006; McKinney et al., 2015 p.285). The potentially damaging effects of tourist presence on primate species and other wildlife are many (Björk, 2000 ; Blangy & Mehta, 2006 ; Horton, 2009 ; McKinney et al., 2015, p.285; Timm et al., 2009), ranging from increased cortisol levels in primates due to human-provoked stress (Behie et al., 2010), changes in social behavior including social interactions and ranging behaviors (O'Leary & Fa, 1993 ; De la Torre et al., 2000; Grossberg et al., 2003), ecological changes (Hidinger, 1996), and the risk of disease transmission (O'Leary & Fa, 1993; Chapman et al., 2005).

Despite these risks, McKinney et al. (2015) state that "nature-based tourism has the potential to be a great tool for primate conservation, especially in impoverished areas where wildlife must compete with economic development" (Grossberg et al., 2003 ; Jha & Bawa, 2006; McKinney et al., 2015 p.285). In the Pacoche refuge, 35% of participants selected howler monkeys as the leading reason for tourist presence. Also, when asked what purpose the protected area serves, 40 % of respondents stated that it was created predominantly for tourists. As communicated in the

Results chapter, tourism also plays a key role in the Ministry of Environment objectives, with all MAE employees in Pacoche possessing formal education in the tourism sector.

My participant observation in governmental and academic workshops in Manta and Portoviejo identifies a surge in provincial interest in the tourism sector, evident by the quantity of sustainable tourism development panels and discussions occurring during my research phase. My presence in these meetings, and contacts within the provincial government, indicate that a large-scale plan to improve tourism infrastructure is in the making. This includes potential plans for a coastal tourist-train route through the Pacoche Refuge starting in Manta, and ending in Guayaquil. Whether or not these proposals will come to fruition in the near future is unknown. In terms of bottom-up perspectives on these issues, it appears people in Pacoche are supportive of tourism development and its associated potential to increase economic opportunities. Thus, the value of howler monkeys in attracting tourists to the area likely adds to their conservation significance for local people.

This chapter has demonstrated how people's perceptions of primates and protected areas can reveal natural-cultural connections that shape both the human and alloprimate experience. By uncovering local knowledge on these themes, alternative opinions are exposed, which in some cases challenge top-down protected area regulations. These perspectives can provide both socially and environmentally robust options to improve protected area policy and in turn the ecosystem as a whole.

Chapter Seven: Conclusion

Through a case study example in the Pacoche Coastal and Marine Wildlife Refuge, this thesis has shown the value of an ethnoprimatological approach to provide a holistic perspective from which to investigate the complex factors involved in primate conservation. As discussed in the previous chapter, the results determined three key areas where using an ethnoprimatological approach provided alternative insights that challenge top-down conservation paradigms, while simultaneously revealing areas of promise and potential to redefine conservation objectives. These thematic areas include: 1) policy meets practice, 2) folkloric and anthropomorphic belief systems, and 3) touristic value of primates.

Findings regarding perceptions of primates indicate that despite previous local practices in comparison to other faunal species in the park, primates are no longer commonly targeted for food or medicinal purposes. White-fronted capuchins *micos* while reported to be damaging to corn and orange plots, and commonly viewed as aggressive, were also widely respected as human-like and intelligent, thus showing promise for their conservation status in this area. The mantled howler *mono* also showed similar promise, in that participants indicated a respect and harmony living alongside this primate. Results reveal folkloric beliefs of howlers as "rain prophets" calling to the gods to bring the rain, and also as "Christians" signaling Hail Marys when feeling threatened in the presence of human beings. These traits, alongside their ability to attract tourists to the area indicate reciprocal relationships between humans and alloprimates that benefit both parties.

While relationships between the community and the environment indicate a natural-cultural balance, interactions with the Ministry of the Environment (MAE) reveal more contentious results. For instance, this study found an overall decrease in hunting and exotic pet ownership since the introduction of the protected area ten years ago, however discrepancies between community members and the MAE still exist over natural resource extraction, particularly in regards to guadua bamboo and firewood. The results indicate a lack of community engagement in conservation initiatives, and consequently a misunderstanding of protected area policies.

The findings highlight the need to restructure management plans to incorporate local knowledge and practices. Identifying these themes serves as the first step towards a long path of garnering

local support for conservation initiatives in the protected area. This path must include community perspectives at the forefront if sustainable solutions are to be negotiated. The human beings and alloprimates in Pacoche not only share spaces, but also have intertwined livelihoods that equally depend on a healthy and well-balanced ecosystem.

The results also highlight the agency and resiliency of local people to adapt to ever-changing conditions of drought, environmental degradation and encroaching development. Using this approach helped to identify complex socio-political and economic entanglements involved with protected area livelihoods, while also recognizing potential areas of sympatry between humans and alloprimates. By putting local people's voices at the center of the discussion, new perspectives about conservation's value in the area were revealed. These findings show promise, in that the people of Pacoche value the conservation of their forests and are actively searching for alternatives to live in harmony with their natural environment.

By understanding the various ways we are interconnected with our primate relatives, the ethnoprimatological integrative method sets the stage for a much needed paradigm shift from conflict to coexistence. An ethnoprimatological approach is thus well situated as a tool for primate conservation and community development.

The results of this study have both theoretical and practical implications. Most of the academic interest and publications in international journals have focused on conservation concerns and species east of the Andes cordillera (Cervera, et al., 2015). However, the Conservation Action Plan for Ecuadorian Primates (2017) states that "species inhabiting the coastal region deserve special attention because of the critical situation they are facing, which increases their risk of extinction" (p. 11). This study will be the first ethnoprimatological analysis in coastal Ecuador, as a contribution to the literature and a response to the call for research in the region (Cervera, et al., 2017). Given the provincial plans for tourism development, and widespread economic insecurity in the area, the addition of a community-based conservation action plan to address ongoing conflicts in the protected area is also urgently needed. The results of this study will help to inform management policy and community participation in future conservation planning.

Areas of Future Research and Next Steps

Future areas of research include the potential to expand this investigation to all other eight communities within the Pacoche Refuge to complete a comparative ethnoprimatological study of perceptions of primates. Given the population growth in the area, and the most recent socio-economic survey in the refuge taking place in 2009, a renewal of these data is also needed.

Working with Ministry of the Environment personnel to incorporate local knowledge and perspectives into the management plan is of urgent necessity. Based on the complications and frustrations associated with the extracting of *caña* guadua, this study indicates that finding ways to improve this process would likely be a good first step in working towards sustainable solutions. Improved communication of MAE regulations complemented by more reciprocal relationships would make a big difference in the long-term. Potential options include allowing controlled community access zones to the forest with more lenient extraction policies, in addition to stronger policing focusing on controlling the large-scale extraction of natural resources. Perhaps employing more local residents for these tasks would help to build a sense of ownership and pride in resource protection. Participatory research with community members and local stakeholders could help to define potential economic alternatives in the refuge in balance with the natural environment. This should be coupled with improved planning and facilitation of community meetings in order to increase participation of local people in conservation decision-making. There is also a need for participatory educational awareness campaigns/workshops in the protected area to communicate park policy and conservation priorities.

Additional research into how the community can be better incorporated in future tourism expansion in the protected area, would also be largely beneficial. Perhaps streamlining the process of becoming a tour guide, or establishing a marketplace in the refuge to sell artisan goods along the major highway, would help local people experience more direct benefits from tourism. Given the provincial plans for tourism expansion, research regarding these effects on howler monkey health and behaviour would also be highly recommended, so as to proceed with these developments in the most sustainable and profitable manner possible.

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Appendix A: Map of Pacoche Marine and Coastal Wildlife Refuge

(MAE, 2009).

Appendix B: Letter of Support from Greenearth Ecuador

March 19, 2018

Dear Tamara,

In appreciation for our continued relationship since 2016, please accept this official letter of invitation to conduct your research project "Sharing Spaces: Human-Nonhuman Primate Nature cultures in the Pacoche Coastal and Marine Wildlife Reserve" with the support of Greenearth Ecuador, and the validation of the Environmental Ministry of Ecuador.

Your project goals to investigate the "shared spaces and symbiotic relationships between humans and non-human primates (*Alouatta aequatorialis,* and *Cebus aequatorialis*)", are in line with our mission and values at Greenearth, and we believe would contribute to much needed research on these particular species.

Greenearth Ecuador is a non-profit organization dedicated to generating resilient communities aware of their actions in harmony with their environment through the development and support of scientific research projects. As an organization, Greenearth is committed to providing on-the-ground assistance for student and professional projects aimed at mitigation and adaptation to climate change, conservation of natural resources and ecosystems, as well as education and environmental awareness, in the Pacoche Coastal and Marine Wildlife Reserve.

We are delighted you have requested to conduct your investigation at Pacoche, and are committed to making your investigation a success. Our logistical support extends to providing room and board for the principle researcher, and or research team, assistance acquiring necessary permits with the Ministry of Environment, networking with our community partners, local schools and tourism providers, as well as other associated (non-financial) logistical concerns needed to ensure the success of this project.

Greenearth is happy to support your specific request to organize a meeting with the local community members of Pacoche and El Aromo to introduce you and your research, as well as to gain community support and assistance in acquiring research participants, through our long-term community contacts.

We are excited to welcome you at Pacoche this May until August 2018, and look forward to our continued partnership!

Sincerely,

Executive Director
Greenearth Ecuador

Appendix C: Structured (open-ended) Interview Questions

SECTION A) DEMOGRAPHICS:

1. ¿Dónde naciste? *Where were you born?*
2. ¿Dónde vives ahora? ¿Desde cuándo viviste allí? *Where do you live now? How long have you lived there?*

3. Si vienes de otro lugar: ¿por qué decidiste venir? ¿Dónde vivías antes? *If you migrated from elsewhere: When did you move here, and where did you live before?*

4. ¿Tus padres pertenecen a la comunidad? Si □ No □ Solo 1 □
   Are your parents from this community?

5. ¿Si ninguno de tus padres pertenece a la Comunidad, de donde son? *If both or one of your parents are not from here, please specify where they are from?*

6. ¿Cuántos años tiene usted? 18-25 □ 26-30 □ 31-39 □ 40-49 □ 50-59 □ 60+ □ *How old are you?*

7. ¿Tienes hijos? Si □ No □ *Do you have any children?*

8. ¿Cuántos hijos tienes? 1 □ 2 □ 3 □ 4 □ 5 □ 6 □ 7□ 8 □ 9+ □ *How many children do you have?*

9. De que edades son: *What ages are they?*

10. ¿Hasta qué año estudiaste? Educación primaria: Grado 1 □ 2 □ 3 □ 4 □ 5 □ 6 □ Entre secundaria □ Termine secundaria □ Universitaria □ Maestría □ *What is the highest level of school you completed?*

11. ¿En qué trabajan sus hijos? *What do you children do for work?*

12. ¿Hasta qué año estudiaron tus hijos? Grado 1 □ 2 □ 3 □ 4 □ 5 □ 6 □ Entre secundaria □ Termine secundaria □ Universitaria □ Maestría □ *What level of education do your children have?*

13. ¿Cuál es tu trabajo principal? *What is your current primary occupation?*

14. ¿Siempre has trabajado en eso, o tenías un otro trabajo antes? ¿Si es en la montaña, es propia? *Have you always worked in this occupation? What other jobs have you had? Do you own the land you farm?*

15. ¿Ganas dinero de otra manera? *Do you earn money doing anything else?*
16. ¿Cuánto ganas por mes? (Si, no quieres decirme, no me contestas) *How much do you make a month?*
17. ¿Qué hace su esposa? *What does your wife do?*

18. ¿Qué tipo de cultivos tienes? *What crops you do have?*

19. ¿Vendes algo de lo que cosechas para generar otros ingresos? *Do you sell any of your produce?*

20. ¿Tienes problemas con algún animal que esté dañando tus cosechas? Si es así, qué has hecho\estrategias tienes para resolver este problema? *Do you have problems with any animals causing harm to your crops? If so do you have any strategies to resolve these problems?*

SECTION B: ÁREAS PROTEGIDAS

1. ¿En su opinión, para qué sirve un área protegida? *In you opinion, what the purpose of a protected area?*

2. ¿Cuáles son los efectos de la reserva protegida? *What are the effects of a protected area?*

A) Se beneficia la comunidad local. *It benefits the local communty.*
B) Afecta la comunidad en una manera negativa. *It affects the community in a negative way.*
C) No tiene ningún efecto. *It does not have an effect.*

Por qué? *Why?*

3. Como te llevas con los guardaparques? *How do you get along with the park guards?*

A) Buena relación *Good relationship*
B) Mala relación *Bad relationship*
C) No tengo opinión de eso *No opinion*
D) No me importa – no me afecta *It's not important, it doesn't affect me*

…Y con otros empleados del MAE? *And with the other MAE staff?*

4. Percepción del área protegida y la protección de la naturaleza. *Your perception of the protected area*

A) Es bueno que el bosque esté protegido. *It's good that the forest is protected*
B) Sería mejor no tener una reserva aquí. *It would be better not to have a reserve here*
C) El parque fue creado principalmente para turistas. *The park was created mostly for tourists*
D) Es importante proteger el bosque para nuestros hijos. *It's important to protect the forest for our children*
E) Es importante proteger el bosque para los animales. *It's important to protect the forest for the animals*

5. Percepción de los efectos de la reserva a nivel personal. *Perception of the protected area on a personal level*

A) Mis condiciones de vida han mejorado desde la creación del área protegida. *My quality of life has improved since the creation of the park*
B) Era más fácil ganarse plata antes de la creación del área protegida. *It was easier to make money before the park was created*
C) El área protegida me ha traído problemas. *The protected area has caused me problems*
D) Mis condiciones de vida no tienen relación al área protegida. *My living conditions have nothing to do with the protected area*

6. Percepción de los beneficios del área protegida para la comunidad. *Perception of community benefits of the protected area*

A) Los empleados del Ministerio ayudan a la comunidad Si No
MAE employees help the community

B) El área protegida crea puestos de trabajo para la comunidad Si No
The protected area provides jobs for the community

7. Percepción del uso de recursos naturales. *Perception of natural resource extraction*

A) Las personas deberían poder cazar animales en el área protegida Si No
People should be able to hunt animals in the protected area

B) Las personas deberían poder recoger leña en el área protegida Si No
People should be able to collect firewood in the protected area

C) Las personas deberían poder cortar caña o madera en área protegida Si No
People should be able to cut bamboo/wood in the protected area

8. Percepción del área protegida y las restricciones. *Perception of protected area restrictions*

A) El área protegida es demasiado grande Si No
The protected area is too big

B) La tierra del área protegida se debe usar para la agricultura sin restricciones Si No
The land in the protected area should be used for agriculture without any restrictions

9. ¿Has participado en algunas reuniones con el Ministerio del Medio Ambiente?
Have you participated in any Ministry of The Environment meetings?

A) Sí, todavía participo a veces
Yes, I particípate sometimes

B) Sí, siempre participo
Yes, I always participate

C) No, no estoy interesado en participar
No I am not interested in participating

D) No participo porque no tiene sentido
I do not particpate because there is no point

E) Nunca he oído de estas reuniones
I have never heard of these meetings

10. ¿Quién debería estar a cargo del uso de los recursos naturales? *Who should be in charge of natural resource extraction?*

A) El gobierno debería tener el control
The government should be in control

B) La comunidad debe tener el control
The community should have control

C) No hay necesidad de control
There is no need for control

D) No tengo una opinión
I have no opinion

11. ¿Perdiste alguna tierra como resultado de la construcción de la vía? *Did you lose any land as a result of the highway construction?*

A) Sí, fue molesto y todavía me molesta
Yes, and I am still bothered by it

B) No, no fui afectado
No, I was not affected

C) Sí, pero la autopista trae más beneficio
Yes, but the highway brings more benefits

.. ¿Te compensan por esta pérdida? *Were you compensated for this loss?* Si No

12. ¿Qué hace el Ministerio del Medio Ambiente? *What does the Ministry of the Environment do?*

A) Hacen un trabajo importante para proteger el medioambiente
An important job to protect the environment

B) Son una organización política, nada más *They are a political organization, nothing more*

C) Ayudan a la comunidad *They help the communty*

D) Son como policías y hacen cumplir las reglas *They are like police who make you follow rules*

E) Son inútiles *they are useless*

No sé lo que hacen *I dont know what they do*
Otros:
_____

13. ¿Antes del Ministerio del Medio Ambiente, hice lo siguiente para ganar dinero? *Before the Ministry of the Environment what did you to make a living?*

... ¿Ha cambiado esto? Ahora, ¿cómo se gana dinero? *Has this changed? Now how do you make money?*

14. ¿Qué crees que pasaría con el bosque si no hubiese más animales viviendo en él? *What do you think would happen to the forest if there were no more animals living there?*

A) El bosque moriría, los animales son muy importantes *the forest would die, animals are very important*

B) El bosque crecería más sin que los animales se comieran todas las plantas *the forest would grow without animals eating all the plants*

C) No me importa *I don't care*

D) Seria lo mismo*, it would be the same*

15. ¿Qué crees que le pasaría a la comunidad si hubiera muy pocos árboles o animales aquí? *What do you think would happen to the community if there were few trees and animals here?*

A) La comunidad sería la misma *The community would be the same*

B) La comunidad sufriría *The community would suffer*

C) La comunidad se adaptaría *The community would adapt*

D) La gente se alejaría *People would leave*

16. ¿En qué opinión crees que puedes hacer las cosas en tu comunidad para proteger el bosque? *In your opinion, what things can the community do to protect the forest?*

17. Qué piensa usted sobre un proyecto comunitario de sembrar árboles? ¿Usted tiene otra idea que puede ayudar la comunidad y también la naturaleza? *What do you think about a tree planting project? Do you have any other ideas of how the community can help nature?*

18. Si quisieras aprender una nueva habilidad que te genera una fuente de ingreso que sería? *If you could learn a new ability to make money for your family what would it be?*

19. ¿Ha habido un cambio en la cantidad de animales en el bosque en los últimos 10 y 20 años? *Have the quantity of animals in the area changed in the past 10 or 20 years?*

A) Sí, ahora hay más *Yes, now there are more*
B) No, es lo mismo *No, it is the same*
C) Sí, ahora hay menos *Yes, now there are less*

... ¿Por qué crees que hay una diferencia? *Why do you think there is this difference now?*

20. ¿Qué conoces de la refinería? *What do you know about the refinery?*

A) No sé qué es eso *I dont know what that is*
B) Creo que es bueno, y traerá trabajos al área *I think its good, it will bring jobs to the area*
C) Creo que es peligroso para el bosque *I think it is dangerous for the forest*
D) Creo que es un ejemplo de cómo al gobierno no le importa la naturaleza *I think its an example of how the government does no care about the environment*
E) No tengo una opinión *I dont have an opinion*

21. ¿Qué conoces de sobre las historias del salvaje y los duendes? ¿Hay otras leyendas del área? *What stories have you heard about "the wild one" and "the dwarves"? Are there other legends in the area?*

SECTION D: TURISMO

22. ¿Qué piensas sobre el turismo en esta área? *What do you think about tourism in the area?*

A) La comunidad se beneficia del turismo *The community benefits from tourism*
B) Los turistas causan daño *Tourists cause harm*
C) Mi familia se beneficia directamente del turismo *My family benefits directly from tourism*
D) Solo el gobierno se beneficia del turismo *Only the government benefits from tourism*

23. ¿Por qué crees que los turistas vienen a este lugar? *Why do you think tourists come to the area?*

A) Para ver los monos *To see the monkeys*
B) Para ver las aves *To see the birds*
C) Para sentir el bosque y toda la vida silvestre *To experience the forest and all the wildlife*
D) Aprender sobre la comunidad *To learn about the community*
E) Ir a la playa *To go to the beach*

24…..¿Participas de alguna manera en la industria del turismo? ¿Recibes dinero por alguna actividad relativa a este tema? Have you participated in some way in the tourism industry? *Do you receive any monkey from an activity related to this theme?*

SECTION E: PILE SORTING

1. ¿Puedes identificar a este animal? ¿Cómo lo llamarías? *Can you identify this animal? What do you call it?*
2. ¿Conoces otros nombres para este animal? *Do you know any other names for this animal?*
3. Es este animal de esta área? ¿Lo has visto antes? ¿Cuándo fue la última vez que lo viste? ¿A menudo? *Is this animal from the area, have you seen it before? When was the last time you saw it?*
4. ¿Los viste en grupo? ¿Cuántos estaban juntos? *Did you see them in a group? How many?*
5. ¿Dónde los viste? *Where did you see it/them?*

AGRUPAR FOTOS

1) Animales que han sido o son comida para la comunidad *Animals that are food for the community*
2) Animales que dañan tus cosechas *Animals that cause damage to your crops*
3) Animales que han sido mascotas *Animals that are pets*
4) Animales que tienen usos médicos? *Animals that are used for medical purposes?*
5) Animales peligrosos o que tienes miedo- estrategia para evitar peligro *Animals that are dangerous, or that you are afraid of? Do you have any strageties to avoid them?*
6) Animales que tienen un significado especial para ti personalmente o para la comunidad *Animals that have a special meaning/value to you or the community?*
7) ¿Conoces animales que ya no existen aquí más y que antes había? *Are there any animals here that no longer exist in this area?*
8) Animales que tiene cuentas/ historias/ leyendas/ creencias o supersticiones? *Are there any stories, or legends about any of these animals?*
9) ¿Hay algunos animales que tienen habilidades especiales? Ejemplo: te avisan antes que algo malo pase. *Are there any animals that have a special ability?*

SOLO MONOS

10) ¿Significa algo para ti el sonido de los monos? *Does the sound that monkey make mean anything to you?*
11) ¿Que conoces de la muerte de los monos antes del terremoto en 2016? *What have you heard about the death of monkeys in 2016?*

Appendix D: Pile-sorting photos

African land snail (*Lissachatina fulica*)

Brown-throated sloth (*Bradypus variegatus*)

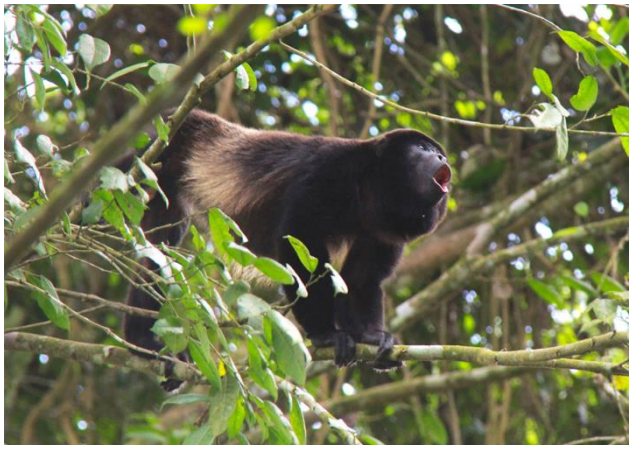
Central American agouti (*Dasyprocta punctata*)

Common lancehead (*Bothrops atrox*)

Guayaquil squirrel (*Sciurus stramineus*)

Jaguarundi (*Herpailurus yagouaroundi*)

Lowland (spotted) paca (*Cuniculus paca*)



Mantled howler (*Alouatta palliata aequatorialis*)

Nine-banded armadillo (*Dasypus novemcinctus*)

Ocelot (*Leopardus pardalis*)

Red brocket deer (*Mazama americana*)

Rufous-headed Chachalaca (*Ortalis erythroptera*)

Southern tamandua (*Tamandua tetradactyla*)

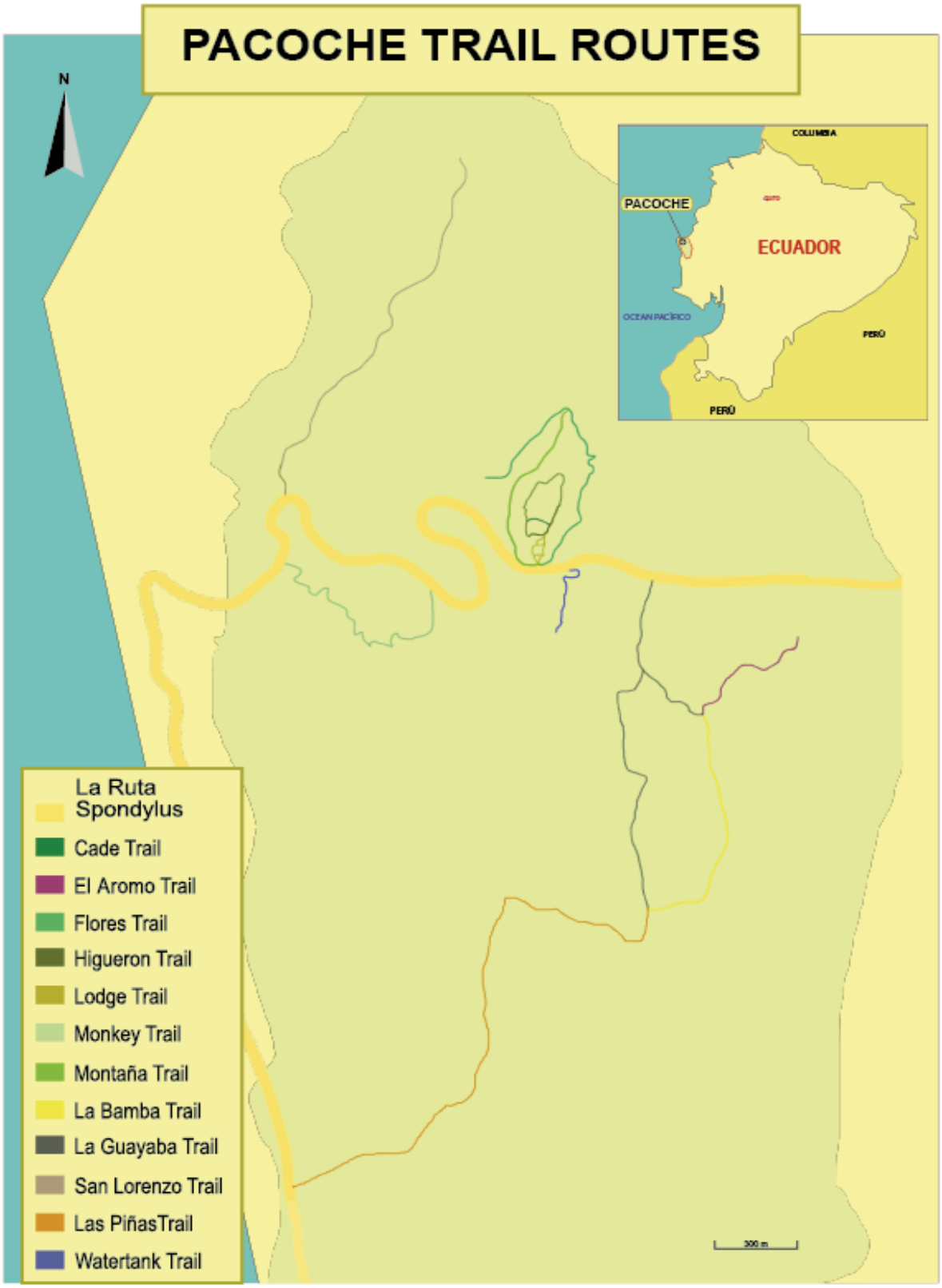
Tapeti (*Sylvilagus brasiliensis*)

Tayra (*Eira barbara*)

White-fronted capuchin (*Cebus albifrons aequatorialis*)

White-lipped peccary (*Tayassu pecari*)

Appendix E: Map of Trails



Appendix F: Ethics Review Approval Letter

Date: 18 July 2018

To: Ian Colquhoun

Project ID: 111919

Study Title: SHARED SPACES AND LOCAL PERCEPTIONS: EXPLORING THE HUMAN-PRIMATE INTERFACE IN THE PACOCHE WILDLIFE REFUGE

Application Type: NMREB Initial Application

Review Type: Delegated

Full Board Reporting Date: 03/Aug/2018

Date Approval Issued: 18/Jul/2018 13:38

REB Approval Expiry Date: 18/Jul/2019

Dear Ian Colquhoun

The Western University Non-Medical Research Ethics Board (NMREB) has reviewed and approved the WREM application form for the above mentioned study, as of the date noted above. NMREB approval for this study remains valid until the expiry date noted above, conditional to timely submission and acceptance of NMREB

Continuing Ethics Review.

This research study is to be conducted by the investigator noted above. All other required institutional approvals must also be obtained prior to the conduct of the study.

Documents Approved:

Interview-Guide Interview Guide 13/Jun/2018 2

Interviews_LOI Consent_ID 111919 Written Consent/Assent 28/Jun/2018 2

Interviews_Recruitment Script Oral Script 13/Jun/2018 2

Letter of Verbal Consent Verbal Consent/Assent 13/Jun/2018 2

Participant Observation_LOI Consent_ID

Written Consent/Assent 27/Jun/2018 2

Participant Observation_Recruitment Script Oral Script 13/Jun/2018 2

Participant-Observation-Guide Participant Observation Guide 13/Jun/2018 2

Photographic-Release-Form Additional Consent Documents 13/Jun/2018 1

Pile Sorting Data Collection Instrument Other Data Collection

Spanish Interview LOIC ID 111919 Additional Consent Documents 28/Jun/2018 1

Spanish Participant Obs LOIC ID 111919 Additional Consent Documents 28/Jun/2018 1

Spanish_LOI Consent survey_ID_111919 Additional Consent Documents 28/Jun/2018 1

Spanish_Photo Release form ID 111919 Additional Consent Documents 28/Jun/2018 1

Spanish_video release form ID111919 Additional Consent Documents 28/Jun/2018 1

Survey_LOI Consent_ID 111919 Written Consent/Assent 28/Jun/2018 2

Survey_Recruitment Script Oral Script 13/Jun/2018 2

Survey-Guide Paper Survey 13/Jun/2018 2

Videographic-Release-Form Additional Consent Documents 13/Jun/2018 1

Walking-Interview-Guide Other Data Collection

Documents Acknowledged:

Document Name Document Type Document Date Document Version

Letter of Support Greenearth Ecuador(signed) Letter Document

Translation attestation_ID 111919 Additional Consent Documents 02/Jul/2018 1

No deviations from, or changes to the protocol should be initiated without prior written approval from the NMREB, except when necessary to eliminate immediate hazard(s) to study participants or when the change(s) involves only administrative or logistical aspects of the trial.

The Western University NMREB operates in compliance with the Tri-Council Policy Statement Ethical Conduct for Research Involving Humans (TCPS2), the Ontario

Personal Health Information Protection Act (PHIPA, 2004), and the applicable laws and regulations of Ontario. Members of the NMREB who are named as

Investigators in research studies do not participate in discussions related to, nor vote on such studies when they are presented to the REB. The NMREB is registered with the U.S. Department of Health & Human Services under the IRB registration number IRB 00000941.

Appendix G: Consent Forms

Letter of Information and Consent – Interview Participants

"SHARED SPACES AND LOCAL PERCEPTIONS
IN THE PACOCHE WILDLIFE REFUGE"

Researcher (MA student):
Tamara Britton-Mendieta
Department of Anthropology
Western University (London, Canada)
Email:
Telephone:

Principal Investigator:
Dr. Ian Colquhoun
Department of Anthropology
Western University (London, Canada)
Email:
Telephone:

Invitation to Participate

I invite you to participate in this study about ecological knowledge and conservation perspectives in the Pacoche Wildlife Refuge. If you agree to participate, you will be invited to an interview.

About the Research

My name is Tamara Mendieta, and I am carrying out this study to obtain my MA in Anthropology from Western University in Canada. My research is centered on collecting community perspectives about conservation and ecological knowledge, with specific interest in interactions between human beings and wildlife.

I am here with the support of the GreenEarth Ecuador Foundation, and I will be in the area from late June until the end of August to conduct my fieldwork. While I am here, I will document stories about people's interactions, experiences and perceptions of the environment, conservation and the local mammals that inhabit the area. I am interested in understanding how people living near/in the Pacoche Wildlife Refuge perceive and utilize the natural resources, including the various animal species that live there.

This research might be of interest to you and your community as it will help to contribute to a wider dialogue of the lived experiences of sharing space with a protected area, and greater awareness of local conservation and livelihood concerns, both in Ecuador and globally.

Study Procedures

By signing this document you are providing your consent to participate in an interview session. I will ask you some semi-structured questions to promote dialogue on themes related to the research objectives. I will also take handwritten notes throughout the interview. There is no set number of interviews, and no set duration for each session. Most interviews will take about 1 hour but you are welcome to tell me as many things as you like, and therefore interviews may run longer or shorter. However, if interviews go on for a long time and there are more things to discuss, we can schedule another session to continue the interview then.

You will not be compensated for your participation in this research.

Audio-Recording

If you allow me to, I will audio record our session so that I can listen to and transcribe it into a written script later, so that I can quote your words as accurately as possible. Nobody except me will have access to the recordings. Recordings will not be released. If you do not want to be recorded during the session, please indicate this in the consent form below. You can still participate even if you do not want to be recorded.

If you consent to the recording but change your mind during the interview, you may tell me to stop recording at any time.

Risks

There are no known or anticipated risks or discomforts associated with participating in this study. Most questions will be proposed in general terms, and you will not be required to reveal any personal information that may make you feel uncomfortable. If you do feel uncomfortable at any time, you may refuse to participate or to answer questions and the session will end at your request. If you agree to participate but decide later that you no longer want to, you may withdraw from the study at any time without consequences.

Rights

You have the right to have any or all previously provided information removed upon your request. Withdrawn information will not be used in the study, and no new information will be collected without your permission.

You do not waive any legal rights by consenting to this study.

Confidentiality

All data collected will remain confidential and accessible only to the researchers involved in this study. In all final reports and presentations, a pseudonym will be used instead of real names. However, please note that consenting to photography or video-recording at a different stage in the research may allow for identification through the triangulation of data. Your identity will be protected to the best of my abilities. If you choose to withdraw from this study, your data will be removed and destroyed from our database, provided you ask to withdraw your information within a year of providing it (that is, before the thesis is completed). While we will do our best to protect

your information there is no guarantee that we will be able to do so. Identifiable and de-identified data will not be shared with anyone. Representatives of The University of Western Ontario Non-Medical Research Ethics Board may require access to your study-related records to monitor the conduct of the research. All identifying information will be stored separately from the interview and transcripts. All electronic records will be password protected and files stored on my laptop. The original audio interviews and the transcripts will be accessible only to the PI and held in a secure locked, drawer at my home. A list linking the study number with the participant's names and contact information will be kept by the researcher in a secure place, separate from the study file. The student researcher will have a master list of pseudonyms connecting participant first names and numbers on paper while in the field, which will be destroyed after 7 years according to institutional policy.

It is also important to note that as a local collaborating institution Ana De La Torre from Greenearth Ecuador will be assisting with the surveys and interviews to aid in any clarification of terms that may be needed, as well as other logistical concerns. She will have access to the field data during data collection, however will not have access to stored or analyzed data, nor personal records of contact information of participants. Participants are reassured that there is no direct benefit to them, or the foundation, associated with their participation. Participation is voluntary, will not have any impact on their employment or other community relations. This is in addition to a focus on the study being a component of the student researcher's master's thesis, as well as designed by the student researcher, and reassurance that participants are free to decline participation without any consequence, or stop the study at any time.

You will be asked to also indicate your consent regarding the use of direct and indirect quotes from your interview(s). As the purpose of this research is to extract themes from the data, all personal identifiable information will be removed from all quotations in final reports and presentations.

Dissemination

A final report summarizing the results of this study will be shared with the Ecuadorian Ministry of the Environment, and with GreenEarth Ecuador. GreenEarth Ecuador will make these results public online at http://www.greenearthecuador.org/. A copy of the final Master's dissertation will also be available to the public online through the Western University electronic thesis and dissertation depository. This research will also be published in an academic journal and shared within the academic community in conference presentations.

Questions

Please do not hesitate to ask questions or raise concerns about any aspect of this research, or if you wish to receive a copy of either your interview transcript or of the published study results. If there are any additional issues you wish to address, you are welcome to do so, so that we can work out a solution.

You may direct any questions and concerns to me, Tamara Britton-Mendieta, or my supervisor Dr. Ian Colquhoun, who functions as the Principal Investigator of this study. You will find the contact information at the top of this letter.

If you have any questions about your rights as a research participant or the conduct of this study, you may contact The Office of Human Research Ethics at Western University.

This letter is yours to keep for future reference.

Form of Consent – Interview Participants

"SHARED SPACES AND LOCAL PERCEPTIONS
IN THE PACOCHE WILDLIFE REFUGE"

Researcher (MA student):
Tamara Britton-Mendieta
Department of Anthropology
Western University (London, Canada)
Email:
Telephone:

Principal Investigator:
Dr. Ian Colquhoun
Department of Anthropology
Western University (London, Canada)
Email:
Telephone:

Written Consent

I have read the Letter of Information, have had the nature of the study explained to me and I agree to participate. All questions have been answered to my satisfaction.

Contact for Future Studies
I agree to be contacted for further research studies.
☐ **YES** ☐ **NO**

Audio Recording
I agree to be audio-recorded in this research.
☐ **YES** ☐ **NO**

Direct Quotes
I consent to the use of direct quotes obtained during the study in the dissemination of this research
☐ **YES** ☐ **NO**

Indirect Quotes

I consent to the use of indirect (paraphrased) quotes obtained during the study in the dissemination of this research

☐ **YES** ☐ **NO**

Pseudonyms

Please indicate that the following format is acceptable to appear in the research:

☐ **FULL PSEUDONYM (no component of the name will be identifiable)**

Participant's Signature (State name, date and repeat the following)

I agree to participate in the study under the above-clarified conditions.

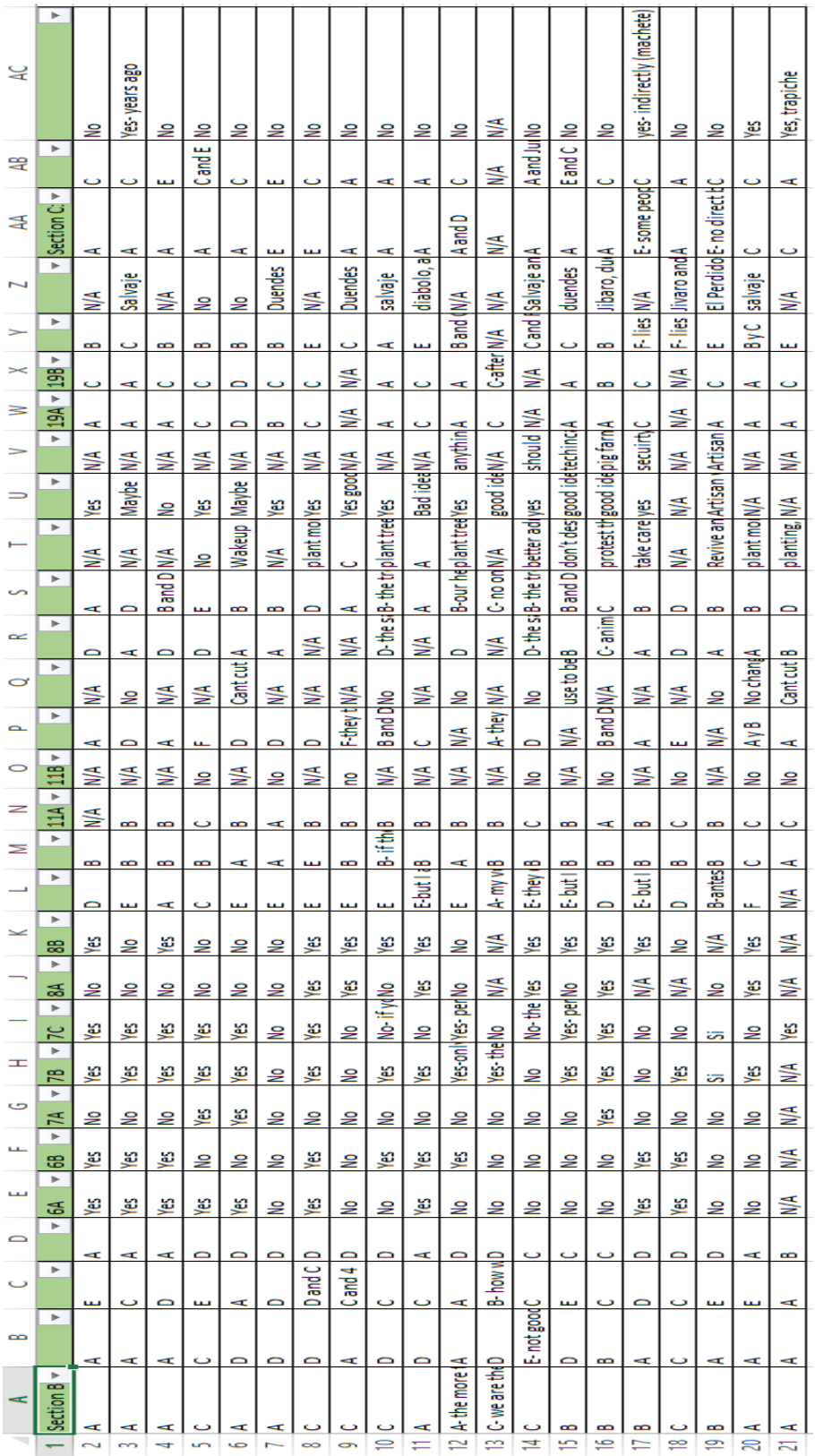
_____	_____	_____
Print Name of Participant	Signature	*Date (DD-MM-YYYY)*

Researcher's Signature

My signature means that I have explained the study to the participant named above. I have answered all outstanding questions.

_____	_____	_____
Print Name of Person Obtaining Consent	Signature	*Date (DD-MM- YYYY)*

Appendix H: Multiple Choice Data



	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	AA	AB	AC
1	Section B				6A	6B	7A	7B	7C	8A	8B			11A	11B								19A	19B			Section C		
2	A	A	E	A	Yes	Yes	No	Yes	Yes	No	Yes	D	B	N/A	N/A	A	N/A	D	A	N/A	Yes	N/A	A	C	B	N/A	A	C	No
3	A	A	C	A	Yes	Yes	No	Yes	Yes	No	No	E	B	B	N/A	D	No	A	D	N/A	Maybe	N/A	A	A	C	Salvaje	A	C	Yes- years ago
4	A	A	D	A	Yes	Yes	No	Yes	Yes	No	Yes	A	B	B	N/A	A	N/A	D	B and D	N/A	No	N/A	A	C	B	N/A	A	E	No
5	C	C	E	D	Yes	No	Yes	Yes	Yes	No	No	C	B	C	No	F	N/A	D	E	No	Yes	N/A	C	C	B	No	A	C and E	No
6	A	D	A	D	Yes	No	Yes	Yes	Yes	No	No	E	A	B	N/A	D	Cant cut	A	B	Wakeup	Maybe	N/A	D	D	B	No	A	C	No
7	A	D	D	D	No	No	No	No	No	No	No	E	A	A	No	D	N/A	A	B	N/A	Yes	N/A	B	C	B	Duendes	E	E	No
8	C	D	D and C	D	Yes	Yes	No	Yes	Yes	Yes	Yes	E	E	B	N/A	D	N/A	N/A	D	plant mo	Yes	N/A	C	C	E	N/A	E	C	No
9	C	A	C and 4	D	No	No	No	No	No	Yes	Yes	E	B	B	no	F-they t	N/A	N/A	A	C	Yes good	N/A	N/A	N/A	C	Duendes	A	A	No
10	C	D	C	D	No	Yes	No	Yes	No- if yo	No	Yes	E	B- if the	B	N/A	B and D	No	D- the si	B- the tr	plant tree	Yes	N/A	A	A	A	salvaje	A	A	No
11	A	D	C	A	Yes	Yes	No	Yes	No	Yes	Yes	E-but I a	B	B	N/A	C	N/A	N/A	A	A	Bad idea	N/A	C	C	E	diabolo, a	A	A	No
12	A- the more	A	A	D	No	Yes	No	Yes-on	Yes- per	No	No	E	A	B	N/A	N/A	No	D	B-our he	plant tree	Yes	anythin	A	A	B and D	N/A	A and D	C	No
13	C- we are the	D	B- how w	D	No	No	No	Yes- the	No	N/A	N/A	A- my w	B	B	N/A	A- they	N/A	N/A	C- no on	N/A	good ide	N/A	C	C-after	N/A	N/A	N/A	N/A	N/A
14	C		E- not good	C	No	No	No	No	No- the	Yes	Yes	E- they	B	C	No	D	No	D- the si	B- the tr	better ad	yes	should	N/A	N/A	C and I	Salvaje an	A	A and Juu	No
15	B	D	E	C	No	No	No	Yes	Yes- per	No	Yes	E- but I	B	B	N/A	N/A	use to be	B	B and D	don't des	good ide	tetechinc	A	A	C	duendes	A	E and C	No
16	B	B	C	C	No	No	Yes	Yes	Yes	Yes	Yes	D	B	A	No	B and D	N/A	C- animi	C	protest th	good ide	pig farm	A	B	B	Jibaro, du	A	C	No
17	B	A	D	D	Yes	Yes	No	No	No	N/A	Yes	E- but I	B	B	N/A	A	N/A	A	B	take care	yes	security	C	C	F- lies	N/A	E- some peop	C	yes- indirectly (machete)
18	C	C	C	D	Yes	Yes	No	Yes	No	N/A	No	D	B	C	No	E	N/A	D	D	N/A	N/A	N/A	N/A	N/A	F- lies	Jivaro and	A	A	No
19	B	A	E	D	No	No	No	Si	Si	No	N/A	B-antes	B	B	N/A	N/A	No	A	B	Revive an	Artisan	Artisan	A	C	E	El Perolo	E- no direct	C	No
20	A	A	E	A	No	No	No	Yes	No	Yes	Yes	F	C	C	No	A y B	No chang	A	B	plant mo	N/A	N/A	A	A	B y C	salvaje	C	C	Yes
21	A	A	A	B	N/A	N/A	N/A	N/A	Yes	N/A	N/A	N/A	A	C	No	A	Cant cut	B	D	planting,	N/A	N/A	A	C	E	N/A	C	A	Yes, trapiche

Appendix I: Pile-sorting Data

Species	Local Names	Distribution/Sightings	More or les	Food	Pets	Crop Damage	Medicinal	Folklore	Anthropomorphism	Special Attributes
White-fronted capuchin	mono micola	NA	NA	NA	NA	they eat the same a	NA	they say they li	they are like people- because they look like us; they	they are they most intelligente animals and are very curiosus- they eat healthy. They are in a different class
	el mico	I saw one last week in an orange same	no- they are too f	made a good pe	they are not destruc	NA	NA	NA	NA	NA
	mico	saw one near Montana Verde bi less	NA	NA	bananas, oranges,	NA	NA	they fall in love with girls and follows you		they are more intelligent/curious, they are like people, not like the other monkeys
	mono mico	saw them this year a group of 6- less	no	NA	they eat everything	NA	NA	I like to see them and hear them because they remind	NA	
	mico	large groups- especially near Ri NA	NA	NA	no	NA	NA	fall in love with girls		daring- come close and try to caress you
	mono mico	have seen about 5 years ago in less	NA	NA	NA	NA	NA	NA	NA	NA
	mico of the moul	saw one about a month ago less	no	NA	fruit and bananas-	NA	NA	badly behaved and self-serving		they are the most intelligente animal very curious
	mico	NA	NA	NA	banana and papay	NA	NA	NA	NA	they are bold and will attack you
	mico	NA	NA	NA	oranges and corn	NA	NA	NA	NA	NA
	mico	you can find them on the other s less	no	NA	they eat everthing,a	no	no	jealous of people		bold and daring- they attack women who are alone in the forest
	mico	bastante	NA	NA	oranges and corn	NA	NA	NA	NA	mas travieso que monos
	mono-mico	haivent seen them in over 2 year less	NA	NA	damaging to corn a	NA	NA	follow women a	carry their babies like a human mother	agile/aggressive, masterbate in front of ladies
	mico	never seen one	NA	NA	NA	NA	NA	NA	NA	NA
	mico	sometimes you see them	less	no	damaging to orange	no	NA	NA	NA	NA
	mico	near rio cana	less	no	NA	are damaging to co	no	NA	like people they travel in pairs to protect eachother-	brave, aggressive, they jump on your back and bite you
	mico	very difficult to find now - many pless	no	NA	oranges, papaya, a	NA	NA	NA	fall in love with girls and follow them	curious, take initative and move agile than mono
	mico	have seen them, in finca near la less	no	NA	destroys orange crc	NA	NA	NA	NA	brave, daring, dangerous it will attack you
	mico	in the intangible zone - near las more now	NA	yes, before MAE	oranges	blood - asthm	NA	NA	NA	very intelligente - tool use
	mico	long time ago - years ago "Guaju less now	NA	NA	NA	NA	NA	NA	NA	NA
	mico	est. once a month - groups of 5 - Less now - there are few		Yes - before MA	oranges	NA	NA	caires about this animal because he feels accompan	destructive and se ponen bravos	
	mico	used to be one around here, bu less	NA	yes	oranges - they are c	Blood used t	Bad luck on yo	Hail mary's when threatened	NA	
Species	Local Names	Distribution/Sightings	More or les	Food	Pets	Crop Damage	Medicinal	Folklore	Anthropomorphism	Special Attributes
Mantled Howler	el mono	see them frequently in the humi same	NA	NA	NA	banana plantain- n	NA	NA	NA	People say when they howl that they are signaling that they are happy or angry
	el mono aullador	there are plenty on the mountain same	yes- smoked meat	NA	NA	blood can sa	They howl to al	they perform hail marys when they think they are goi	NA	
	mono aullador	common sight in the humid forel less	NA	NA	oranges, bananas,	blood is good	our ancestors	we are friends, we are always happy to see one anot	this animal feels time (referring to climate change here)	
	mono negro / got	see them everytime I am on the less	NA	NA	no	NA	When they how	NA	NA	NA
	el mono	see them frequently when workii same - group	never hunted this	NA	NA	NA	NA	calls to bring th	NA	noisy starting at 6am
	el mono	ive seen them in the forest 2 yea less	yes	NA	no	NA	NA	NA	NA	NA
	mono aullador	saw them 4 days ago - but you cl NA	no - I would feel ba	NA	no	yes - their blo	NA	They are like humans and are religious		NA
	mono	NA	NA	NA	they eat leave - they	NA	their call brings	NA	NA	NA
	mono	everyday in the forest more near same amour	no	NA	they eat guarumo le	No	they warn whe	NA	NA	NA
	mono	there are few now	less	no	use to be a good pet but the MAE tak	NA	they warn whe	NA	NA	NA
	el mono	always/everytime on the mounta NA	NA	NA	oranges and sapote	NA	NA	NA	NA	NA
	mono	NA	NA	NA	no	NA	NA	the howler monkey feels more like a human to me, th	NA	NA
	mono	yes I see them a lot passing thro same	no	NA	NA	blood is reme	NA	NA	NA	NA
	mono	always see them	more	no	no	no	NA	NA	NA	NA
	mono/gorilla	everywhere in the forest	more	no	no	no		NA	NA	can be aggressive
	mono	sees them frequently near La Cl less		yest, the meat is d	NA	oranges, papaya, a	the blood is v	NA	NA	NA
	mono	have seen them	less	no	NA	no	NA		monos have their own song and like to sing just like u	NA
	mono aullador	often see it in a higueron tree ne more now		yes, but not longe	yes, before MAE	NA	blood - asthm	NA	NA	many mono's depicted in arch. Record
	mono	every Saturday when he visits hi more		yes, but not for 10	NA	NA	blood - for illn	NA	NA	NA
	mono	almost everyday on the mountai more now th		NA	Yes - before MA	oranges	NA	NA	caires about this animal because he feels accompan	NA

	A	B	C	D	E	F	G	H	I	J	K
127		armadillo	yes but its rare								
128	Species	Local Names	Distribution/Sightings		Food	Pets	Crop Damage	Medicinal	Folklore	Anthropomorphism	Special Attributes
129	Brown-throated Sloth	sloth	never seen one, but they are here								
130		sloth "peculiar o	i havent seen one in a long time- rare to find th	no	no- bad pets	no	no				they sing at night
131		sloth									
132		sloth	lives on the mountain- havent seen one in a l	no							very intelligent animal
133		sloth	no								
134		sloth	no								
135		sloth	yes, ive seen one once or twice- they are diffi	yes people eat the	they make good pets, but not since the MAE						
136		no ID									
137		no ID									
138		oso	no, never seen one here								
139		no ID									
140		no ID									
141		no ID									
142		sloth	no, we don't have those here								
143		no ID									
144		no ID									
145		no ID									
146		peresoso	yes- saw one once in a guatumo tree								
147		no ID									
148		no ID									
149	Species	Local Names	Distribution/Sightings		Food	Pets	Crop Damage	Medicinal	Folklore	Anthropomorphism	Special Attributes
150	Central American Agouti										
151		guatusa	sometimes		for family consumption						
152		guatusa	no								
153		no ID									
154		no ID	no								
155		guatuso	no								
156		guatusa	there are few now from over hunting		yes		fruit, sapote, and oranges				
157		no ID									
158		guatuso	yes its found here		before people use to hunt them for		it eats fruit that falls on the ground				
159		guatuso	there are few now, use to be a lo	less	yes						
160		guatuso	sometimes								
161		guatuso	less now	less	food for people before MAE, less often now						
162		guatuso	yes								
163		guatusa	yes, at night		people hunt this for food, less since the MAE						
164		guatusa	yes they are here								
165		guatusa	yes its found here								
166		no ID									
167		guatusa/o	is present, but has never seen one		yes- people still eat this animal						
168		no ID									
169		no ID									

	A	B	C	D	E	F	G	H	I	J	K
43		mono	almost everyday on the mountai	more now th	N/A	Yes- before	N/A oranges	N/A	N/A	cares about this animal because he feels accompai	N/A
44	**Species**	**Local Names**	**Distribution/Sightings**		**Food**	**Pets**	**Crop Damage**	**Medicinal**	**Folklore**	**Anthropomorphism**	**Special Attributes**
45	**Southern tamandua**	oso hormiguero	haven't seen on in 8 years								
46		oso hormiguero	haven't seen one in a long time								
47		oso hormiguero	you see them very rarely								
48		sorro hormiguero	see them alot in the forest		no	no					sometimes can be nasty has large claws
49		tejon or oso horm	no								
50		no ID									
51		oso hormiguero	yes, see them a lot								
52		oso hormiguero					destroys sugar cane				
53		sorro hormiguero	yes they are here, but there are few				eats fruit				
54		no ID									
55		no ID									
56		oso hormiguero	not around here anymore								
57		no ID									
58		anda solo	sometimes								
59		sorro hormiguero	haven't seen one in over a year								
60		anda solo					use to plant corn and it would eat the seeds				
61		no ID									
62		oso hormiguero	more common in dry forest								
63		oso hormiguero	haven't seen one in a long time								
64		oso hormiguero	once a month, maybe								siempre grita en invierno cuando esta perdido
65	**Species**	**Local Names**	**Distribution/Sightings**		**Food**	**Pets**	**Crop Damage**	**Medicinal**	**Folklore**	**Anthropomorphism**	**Special Attributes**
66	**Ocelot**	tigrillo	never seen one		not eaten- but hunted for pelts		they eat chickens				
67		tigre	not anymore		used fur to make purses and skin to		they don't exist here anymore because people killed them all because they ate their livestock				
68		tigrillo	very rare		used to hunt it for its skin						
69		tigre/tigrillo	never seen one but have heard they are here		not eaten- but hunted for pelts						
70		tigre/leon	no								
71		tigre	no- but we use have them here		people would hunt them for their pelts and sell it in Puerto Viejo						
72		tigrillo	not anymore		hunted for their pelts						
73		tigre	no								
74		tigrillo	yes they are here, but we never seen one					fat is good for muscles- people hunt it for this remedy			
75		tigrillo	saw one along time ago on the mountain		people kill them for their pelts, now its prohibited						they scream at night on the mountain
76		tigrillo	no								
77		tigre	not here								
78		tigrillo	not anymore								
79		tigre	not anymore								
80		tigre, puma	at night- there use to be more n less								use to hunt it for its pelt to make purses etc
81		tigre	there use to be these here, not anymore- people hunted it too much because it wi eat livestock								
82		tigre	no								
83		tigrillo	is present - has seen one as roadkill		yes			fat to treat hemmeriods			
84		tigre	a year ago								
85		tigrillo	only seen it twice- its nocturnal				livestock- esp. chickens				

	A	B	C	D	E	F	G	H	I	J
211		ardilla	everyday	more	yes- before MAE	Yes- before MA	oranges			
212	**Species**	**Local Names**	**Distribution/Sightings**		**Food**	**Pets**	**Crop Damage**	**Medicinal**	**Folklore**	**Anthropomorphism**
213	**Tapeti**	mula de monte	see them all over the place		not common food for people		no			
214		mula de monte	everywhere		no		no			
215		mula de monte	yes, on the mountain		people use to eat them (roasted)					
216		conejo	sometimes		not common food- heard their mea		not too damaging- mostly leaves and roots			
217		mula de monte	todo lados, andan solos		no					
218		mula de monte	yes		yes- people still eat them		eat crops			
219		conejo	yes all the time- they breed quickly		yes					
220		conejo	never seen one		yes					
221		mula de monte	everywhere, everyday		yes some people eat them		eats crops			
222		mula de monte	yes- I saw one afew months ago		yes people still ea	bad pets				
223		mula de monte	yes		sometimes people eat them but its not common					
224		lapa, conejo	yes, I see them all the time		yes- flavorful and expensive					
225		mula de monte	evertwhere		yes					
226		mula de monte	everyday		people use to					
227		mulita de monte	always		yes, but not that common					
228		mula de monte	afew months ago		Yes before MAE					
229		mula de monte	yes		yes					
230		mula de monte	I see them often		no					
231		mula de monte	2 months ago		yes-before MAE					
232		mula de monte	every day on the mountain		yes-before MAE					
233	**Species**	**Local Names**	**Distribution/Sightings**		**Food**	**Pets**	**Crop Damage**	**Medicinal**	**Folklore**	**Anthropomorphism**
234	**Jaguarundi**	Danta	not here							
235		tejon	havent seen one in years				very damaging to sugar cane and corn			
236		No ID								
237		leon	no							
238		jaguarundi	there are some higher up on the mountain							
239		jaguarundi	not here, but I think I have seen it in other areas more south							
240		tigrillo gris	no							
241		No ID								
242		leon	not here							
243		jaguarundi	no- ive only seen it on tv							
244		No ID								
245		tigre gris	not here							
246		No ID								
247		tejon	at night - havent seen it in years				destroys sugar cane			
248		tigre	yes, but I have only seen it afew times							
249		No ID								
250		No ID		less						
251		el gate, gatito	heard its present, but never seen one							
252		tigrillo plomo	not sure, never seen one							
253		No ID								

	A	B	C	D	E	F	G	H	I	J	K
169		no ID									
170	Species	Local Names	Distribution/Sightings		Food	Pets	Crop Damage	Medicinal	Folklore	Anthropomorphism	Special Attributes
171	Spotted Paca	guanta	I havent seen one in about 8 years		people still hunt this anima- very go no						
172		guanta	yes, but there are lever now		we hunted them a lot before the MAE- they have a very nutritious meat						
173		guanta	at night- havent seen one in a long time		people use to hunt this animal a lot- eats yuca crops						
174		guanta	never seen one		yes people eat them						
175		guantale			yes, its like pork, ive eaten alew yes no- they eat tagua nuts						
176		guantalconejo	at night		yes, people hunt it at night						
177		guantelconejo	yes		use to be hunted a lot for food $5 a pound for their meat						
178		mula de monte (paca)									
179		guanta	at night - havent seen it in years		yes, people use to it it, but not anymore now its prohibited						
180		guante	havent seen one in a year- use(less		yes people still eat this if they can find it						
181		no ID									
182		guante	few now - only at night		yes, but its rarely hunted now						
183		guante	at night- havent seen one in a long time		yes, very good meat						
184		guante	havent seen one in years								
185		guante	at night near garbage on the side of the road		yes but its prohibited now						
186		guanta	see it rarely		yes- smoked or barbaqued its delicous						
187		no ID			yes- before MAE people hunted this animal now rarely						
188		guanta	yes I have seen one		yes- before MAE people hunted this animal now rarely						
189		no ID									
190		no ID									
191	Species	Local Names	Distribution/Sightings		Food	Pets	Crop Damage	Medicinal	Folklore	Anthropomorphism	Special Attributes
192	Guayaquil Squirrel	ardilla	yes there are a lot around here		people use to eat them - there is ar corn crops						
193		ardilla	they are everywhere		some people peel people use to his fruit, tagua, orange crops						
194		ardilla	common here		sometimes people eat them but ist eat fruit, papaya, banan, and especially cacao						
195		ardilla	yes they are everywhere		not food		eat sapote and cococa				
196		ardilla	groups of 2 or 3		no		corn				
197		ardilla	yes many		people eat them roasted and they l yes they damage corn crops						
198		ardilla	yes		yes people eat them also use their pelts for hats						
199		ardilla	yes there are many		yes people eat them		destroys amot especially corn				
200		ardilla	yes lots		no	good pet- now it destroys crops until there is nothing left, especially cacoa and corn. Some people stopped planting corn because of this animal					
201		ardilla	yes they are everywhere		not anymore		corn, bananas, tagua, oranges, and other fruits				
202		ardilla	yes		not anymore						
203		ardilla	yes		people still eat this animal- more oc eats fruit crops			fat is good for hypothermia			
204		ardilla	yes there are many		not anymore						
205		ardilla	everyday in my crops		yes		cocao				
206		ardilla	always		yes- few people use to eat this		tagua and banana	fat for asthma			
207		ardilla	yes		Yes, cooked with peanut sauce it is		corn, cacoa, papaya, avocado, oranges				
208		ardilla	everywhere		yes						
209		ardilla	the are common around here		no		cacoa and tagua				helps to spread seeds
210		ardilla	everyday		yes- before MAE						
211		ardilla	everyday	more	yes- before MAE	Yes- before MAE	oranges				

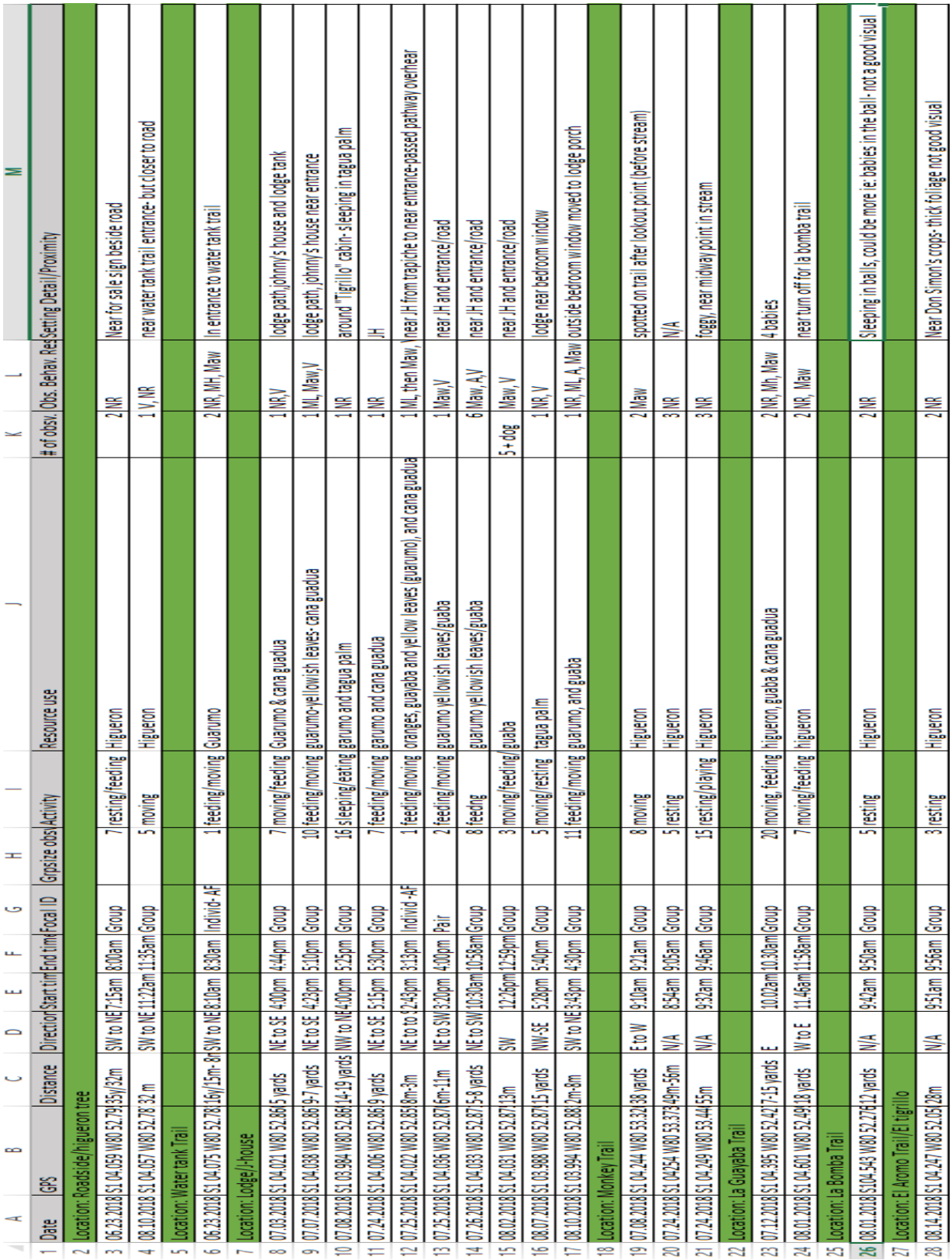
	A	B	C	D	E	F	G	H	I	J
253		No ID								
254	**Species**	**Local Names**	**Distribution/Sightings**		**Food**	**Pets**	**Crop Damage**	**Medicinal**	**Folklore**	**Anthropomorphism**
255	**White-lipped Peccary**	porko de espina	they use to be here		overhunting for meat					
256		saino	10 years ago there use to be these here		people use to hunt them for food using their dogs- they were commonly eaten					
257		porko de espina	not anymore, they were hunted out of the are		use to be					
258		saino	no							
259		saino	no							
260		saino	not anymore		use to set traps at night and then eat them roasted					
261		porko de espina	not anymore- from over hunting							
262		No ID								
263		porkolsaino	no							
264		porko de la mont	not found here anymore- they disappeared		people ate them					
265		No ID								
266		saino	not here anymore for at least 10 years- must h		people use to eat it					
267		No ID								
268		porko de espina	in my fathers time, not anymore							
269		No ID								
270		No ID								
271		porko de espina	saw one years ago	less	yes					
272		No ID								
273		saino	never seen one							
274		no ID								
275	**Species**	**Local Names**	**Distribution/Sightings**		**Food**	**Pets**	**Crop Damage**	**Medicinal**	**Folklore**	**Anthropomorphism**
276	**Red-brocket Deer**	venado	saw them last week crossing the road, there a		people eat them, ,but I don't personally like the meat, its totally prohibited to hunt them so people only do it at night					
277		venado	there are more now that people stopped hunt		use to be hunted a lot they are an excellent meat ribs etc					
278		venado	not common to see them anymore		we use to eat them all the time, now rarely		local secret is that their fat is like a balm for sore muslces, and their hides can make a good bed for children			
279		venado	saw one 3 years ago- there are less now than		people use to eat them a lot- now n they eat the leaves of uyuca plnats					
280		venado	yes I have seen them- always alone		yes as meat, and their hide to make they eat banana leaves and sapallo					
281		venado	not anymore around here		use to be good meat- people still hunt them in other areas near here					
282		venado	cant find them on the mountain anymore		yes	yuca, sweet potato	yes- fat for arthritis			
283		venado	yes		yes, years ago- its good meat now	yes its damaging to the roots of sweet potatoes but not that much.				
284		venado	yes they are on the mountain		people use to eat it before the MAE					
285		venado	there are few now, use to be eve less		people still eat this animal					
286		venado								
287		venado	yes		yes everyone hunts it, the meat is d banana, sapote and cacoa					
288		venado								
289		venado	yes, in the dry part of the forest					fat- for sore muscles		
290		venado	often see it passing the highway- more so in dry forest areas							
291		venado	this animal is not well protected		yes- has killed and eaten it before, y eats bean crops					
292		venado	havent seen one in a long time	less	yes					
293		venado			yes			hooves- constipation		
294		venado	last year by the refinery		Yes- before MAE			fat- for muscle aches		
295		venado	maybe once every 3 months- its near pacoch		Yes- before MAE	Yes- before MAE				

	A	B	C	D	E	F	G	H	I	J
85		tigrillo	only seen it twice- its nocturnal				livestock- esp. chickens			
86	**Species**	**Local Names**	**Distribution/Sightings**		**Food**	**Pets**	**Crop Damage**	**Medicinal**	**Folklore**	**Anthropomorphism**
87	**Tayra**	el sorro/tejon	never seen one personally				destructive to corn crops			
88		cabeza de mate	sometimes you see them				papaya, sugar cane and corn			
89		cabeza de mate	yes it in the humid forest				they destroy corn and banana crops			
90		cabeza de mate	yes ive seen them 2 years ago				eat corn			
91		cabeza de mate	have seen one- but it ran away fast				corn and sugar cane (white)			
92		cabeza de mate	yes- but deeper in the mountain you don't see them often				destroys corn crops			
93		cabeza de mate	yes there are many				fruit, oranges, and corn			
94		cabeza de mate	yes, years ago				it takes down the corn stalks			
95		cabeza de mate	yes, ive seen it in the day time				papaya and fruit			
96		cabeza de mate	I saw one along time ago				sugar cane, corn, watermelon and sapote			
97		cabeza de mate	never seen one							
98		cabeza de mate	have seen them before not often							
99		cabeza de mate	long time ago							
100		sorro/cabeza de	all the time				cocao, and banana			
101		cabeza de mate	passing the highway							
102		cabeza de mate	saw one last month							
103		no ID	havent seen on in a long time							
104		cabeza de mate	yes its present here, has seen them in groups							
105		tejon or cabeza	2 weeks ago				sapote			
106		cabeza de mate	almost everyday on the mountain				papaya			
107	**Species**	**Local Names**	**Distribution/Sightings**		**Food**	**Pets**	**Crop Damage**	**Medicinal**	**Folklore**	**Anthropomorphism**
108	**Nine-banded Armadillo**	armadillo	havent seen one in 10 years they only come o		people eat this, its like pork and use their shell to hold things like eggs					
109		catchicambo	havent seen one in 20 years		yes people eat them roasted with yuca, sweet pototoes		use their fat for a cough			
110		catchicambo	yes, its around here, but not easy to find- only		yes people eat this animal if they can find it, it is very deli		a spoonful of their fat is given to children for a bad cough			
111		armadillo	havent seen one in years		yes, some people eat them			fat is good for dry cough and the lungs		
112		armadillo	never see them anymore	Less now-th	Yes, people still do. If I find one, I'll eat it					
113		armadillo	yes		no one eats them anymore			fat for cough		
114		armadillo	there are many		we use to eat them all the time, now rarely			their fat for cough, tail for ear ache, and shell for musical instruments		
115		armadillo	yes		yes, we used to eat them					
116		armadillo	yes, it comes out at night- seen it in the garba		no			fat is good fo it is an ancester animal of the mountain		
117		armadillo	not as easy to find anymore		use to live off of hunting- but now few people want this n			the fat is good for a dry cough		
118		armadillo	yes							
119		armadillo	few now- only at night							
120		armadillo	hard to find							
121		armadillo	at night- it lives in holes					fat for cough and asthma		
122		catchicambo	at night in the forest		use to eat this					
123		catchicambo	not around here anymore		yes delicious meat- cooked with yuca					
124		armadillo	not sure only at night		yes					
125		armadillo	yes					fat- to treat hemerriods		
126		armadillo	no ive never seen one							
127		armadillo	yes but its rare							

	A	B	C	D	E	F	G	H	I	J	K
295		venado	maybe once every 3 months- its near pacoch	Yes- before MAE		Yes- before MAE					
296	**Species**	**Local Names**	**Distribution/Sightings**	**Food**	**Pets**	**Crop Damage**	**Medicinal**	**Folklore**	**Anthropomorphism**	**Special Attributes**	
297	**African land Snail**	caracol	you don't see them that much anymore- they	no		they are very damaging to crops					
298		caracol	always had these here but now there are diffe	no		the eat the leaves and destroy all types of plants					
299		caracol	appeared a few years ago now t less now tho	no		very destructive especially for yuca and coffee crops					
300		caracol	often found near fresh water, were introduce	no		destroy leaves of fruit crops					
301		caracol	have seen them, but not common around ther	ceviche		destroys coffee plants, worse effects on small crops				invasive species at one point a plague	
302		no ID	only on the mountain	yes		they are very damaging to crops					
303		caracol	yes- there are many over the past 5 years	yes		they are very destructive and eat, banana and corn, especially				a man had a colony of them and when he died, they multiplied everywhere	
304		caracol	yes there are many	some people eat them in a ceviche		yes they are very damaging like a plague					
305		caracol	there are many	no, its got a virus		they eat everything				people say they have a virus so only animals eat them	
306		caracol	yes they are still around, but less now	no		bananas, coffee, very damaging					
307		caracol	yes	yes		they eat everything					
308		caracol	many	yes, but you have to know how to pl	eats everything you plant						
309		caracol	yes less now though	no		they are very damaging to crops					
310		caracol	there are a lot on mountain	no		they do a lot of damage to everything especially yuca					
311		caracol	everywhere in the forest	yes- we use to but people stopped	because it had a virus						
312		caracol	lots in the mountain	never ate this- but have heard of people who do							
313		caracol	there are many	yes, ceviche	they eat everything						
314		caracol	yes	heard people eat this	cause a lot of damage to coffee and banana plants esp.					introduced species-invasive	
315		caracol	everywhere	no	bananas, coffee, very damaging						
316		caracol	yes	no	they are very damaging to crops						
317	**Species**	**Local Names**	**Distribution/Sightings**	**Food**	**Pets**	**Crop Damage**	**Medicinal**	**Folklore**	**Anthropomorphism**	**Special Attributes**	
318	**Rufous-headed Chacalac**	guachalaca	yes all the time	used to be food, g	also used to be	they eat banana and orange crops					
319		guachalaca	yes in the forest and savannah	used to be common source of food for people, now we cant hunt them		they sing to announce the rain					
320		guachalaca	everyone here knows them, they are very com	not anymore				when they sing it means its going to rain			
321		guachalaca	I see them all the time	yes people eat them, like a partridge but not anymore because of the				when they sing it means its going to rain			
322		guachalaca	hay muchos- more than 20 in a group	yes- but not for 10 years		eat seeds that you plant		their call/song is a warning that there is a snake nearby		they are scandalous	
323		guachalaca	yes there are many	yes people use to eat them				they sing to announce the rain			
324		guachalaca	yes there are many	yes- good in a stew - but the MAE might put you in prison				their song calls the rain			
325		guachalaca	yes there are many	yes, very delicous - good in stew				everyone says they sing to announce the rain			
326		guachalaca	yes there are many	no- too many born	used to be a good pet until MAE			their song brings the rain			
327		guachalaca	there are a lot around here	yes, people still e	make good pets- because they sing in the morning to wake you up						
328		guachalaca	I see them all the time	yes							
329		guachalaca	yes a lot	some people use to eat it before MA	not damaing to anything- it likes fruit						
330		guachalaca	common sight	yes							
331		guachalaca	sometimes you see them	yes, like a partridge							
332		guachalaca	yes it is abundant	yes- not anymore though							
333		guachalaca	yes now there are a lot	good meat- in a stew. we use to hunt it during la molienda. I use to eat it a lot. Often kill 2 at once, one bird can feed 5 people.							
334		guachalaca	everywhere	less	yes	yes- destroys coffee crops					
335		chacalaca	I see them all the time		yes						
336		guacha	everywhere, every week		yes, like a partridge						
337		guachalaca	everyday	more	Yes- before MAE	Yes -before MAE					

	A	B	C	D	E	F	G	H	I	J	K
337		guachalaca	everyday	more	Yes- before MAE	Yes -before MAE					
338	Species	Local Names	Distribution/Sightings		Food	Pets	Crop Damage	Medicinal	Folklore	Anthropomorphism	Special Attributes
339	Pit Viper (common lancehead)	cuelbra	Ive never seen one		NVA			NVA			
340		una viboraequis	see them sometimes- more common on the m		chicharon			the fat- cough and lung infections, and sore muscles			
341		equis	yes common I saw one a month ago- we often		NVA			NVA	if you are bitten you need to put lime juice in the wound it	the venom stays in its bones, and if they stop on them youll also die	
342		serpentelcuelbra	I see them often - kill them when I see them		NVA			fat for sore muscles			
343		cuelebra equis	saw one yesterday		chicharon			butterfat used on newborn babies skin and also for sore muscles		cut off head and tail	
344		cuelbra equis	yes, but not frequent		NVA			fat is good for cough- drink it hot			
345		equis			chicharon			fat for respitory illnesses and cough			
346		equis	havent killed one in a while, but they are very		NVA			my dad use to remove the fat for joint pain			
347		cuelbra "the enemy of man"			NVA			NVA			
348		cuelbra equis	yes they are common		NVA			NVA			someone was bitten in the street here in Pacoche the other day and died
349		equis	common		NVA			NVA			
350		cuelbra	they are very abdundant- especially near the		NVA			their fat for sore joints- their skin for purses and belts			if you get bitten their venom is like a current, you don't stand a chance.
351		equis	I see them often - kill them when I see them		NVA			NVA			
352		cuelbra equis	sometimes		NVA			fat to treat cough			
353		equis	they are everywhere		yes chicharon			fat to treat tumours, hemeroids, a cough and asthma			
354		equis	5 months ago I saw one, they are rare		yes chicharon			fat to treat cot they announce the rain		use their skin to make books	
355		cuelebra equis	they are everywhere	less	yes, chicharon			fat- for muscle aches and arthritis		dangerous- is afraid of it	
356		mata caballo	you see them everywhere		NVA			fat and liquid (fluids) to treat cough and hemerroids			
357		equis, mata cab	last year in feb		NVA			fat, for muscle aches			
358		cuelebra equis	cada 2 or 3 meses		NVA			NVA	distibute eggshells on the ground to keep equis away	very dangerous	
359	OTHER locally suggested:										
360	Valdivia (bird)	"hueco ah"							"hueco ah" call means someone is going to die/usually by a snake bite		
361		valdivia							their call also announces the birth of a child		
362											
363											
364											
365											
366											
367											

Appendix J: Primate Survey Data



Date	GPS	Distance	Direction	Start time	End time	Focal ID	Grp size obs	Activity	Resource use	# of obsv	Obs. Behav. Req	Setting Detail/Proximity
Location: Roadside/higueron tree												
06.23.2018	S1 04.059 W80 52.791	35y/32m	SW to NE	7:15am	8:00am	Group	7	resting/feeding	Higueron	2	NR	Near for sale sign beside road
08.10.2018	S1 04.057 W80 52.78	32 m	SW to NE	11:22am	11:35am	Group	5	moving	Higueron	1	V, NR	near water tank trail entrance- but closer to road
Location: Water tank Trail												
06.23.2018	S1 04.075 W80 52.781	6y//15m- 8m	SW to NE	8:10am	8:30am	Individ- AF	1	feeding/moving	Guarumo	2	NR, MH, Maw	In entrance to water tank trail
Location: Lodge//-house												
07.03.2018	S1 04.021 W80 52.865	5 yards	NE to SE	4:00pm	4:44pm	Group	7	moving/feeding	Guarumo & cana guadua	1	NR,V	lodge path;johnny's house and lodge tank
07.07.2018	S1 04.038 W80 52.865	9-7 yards	NE to SE	4:23pm	5:10pm	Group	10	feeding/moving	guarumo-yellowish leaves: cana guadua	1	ML, Maw,V	lodge path; johnny's house near entrance
07.08.2018	S1 03.984 W80 52.865	14-19 yards	NW to NE	4:00pm	5:25pm	Group	16	sleeping/eating	garumo and tagua palm	1	NR	around "Tigrillo" cabin- sleeping in tagua palm
07.24.2018	S1 04.006 W80 52.865	9 yards	NE to SE	5:15pm	5:30pm	Group	7	feeding/moving	garumo and cana guadua	1	NR	JH
07.25.2018	S1 04.022 W80 52.855	8m-3m	NE to no	12:43pm	3:13pm	Individ -AF	1	feeding/moving	oranges; guayaba and yellow leaves (guarumo), and cana guadua	1	ML, then Maw, V	near JH from trapiche to near entrance-passed pathway overhear
07.25.2018	S1 04.036 W80 52.877	6m-11m	NE to SW	3:20pm	4:00pm	Pair	2	feeding/moving	guarumo yellowish leaves/guaba	1	Maw,V	near JH and entrance/road
07.26.2018	S1 04.033 W80 52.877	5-8 yards	NE to SW	10:30am	10:38am	Group	8	feeding	guarumo yellowish leaves/guaba	6	Maw, A,V	near JH and entrance/road
08.02.2018	S1 04.031 W80 52.877	13m	SW	12:26pm	12:39pm	Group	3	moving/feeding/	guaba	5 + dog	Maw, V	near JH and entrance/road
08.07.2018	S1 03.988 W80 52.877	15 yards	NW-SE	5:28pm	5:40pm	Group	5	moving/resting	tagua palm	1	NR, V	lodge near bedroom window
08.10.2018	S1 03.994 W80 52.880	2m-8m	SW to NE	3:43pm	4:30pm	Group	11	feeding/moving	guarumo, and guaba	1	NR, ML, A, Maw	outside bedroom window moved to lodge porch
Location: Monkey Trail												
07.08.2018	S1 04.244 W80 53.321	38 yards	E to W	9:10am	9:21am	Group	8	moving	Higueron	2	Maw	spotted on trail after lookout point (before stream)
07.24.2018	S1 04.254 W80 53.379	49m-56m	N/A	8:54am	9:05am	Group	5	resting	Higueron	3	NR	N/A
07.24.2018	S1 04.249 W80 53.445	55m	N/A	9:32am	9:46am	Group	15	resting/playing	Higueron	3	NR	foggy, near midway point in stream
Location: La Guajaba Trail												
07.12.2018	S1 04.395 W80 52.427	7-15 yards	E	10.02am	10.30am	Group	20	moving, feeding	higueron, guaba & cana guadua	2	NR, MH, Maw	4 babies
08.01.2018	S1 04.601 W80 52.495	18 yards	W to E	11:46am	11:58am	Group	7	moving/feeding	higueron	2	NR, Maw	near turn off for la bomba trail
Location: La Bomba Trail												
08.01.2018	S1 04.543 W80 52.272	12 yards	N/A	9:42am	9:50am	Group	5	resting	Higueron	2	NR	Sleeping in balls, could be more ie: babies in the ball- not a good visual
Location: El Aromo Trail/El tigrillo												
08.14.2018	S1 04.247 W80 52.052	8m	N/A	9:51am	9:56am	Group	3	resting	Higueron	2	NR	Near Don Simon's crops- thick foliage not good visual

Appendix K: CV

TAMARA BRITTON-MENDIETA

EDUCATION

Ph.D. Student, Sociocultural Anthropology, & Environment and Sustainability January 2019
University of Western Ontario, London, Ontario
Research Interests**:** *Ethnoprimatology, resource-partitioning, community-based conservation, natural resource management, ecotourism, and multi-species ethnography*.
Advisor: Dr. Ian Colquhoun, Dr. Andrew Walsh and Dr. Kim Clark

M.A/MES, Sociocultural Anthropology, & Environment and Sustainability Present
University of Western Ontario, London, Ontario
Dissertation in Progress: *People, Primates and Protected Areas: An Ethnoprimatological study in the Pacoche Marine and Coastal Wildlife Refuge, Manabí Ecuador.*
Advisor: Dr. Ian Colquhoun, and Dr. Kim Clark

M.A., Immigration and Settlement Studies August 2015
Ryerson University, Toronto, Ontario
Dissertation: "*Social Constructions of childhood and migration: What does it mean for child participation in NGO programming in Guatemala?"*
Advisor: Dr. Tara Collins

B.A (Hons.) Anthropology and International Development Studies April 2014
Trent University, Peterborough, Ontario
Honours Thesis: *"The Impossibilities of Integration: Colombian Refugees and Asylum Seekers in Ecuador."*
Advisor: Dr. Christiaan Beyers
Award: Dean's Honour Roll 2014

Trent in Ecuador, International Development Studies Year Abroad Program April 2012
Universidad Andina Simón Bolívar, Quito, Ecuador
Field Research Project: "*Ecotourism in Animal Rehabilitation Centers: A Sustainable Practice?"*
Advisor: Dr. Julie Williams

GRANTS AND AWARDS

- CAPA Student Travel Assistance Grant November 2018
- Regna Darnell Graduate Award for Fieldwork in Sociocultural Anthropology May 2018
- Graduate Student Research Award April 2018
- Environment and Sustainability Travel Award April 2018
- WGRS Western Graduate Research Scholarship September 2017- August 2019
- Ryerson Graduate Fellowship September 2014 - August 2015
- Ryerson International Work Experience Fund April - August 2015

PUBLICATIONS

Nichols, B., Umana, K., **Britton, T., L.,** Farias, L., Lavalley, R., Hall-Clifford R. (2017). Transnational Information Politics and the Child Migration "Crisis": Guatemalan NGOs respond to Youth Migration. *Voluntas*, 28:1967-1987. DOI 10.107/s11266-017-9890-9.

CONFERENCE PRESENTATIONS AND WORKSHOPS

Poster Presentation, Canadian Association for Physical Anthropology November 2018
The 46th Annual Meeting, London Ontario
"Local Perceptions of Primates and Protected Areas: An Ethnoprimatological Study."

Conservation and Risk, Provincial Government of Manabí Agenda for Sustainable Development July 2018
Universidad Técnica de Manabí, Portoviejo, Manabí, Ecuador

Ecuador Sustainable Development Goals Initiative June 2018
Grupo Faro and Fundación Futuro Latinoamericano, Portoviejo, Manabí, Ecuador

Primate Conservation, Ecuadorian Ministry of the Environment June 2018
Universidad San Gregorio de Portoviejo, Portoviejo Manabí, Ecuador
"Shared Spaces and Local Perceptions in the Pacoche Reserve"

Towards a Boundless Anthropology, Western Anthropology 6th Annual Graduate Conference March 2018
Department of Anthropology, University of Western Ontario
"Boundless Anthropology in the Classroom?"

Exploring Migration Roots and Routes, Community Movements Conference February 2016
Student Association for International Development, Trent University
"Constructions of Childhood and Migration: US Media and Guatemalan NGO Perspectives".

NGO-graphies, Second Biannual NGO and Non-Profits Conference November 2015
Association for Political and Legal Anthropology, Metropolitan State University
"Transnational Information Politics, Power, and the Child Migration "Crisis": Guatemalan NGO Perspectives on Causes of Child Migration".

RESEARCH EXPERIENCE

***Researcher,* MA Fieldwork in Ethnoprimatology** June - August 2018
University of Western Ontario, *London Ontario*

- Conducted ethnographic research using participatory methodologies with agricultural workers in the Pacoche Marine and Coastal Wildlife Refuge, Manabí Ecuador.
- Collected GIS data and primate surveys of resource use for *C. aequatoralis* and *A. palliata.*
- Worked with park staff and tour guides to understand protected area policy and ecotourism industry.

***Researcher,* Youth Program Evaluation, Cross Cultural Learning Center (CCLC)** January- April 2018
Sociocultural Research Methods, University of Western Ontario, *London, Ontario*

- Invited to utilize qualitative and quantitative research techniques as a team to evaluate the participation, gender distribution and overall satisfaction/ideas improvement for youth targeted arts and recreation programs through the CCLC.

Program Manager October - February 2016
Horizons of Friendship, *Cobourg, Ontario*

- Conducted in-depth research in thematic areas such as maternal health, migration and gender-based violence in Central America in order to seek synergies and develop new consortia initiatives.
- Prepared country and partner profiles, project descriptions, reports and proposals on active community development initiatives in Costa Rica, Guatemala, Nicaragua, El Salvador and Mexico.

***Research Assistant,* International Child Protection** April - July 2016
Ryerson University, and CEDIC (Centre for Development and Constructive Interaction), *Toronto, Ontario*
Advisor: Dr. Henry Parada

- Created a review of literature on violence against adolescents in Latin America, with a focus on the education system.
- Conducted extensive research on themes such as bullying, sexual abuse, community violence and international child protection to produce a collaborative report.
- Translated report from Spanish to English, edited qualitative and quantitative sections, and assisted in the creation of a baseline for violence as experienced by adolescents across the Dominican Republic.

***Research Assistant,* International Child Protection** February 2015 - July 2016
Ryerson University, and CIANI (Center for the Comprehensive Care of Children), *Toronto, Ontario*
Advisor: Dr. Henry Parada

- Created a review of literature relevant to child abuse and early childhood education programs in Latin America.
- Analyzed themes found in qualitative and quantitate data, and translated report from English to Spanish.
- Research support is acknowledged in the publication: Parada, H., Silver, S., & Burke, M. (2016). Evaluation of Centres for the Integral Attention of Children in Dominican Republic (CIANIs) and Local Community Organizations for Child Protection (LCOCP). Santo Domingo: Buho Editorial.

***Researcher*, Child Migration Team** June 2015
National Association for the Practice of Anthropology (NAPA-OT) Field School, *Antigua, Guatemala*
Advisor: Dr. Rachel Hall-Clifford

- Worked as a team to collect qualitative data on root causes of child migration through structured observations and semi-structured open-ended interviews with local and transnational NGO staff, scholars, lawyers, and activists.
- Enhanced research skills from a medical anthropological and social justice perspective, as well as knowledge on occupational therapy and the Guatemalan health care system.
- Created partnerships with local and international NGOs, in addition to academics from the United States, and enriched own understanding of the diverse cultural mosaic, and political-economic history of Guatemala.
- Coded and translated interviews from Spanish to English, and created a formal presentation of results to colleagues.
- Publication: Nichols, B., Umana, K., **Britton, T., L**., Farias, L., Lavalley, R., Hall-Clifford R. (2017). Transnational Information Politics and the Child Migration "Crisis": Guatemalan NGOs respond to Youth Migration. *Voluntas*, 28:1967-1987. DOI 10.107/s11266-017-9890-9.

***Research Assistant*, Child Participation in International Child Protection Initiatives** January - March 2015
Ryerson University, School of Child and Youth Care, *Toronto, Ontario*
Advisor: Dr. Tara Collins

- Conducted research as a team on human rights, including child rights, international child protection and child/youth participation.
- Analyzed literature on international child protection initiatives, as well as synthesized information to create a collaborative literature review.
- Research support is acknowledged in the publication: Collins, T., M. (2016). A Child's Rights to Participate: Implications for international child protection. *International Journal of Human Rights*, http://dx.doi.org/10.1080/13642987.2016.1248122.

***Researcher,* Ecotourism, Primate Behaviour** February - April 2012
YanaCocha, Centro de Rescate (Rescue Center), *Puyo, Pastaza, Ecuador*

- Conducted own qualitative research, including interviews and surveys on tourism and behaviour of captive primates including: (*Saguinus fuscicollis, Saguinus graellsi, Callithrix pygmaea, Callicebus cupreus, Saimiri sciureus, Cebus albirons, Cebus apella, Lagothrix lagotricha, Lagothrix poeppigii,* and *Ateles belezbuth*) through participant observation.

***Researcher,* Conservation Education and Primate Behaviour** November - February 2012
Sumak Allpa, Centro de Interpretación Ambiental y Manejo de Biodiversidad, *Coca, Orellana, Ecuador*

- Conducted own research including: primate observations of *Lagothrix lagotricha* reintroduced to their natural habitat, as well as interviews and surveys with tourists and staff regarding sustainable community development through eco-tourism and its impact on animal behaviour.
- Lived in an isolated Amazonian environment in order to compare both captive (YanaCocha) and wild (Sumak Allpa) primate-centered ecotourism projects for undergraduate thesis research.

TEACHING EXPERIENCE

Teaching Assistant, Primate Behaviour 2265F (online course) Present
University of Western Ontario**,** *London Ontario*

- Assisted with course design through the conversion of a lecture-style class into an online format.
- Created weekly online "test your knowledge" quizzes, and regularly uploaded video content.
- Provided assistance to students regarding course content and expectations through weekly office hours and email support.
- Marked cumulative assignments and exams, and monitored online forum.

Teaching/Research Assistant, Anthropology of Zoos (online course) January- April 2018
University of Western Ontario**,** *London Ontario*

- Assisting Anthropology faculty with the creation and preparation of a new online course.
- In charge of research for new online university course policy and the creation of curriculum, including learning outcomes, active learning activities, and coursework assessment matrix.
- Participated in online course teaching module through the teaching skills center at Western.

SPARK Conference, Gifted Itinerant Program November 2017
University of Western, Ontario, *London Ontario*

- Collaboratively designed two workshops entitled, "Anthropology in Action: Shattering Stereotypes of the Human Experience" on cultural anthropology to groups of twenty gifted level high-school students in order to teach ethnographic research methods and how these skills relate to potential job prospects in the future.
- Organized conference itinerary of activities, workshops, welcome and closing session, including the preparation of a PowerPoint display, video clips and background music, as well as a series of active learning exercises.

Teaching Assistant, ANTH 1025F: Sociocultural Anthropology September – December 2017
University of Western Ontario, *London, Ontario*
Professor: Dr. Doug Campbell

- Assisted course instructor with class organization, discipline and description of course material.
- Lead class discussions on weekly thematic topics introducing the study of sociocultural anthropology.
- Provided assistance to students regarding course content and expectations through weekly office hours and email support.
- Marked cumulative assignments and exams.

Community Outreach and Program Logistics, Intern June - August 2014
AIDS Committee of Durham Region, *Oshawa, Ontario*

- Delivered and produced curriculum (in English and Spanish) for workshops on themes such health and safety and labour rights as part of a community outreach strategy within the migrant farm worker community in Durham Region.

Assistant to the Director September 2012 - November 2013
Trent University, Trent in Ecuador Program, *Peterborough, Ontario and Quito, Ecuador*

- Produced and delivered presentations to undergraduate classes on Trent in Ecuador program as part of a recruitment strategy.
- Led two informational workshops on Trent in Ecuador program for interested students.
- Co-ordinated annual two day Ecuador orientation session and led workshops on health and safety while abroad, culture shock, ethics while abroad, field placements, and "daily life abroad" themes to incoming students.

Tour Guide/Volunteer Assistant Co-ordinator, Ecotourism, Primate Behaviour February - April 2012
YanaCocha, Centro de Rescate (Rescue Center), *Puyo, Pastaza, Ecuador*

- Lead educational tours in English and Spanish to teach tourists about the effects of the exotic pet trade.
- Delivered training workshops for new volunteers.

Tour Guide/Educator, Conservation Education and Primate Behaviour November - February 2012
Sumak Allpa, Centro de Interpretación Ambiental y Manejo de Biodiversidad, *Coca, Orellana, Ecuador*

- Taught and organized curriculum for environmental conservation classes for local children.
- Led bilingual tour groups on educational themes regarding rainforest biodiversity and the illegal pet trade.

VOLUNTEER

Greenearth Ecuador October 2016 -present
Pacoche Coastal and Marine Wildlife Refuge, *Manta Ecuador*

The Canadian Association for Physical Anthropology (CAPA), *46th Annual Meeting* November 2018
Delta Armories Hotel, *London Ontario*

Jane Goodall Institute of Canada, "An Evening with Jane" September 2018
Centennial Hall, *London Ontario*

EnviroCon, Community Engagement Student Conference March 2018
Environment and Sustainability, University of Western Ontario, *London Ontario*

Western Anthropology 6th Annual Graduate Conference, Towards a Boundless Anthropology March 2018
Department of Anthropology, University of Western Ontario, *London Ontario*

LANGUAGES

Spanish, *Advanced level reading, writing and conversation*